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SUPPORT FOR LETHAL WILDLIFE MANAGEMENT IN MICHIGAN: RESULTS FROM THE 1999 AND 2000 RESOURCE ATTITUDES IN MICHIGAN SURVEYS

By

Melissa Hodges Koval

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ABSTRACT

SUPPORT FOR LETHAL WILDLIFE MANAGEMENT IN MICHIGAN:
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In the past, wildlife management largely focused on game species management for the benefit of consumptive recreationists. However, managers have noted a growing interest in wildlife among non-traditional audiences. Wildlife agencies across the United States have begun to incorporate human dimensions information into their management policies in an effort to respond to the desires of an increasingly diverse constituency. This paper presents two studies utilizing results from the annual "Resource Attitudes in Michigan" (RAM) Survey to assess support for lethal wildlife management. In Study 1, data from the 1999 RAM Survey were used to measure support for lethal wildlife management among wildlife agency personnel and the Michigan public. Wildlife agency personnel were generally more supportive of lethal wildlife management than were members of the public; majorities of both groups found lethal management acceptable in all of the situations that were considered. In Study 2, data from the 2000 RAM Survey were used to assess gender differences in acceptance of lethal wildlife management in eight situations. Men were more supportive of lethal wildlife management than were women in most of the situations, and scored higher than did women on a scale measuring overall support for lethal wildlife management. In both studies, respondents were particularly supportive of using lethal management to control wildlife diseases.

For my husband, Volga, who was willing to give up the ocean for me.

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Chapter I

INTRODUCTION

Human Dimensions of Wildlife Management

Wildlife agencies, as public entities, are charged with the task of managing wildlife in the interest of the public. In the past, wildlife management decisions were typically based on the desires of a limited constituency of consumptive resource users seeking larger populations of game species. However, over the last several decades, wildlife managers have recognized a growing interest in wildlife among non-traditional audiences, such as non-consumptive wildlife recreationists (e.g., wildlife viewers, bird watchers) (Lyons 1987). In addition, there seems to be an increasing expectation among members of the public that they should be allowed to participate in government decision-making (Lyons 1987; Decker 1994; Decker *et al.* 1996). These factors, combined with an increase in the frequency of controversies over wildlife management policies in recent years, have been at least partially responsible for the development of the specialized field of human dimensions of wildlife management (Decker 1994).

Clay and Schmidt (1998) noted that public acceptance of wildlife management programs and activities often hinges on the study and application of human dimensions information to management situations. Human dimensions research has been used for such purposes as identifying and understanding an increasingly diverse set of stakeholders, obtaining stakeholder input for management decision making, improving acceptance of management decisions, and evaluating outcomes of management actions (Decker and Enck 1996; Decker *et al.* 1996). It is hoped that gathering and applying

human dimensions information will enrich relationships between the management agency and members of the public, open communication lines, and thereby create trust among members of the public in the agency's ability to manage the resource.

Statement of the Problem

At a time when both human and wildlife populations are growing and human/wildlife conflicts are increasing across the United States, the need for human dimensions research has never been more evident. Wildlife managers are repeatedly being faced with public concerns about wild animals as humans and wildlife increasingly occupy the same landscapes. To deal with these concerns, wildlife managers must often focus on wildlife population management as the key to resolving human/wildlife conflicts. Managing wildlife populations can involve both lethal and non-lethal management. The term "lethal wildlife management," as it applies herein, encompasses two main goals: 1) to control the risks wildlife pose for people, animals, and the environment, and 2) to provide opportunities for consumptive wildlife recreation (e.g., hunting, trapping). These two goals are closely linked in that consumptive wildlife recreation is not only a goal of management in itself, but it is also often utilized to obtain the first goal of protecting people, animals, and the environment from wildlife-related risks. Lethal wildlife management may be used for such purposes as ensuring public safety, controlling wildlife diseases or damage, preserving ecological health, ensuring species survival, managing wildlife population levels, or providing opportunities for hunters to obtain food or trophies. While Americans generally find non-lethal management acceptable, lethal wildlife management tends to be somewhat controversial

(Lauber *et al.* 2001), and has often sparked intense public debate.

Animal protection groups (i.e., animal rights and welfare groups) as well as anti-hunting/trapping groups have been responsible for bringing much public attention to the issue of lethal wildlife management through protests (Tilt and Spotila 1991; Jasper and Nelkin 1992), media campaigns, and legislative processes (Gentile 1987; Minnis 1998). For example, anti-hunting protests were used in Maryland to interfere with the opening of the deer hunting season (Hill 1991). Legislation has been introduced in many U.S. states – and passed in some – to ban wildlife trapping or particular trapping methods (Gentile 1987; Minnis 1998). In another well-known case, animal protection proponents used the media to draw public attention to fur hunting of harp seals (*Phoca greonlandica*) beginning in the mid 1960's. As a result, the import of baby seal pelts was banned in Europe and the traditional lethal harvest techniques were scrutinized and limited (Tilt and Spotila 1991). The vast media attention surrounding the issue irreparably damaged the seal pelt market, changing the entire industry. As these cases illustrate, animal rights, animal welfare, and anti-hunting/trapping groups have been successful in limiting the use of wildlife for consumptive recreation and economic gain. These cases and others like them caused Decker and Brown (1987: 59) to note: "The animal rights movement is particularly disconcerting for most wildlife professionals because it opposes not only the activities that management makes possible (e.g., hunting and trapping) but also the underlying assumptions and precepts upon which the profession has been based."

In order to avoid – or at least minimize the potential for – negative public reaction to management actions, managers must first be aware of public perceptions and concerns about lethal wildlife management. Past studies have found that a majority of the public

prefers non-lethal means of controlling problem species (Schmidt *et al.* 1997; Reiter *et al.* 1996). Still, lethal wildlife management may be acceptable to the public if they feel that the situation warrants its use (Schmidt *et al.* 1997). Members of the public have generally been the most supportive of lethal wildlife management when public safety is threatened by wild animals, such as in cases of wildlife diseases or high incidence of wildlife/car accidents (Kilpatrick and Walter 1997; Schmidt *et al.* 1997; Reiter *et al.* 1999). Public concern about property damage by wildlife has also led to increased support for lethal wildlife management (Schmidt *et al.* 1997; Wittmann *et al.* 1998; Manfredo *et al.* 1999). Further research is needed to assess public support for the use of lethal wildlife management in other situations, and how support varies among different sectors of the public. Wildlife managers must understand and respond to the concerns of their constituents regarding lethal wildlife management if they wish to minimize conflicts and ensure continued leadership in determining management actions.

Goal of the Research

The goal of this research was to utilize data from the "Resource Attitudes in Michigan" (RAM) surveys to assess support for lethal wildlife management in Michigan. The RAM surveys are recurring, statewide human dimensions surveys designed to assess trends in public opinion toward general wildlife management issues as well as attitudes toward specific emerging wildlife issues. The first RAM survey was implemented to members of the Michigan public in 1999, and annual surveys followed thereafter. The 1999 survey was intended to create a baseline of data to which results from future public RAM surveys could be compared. In order to also develop a baseline of responses from

natural resource managers, the 1999 survey was administered to a selection of Michigan Department of Natural Resources personnel. This thesis presents two studies utilizing data from the 1999 and 2000 RAM surveys to assess support for lethal wildlife management in Michigan.

Study 1

Researchers have shown that management agency personnel and members of the public often differ greatly in their perceptions of particular management actions (Peyton and Langenau 1985; Leuschner *et al.* 1989; Vining and Ebreo 1991; Messmer *et al.* 1997; Lauber and Knuth 2000). Further, wildlife managers have not always been very accurate in gauging public opinion and responses to management decisions, even for those stakeholder groups with which they are the most familiar (Hendee and Harris 1970; Saltiel and Irby 1998). This situation has created a need for human dimensions research to explore management situations in which public and personnel opinions may diverge. Failing to recognize and respond to the spectrum of attitudes public stakeholders hold toward management actions, such as lethal wildlife management, could lead to controversy and possibly political action that could limit the power of the agency to manage wildlife.

Study 1 utilizes data from the 1999 RAM survey to assess public and wildlife agency personnel attitudes toward lethal wildlife management in Michigan. The objectives of the study were to:

1. Determine whether wildlife agency personnel and members of the public differed in terms of their support for lethal wildlife management in 7 lethal

management situations.

2. Assess differences between the public and wildlife personnel in overall support for lethal wildlife management, as measured by a Lethal Wildlife Management (LWM) Scale.
3. Identify any differences in support for lethal wildlife management among different subgroups (e.g., demographic subgroups) of respondents within each group (wildlife personnel and public).

Study 2

In general, studies have found that women are not as supportive of lethal wildlife management as are men; they tend to prefer non-lethal methods to control wildlife populations (Sanborn and Schmidt 1995; Lauber and Knuth 2000). Women are also more likely than are men to support the anti-hunting (Gray 1993) and animal rights movements (Sperling 1988; Herzog *et al.* 1991; Richards and Krannich 1991; Jasper and Nelkin 1992; Eldridge and Gluck 1996; Minnis 1998; Kruse 1999), both of which are opposed to most lethal wildlife management actions. Animal rights activists and anti-hunting/trapping groups have been successful in lobbying for legislation to limit the use of particular lethal management techniques, and continue to challenge the way in which wildlife agencies manage wildlife (Minnis 1998). Gender differences in attitudes toward animals and their management can, therefore, have profound implications for wildlife managers who are responsible for managing wildlife resources on behalf of the public.

In the second study, data from the 2000 RAM Survey were utilized to assess gender differences in acceptance of lethal wildlife management in Michigan. The 2000

RAM survey was used because it had two advantages over the 1999 RAM for the purposes of this study. First, the original sample for the 2000 RAM was divided equally by gender, whereas the original sample for the 1999 RAM was male-biased due to sample source. Second, the 2000 RAM included an additional lethal management item related to trophy hunting that we believed was important for identifying gender differences in support for lethal wildlife management. Thus, the objectives of Study 2 were to:

1. Determine whether gender differences existed in terms of support for lethal wildlife management in 8 management situations.
2. Assess differences between men and women in overall support for lethal wildlife management, as measured by a Lethal Wildlife Management (LWM) Scale.

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Chapter II

STUDY 1: MICHIGAN PUBLIC AND WILDLIFE AGENCY PERSONNEL ATTITUDES TOWARD LETHAL WILDLIFE MANAGEMENT

Abstract

In recent years, natural resource agencies have recognized the importance of incorporating public opinion into their management policies to better identify the needs and desires of a broad public constituency. In the spring of 1999, a mail survey was designed to assess attitudes toward a broad array of natural resources issues. Surveys were sent to Michigan residents (56% response), as well as to all employees in the Michigan Department of Natural Resources Wildlife Division (76% response) in order to compare public and personnel responses. The portion of the survey discussed here was designed to assess support for lethal wildlife management in Michigan. Seven situations were identified in which lethal wildlife management can be used: to control wildlife diseases, ensure species survival, preserve the ecological health of an area, control wildlife damage, ensure public safety, manage population levels of wild animals, and provide opportunities to gather food. Wildlife agency personnel were more supportive of lethal wildlife management in all the situations than were members of the public; however, majorities of the public were supportive of each lethal management situation as well. Areas of largest disagreement between agency personnel and the public were the use of lethal management for obtaining food and controlling wildlife damage. Among the public, men and those who were more supportive of consumptive recreation were more likely to find lethal wildlife management acceptable, even while controlling for the

effect of other relevant factors. Agency personnel who were more supportive of consumptive recreation were also more accepting of lethal wildlife management, as were older employees and those in management positions. The general public support for lethal management seen in this study suggests that it may be possible for managers to implement lethal wildlife management in Michigan with few conflicts. However, since public support for the use of lethal wildlife management varies by management situation, managers will need to continue to consider public attitudes in specific lethal management situations.

Key Words

Agency, attitudes, lethal control, managers, Michigan, opinion, public, wildlife

Introduction

Over the last several decades, public resource agencies have recognized a growing interest in citizen participation in natural resource decision-making (Decker *et al.* 1987; Decker and Enck 1996). In the past, wildlife management decisions were typically based on the desires of a limited constituency of consumptive resource users asking for larger game species populations. However, increasing interest in non-game wildlife among members of the public has led natural resource managers to realize the need for understanding and considering the interests of a broadening public constituency. Wildlife managers have not always been very accurate in gauging public opinion and response to management decisions, even for those stakeholder groups with which they are most familiar (Hendee and Harris 1970; Saltiel and Irby 1998). Interaction with members of

the public is often limited to contact with an "outspoken few," leading to bias in understanding attitudes of the public in general (Hendee and Harris 1970). To resolve this problem, agencies have begun to incorporate human dimensions research into the development of management plans, allowing managers to better understand the interests of their constituents. This knowledge is essential in assessing public reaction to management decisions (Brown and Decker 1982) and identifying potential sources of controversy before they develop into full-blown conflict. Additionally, the study and application of human dimensions information may increase public acceptance of wildlife management programs and activities (Clay and Schmidt 1998). When stakeholders feel that they have a voice in the development and implementation of a management policy, they are likely to be more supportive of the policy, reducing the potential for conflicts (Bjerke *et al.* 2000). Including the public in decision-making may also prevent citizens from feeling alienated with regard to decisions being made about "their" wildlife. When people feel powerless they may begin to seek alternatives to agency management of resources, possibly through democratic means such as ballot initiatives and popular referenda. These processes have been used successfully by citizens in several states to establish a system in which members of the public have a direct vote on how resources will be managed, thereby limiting the power of wildlife managers to institute particular wildlife management policies (Minnis 1998). By incorporating public opinion into management plans, managers may decrease the likelihood of this happening.

Managers can also use human dimensions information to identify situations in which public and personnel opinions diverge. Members of the public and agency personnel often differ greatly in their perceptions of particular management actions

(Peyton and Langenau 1985; Leuschner *et al.* 1989; Vining and Ebreo 1991; Messmer *et al.* 1997; Lauber and Knuth 2000). Although managers ultimately institute wildlife policies, identifying and reconciling disparities between public and agency personnel beliefs about wildlife management is essential to smooth policy implementation. Relying solely on managers to determine wildlife policies in the public interest is likely to lead to disputes if managers do not accurately gauge public desires pertaining to wildlife. Further, Muth *et al.* (1998) found that even among wildlife managers, there is some disagreement about the appropriateness of various wildlife management policies. Identifying and reconciling these areas of disagreement within the agency will allow wildlife agencies to develop a single, shared vision of wildlife management, a vision which, according to Muth *et al.* (1998), will be essential in leading the direction of wildlife management in the future.

In much of the United States, human/wildlife conflicts (e.g., property damage, public safety risks) and other wildlife-related problems (e.g., spread of wildlife diseases, deterioration of ecological health) have become more common in recent years, leading managers to put new emphasis on research to understand public opinions about possible management solutions. The rise in wildlife problems has been attributed to several factors, including management practices favoring increases in certain species (generally for consumptive recreation), growing human populations, and urban expansion into areas that were formerly wildlife habitat. Not surprisingly, wildlife managers have often focused on controlling wildlife populations as a way to decrease these problems. Wildlife population control has utilized both lethal and non-lethal methods. In general, researchers have found that a majority of the public prefers non-lethal means of

controlling problem species, such as birth control or removal of animals to another area (e.g., Schmidt *et al.* 1997; Reiter *et al.* 1999). However, several studies have indicated that lethal methods of control may be acceptable to the public if they feel that the situation warrants their use (Loker *et al.* 1999; Schmidt *et al.* 1997). Our focus here is on identifying those situations in which members of the public and wildlife agency personnel find lethal wildlife management warranted. With this in mind, we assessed several situations in which lethal management might be used: ensuring public safety, controlling wildlife damage and wildlife diseases, preserving ecological health, ensuring species survival, managing wildlife population sizes, and allowing people to obtain food.

Several studies have found support for lethal wildlife management among members of the public when people are faced directly with wildlife problems. For example, members of the public have been shown to be very supportive of destroying mountain lions that have injured or killed a person (Manfredo *et al.* 1998; Wittmann *et al.* 1998). Not surprisingly, public safety consistently emerges as one of the most important issues determining the need for lethal management (Kilpatrick and Walter 1997; Schmidt *et al.* 1997; Reiter *et al.* 1999). Like public safety, concern about wildlife damage tends to rank among the most important determinants of public support for lethal wildlife management. Members of the public have been found to be supportive of lethal management in order to protect agricultural crops (Schmidt *et al.* 1997), livestock (Manfredo *et al.* 1999), and pets (Wittmann *et al.* 1998) from wildlife depredation.

Wildlife diseases may also threaten livestock, pets and people, as well as various wildlife species. Public concern about diseases that can spread from wildlife to humans (e.g., Lyme disease, rabies) has been growing as people and wildlife increasingly occupy

the same areas. Members of the public have been found to be supportive of lethal management to control wildlife diseases in beaver and coyote (Wittmann *et al.* 1998), and white-tailed deer (Kilpatrick and Walter 1997). In Colorado, residents found trapping acceptable to control wildlife diseases, even though they were not very supportive of trapping in general (Manfredo *et al.* 1999). The potential for wildlife diseases to spread to other species seems to be an important factor in public acceptance of lethal wildlife management.

Few studies have explored public acceptance of lethal wildlife management to ensure wildlife species survival or to protect ecological health. However, growing wildlife populations have caused changes in habitat and species diversity in the United States. White-tailed deer (*Odocoileus virginianus*), which are considered overabundant throughout much of the United States, present a revealing example of this situation. Deer have been implicated in changing the composition of eastern deciduous forests through browsing to the extent that the diversity of bird species has decreased (McShea and Rappole 1997). Evergreen forests have been impacted as well. According to Alverson and Waller (1997), deer browse has caused the rate of hemlock forest regeneration in the Great Lakes Region to decline. A number of studies have corroborated the drop in floral and faunal diversity as a result of deer browse (see Christoffel and Craven 2000). As these examples illustrate, one flourishing species can be detrimental to the wellbeing of other wildlife species or even entire ecosystems. In such cases, managers may turn to lethal methods in order to protect wildlife species and ecosystems.

Because many of the problems mentioned above (e.g., wildlife damage, ecosystem health) tend to increase in severity as wildlife population sizes increase,

managers often focus on controlling populations as a way to limit a variety of negative wildlife impacts. Lethal methods may also be used to maintain or manage population levels of species that are not overabundant or problematic, but have the potential to become so. Several recent studies conducted in the U.S. have found majority public support for lethal management (specifically, the use of regulated hunting) to control overabundant wildlife populations (Duda *et al.* 1998).

