The Public and the Timber Wolf in Minnesota

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CONTENTS

CONTENTS CONTINUED

EXECUTIVE SUMMARY

This study examined public sentiment, belief, and behavior toward the timber wolf in Minnesota. Our intention in exploring this complicated issue was to foster a more exact consideration of public attitudes and behaviors in the formulation of effective policy concerning the timber wolf. This animal continues to exercise its hold on the human imagination with myth, bias, and supposition exerting as much influence on public perception as the considerable increase in scientific knowledge that has emerged in recent times. As a symbolic fulcrum on which people project some of their strongest and deepest views of nature, understanding perceptions of the timber wolf can help us to conserve this animal, as well as tell us something about our more general views of wilderness, wildlife, and even the ethical relationship between people and animals in our modern age.

Data for the study was collected through lengthy telephone interviews with randomly selected samples of the general public in the Minneapolis-St. Paul area, the northern counties of the state, farmers (mostly livestock producers), deer hunters, and trappers. The roughly 45 minute interview occurred with a total of 621 Minnesotans.

Most respondents supported the protection and conservation of the timber wolf in Minnesota, but not at the expense or sacrifice of important human needs. Most favored the maintenance of healthy and abundant timber wolf populations in the northern sections of the state, but affirmed the right of farmers to protect their livestock from wolf predation. Additionally, most respondents opposed limitations on human settlement in northern Minnesota or curtailing the development of needed

mineral resources in this area in order to preserve wilderness habitat for the timber wolf.

On the other hand, most Minnesotans believed we should be cautious in allowing human development in areas with existing timber wolf populations. Additionally, while most supported the concept of controlling wolf depredations of livestock, the great majority (except farmers) strongly favored the use of humane control methods focusing on the individually troublesome animal. Most respondents disapproved of the use of poisons, elimination of wolves without proof of guilt, indiscriminate reductions in the overall population of timber wolves in areas where they are abundant, or killing wolf pups. Instead, the most preferred wolf control procedures were eliminating only individual timber wolves known to have caused livestock damage, capture and relocation of timber wolves, compensation for farmers who lost livestock, and the training of guard dogs. Additionally, on a different wolf control issue, the most favored methods (except among farmers) for increasing the deer population in northern Minnesota were reductions in the number of human hunters or doing nothing, and the least preferred option was reductions in the population of timber wolves.

One of the most consistent results was a strong positive perception of the timber wolf among all sample groups except farmers. This favorable image was particularly evident in relation to the outdoor recreational and wilderness values of the wolf. Most respondents (except farmers) indicated a strong desire to see a timber wolf in the wild, said it would be wonderful to hear this animal howl, and expressed a view of the timber wolf as symbolic of nature's wonder and beauty (even farmers

agreed with this view). Additionally, most regarded the wolf as an essential aspect of Minnesota's wilderness, and said it was important for them to know this animal existed in Minnesota even if they never actually saw a wolf in the wild. Finally, the great majority of respondents reported viewing timber wolves at the zoo, seeing films about this animal, or reading articles and books about wolves.

Despite these favorable views of the timber wolf, this animal was not among the best liked species relative to 17 other animals. Additionally, approximately one-third of the respondents indicated they would be afraid if timber wolves lived near their homes, or if they encountered this animal in the woods. Furthermore, a strongly ingrained anti-wolf bias among farmers was suggested by various results. Farmers repeatedly viewed the timber wolf in highly negative, hostile, and unsympathetic ways. The strength and intensity of these attitudes intimated the likelihood that farmers would oppose many wolf conservation measures, unless they were convinced of the practical and positive values of this animal to the farming way of life.

One of the more disturbing results of this study was the possibility of an inordinate degree of killing and removal of timber wolves from the wild. Approximately one-third of farmers, hunters, and trappers said they might shoot a timber wolf if they encountered one while deer hunting. The majority of respondents reported they would shoot a timber wolf if it threatened not necessarily attacked their pets. Most of the general public and one-third of the trappers believed the illegal killing of timber wolves would increase if a legal season for wolf pelts was instituted in Minnesota. In terms of reported behavior, 12% of farmers and

17% of trappers said they had personally killed or captured a timber wolf, more than 40% of farmers, hunters, trappers, and northern counties residents reported knowing someone who had captured or killed a timber wolf. These and other results collectively suggested a potentially large-scale problem.

Considerable difference of opinion occurred regarding the value of establishing a legal season for trapping timber wolves in Minnesota. Respondents were uncertain about the economic benefits that could be derived from the legal sale of wolf pelts, assuming wolf populations could support this harvest. On the other hand, most respondents disagreed that support for wolf conservation would increase if the timber wolf had greater economic value, and the limited recreational hunting value of the wolf was suggested by most disagreeing that hunting or trapping wolves seemed like a challenging or rewarding activity. Moderate support was expressed, however, for timber wolf recovery plans in other areas of the state and country. Capture and relocation of timber wolves was the most preferred wolf control option, and most respondents approved of translocating surplus timber wolves to other states under suitable conditions.

The need for greater public knowledge and factual understanding of the timber wolf was clearly evident, especially among twin cities residents, the less educated, nonwhites, and females. Many respondents revealed little knowledge of the difference between a timber wolf and a coyote, the physical characteristics of the timber wolf, its predatory nature, its population size in Minnesota and elsewhere, or the typical diet of this animal. On the other hand, most respondents recognized the inaccuracy of the myth that timber wolves had killed many people during

frontier times in America, and most knew that timber wolves sometimes eat small animals like mice. A particularly encouraging result was the substantial knowledge of timber wolves found among trappers and, to a less outstanding degree, deer hunters.

Despite the limited knowledge of twin cities residents, this group expressed strong affection, appreciation, and protectionist concern for the timber wolf. Interestingly, trappers were the most similar in their degree of affection and concern for this animal, although they differed substantially from twin cities residents in being far more knowledgeable, and inclined to support the right of humans to utilize and dominate the timber wolf. Northern counties respondents also varied considerably from twin cities residents in being less concerned about protection of the timber wolf, less interested in this animal's wilderness and outdoor recreational value, and more oriented toward the practical exploitation of the timber wolf.

Despite these differences, the potential for compromise and consensus regarding management of the timber wolf was suggested by the results of this study. The respondents were alike in viewing the timber wolf as a symbol of nature's wonder and beauty. They also appeared to accept the notion of the timber wolf as a potential source of human enjoyment and practical benefit. If these mutual perspectives can be nurtured and broadened, it might be possible to achieve some agreement regarding the conservation of this species in Minnesota. It might, in fact, be possible to proceed with the conviction that a world made better for the timber wolf is a world more attractive, meaningful, and satisfying for people.

LIST OF TABLES AND FIGURES

TABLES

TABLES PAGE

TABLES PAGE

TABLES PAGE

TABLES PAGE

TABLES PAGE

TABLES PAGE

I. INTRODUCTION

This report will consider the results of a study of public attitudes, knowledge, and behaviors toward the timber wolf (*Canis lupis*) in Minnesota. An advisory committee provided guidance and assistance for this project and included the following persons: Mrs. Karlyn Atkinson-Berg, North American Wildlife Park Foundation; Mr. Edward Boggess, Minnesota Department of Natural Resources; Dr. Steven Fritts, U.S. Fish and Wildlife Service; Mr. Todd Fuller, Minnesota Department of Natural Resources; Mr. Blair Joselyn, Minnesota Department of Natural Resources; Dr. Lynn Llewellyn, U.S. Fish and Wildlife Service; Mrs. Harriet Lykken and Ms. Joan Olson, H.O.W.L.; Dr. L. David Mech, U.S. Fish and Wildlife Service; Mr. Brian O'Neill, Attorney; Mr. Robert Radtke, U.S. Forest Service; Mr. John Sidle and Mr. James Engel, U.S. Fish and Wildlife Service; Mr. Dick Thiel, Wisconsin Department of Natural Resources; and Ms. Karen Woodsum, Defenders of Wildlife. Funding for the study was generously provided by the Mardag Foundation, the G.R.Dodge Foundation, Defenders of Wildlife, the United States Fish and Wildlife Service, the U.S. Forest Service, H.O.W.L., Quetico-Superior Foundation, Mr. Wallace Dayton, Mrs. Olivia Dodge, and Mr. Shaw Mudge. The northcentral regional office of Defenders of Wildlife, particularly the activities of Ms. Karen Woodsum, played a major administrative role in coordinating this research effort. A great deal of thanks is due Mrs. Harriet Lykken whose efforts made this study possible.

The advisory committee and sponsoring organizations were motivated by a desire to incorporate an accurate understanding of public percep-

tions and behaviors toward the timber wolf into the formulation of effective and socially responsible public policy. The management of the timber wolf in Minnesota has been characterized by a long history of conflict regarding the desires, interests, and needs of the general public and major interest groups including farmers, hunters, trappers, wildlife protectionists, and conservationists. Committee members recognized that controversial policy involving the timber wolf must be based on some consideration of prevailing sentiments in trying to meet the desires and interests of major constituencies. Too often particular groups or individuals appear to be speaking for the public when in fact they represent but a small fraction of concern.

Public debate concerning the timber wolf has been complicated by two aspects of the issue: the near extirpation of this species from the 48 contiguous states with the exception of Minnesota; and a major expansion in public concern for the timber wolf from a largely local to an increasingly national clientele. These two factors contributed to the listing of the timber wolf as an endangered species under the Endangered Species Act of 1973, although this classification was later changed to threatened in 1978. Because of the importance of historical factors in the evolution of public sentiment toward the timber wolf, a brief historical overview will be presented.*

A review of the timber wolf in Minnesota must first acknowledge the extraordinary effort to eliminate this animal from the United States that occurred prior to the 20th century. Indeed, to the pioneer American, the

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*Many thanks are due Mark Kern and Steven Kohls for their assistance on the historical review.

wolf was despised as emblematic of wilderness regarded as both a perceived threat to personal safety and livestock, and as an impediment to progress and civilization (Matthiessen 1959, Kellert 1985). Appropriately, the first wildlife statute in the United States involved a bounty on wolves in Plymouth county, Massachusetts in 1630 (Bean 1975). The height of this effort to exterminate the wolf occurred during the 19th century when poisons were massively employed as a predator control procedure throughout the western United States (V. Bailey 1907). The use of these poisons, and other control procedures, resulted in the extirpation of the timber wolf from the 48 contiguous states with the exception of Minnesota by the middle of the 20th century (Lopez 1978). The timber wolf survived in northern Minnesota largely because of the inaccessible and harsh character of this region and the resulting sparseness of the human population. In addition, the proximity of an abundant Canadian wolf population allowed for continual recruitment of wolves into the state (Mech 1970).

A bounty for timber wolves existed in Minnesota from 1849-1965, ranging from $3 per animal in 1849 to $35 in 1949. The bounty system ended in 1965 with then Governor Rolvaag vetoing its continued appropriation (Van Ballenberghe 1974). The Minnesota department of Natural Resources also administered a wolf control program from 1949-1954, employing 6 professionals and practicing aerial hunting, snaring, and trapping. Approximately, 150 wolves per year were controlled until aerial hunting was eliminated in 1954, resulting in a reduction in the number of timber wolves taken to approximately 70-90 animals per year from 1954-1956 (MDNR 1980).

The period following the bounty system witnessed a remarkable increase in media attention and public sympathy for the timber wolf. Numerous books and movies appeared, and public concern for the plight of the timber wolf expanded dramatically. In 1966, a federal Endangered Species Act was passed which helped to foster public support for protecting the timber wolf, and for many this animal became a symbol of past human persecution of wildlife. In 1967, the timber wolf outside of Alaska was classified as an endangered species (Goldman-Carter 1983).

Within Minnesota, at this time, events changed rapidly. In 1970, the first wolf sanctuary in the United States was effectively established in the Superior National Forest by prohibiting most hunting of timber wolves within this area. In 1972, the Minnesota Department of Natural Resources and the United States Fish and Wildlife and Forest Services produced a management plan designed to preserve the timber wolf in Minnesota, but which also recommended a livestock depredation control program. In 1973, another federal Endangered Species Act was passed, and four subspecies of wolf were officially listed as endangered. Unlike the previous Endangered Species Act, the 1973 legislation effectively abolished wolf killing in the nation outside of Alaska (FWS 39 F.R. 1171, 1977). Despite efforts by the state of Minnesota to resist federal authority, management of the timber wolf was largely turned over to the United States Fish and Wildlife and Forest Services.

In 1978, a Timber Wolf Recovery Plan was publically released, reflecting the views of 8 biologists commissioned by the federal government to produce this report (R. Bailey 1978). The plan has since been the

most important single influence on all subsequent efforts to manage the timber wolf in Minnesota. Among its provisions was the recommendation that five geographic management zones be established based on varying timber wolf densities. Of the roughly 31,000 square miles of timber wolf range in Minnesota, approximately 10,000 square miles in the northeastern region (zones 1-3) were proposed as wilderness with an estimated 1 timber wolf per 20 square miles. The target for the 21,000 square mile zone 4 was 1 wolf per 50 square miles, and for zone 5 (55,000 square miles), no density was specified. The plan also called for the reintroduction of timber wolves into other suitable areas of the country, restoration of prey species in northern Minnesota, habitat improvement and manipulation, extensive biological research, the possibility of a limited legal harvest, and public information and education efforts.

The implementation of the plan minimally depended on an accurate estimate of the number of timber wolves in varying parts of Minnesota which, until the 1970's, did not exist. In the late 1960's, the estimate of timber wolves in the state was roughly 300-400 animals, although some claimed as few as 100 wolves while others estimated 5000-10000 animals. The first relatively accurate estimate of 400 timber wolves in the Superior National Forest was offered by Mech in 1973 (Mech 1977). Continued work by Mech and his associates eventually resulted in the currently accepted figure of 1000-1200 animals in the northern one-third of Minnesota, and an additional 15 - 25 timber wolves on the island of Isle Royale in Michigan, and approximately 25 wolves in Wisconsin (Sierra Club v. Clark 1984).

Based on the recommendations of the Timber Wolf Recovery Team, the Secretary of the Interior in 1978 changed the classification of the timber wolf in Minnesota from endangered to threatened (FWS 43: 9607, 1978). This shift allowed federal authorities to control for timber wolves that had committed "significant depredations on lawfully present domestic animals." This ruling prompted a lawsuit by a consortium of environmental groups, represented by Minneapolis attorney, Brian O'Neill, that resulted in the promulgation of stricter regulations for the conduct of the livestock depredation control program (Fund for Animals v. Andrus 1978). Since 1979, approximately 178 wolves have been controlled under this program. In addition, a state program has provided financial compensation for farmers who experience verified livestock losses. Although 90% of the farms in northern Minnesota include livestock, a 1982 study found that roughly 0.3% were directly impacted by wolves and 0.1% of the livestock had been killed, injured or threatened by timber wolves (however, a small number of farms have experienced significant wolf depredation problems) (Fritts 1982).

In February 1980, the Minnesota Department of Natural Resources issued its own timber wolf management plan which included most of the recovery team's recommendations (MDNR 1980). Similar to the federal plan, it projected the potential treatment of the timber wolf as a renewable resource subject to a regulated harvest and legal sale of its pelt. Additionally, it suggested the possible control of wolf numbers in certain zones to maintain desired deer densities. A proposed federal rulemaking called for an increase in the distance from an affected farm where wolves

could be controlled (from 1/4 to 1/2 mile), and the possible elimination of all members of a depredating pack (including pups). It should be noted the state plan accepted the objective of timber wolf densities not being allowed to decline below "optimal" numbers specified by the Timber Wolf Recovery Team.

A rationale for a legal harvest was the notion that a permitted trapping season might diminish antagonism toward the timber wolf (presently linked to an estimated illegal killing of 250 wolves per year) (Sierra Club v. Clark 1984); a very rough and controversial estimate).