One other aspect of lethal wildlife management that is important to consider is public acceptance of hunting or trapping wildlife for food. Wildlife managers often use hunting or trapping to achieve lethal management goals like wildlife population reduction or damage control. Tracking public acceptance of consumptive recreation is important for that reason, as managers' options may be limited if people reject the use of consumptive recreation in management. On the other hand, it is also important to assess acceptance of consumptive recreation to obtain food as a reason for lethal management in itself because large public constituencies desire access to wildlife resources for this purpose. Overall, members of the public seem to be fairly supportive of hunting, though public approval for hunting has been shown to vary with hunter motivation (Duda *et al.* 1998). In a study in Maryland, residents were most accepting of hunting for meat among several possible hunter motivations (Duda *et al.* 1998). Trapping for food has also been found to be acceptable, despite the fact that trapping in general is not widely supported (Responsive Management 2001). However, public support for hunting and trapping for food should not be assumed, as is evidenced by the recent trend toward citizen-initiated ballot initiatives to limit hunting and trapping in several states noted by Minnis (1998). This trend emphasizes the importance of monitoring public perceptions about

consumptive recreation and incorporating such information into wildlife management.

Study Purpose

The purpose of this study was to assess public and wildlife agency personnel attitudes toward a variety of situations in which managers might choose to use lethal wildlife management. We expected that wildlife personnel would be more supportive of lethal wildlife management in each of the seven situations assessed (i.e., ensure public safety, control wildlife damage, control wildlife diseases, ensure species survival, preserve ecological health, manage population levels, and gather food) than would members of the public. Among both groups, we expected to see the greatest support for lethal management to protect public safety, control wildlife damage, and control wildlife diseases. We also believed that preserving ecological health and ensuring species survival were also likely to be of high concern, particularly for wildlife personnel. We suspected that public support for using lethal management to obtain food would be lowest among all the management situations.

Within each of the groups (public and personnel), we believed that support for lethal management would likely vary considerably among different subgroups of respondents. We assessed several variables as possible precursors to support for lethal wildlife management, including gender, age, education level, household income level, area of childhood residence, property ownership, frequency of hunting and fishing, experience with wildlife problems, attitude toward consumptive recreation, and, for personnel only, management position. Based on substantive reasoning and findings of similar studies (discussed below), we expected that men, older people, those with lower

levels of education and income, those growing up in more rural areas, property owners, more frequent hunters and anglers, those who have experienced wildlife problems, and those who are more supportive of consumptive recreation would be more supportive of lethal wildlife management on the whole. In addition, we believed that agency personnel in management positions would be more supportive of lethal management than would those in non-management positions.

Methods

A mail survey was developed to assess attitudes toward a wide variety of natural resource and wildlife issues in the state of Michigan. Members of the Michigan public and employees of the Michigan Department of Natural Resources (MDNR) Wildlife Division were contacted in order to evaluate public and agency opinions on these issues in general, and attitudes toward lethal wildlife management in particular.

Public Survey

In February 1999, the survey was mailed to a representative sample of 2000 Michigan residents (see Mertig and Koval 1999). Names and addresses were purchased from Survey Sampling, Inc. (Fairfield, CT), a survey sampling company specializing in drawing representative samples from public telephone listings. Following the recommendations set forth by Dillman (1978), a series of survey mailings was used to encourage response to the survey. As an incentive to complete the survey, respondents were entered into a prize drawing for one of several gift cards to a national discount store. The survey received a final response rate of 56% (n=952, sampling error +/- 2%) after

deletion of bad addresses and those ineligible to respond. Because the response rate was considered rather low, a brief follow-up survey was sent to the non-respondents, but revealed no important differences between the original respondents and the non-respondents who chose to respond to the follow-up survey.

Wildlife Agency Survey

In May 1999, all 186 employees in the MDNR Wildlife Division were sent a survey identical to that sent to the public. To increase response and to ease fears of individual identification, agency surveys were coded only by broad job classification to ensure that individual respondents would be completely unknown to the researchers. Using broad codes precluded multiple individualized mailings; however, the agency survey still received a healthy 76% response rate (n=142).

Variable Measurement

We identified several real-life situations in which the use of lethal wildlife management might be warranted. Seven items measured support for lethal management in particular situations, while one additional item determined a respondent's acceptance of killing individual animals under any circumstance. The seven situational items read as follows:

As long as it is properly controlled, is it acceptable to kill individual wild animals in order to...

a. *...control wildlife diseases*

b. *...ensure species survival*

c. *...preserve the ecological health of an area*

d. *...control wildlife damage*

e. *...ensure public safety*

f. *...manage population levels of wild animals*

g. *...provide opportunities to gather food*

Respondents were also asked to assess an eighth item, a statement on acceptability of killing under any circumstance:

*It is **never** acceptable to kill individual wild animals.*

For each of the eight items, respondents were asked to choose one of three possible response categories: yes, no, or unsure. For bivariate analyses, the items were coded ordinally with higher numbers reflecting support for lethal management in each situation. A scale assessing degree of support for lethal management was also constructed on the basis of the eight items. Respondents must have answered at least one of the eight items in order to receive a score on the scale. Respondents received a score by summing the number of situations (from the seven situational items) in which they felt that lethal management was acceptable (i.e., a "yes" response to the question). If an individual felt that it was not acceptable to kill an individual animal under any circumstance, they were given a score of zero on the scale. The Lethal Wildlife Management (LWM) Scale, therefore, ranged from 0 to 7, with a higher scale score

reflecting more support for lethal wildlife management overall.

Several independent or explanatory variables were used in this analysis: gender, age, education, income, childhood residence, property ownership, frequency of participation in hunting and fishing, previous experience with wildlife problems, support for consumptive recreation, and, for agency personnel only, management position. Table II-1 presents the measurement and coding for each of these variables.

Analysis of the Data

Data were analyzed using SPSS 10.0.7 for Windows software for social statistics (2000). First we present basic descriptive statistics for the explanatory and dependent variables by sample, noting any statistically significant differences between the two samples. Comparisons between sample means were assessed using ANOVAs, and differences between proportions were examined using Pearson's chi-squared tests. We next present an analysis of the overall LWM Scale. Principal Components Analysis and Cronbach's alpha were used to assess scale dimensionality and reliability, respectively. Both simple and multiple linear regression analyses were utilized to evaluate the effect of the explanatory variables on the LWM Scale. According to Tabachnick and Fidell (2001), it is important to evaluate both simple and multiple regression results in order to get a complete understanding of the effect of an independent variable in the regression. The results of the simple regression show the total relationship of the independent variable with the dependent variable, while multiple regression elucidates the unique relationship of the independent variable with the dependent variable, compensating for any redundancy between the effects of the independent variables. In interpreting linear

Table II-1. Measurement of the independent variables used to explain support for lethal wildlife management among members of the public and wildlife agency personnel in Michigan.

Variable	Coding
Gender [a]	0 Female 1 Male
Age [b]	Age is continuous
Education [c]	1 Less than high school graduate 2 High school graduate or GED 3 Vocational or Trade School 4 Associate's Degree (2 year degree) 5 Some College 6 College Graduate (Bachelor's or 4 year degree) 7 Graduate or Professional Degree
Income [d]	1 Less than $20,000 2 $20,000 to $39,999 3 $40,000 to $59,999 4 $60,000 to $74,999 5 $75,000 or more
Childhood residence [e]	1 Rural, Farm 2 Rural, Non-Farm (2,500 people or fewer) 3 Small Town (From 2,501 up to 25,000 people) 4 Urban Area (From 25,001 up to 100,000 people) 5 Metropolitan Area (More than 100,000 people)
Property ownership [f]	0 No 1 Yes
Hunting frequency [g]	1 Never 2 Rarely 3 Sometimes 4 Frequently
Fishing frequency [h]	1 Never 2 Rarely 3 Sometimes 4 Frequently
Experience with wildlife problems [i]	0 No 1 Yes

Table II-1 (cont'd).

Variable	Coding
Support for consumptive recreation[j]	7 item scale. Each item was coded from 1 to 5, with 1 representing the least support and 5 representing the most support for hunting, trapping or fishing. Respondents were given a scale score only if they had two or fewer missing responses on the set of items. Those with missing values had a middle response (3) assigned for the relevant missing item(s). An overall scale score was then calculated by adding item responses. Range: 7 to 35; Cronbach's Alpha for the public sample = 0.82; unidimensional scale (1 factor explaining 49% of the variance in items).
Management position[k] (agency only)	0 Non-management position 1 Management position

[a] Are you male or female?

[b] In what year were you born? (Age = 1999 - year born.)

[c] What is the highest level of formal education that you have completed?

[d] What was your gross household income (before taxes) in 1998?

[e] In what type of area did you spend all or most of your childhood?

[f] Do you own property in Michigan?

[g, h] About how often, in a typical year, do you engage in each of the following natural resource activities?...Hunting, Fishing

[i] A respondent was considered to have experienced problems with wildlife if he or she responded positively to any of the three following questions: 1) Have you or any members of your immediate family had any problems with white-tailed deer in the state of Michigan within the last 5 years? 2) Have you or any members of your immediate family had any problems with Canada Geese in the state of Michigan within the last 5 years? 3) Have you or members of your immediate family had any problems with other species of wildlife in the state of Michigan in the last 5 years?

[j] For each of the following statements, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree or Strongly Disagree. 1) Hunting is an important part of our national heritage. 2) In general, hunters tend to be very concerned about protecting the environment. 3) In general, hunters are socially responsible individuals. 4) I oppose all forms of recreational hunting. 5) Trappers are concerned about the humane treatment of animals. 6) I feel trapping animals for fur is acceptable when it is properly regulated. 7) I feel fishing is acceptable when it is properly regulated.

[k] Job classifications for agency personnel were divided *a priori*. Those considered in a management position included: biologists and supervisors (37% of the agency respondents fell within this category). Those considered in a non-management position included administrators, secretaries, technicians and laborers.

regression results, a statistically significant positive coefficient indicates that the explanatory variable has a positive effect on the dependent variable (in our case, the LWM Scale) in the population.

Results

Sample Characteristics

Table II-2 presents a comparison of the public and wildlife agency samples based on the explanatory variables used in the study. The samples were similar in terms of gender, although both samples were somewhat male-biased with about 3/4 of each sample being male. For the wildlife agency sample, the gender bias was not unexpected, as it simply reflects the proportions of men and women working for the agency. For the public, however, this bias may result from two main sources: 1) a sample drawn from public telephone listings – men are more likely to be listed than are women, and 2) a greater level of interest in the subject of the survey (natural resources) among men than women.

Public respondents were somewhat older, on average, than were agency personnel – not surprising, given that people retire from the agency as they get older. Also not surprising, agency personnel were more highly educated and earned higher incomes than did members of the public. Sixty-eight percent of agency personnel reported having earned a bachelor's degree or higher, while only 31% of the public reported having done so. However, members of the public in this sample were more highly educated than would be expected based on U.S. Census (2000) results, which report that 20% of

Table II-2. Results of the explanatory or independent variables by sample.

Variable[a]	Statistic	Public	*n*	Wildlife Agency	*n*
Gender	% Male	75	910	72	138
Age *	Mean	52	897	44	135
Education *	% College Degree+	31	909	68	138
Income *	% ≥ $40,000	58	821	77	132
Childhood residence *	% Urban or Metropolitan	41	909	22	139
Property ownership	% Yes	82	908	83	139
Hunting frequency *	% Frequently	22	916	55	142
	% Never	50		18	
Fishing frequency *	% Frequently	25	922	32	142
	% Never	22		11	
Experience with wildlife problems	% Yes	58	952	61	142
Support for consumptive recreation *	Mean	26.5	942	30.8	142

[a] See Table II-1 for variable measurement.

* Statistically significant difference between groups at $P<0.05$

Michigan adults have earned at least a bachelor's degree. Seventy-seven percent of personnel and only 58% of the public reported household incomes of at least $40,000 in 1998. Public household incomes were similar to U.S. Census (2000) results, which reported that 55% of households earned incomes of at least $40,000 in 1999. Members of the public were about twice as likely as agency personnel to have spent all or most of their childhood living in urban or metropolitan areas. Both groups were similar in terms of property ownership, with 82% of the public and 83% of wildlife personnel owning property in Michigan.

In terms of outdoor recreation, agency personnel were very active – they participated in both hunting and fishing more often than did members of the public. Fifty-five percent and 32% of wildlife personnel reported that in a typical year they participated "frequently" in hunting and fishing, respectively, while only 22% and 25% of public respondents did so. According to the most recent estimates of the U.S. Fish and Wildlife Service, 10% of Michigan adults (age 16 or older) engaged in hunting and 14% engaged in recreational fishing in 2001 (U.S. Department of Interior and U.S. Department of Commerce 2002). This survey, therefore, appears to have overestimated the hunting and angling populations in Michigan. This is likely due to a combination of factors. First, respondents were asked to report their participation in hunting and fishing in "a typical year." This would likely lead to a greater proportion of hunters than would be found based on actual participation in hunting or fishing in a single year. Second, since the sample was male-biased and men participate more often in hunting than do women, it follows that the sample would reflect a disproportionate number of hunters. Finally, hunters may have been more likely to respond to the survey due to a greater interest in

natural resource issues than could be the case for many others in the general public. Not surprisingly, given their greater participation in hunting and fishing, wildlife personnel scored higher on a scale measuring support for consumptive recreation (hunting, fishing, and trapping) than did members of the public. Similar majorities of both groups had experienced problems with wildlife in the last five years.

Support for Lethal Wildlife Management

Wildlife agency personnel were more likely than were members of the public to support lethal wildlife management in all of the given situations, though the public was also fairly supportive in all cases as well. Table II-3 presents the lethal wildlife management items by sample. In every case, agency personnel were overwhelmingly supportive of using lethal management. The biggest gaps between the perspectives of the two groups were with regard to providing opportunities to gather food (89% agency and 60% public support), controlling wildlife damage (89% agency and 65% public support), managing wildlife population levels (95% agency and 74% public support), and preserving ecological health (96% agency and 76% public support). Both groups were most supportive of lethal wildlife management to control wildlife diseases, with 99% of personnel and 91% of the public supporting lethal management in this situation.

Agency personnel were particularly opposed to the statement "It is *never* acceptable to kill individual wild animals" – not even one respondent agreed with the statement. Very few members of the public agreed either; however, they were more unsure about this question than were agency personnel.

Table II-3. Michigan public and wildlife agency personnel support for lethal wildlife management in given situations.

Variable [a]	Statistic	Public	Wildlife Agency
Control wildlife diseases [b] *	% Yes	91	99
	% No	3	0
	% Unsure	6	1
	n	937	142
Ensure species survival *	% Yes	80	94
	% No	9	1
	% Unsure	11	4
	n	928	142
Preserve the ecological health of an area *	% Yes	76	96
	% No	8	0
	% Unsure	16	4
	n	926	141
Control wildlife damage *	% Yes	65	89
	% No	16	2
	% Unsure	19	9
	n	932	142
Ensure public safety *	% Yes	79	92
	% No	10	2
	% Unsure	11	6
	n	933	142
Manage population levels of wild animals *	% Yes	74	95
	% No	14	2
	% Unsure	12	3
	n	936	142
Provide opportunities to gather food *	% Yes	60	89
	% No	19	3
	% Unsure	21	9
	n	926	140
It is ***never*** acceptable to kill individual wild animals [c] *	% Yes	2	0
	% No	83	99
	% Unsure	15	1
	n	913	139

[a] See methods section for variable measurement.

[b] For bivariate analysis, "No" and "Unsure" responses were combined for this item in order to meet the requirements of the chi-squared test.

[c] For bivariate analysis, "Yes" and "Unsure" responses were combined for this item in order to meet the requirements of the chi-squared test.

* Statistically significant difference between groups at $P<0.05$

LWM Scale

The LWM Scale, which was made up of the 7 situational lethal management items, achieved a Cronbach's alpha of 0.77, reflecting a high level of reliability or consistency among the items. Principal Components Analysis found the scale to be unidimensional, extracting one factor that explained 43% of the variance in items. Scale reliability and dimensionality were assessed using the public sample. Not surprisingly, wildlife agency personnel scored higher on the LWM Scale (i.e., they approved of killing individual wild animals in more cases) than did members of the public (F=62.451, df=1083, P<0.001). On average, members of the public approved of killing individual animals in about 5 of the 7 situations, while agency personnel approved in about 7 of 7 situations.

Simple and multiple regression analyses were utilized to assess the ability of the explanatory variables to predict support for lethal wildlife management, as measured by the LWM Scale. Table II-4 presents the results of the analyses for both the public and wildlife agency samples.

Among the public, men, those who participated more frequently in hunting and fishing, those who had experienced problems with wildlife in the last 5 years, and those who were more supportive of consumptive recreation were more supportive of lethal wildlife management, at least at the bivariate level. At the multivariate level, controlling for all other variables, only gender and support for consumptive recreation remained significant. Taken together, the independent variables did a reasonable job explaining the variation in the dependent variable; the R-squared value indicates that approximately 22% of the variation was explained. Support for consumptive recreation had a somewhat

Table II-4. Standardized simple and multiple regression coefficients and R-squared values for the Lethal Wildlife Management Scale and explanatory variables by sample.

Explanatory Variable	Public Bivariate	Public Multivariate	Agency Bivariate	Agency Multivariate
Gender (male = 1)	0.264 **	0.152 **	0.164	0.028
Age	0.031	0.038	0.224 *	0.221 *
Education	- 0.012	0.040	0.122	0.001
Income	0.060	0.033	0.091	-0.074
Childhood residence	- 0.064	0.016	-0.161	-0.152
Property ownership	0.056	-0.036	0.045	-0.096
Hunting frequency	0.203 **	-0.087	0.180 *	-0.056
Fishing frequency	0.190 **	0.045	0.006	-0.130
Experience with wildlife problems	0.105 **	0.044	0.127	0.139
Support for consumptive recreation	0.428 **	0.426 **	0.260 **	0.218 *
Management position (Manager = 1)	--	--	0.335 **	0.318 **
n	764	764	129	129
R^2	--	0.218	--	0.238
Adjusted R^2	--	0.207	--	0.166

* $P<0.05$ ** $P<0.01$

stronger effect on the dependent variable than did gender. In fact, taken alone, support for consumptive recreation explained 18% of the variance in support for lethal wildlife management.

In the bivariate case, wildlife agency personnel who were older, hunted more frequently, were more supportive of consumptive recreation, and were in management positions were all more likely to support lethal wildlife management. Hunting frequency dropped out at the multivariate level; only age, support for consumptive recreation, and management position had significant effects. Again, the independent variables explained a fair amount of variation (~24%) in the dependent variable. Management position had the strongest effect, explaining 11% of the variance when taken alone.

Discussion

Support for Lethal Wildlife Management

Support for lethal wildlife management was remarkably high among both the public and wildlife agency personnel. Majorities of both groups believed that all the situations presented acceptable conditions for the use of lethal methods. Still, differences between public and agency personnel in terms of support for lethal management in each situation should not be discounted, as they may indicate areas of potential discord.

As expected, the results showed that wildlife agency personnel were overwhelmingly supportive of lethal management, regardless of the situation. The reasons behind using lethal wildlife management seemed to be much more important for members of the public in determining acceptance of such management policies. For example, while 91% of the public supported the use of lethal wildlife management to

control wildlife diseases, only 60% supported the same to obtain food. Personnel responses showed much less variation. Table II-5 presents a list of the management situations ordered from highest level of support to lowest. In order to determine whether level of support for lethal management differed between these situations, percents of "yes" responses in each situation were treated as Bernoulli proportions (Lindgren 1976). The Bernoulli proportion for each situation was compared to that of the next proportion on the list. Pairwise tests using Z-test statistics were applied to compare approval rates for the lethal management situations within each group (public and agency personnel). Analyses of Bernoulli proportions revealed no significant differences in agency personnel support for the use of lethal management in consecutive situations on the list. In other words, personnel support for lethal management to control wildlife diseases did not differ from that to preserve ecological health, which did not differ from that to control population levels of wild animals, and so on. The same was not true of public responses. Members of the public seem to require more justification for the use of lethal wildlife management than do wildlife agency personnel.

Use of lethal management to control wildlife diseases received the highest level of public support and among the highest for wildlife agency personnel. Support for lethal management in this situation was far stronger than for the other options, particularly in the public sample. Although we did not expect this to be the case, it is actually not particularly surprising given current conditions in Michigan. In recent years, Michigan has been facing a complex problem involving bovine tuberculosis (BTB), a disease that has affected the health of Michigan's livestock and white-tailed deer herds (Bovine TB Eradication Project 2002). Even though the chance is very low, humans can also contract

Table II-5. Public and wildlife agency support for various lethal wildlife management situations in Michigan.

Level of Support for Lethal Management [a]	Public	Wildlife Agency
Highest	Wildlife diseases *	Wildlife diseases
▲	Species survival	Ecological health
|	Public safety	Population levels
|	Ecological health	Species survival
|	Population levels *	Public safety
|	Wildlife damage *	Wildlife damage
Lowest	Food	Food

[a] These rankings are based on the percentage of respondents choosing a "yes" response for each of the situational management items.

* Indicates significant difference ($p<0.05$) between support for lethal management in the situation and the situation that follows on the list.

BTB. White-tailed deer are believed to be a reservoir host of the disease in Michigan, and much of the management to control BTB has focused on controlling deer in the area of the state where the herds have been affected. Media reports have heightened public awareness of the BTB problem, as well as the methods being used to control BTB in Michigan's deer herd. Further exploration into public motivations for supporting lethal methods to control wildlife diseases is called for. Our results indicate that using lethal methods to control BTB may not be particularly controversial for the majority of the public, despite the fact that it has been of concern among specific stakeholder groups (e.g., hunters).

Support for lethal management to protect public safety was lower than we expected for both groups relative to support for the other situations. These findings do not suggest that the issue of public safety is unimportant – lethal management for this purpose was still supported by large majorities of the public and agency personnel. Our results indicate that public safety is simply not as much of a concern as other issues in Michigan – wildlife diseases in particular seem to be of much higher concern to both groups.

Contrary to our prediction and despite the rising number of incidents and costs associated with wildlife damage noted by researchers in recent years, support for lethal management to control wildlife damage was among the lowest for all of the situations among the public. Still, a majority (65%) of the public supported lethal management in this situation. Several different factors might account for the lower level of support for lethal management in this situation. First, people may see wildlife damage as a cost of choosing to live near wildlife. Such costs may be acceptable if people perceive benefits

from having wildlife near their homes (e.g., wildlife viewing). Second, our focus on a general situation may not accurately reflect attitudes and concerns of those who are experiencing specific incidents of wildlife damage, particularly in areas of severe damage. Researchers have found that as severity of damage increases, so does willingness to support lethal management to control nuisance wildlife (Wittmann *et al.* 1998; Loker *et al.* 1999; West and Parkhurst 2002). Additionally, people may prefer non-lethal means of controlling wildlife damage. Further research is necessary to discover which, if any, of these factors play a role in public acceptance of lethal management to control wildlife damage.

Members of the public were more supportive of using lethal wildlife management to ensure species survival than to preserve ecological health. The strong support for lethal management to ensure species survival seen among members of the public could be related to public exposure to, and conservation organization emphasis on, endangered species issues, and less public exposure to the concept of ecosystem management, which focuses on entire systems, rather than individual organisms or species. Further, members of the public may not see a link between wildlife populations and ecosystems and, therefore, may not recognize the negative impacts overabundant species can have on overall ecosystem health.

As we expected, members of the public were much less supportive of controlling wildlife population levels via lethal means than were agency personnel, though again, lethal management in this situation received majority public support. Wildlife managers are responsible for setting goals for game species population sizes, often issuing hunting or trapping permits to obtain their goals, so it is not surprising that agency personnel are

very supportive of lethal wildlife population control. Members of the public, on the other hand, may not be as familiar with these common management practices, leading to less public support for lethal population control.

Like controlling wildlife population sizes, hunting or trapping for food was, as we expected, not as popular with members of the public as was lethal management in other situations. The public seems to be much more supportive of lethal management to control a perceived wildlife problem than for simply obtaining food. Personnel were far more supportive of this option than were members of the public. Of all the lethal management situations, this one exhibited the largest percentage difference between public and agency support, highlighting an area of potential conflict. Because hunting and trapping are also considered to be important tools for wildlife managers in controlling wildlife populations, it is especially important to be aware of public attitudes toward this issue.

LWM Scale

Of all the explanatory variables, gender and attitude toward consumptive recreation were the most strongly related to overall attitude toward lethal wildlife management in the public sample. Frequency of hunting and fishing participation and experience with wildlife problems were also significant, though these relationships existed only at the bivariate level (see discussion below). No other explanatory variable in the public sample contributed significantly to explaining support for lethal wildlife management.

As we expected, men were more supportive of lethal wildlife management than were women. This corroborates the results of other studies, which have found that

women are generally opposed to lethal management techniques to control wildlife populations (Donnelly and Vaske 1995; Teel *et al.* 2002). Women's opposition to lethal management is most likely related to their reportedly high levels of concern about animal cruelty and exploitation (Kellert 1980) and general aversion to killing or violence (Gray 1993).

Positive attitudes toward consumptive recreation were also associated with support for lethal wildlife management in the public sample, as we predicted. In fact, attitude toward consumptive recreation was a much stronger predictor of support for lethal management than any of the other explanatory variables in our study. As was the case here, Donnelly and Vaske (1995) suggested that specific attitudes related to a management action are better for predicting public reaction than are traditional sociodemographic characteristics. In addition, lethal management often involves consumptive recreation as a management tool, so it is not surprising that those who support consumptive use of wildlife also find it acceptable to use lethal methods to control wildlife populations. One of the lethal management situations discussed in this paper ("provide opportunities to gather food") specifically concerned attitudes toward consumptive recreation. Given this obvious overlap, it is highly likely that a person's attitude toward consumptive recreation would strongly influence their attitude toward lethal wildlife management. Still, we believe it was important to include attitude toward consumptive recreation in our model, as it provided an opportunity to explore the relationships between the other independent variables and the dependent variable while controlling for the strong impact of consumptive recreation attitude on support for lethal wildlife management.

We accurately predicted that members of the public who hunted or fished more frequently and those who had experienced problems with wildlife would be more supportive of lethal wildlife management (though only while not controlling for the effects of other variables). Both hunters and anglers are consumptive users of wildlife resources who are more likely than those who do not participate in consumptive recreation to share a utilitarian disposition towards animals (Kellert 1980). It is therefore not surprising that we found a positive relationship between hunting or fishing frequency and support for lethal wildlife management. In a Utah study, researchers found a similar result: hunters were more supportive of lethal predator control than were non-hunters (Teel *et al.* 2002). Another study reported that hunters in Pennsylvania were much more supportive of a proposed moose hunt than were non-hunters (Donnelly and Vaske 1995). In our study, when all other variables were controlled in the multiple regression, hunting and fishing frequency were no longer predictive of support for lethal management, suggesting that these relationships may be mediated by attitude toward consumptive recreation.

Similar to our finding, other studies have also suggested that experience with wildlife problems increases the likelihood that one will support lethal wildlife management. In one case, homeowners and agricultural producers in Virginia who experienced wildlife damage problems were more likely to support dramatic reductions in wildlife population size (West and Parkhurst 2002). A community in Connecticut experiencing numerous deer problems voted in favor of holding an archery hunt to cull the herd (Kilpatrick and Walter 1997). While experience with wildlife problems was not the strongest predictor of attitude toward lethal management, it is still an important

variable to assess as concerns about human/wildlife conflicts continue to grow. Further, in more specific management situations – rather than the general ones explored here – experience with problems is likely to be an even stronger predictor of public support for a lethal management action.

Age, consumptive recreation attitude, and management position were the strongest predictors of support for lethal wildlife management among wildlife agency personnel. Hunting frequency was also significant, but only at the bivariate level. No other independent variable in the personnel sample significantly helped to explain support for lethal management. As we predicted, older personnel were more likely to support lethal management than were younger personnel. Kellert (1980) and Kaltenborn *et al.* (1999) found that older people tend to hold more utilitarian views of animals than do younger people. This could be true for older wildlife personnel as well (although this was not the case for the public in this study). Younger people tend to be more humanistic (Kellert 1980) and ecologistic (Kaltenborn *et al.* 1999) in their orientation toward animals, suggesting that they may be more open to a variety of solutions to wildlife overabundance issues, rather than just lethal ones. In addition, older personnel are likely to possess a more traditional management perspective than that of their younger counterparts. In a study of entry-level wildlife managers, Kennedy and Mincolla (1982) suggested that new recruits into natural resource management have a somewhat idealistic view of the field. With time, some of this idealism may fade as they gain experience and deal with the realities of natural resource management, such as the need to implement lethal wildlife management. The fact that older personnel were more supportive of lethal

wildlife management may, therefore, reflect not only age, but also their experience in wildlife management.

As was the case for the public, positive attitudes toward consumptive recreation were related to support for lethal wildlife management. Unlike the case for the public, however, attitude toward consumptive recreation was not the strongest predictor of support. Management position was a much stronger predictor of attitude toward lethal management in our study. Among wildlife personnel, managers were more likely to support lethal management than were non-managers, as we predicted. We suspect that managers are more aware of problems with wildlife as well as methods to deal with those problems. They are likely more willing to do "whatever it takes" to manage wildlife problems successfully and with a minimum of costs. In a study comparing attitudes toward animals among Bureau of Land Management biologists and the public, Peyton and Langenau (1985) similarly proposed that biologists tend to rely on objective scientific arguments – as opposed to value-laden judgements – to assess wildlife management issues. This perspective likely leads to greater support for lethal wildlife management.

We were somewhat surprised that we did not find any significant relationships between the other explanatory variables (education, income, childhood residence, and property ownership) and support for lethal wildlife management for either sample group. Studies have found that people with lower levels of education (Donnelly and Vaske 1995; Teel *et al.* 2002) and income (Donnelly and Vaske 1995) are more likely to support lethal management actions. Rural residents have been found to be more accepting of lethal wildlife management than their urban counterparts (Teel *et al.* 2002). In our study we

found no such relationships for these explanatory variables. We also falsely believed that property owners, who may be more likely than non-property owners to be concerned about wildlife damage, would be more supportive of lethal management. It seems that landowners may be tolerant of some wildlife damage, perhaps because of perceived benefits of having wildlife on their land or because they are not experiencing wildlife damage severe enough to warrant lethal management of wildlife.

Management Implications

While the study showed majority public support for all the lethal management situations, some issues seemed to resonate more strongly with the public than did others. In particular, members of the public were overwhelmingly supportive of lethal wildlife management to control wildlife diseases, ensure species survival, and ensure public safety. They were much less supportive of lethal management in other situations such as controlling wildlife damage or providing opportunities to gather food. Diefenbach and Palmer (1997) suggested that managers should use marketing techniques to promote wildlife population control and management to the public. By focusing on the issues of greatest concern to the public, such as controlling wildlife diseases, managers have the best chance of developing a message that will increase the level of support for lethal wildlife management among the public, and thereby decrease disruptive opposition to management policies. Marketing campaigns utilizing a variety of approaches, including print and television media, government brochures, and public meetings have the greatest likelihood of garnering broad support for lethal wildlife management policy.

Managers should be aware that despite the findings of general support for lethal

wildlife management in this study, other researchers have found that lethal techniques remain controversial, particularly in urban and suburban environments, even after they have been implemented for some amount of time (Lauber and Knuth 2000; Lauber *et al.* 2001). Persisting conflicts over use of lethal management suggest that it will be important to continue monitoring public opinion about lethal management in the future as urban and suburban areas continue to grow and the number of human/wildlife conflicts continues to increase.

Further, because in this study agency personnel were more supportive of each lethal management situation than were members of the public, managers seeking to implement lethal wildlife management should be cautious. Majority public support for each situation suggests that managers have a good base from which to start, but public support varies greatly depending on the management situation. If possible, managers should attempt to include members of the public in the decision-making process when situations arise in which lethal wildlife management is being considered. Doing so will allow managers to gain insight into public perspectives about and management preferences for the situation, to educate public participants about the diversity of needs and concerns for public lands, and to develop management plans that satisfy a variety of stakeholder interests (Lauber *et al.* 2001).

One concern of this study is the possibility that the public sample may not be entirely representative of the state of Michigan due to response bias. The overall response rate (56%) was somewhat low. In addition, men, hunters, anglers, and those with higher levels of education responded to the survey in disproportionately greater numbers than would be expected based on known populations in Michigan. The question

is whether response bias among these groups may have resulted in artificially high levels of support for lethal wildlife management. While space limitations here do not allow for a complete analysis of all the possible segments of respondents, and it is not possible to fully characterize survey non-respondents, managers may be particularly interested in identifying differences in support for lethal management among hunters and non-hunters. For the purpose of this discussion, non-hunters are those who indicated that they "never" hunt in a typical year, while hunters are those who reported hunting "frequently," "sometimes," or "rarely" in a typical year. A brief analysis of these groups revealed that while hunters were more supportive of lethal management than were non-hunters in most situations, there were no differences between the groups in level of support for lethal management to control wildlife diseases or ensure public safety. As was the case for the public and wildlife agency samples, hunters and non-hunters were more supportive of lethal management to control wildlife diseases than for any other purpose. Further, majorities of both hunters and non-hunters were supportive of lethal management in all situations. So while some differences existed between the two groups, the high level of support for lethal wildlife management found among both hunters and non-hunters suggest that the study results here may be fairly accurate in representing the state, despite possible response biases.

Another point worth noting is that this study assessed attitudes toward lethal management in general. Managers may need to continue to study public attitudes in specific management situations, since public attitudes may be modified by species of concern, area of interest, and severity of issue, among other factors (Riley and Decker 2000). Case-specific attitudinal studies may be necessary to effectively assess likely

public reaction to lethal management actions. A case in point: our findings showed a high level of support for lethal management to control wildlife diseases, possibly reflecting public and agency concerns about bovine tuberculosis in Michigan's deer herds. We suspect that the public may be fairly supportive of lethal wildlife management to control BTB in white-tailed deer; however further exploration into attitudes toward control methods is needed to determine if this is the case. This information could be invaluable to managers dealing with BTB in Michigan's deer herds.

Finally, further analyses of sociodemographic and attitudinal explanatory variables could provide a more complete picture of public attitudes toward lethal wildlife management overall and for specific lethal management situations. More detailed attitudinal variables could be especially helpful in gauging public reaction to management actions. Such analyses could allow managers to better predict sources of opposition to planned lethal wildlife management and, therefore, provide opportunities for building consensus for effective policy implementation.

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Chapter III

STUDY 2: GENDER DIFFERENCES IN ACCEPTANCE OF LETHAL WILDLIFE MANAGEMENT: A STUDY OF THE MICHIGAN PUBLIC

Abstract

A mail survey of the Michigan public was utilized to identify gender differences in support for lethal wildlife management in eight situations. They included: controlling wildlife diseases, ensuring species survival, preserving the ecological health of an area, controlling wildlife damage, ensuring public safety, managing population levels of wild animals, providing opportunities to gather food, and allowing hunters to obtain trophy animals. The survey achieved a final response rate of 43% (n=1970). When controlling for the effects of several explanatory variables, gender was an important predictor of support for lethal wildlife management overall; men were more supportive than were women. Men were also more likely to support lethal management in five of the eight situations. While men and women differed in their support for lethal management in each of the situations, marked similarities between the groups in how they assessed the need for lethal management bode well for managers making decisions involving lethal wildlife management.

Key Words

Attitudes, gender, lethal management, Michigan, opinion, public, survey, wildlife

Introduction

As wildlife populations in suburban areas continue to grow and human/wildlife conflicts increase across the United States, wildlife managers are repeatedly being faced with public concerns about wildlife. Wild animals are posing risks to people as both human and wildlife populations increase in size and occupy the same landscapes. Often, managers must focus on wildlife population management as the key to resolving human/wildlife conflicts. Managing wildlife populations can involve both lethal and non-lethal methods. While Americans generally find non-lethal methods acceptable, lethal methods remain controversial (Lauber *et al.* 2001).