In August 1983, the U.S. Department of Interior proposed sharing responsibility for managing the timber wolf with the state government and, in effect, endorsed the Minnesota Department of Natural Resources proposed wolf management plan (FWS 48 F.R. 36256, 1983). The consortium of 15 environmental organizations filed lawsuit to block this transfer (Sierra Club v. Clark 1984) and, thus, deny implementation of the state management plan (particularly the proposal to allow a legal harvest of approximately 50 wolves per year). In January, 1984, the federal district court ruled in favor of the environmental groups, with presiding Judge Miles Lord making the following statement:

> "An attempt to 'manage' the wolf in this manner -- by allowing a sport season and creation of a market in wolf pelts -- is to treat the wolf as a furbearer, and not as a threatened species ...Congress has now mandated that each person who would slay the wolf must stay his hand...An increased 'war on wolves' will not be permitted under the law."

The federal government appealed this ruling and the lower court decision was upheld by the U.S. Court of Appeals.

II. METHODOLOGY

A telephone survey of Minnesota residents -- representing samples of the general public in the Minneapolis-St. Paul and northern Minnesota areas, farmers, deer hunters, and trappers -- was conducted to obtain data on public attitudes, knowledge, and behaviors toward the timber wolf. Quality Controlled Services of Minneapolis was contracted to select random samples of the general public and to conduct the survey.*

The general public sample consisted of randomly selected residents of the Minneapolis-St. Paul area and ten northern Minnesota counties (roughly congruent with present timber wolf range). A distribution map of the general public sample by county is presented in Figure 1.

Representative samples of the Minneapolis-St Paul and northern counties areas were drawn from every "Nth" name in five replicates from a proportionate panel data base. For the northern counties, this sampling procedure was somewhat modified in that the sample was drawn by county. It was anticipated that some households in the first replicates of the general public sample would not complete a telephone interview. Some households could not be reached during the original telephone interview attempt or after the required three callbacks. Others did not qualify or refused to complete the interview. In order to maintain the designated sampling quotas, replacement samples were utilized. For the general public samples, the replacement sample was drawn from successional

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* Quality Control Services was chosen over six competing firms based on proposed sample selection procedures, interviewing techniques, client recommendations, personnel skills, experience, and competitive cost considerations.

DISTRIBUTION BY COUNTY OF GENERAL PUBLIC SAMPLE

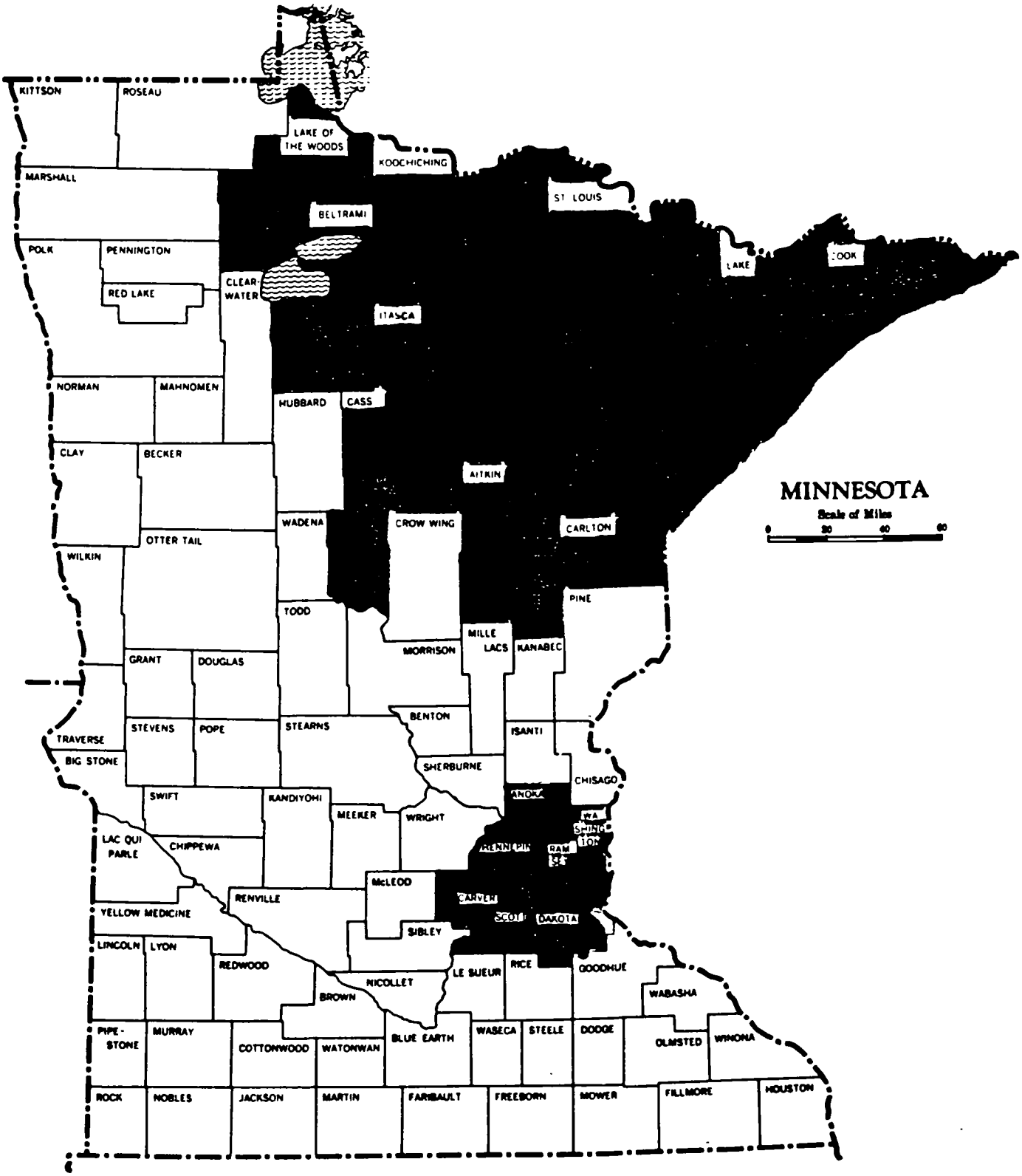

FIGURE 1

replicates systematically. All samples received a pre-interview mailer sent prior to the telephone interview. The letter alerted the household to the upcoming interview, stated the general purpose of the study, and assured the respondent of the confidentiality of his or her identity.

The Minneapolis-St Paul sample consisted of 186 persons, while the northern counties sample was 183. It should be noted the northern counties sample was largely rural, although one major metropolitan area, Duluth, was included in this sample. To assure a largely rural sample for the northern counties, sampling quotas were designated for each northern county. Moreover, St. Louis county, which included Duluth, was divided into northern, central, and southern (Duluth area) sampling segments. The total population sample sizes of each of the northern counties is indicated in Table One.

Samples of farmers (nearly all livestock producers), deer hunters, and trappers were randomly chosen from lists provided by the Minnesota Farmers Union and the Minnesota Department of Natural Resources.* Farmers were chosen for special consideration because of their concern regarding the control of livestock lost to timber wolves and other wild predators; deer hunters, because of recent controversy concerning the role of timber wolves in population fluctuations of northern Minnesota deer herds; and, trappers, because a legal season for trapping timber wolves has been proposed.

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*The total approximate size of these groups in Minnesota are as follows: farmers with livestock, poultry, and their products--65,014 (U.S. Census of Agriculture, 1982); big game hunters--446,921 (Minnesota DNR); trappers, 18 years and older--13,346 (Minnesota DNR).

TABLE 1

1980 TOTAL POPULATION* AND SAMPLE SIZES FOR SELECTED NORTHERN MINNESOTA COUNTIES

NORTHERN COUNTIES	TOTAL POPULATION	SAMPLE SIZE
LAKE OF THE WOODS	3,764	6
BELTRAMI	30,982	15
CASS	21,050	9
AITKIN	13,404	6
CARLTON	29,936	15
ITASCA	43,069	25
KOOCHICHING	17,571	9
ST. LOUIS**	222,229	NORTH ST. LOUIS 20
		CENTRAL ST. LOUIS 20
		SOUTH ST. LOUIS 28
LAKE	13,043	15
COOK	4,092	15
TOTAL		183

*BUREAU OF THE CENSUS, 1980 CENSUS OF THE POPULATION, VOL. 1, CHARACTERISTICS OF THE POPULATION, PART 25: MINNESOTA.

**THIS INCLUDES THE POPULATION FOR THE CITY OF DULUTH (99,570)

The Minnesota Farmers Union was asked to provide a randomly chosen list of 500 farmers, mainly livestock producers, but to avoid individuals with a known bias regarding the management of timber wolves. This list included farmers in seven counties in southern Minnesota, eight counties in the Minneapolis-St Paul area, and nine counties in northern Minnesota (Figure 2). A total of 97 farmers were randomly selected.

The same geographic distribution was used to identify potential samples of hunters and trappers, although a much smaller number of trappers in the state made this geographic distribution impossible. The Minnesota Department of Natural Resources provided lists of deer hunters and trappers based on hunting and trapping licenses and previously conducted surveys. The deer hunters sample included 102 persons. A much smaller list of trappers necessitated less stringent sample selection procedures, and due to nonavailability and difficulty in locating potential respondents, the final trappers sample consisted of 53 respondents.

It should be noted that theoretically the general public and hunter and trapper samples are not mutually exclusive as many deer hunters and trappers reside in both the northern counties and Minneapolis-St. Paul areas. No individual, however, occurred in more than one sample group and, thus, the samples can be regarded as mutually exclusive.

The general public samples were combined and divided into a number of demographic groups for data analysis purposes. These demographic groups included age, sex, ethnicity, education, income, property ownership, livestock raising, birdwatching, and pro and anti-hunting sentiment. Sample sizes for the major sample and demographic groups are indicated in

DISTRIBUTION BY COUNTY OF MINNESOTA FARMERS SAMPLE

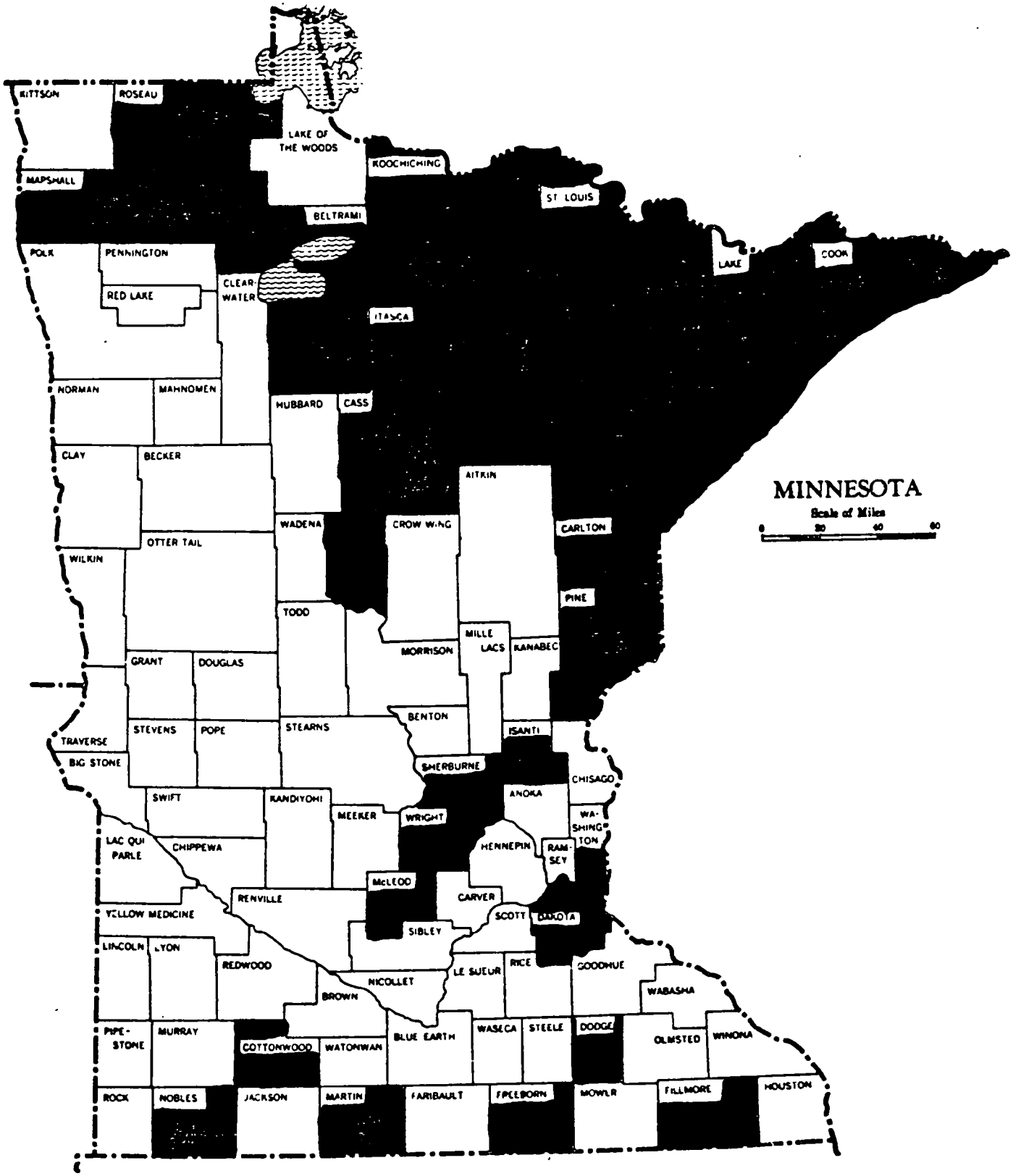

FIGURE 2

Table Two. In general, the major demographic sample groups (age, sex, race, income, and education) were a good approximation of national census statistics for Minnesota, with the exception of a somewhat greater income level among the sample. A comparison of the sample with the total Minnesota population is provided in Table 3.

All respondents were surveyed by telephone using specially trained interviewers. Respondents were informed of the broad purposes of the study and assured of the confidentiality of their responses. The study was described as a Yale University project rather than being identified with any government agency or private interest group. Selection of telephone interviewers was made on the basis of previous experience with attitudinal studies and interviewing skills. All interviewers received an in-depth briefing prior to the interview which included: an overview of the project, review of selection procedures for identifying an appropriate respondent within a household, procedures for callbacks, question-by-question review of the survey, techniques for recording each call and noting final disposition of the interview, ways to avoid interviewer bias and methods for recording responses accurately. On completion of the briefing, interviewers conducted three pre-interview surveys with randomly selected respondents. These interviews were reviewed (i.e., monitored and edited) before the interviewer was allowed to begin the actual surveying.

Some respondents could not be contacted, refused to be interviewed, or terminated the interview before its completion. The overall completion rate was 79%, although considerable variation in completion rates occurred among sample groups as indicated by Table 4. The completion

TABLE 2

MINNESOTA WOLF STUDY SAMPLE SIZES FOR PRIMARY, DEMOGRAPHIC AND ANIMAL ACTIVITY GROUPS*

MAIN GROUPS

	(N)
TWIN CITIES	186
NORTHERN COUNTIES	183
FARMERS	97
HUNTERS	102
TRAPPERS	53

DEMOGRAPHIC GROUPS

	(N)		(N)
AGE		ETHNICITY	
18 - 35	163	WHITE	354
36 - 55	114	NONWHITE	13
56+	92		
GENDER		EDUCATION	
MALE	180	≤ 11TH GRADE	43
FEMALE	189	HIGH SCH./VOC.	170
		COLLEGE	140

INCOME

≤ $9,999	51
10-19,000	74
20-49,999	182
50,000+	20

*DEMOGRAPHIC AND ANIMAL ACTIVITY GROUP SAMPLES WERE DERIVED FROM THE MINNEAPOLIS-ST. PAUL AND NORTHERN COUNTIES SAMPLES.

TABLE 2 CONTINUED

MINNESOTA WOLF STUDY SAMPLE SIZES FOR PRIMARY, DEMOGRAPHIC AND ANIMAL ACTIVITY GROUPS

ANIMAL ACTIVITY GROUPS

PROPERTY OWNERSHIP	(N)
< 1/2 ACRE OR CITY LOT	144
1/2 - 2 ACRES	70
3 - 25 ACRES	36
26+ ACRES	24

APPROVE HUNTING FOR RECREATION AND MEAT**	
APPROVE	193
DISAPPROVE	82

EVER RAISED LIVESTOCK	(N)
YES	115
NO	254

BIRDWATCHED PAST 2 YEARS**	
COMMITTED BIRDERS (CAN IDENTIFY > 40 BIRD SPECIES)	24
CASUAL BIRDERS (CAN IDENTIFY ≤ 10 BIRD SPECIES)	69
NONBIRDERS	136

**THE TOTAL NUMBER IN EACH OF THESE GROUPS DOES NOT EQUAL THE TOTAL POPULATION OF INDIVIDUALS INCLUDED IN THE GENERAL PUBLIC SAMPLE BECAUSE CERTAIN RESPONDENTS WERE OMITTED. SPECIFICALLY, FOR APPROVE/DISAPPROVE OF HUNTING, INDIVIDUALS WHO NEITHER APPROVED OR DISAPPROVED OF HUNTING WERE OMITTED; FOR BIRDWATCHING THE PAST TWO YEARS, RESPONDENTS WERE OMITTED WHO BIRDWATCHED BUT COULD IDENTIFY BETWEEN 10-40 BIRD SPECIES.

TABLE 3

COMPARISON OF SAMPLE DEMOGRAPHIC GROUPS WITH NATIONAL CENSUS FIGURES

	MINNESOTA CENSUS	SAMPLE (18 YEARS+)
AGE		
20-34	39.1	44.2
35-54	30.3	30.8
56+	30.6	24.9
GENDER		
	(20 YEARS+)	(18 YEARS+)
FEMALE	52.0	51.2
MALE	48.0	48.8
RACE		
	(TOTAL POP.)	(18 YEARS+)
WHITE	96.7	95.9
BLACK	1.3	3.5
INCOME		
$\leq$ 9,999	27.0	13.8
$10,000-19,999	29.0	20.1
$20,000-49,999	39.5	49.3
$50,000+	----	11.4
EDUCATION		
	(25 YEARS+)	(18 YEARS+)
<11TH GRADE	26.9	12.2
HIGH SCHOOL	38.6	48.2
COLLEGE	34.5	39.7

TABLE 4

MINNESOTA WOLF STUDY RESPONSE RATES

	COMPLETED INTERVIEWS	%	REFUSALS	%
TWIN CITIES	186	69	83	31
NORTHERN COUNTIES	183	79	48	21
FARMERS	97	83	20	17
HUNTERS	102	87	15	13
TRAPPERS	53	98	1	2

rate appeared to be directly related to the importance of the wolf issue, and the geographic proximity of timber wolves to the various sample groups. Thus, the highest refusal rate, 31%, was encountered among twins cities residents, while the lowest occurred among trappers, hunters, and farmers.

The survey consisted of 125 questions covering six areas of interest--attitudes toward the timber wolf and wolf management, knowledge of the timber wolf and awareness of the wolf issue, behavioral interactions and personal contacts with the timber wolf, preferences for varying animal species and symbolic perceptions of the timber wolf, participation in diverse animal-related activities, and demographic characteristics. Over 700 questions were considered in developing the attitude section and six pretests conducted; 66 attitude questions were eventually selected for the final survey. Members of the advisory committee were especially helpful in evaluating potential attitude questions, as was the previous research of Hook and Robinson (1982) and Thiel (1982).

The final survey required an average of 43 minutes to complete. All but three questions were closed-ended with the respondent only allowed to select answers among a limited choice of response alternatives. Response options for most attitude questions generally included five choices from strongly agree to strongly disagree and a neither agree nor disagree response. The three open-ended questions included the number of timber wolves in Minnesota, and the titles of books read and films seen about timber wolves. The entire survey is presented in Appendix A.

The time required to complete the survey may have, in some cases, re-

sulted in respondent fatigue and, thus, influenced the quality of the answers. To minimize this possibility, questions particularly sensitive to the affects of fatigue (mainly attitude questions) were at the beginning of the survey, followed by knowledge, behavioral and, finally, demographic questions. In general, the interviewers reported considerable respondent interest in the survey.

Attitudes toward timber wolf scales were constructed based on cluster and correlational analyses of the various attitude questions. Attitudes scales were labelled the dominionistic, ecologistic, moralistic, naturalistic, negativistic and utilitarian (Kellert 1980). Brief definitions of these scales are as follows:

Dominionistic -- a desire to exert mastery, control, and dominance over the timber wolf;

Ecologistic -- a strong interest and concern for maintaining viable relationships between the timber wolf, other animal species, and the natural environment;

Moralistic -- particular concern for the possible infliction of cruelty, harm, and excessive exploitation on the timber wolf;

Naturalistic -- a strong interest in direct contact and outdoor recreational experience with the timber wolf, or with wilderness settings that include wolf populations;

Negativistic -- fear, dislike or indifference toward the timber wolf;

Utilitarian -- strong support for the practical utilization of the timber wolf, or for subordinating the wolf or its habitat for the benefit of human material well-being.

A total of 35 attitude questions were used in constructing the six scales. The smallest scale consisted of 4 questions, while the largest contained 7 items. Agree or disagree responses were assigned scores for each of the selected scale questions, with the total scale score being the sum of individual question scores standardized on a 0 to 1 range. Specific questions and scoring ranges associated with each of the scales are included in Appendix B. The six scales were relatively independent of one another, although the ecologistic* and naturalistic, and dominionistic and utilitarian scales had a greater than .60 correlation. A correlation matrix of the scales is provided in Table 5.

A knowledge of timber wolf scale was also constructed based on responses to 19 true-false questions. A score of 4 was assigned each correct answer, 1 each don't know response, and 0 for an incorrect answer. The total knowledge scale score was the sum of scores for the 19 questions standardized on a 0-100 scoring range.

A positive perception of timber wolf scale was constructed based on responses to eight bipolar adjectives depicting roughly contrasting characterizations of the timber wolf. A five point scale was used to measure responses for the following eight contrasting depictions of the timber wolf: brave-cowardly, mean-kind, beautiful-ugly, scary-not scary, valuable-useless, dangerous-harmless, good-bad, abundant-rare.

Statistical comparisons of scale mean scores was based on an F test of significance. The statistical analysis of group responses to specific

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*The ecologistic attitude scale is not regarded as a particularly strong or entirely valid measure of this attitude toward the timber wolf.

TABLE 5

CORRELATION MATRIX OF ATTITUDES TOWARD TIMBER WOLF SCALES

	NATURAL-ISTIC	NEGATI-VISTIC	ECOLOGIS-TIC	UTILITAR-IAN	DOMINION-ISTIC	MORALIS-TIC
NATURAL-ISTIC	X	-.388	.607	-.382	-.289	.477
NEGATI-VISTIC	-.388	X	-.381	.554	.454	-.061
ECOLOGIS-TIC	.607	-.381	X	.387	-.306	.399
UTILITAR-IAN	.382	.554	-.387	X	.694	-.241
DOMINION-ISTIC	.289	.454	-.306	.694	X	-.162
MORALIS-TIC	.477	-.061	.399	-.241	-.162	X

attitudinal, knowledge, and behavioral questions involved the Chi-square test of significance. A .05 probability level was consistently employed in evaluating the statistical significance of the results.

III. ATTITUDES TOWARD THE TIMBER WOLF -- INDIVIDUAL QUESTION RESULTS

Individual attitude question results have been roughly grouped together for presentation purposes according to a number of major topics. Because of the large number of results, findings are presented mainly for the major sample groups -- Minneapolis-St Paul and northern counties residents, farmers, hunters, and trappers. When particularly pertinent, varying demographic and animal-related activity group comparisons are included.

A. CONFLICTS BETWEEN THE TIMBER WOLF AND VARIOUS HUMAN ACTIVITIES

1. Farming

Possible conflict between the timber wolf and various farming activities was limitedly explored. Most respondents supported the farmers right to protect their livestock from wolves, but not without qualification and most (with the exception of farmers) opposed the presumably inhumane or indiscriminate control of timber wolves.

The public's willingness to support farmers in conflict with wolves was suggested by most disagreeing with the statement, "we should not help farmers whose cattle are killed by timber wolves because this is part of the risk of farming in areas where timber wolves live" (Table 6). Farmers were especially inclined to disagree with this statement, in significant contrast to twin cities residents. On the other hand, only a majority of farmers and the elderly, less educated, and lower income respondents agreed with the notion that, "our country is in bad shape when

TABLE 6*

WE SHOULD NOT HELP FARMERS WHOSE CATTLE ARE KILLED BY TIMBER WOLVES BECAUSE THIS IS PART OF THE RISK OF FARMING IN AREAS WHERE TIMBER WOLVES LIVE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	23.1	52.6
NORTHERN COUNTIES	22.9	60.1
FARMERS	8.2	86.6
HUNTERS	21.5	61.7
TRAPPERS	18.8	60.3

$X^2 = 34.2$ P = .0001

*NOTE ON THIS AND ALL SUBSEQUENT ATTITUDE QUESTION TABLES: % AGREE = COMBINED STRONGLY AND SLIGHTLY AGREE RESPONSES; % DISAGREE = COMBINED STRONGLY AND SLIGHTLY DISAGREE RESPONSES; THE % OF RESPONDENTS WHO NEITHER AGREED NOR DISAGREED WITH THE QUESTION IS OMITTED FROM THE TABLES TO SIMPLIFY THE PRESENTATION OF RESULTS. THIS LATTER FIGURE CAN BE ROUGHLY COMPUTED BY SUBTRACTING THE TOTAL PERCENTAGE OF AGREE PLUS DISAGREE RESPONSES FROM 100%.

we choose to protect timber wolves instead of hard working farmers" (Table 7). In contrast, a majority of twin cities, college educated, and higher income respondents disagreed with this statement, and twin cities residents were significantly more likely to disagree than northern counties respondents. Most respondents -- with the exception of farmers, the elderly, lower income, and less educated persons -- expressed the belief that timber wolves and farmers could coexist, as suggested by responses to the question, "because timber wolves eat livestock, I do not think timber wolves and farmers can coexist in the same area" (Table 8).

The public's attitude toward varying methodologies for controlling livestock predation by wolves was also explored. Most respondents supported the need to protect livestock as suggested by responses to the question, "people have a duty to protect weak and defenseless creatures like sheep from predators like timber wolves." However, farmers, hunters and northern counties residents were significantly more inclined to agree with this statement than twin cities residents or trappers (Table 9). Additionally, most farmers, hunters, and trappers supported the statement -- "when timber wolves kill cattle and sheep they must be eliminated" (Table 10) -- in contrast to less than a majority of the general public, particularly twin cities residents (although less than a majority disagreed).

Attitudes toward alternative timber wolf control methodologies were considered. Twin cities and northern counties residents most preferred nonlethal control techniques (i.e., capture and relocation of timber wolves, training guard dogs, paying farmers for their losses), or just

TABLE 7

OUR COUNTRY IS IN BAD SHAPE WHEN WE CHOOSE TO PROTECT TIMBER WOLVES INSTEAD OF FARMERS.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	21.5	51.0
NORTHERN COUNTIES	39.3	35.5
		*TC/NC P = ≤.05
FARMERS	53.6	19.5
HUNTERS	38.2	35.2
TRAPPERS	28.3	43.4
	X^2 = 39.1, P = .0001	

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	25.1	46.6
36 - 55	21.0	54.3
56+	51.0	23.9
	X^2 = 29.7, P = .0001	

ETHNICITY	% AGREE	% DISAGREE
WHITE	30.2	43.5
NONWHITE	38.4	30.7
	X^2 = 0.8,	P = .65

GENDER	% AGREE	% DISAGREE
MALE	29.4	46.6
FEMALE	31.2	40.2
	X^2 = 1.7, P = .41	

EDUCATION	% AGREE	% DISAGREE
≤ 11TH GRADE	62.7	16.2
HIGH SCH./VOC.	32.9	38.8
COLLEGE	19.2	53.5
	X^2 = 32.6,	P = .0001

INCOME

≤ $9,999	54.9	27.4
10-19,000	29.7	40.5
20-49,999	23.6	46.7
50,000+	15.0	65.0
	X^2 = 23.1, P = .0007	

*TC = TWIN CITIES; NC = NORTHERN COUNTIES -- PLEASE NOTE A SIMILAR PROCEDURE IS USED IN VARIOUS SUBSEQUENT TABLES.

TABLE 8

BECAUSE TIMBER WOLVES EAT LIVESTOCK, I DO NOT THINK TIMBER WOLVES AND FARMERS CAN COEXIST IN THE SAME AREA.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	21.5	54.8
NORTHERN COUNTIES	25.6	56.2
FARMERS	49.4	38.1
HUNTERS	29.4	54.9
TRAPPERS	20.7	62.2

$X^2 = 30.5$, $P = .0002$

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	19.0	61.9
36 - 55	19.3	57.8
56+	37.0	41.3

$X^2 = 14.4$, $P = .006$

GENDER	% AGREE	% DISAGREE
MALE	22.7	61.6
FEMALE	24.3	49.7

$X^2 = 7.2$, $P = .02$

ETHNICITY	% AGREE	% DISAGREE
WHITE	23.1	55.9
NONWHITE	38.4	38.4

$X^2 = 1.9$, $P = .37$

EDUCATION	% AGREE	% DISAGREE
≤ 11TH GRADE	46.5	25.5
HIGH SCH./VOC.	25.8	57.0
COLLEGE	12.1	65.7

$X^2 = 29.8$, $P = .0001$

INCOME

≤ $9,999	39.2	43.1
10-19,000	24.3	59.4
20-49,999	17.0	60.4
50,000+	25.0	55.0

$X^2 = 12.2$, $P = .05$

TABLE 9

PEOPLE HAVE A DUTY TO PROTECT WEAK AND DEFENSELESS CREATURES LIKE SHEEP FROM PREDATORS LIKE TIMBER WOLVES.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	48.9	19.3
NORTHERN COUNTIES	62.8	15.8
FARMERS	78.3	9.2
HUNTERS	63.7	13.7
TRAPPERS	49.0	32.0

$X^2 = 34.2$, $P = .0001$

TABLE 10

WHEN TIMBER WOLVES KILL CATTLE AND SHEEP THEY MUST BE ELIMINATED.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	35.4	45.1
NORTHERN COUNTIES	48.6	33.8
	TC/NC = $P = \leq .05$	
FARMERS	80.4	11.3
HUNTERS	61.7	26.4
TRAPPERS	60.3	13.2

$X^2 = 67.8$, $P = .0001$

the lethal control option of shooting or trapping individual timber wolves known to have killed livestock (Table 11). The two general public samples were least in favor of eliminating the pups of adult timber wolves that had killed livestock, or poisoning timber wolves (cited as the least expensive control option).* Farmers and hunters expressed significantly greater support for the elimination of wolf pups. Additionally, farmers indicated the strongest approval of any group for paying farmers for livestock lost to wolves, reducing the overall number of timber wolves in areas where these animals are abundant, and shooting and trapping of individual wolves known to have preyed on livestock. The option of reducing the number of timber wolves (i.e., "shoot or trap timber wolves to reduce their overall numbers in areas where they are abundant") was approved by two-thirds or more of farmers, hunters, and trappers, in contrast to less than a majority of twin cities and northern counties residents.

2. Hunting

Several questions considered the possibility of conflict between hunters and timber wolves. Most respondents, with the exception of farmers, disagreed that timber wolves had been responsible for drastic reductions in the deer of northern Minnesota, as suggested by responses to the question, "timber wolves have destroyed the deer in northern Minnesota and only reducing the number of timber wolves will allow the deer

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*It should be noted the question referred to the elimination of the "puppies" rather than "pups" of timber wolves. The general association of the former term with the young of domestic dogs may have created some bias in responses to this question.

TABLE 11

APPROVE OF ALTERNATIVE TIMBER WOLF CONTROL METHODS

PLEASE INDICATE ON A SCALE OF FROM 1 TO 5 IF YOU APPROVE OR DISAPPROVE OF THE FOLLOWING METHODS FOR CONTROLLING TIMBER WOLVES THAT KILL LIVESTOCK.