One reason for this is the rise of the animal rights movement, which seeks to grant animals rights that are equal or similar to those of humans, and the animal welfare movement, which seeks to limit animal suffering (Schmidt 1989; Causey 1992; Minnis 1998). In recent years, these movements have been gaining support from the mainstream public (Minnis 1998) and changing the way in which managers conduct wildlife management (Schmidt 1989). Decker and Brown (1987) asserted that the animal rights movement in particular is a threat to wildlife management because it opposes traditional wildlife activities such as hunting and trapping, and questions how and why managers manage wildlife. At the same time that the animal rights and welfare movements have been gaining momentum, an anti-hunting movement has also emerged. Animal rights and welfare groups as well as anti-hunting groups have been responsible for bringing much public attention to the issue of lethal wildlife management through protests (Tilt and Spotila 1991; Jasper and Nelkin 1992), media campaigns, and legislative processes (Gentile 1987; Minnis 1998). For example, anti-hunting protests were used in Maryland

to interfere with the opening of the deer hunting season (Hill 1991). Legislation has been introduced in many U.S. states – and passed in some – to ban wildlife trapping or particular trapping methods (Gentile 1987; Minnis 1998). In another well-known case, animal rights activists used the media to draw public attention to fur hunting of harp seals (*Phoca greonlandica*) beginning in the mid 1960's, ultimately leading to the near-demise of the entire industry (Tilt and Spotila 1991). As these cases illustrate, animal rights, animal welfare, and anti-hunting groups have been successful in limiting the use of wildlife for consumptive recreation and economic gain. In addition to their shared concerns about wildlife management practices, these movements have another major aspect in common: all three are predominantly made up of women. As both human/wildlife conflicts and the need for lethal actions to control such conflicts continue to increase, managers will, therefore, need to address the specific concerns women have about lethal wildlife management.

Researchers have long recognized differences between men and women in how they relate to animals and the environment. Gender differences in attitudes toward animals and their management can have profound implications for wildlife managers who are responsible for managing wildlife resources on behalf of the public. Traditionally in the United States, wildlife management focused on managing wildlife and habitats to increase opportunities for consumptive recreation (i.e., hunting, fishing and trapping); managers and constituents have generally been male and white. Increasingly, the field of wildlife management is embracing a broader constituency, but to do so there must be a greater understanding of the desires and concerns of non-traditional wildlife constituents, such as women. Managers considering the use of lethal wildlife management will need

to understand and respond to gender differences in acceptance of lethal wildlife management in order to minimize conflicts in policy implementation. This paper examines gender differences in support for the use of lethal wildlife management in Michigan.

Lethal wildlife management may be used for goals such as controlling wildlife-related risks (e.g., diseases, wildlife/car collisions, crop damage) as well as for providing consumptive recreational opportunities (e.g., hunting, trapping). While several studies have focused on general public attitudes toward the use of lethal management, fewer have concentrated on gender differences in support for lethal methods. In general, researchers have found that a majority of the public prefers non-lethal means of controlling problem species, such as birth control or removal of animals to another area (e.g., Schmidt *et al.* 1997; Reiter *et al.* 1999). However, several studies have indicated that lethal methods of control may be acceptable to the public if they feel that the situation warrants their use (Loker *et al.* 1999; Schmidt *et al.* 1997). Our focus here is on assessing situations in which men and women might find lethal wildlife management warranted. With this in mind, we identified several situations in which lethal wildlife management has been used: to control wildlife diseases, ensure species survival, preserve the ecological health of an area, control wildlife damage, ensure public safety, manage population levels of wild animals, provide opportunities to gather food, and allow hunters to obtain trophy animals.

Acceptance of lethal wildlife management has been found to vary based on the risks or costs associated with a management situation. In general, people find lethal management most acceptable under circumstances in which the level of risk to humans is high. Studies have found that members of the public generally find lethal wildlife

management acceptable if it is intended to protect public safety (Kilpatrick and Walter 1997; Schmidt *et al.* 1997; Manfredo *et al.* 1998; Wittmann *et al.* 1998; Reiter *et al.* 1999), control wildlife damage (Schmidt *et al.* 1997; Manfredo *et al.* 1999; Wittmann *et al.* 1998), or control wildlife diseases (Kilpatrick and Walter 1997; Wittmann *et al.* 1998; Manfredo *et al.* 1999). Public support tends to be somewhat lower for lethal management related to consumptive uses of wildlife; consumptive activities for sport (rather than need) are particularly controversial (Regan 1983; Wenz 1983; Decker and Brown 1987; King 1991).

In general, women are not as supportive of lethal wildlife management as are men; they tend to prefer non-lethal methods to control wildlife populations (Sanborn and Schmidt 1995; Lauber and Knuth 2000). In our 1999 study measuring attitudes toward lethal wildlife management, women were less supportive than were men of lethal wildlife management overall (see Chapter II). Several studies have corroborated this lack of support among women for lethal control of predators (Teel *et al.* 2002; Zinn and Pierce 2002) and deer (Lauber *et al.* 2001). In a study of wildlife professionals, Sanborn and Schmidt (1995) found that even among wildlife managers, women were less supportive than men of using the lethal techniques of shooting, trapping, or poisoning to control wildlife populations. Interestingly, male and female managers in the study considered different factors in making a decision as to whether particular lethal methods were appropriate. Male managers tended to focus on the cost-effectiveness of the technique, while female managers were more concerned about producing a quick and humane death for the animals. As this example illustrates, men and women tend to differ in their approach to making decisions affecting wild animals. Similarly, in a study of gender and

attitudes toward animals, Kellert and Berry (1987: 365) noted that "the strength and consistency of male vs. female differences were so pronounced as to suggest gender is among the most important demographic influences on attitudes toward animals in our society."

To explain the prominent differences in men's and women's attitudes toward animals, many researchers have turned to the works of feminist theorists like Nancy Chodorow and Carol Gilligan (e.g., Kellert and Berry 1987; Stern *et al.* 1993; Eldridge and Gluck 1996; Peek *et al.* 1996; Lauber *et al.* 2001). Chodorow (1978) suggested that girls' feelings of sameness and identification with their mothers as their primary caretakers cause them to feel connected to the world, while boys develop a sense of self that is separate and distinct from the world. Building on Chodorow's theories, Gilligan (1982) postulated that women's early socialization creates an "ethic of care," leading them to be more altruistic and empathetic toward others. Women are therefore nurturers and caretakers; essentially, women "mother." Some feminists also equate the suffering and oppression of women with oppression of animals and nature (Merchant 1990; Gaard 1993). Ecofeminists see a strong connection between women and animals, and see it as a woman's role to liberate not only women, but also animals and nature. In light of these feminist philosophies, the findings that women are more likely than are men to oppose lethal wildlife management make sense. If women tend to nurture others and they feel close ties to animals, it follows that they may be less supportive of management practices that would directly harm individual wild animals. Research on gender and environmental concern, animal rights and welfare issues, and attitudes toward consumptive recreation

generally support these feminist theories, and provide further insight for understanding women's attitudes toward lethal wildlife management.

Gender and Environmental Concern

Studies of gender and environmental concern have often yielded conflicting results, probably because the ways in which environmental concern has been measured have lacked consistency. There seem to be two main branches of environmental concern research. The first measures general concern about the environment, while the second measures concern about environmental risks. General, national level studies of gender and environmental concern have been particularly inconsistent, finding little or no gender difference (e.g., see Van Liere and Dunlap 1980; Smith 2001). However, recent studies of gender and environmental risk concern have found women to be more concerned than men, particularly when local level environmental risks are involved (Blocker and Eckberg 1989; Mohai 1992; Stern *et al.* 1993; Davidson and Freudenburg 1996; Zelezny *et al.* 2000; Hayes 2001; Smith 2001). Hayes (2001) suggested that due to their nurturing roles and their perceived need to protect their families and communities from harm, women are predisposed to a higher level of concern about environmental risks than are men. While most environmental risk concern literature has involved anthropogenic, technological risks, Zinn and Pierce (2002) suggested that the same principles could be applied to assess concerns about potentially dangerous wildlife. In a Colorado study, women were found to be more concerned than men about dangerous wildlife, though they were still less willing to support killing an animal that had injured or killed a human (Zinn and Pierce 2002). Still, concern about environmental or wildlife-related risks may

lead women to be more open to using lethal methods to control dangerous wildlife than they would have otherwise been. Women, therefore, may find lethal wildlife management more acceptable in situations that pose risks to humans (i.e., ensuring public safety, controlling wildlife diseases) than in those that do not present such risks.

Gender, Animal Rights, and Animal Welfare

As mentioned above, women seem to have a particularly strong affinity for animal rights and welfare causes; both movements are predominantly made up of women (Sperling 1988; Herzog *et al.* 1991; Richards and Krannich 1991; Jasper and Nelkin 1992; Eldridge and Gluck 1996; Minnis 1998; Kruse 1999). Peek *et al.* (1996) suggested that women's experiences with oppression make them more concerned about equality, and therefore animal rights. Kellert and Berry (1987) also noted that women are more "humanistic" and "moralistic" than are men in their attitudes toward animals. In other words, they tend to be more concerned about the well-being of individual animals (as opposed to an entire species) and more concerned about animal cruelty issues. Similarly, Siemer and Brown (1992) found that female wildlife rehabilitators were motivated by a sense of moral obligation to animals. Women's moralistic and humanistic orientations likely disproportionately attract them to animal rights and welfare causes. In addition, women are more likely to question the need for animal research (Eldridge and Gluck 1996), are less supportive of manipulating wildlife populations (Zinn and Pierce 2002), and are less trusting of institutions, such as wildlife agencies (Davidson and Freudenburg 1996) than are men. These factors, taken together, may explain, at least in part, why

women have so readily embraced the animal rights and welfare movements and also tend to oppose the use of lethal wildlife management.

Gender and Consumptive Recreation

Women have not only become key players in the animal rights and welfare movements, but they have also taken a lead role in the emergence of an anti-hunting movement, which questions the appropriateness of hunting and trapping (Gray 1993). Women seem to be particularly concerned about issues related to animal exploitation, including killing animals for fur, meat or sport (Applegate 1973; Shaw 1977; Kellert and Berry 1987). Given their concerns, it is not surprising that women are less likely to participate in (Kellert and Berry 1987; Connelly and Decker 1996) or support (Lauber *et al.* 2001) consumptive recreation than are men. Proponents of the anti-hunting movement believe that hunting is unethical because hunters kill casually, with no "reverence for life" (Causey 1992: 56), and because hunting is destructive to women and nature (King 1991). According to anti-hunters, there must be a justifiable reason for killing animals (Causey 1992), and hunting for sport or recreation is not considered justified (Regan 1983; Wenz 1983; Decker and Brown 1987; King 1991). Although the literature shows women are often open to using lethal management if they feel the situation justifies its use, their strong association with anti-hunting would likely lead them to oppose lethal wildlife management for obtaining trophies or food.

In general, studies on gender and environmental concern, animal rights and welfare issues, and attitudes toward consumptive recreation suggest that women are not likely to be as supportive of lethal wildlife management as are men, regardless of the

situation. However, as the potential for risk to humans increases, support for lethal management is likely to increase as well, reducing the disparity in men's and women's acceptance of lethal wildlife management.

Purpose of Study

The purpose of this study was to assess differences between men and women in terms of support for lethal wildlife management in a variety of management situations including: controlling wildlife diseases, ensuring species survival, preserving the ecological health of an area, controlling wildlife damage, ensuring public safety, managing population levels of wild animals, providing opportunities to gather food, and allowing hunters to obtain trophy animals.

For both men and women, we expected to find the most support for lethal wildlife management in situations involving risks to humans (i.e., ensuring public safety, and controlling wildlife diseases). Further, we expected to find particularly low levels of support among women for lethal wildlife management involving consumptive recreation (i.e., providing opportunities to gather food, and allowing hunters to obtain trophy animals). We believed that gender would be an important predictor of support for lethal wildlife management overall; men would be more supportive than would women. We also believed that men would be more supportive of lethal management in each of the management situations than would women.

Methods

A mail survey was developed to assess public attitudes toward a wide variety of natural resource and wildlife issues in the state of Michigan. In the spring of 2000, the survey was mailed to a sample of 2500 men and 2500 women in Michigan (see Mertig and Koval 2001) in order to assess the effects of gender on attitude toward these issues in general, and toward lethal wildlife management in particular. Names and addresses were purchased from USADATA.com, a firm specializing in drawing representative household samples from a combination of sources (e.g., telephone lists, driver's licenses). Following the recommendations set forth by Dillman (1978), a series of survey mailings was used to encourage response to the survey. As an incentive to complete the survey, respondents were entered into a prize drawing for one of several gift cards to a national discount store. The survey achieved a final response rate of 43% (n=1970, sampling error +/- 1%) after deletion of bad addresses and those ineligible to respond.

Variable Measurement

Several real-life situations were identified in which the use of lethal wildlife management might be warranted in Michigan. One item determined a respondent's acceptance of killing individual animals under any circumstance, while eight additional items measured support for lethal management in particular situations. The first item read as follows:

> *Do you believe it is acceptable to kill individual wild animals in certain circumstances?*

For this item, respondents could choose between three response categories: yes, no, or unsure. Those respondents who responded positively (i.e., a "yes" response) or were unsure about whether killing individual animals would be acceptable in certain circumstances were also asked to evaluate the following eight items pertaining to the use of lethal management in specific situations:

As long as it is properly controlled, is it acceptable to kill individual wild animals in order to...

a. ...control wildlife diseases

b. ...ensure species survival

c. ...preserve the ecological health of an area

d. ...control wildlife damage

e. ...ensure public safety

f. ...manage population levels of wild animals

g. ...provide opportunities to gather food

h. ...allow hunters to obtain trophy animals

For each of the eight situational items, respondents were asked to choose one of three possible response categories: yes, no, or unsure. A scale assessing degree of support for lethal management was constructed on the basis of the eight situational items. Respondents must have answered at least one of the eight items in order to receive a score on the scale. Respondents received a score by summing the number of situations (from the eight situational items) in which they felt that lethal management was acceptable (i.e., a "yes" response to the question). If an individual felt that it was not acceptable to kill an individual animal under any circumstance, they were given a score

of zero on the scale. The Lethal Wildlife Management (LWM) Scale[1], therefore, ranged from 0 to 8, with a higher scale score reflecting more support for lethal wildlife management overall.

In the multivariate analyses, gender differences were assessed while controlling for the effects of several independent or explanatory variables: age, education, years lived in Michigan, childhood residence, property ownership, previous experience with wildlife problems, frequency of participation in hunting, support for consumptive recreation, and level of environmental concern. Table III-1 presents the measurement and coding for each of these variables.

Analysis of the Data

Data were analyzed using SPSS 10.0.7 for Windows software for social statistics (2000). Basic descriptive statistics are presented for the independent and dependent variables by gender; statistically significant differences between men and women are noted. Comparisons between means were assessed using ANOVA, and differences between proportions were examined using Pearson's chi-squared tests. Responses for the situational lethal management items were coded ordinally for these statistical comparisons, with higher numbers reflecting more support for the lethal management item (i.e., no=1, unsure=2, yes=3).

Both simple and multiple linear regression analyses of the LWM Scale were used next to identify the factors affecting support for lethal wildlife management overall. According to Tabachnick and Fidell (2001), it is important to evaluate both simple and multiple regression results in order to get a complete understanding of the effect of an

Table III-1. Measurement of the independent variables used to explain support for lethal wildlife management among Michigan men and women.

Variable	Coding
Gender [a]	0 Female 1 Male
Age [b]	Age is continuous
Education [d]	1 Less than high school graduate 2 High school graduate or GED 3 Vocational or Trade School 4 Associate's Degree (2 year degree) 5 Some College 6 College Graduate (Bachelor's or 4 year degree) 7 Graduate or Professional Degree
Years lived in Michigan [c]	Years in Michigan is continuous
Childhood residence [e]	1 Rural, Farm 2 Rural, Non-Farm 3 Small Town (25,000 people or fewer) 4 Urban Area (From 25,001 up to 100,000 people) 5 Metropolitan Area (More than 100,000 people)
Property ownership [f]	0 No 1 Yes
Experience with wildlife problems [g]	0 No 1 Yes
Hunting frequency [h]	1 Never 2 Rarely 3 Sometimes 4 Frequently
Support for consumptive recreation [i]	7 item scale. Each item was coded from 1 to 5, with 1 representing the least support and 5 representing the most support for hunting, trapping or fishing. Respondents were given a scale score only if they had two or fewer missing responses on the set of items. Those with missing values had a middle response (3) assigned for the relevant missing item(s). An overall scale score was then given to respondents by adding item responses. Range: 7 to 35; Cronbach's Alpha = 0.83; unidimensional scale (1 factor explaining 50% of the variance in items).

Table III-1 (cont'd).

Variable	Coding
Level of environmental concern [j]	Assessed by creating an environmental concern scale of 10 items taken from the revised 15 item "New Ecological Paradigm" (NEP) scale (Dunlap *et al.* 2000). Answering positively to the items marked with a "+" (see footnote) and answering negatively to the items marked with a "-" would reflect a higher level of environmental concern. Items were coded from 1 to 5 with higher numbers reflecting a more "pro-environmental" stance. Respondents were given a scale score only if they had two or fewer missing responses on the set of items. Those with missing values had a middle response (3) assigned for the relevant missing item(s). An overall scale score was then given to respondents by adding item responses. Range: 10 to 50; Cronbach's Alpha = 0.73; scale with 3 dimensions (3 factors explaining 54% of the variance in items).

[a] Are you male or female?

[b] In what year were you born? (Age = 2000 - year born.)

[c] How many years have you lived in the State of Michigan?

[d] What is the highest level of formal education that you have completed?

[e] In what type of area did you spend all or most of your childhood?

[f] Do you own property in Michigan?

[g] A respondent was considered to have experienced problems with wildlife if he or she responded positively to any of the three following questions: 1) Have you or any members of your immediate family had any problems with white-tailed deer in the state of Michigan within the last 5 years? 2) Have you or any members of your immediate family had any problems with Canada Geese in the state of Michigan within the last 5 years? 3) Have you or members of your immediate family had any problems with other species of wildlife in the state of Michigan in the last 5 years?

[h] About how often, in a typical year, do you engage in each of the following natural resource activities?...Hunting, Fishing

[i] For each of the following statements, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree or Strongly Disagree. 1) Hunting is an important part of our national heritage. 2) In general, hunters tend to be very concerned about protecting the environment. 3) In general, hunters are socially responsible individuals. 4) I oppose all forms of recreational hunting. 5) Trappers are concerned about the humane treatment of animals. 6) I feel trapping animals for fur is acceptable when it is properly regulated. 7) I feel fishing is acceptable when it is properly regulated.

[j] The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. 1) We are approaching the limit of the number of people the earth can support (+). 2) When humans interfere with nature it often produces disastrous consequences (+). 3) The earth has plenty of natural resources if we just learn how to develop them (-). 4) Plants and animals have as much right as humans to exist (+). 5) The balance of nature is strong enough to cope with the impacts of modern industrial nations (-). 6) Despite our special abilities humans are still subject to the laws of nature (+). 7) The so-called 'ecological crisis' facing humankind has been greatly exaggerated (-). 8) Humans were meant to rule over the rest of nature (-). 9) Humans will eventually learn enough about how nature works to be able to control it (-). 10) If things continue on their present course, we will soon experience a major ecological catastrophe (+).

independent variable in the regression. The results of the simple regression show the total relationship of the independent variable with the dependent variable, while multiple regression elucidates the unique relationship of the independent variable with the dependent variable, compensating for any redundancy between the effects of the independent variables. In interpreting linear regression results, a statistically significant positive coefficient indicates that the explanatory variable has a positive effect on the dependent variable (in our case, the LWM Scale) in the population. Principal Components Analysis and Cronbach's alpha were used to assess scale dimensionality and reliability, respectively. Finally, zero-order and partial correlations were used to evaluate gender effects on support for lethal wildlife management in each of the given situations. To be consistent with the coding of items for the LWM Scale, the situational lethal management items were coded dichotomously (yes=1, no and unsure=0) for the zero-order and partial correlations. In addition, only those people who provided responses for all of the independent and dependent variables used in the analyses were included in the calculations of zero-order and partial correlations and multiple regression coefficients (n=1716).

Results

Similar to the original sample, which was split evenly between the sexes, 52% of the respondents who reported their gender on the survey were men and 48% were women (n=1912). Table III-2 presents male and female responses for the explanatory variables used in the study. Men in the sample were slightly older and lived in Michigan longer, on average, than women, though the mean differences in years were small (2 and 3 years,

respectively). Men were also more likely to own property than were women, with 85% of men and only 79% of women reporting property ownership in Michigan. Not surprisingly, given the traditional gender bias in participation in consumptive recreation activities, men participated in hunting more frequently than did women. Thirty-three percent of men and 8% of women reported that they participate "frequently" in hunting in a typical year. According to estimates by the U.S. Fish and Wildlife Service, 22% of men and 2% of women (age 16 or older) in Michigan engaged in hunting in 1996 (U.S. Department of Interior and U.S. Department of Commerce 1998). This survey, therefore, appears to have overestimated the hunting population in Michigan. This is likely due to a combination of factors. First, respondents were asked to report their participation in hunting and fishing in "a typical year." This would likely lead to a greater proportion of hunters than would be found based on actual participation in hunting or fishing in a single year. Second, hunters may have been more likely to respond to the survey due to a greater interest in natural resource issues than could be the case for many others in the general public.

Men were more supportive of consumptive recreation than were women, while women scored higher in terms of environmental concern than did men. There were no differences between men and women in terms of childhood residence, experience with wildlife problems, or educational attainment. However, both groups in this sample were more highly educated than would be expected based on U.S. Census (2000) results, which report that 21% of men and 20% of women have earned at least a bachelor's degree.

Table III-2. Results of the explanatory or independent variables by gender in a study of attitudes toward lethal wildlife management in Michigan.

Variable [a]	Statistic	Men	*n*	Women	*n*
Age **	Mean	50.9	988	48.8	892
Education	% College Degree+	32	990	29	908
Years lived in Michigan **	Mean	44.9	991	42.5	907
Childhood residence	% Urban or Metropolitan	42	986	43	907
Property ownership **	% Yes	85	992	79	910
Experience with wildlife problems	% Yes	54	995	52	917
Hunting frequency **	% Frequently	33	950	8	873
	% Never	39		76	
Support for consumptive recreation **	Mean	27.2	987	22.9	899
Level of environmental concern **	Mean	34.0	988	35.2	901

[a] See Table III-1 for variable measurement.

** Statistically significant difference between groups at $P<0.01$

Table III-3 presents the breakdown of responses to the lethal wildlife management items by gender. Both men and women were very supportive of the idea that lethal management should be used under certain circumstances. Men were somewhat more likely to support lethal management than were women, however, with 92% of men and 85% of women indicating that lethal management was acceptable under certain circumstances. For the eight specific management situations, majorities of both men and women supported using lethal wildlife management to control wildlife diseases, ensure species survival, preserve the ecological health of an area, control wildlife damage, ensure public safety, and manage population levels of wild animals. Men were more likely to support using lethal management than were women in six of the eight situations. For the other two situations, controlling wildlife diseases and ensuring public safety, there were no statistically significant gender differences in level of support. Men were also more likely than were women to find lethal wildlife management acceptable to provide opportunities to gather food and allow hunters to obtain trophy animals, though support was low for these two items among both groups. Of all the management situations, both men and women were most supportive of using lethal wildlife management to control wildlife diseases, and least supportive of doing so to allow hunters to obtain trophy animals.

The 8 situational lethal management items were used to create a scale to measure overall support for lethal wildlife management. The LWM Scale achieved a Cronbach's alpha of 0.81, reflecting a high level of consistency. Principal Components Analysis found the scale to have two dimensions, extracting two factors explaining 57% of the variance in items.[2] One factor contained the two items related to consumptive recreation

Table III-3. Support for lethal wildlife management in given situations by gender.

Variable [a]	Statistic	Men	Women
Acceptable under certain circumstances **	% Yes	92	85
	% No	3	5
	% Unsure	5	10
	n	985	900
Control wildlife diseases	% Yes	94	92
	% No	2	2
	% Unsure	4	6
	n	943	832
Ensure species survival **	% Yes	83	74
	% No	6	8
	% Unsure	11	17
	n	940	826
Preserve the ecological health of an area **	% Yes	81	73
	% No	7	8
	% Unsure	12	19
	n	940	826
Control wildlife damage **	% Yes	72	56
	% No	14	20
	% Unsure	13	24
	n	939	824
Ensure public safety	% Yes	83	80
	% No	8	7
	% Unsure	9	12
	n	938	828
Manage population levels of wild animals **	% Yes	77	62
	% No	12	19
	% Unsure	11	19
	n	939	829
Provide opportunities to gather food **	% Yes	61	49
	% No	20	24
	% Unsure	18	27
	n	937	827
Allow hunters to obtain trophy animals **	% Yes	33	14
	% No	54	75
	% Unsure	13	11
	n	941	830

Table III-3 (cont'd).

[a] See methods section for variable measurement.

[b] For statistical analyses, variables were coded ordinally, with higher numbers reflecting more support for each lethal management situation (i.e., no=1, unsure=2, yes=3).

** Statistically significant difference between groups at $P<0.01$

(provide opportunities to gather food and allow hunters to obtain trophy animals), while the other factor was made up of the remaining management items. This distinction makes substantive sense in that the consumptive recreation items involve human use of wildlife, while the other items reflect more general wildlife population management. Despite the non-unidimensionality of the LWM Scale, for ease of the analyses presented here the scale was treated as one entity measuring overall support for lethal wildlife management.

Men were more likely than were women to support lethal management overall, as measured by the LWM Scale (F=84.455, df=1884, P<0.001). Simple and multiple regression analyses were utilized to assess the ability of the explanatory variables to predict support for lethal wildlife management overall, as measured by the LWM Scale (Table III-4).[3] At the multivariate level, being male, having a higher level of education, owning property, having experienced problems with wildlife, having a more positive attitude toward consumptive recreation and exhibiting a lower level of environmental concern were all predictive of support for lethal wildlife management. Overall, the explanatory variables contributed significantly to explaining variation in support for lethal wildlife management (F=46.505, df=1715, P<0.001); the R-squared value indicates that approximately 21% of the variation was explained. In addition to the relationships found in the multiple regression analysis, living in Michigan longer, growing up in more rural areas, and hunting more frequently were predictive of support for lethal management at the bivariate level. Interestingly, while education was not related to support for lethal wildlife management at the bivariate level, it contributed significantly in the multiple regression model, indicating that some other explanatory variable or

Table III-4. Standardized simple and multiple regression coefficients and Model R-squared value for the Lethal Wildlife Management Scale.

Explanatory Variable	Bivariate Coefficient	Multivariate Coefficient
Gender (male=1)	0.219 **	0.072 **
Age	0.037	-0.012
Education	0.018	0.084 **
Years lived in Michigan	0.056 *	0.005
Childhood residence	-0.092 **	-0.006
Property ownership	0.101 **	0.050 *
Experience with wildlife problems	0.156 **	0.110 **
Hunting frequency	0.252 **	0.004
Support for consumptive recreation	0.421 **	0.368 **
Level of environmental concern	-0.193 **	-0.097 **
n	1716	1716
R^2	--	0.214

* $P<0.05$ ** $P<0.01$

variables used in the multivariate analysis suppressed this relationship in the bivariate case (Tabachnick and Fidell 2001). In this model, only age did not significantly contribute to explaining the variance in support for lethal management at any level, though age was still controlled for when calculating partial correlations to evaluate gender influences on support for each of the lethal management items.

Table III-5 presents zero-order and partial correlations between gender and support for each of the 8 lethal wildlife management situations. In the bivariate, zero-order correlations, men were significantly more supportive of lethal wildlife management than were women in all 8 situations;[4] this was also the case in 5 of 8 situations at the multivariate level. Men were more likely than were women to support lethal wildlife management to ensure species survival, preserve the ecological health of an area, control wildlife damage, manage population levels of wild animals, and allow hunters to obtain trophy animals, even when controlling for the effects of other variables in the partial correlations. After controlling for other variables, men and women did not differ in support for lethal management to control wildlife diseases, ensure public safety, or provide opportunities to gather food.

Discussion

Interestingly, despite the fact that men were more supportive of lethal wildlife management in most of the lethal management situations, men and women seem to be remarkably similar in their relative assessment of which situations warrant the use of lethal management. Table III-6 shows how men and women ranked the eight management situations in terms of support for lethal wildlife management. In order to

Table III-5. Zero-order and partial correlations between gender and support for the eight lethal wildlife management situations.

Variable	Zero-order Correlations [a]	Partial Correlations [b]
Control wildlife diseases	0.070 **	0.006
Ensure species survival	0.134 **	0.060 *
Preserve the ecological health of an area	0.126 **	0.053 *
Control wildlife damage	0.179 **	0.085 **
Ensure public safety	0.055 *	-0.012
Manage population levels of wild animals	0.178 **	0.067 **
Provide opportunities to gather food	0.145 **	0.022
Allow hunters to obtain trophy animals	0.228 **	0.063 **
n	1716	1716

[a] Responses were coded dichotomously (yes=1, no and unsure=0) for both zero-order and partial correlations.

[b] Controlling for the effects of age, education, years lived in Michigan, area of childhood residence, property ownership, experience with wildlife problems, hunting frequency, support for consumptive recreation, and level of environmental concern.

* $P<0.05$ ** $P<0.01$

Table III-6. Ranking of support for the use lethal wildlife management in particular management situations among Michigan men and women.

Level of Support for Lethal Management [a]	Men	Women
Highest	Wildlife diseases *	Wildlife diseases *
▲	Species survival	Public safety *
	Public safety	Species survival
	Ecological health *	Ecological health *
	Population levels *	Population levels *
	Wildlife damage *	Wildlife damage *
	Food *	Food *
Lowest	Trophy	Trophy

[a] These rankings are based on the percentage of respondents choosing a "yes" response for each of the situational lethal management items.

* Indicates significant difference ($p<0.05$) between support for lethal management in the situation and the situation that follows on the list.

determine whether level of support for lethal management differed between these situations, percents of "yes" responses in each situation were treated as Bernoulli proportions (Lindgren 1976). The Bernoulli proportion for each situation was compared to that of the next proportion on the list. Pairwise tests using Z-test statistics were applied to compare approval rates for the lethal management situations within each group (men and women). In most cases, proportions differed from one situation to the next for both groups. Rankings of the acceptability of lethal wildlife management utilization in particular situations by men roughly paralleled those of women, even though women were generally less supportive of lethal management.

As we predicted, support for lethal wildlife management was strong among both men and women for situations involving risks to humans: controlling wildlife diseases and ensuring public safety. It is likely that both groups were most supportive of using lethal management to control wildlife diseases due to a current wildlife disease problem in Michigan. Recently, Michigan has been experiencing a highly publicized problem involving bovine tuberculosis (BTB) in its white-tailed deer herds. Media reports have heightened public awareness of the BTB problem, as well as the methods being used to control BTB in Michigan's deer herd. Men and women are likely very concerned about eliminating this disease in Michigan, and their support for lethal management to control wildlife diseases reflects their concerns.

We also predicted that women would not be very supportive of lethal management for obtaining food or trophies. These consumptive recreation-related situations actually received the least support of all the situations among men as well as among women. Lethal management for trophies was the only situation that did not

garner majority support from either men or women. Both men and women seem to find lethal management most acceptable when it is used to protect people, wildlife, or the environment. For many Michigan residents, killing animals does not seem to be justified for obtaining food or trophies.

As we predicted, men were more supportive of lethal wildlife management overall, as measured by the LWM Scale, reflecting their more "utilitarian" attitudes toward animals (Kellert and Berry 1987). Those with higher levels of education, property owners, those who experienced problems with wildlife, those who were more supportive of consumptive recreation, and those with lower levels of environmental concern were also more supportive of lethal wildlife management overall. Of all the explanatory variables used in the multiple regression analysis of the LWM Scale, support for consumptive recreation had the strongest effect on support for lethal wildlife management by far. This is not surprising given the nature of the lethal management situations explored in this paper. Several of the situations involved wildlife population control for various purposes. In such situations, resource managers often utilize consumptive recreationists (i.e., hunters and trappers) to accomplish their management goals. Furthermore, two of the situations ("provide opportunities to gather food" and "allow hunters to obtain trophy animals") specifically concerned attitudes toward consumptive recreation. Given the obvious overlap of consumptive recreation and lethal wildlife management, it is highly likely that a person's attitude toward consumptive recreation would strongly influence their attitude toward lethal wildlife management. Still, we believe it was important to include attitude toward consumptive recreation in our model, as it provided an opportunity to explore variable relationships while controlling

for the strong impact of consumptive recreation attitude on support for lethal wildlife management.

Our final prediction was that men would be more supportive of lethal wildlife management than would women in all of the management situations. This was only the case in the bivariate, zero-order correlations. When controlling for the explanatory variables in the partial correlations, men were more supportive of lethal management in 5 of the 8 situations. There were no gender differences in support for lethal management to control wildlife diseases, ensure public safety, or provide opportunities to gather food. Two of these situations, controlling wildlife diseases and ensuring public safety, involve using lethal management to protect humans from risks posed by wildlife. Since women tend to have higher levels of environmental risk concern (Blocker and Eckberg 1989; Mohai 1992; Stern *et al.* 1993; Davidson and Freudenburg 1996; Zelezny *et al.* 2000; Hayes 2001; Smith 2001), perhaps they were as supportive of lethal wildlife management as were men in these situations because of the risks animals posed to humans in these cases.

It is interesting to note that even when attitude toward consumptive recreation was controlled for in the partial correlations, women were still less supportive of lethal management for trophy hunting than were men, though they did not differ from men in terms of support for lethal management to obtain food. Women seem to be particularly opposed to killing animals for sport. This is consistent with the findings that women tend to be drawn to animal rights causes, (Sperling 1988; Herzog *et al* 1991; Richards and Krannich 1991; Jasper and Nelkin 1992; Eldridge and Gluck 1996; Minnis 1998; Kruse 1999), which oppose such activities.

Response Bias

One concern of this study is that the sample may not accurately represent the state of Michigan due to response bias. The overall response rate (43%) was somewhat low. In addition, hunters, as well as those with higher levels of education, responded to the survey in disproportionately greater numbers than would be expected based on known populations in Michigan. The question is whether response bias may have resulted in artificially high levels of support for lethal wildlife management in this study. While space limitations here do not allow for a complete analysis of all the possible segments of respondents, and it is never possible to fully identify the characteristics of survey non-respondents, it is possible to identify differences in support for lethal management among male and female hunters and non-hunters. It is particularly important to look at any differences between these groups because hunters are likely to be more supportive of lethal wildlife management than are non-hunters. Further, if respondents were disproportionately made up of hunters, it follows that non-respondents would disproportionately be non-hunters. For the purpose of this discussion, non-hunters are those who indicated that they "never" hunt in a typical year, while hunters are those who reported hunting "frequently," "sometimes," or "rarely" in a typical year. A brief analysis of these groups revealed that among Michigan women, greater than expected participation among female hunters did not have much of an effect on support for lethal wildlife management. There were no differences between female hunters and non-hunters in terms of support for lethal wildlife management in most of the situations. The only cases in which disproportionate response among female hunters may have increased support for lethal management were in managing wildlife populations and in the two

consumptive recreation situations – three situations receiving among the lowest levels of support of all the management situations. Male hunters were more supportive of lethal management than were male non-hunters in most situations. However, there were no differences between the groups in level of support for lethal management to control wildlife diseases, preserve ecosystem health, or ensure public safety, all of which received among the greatest support of all the management situations. The disproportionate response among male hunters may have slightly increased support for lethal management in the other situations. Overall, however, the impacts were not great. For example, majorities of both male hunters and non-hunters still supported the use of lethal management in all situations except obtaining trophies, which did not receive majority support from either group. So while some differences existed between male and female hunters and non-hunters, they did not seem to overly skew the results of the study, suggesting that these findings may be fairly accurate in representing the state, despite possible response biases.

Conclusions

While men and women differed in their level of support for each of the lethal wildlife management situations explored here, there were marked similarities between the groups in terms of how they assessed the need for lethal management. Both men and women found lethal management most acceptable to control wildlife diseases and least acceptable for consumptive recreation (i.e., obtaining food and trophy animals). The similarities bode well for managers who are struggling with making management decisions involving lethal wildlife management. While many studies have found mixed

support for using lethal wildlife management, in most cases explored here, majorities of both men and women found lethal management justified. Still, women were not as supportive as were men in most of the situations, so managers should be aware of the need to understand and respond to women's concerns about lethal wildlife management in order to minimize conflicts and avoid potential political impediments to implementing policies that involve such methods.

This will be of particular importance as populations of species like white-tailed deer (*Odocoileus virginianus*) and coyote (*Canis latrans*) continue to grow in many areas across the United States. Public support for the use of lethal management to control these populations will be critical, particularly in suburban and urban areas where management options are likely to be limited. In some cases, involving the affected publics in the decision-making process may be necessary for promoting public support for lethal wildlife management. Gaining the support of women for such management is of importance since they are not only more likely than are men to oppose lethal wildlife management, but their association with the animal rights and welfare movements also suggests they may be more likely to support legislative efforts to legally prevent lethal actions.