A. SHOOT OR TRAP TIMBER WOLVES TO REDUCE THEIR OVERALL NUMBERS IN AREAS WHERE THEY ARE ABUNDANT.

B. SHOOT OR TRAP ONLY INDIVIDUAL TIMBER WOLVES DEFINITELY KNOWN TO HAVE KILLED LIVESTOCK.

C. PAY FARMERS FOR LIVESTOCK KILLED BY WOLVES.

D. CAPTURE AND RELOCATE TIMBER WOLVES TO OTHER AREAS WITH LITTLE OR NO LIVESTOCK.

E. ELIMINATE THE PUPPIES OF PARENT TIMBER WOLVES WHO HAVE KILLED LIVESTOCK.

F. POISON TIMBER WOLVES BECAUSE IT IS THE LEAST EXPENSIVE METHOD.

G. TRAIN GUARD DOGS TO PROTECT LIVESTOCK.

TWIN CITIES		NORTHERN COUNTIES	
CAPTURE AND RELOCATE	68.8	CAPTURE AND RELOCATE	71.0
SHOOT OR TRAP OFFENDING ANIMAL	65.1	SHOOT OR TRAP OFFENDING ANIMAL	71.0
TRAIN GUARD DOGS	53.2	PAY FARMERS FOR LOSSES	53.0
PAY FARMERS FOR LOSSES	38.7	TRAIN GUARD DOGS	49.2
SHOOT OR TRAP IN AREAS WHERE WOLVES ABUNDANT	33.9	SHOOT OR TRAP IN AREAS WHERE WOLVES ABUNDANT	48.1
ELIMINATE PUPS	6.5	ELIMINATE PUPS	14.2
POISON	3.2	POISON	3.3

TABLE 11 CONTINUED

APPROVE OF ALTERNATIVE TIMBER WOLF CONTROL METHODS

FARMERS		HUNTERS	
PAY FARMERS FOR LOSSES	78.4	SHOOT OR TRAP OFFENDING ANIMAL	84.3
SHOOT OR TRAP IN AREAS WHERE WOLVES ABUNDANT	77.3	CAPTURE AND RELOCATE	77.5
SHOOT OR TRAP OFFENDING ANIMAL	74.2	PAY FARMERS FOR LOSSES	66.7
CAPTURE AND RELOCATE	58.8	SHOOT OR TRAP IN AREAS WHERE WOLVES ABUNDANT	64.7
TRAIN GUARD DOGS	34.0	TRAIN GUARD DOGS	41.2
ELIMINATE PUPS	29.9	ELIMINATE PUPS	21.6
POISON	5.2	POISON	4.9

TRAPPERS

SHOOT OR TRAP OFFENDING ANIMAL	77.4
SHOOT OR TRAP IN AREAS WHERE WOLVES ABUNDANT	77.4
CAPTURE AND RELOCATE	73.6
PAY FARMERS FOR LOSSES	54.7
TRAIN GUARD DOGS	34.0
ELIMINATE PUPS	18.9
POISON	5.7

to return" (Table 12). Most respondents denied they might shoot a timber wolf if they encountered this animal while deer hunting, although approximately one-third of farmers, hunters, and trappers did agree with this notion (Table 13). Regarding the right of people versus wolves to get deer, a majority of northern countries residents and farmers, in contrast to a minority of twin city residents, hunters and trappers, agreed that, "because many poor Minnesotans depend on deer for food, I prefer to see these people get the deer instead of timber wolves" (Table 14).

3. Pets

The possible conflict between domestic pets and timber wolves was limitedly considered. Most respondents appeared uncertain about the need to eliminate timber wolves that killed pet animals with less than a majority agreeing or disagreeing with the statement, "timber wolves that kill pet cats and dogs have to be eliminated" (Table 15). In contrast, a majority of farmers agreed with this statement. On the other hand, the great majority of respondents, in particular farmers, indicated they would shoot a timber wolf if it threatened, not necessarily attacked, their own pets (Table 16).

4. Human Settlement and Mining

Relatively few respondents favored protecting wolves by limiting the number of people who could live in northern Minnesota. Specifically, less than one-tenth of all respondents agreed with the statement, "rather than limit the number of timber wolves in northern Minnesota, we should limit the number of people who live there" (Table 17). On the other hand, most respondents were ambivalent about allowing major new mining developments

TABLE 12

TIMBER WOLVES HAVE DESTROYED THE DEER IN NORTHERN MINNESOTA AND ONLY REDUCING THE NUMBER OF TIMBER WOLVES WILL ALLOW THE DEER TO RETURN.

MAIN GROUPS	% AGREE	% DISAGREE
TWIN CITIES	11.2	67.2
NORTHERN COUNTIES	23.5	58.4
FARMERS	43.3	42.2
HUNTERS	35.2	53.9
TRAPPERS	28.3	60.3

$X^2 = 44.6$, $P = .001$

TABLE 13

IF I WERE HUNTING DEER AND SAW A TIMBER WOLF, I MIGHT SHOOT IT.

TWIN CITIES	10.7	74.7
NORTHERN COUNTIES	25.6	56.8
FARMERS	40.2	48.4
HUNTERS	31.3	57.8
TRAPPERS	30.1	62.2

$X^2 = 39.8$, $P = .0001$

TABLE 14

BECAUSE MANY POOR MINNESOTANS DEPEND ON DEER FOR FOOD, I PREFER TO SEE THESE PEOPLE GET THE DEER INSTEAD OF TIMBER WOLVES.

TWIN CITIES	36.5	38.1
NORTHERN COUNTIES	51.3	26.2
	TC/NC $P = \leq .05$	
FARMERS	59.7	21.6
HUNTERS	43.1	34.3
TRAPPERS	37.7	37.7

$X^2 = 19.2$, $P = .01$

TABLE 15

TIMBER WOLVES THAT KILL PET CATS AND DOGS HAVE TO BE ELIMINATED.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	27.9	49.4
NORTHERN COUNTIES	42.0	36.6
	TC/NC = P = ≤ .05	
FARMERS	52.5	29.9
HUNTERS	49.0	36.2
TRAPPERS	30.1	39.6
	X^2 = 26.6, P = .0008	

TABLE 16

I WOULD SHOOT A TIMBER WOLF IF IT THREATENED MY PETS.

TWIN CITIES	56.9	24.1
NORTHERN COUNTIES	66.1	13.1
FARMERS	86.6	10.3
HUNTERS	69.6	16.6
TRAPPERS	71.7	16.9
	X^2 = 33.4, P = .0001	

TABLE 17

RATHER THAN LIMIT TIMBER WOLVES IN NORTHERN MINNESOTA, WE SHOULD LIMIT THE NUMBER OF PEOPLE WHO LIVE THERE.

TWIN CITIES	5.9	73.1
NORTHERN COUNTIES	10.3	74.8
FARMERS	8.2	80.4
HUNTERS	5.8	81.3
TRAPPERS	11.3	79.2
	X^2 = 11.0, P = .19	

in northern Minnesota if it destroyed essential wolf habitat. Specifically, less than a majority approved or disapproved of the notion that, "if new mines in northern Minnesota create more jobs, they have to be developed even if land needed by the timber wolf is destroyed" (Table 18).

B. Utilizing the Practical Value of the Timber Wolf

Several questions considered the potential practical benefit of the timber wolf in an attempt to explore the notion that more people might support its conservation if the wolf possessed greater monetary value. This notion was not confirmed by the results of this study, with less than 20% of the respondents agreeing with the statement, "if the timber wolf had more monetary value, I could get more concerned about protecting it" (Table 19). The study did not consider, however, if support for wolf conservation would increase if a recreational trapping season was established. Considerable difference of opinion was expressed regarding the value of killing timber wolves for their fur. A majority of farmers, hunters, and trappers, in contrast to a minority of twin cities and northern counties residents and all major demographic groups, approved of "harvesting surplus" timber wolves for their fur, as suggested by responses to the question, "if there are enough timber wolves, we should allow some of them to be killed for their fur" (Table 20). Only a majority of twin cities residents, and younger, female, and moderate to higher income respondents disagreed with this use of timber wolves. In contrast, a majority of livestock producers, large property owners, persons who reported having killed or captured a timber wolf, or who had an animal killed by a timber wolf approved of killing timber wolves for their fur (Table 21).

TABLE 18

IF NEW MINES IN NORTHERN MINNESOTA CREATE MORE JOBS, THEY HAVE TO BE DEVELOPED EVEN IF LAND NEEED BY THE TIMBER WOLF IS DESTROYED.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	31.1	37.6
NORTHERN COUNTIES	38.8	26.7
FARMERS	47.4	25.7
HUNTERS	41.1	27.4
TRAPPERS	37.7	35.8

$X^2 = 11.8, \quad P = .16$

TABLE 19

IF THE TIMBER WOLF HAD MORE MONETARY VALUE, I COULD GET MORE CONCERNED ABOUT PROTECTING IT.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	14.5	70.9
NORTHERN COUNTIES	19.6	61.2
FARMERS	16.4	67.0
HUNTERS	14.7	55.8
TRAPPERS	15.0	66.0

$X^2 = 12.7, \quad P = .12$

TABLE 20

IF THERE ARE ENOUGH TIMBER WOLVES, WE SHOULD ALLOW SOME OF THEM TO BE KILLED FOR THEIR FUR.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	30.1	51.6
NORTHERN COUNTIES	43.7	39.3
	TC/NC = P = ≤ .05	
FARMERS	72.1	10.3
HUNTERS	56.8	31.3
TRAPPERS	84.9	3.7
	X^2 = 91.2, P = .0001	

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	33.1	50.3
36 - 55	38.6	45.6
56+	41.3	36.9
	X^2 = 4.7, P = .31	

GENDER	% AGREE	% DISAGREE
MALE	45.0	37.2
FEMALE	29.1	53.4
	X^2 = 11.6, P = .002	

ETHNICITY	% AGREE	% DISAGREE
WHITE	36.4	46.3
NONWHITE	46.1	30.7
	X^2 = 1.2, P = .54	

EDUCATION	% AGREE	% DISAGREE
≤ 11TH GRADE	44.1	32.5
HIGH SCH./VOC.	36.4	45.2
COLLEGE	35.7	48.5
	X^2 = 3.6, P = .45	

INCOME

≤ $9,999	39.2	35.2
$10,000 - 19,999	35.1	51.3
$20,000 - 49,999	35.7	44.5
$50,000+	45.0	50.0
	X^2 = 6.9, P = .32	

TABLE 21

IF THERE ARE ENOUGH TIMBER WOLVES, WE SHOULD ALLOW SOME OF THEM TO BE KILLED FOR THEIR FUR.

ANIMAL ACTIVITY GROUPS

	% AGREE	% DISAGREE
EVER RAISED LIVESTOCK		
YES	46.9	33.9
NO	32.2	50.7

$X^2 = 9.7$, $P = .007$

	% AGREE	% DISAGREE
EVER KILLED OR CAPTURED A TIMBER WOLF		
YES	74.3	17.1
NO	48.3	35.2

$X^2 = 8.9$, $P = .01$

	% AGREE	% DISAGREE
EVER HAD ANIMAL KILLED BY WOLF		
YES	82.1	3.6
NO	48.2	35.6

$X^2 = 14.2$, $P = .0008$

PROPERTY OWNERSHIP

	% AGREE	% DISAGREE
≤ 1/2 ACRE CITY LOT	37.5	46.5
1/2 - 2 ACRES	35.7	45.7
3 - 25 ACRES	41.6	36.1
26+ ACRES	54.1	29.1

$X^2 = 4.4$, $P = .61$

Most respondents disapproved of preferential treatment for people who derived a living from the land over protection of the timber wolf. Specifically, less than a majority agreed (and a majority of twin cities and northern counties residents and deer hunters disagreed) that, "In an area like northern Minnesota, where so many people depend on the land for a living, timber wolf hunting should be allowed so people can make money from the furs of these animals" (Table 22). Additionally, less than a majority agreed or disagreed with the statement, "the timber wolf should be used for practical purposes in places such as northern Minnesota where so many people depend on the land for a living" (Table 23). Most respondents endorsed the notion that if timber wolves had to be killed they would prefer that the fur be used than collected by the government, as suggested by responses to the statement, "I prefer to see a hunter get a timber wolf and sell its fur rather than see the animal killed and not used by a government trapper" (Table 24).

C. Hunting Wolves and Deer

Some questions considered the value of trapping and hunting timber wolves, or the hunting of deer in areas with current wolf populations. Relatively little support was expressed for sport hunting of timber wolves, with less than a third of all respondents (except a majority of trappers) agreeing that, "capturing a timber wolf would be a challenging and rewarding experience" (Table 25). Furthermore, only a minority of respondents agreed (although only a majority of twin cities and northern counties residents disagreed) with the statement, "I admire the skill and courage of a man who tries to hunt a timber wolf in the wild," (Table 26).

TABLE 22

IN AN AREA LIKE NORTHERN MINNESOTA, WHERE SO MANY PEOPLE DEPEND ON THE LAND FOR A LIVING, TIMBER WOLF HUNTING SHOULD BE ALLOWED SO PEOPLE CAN MAKE MONEY FROM THE FURS OF THESE ANIMALS.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	10.7	75.8
NORTHERN COUNTIES	16.3	63.9
FARMERS	40.2	40.2
HUNTERS	28.4	57.8
TRAPPERS	33.9	30.1

$X^2 = 68.7$, $P = .0001$

TABLE 23

THE TIMBER WOLF SHOULD BE USED FOR PRACTICAL PURPOSES IN PLACES SUCH AS NORTHERN MINNESOTA WHERE SO MANY PEOPLE DEPEND ON THE LAND FOR A LIVING.

TWIN CITIES	28.4	19.3
NORTHERN COUNTIES	27.3	24.5
FARMERS	39.1	23.7
HUNTERS	37.2	25.4
TRAPPERS	43.4	16.9

$X^2 = 14.2$, $P = .07$

TABLE 24

I PREFER TO SEE A HUNTER GET A TIMBER WOLF AND SELL ITS FUR RATHER THAN SEE THE ANIMAL KILLED AND NOT USED BY A GOVERNMENT TRAPPER.

TWIN CITIES	50.5	23.6
NORTHERN COUNTIES	62.3	14.2
	TC/NC = $P = \leq .05$	
FARMERS	64.9	15.4
HUNTERS	54.9	18.6
TRAPPERS	84.9	11.3

$X^2 = 26.1$, $P = .001$

TABLE 25

CAPTURING A TIMBER WOLF WOULD BE A CHALLENGING AND REWARDING EXPERIENCE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	22.0	58.6
NORTHERN COUNTIES	26.2	60.6
FARMERS	34.0	51.5
HUNTERS	26.4	53.9
TRAPPERS	69.8	20.7

$X^2 = 51.6$, $P = .0001$

TABLE 26

I ADMIRE THE SKILL AND COURAGE OF A MAN WHO TRIES TO HUNT A TIMBER WOLF IN THE WILD.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	13.9	54.8
NORTHERN COUNTIES	22.4	52.4
FARMERS	40.2	36.0
HUNTERS	34.3	40.2
TRAPPERS	47.1	30.1

$X^2 = 42.2$, $P = .0001$

A greater difference of opinion was expressed regarding the relationship of pro-wolf and anti-hunting sentiment. A minority of the general public, in contrast to a majority of farmers, hunters, and trappers, agreed that, "most people who favor protecting timber wolves are opposed to hunting" (Table 27). Group differences on this question, however, were statistically insignificant.

The respondents were also somewhat divided on the possible impact of establishing a legal season for trapping timber wolves. The majority of twin cities and northern counties residents believed that establishing a legal harvest of timber wolves would result in greater illegal killing because of the increased value of this animal's pelt. In contrast, less than a majority of hunters, trappers, and farmers agreed (although only a majority of trappers disagreed) that, "a hunting season on timber wolves would encourage more illegal killing of timber wolves because of the money people would get from selling wolf fur" (Table 28). Moreover, despite a majority of trappers disagreeing with this statement, more than one-third of this relatively knowledgeable group supported the notion that a legal harvest would result in more illegal killing of timber wolves.