When specific instances arise in which they feel that lethal wildlife management may be necessary, managers should seek to include women in the management decision-making process, possibly through the use of a Citizen Task Force approach (Curtis and Hauber 1997) or some other open forum that promotes the exchange of ideas among citizens, and between citizens and wildlife managers. Whatever the approach, managers should ensure that women feel accepted as participants and comfortable in expressing

their ideas. While public involvement alone cannot solve all management problems, by utilizing such an approach it may be possible to develop a management decision that is acceptable to the interested and affected citizens (Lauber and Knuth 1998), and thereby prevent undesirable legislative or political backlash to the policy decision.

Managers may also be able to use public involvement to market or promote wildlife population control and management to the public (Diefenbach and Palmer 1997). Public forums may be used to gather information about how best to develop a message about wildlife management that will resonate with affected citizens, and also as a stage for disseminating this message. This study showed that both men and women were very supportive of using lethal methods to control wildlife diseases and protect public safety. By focusing on issues like these that are of greatest concern to the public, managers have the best chance of developing a message that will increase the level of support for lethal wildlife management, and thereby decrease disruptive opposition to management policies. Marketing campaigns utilizing a variety of approaches, including print and television media, government brochures, and public meetings have the greatest likelihood of garnering broad support for lethal wildlife management policy.

Notes

1. A slightly different version of the LWM Scale was used in a similar 1999 survey of Michigan residents. The 1999 LWM Scale consisted of 7 situational items ("Allow hunters to obtain trophy animals" was added in 2000) and responses to the situational items were not contingent upon response to the question about whether it was acceptable to kill individual animals under particular circumstances (see Chapter II).

2. Factor analysis (Principle Components Analysis) and the reliability measure (Cronbach's alpha) were presented for the combined male and female samples since results did not substantially differ when calculated by gender separately.
3. In order to determine whether one regression model would apply to both male and female sub-samples (i.e., that the explanatory variables had similar effects for both men and women), a Chow test was performed using the original explanatory variables as well as items incorporating interaction between the variables and gender (Chow 1960). The results of the Chow test indicated that there was no difference between the regressions for the two groups, and therefore only one regression model that incorporated gender as a dummy variable was necessary.
4. Due to differences in coding for the analyses and different sample sizes, significance results differ slightly for the chi-square tests and zero-order correlations. Men were more supportive of lethal wildlife management than were women in 6 of 8 situations in the chi-square tests, while they were more supportive in all cases when data were analyzed using zero-order correlations.

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Chapter IV

CONCLUSION

In designing these two studies, it was believed that there would be large differences between groups – between wildlife agency personnel and members of the public in the first study, and between men and women in the second study – in terms of support for lethal wildlife management. While differences did exist, the similarities between groups may provide greater insight for managers wishing to implement lethal wildlife management. In particular, it is interesting to note that in these two separate studies, all groups were overwhelmingly supportive of using lethal wildlife management to control wildlife diseases. This is of particular interest in Michigan, where managers are attempting to eradicate bovine tuberculosis (BTB) from the white-tailed deer herds. BTB is a complex problem with the potential to impact wildlife, livestock, and human health, as well as the economy of Michigan. The BTB issue has been highly publicized, heightening public awareness of the BTB problem, as well as the methods being used to control BTB in Michigan's deer herd. Certainly, the BTB situation in Michigan has not been without controversy. However, the high level of support seen in both studies for the use of lethal wildlife management to control wildlife diseases bodes well for managers promoting the use of lethal methods to deal with BTB, and can likely be attributed to the disease situation, which has become a major factor in deer management in Michigan.

The general support for lethal wildlife management found in these studies may have greater significance beyond Michigan in situations involving wildlife problems. If people are highly concerned about a wildlife problem (e.g., the spread of wildlife

diseases, wildlife damage, threats to public safety), they may be more likely to support management that will quickly deal with the problem – in many cases lethal wildlife management may be the most effective and efficient policy. People are likely to be particularly supportive if, as in Michigan, the problem receives media attention, and if the risks posed by wildlife are clear to people. In these cases, managers are likely to find the most public support for lethal wildlife management, and are less likely to encounter conflict with their constituents.

There is a continued need to monitor public attitudes toward lethal wildlife management, especially as both human and wildlife populations grow and human/wildlife conflicts increase. By understanding the perspectives of their constituents, wildlife managers may be able to identify potential opponents to lethal management policies. The key to minimizing conflicts will be to work with affected publics in developing management plans that are acceptable to all stakeholders.

APPENDICES

APPENDIX A:

UCRIHS Approval Letters

MICHIGAN STATE
UNIVERSITY

February 6, 1998

Dr. Angela Mertig

IRB # 98-080
ATTITUDES TOWARD NATURAL RESOURCES AND THEIR MANAGEMENT: A SURVEY OF MICHIGAN RESIDENTS

Dear Dr. Mertig,

UCRIHS has reviewed this proposal and **given it "Preliminary" approval.** The approval is "Preliminary" because it is not possible to fully evaluate the research instruments or detailed procedures at this time. As you have indicated, one of the purposes of the research project is to develop these instruments and procedures. **After you develop the instruments and detailed procedures and prior to any data collection, you must seek "full" UCRIHS approval.** ***When you submit your full UCRIHS application please write in the IRB # listed above on the upper right corner of the application.***

Thank you for bringing this project to our attention. Please feel free to contact us, if we can be of any further assistance.

Sincerely,

David E. Wright, Ph.D.
Chair
University Committee on Research
Involving Human Subjects

DEW:mal

c. Julie Traver

OFFICE OF
RESEARCH AND GRADUATE STUDIES
University Committee on Research Involving Human Subjects (UCRIHS)
Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX: 517/432-1171

MICHIGAN STATE
UNIVERSITY

February 5, 1999

TO: Dr. Angela Mertig
13 Natural Resources

APPROVAL DATE: February 8, 1999

RE: **IRB # 98080** CATEGORY: 1-C

TITLE: ATTITUDES TOWARD NATURAL RESOURCES AND THEIR MANAGEMENT: A SURVEY OF MICHIGAN RESIDENTS

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. Please note that all UCRIHS forms and instruction are located

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW: bd
cc: Melissa Koval

OFFICE OF
RESEARCH AND GRADUATE STUDIES

University Committee on Research Involving Human Subjects (UCRIHS)

Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX 517/353-2976

MICHIGAN STATE
UNIVERSITY

June 24, 2002

TO: Angela MERTIG
13 NAT. RESOURCES

RE: **IRB # 98-080** CATEGORY: 1-C EXEMPT
RENEWAL APPROVAL DATE: June 24, 2002

TITLE: ATTITUDES TOWARD NATURAL RESOURCES AND THEIR MANAGEMENT: A SURVEY OF MICHIGAN RESIDENTS

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS APPROVED THIS PROJECT'S RENEWAL.**

This letter also notes approval of change in target population (include DNR personnel).

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewal are possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.
REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.
PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu.

Sincerely,

Ashir Kumar, M.D.
UCRIHS Chair

AK: kb

cc: Melissa Koval
13 Natural Resources Building

OFFICE OF
RESEARCH ETHICS AND STANDARDS
University Committee on Research Involving Human Subjects
Michigan State University
202 Olds Hall
East Lansing, MI
48824
517/355-2180
FAX: 517/432-4503
Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

MICHIGAN STATE
UNIVERSITY

March 20, 2000

TO: Angela MERTIG
13 Natural Resources

RE: **IRB# 00-125** CATEGORY:1-C
APPROVAL DATE: March 20, 2000

TITLE: ATTITUDES TOWARD NATURAL RESOURCES AND THEIR MANAGMENT: A SURVEY OF MICHIGAN RESIDENTS, 2000

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.
REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.
PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/unit/vprgs/UCRIHS/

Sincerely,

David E. Wright, Ph.D.
DEW: bd
cc: Melissa Koval
13 Natural Resources Building

OFFICE OF
RESEARCH AND GRADUATE STUDIES
University Committee on Research Involving Human Subjects
Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX: 517/353-2976
Web: www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

APPENDIX B:

1999 RAM Survey Materials

Cover Letter for Public Mailing #1, MSU Sender

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

February 16, 1999

The state of Michigan is blessed with a wonderful variety and abundance of natural resources. The Department of Natural Resources (DNR) has been given the task of managing these natural resources, but the DNR requires input from Michigan residents in order to manage these resources in everyone's best interests. For this reason, we are asking for about 10 minutes of your time to complete the enclosed questionnaire regarding the DNR and natural resource issues.

As a public agency, the DNR is interested in serving you. Therefore your response to this survey is very important. Only a relatively small number of Michigan residents are being sent this questionnaire—your response is therefore essential to getting an accurate representation of all residents. While your response to this questionnaire and any of the questions is completely voluntary, the DNR needs this information in order to serve in the public's best interest. You indicate your voluntary agreement to participate by completing and returning this questionnaire.

This survey is intended for someone who is at least 18 years of age and is currently a resident of Michigan. If the person to whom this is addressed does not fit this description, please give this survey to a person in your household who does. If more than one person fits this description, the person with the closest birthday should complete the survey. If no one in your household fits this description, please write on the survey that no one was eligible to complete it and send the survey back to us. We would really appreciate it, and this way we can take you off our mailing list and stop sending you reminders to complete the survey.

You may be assured of complete confidentiality. The survey has identifying information for mailing purposes only. This is so that we may check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you respond by **March 5, 1999**, your name will be entered into a **prize drawing to receive a $50 gift certificate to K-Mart.** I would be happy to answer any questions you might have. Feel free to call me **toll free at 1-888-206-4350**. Thank you for your assistance. Your contribution to the success of this study will be appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Cover Letter for Public Mailing #1, DNR Sender

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

KEITH J. CHARTERS, Chairman
JERRY C. BARTNIK
NANCY A. DOUGLAS
L. THORNTON EDWARDS, JR.
PAUL EISELE
WILLIAM U. PARFET
LLOYD F. WEEKS

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

WEBSITE: www.dnr.state.mi.us

K. L. COOL, Director

WILDLIFE SURVEYS

MICHIGAN DEPARTMENT
OF NATURAL RESOURCES
P.O. BOX 30030
LANSING, MI 48909-9965

February 16, 1999

The state of Michigan is blessed with a wonderful variety and abundance of natural resources. The Department of Natural Resources (DNR) has been given the task of managing these natural resources, but the DNR requires input from Michigan residents in order to manage these resources in everyone's best interests. For this reason, we are asking for about 10 minutes of your time to complete the enclosed questionnaire regarding the DNR and natural resource issues.

As a public agency, the DNR is interested in serving you. Therefore your response to this survey is very important. Only a relatively small number of Michigan residents are being sent this questionnaire—your response is therefore essential to getting an accurate representation of all residents. While your response to this questionnaire and any of the questions is completely voluntary, the DNR needs this information in order to serve in the public's best interest. You indicate your voluntary agreement to participate by completing and returning this questionnaire.

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You may be assured of complete confidentiality. The survey has identifying information for mailing purposes only. This is so that we may check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you respond by **March 5, 1999**, your name will be entered into a **prize drawing to receive a $50 gift certificate to K-Mart.** I would be happy to answer any questions you might have. Feel free to call me **toll free at 1-888-206-4350**. Thank you for your assistance. Your contribution to the success of this study will be appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Cover Letter for Public Mailing #2, MSU Sender

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

March 15, 1999

A few weeks ago you were mailed a survey on "Resource Attitudes in Michigan." As of today, we have not received your completed survey. If this letter and your completed survey have crossed in the mail, we would like to thank you for returning your survey. If you have not yet filled out the survey, we hope you will take the opportunity to do so now. We are sending another survey, along with a stamped return envelope, to make it easier for you to respond.

Michigan is blessed with a wonderful variety and abundance of natural resources. In order for the Department of Natural Resources (DNR) to manage these resources for everyone's benefit, it is essential that we hear from you. Because this survey is being sent to relatively few people within the state of Michigan and because we need the results to represent all residents, it is very important that each person respond to this survey.

We are interested in everyone's opinion. It doesn't matter how old you are—your opinions are valued. You do not have to be a hunter or angler—we still want to know your thoughts on the management of Michigan's natural resources. If you truly have no opinion on an issue, feel free to indicate that on the survey—but we still need your response in order to know this.

This survey is intended for someone who is at least 18 years of age and is currently a resident of Michigan. If the person to whom this is addressed does not fit this description, please forward this survey to a person in your household who does. If more than one person fits this description, the person with the closest birthday should complete the survey. However, if no one fits this description, we would really appreciate it if you sent the survey back, indicating that no one was eligible to complete it. This allows us to stop sending reminders.

You indicate your voluntary agreement to participate in this survey by completing and returning this questionnaire. You may be assured of complete confidentiality. The survey has an identification number that allows us to check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you respond by **March 31, 1999**, your name will be entered into a new **prize drawing to receive a $50 gift certificate to K-Mart.** I would be happy to answer any questions you have. Feel free to call me at 1-800-206-4350. Thank you for your assistance—it is truly appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Cover Letter for Public Mailing #2, DNR Sender

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

KEITH J. CHARTERS, Chairman
JERRY C. BARTNIK
NANCY A. DOUGLAS
L. THORNTON EDWARDS, JR.
PAUL EISELE
WILLIAM U. PARFET
LLOYD F. WEEKS

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

WEBSITE: www.dnr.state.mi.us

K. L. COOL, Director

WILDLIFE SURVEYS

MICHIGAN DEPARTMENT
OF NATURAL RESOURCES
P.O. BOX 30030
LANSING, MI 48909-9965

March 15, 1999

A few weeks ago you were mailed a survey on "Resource Attitudes in Michigan." As of today, we have not received your completed survey. If this letter and your completed survey have crossed in the mail, we would like to thank you for returning your survey. If you have not yet filled out the survey, we hope you will take the opportunity to do so now. We are sending another survey, along with a stamped return envelope, to make it easier for you to respond.

Michigan is blessed with a wonderful variety and abundance of natural resources. In order for the Department of Natural Resources (DNR) to manage these resources for everyone's benefit, it is essential that we hear from you. Because this survey is being sent to relatively few people within the state of Michigan and because we need the results to represent all residents, it is very important that each person respond to this survey.

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If you respond by **March 31, 1999**, your name will be entered into a new **prize drawing to receive a $50 gift certificate to K-Mart.** I would be happy to answer any questions you have. Feel free to call me at 1-800-206-4350. Thank you for your assistance—it is truly appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Cover Letter for Public Mailing #3, MSU Sender

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

April 7, 1999

Recently you were mailed a survey on "Resource Attitudes in Michigan." As of today, we have not received your completed survey. If this letter and your completed survey have crossed in the mail, we would like to thank you for returning your survey. If you have not yet filled out the survey, we hope you will take the opportunity to do so now. We are sending another survey, along with a stamped return envelope, to make it easier for you to respond.

Michigan is blessed with a wonderful variety and abundance of natural resources. In order for the Department of Natural Resources (DNR) to manage these resources for everyone's benefit, it is essential that we hear from you. Because this survey is being sent to relatively few people within the state of Michigan and because we need the results to represent all residents, it is very important that each person respond to this survey.

We are interested in everyone's opinion. It doesn't matter how old you are—your opinions are valued. You do not have to be a hunter or angler—we still want to know your thoughts on the management of Michigan's natural resources. If you truly have no opinion on an issue, feel free to indicate that on the survey—but we still need your response in order to know this.

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You indicate your voluntary agreement to participate in this survey by completing and returning this questionnaire. You may be assured of complete confidentiality. The survey has an identification number that allows us to check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you have any questions regarding the survey, feel free to call me at 1-888-206-4350. Thank you for your assistance—it is truly appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Cover Letter for Public Mailing #3, DNR Sender

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

KEITH J. CHARTERS, Chairman
JERRY C. BARTNIK
NANCY A. DOUGLAS
L. THORNTON EDWARDS, JR.
PAUL EISELE
WILLIAM U. PARFET
LLOYD F. WEEKS

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

WEBSITE: www.dnr.state.mi.us

K. L. COOL, Director

WILDLIFE SURVEYS

MICHIGAN DEPARTMENT
OF NATURAL RESOURCES
P.O. BOX 30030
LANSING, MI 48909-9965

April 7, 1999

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Michigan is blessed with a wonderful variety and abundance of natural resources. In order for the Department of Natural Resources (DNR) to manage these resources for everyone's benefit, it is essential that we hear from you. Because this survey is being sent to relatively few people within the state of Michigan and because we need the results to represent all residents, it is very important that each person respond to this survey.

We are interested in everyone's opinion. It doesn't matter how old you are—your opinions are valued. You do not have to be a hunter or angler—we still want to know your thoughts on the management of Michigan's natural resources. If you truly have no opinion on an issue, feel free to indicate that on the survey—but we still need your response in order to know this.

This survey is intended for someone who is at least 18 years of age and is currently a resident of Michigan. If the person to whom this is addressed does not fit this description, please forward this survey to a person in your household who does. If more than one person fits this description, the person with the closest birthday should complete the survey. However, if no one fits this description, we would really appreciate it if you sent the survey back, indicating that no one was eligible to complete it. This allows us to stop sending reminders.

You indicate your voluntary agreement to participate in this survey by completing and returning this questionnaire. You may be assured of complete confidentiality. The survey has an identification number that allows us to check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you have any questions regarding the survey, feel free to call me at 1-888-206-4350. Thank you for your assistance—it is truly appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Postcard for Public Mailing

February 26, 1999

Recently you were mailed a questionnaire seeking your opinion about the Department of Natural Resources and natural resource issues in the state of Michigan.

If you have already completed and returned the survey, please accept our sincere thanks! If not, please do so today. Because the DNR is interested in serving the public of Michigan, it is very important that we receive your feedback.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me toll free at 1-888-206-4350 and I will get another one in the mail to you.

Sincerely,

Angela G. Mertig
Project Manager

Public Non-response Survey

June 1, 1999

Recently you were mailed a questionnaire seeking your opinion about the Department of Natural Resources (DNR) and Resource Attitudes in Michigan. Since our response rate to this survey was lower than we had hoped, we would like to ask you a few questions so we can understand the nature of this non-response.

We are not asking you to fill out anything like the survey we sent to you previously. Rather, we have attached a stamped, addressed postcard for you to fill out, detach, and drop in the mail. It should take no more than a minute or two to fill out the postcard. We would sincerely appreciate your taking the time to get this back to us soon as it will provide valuable information for our study.

As before, your response to this is voluntary but we would not be asking you for this information if we did not consider it important. You may be assured of complete confidentiality. The postcard has an identification number for mailing purposes only. Your name will never be linked to your responses.

Your cooperation is greatly appreciated. Thank you in advance for taking the time to help us in this matter.

Sincerely,

Angela G. Mertig
Project Manager

1. Was there a particular reason you did not respond to our survey on Resource Attitudes in Michigan? (Check all that apply.)
   - ❒ I do not like answering surveys
   - ❒ I do not have time to answer surveys
   - ❒ I know very little about the DNR
   - ❒ I never received the survey
   - ❒ Another reason (please specify):_____
   - ❒ The survey looked too long and/or complicated
   - ❒ I am unhappy with the DNR and/or its programs
   - ❒ I am not interested in the issues in the survey
   - ❒ I would prefer being contacted by telephone

2. In a typical year, do you engage in any of the following activities? (Check all that apply.)
   ❒ Hunting ❒ Fishing ❒ Bird Watching and/or Wildlife Viewing

For the following two statements, choose the response closest to your opinion.

3. I trust the DNR to fairly consider all interests when making natural resource decisions. (Check one.)
   ❒ Always ❒ Usually ❒ Sometimes ❒ Never ❒ Unsure

4. Hunting is an important part of our national heritage. (Check one.)
   ❒ Strongly Agree ❒ Mildly Agree ❒ Unsure ❒ Mildly Disagree ❒ Strongly Disagree

For the following situations, choose the response closest to your opinion. (Check one for each.)

5. As long as it is properly controlled, is it acceptable to kill individual wild animals in order to...
   - a. ...control wildlife damage ❒ Yes ❒ No ❒ Unsure
   - b. ...ensure public safety ❒ Yes ❒ No ❒ Unsure
   - c. ...manage population levels of wild animals ❒ Yes ❒ No ❒ Unsure

6. Do you have a college degree? ❒ Yes ❒ No
7. Are you male or female? ❒ Male ❒ Female
8. In what year were you born? 19____

Cover Letter for Agency Mailing

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

KEITH J. CHARTERS, Chairman
JERRY C. BARTNIK
NANCY A. DOUGLAS
L. THORNTON EDWARDS, JR.
PAUL EISELE
WILLIAM U. PARFET
LLOYD F. WEEKS

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

WEBSITE: www.dnr.state.mi.us

K. L. COOL, Director

WILDLIFE SURVEYS

MICHIGAN DEPARTMENT
OF NATURAL RESOURCES
P.O. BOX 30030
LANSING, MI 48909-9965

May 14, 1999

Dear DNR Employee:

For the last couple of months, the Wildlife Division and Michigan State University have been working together on a survey to assess Michigan citizens' attitudes toward the DNR and wildlife issues in the state of Michigan. As the survey has progressed, we recognized the value in comparing public responses to those of DNR personnel. For this reason, we are asking for about 10 minutes of your time to complete the enclosed questionnaire regarding the DNR and natural resource issues.

Your response to this survey is very important. Only a relatively small number of agency personnel are being sent this questionnaire—your response is therefore essential to getting an accurate representation of all personnel. While your response to this questionnaire and any of the questions is completely voluntary, we need this information in order to compare agency and public responses. You indicate your voluntary agreement to participate by completing and returning this questionnaire.

This survey is completely anonymous. The letter code on your survey tells us only your general job classification – **we will not be able to identify you by name**.

Please take a few minutes to complete the enclosed survey and return it in the envelope provided via usual agency protocol **by Wednesday, June 2, 1999**. If you have any questions about the survey, please call me toll free at 1-888-206-4350. Thank you for your assistance. Your contribution to the success of this study is greatly appreciated.

Sincerely,

Angela G. Mertig
Project Manager

Postcard for Agency Mailing

May 26, 1999

Dear DNR Employee:

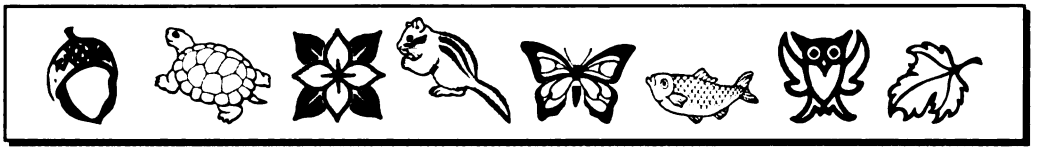
Recently you were asked to complete a questionnaire on Resource Attitudes in Michigan.

If you have already completed and returned the survey, thank you! If not, please do so today. It is very important that we receive your feedback in order to compare agency responses to those of the public.

If you did not receive the questionnaire, or it got misplaced, please call me toll free at 1-888-206-4350 and I will get another one in the mail to you.

Sincerely,

Angela G. Mertig
Project Manager



1999 Resource Attitudes in Michigan Survey

This survey deals with the Department of Natural Resources and natural resource issues in the state of Michigan. For this survey, natural resources include wildlife (game and non-game), fish, forests and parks as well as the general environment in which these resources are located.

The Department of Natural Resources

First, we would like to ask you some questions about the Michigan Department of Natural Resources, also known as the DNR.

1. For each of the following statements, please indicate whether you believe the statement to be true Always, Usually, Sometimes, or Never, or if you are Unsure. (Circle one response for each.)

		1 Always	2 Usually	3 Sometimes	4 Never	5 Unsure
a.	The DNR manages natural resources in a scientifically sound manner.	A	US	S	N	UN
b.	The DNR provides accurate information on natural resource issues.	A	US	S	N	UN
c.	I trust the DNR to fairly consider all interests when making natural resource decisions.	A	US	S	N	UN
d.	The DNR adequately explains its programs to the public.	A	US	S	N	UN
e.	DNR personnel provide high quality service to the public.	A	US	S	N	UN
f.	The DNR provides adequate opportunities for public participation in natural resource decisions.	A	US	S	N	UN

2. What issues or problems should the DNR focus on during the next 5 years? Please list any issues or problems that are important to you that you think the DNR should do something about.

_____
_____
_____

3. Which of the following do you believe are current functions of the DNR? (Check all that apply.)
   1 ❒ Establishing hunting regulations
   2 ❒ Removing litter on state highways
   3 ❒ Managing fisheries
   4 ❒ Monitoring air quality
   5 ❒ Providing permits for draining and filling wetlands
   6 ❒ Enforcing laws
   7 ❒ Protecting endangered species
   8 ❒ Unsure

4. For each of the following goals of natural resource management, please indicate which you think should be given the highest priority by placing a "1" next to it. Place a "2" next to the goal that should be given the next highest priority, and so on until you have ranked all four goals.

➡Natural resource management goals should be...

____ ... to provide recreational opportunities.
____ ... to actively promote the ecological health of Michigan.
____ ... to support resource development for greater economic growth.
____ ... to allow natural processes to take their course.

Wildlife Issues

The next set of questions is specifically related to wildlife resources in Michigan.

5. Each of the following statements pertains to the management of wildlife species in Michigan. For each, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	Whether or not I see wildlife, just knowing that wildlife exist in Michigan is important.	SA	MA	U	MD	SD
b.	Wildlife should be managed for the benefit of future generations.	SA	MA	U	MD	SD
c.	It is more important to manage wildlife for current human needs than to preserve wildlife for future generations.	SA	MA	U	MD	SD
d.	It is important to preserve habitat for rare and endangered species.	SA	MA	U	MD	SD
e.	It is the DNR's responsibility to ensure that individual wild animals remain healthy.	SA	MA	U	MD	SD
f.	It is the DNR's responsibility to ensure that wildlife do not become a nuisance to land owners and farmers.	SA	MA	U	MD	SD
g.	Humans should stop managing wildlife populations and leave wildlife alone.	SA	MA	U	MD	SD

6. For each of the following statements, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	Hunting is an important part of our national heritage.	SA	MA	U	MD	SD
b.	In general, hunters tend to be very concerned about protecting the environment.	SA	MA	U	MD	SD
c.	In general, hunters are socially responsible individuals.	SA	MA	U	MD	SD
d.	I oppose all forms of recreational hunting.	SA	MA	U	MD	SD
e.	Trappers are concerned about the humane treatment of animals.	SA	MA	U	MD	SD
f.	I feel trapping animals for fur is acceptable when it is properly regulated.	SA	MA	U	MD	SD
g.	I feel fishing is acceptable when it is properly regulated.	SA	MA	U	MD	SD

7. For each of the following situations, please indicate whether you believe it is acceptable to kill individual wild animals. (Circle one response for each.)

➡As long as it is properly controlled, is it acceptable to kill individual wild animals in order to...

a.	...control wildlife diseases	Yes	No	Unsure
b.	...ensure species survival	Yes	No	Unsure
c.	...preserve the ecological health of an area	Yes	No	Unsure
d.	...control wildlife damage	Yes	No	Unsure
e.	...ensure public safety	Yes	No	Unsure
f.	...manage population levels of wild animals	Yes	No	Unsure
g.	...provide opportunities to gather food	Yes	No	Unsure
h.	It is ***never*** acceptable to kill individual wild animals.	Yes	No	Unsure

WHITE-TAILED DEER

This set of questions deals with one of the most popular wildlife species in Michigan – the white-tailed deer.

8. What is your opinion of the current number of white-tailed deer in the area in which you live? (Check one.)
   - 1 ❒ Far too few
   - 2 ❒ Slightly too few
   - 3 ❒ About the right amount
   - 4 ❒ Slightly too many
   - 5 ❒ Far too many
   - 6 ❒ Unsure

9. Have you or any members of your immediate family had any problems with white-tailed deer in the state of Michigan within the last 5 years? (Check one.)
   - 1 ❒ Yes
   - 2 ❒ No ***(If 'No', please skip to question 11)***

10. What type(s) of problem(s) have you or members of your family had with white-tailed deer? (Check all that apply.)
    - 1 ❒ Property damage
    - 2 ❒ Crop damage
    - 3 ❒ Deer-car accidents
    - 4 ❒ Other (please specify)_____

11. Do you feel that the number of deer/car accidents in Michigan in the past 5 years has: (Check one.)
    - 1 ❒ Decreased substantially
    - 2 ❒ Decreased somewhat
    - 3 ❒ Stayed the same
    - 4 ❒ Increased somewhat
    - 5 ❒ Increased substantially
    - 6 ❒ Unsure

12. If, at some time, you believe there ***are*** far too many white-tailed deer <u>in the area in which you live</u>, which of the following deer management strategies would you find acceptable to control deer populations? (Circle one response for each.)

a.	Allow hunters to kill more deer	Yes	No	Unsure
b.	Hire sharpshooters to thin the herd	Yes	No	Unsure
c.	Trap and remove deer	Yes	No	Unsure
d.	Do nothing – allow nature to take its course	Yes	No	Unsure

13. Do you believe deer should be fed in order to survive an unusually harsh winter? (Check one.)
    1 ❒ Yes
    2 ❒ No
    3 ❒ Unsure

14. Have you heard about the incidence of bovine TB (tuberculosis) in white-tailed deer in Michigan? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 16)***

15. In your opinion, how serious is the issue of bovine TB in white-tailed deer in Michigan? (Check one.)
    1 ❒ Not At All Serious
    2 ❒ Somewhat Serious
    3 ❒ Very Serious
    4 ❒ Unsure

6

CANADA GEESE

Another popular wildlife species in Michigan is the Canada Goose.

16. What is your opinion of the current number of Canada Geese in the area in which you live? (Check one.)
    1 ❒ Far too few
    2 ❒ Slightly too few
    3 ❒ About the right amount
    4 ❒ Slightly too many
    5 ❒ Far too many
    6 ❒ Unsure

17. Have you or any members of your immediate family had any problems with Canada Geese in the state of Michigan within the last 5 years? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 19)***

18. What type(s) of problem(s) have you or members of your family had with Canada Geese? (Check all that apply.)
    1 ❒ Property or crop damage
    2 ❒ Bothered by noise
    3 ❒ Bothered by droppings
    4 ❒ Bothered by odor
    5 ❒ Attacked by goose
    6 ❒ Other (please specify) _____

19. If, at some time, you believe there ***are*** far too many Canada Geese in the area in which you live, which of the following strategies would you find acceptable to control goose populations? (Circle one response for each.)

a.	Increase the number of geese taken by hunters	Yes	No	Unsure
b.	Destroy the eggs of problem geese	Yes	No	Unsure
c.	Destroy the nests of problem geese	Yes	No	Unsure
d.	Kill problem geese and give the meat to charity	Yes	No	Unsure
e.	Trap and remove geese	Yes	No	Unsure

20. Have you or members of your immediate family had any problems with other species of wildlife in the state of Michigan in the last 5 years? If so, please list which wildlife species:_____

_____

Environmental Opinions

The next set of questions deals with your environmental opinions.

21. The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	We are approaching the limit of the number of people the earth can support.	SA	MA	U	MD	SD
b.	When humans interfere with nature it often produces disastrous consequences.	SA	MA	U	MD	SD
c.	The earth has plenty of natural resources if we just learn how to develop them.	SA	MA	U	MD	SD
d.	Plants and animals have as much right as humans to exist.	SA	MA	U	MD	SD
e.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	SA	MA	U	MD	SD
f.	Despite our special abilities humans are still subject to the laws of nature.	SA	MA	U	MD	SD
g.	The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	SA	MA	U	MD	SD
h.	Humans were meant to rule over the rest of nature.	SA	MA	U	MD	SD
i.	Humans will eventually learn enough about how nature works to be able to control it.	SA	MA	U	MD	SD
j.	If things continue on their present course, we will soon experience a major ecological catastrophe.	SA	MA	U	MD	SD

22. Which of these two statements is closer to your opinion? (Check one.)

1 ❒ We ***cannot*** have both economic growth and a high level of environmental quality; we must sacrifice one or the other.

2 ❒ We ***can*** have both economic growth and a high level of environmental quality. ***(If you marked 2, please skip to question 24)***

23. Which of these two statements is closer to your opinion? (Check one.)

1 ❒ Protecting the environment should be given priority, even at the risk of slowing down economic growth.

2 ❒ Economic growth should be given priority, even if the environment suffers to some extent.

Background Information

In order for us to more fully understand people's responses to the previous questions, we need to know a few things about your background. Remember that your responses are completely confidential and that neither your name nor your address will be directly linked to your responses in any way.

24. About how often, in a typical year, do you engage in each of the following natural resource activities? (Circle one response for each.)

	1 Frequently	2 Sometimes	3 Rarely	4 Never
Hunting	F	S	R	N
Fishing	F	S	R	N
Bird Watching	F	S	R	N
Wildlife Viewing	F	S	R	N
Fur Trapping	F	S	R	N
Other:_____	F	S	R	N
Other:_____	F	S	R	N

25. Please list any organizations, related to natural resources, that you have been a member of or have contributed money to in the last 5 years.

_____

_____

_____

26. How many years have you lived in the State of Michigan? _____YEARS

27. In what county do you currently live? _____COUNTY

28. In what type of area do you currently live? (Check one.)
    1 ❒ Rural, Farm
    2 ❒ Rural, Non-Farm (2,500 people or fewer)
    3 ❒ Small Town (From 2,501 up to 25,000 people)
    4 ❒ Urban Area (From 25,001 up to 100,000 people)
    5 ❒ Metropolitan Area (More than 100,000 people)

29. In what type of area did you spend all or most of your childhood? (Check one.)
    1 ❒ Rural, Farm
    2 ❒ Rural, Non-Farm (2,500 people or fewer)
    3 ❒ Small Town (Between 2,501 and 25,000 people)
    4 ❒ Urban Area (Between 25,001 and 100,000 people)
    5 ❒ Metropolitan Area (More than 100,000 people)

30. Do you own property in Michigan? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 33)***

31. Approximately how many acres do you own? _____ ACRES

32. Which of the following uses do you make of this land? (Check all that apply.)
    1 ❒ Residence
    2 ❒ Agricultural production
    3 ❒ Recreation
    4 ❒ Investment

33. How many children (under the age of 18) currently live in your household?
_____ CHILDREN

34. What is the highest level of formal education that you have completed? (Check one.)
1 ❒ Less than high school graduate
2 ❒ High school graduate or GED
3 ❒ Vocational or Trade School
4 ❒ Associate's Degree (2 year degree)
5 ❒ Some College
6 ❒ College Graduate (Bachelor's or 4 year degree)
7 ❒ Graduate or Professional Degree

35. Are you male or female?
1 ❒ Male
2 ❒ Female

36. In what year were you born? 19____

37. What is your race or ethnicity? (Check all that apply.)
1 ❒ American Indian or Alaska Native
2 ❒ Asian
3 ❒ Black or African American
4 ❒ Hispanic or Latino
5 ❒ Native Hawaiian or Other Pacific Islander
6 ❒ White

38. What was your gross household income (before taxes) in 1998? (Check one.)
1 ❒ Less than $20,000
2 ❒ $20,000 to $39,999
3 ❒ $40,000 to $59,999
4 ❒ $60,000 to $74,999
5 ❒ $75,000 or more




Thank you for your participation!

If you have any other comments you would like to share with us, please use the space below (or add additional sheets if necessary).

Please use the enclosed addressed and stamped envelope or return this survey to:

Wildlife Surveys
Department of Fisheries and Wildlife
13 Natural Resources Building
Michigan State University
East Lansing, MI 48824-1222

APPENDIX C:

2000 RAM Survey Materials

Cover Letter for Mailing #1

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

April 3, 2000

Michigan is blessed with a wonderful variety and abundance of natural resources. The Department of Natural Resources (DNR) has been given the task of managing these natural resources, but the DNR requires input from Michigan residents in order to manage resources in everyone's best interests. For this reason, we are asking for about 10 minutes of your time to complete the enclosed questionnaire regarding natural resource issues in Michigan. Only a relatively small number of Michigan residents are being sent this questionnaire—your response is therefore essential to getting an accurate representation of all residents.

We are interested in everyone's opinion. It doesn't matter how old you are—your opinions are valued. You do not have to be a hunter or angler—we still want to know your thoughts on the management of Michigan's natural resources. If you have no opinion on an issue, feel free to indicate that on the survey—but we still need your response in order to know this.

This survey is intended for someone who is at least 18 years of age and is currently a resident of Michigan. If the person to whom this is addressed does not fit this description, please give this survey to a person in your household who does. If more than one person fits this description, the person with the closest birthday should complete the survey. If no one in your household fits this description, please write on the survey that no one was eligible to complete it and send the survey back to us. We would really appreciate it, and this way we can take you off our mailing list and stop sending you reminders to complete the survey.