Respondents were asked to indicate which of four methods they preferred as a means of increasing deer populations in northern Minnesota (Table 29). Twin cities and northern counties residents were most in favor of reductions in the number of hunters. This option was also the most preferred choice of trappers and, quite unexpectedly, the second most favored option among deer hunters. The most frequently cited choice

TABLE 27

MOST PEOPLE WHO FAVOR PROTECTING TIMBER WOLVES ARE OPPOSED TO HUNTING.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	44.0	37.6
NORTHERN COUNTIES	42.6	33.3
FARMERS	52.5	30.9
HUNTERS	55.8	27.4
TRAPPERS	58.4	24.5

$X^2 = 11.2$, $P = .18$

TABLE 28

A HUNTING SEASON ON TIMBER WOLVES WOULD ENCOURAGE MORE ILLEGAL KILLING OF TIMBER WOLVES BECAUSE OF THE MONEY PEOPLE WOULD GET FROM SELLING THEIR FUR.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	52.1	32.2
NORTHERN COUNTIES	55.1	27.8
FARMERS	39.1	36.0
HUNTERS	49.0	39.2
TRAPPERS	33.9	54.7

$X^2 = 22.1$, $P = .004$

TABLE 29

METHOD PREFERRED TO INCREASE DEER HERD BY TWIN CITIES AND NORTHERN COUNTY RESIDENTS, DEER HUNTERS, FARMERS AND TRAPPERS

TWIN CITIES		HUNTERS	
REDUCE NUMBER OF HUNTERS	34.4	DO NOTHING, LET NATURE TAKE ITS COURSE	24.5
DO NOTHING, LET NATURE TAKE ITS COURSE	25.3	REDUCE NUMBER OF HUNTERS	23.5
IMPROVE THE HABITAT	18.8	REDUCE BOTH THE NUMBER OF WOLVES AND HUNTERS	23.5
REDUCE BOTH THE NUMBER OF WOLVES AND HUNTERS	16.1	IMPROVE THE HABITAT	14.7
REDUCE THE NUMBER OF TIMBER WOLVES	5.4	REDUCE THE NUMBER OF TIMBER WOLVES	13.7
NORTHERN COUNTIES		TRAPPERS	
DO NOTHING, LET NATURE TAKE ITS COURSE	29.5	REDUCE NUMBER OF HUNTERS	32.1
REDUCE NUMBER OF HUNTERS	24.0	IMPROVE THE HABITAT	22.6
REDUCE BOTH THE NUMBER OF WOLVES AND HUNTERS	19.7	REDUCE BOTH THE NUMBER OF WOLVES AND HUNTERS	17.0
IMPROVE THE HABITAT	18.6	DO NOTHING, LET NATURE TAKE ITS COURSE	17.0
REDUCE THE NUMBER OF TIMBER WOLVES	8.2	REDUCE THE NUMBER OF TIMBER WOLVES	11.3

FARMERS

REDUCE BOTH THE NUMBER OF WOLVES AND HUNTERS	26.8
REDUCE THE NUMBER OF TIMBER WOLVES	21.7
REDUCE NUMBER OF HUNTERS	19.6
DO NOTHING, LET NATURE TAKE ITS COURSE	17.5
IMPROVE THE HABITAT	14.4

of farmers was to reduce the numbers of timber wolves and hunters, and farmers were the only group to cite reductions in timber wolves as their second most preferred choice. In contrast, trappers, hunters, northern counties and twin cities residents indicated reducing the number of timber wolves as their least desired option for increasing the deer herd. The choice of "do nothing and let nature take its course" received moderate to strong support, particularly among northern counties and twin cities residents, and hunters. Among demographic groups -- particularly the college educated, female, young, and moderate to higher income respondents -- the most preferred option was reducing the number of hunters (Table 30). The least favored choice was reductions in the population of timber wolves, except among persons of less than a high school education (who most preferred "doing nothing and letting nature take its course").

D. The Wilderness and Outdoor Recreational Value of the Timber Wolf

In general, the great majority of respondents, with the exception of farmers, regarded the timber wolf as an important and essential aspect of the outdoors and wilderness experience. Specifically, more than two-thirds of all major groups (except 39% of farmers) agreed with the statement, "I would very much like to see a timber wolf in the wild" (Table 31). Additionally, most respondents agreed that, "seeing a timber wolf in the wild would be one of the greatest outdoor experiences of my life" (Table 32). On the other hand, this statement was supported by less than a majority of farmers, elderly, nonwhite, and lower income respondents. The timber wolf's outdoor recreational and wilderness

TABLE 30

METHOD PREFERRED TO INCREASE DEER HERD
BY MAIN GROUPS AND DEMOGRAPHIC GROUPS

	REDUCE # WOLVES	REDUCE # HUNTERS	REDUCE BOTH WOLVES AND HUNTERS	DO NOTHING	IMPROVE HABITAT
MAIN GROUPS					
TWIN CITIES	5.3	34.4	16.1	25.2	18.8
NORTHERN COUNTIES	8.2	24.0	19.6	29.5	18.5
FARMERS	21.6	19.5	26.8	17.5	14.4
HUNTERS	13.7	23.5	23.5	24.5	14.7
TRAPPERS	11.3	32.0	16.9	16.9	22.6
		$X^2 = 16.5$, P = .03			
GENERAL POPULATION					
AGE					
18 - 35	3.6	37.4	14.7	25.1	19.0
36 - 55	8.7	27.1	14.0	29.8	20.1
56+	9.7	17.3	28.2	28.2	16.3
		$X^2 = 20.8$, P = .007			
GENDER					
MALE	8.8	26.1	17.2	28.8	18.8
FEMALE	4.7	32.2	18.5	25.9	18.5
		$X^2 = 3.9$, P = .41			
INCOME					
≤ $9,999	9.8	19.6	23.5	33.3	13.7
$10,000 - 19,999	6.7	29.7	21.6	24.3	17.5
$20,000 - 49,999	6.0	31.3	12.0	26.9	23.6
$50,000+	10.0	40.0	30.0	10.0	10.0
		$X^2 = 16.9$, P = .15			
ETHNICITY					
WHITE	7.0	28.2	17.8	27.9	18.9
NONWHITE	0.0	46.1	23.0	15.3	15.3
		$X^2 = 3.3$, P = .50			
EDUCATION					
≤ 11TH GRADE	20.9	18.6	18.6	30.2	11.6
HIGH SCH./VOC.	5.8	25.2	23.5	26.4	18.8
COLLEGE	3.5	37.1	11.4	27.1	20.7
		$X^2 = 28.3$, P = .0004			

TABLE 31

I WOULD VERY MUCH LIKE TO SEE A TIMBER WOLF IN THE WILD.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	78.4	9.6
NORTHERN COUNTIES	66.1	21.3
FARMERS	39.1	37.1
HUNTERS	70.5	10.7
TRAPPERS	84.9	7.5

$X^2 = 62.4$, $P = .0001$

TABLE 32

SEEING A TIMBER WOLF IN THE WILD WOULD BE ONE OF THE GREATEST OUTDOOR EXPERIENCES OF MY LIFE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	58.0	20.9
NORTHERN COUNTIES	53.0	27.8
FARMERS	31.9	46.3
HUNTERS	52.9	28.4
TRAPPERS	60.3	22.6

$X^2 = 25.5$, $P = .001$

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	57.6	17.7
36 - 55	60.5	18.4
56+	45.6	43.4
	$X^2 = 26.1$,	$P = .0001$

ETHNICITY	% AGREE	% DISAGREE
WHITE	55.9	24.0
NONWHITE	46.1	38.4
	$X^2 = 1.4$,	$P = .24$

GENDER		
MALE	57.2	24.4
FEMALE	53.9	24.3
	$X^2 = 0.69$,	$P = .70$

EDUCATION		
≤ 11TH GRADE	48.8	37.2
HIGH SCH./VOC.	52.3	25.2
COLLEGE	62.1	18.5
	$X^2 = 7.9$,	$P = .09$

INCOME

≤ $9,999	52.9	35.2
10-19,000	55.4	25.6
20-49,999	60.4	16.4
50,000+	55.0	25.0

$X^2 = 10.2$, $P = .11$

appeal was also suggested by the majority of respondents (except 41% of farmers) agreeing, "it would be wonderful to hear a timber wolf howl in the wild" (Table 33). The timber wolf's wilderness value was further indicated by the majority of respondents (with the exception of farmers) supporting the statement, "it is the presence of timber wolves that makes a wilderness experience so wonderful in northern Minnesota" (Table 34). Finally, the timber wolf's considerable aesthetic and naturalistic value was dramatically suggested by the finding that a majority of respondents, including farmers, agreed that, "to me, the timber wolf symbolizes the beauty and wonder of nature" (Table 35).

Despite the apparent outdoor recreational and wilderness importance of the timber wolf, most respondents (with the exception of twin cities residents and young adults) disapproved of preserving wilderness habitat for the timber wolf at the expense of economically hurting farmers. On the other hand, only a majority of farmers and trappers disagreed that, "timber wolves are part of our vanishing wilderness and should be protected even if farmers have to make economic sacrifices" (Table 36). Most respondents were uncertain regarding the relative economic value of the timber wolf as a wilderness attraction versus the monetary gain to be derived from selling its pelt. Specifically, less than a majority agreed or disagreed (although most farmers disagreed) that, "the economic value of timber wolves as an attraction to campers visiting northern Minnesota far exceeds any commerical value from killing these animals for their fur" (Table 37).

TABLE 33

IT WOULD BE WONDERFUL TO HEAR A TIMBER WOLF HOWL IN THE WILD.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	72.5	15.0
NORTHERN COUNTIES	63.9	18.5
FARMERS	41.2	35.0
HUNTERS	62.7	16.6
TRAPPERS	81.1	11.3

$X^2 = 37.5$, $P = .0001$

TABLE 34

IT IS THE PRESENCE OF TIMBER WOLVES THAT MAKES A WILDERNESS EXPERIENCE SO WONDERFUL IN NORTHERN MINNESOTA.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	62.9	16.1
NORTHERN COUNTIES	54.1	27.3
FARMERS	42.2	35.0
HUNTERS	50.0	31.3
TRAPPERS	60.3	28.3

$X^2 = 19.8$, $P = .01$

TABLE 35

TO ME, THE TIMBER WOLF SYMBOLIZES THE BEAUTY AND WONDER OF NATURE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	79.0	5.3
NORTHERN COUNTIES	71.5	12.5
FARMERS	56.7	24.7
HUNTERS	73.5	11.7
TRAPPERS	77.3	16.9

$X^2 = 28.6$, $P = .0004$

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	77.3	7.3
36 - 55	78.9	6.1
56+	67.3	15.2

$X^2 = 6.7$, $P = .14$

ETHNICITY	% AGREE	% DISAGREE
WHITE	75.7	7.9
NONWHITE	61.5	38.4

$X^2 = 15.4$, $P = .0004$

GENDER		
MALE	79.4	9.4
FEMALE	71.4	8.4

$X^2 = 5.6$, $P = .05$

EDUCATION		
≤ 11TH GRADE	65.1	18.6
HIGH SCH./VOC.	70.5	10.5
COLLEGE	84.2	3.5

$X^2 = 14.4$, $P = .006$

INCOME

≤ $9,999	68.6	17.6
10-19,000	72.9	10.8
20-49,999	80.7	5.4
50,000+	70.0	5.0

$X^2 = 10.3$, $P = .10$

TABLE 36

TIMBER WOLVES ARE A PART OF OUR VANISHING WILDERNESS AND SHOULD BE PROTECTED EVEN IF FARMERS HAVE TO MAKE ECONOMIC SACRIFICES.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	51.0	27.4
NORTHERN COUNTIES	38.2	40.9
	TC/NC = P = ≤ .05	
FARMERS	13.4	75.2
HUNTERS	30.3	44.1
TRAPPERS	18.8	58.4
	X^2 = 72.7, P = .0001	

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	52.7	28.8
36 - 55	41.2	32.4
56+	34.7	45.6
	X^2 = 11.8, P = .01	

GENDER		
MALE	45.5	35.5
FEMALE	43.9	32.8
	X^2 = 1.1, P = .57	

ETHNICITY	% AGREE	% DISAGREE
WHITE	44.3	34.1
NONWHITE	46.1	38.4
	X^2 = 0.29, P = .86	

EDUCATION		
≤ 11TH GRADE	37.2	41.8
HIGH SC./VOC.	42.9	39.4
COLLEGE	47.8	28.5
	X^2 = 5.4, P = .24	

INCOME

≤ $9,999	31.3	47.0
$10,000 - 19,999	52.7	31.0
$20,000 - 49,999	46.1	31.8
$50,000+	35.0	50.0
	X^2 = 8.9, P = .17	

TABLE 37

THE ECONOMIC VALUE OF TIMBER WOLVES AS AN ATTRACTION TO CAMPERS VISITING NORTHERN MINNESOTA FAR EXCEEDS ANY COMMERCIAL VALUE FROM KILLING THESE ANIMALS FOR THEIR FUR.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	41.4	24.1
NORTHERN COUNTIES	45.3	27.8
FARMERS	22.6	54.6
HUNTERS	38.2	35.2
TRAPPERS	20.7	52.8

$X^2 = 42.1$, $P = .0001$

E. Negative Perceptions of the Timber Wolf

Various questions explored feelings of fear and hostility toward the timber wolf. In general, relatively negative perceptions of the timber wolf were far less apparent than the positive attitudes reported in the previous and to be discussed later sections. Few respondents regarded the timber wolf as particularly dangerous to people, as suggested by responses to the question, "all timber wolves are dangerous to people" (Table 38). Additionally, a minority of respondents agreed, although only a majority of hunters and trappers disagreed, "I would be afraid if timber wolves lived near my home" (Table 39). More ambivalence was expressed regarding the notion that, "if I was hiking in the woods and saw a timber wolf, I would be afraid it might attack me," with only a majority of northern counties residents, hunters and trappers disagreeing with this statement (Table 40). The wolf's howl was not perceived as a frightening characteristic of this animal, with the great majority of respondents, except farmers, disagreeing that, "a timber wolf's howl is one of the most frightening sounds in nature" (Table 41). Finally, most respondents (with the exception of farmers) did not regard the timber wolf as dangerous to children, as suggested by answers to the question, "because we no longer hunt timber wolves, they have lost their fear of people and now threaten children" (Table 42).

Certain questions explored negative feelings toward wolf predation. The great majority of respondents disagreed that the timber wolf was an intrinsically cruel animal, as suggested by responses to the question, "some animals like timber wolves and rattlesnakes are naturally cruel"

TABLE 38

ALL TIMBER WOLVES ARE DANGEROUS TO PEOPLE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	10.7	76.3
NORTHERN COUNTIES	13.1	73.7
FARMERS	23.7	61.8
HUNTERS	7.8	84.3
TRAPPERS	1.8	92.4

$X^2 = 26.7$, $P = .0008$

TABLE 39

I WOULD BE AFRAID IF TIMBER WOLVES LIVED NEAR MY HOME.

TWIN CITIES	34.9	44.0
NORTHERN COUNTIES	36.6	45.9
FARMERS	35.0	49.4
HUNTERS	28.4	59.8
TRAPPERS	15.0	66.0

$X^2 = 17.0$, $P = .03$

TABLE 40

IF I WAS HIKING IN THE WOODS AND SAW A TIMBER WOLF, I WOULD BE AFRAID IT MIGHT ATTACK ME.