While your response to this questionnaire and any of the questions is completely voluntary, the DNR needs this information in order to serve in the public's best interest. You indicate your voluntary agreement to participate by completing and returning this questionnaire. You may be assured of complete confidentiality. The survey has identifying information for mailing purposes only. This is so that we may check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you respond by **May 22, 2000**, your name will be entered into a **prize drawing to receive one of two $50 gift certificates to K-Mart.** I would be happy to answer any questions you might have. Feel free to call me **toll free at 1-888-206-4350**. Thank you for your assistance. Your contribution to the success of this study will be appreciated.

Sincerely,

A. Mertig
Project Manager

Cover Letter for Mailing #2

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

May 10, 2000

A few weeks ago you were mailed a survey on "Resource Attitudes in Michigan." As of today, we have not received your completed survey. If this letter and your completed survey have crossed in the mail, we would like to thank you for returning your survey. If you have not yet filled out the survey, we hope you will take the opportunity to do so now. We are sending another survey, along with a stamped return envelope, to make it easier for you to respond.

Michigan is blessed with a wonderful variety and abundance of natural resources. In order for the Department of Natural Resources (DNR) to manage these resources for everyone's benefit, it is essential that we hear from you. For this reason, we are asking for about 10 minutes of your time to complete the enclosed questionnaire regarding natural resource issues in Michigan. Because this survey is being sent to relatively few people within the state of Michigan and because we need the results to represent all residents, it is very important that each person respond to this survey.

We are interested in everyone's opinion. It doesn't matter how old you are—your opinions are valued. You do not have to be a hunter or angler—we still want to know your thoughts on the management of Michigan's natural resources. If you truly have no opinion on an issue, feel free to indicate that on the survey—but we still need your response in order to know this.

This survey is intended for someone who is at least 18 years of age and is currently a resident of Michigan. If the person to whom this is addressed does not fit this description, please forward this survey to a person in your household who does. If more than one person fits this description, the person with the closest birthday should complete the survey. However, if no one fits this description, we would really appreciate it if you sent the survey back, indicating that no one was eligible to complete it. This allows us to stop sending reminders.

While your response to this questionnaire and any of the questions is completely voluntary, the DNR needs this information in order to serve in the public's best interest. You indicate your voluntary agreement to participate in this survey by completing and returning this questionnaire. You may be assured of complete confidentiality. The survey has an identification number that allows us to check your name off of the mailing list when your survey is returned. Your name and address will never be associated with your responses in any way.

If you respond by **May 29, 2000**, your name will be entered into a new **prize drawing to receive one of two $50 gift certificates to K-Mart.** I would be happy to answer any questions you have. Feel free to call me **toll free at 1-888-206-4350**. Thank you for your assistance—it is truly appreciated.

Sincerely,

A. Mertig
Project Manager

Postcard

April 13, 2000

Recently you were mailed a questionnaire seeking your opinion about natural resource issues in the state of Michigan.

If you have already completed and returned the survey, please accept our sincere thanks! If not, please do so today. Because the DNR is interested in serving the public of Michigan, it is very important that we receive your feedback.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me **toll free at 1-888-206-4350** and I will get another one in the mail to you.

Sincerely,

A. Mertig
Project Manager

2000 Resource Attitudes in Michigan Survey

This survey deals with natural resource issues in the state of Michigan. For this survey, natural resources include wildlife (game <u>and</u> non-game), fish, forests and parks as well as the general environment in which these resources are located.

Natural Resource Activities

First, we would like to ask you about your participation in natural resource related activities. Remember that you do not have to participate in these activities in order to fill out this survey. <u>We are interested in everyone's responses.</u>

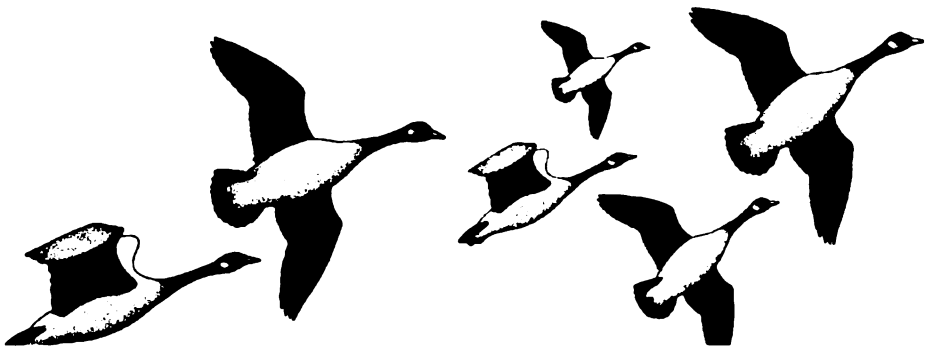
1. About how often, in a typical year, do you engage in each of the following natural resource activities? (Circle one response for each.)

	1 Never	2 Rarely	3 Sometimes	4 Frequently
Wildlife Viewing	N	R	S	F
Bird Watching	N	R	S	F
Hiking	N	R	S	F
Camping	N	R	S	F
Boating	N	R	S	F
Fishing	N	R	S	F
Hunting	N	R	S	F

2. Please list any organizations, <u>related to natural resources</u>, that you have been a member of or have contributed money to in the last 5 years. Please write out full organization name(s). _____

_____

_____



The Department of Natural Resources

The next set of questions relates to the Michigan Department of Natural Resources, also known as the DNR.

3. For each of the following statements, please indicate whether you believe the statement to be true Always, Usually, Sometimes, or Never, or if you are Unsure. (Circle one response for each.)

		1 Always	2 Usually	3 Sometimes	4 Never	5 Unsure
a.	The DNR manages natural resources in a scientifically sound manner.	A	US	S	N	UN
b.	The DNR provides accurate information on natural resource issues.	A	US	S	N	UN
c.	I trust the DNR to fairly consider all interests when making natural resource decisions.	A	US	S	N	UN
d.	The DNR adequately explains its programs to the public.	A	US	S	N	UN
e.	DNR personnel provide high quality service to the public.	A	US	S	N	UN
f.	The DNR provides adequate opportunities for public participation in natural resource decisions.	A	US	S	N	UN

4. What issues or problems should the DNR focus on during the next 5 years? Please list any issues or problems <u>that are important to you</u> that you think the DNR should do something about. _____

_____

_____

_____

5. Please indicate whether you believe each of the following are current functions of the DNR. (Circle one response for each.)

a.	Establishing hunting regulations	Yes	No	Unsure
b.	Leasing mineral resources	Yes	No	Unsure
c.	Removing litter on state highways	Yes	No	Unsure
d.	Stocking lakes with fish	Yes	No	Unsure
e.	Monitoring air quality	Yes	No	Unsure
f.	Providing permits for draining and filling wetlands	Yes	No	Unsure
g.	Removing dead deer from roads	Yes	No	Unsure
h.	Enforcing laws	Yes	No	Unsure
i.	Protecting endangered species	Yes	No	Unsure
j.	Controlling forest fires	Yes	No	Unsure

6. For each of the following goals of natural resource management, please indicate which you think should be given the highest priority by placing a "1" next to it. Place a "2" next to the goal that should be given the next highest priority, and so on until you have ranked all four goals.

➡Natural resource management goals should be...

___ ... to provide recreational opportunities.
___ ... to actively promote the ecological health of Michigan.
___ ... to support resource development for greater economic growth.
___ ... to allow nature to take its course.

3

Wildlife Issues

The next set of questions is specifically related to wildlife resources in Michigan.

7. Each of the following statements pertains to the management of wildlife species in Michigan. For each, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	Whether or not I see wildlife, just knowing that wildlife exist in Michigan is important.	SA	MA	U	MD	SD
b.	Wildlife should be managed for the benefit of future generations.	SA	MA	U	MD	SD
c.	It is more important to manage wildlife for current human needs than to preserve wildlife for future generations.	SA	MA	U	MD	SD
d.	It is important to preserve habitat for rare and endangered species.	SA	MA	U	MD	SD
e.	Development of rural areas is currently one of the greatest threats to wildlife in Michigan.	SA	MA	U	MD	SD
f.	The DNR should manage wildlife to increase hunting opportunities in Michigan.	SA	MA	U	MD	SD
g.	It is the DNR's responsibility to ensure that wild animals remain healthy.	SA	MA	U	MD	SD
h.	It is the DNR's responsibility to ensure that wildlife do not become a nuisance to land owners.	SA	MA	U	MD	SD
i.	Humans should stop managing wildlife populations and leave wildlife alone.	SA	MA	U	MD	SD

8. For each of the following statements, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	Hunting is an important part of our national heritage.	SA	MA	U	MD	SD
b.	Hunters tend to be very concerned about protecting the environment.	SA	MA	U	MD	SD
c.	Hunters are socially responsible individuals.	SA	MA	U	MD	SD
d.	I oppose all forms of recreational hunting.	SA	MA	U	MD	SD
e.	Trappers are concerned about the humane treatment of animals.	SA	MA	U	MD	SD
f.	I feel trapping animals for fur is acceptable when it is properly regulated.	SA	MA	U	MD	SD
g.	I feel fishing is acceptable when it is properly regulated.	SA	MA	U	MD	SD

9. Do you believe it is acceptable to kill individual wild animals in certain circumstances? (Check one.)

1 ❒ Yes
2 ❒ Unsure
3 ❒ No **(If 'No', please skip to question 11)**

10. For each of the following situations, please indicate whether you believe it is acceptable to kill individual wild animals. (Circle one response for each.)

➡ ***As long as it is properly controlled, is it acceptable to kill individual wild animals in order to...***

a.	...control wildlife diseases	Yes	No	Unsure
b.	...ensure species survival	Yes	No	Unsure
c.	...preserve the ecological health of an area	Yes	No	Unsure
d.	...control wildlife damage	Yes	No	Unsure
e.	...ensure public safety	Yes	No	Unsure
f.	...manage population levels of wild animals	Yes	No	Unsure
g.	...provide opportunities to gather food	Yes	No	Unsure
h.	...allow hunters to obtain trophy animals	Yes	No	Unsure

White-tailed Deer

This set of questions deals with a popular wildlife species in Michigan – the white-tailed deer.

11. What is your opinion of the current number of white-tailed deer in the area in which you live? (Check one.)
    1 ❒ Far too few
    2 ❒ Slightly too few
    3 ❒ About the right amount
    4 ❒ Slightly too many
    5 ❒ Far too many
    6 ❒ Unsure

12. Have you or any members of your immediate family had any problems with white-tailed deer in the state of Michigan within the last 5 years? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 14)***

13. What type(s) of problem(s) have you or members of your family had with white-tailed deer? (Check all that apply.)
    1 ❒ Property damage
    2 ❒ Crop damage
    3 ❒ Deer-car accidents
    4 ❒ Other (please specify)_____

14. Do you feel that the number of deer-car accidents in Michigan in the past 5 years has: (Check one.)
    1 ❒ Decreased substantially
    2 ❒ Decreased somewhat
    3 ❒ Stayed the same
    4 ❒ Increased somewhat
    5 ❒ Increased substantially
    6 ❒ Unsure

15. If, at some time, you believe there ***are*** far too many white-tailed deer in the area in which you live, which of the following deer management strategies would you find acceptable to control deer populations? (Circle one response for each.)

a.	Allow hunters to kill more deer	Yes	No	Unsure
b.	Hire sharpshooters to thin the herd	Yes	No	Unsure
c.	Kill deer and give the meat to charity	Yes	No	Unsure
d.	Trap and remove deer	Yes	No	Unsure
e.	Do nothing – allow nature to take its course	Yes	No	Unsure

16. Do you believe deer should be fed in order to survive an unusually harsh winter? (Check one.)
    1 ❒ Yes
    2 ❒ No
    3 ❒ Unsure

17. Have you heard about the incidence of bovine TB (tuberculosis) in white-tailed deer in Michigan? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 20)***

18. In your opinion, how serious is the issue of bovine TB in white-tailed deer in Michigan? (Check one.)
    1 ❒ Not At All Serious
    2 ❒ Somewhat Serious
    3 ❒ Very Serious
    4 ❒ Unsure

19. For each of the following, please indicate whether you believe the threat of bovine TB is Not At All Serious, Somewhat Serious, Very Serious, or you are Unsure. (Circle one response for each.)

➡ **How serious do you believe the threat of bovine TB is for...**		**1 Not At All Serious**	**2 Somewhat Serious**	**3 Very Serious**	**4 Unsure**
a.	...wildlife populations	NS	SS	VS	U
b.	...human health	NS	SS	VS	U
c.	...the livestock industry	NS	SS	VS	U

Canada Geese

Another popular wildlife species in Michigan is the Canada Goose.

20. *What is your opinion of the current number of Canada Geese in the area in which you live? (Check one.)*
    1 ❒ Far too few
    2 ❒ Slightly too few
    3 ❒ About the right amount
    4 ❒ Slightly too many
    5 ❒ Far too many
    6 ❒ Unsure

21. Have you or any members of your immediate family had any problems with Canada Geese in the state of Michigan within the last 5 years? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 23)***

22. What type(s) of problem(s) have you or members of your family had with Canada Geese? (Check all that apply.)
    1 ❒ Property damage
    2 ❒ Crop damage
    3 ❒ Bothered by noise
    4 ❒ Bothered by droppings
    5 ❒ Attacked by goose
    6 ❒ Other (please specify) _____

23. If, at some time, you believe there ***are*** far too many Canada Geese in the area in which you live, which of the following strategies would you find acceptable to control goose populations? (Circle one response for each.)

a.	Increase the number of geese taken by hunters	Yes	No	Unsure
b.	Destroy the eggs of problem geese	Yes	No	Unsure
c.	Destroy the nests of problem geese	Yes	No	Unsure
d.	Kill problem geese and give the meat to charity	Yes	No	Unsure
e.	Trap and remove geese	Yes	No	Unsure
f.	Do nothing - allow nature to take its course	Yes	No	Unsure

24. Have you or members of your immediate family had any problems with other species of wildlife in the state of Michigan in the last 5 years? If so, please list which wildlife species and briefly explain the problem. _____

_____

_____

Environmental Opinions

The next set of questions deals with your environmental opinions.

25. The following statements talk about the relationship between humans and the environment. For each statement, please indicate whether you Strongly Agree, Mildly Agree, are Unsure, Mildly Disagree, or Strongly Disagree. (Circle one response for each.)

		1 Strongly Agree	2 Mildly Agree	3 Unsure	4 Mildly Disagree	5 Strongly Disagree
a.	We are approaching the limit of the number of people the earth can support.	SA	MA	U	MD	SD
b.	When humans interfere with nature it often produces disastrous consequences.	SA	MA	U	MD	SD
c.	The earth has plenty of natural resources if we just learn how to develop them.	SA	MA	U	MD	SD
d.	Plants and animals have as much right as humans to exist.	SA	MA	U	MD	SD
e.	The balance of nature is strong enough to cope with the impacts of modern industrial nations.	SA	MA	U	MD	SD
f.	Despite our special abilities humans are still subject to the laws of nature.	SA	MA	U	MD	SD
g.	The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	SA	MA	U	MD	SD
h.	Humans were meant to rule over the rest of nature.	SA	MA	U	MD	SD
i.	Humans will eventually learn enough about how nature works to be able to control it.	SA	MA	U	MD	SD
j.	If things continue on their present course, we will soon experience a major ecological catastrophe.	SA	MA	U	MD	SD

26. Which of these two statements is closer to your opinion? (Check one.)
    1 ❒ Protecting the environment should be given priority, even at the risk of slowing down economic growth.
    2 ❒ Economic growth should be given priority, even if the environment suffers to some extent.

Background Information

In order for us to more fully understand people's responses to the previous questions, we need to know a few things about your background. Remember that your responses are completely confidential and that neither your name nor your address will be directly linked to your responses in any way.

27. How many years have you lived in the State of Michigan? _____YEARS

28. In what county do you currently live? _____COUNTY

29. In what type of area do you currently live? (Check one.)
    1 ❒ Rural, Farm
    2 ❒ Rural, Non-Farm
    3 ❒ Small Town (25,000 people or fewer)
    4 ❒ Urban Area (From 25,001 up to 100,000 people)
    5 ❒ Metropolitan Area (More than 100,000 people)

30. In what type of area did you spend all or most of your childhood? (Check one.)
    1 ❒ Rural, Farm
    2 ❒ Rural, Non-Farm
    3 ❒ Small Town (25,000 people or fewer)
    4 ❒ Urban Area (From 25,001 up to 100,000 people)
    5 ❒ Metropolitan Area (More than 100,000 people)

31. Do you own property in Michigan? (Check one.)
    1 ❒ Yes
    2 ❒ No ***(If 'No', please skip to question 34)***

32. Approximately how many acres do you own? _____ ACRES

33. Which of the following uses do you make of this land? (Check all that apply.)
    1 ❒ Residence
    2 ❒ Agricultural production
    3 ❒ Recreation
    4 ❒ Investment

34. How many children (under the age of 18) currently live in your household?
_____ CHILDREN

35. What is the highest level of formal education that you have completed? (Check one.)
1 ❒ Less than high school graduate
2 ❒ High school graduate or GED
3 ❒ Vocational or Trade School
4 ❒ Associate's Degree (2 year degree)
5 ❒ Some College
6 ❒ College Graduate (Bachelor's or 4 year degree)
7 ❒ Graduate or Professional Degree

36. Are you male or female?
1 ❒ Male
2 ❒ Female

37. In what year were you born? 19____

38. What is your race or ethnicity? (Check all that apply.)
1 ❒ American Indian or Alaska Native
2 ❒ Asian
3 ❒ Black or African American
4 ❒ Hispanic or Latino
5 ❒ Native Hawaiian or Other Pacific Islander
6 ❒ White

39. What was your gross household income (before taxes) in 1999? (Check one.)
1 ❒ Less than $20,000
2 ❒ $20,000 to $39,999
3 ❒ $40,000 to $59,999
4 ❒ $60,000 to $74,999
5 ❒ $75,000 or more




Thank you for your participation!

If you have any other comments you would like to share with us, please use the space below (add additional sheets if necessary).

Please use the enclosed addressed and stamped envelope or return this survey to:

Wildlife Surveys
Department of Fisheries and Wildlife
13 Natural Resources Building
Michigan State University
East Lansing, MI 48824-1222