TWIN CITIES	38.1	43.0
NORTHERN COUNTIES	36.0	50.2
FARMERS	38.1	47.4
HUNTERS	15.6	68.6
TRAPPERS	16.9	79.2

$X^2 = 38.9$, $P = .0001$

TABLE 41

A TIMBER WOLF'S HOWL IS ONE OF THE MOST FRIGHTENING SOUNDS IN NATURE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	16.1	65.5
NORTHERN COUNTIES	18.0	60.1
FARMERS	35.0	53.6
HUNTERS	19.6	64.7
TRAPPERS	13.2	73.5

$X^2 = 21.7$, $P = .005$

TABLE 42

BECAUSE WE NO LONGER HUNT TIMBER WOLVES, THEY HAVE LOST THEIR FEAR OF PEOPLE AND NOW THREATEN CHILDREN.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	8.6	74.1
NORTHERN COUNTIES	14.2	71.0
FARMERS	26.8	55.6
HUNTERS	17.6	73.5
TRAPPERS	11.3	77.3

$X^2 = 23.3$, $P = .003$

(Table 43). Additionally, all sample groups, with the exception of farmers, disagreed that, "timber wolves are among the few animals who will kill for the pleasure of killing" (Table 44). On the other hand, more divided opinion was expressed about being personally disturbed by wolf predation, as indicated by responses to the question, "It upsets me to think how a timber wolf must actually kill a deer." A majority of twin cities residents, hunters, and particularly trappers disagreed with this statement, in contrast to a minority of northern counties residents and farmers (Table 45)

In general, Minnesotans welcomed the presence of the timber wolf in their state. Little support existed for the idea that, "timber wolves belong in places like Alaska not in Minnesota," although this sentiment occurred significantly less often among farmers, elderly respondents, and persons of limited income and education (Table 46). Additionally, few respondents supported the notion that, "Minnesota would be a nicer place to live, if fewer dangerous animals, like timber wolves, were found here" (Table 47). Far more ambivalence was expressed regarding the importance of timber wolves in Minnesota given abundant populations in Canada and Alaska, as suggested by responses to the question, "It seems silly to worry alot about timber wolves in Minnesota when there are so many in Canada and Alaska" (Table 48). Only a distinct majority of twin cities, college educated, younger, female, and higher income respondents disagreed with this notion.

F. Positive Perceptions of the Timber Wolf

The presumed ecological importance of the timber wolf was indicated

TABLE 43

SOME ANIMALS LIKE TIMBER WOLVES AND RATTLESNAKES ARE NATURALLY CRUEL.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	12.9	69.3
NORTHERN COUNTIES	14.7	72.1
FARMERS	25.7	54.6
HUNTERS	21.5	66.6
TRAPPERS	26.4	67.9

$X^2 = 19.4$, $P = .01$

TABLE 44

TIMBER WOLVES ARE AMONG THE FEW ANIMALS WHO WILL KILL FOR THE PLEASURE OF KILLING.

TWIN CITIES	13.4	66.1
NORTHERN COUNTIES	23.5	59.0
FARMERS	42.2	40.2
HUNTERS	31.3	57.8
TRAPPERS	24.5	62.2

$X^2 = 35.1$, $P = .0001$

TABLE 45

IT UPSETS ME TO THINK HOW A TIMBER WOLF MUST ACTUALLY KILL A DEER.

TWIN CITIES	23.1	50.5
NORTHERN COUNTIES	40.4	40.9
	TC/NC = P = $\leq .05$	
FARMERS	48.4	40.2
HUNTERS	29.4	50.9
TRAPPERS	22.6	62.2

$X^2 = 31.7$, $P = .0001$

TABLE 46

TIMBER WOLVES BELONG IN PLACES LIKE ALASKA NOT IN MINNESOTA.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	8.0	81.7
NORTHERN COUNTIES	10.8	78.1
FARMERS	23.7	56.7
HUNTERS	18.6	76.4
TRAPPERS	9.4	86.7

$X^2 = 35.3$, $P = .0001$

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	5.5	87.1
36 - 55	5.2	82.4
56+	20.6	64.1
	$X^2 = 15.8$,	$P = .003$

GENDER		
MALE	8.8	82.7
FEMALE	9.5	77.2
	$X^2 = 2.4$,	$P = .29$

ETHNICITY	% AGREE	% DISAGREE
WHITE	9.6	79.6
NONWHITE	0.0	84.6
	$X^2 = 1.5$,	$P = .46$

EDUCATION		
≤ 11TH GRADE	27.9	55.8
HIGH SCH./VOC.	9.4	78.8
COLLEGE	2.1	89.2
	$X^2 = 31.6$,	$P = .0001$

INCOME

≤ $9,999	23.5	66.6
10-19,000	9.4	79.7
20-49,999	4.9	85.7
50,000+	0.0	95.0

$X^2 = 20.7$, $P = .002$

TABLE 47

MINNESOTA WOULD BE A NICER PLACE TO LIVE, IF FEWER DANGEROUS ANIMALS, LIKE TIMBER WOLVES, WERE FOUND HERE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	10.7	77.4
NORTHERN COUNTIES	12.5	73.2
FARMERS	25.7	56.7
HUNTERS	14.7	71.5
TRAPPERS	7.5	81.1

$X^2 = 19.1$, $P = .01$

TABLE 48

IT SEEMS SILLY TO WORRY ALOT ABOUT TIMBER WOLVES IN MINNESOTA WHEN THERE ARE SO MANY IN CANADA AND ALASKA.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	19.4	63.4
NORTHERN COUNTIES	38.3	44.8
	TC/NC P = ≤ .05	
FARMERS	42.3	29.9
HUNTERS	39.2	48.0
TRAPPERS	37.7	45.3

$X^2 = 38.9$, P = .0001

GENERAL POPULATION

AGE	% AGREE	% DISAGREE
18 - 35	27.6	54.6
36 - 55	25.4	57.9
56+	34.8	48.9
	$X^2 = 2.5$,	P = .63

ETHNICITY	% AGREE	% DISAGREE
WHITE	28.3	54.2
NONWHITE	46.2	46.2
	$X^2 = 2.2$,	P = .32

GENDER		
MALE	33.9	50.6
FEMALE	23.8	57.7
	$X^2 = 4.5$,	P = .10

EDUCATION		
≤ 11TH GRADE	46.5	32.6
HIGH SCH./VOC.	32.4	50.0
COLLEGE	18.6	67.1
	$X^2 = 20.1$,	P = .0005

INCOME

≤ $9,999	41.2	43.1
10-19,000	24.3	55.4
20-49,999	28.0	57.1
50,000+	15.0	65.0
	$X^2 = 7.5$,	P = .27

by most respondents, with the exception of farmers, as suggested by responses to the statement, "timber wolves are essential to maintaining the balance of nature" (Table 49). More uncertainty was expressed, however, regarding the role of timber wolves in maintaining deer in a "balanced" relationship with the environment, with only a majority of twin cities residents and hunters agreeing that, "the timber wolf is essential for keeping the deer in northern Minnesota in a proper balance with the environment" (Table 50). Additionally, most respondents expressed uncertainty regarding whether or not the elimination of wolves from most of the country had adversely affected deer in these areas, as indicated by answers to the statement, "the elimination of timber wolves from most of the United States has resulted in overpopulated and unhealthy deer populations in many places" (Table 51).

Most Minnesotans valued the existence of the timber wolf in the wild, despite the probability of never actually seeing one. The great majority, except farmers, agreed that, "I may never see a timber wolf in the wild but it is important for me to know they exist in Minnesota (Table 52). Despite the timber wolf's "existence" value, very few respondents reported wanting to have a wolf as a pet (Table 53).

The majority of respondents perceived the timber wolf as an especially intelligent animal, although many expressed no opinion on the matter (Table 54). The general public was ambivalent, however, regarding any ethical problem with killing timber wolves because of their presumed intelligence or emotional sensitivity. In contrast, most farmers, hunters, and trappers disagreed that, "it is wrong to kill timber wolves because they seem so intelligent and emotionally sensitive" (Table 55).

TABLE 49

TIMBER WOLVES ARE ESSENTIAL TO MAINTAINING THE BALANCE OF NATURE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	79.0	9.6
NORTHERN COUNTIES	65.0	20.7
FARMERS	44.3	41.2
HUNTERS	62.7	22.5
TRAPPERS	58.4	26.4

$X^2 = 43.9$, $P = .0001$

TABLE 50

THE TIMBER WOLF IS ESSENTIAL FOR KEEPING THE DEER IN NORTHERN MINNESOTA IN A PROPER BALANCE WITH THE ENVIRONMENT.

TWIN CITIES	59.6	17.2
NORTHERN COUNTIES	48.6	32.2
FARMERS	35.0	48.4
HUNTERS	50.0	39.2
TRAPPERS	47.1	41.5

$X^2 = 39.1$, $P = .0001$

TABLE 51

THE ELIMINATION OF TIMBER WOLVES FROM MOST OF THE UNITED STATES HAS RESULTED IN OVERPOPULATED AND UNHEALTHY DEER POPULATIONS IN MANY PLACES.

TWIN CITIES	30.1	34.9
NORTHERN COUNTIES	32.7	40.4
FARMERS	28.8	53.6
HUNTERS	34.3	51.9
TRAPPERS	28.3	49.0

$X^2 = 23.5$, $P = .002$

TABLE 52

I MAY NEVER SEE A TIMBER WOLF IN THE WILD BUT IT IS IMPORTANT FOR ME TO KNOW THEY EXIST IN MINNESOTA.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	84.4	5.4
NORTHERN COUNTIES	74.9	14.6
FARMERS	48.5	27.8
HUNTERS	73.5	13.7
TRAPPERS	73.6	4.9

$X^2 = 48.8$, $P = .0001$

TABLE 53

IT WOULD BE FUN TO HAVE A TIMBER WOLF AS A PET.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	14.5	75.2
NORTHERN COUNTIES	13.1	76.5
FARMERS	7.2	86.6
HUNTERS	17.6	70.5
TRAPPERS	20.7	62.2

$X^2 = 13.2$, $P = .10$

TABLE 54

THE TIMBER WOLF IS ONE OF THE MOST INTELLIGENT ANIMALS.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	42.4	12.9
NORTHERN COUNTIES	54.6	12.5
FARMERS	58.7	14.4
HUNTERS	65.6	6.8
TRAPPERS	67.9	7.5

$X^2 = 23.6$, $P = .002$

TABLE 55

IT'S WRONG TO KILL TIMBER WOLVES BECAUSE THEY SEEM SO INTELLIGENT AND EMOTIONALLY SENSITIVE.

MAIN GROUPS

	% AGREE	% DISAGREE
TWIN CITIES	31.1	25.8
NORTHERN COUNTIES	27.3	46.4
	TC/NC = $\leq$ .05	
FARMERS	16.4	58.7
HUNTERS	19.6	52.9
TRAPPERS	15.0	56.6

$X^2 = 43.7$, $P = .0001$

G. Management and Protection of the Timber Wolf

Various questions considered attitudes toward timber wolf management, conservation, and protection. An issue of current dispute is the extent of illegal killing of timber wolves. Only a majority of twin cities residents indicated the belief that, "so many timber wolves are being illegally killed in Minnesota that if something is not done to stop it, the timber wolf will soon disappear from the state" (Table 56). In contrast, a majority of trappers, hunters, and farmers, and significantly more northern counties than twin cities residents, disagreed with this statement. Most Minnesotans disputed the view that the timber wolf would be in serious trouble if the Federal government was no longer responsible for its management. On the other hand, only a majority of farmers, hunters, and trappers disagreed that, "timber wolf numbers will decline drastically if the Federal government is not allowed to manage this animal" (Table 57).

The general public expressed concern about the negative impact on public perception of establishing a legal season for hunting timber wolves, as indicated by responses to the question, "if a hunting season on timber wolves were allowed after all the years of protecting this animal as an endangered species, it would confuse the public about the need to protect endangered wildlife" (Table 58). On the other hand, less than a majority of farmers and trappers agreed with this notion although, interestingly, nearly half of the deer hunters sample supported the statement. Most of the general public indicated the belief that sportsmen and farmers had exercised undue influence on the proposal to establish a legal season for timber wolves in Minnesota. Moreover, more

TABLE 56

SO MANY TIMBER WOLVES ARE BEING ILLEGALLY KILLED IN MINNESOTA THAT IF SOMETHING IS NOT DONE TO STOP IT, THE TIMBER WOLF WILL SOON DISAPPEAR FROM THIS STATE.

MAIN GROUPS	% AGREE	% DISAGREE
TWIN CITIES	54.8	19.4
NORTHERN COUNTIES	38.8	42.6
FARMERS	17.5	57.7
HUNTERS	25.5	58.8
TRAPPERS	15.0	64.2

$X^2 = 82.8$, $P = .0001$

TABLE 57

TIMBER WOLF NUMBERS WILL DECLINE DRASTICALLY IF THE FEDERAL GOVERNMENT IS NOT ALLOWED TO MANAGE THIS ANIMAL.

TWIN CITIES	46.8	29.0
NORTHERN COUNTIES	38.3	37.7
	TC/NC = $P = \leq .05$	
FARMERS	28.9	53.6
HUNTERS	27.5	52.9
TRAPPERS	37.7	56.6

$X^2 = 34.4$, $P = .0001$

TABLE 58

IF A HUNTING SEASON ON TIMBER WOLVES WERE ALLOWED AFTER ALL THE YEARS OF PROTECTING THIS ANIMAL AS AN ENDANGERED SPECIES, IT WOULD CONFUSE THE PUBLIC ABOUT THE NEED TO PROTECT ENDANGERED WILDLIFE.

TWIN CITIES	61.3	23.1
NORTHERN COUNTIES	54.6	21.3
FARMERS	36.1	42.3
HUNTERS	49.0	32.4
TRAPPERS	35.9	45.3

$X2 = 31.6$, $P = .0001$

hunters and trappers agreed than disagreed with this suggestion, and less than a majority of farmers disagreed that, "the proposal to hunt timber wolves in Minnesota largely stems from the power sportsmen and farmers have over wildlife management" (Table 59).

Two somewhat controversial proposals for helping the timber wolf have been extensive manipulation of this animal's habitat, and relocation of timber wolves to other states. Regarding forest habitat changes, less than a majority of respondents, with the exception of hunters and trappers, supported the notion that, "the best way to help timber wolves in northern Minnesota is to allow more burning and cutting of the forests in order to provide better land and more food for deer" (Table 60). On the other hand, only a majority of twin cities residents disapproved of this suggestion. As for relocation of timber wolves to other states, only a majority of hunters supported, although no group disapproved of the statement, "because of their national importance, excess timber wolves in Minnesota should be relocated to suitable areas in other states" (Table 61).

TABLE 59

THE PROPOSAL TO HUNT TIMBER WOLVES IN MINNESOTA, LARGELY STEMS FROM THE POWER SPORTSMEN AND FARMERS HAVE OVER WILDLIFE MANAGEMENT.

MAIN GROUPS	% AGREE	% DISAGREE
TWIN CITIES	57.5	12.9
NORTHERN COUNTIES	54 1	17.5
FARMERS	33.0	34.0
HUNTERS	43.1	31.4
TRAPPERS	39.6	39.6

$X^2 = 38.1$, $P = .0001$

TABLE 60

THE BEST WAY TO HELP TIMBER WOLVES IN NORTHERN MINNESOTA IS TO ALLOW MORE BURNING AND CUTTING OF THE FORESTS IN ORDER TO PROVIDE BETTER LAND AND MORE FOOD FOR DEER.

TWIN CITIES	15.6	54.3
NORTHERN COUNTIES	35.0	37.7
FARMERS	36.0	39.2
HUNTERS	51.0	31.4
TRAPPERS	56.6	30.2

$X^2 = 55.3$, $P = .0001$

TABLE 61

BECAUSE OF THEIR NATIONAL IMPORTANCE, EXCESS TIMBER WOLVES IN MINNESOTA SHOULD BE RELOCATED TO SUITABLE AREAS IN OTHER STATES.

TWIN CITIES	33.3	45.2
NORTHERN COUNTIES	40.0	37.7
FARMERS	34.0	44.3
HUNTERS	52.9	32.4
TRAPPERS	49.1	35.9

$X^2 = 14.8$, $P = .06$

IV. KNOWLEDGE OF THE TIMBER WOLF

Various true-false questions were asked to explore public understanding and knowledge of the timber wolf. Additionally, a knowledge of timber wolf scale was constructed based on these questions. Finally, the respondents were questioned regarding their perceived familiarity with the timber wolf issue, and assumptions about the number of timber wolves in Minnesota.

A. True-false Questions*

Two knowledge questions considered the tendency of timber wolves to kill domestic livestock. Less than a majority of the general public, although most hunters, trappers, and farmers, correctly answered the question, "timber wolves will kill cattle and sheep only if there are not enough deer" (Table 62). Significantly more northern counties than twin cities residents knew this statement was false. Additionally, the great majority of respondents recognized that all timber wolves do not kill livestock (Table 63).

Widely varying impressions existed regarding the size of the timber wolf. The majority of respondents -- although significantly more farmers, hunters, and trappers than northern counties or twin cities residents -- knew that adult male timber wolves do not average 200 pounds (Table 64). On the other hand, a minority of nonwhites, females, and respondents of limited education and income correctly answered this question.

It has been suggested that some people confuse the timber wolf with

---

*The correct answer to each question is indicated by the initials T (true) or F (false) following the tabular presentation of results.

TABLE 62

TIMBER WOLVES WILL KILL CATTLE AND SHEEP ONLY IF THERE ARE NOT ENOUGH DEER. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	24.7	47.3	28.0
NORTHERN COUNTIES	47.5	33.3	19.1
FARMERS	55.7	32.0	12.4
HUNTERS	55.9	39.2	4.9
TRAPPERS	62.3	34.0	3.8

$X^2 = 61.5$, $P = < .001$

TC/NC $X^2 = 20.8$ $P = <.001$

TABLE 63

ALL TIMBER WOLVES KILL LIVESTOCK. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	78.5	7.5	14.0
NORTHERN COUNTIES	84.2	9.3	6.6
FARMERS	80.4	16.5	3.1
HUNTERS	85.3	10.8	3.9
TRAPPERS	88.7	3.8	7.6

$X^2 = 22.5$, $P = .004$

TABLE 64

ADULT MALE TIMBER WOLVES WEIGH ON THE AVERAGE 200 POUNDS. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	53.8	20.4	25.8
NORTHERN COUNTIES	58.5	22.9	18.6
FARMERS	66.0	24.7	9.3
HUNTERS	74.5	18.6	6.9
TRAPPERS	86.8	11.3	1.9

$X^2 = 40.5$, $P = < .001$

GENERAL POPULATION

AGE	% CORRECT	% WRONG	% D. K.
18 - 35	51.5	24.5	23.9
36 - 55	64.9	14.9	20.2
56+	53.3	25.0	21.7

$X^2 = 6.2$, $P = .18$

GENDER			
MALE	67.2	20.6	12.2
FEMALE	45.5	22.8	31.8

$X^2 = 23.7$, $P = .0001$

ETHNICITY	% CORRECT	% WRONG	% D.K.
WHITE	57.3	21.5	22.0
NONWHITE	15.4	30.8	53.9

$X^2 = 10.4$, $P = .005$

EDUCATION			
≤ 11TH GRADE	39.5	34.9	25.6
HIGH SCH./VOC.	55.3	22.4	22.4
COLLEGE	65.0	14.3	20.7

$X^2 = 11.4$, $P = .02$

INCOME

≤ $9,999	38.2	23.5	37.3
10-19,000	66.2	23.0	10.8
20-49,999	58.2	20.9	20.9
50,000+	70.0	20.0	10.0

$X^2 = 16.1$, $P = .01$

the coyote, the latter animal being referred to as a "brush wolf" in Minnesota. Most respondents correctly recognized that the timber wolf is not considerably larger than the coyote as suggested by responses to the question, "the timber wolf is approximately five times larger than the average coyote" (Table 65). On the other hand, less than a majority of nonwhites and respondents with less than a high school education knew the answer to this question. Additionally, less than a majority of any sample group accurately answered the question, "coyotes and timber wolves are basically the same animal only timber wolves are bigger" (Table 66). It is possible, however, that this question confused many respondents who considered the similarities between coyotes and wolves as members of the canid family to be sufficient indication of their being "basically the same animal." A reflection of greater understanding of the distinction between wolves and coyotes was suggested by the finding that more than two-thirds of northern counties residents, farmers, hunters, and trappers knew that, "brush wolf and timber wolf are names for different animals" (Table 67). On the other hand, just 27% of twin cities residents correctly answered this question.

A number of questions considered the feeding habits of timber wolves. Only a minority of the general public -- although significantly more northern counties than twin cities residents -- knew that, "timber wolves generally feed on large mammals such as deer and moose." In contrast, most farmers, hunters, and particularly trappers correctly answered this question (Table 68). Remarkably few respondents realized the limited significance of plants in a timber wolf's diet, with a minority (except

TABLE 65

THE TIMBER WOLF IS APPROXIMATELY FIVE TIMES LARGER THAN THE AVERAGE COYOTE. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	55.9	17.2	26.9
NORTHERN COUNTIES	62.3	18.0	19.7
FARMERS	74.2	18.6	7.2
HUNTERS	71.6	19.6	8.8
TRAPPERS	86.8	13.2	0.0

$X^2 = 40.0$, $P = < .001$

GENERAL POPULATION

AGE	% CORRECT	% WRONG	% D. K.
18 - 35	54.6	20.9	24.5
36 - 55	62.3	14.9	22.8
56+	63.0	15.2	21.7

$X^2 = 2.9$, $P = .56$

GENDER			
MALE	63.9	21.7	14.4
FEMALE	54.5	13.8	31.8

$X^2 = 16.4$, $P = .0003$

ETHNICITY	% CORRECT	% WRONG	% D.K.
WHITE	60.2	18.1	21.8
NONWHITE	30.8	7.7	61.5

$X^2 = 11.1$, $P = .003$

EDUCATION			
≤ 11TH GRADE	46.5	23.3	30.2
HIGH SCH./VOC.	57.0	20.0	22.9
COLLEGE	65.0	13.6	21.4

$X^2 = 5.7$, $P = .21$

INCOME

≤ $9,999	51.0	19.6	29.4
10-19,000	62.2	16.2	21.6
20-49,999	59.3	18.7	22.0
50,000+	75.0	10.0	15.0

$X^2 = 4.0$, $P = .66$

TABLE 66

COYOTES AND TIMBER WOLVES ARE BASICALLY THE SAME ANIMAL ONLY TIMBER WOLVES ARE BIGGER. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	39.2	39.8	21.0
NORTHERN COUNTIES	37.2	44.8	18.0
FARMERS	38.1	53.6	8.3
HUNTERS	35.3	53.9	10.8
TRAPPERS	49.0	47.2	3.8

$X^2 = 20.3$, $P = < .009$

TABLE 67

BRUSH WOLF AND TIMBER WOLF ARE NAMES FOR DIFFERENT ANIMALS. (T)

TWIN CITIES	26.9	18.3	54.8
NORTHERN COUNTIES	63.9	13.7	22.4
FARMERS	70.1	14.4	15.5
HUNTERS	76.5	16.7	6.8
TRAPPERS	79.2	15.1	5.7

$X^2 = 130.4$, $P = < .001$

TABLE 68

TIMBER WOLVES GENERALLY FEED ON LARGE MAMMALS SUCH AS DEER AND MOOSE. (T)

TWIN CITIES	35.0	43.0	22.0
NORTHERN COUNTIES	47.0	43.2	9.8
FARMERS	51.6	44.3	4.1
HUNTERS	53.9	43.1	2.9
TRAPPERS	66.0	28.3	5.7

$X^2 = 46.0$, $P = < .001$

TC/NC $X^2 = 11.9$ $P = .003$

51% of trappers) correctly answering the question, "plants comprise about 25% of a timber wolf's diet" (Table 69). Additionally, less than a majority of the general public recognized that timber wolves will feed on dead animals, as suggested by responses to the question, "timber wolves will eat animals that are already dead" (Table 70). Most farmers, hunters, and particularly trappers, on the other hand, obtained the correct answer to this question. The great majority of respondents were aware that, "the timber wolf will sometimes eat a small animal like a mouse or a beaver" (Table 71). Moreover, the majority of respondents, with the exception of twin cities residents, knew the answer to the question, "the timber wolf primarily eats the 'best' parts of the deer and leaves the rest" (Table 72). Among demograhic groups, less than a majority of elderly, nonwhite, female, and lower income and less educated respondents correctly answered this question.

Some questions explored knowledge of predation by timber wolves. Most respondents recognized that timber wolves do not "usually kill [their] prey by wounding the animal and then letting it bleed to death," although significantly less twin cities than northern counties residents correctly answered this question (Table 73). Additionally, only a minority of elderly, nonwhite, female, and lower income respondents knew the correct answer to this question. A greater understanding of the timber wolf's predatory nature was suggested by most respondents accurately answering the question, "timber wolves only kill animals that are sick and old" (Table 74). Additionally, most respondents disputed the myth that, "timber wolves killed many people during frontier times in America" (Table 75).

TABLE 69

PLANTS COMPRISE ABOUT 25% OF A TIMBER WOLF'S DIET. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	28.0	24.7	47.3
NORTHERN COUNTIES	38.3	19.1	42.6
FARMERS	45.4	19.6	35.0
HUNTERS	39.2	25.5	35.3
TRAPPERS	50.9	34.0	15.1

$X^2 = 26.0$, P = .001
TC/NC $X^2 = 4.7$ P = .094

TABLE 70

TIMBER WOLVES WILL EAT ANIMALS THAT ARE ALREADY DEAD. (T)

TWIN CITIES	39.3	28.5	32.3
NORTHERN COUNTIES	48.1	29.0	22.9
FARMERS	55.6	29.0	14.4
HUNTERS	56.9	28.4	14.7
TRAPPERS	73.6	15.1	11.3

$X^2 = 31.9$, P = < .001
TC/NC $X^2 = 4.6$ P = .10

TABLE 71

THE TIMBER WOLF WILL SOMETIMES EAT A SMALL ANIMAL LIKE A MOUSE OR A BEAVER. (T)

TWIN CITIES	74.7	4.3	21.0
NORTHERN COUNTIES	80.9	6.5	12.6
FARMERS	90.7	3.1	6.2
HUNTERS	91.2	4.9	3.9
TRAPPERS	98.1	1.9	0.0

$X^2 = 35.4$, P = < .001

TABLE 72

THE TIMBER WOLF PRIMARILY EATS THE "BEST" PARTS OF THE DEER AND LEAVES THE REST. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	45.7	18.3	36.0
NORTHERN COUNTIES	59.0	21.3	19.7
FARMERS	54.6	28.9	16.5
HUNTERS	74.5	20.6	4.9
TRAPPERS	71.7	20.8	7.6

$X^2 = 53.9$, $P = < .001$

TC/NC $X^2 = 12.4$ $P = .002$

GENERAL POPULATION

AGE	% CORRECT	% WRONG	% D.K.
18 - 35	58.3	19.0	22.7
36 - 55	51.8	14.9	33.3
56+	42.4	27.2	30.4

$X^2 = 9.8$, $P = .04$

GENDER			
MALE	66.7	17.8	15.6
FEMALE	38.6	21.7	39.7

$X^2 = 33.8$, $P = .0001$

ETHNICITY	% CORRECT	% WRONG	% D.K.
WHITE	53.1	19.5	27.4
NONWHITE	38.5	30.8	30.8

$X^2 = 1.3$, $P = .50$

EDUCATION			
≤ 11TH GRADE	41.9	39.5	18.6
HIGH SCH./VOC.	55.3	17.7	27.1
COLLEGE	50.7	15.7	33.6

$X^2 = 14.2$, $P = .006$

INCOME			
≤ $9,999	45.1	25.5	29.4
10-19,000	56.8	20.3	23.0
20-49,999	53.9	17.6	28.6
50,000+	50.0	15.0	35.0

$X^2 = 3.4$, $P = .75$

TABLE 73

THE TIMBER WOLF USUALLY KILLS ITS PREY BY WOUNDING THE ANIMAL AND THEN LETTING IT BLEED TO DEATH. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	53.2	6.5	40.3
NORTHERN COUNTIES	62.3	10.4	27.3
FARMERS	67.0	12.4	20.6
HUNTERS	79.4	13.7	6.9
TRAPPERS	84.9	9.4	5.7

$X^2 = 55.1$, $P = < .001$

TC/NC $X^2 = 7.6$ $P = .02$

GENERAL POPULATION

	% CORRECT	% WRONG	% D.K.
AGE			
18 - 35	62.6	8.6	28.8
36 - 55	57.9	7.9	34.2
56+	48.9	8.7	42.4
	$X^2 = 5.1$,	$P = .27$	
GENDER			
MALE	70.0	10.0	20.0
FEMALE	46.0	6.9	47.1
	$X^2 = 30.2$,	$P = .0001$	

	% CORRECT	% WRONG	% D.K.
ETHNICITY			
WHITE	58.8	8.5	32.8
NONWHITE	30.8	7.7	61.5
	$X^2 = 4.7$,	$P = .09$	
EDUCATION			
≤ 11TH GRADE	51.2	7.0	41.9
HIGH SCH./VOC.	60.0	8.2	31.8
COLLEGE	57.9	7.9	34.3
	$X^2 = 1.5$,	$P = .81$	

INCOME

≤ $9,999	47.1	9.8	43.1
10-19,000	60.8	10.8	28.8
20-49,999	60.4	6.0	33.5
50,000+	70.0	5.0	25.0
	$X^2 = 6.2$,	$P = .39$	

TABLE 74

TIMBER WOLVES ONLY KILL ANIMALS THAT ARE SICK AND OLD. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	64.5	20.4	15.1
NORTHERN COUNTIES	73.8	16.9	9.3
FARMERS	82.5	13.4	4.1
HUNTERS	79.4	15.7	4.9
TRAPPERS	79.3	17.0	3.8

$X^2 = 19.5$, $P = < .01$

TC/NC $X^2 = 4.3$, $P = .11$

TABLE 75

TIMBER WOLVES KILLED MANY PEOPLE DURING FRONTIER TIMES IN AMERICA. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	67.2	9.1	23.7
NORTHERN COUNTIES	71.6	3.8	24.6
FARMERS	75.3	9.2	15.5
HUNTERS	84.3	4.9	10.8
TRAPPERS	81.1	1.9	17.0

$X^2 = 19.4$, $P = < .01$

A final set of questions focused on the distribution of the timber wolf and the wolf's howl. Most respondents were ignorant regarding the geographic range of the timber wolf and its population size. Less than a majority of respondents correctly answered the question, "the timber wolf is only found in North America" (Table 76). Additionally, only a small number of respondents knew that 200,000 wolves are not found in Alaska (Table 77). A greater knowledge of the size of a typical wolf pack was suggested by most respondents correctly answering the question, "most timber wolf packs average around 20 - 30 animals" (Table 78). The overwhelming majority of respondents also correctly disagreed that, "timber wolves only howl when they are angry" (Table 79).

B. Knowledge of Timber Wolf Scale

A knowledge of timber wolf scale was constructed based on the summation of answers for all true-false questions, with a correct answer being awarded 4 points, a don't know response, 1 point, and an incorrect answer, no points. The total score for each respondent was standardized on a 0 - 100 scoring range.

Among major sample groups, trappers had the highest mean knowledge of timber wolf scale score of nearly 71 (Table 80). Hunters, farmers, and northern counties residents had mean knowledge scale scores of between 63 and 67.5. The lowest knowledge scale score of 58 was obtained by twin cities residents.

Demographic group results on the knowledge of timber wolf scale revealed that males had signficantly higher scores than females, as did white respondents in comparison to nonwhites. Insignificant knowledge

TABLE 76

THE TIMBER WOLF IS ONLY FOUND IN NORTH AMERICA. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	27.4	38.7	33.9
NORTHERN COUNTIES	30.0	35.0	35.0
FARMERS	29.9	33.0	37.1
HUNTERS	35.3	40.2	24.5
TRAPPERS	45.3	28.3	26.4

$X^2 = 10.6$, P = .22

TABLE 77

AN ESTIMATED 200,000 TIMBER WOLVES LIVE IN ALASKA. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	11.8	18.8	69.4
NORTHERN COUNTIES	10.9	17.5	71.6
FARMERS	8.3	17.5	74.2
HUNTERS	23.5	18.6	57.8
TRAPPERS	22.6	20.8	56.6

$X^2 = 17.6$, P = .02

TABLE 78

MOST TIMBER WOLF PACKS AVERAGE AROUND 20 - 30 ANIMALS. (F)

	% CORRECT ANSWER	% WRONG ANSWER	% DON'T KNOW
TWIN CITIES	49.5	16.1	34.4
NORTHERN COUNTIES	68.3	14.2	17.5
FARMERS	70.1	12.4	17.5
HUNTERS	79.4	10.8	9.8
TRAPPERS	94.3	1.9	3.8

$X^2 = 56.3$, $P = < .001$

TC/NC = 15.9 $P = <.001$

TABLE 79

TIMBER WOLVES ONLY HOWL WHEN THEY ARE ANGRY. (F)

TWIN CITIES	83.9	0.0	16.1
NORTHERN COUNTIES	86.3	0.6	13.1
FARMERS	87.6	2.1	10.3
HUNTERS	98.0	1.0	1.0
TRAPPERS	98.1	0.0	1.9

$X^2 = 26.0$, $P = .001$

TABLE 80

KNOWLEDGE OF TIMBER WOLF SCALE MEAN SCORES BY MAIN GROUPS

	STANDARDIZED MEAN SCORE
TWIN CITIES	58.0
NORTHERN COUNTIES	63.2
FARMERS	64.4
HUNTERS	67.5
TRAPPERS	70.8

SIG F = .0001, F = 24.8

scale differences occurred among varying income, education, and age groups (Table 81).

Among animal-related activity groups, respondents who had raised livestock obtained significantly higher knowledge scale scores than those who had never raised livestock, and a similar contrast occurred when comparing large with small property owners, persons who had killed or captured a timber wolf with those who had not, and active birdwatchers with casual birdwatchers and nonbirdwatchers (Table 82).

C. Number of Timber Wolves and Awareness of Wolf Issue

Respondents were asked to estimate the number of timber wolves presently in Minnesota (Tables 83 and 84). Responses varied widely, although the most frequent answer, especially among trappers, was "don't know." The perception of the timber wolf as a rare animal in Minnesota differed substantially. The presumption of 300 or less timber wolves was found among 14% of northern counties and 10% of twin cities residents, in contrast to 3% of farmers and hunters and 6% of trappers. Farmers, hunters, and trappers were the most likely to provide a relatively accurate estimate of between 1100-1800 timber wolves in Minnesota. Between 9 and 13% of these groups, in contrast to 5% of twin cities and 7% of northern counties residents, cited this number of timber wolves. When the estimated range of timber wolves was extended to 550-2000 animals, nearly one-third or more of northern counties residents, hunters, trappers, and farmers, compared to 23% of twin cities residents, offered this estimate. The perception of a large number of timber wolves in Minnesota most often occurred among hunters, farmers, and twin cities residents, and least

TABLE 81

KNOWLEDGE SCALE MEAN SCORES BY DEMOGRAPHIC GROUPS

	STANDARDIZED MEAN SCORE	F	SIG OF F
AGE			
18 - 35	60.5	.8	.43
36 - 55	61.4		
56+	59.5		
GENDER			
MALE	63.8	34.9	.0001
FEMALE	57.4		
ETHNICITY			
WHITE	60.7	3.9	.05
NONWHITE	54.8		
EDUCATION			
≤ 11TH GRADE	59.0	.7	.49
HIGH SCHOOL/VOC TECH	60.6		
COLLEGE	61.2		
INCOME			
≤ $9,999	58.5	1.5	.21
$10,000-19,999	62.5		
$20,000-49,999	60.9		
$50,000+	62.1		

TABLE 82

KNOWLEDGE SCALE MEAN SCORES BY ANIMAL ACTIVITY GROUPS

	STANDARDIZED MEAN SCORE	F	SIG OF F
PROPERTY OWNERSHIP			
≤ 1/2 ACRE, CITY LOT	58.9	4.8	.003
1.2 - 2 ACRES	62.7		
3 - 25 ACRES	63.8		
26+ ACRES	65.9		
EVER RAISED LIVESTOCK			
YES	63.1	9.7	.001
NO	59.4		
BIRDWATCHERS			
COMMITTED	65.6	8.6	.002
CASUAL	55.7		
NONBIRDERS	60.0		
EVER KILLED OR CAPTURED A TIMBER WOLF			
YES	70.7	18.1	.0001
NO	62.7		

TABLE 83

NUMBER OF TIMBER WOLVES IN MINNESOTA
BY MAIN GROUPS

	TWIN CITIES	NORTHERN COUNTIES	FARMERS	HUNTERS	TRAPPERS
1. DON'T KNOW	16.8	14.2	10.3	13.7	34.0
2. 50 - 150	2.2	6.6	1.0	1.0	0.0
3. 200 - 300	8.1	7.7	1.0	2.0	5.7
4. 350 - 500	8.6	5.5	7.2	7.8	3.8
5. 550 - 1000	8.6	14.2	6.2	12.8	7.6
6. 1100 - 1800	4.8	7.1	13.4	11.8	9.4
7. 2000	9.1	12.0	15.5	7.8	15.1
8. 2100 - 4999	6.5	6.0	10.3	8.8	9.4
9. 5000	8.6	7.7	7.2	6.9	3.8
10. 5500 - 10,000	10.2	7.7	12.4	9.8	5.7
11. 12,000 - 20,000	4.3	3.8	2.1	4.9	1.9
12. 23,000 - 80,000	7.5	4.4	10.3	5.9	1.9
13. 100,000 - 2 MILLION	4.8	3.3	3.1	6.9	1.9

$X^2 = 71.9$, $P = .01$

TABLE 84

SUMMARY TABLE OF NUMBER OF TIMBER WOLVES IN MINNESOTA

	TWIN CITIES	NORTHERN COUNTIES	FARMERS	HUNTERS	TRAPPERS
1. DON'T KNOW	16.7	14.2	10.3	13.7	34.0
2. 50 - 500	18.8	19.7	9.3	10.8	9.4
3. 550 - 2000	22.6	33.3	35.1	32.4	32.1
4. 2100 - 10,000	25.3	21.3	29.9	25.5	18.9
5. 12,000 - 2 MILLION	16.7	11.5	15.5	17.6	5.7

frequently among trappers. Specifically, 12-13% of hunters, farmers and twin cities residents, in contrast to 4% of trappers and 8% of northern counties residents, indicated between 23,000 and 2 million timber wolves in Minnesota.

Demographic group comparisons revealed few significant differences in the estimated number of Minnesota timber wolves (Table 85). Two exceptions were the tendency of higher income respondents and males to provide a more accurate estimate of timber wolves in comparison, respectively, to lower income and female respondents. Among animal-related activity groups, respondents who approved of hunting were far more likely to provide a correct estimate of the number of timber wolves (Table 86). In contrast, respondents who disapproved of hunting were more inclined to regard the timber wolf as a rare animal in Minnesota. The most accurate estimate of timber wolf numbers was provided by respondents who reported having ever captured or killed a timber wolf.

A limited assessment of the public's awareness of the timber wolf controversy was provided by responses to the question, "how much do you know about the controversy regarding the timber wolf in Minnesota." Far less awareness occurred among the general public as suggested by 27% of twin cities and 20% of northern counties residents, in contrast to less than 10% of farmers, trappers and hunters, indicating hardly any or no knowledge of the issue (Table 87). On the other hand, considerable knowledge of the issue was reported by 41.5% of trappers and 35% of farmers, in comparison to 12% of northern counties and 7.5% of twin cities residents.

TABLE 85

NUMBER OF TIMBER WOLVES IN MINNESOTA
BY DEMOGRAPHIC GROUPS

	18 - 35	36 - 55	56+	MALE	FEMALE	≤ 11TH GRADE	H.S. VOC.	COLLEGE
DON'T KNOW	10.4	14.9	25.0	9.4	21.2	25.6	17.1	10.0
50 - 300	12.3	9.7	15.2	9.4	14.8	11.7	11.7	12.2
350-500	6.8	9.7	4.4	6.1	7.9	11.6	4.1	8.6
550-1000	14.1	9.7	8.7	10.6	12.3	9.3	11.8	11.4
1100-1800	4.3	9.7	4.4	8.9	3.2	4.7	5.9	5.7
2000	11.0	12.3	7.6	11.7	9.5	7.0	10.6	12.9
2100-4999	8.0	2.6	7.6	8.9	3.7	9.3	7.1	4.3
5000-10,000	20.3	14.9	14.1	18.3	15.8	11.7	17.1	19.3
12,000-20,000	4.3	4.4	3.3	4.4	3.7	0.0	5.3	4.3
23,000-80,000	4.9	7.0	6.5	6.7	5.3	4.7	4.7	8.6
100,000-2 MILLION	3.7	5.3	3.3	5.6	2.7	4.7	4.7	2.3
	$X^2 = 31.8$			$X^2 = 23.2$		$X^2 = 21.6$		
	$P = .13$			$P = .02$		$P = .59$		

TABLE 85 CONTINUED

NUMBER OF TIMBER WOLVES IN MINNESOTA
BY DEMOGRAPHIC GROUPS

	< $9,999	$10,000-19,999	$20,000-49,999	$50,000	WHITE	NONWHITE
DON'T KNOW	25.5	12.2	13.2	0.0	15.5	15.4
50 - 300	21.6	9.5	11.6	5.0	12.1	15.4
350-500	7.8	5.4	6.6	0.0	7.1	7.7
550-1000	9.8	14.9	10.4	20.0	11.2	23.1
1100-1800	3.9	0.0	8.8	5.0	5.7	15.4
2000	5.9	14.9	11.0	15.0	10.7	7.7
2100-4999	3.9	8.1	6.0	5.0	6.5	0.0
5000-10,000	11.7	16.3	19.8	20.0	17.5	7.7
12,000-20,000	2.0	8.1	2.8	10.0	4.0	0.0
23,000-80,000	5.9	1.4	7.1	15.0	5.9	0.0
100,000-2 MILLION	2.0	9.5	2.8	5.0	4.0	7.7
	$X^2 = 56.3$				$X^2 = 7.81$	
	$P = .01$				$P = .8$	

TABLE 86

NUMBER OF TIMBER WOLVES IN MINNESOTA BY ANIMAL ACTIVITY GROUPS

	HUNTING FOR RECREATION AND MEAT		EVER RAISED LIVESTOCK		EVER KILLED OR CAPTURED A TIMBER WOLF	
	APPROVE	DISAPPROVE	YES	NO	YES	NO
DON'T KNOW	10.4	23.2	12.2	16.9	17.1	15.9
50 - 300	7.3	20.7	13.1	11.8	2.9	8.9
350-500	8.3	2.4	7.0	7.1	0.0	7.3
550-1000	13.5	8.5	9.6	12.2	11.4	10.4
1100-1800	7.3	2.4	7.8	5.1	22.9	7.5
2000	11.9	8.5	10.4	10.6	20.0	10.8
2100-4999	7.3	3.7	7.0	5.9	0.0	8.0
5000-10,000	18.2	17.0	20.0	15.8	8.6	17.2
12,000-80,000	10.9	8.5	8.8	10.6	11.4	9.9
100,000-2 MILLION	5.2	4.9	4.4	3.9	5.7	4.1
	$X^2 = 27.5$		$X^2 = 4.5$		$X^2 = 21.7$	
	$P = .006$		$P = .97$		$P = .04$	

TABLE 87

HOW MUCH DO YOU KNOW ABOUT THE CONTROVERSY

REGARDING THE TIMBER WOLF IN MINNESOTA?

	VERY MUCH	A FAIR AMOUNT	JUST A LITTLE	HARDLY ANYTHING	NOTHING AT ALL
TWIN CITIES	7.5	35.0	30.1	18.8	8.6
NORTHERN COUNTIES	12.0	37.2	31.2	12.6	7.1
FARMERS	35.1	37.1	17.5	7.2	3.1
HUNTERS	23.5	57.8	15.7	2.9	0.0
TRAPPERS	41.5	41.5	7.6	5.7	3.8

$X^2 = 10.3$, $P = .0001$

Among demographic groups, males reported significantly more knowledge of the issue than females, as did whites in comparison to nonwhites (Table 88). Animal activity group results indicated significantly greater awareness of the issue among respondents who had raised livestock, who reported ever killing or capturing a timber wolf, who approved of hunting, and birdwatchers (Table 89).

TABLE 88

AWARENESS OF MINNESOTA WOLF ISSUE
BY DEMOGRAPHIC GROUPS

	VERY MUCH	A FAIR AMOUNT	JUST A LITTLE	HARDLY ANYTHING	NOTHING AT ALL
AGE					
18 - 35	7.4	29.5	36.8	16.6	9.8
36 - 55	11.4	43.9	27.2	12.3	5.5
56+	12.0	38.0	23.9	18.5	7.6
			$X^2 = 12.7$, P = .12		
GENDER					
MALE	11.1	49.0	26.1	9.4	4.4
FEMALE	8.5	23.8	35.0	21.7	11.1
			$X^2 = 33.1$, P = .0001		
INCOME					
≤ $9,999	5.9	27.5	29.4	29.4	7.8
$10,000 - 19,999	10.8	32.4	36.5	10.8	9.5
$20,000 - 49,999	9.3	41.8	29.1	12.6	7.1
$50,000+	15.0	45.0	25.0	15.0	0.0
			$X^2 = 16.2$, P = .17		
ETHNICITY					
WHITE	9.9	36.4	31.4	15.0	7.3
NONWHITE	7.7	15.4	15.4	38.5	23.1
			$X^2 = 10.9$, P = .02		
EDUCATION					
≤ 11TH GRADE	7.0	23.3	32.6	25.6	11.6
HIGH SCHOOL/VOC	10.0	35.9	30.6	17.1	6.5
COLLEGE	10.0	40.7	31.4	10.0	7.7
			$X^2 = 10.2$, P = .24		

TABLE 89

AWARENESS OF MINNESOTA WOLF ISSUE
BY ANIMAL ACTIVITY GROUPS

	AWARE*	UNAWARE*
EVER RAISED LIVESTOCK		
YES	62.6	18.3
NO	38.2	26.0
$X^2 = 19.5$, $P = .0001$		
EVER KILLED OR CAPTURED A TIMBER WOLF		
YES	91.4	2.7
NO	57.0	17.6
$X^2 = 16.1$, $P = .0003$		
BIRDWATCHERS		
COMMITTED	79.2	4.2
CASUAL	24.6	31.9
NONBIRDER	36.0	27.9
$X^2 = 23.2$, $P = .0001$		
EVER HAD ANIMAL KILLED BY WOLF		
YES	78.6	3.6
NO	58.0	17.5
$X^2 = 5.4$, $P = .06$		
HUNTING FOR RECREATION AND MEAT		
APPROVE	52.9	17.1
DISAPPROVE	35.4	29.3
$X^2 = 8.3$, $P = .01$		
PROPERTY OWNERSHIP		
$\leq$ 1/2 ACRE CITY LOT	45.1	29.2
1/2 - 2 ACRES	51.4	14.3
3 - 25 ACRES	55.6	22.2
26+ ACRES	54.2	20.8
$X^2 = 7.2$, $P = .29$		

*AWARE = MODERATELY OR VERY AWARE, *UNAWARE = LIMITED OR NO KNOWLEDGE OF THE TIMBER WOLF ISSUE.

V. BASIC ATTITUDES TOWARDS THE TIMBER WOLF

As described in the methodology section, attitudes toward timber wolf scales were constructed based on cluster and correlational analyses of the various attitude questions. The resulting six attitude scales were labelled the dominionistic, ecologistic*, moralistic, naturalistic, negativistic, and utilitarian. Definitions of the attitudes are provided on page 28, and an indication of specific questions employed in each of the scales and scoring procedures can be found in Appendix B.

As the scales were based on individual attitude questions, scale results are somewhat redundant of previously described attitude question findings. To minimize this repetition, attitude scale results are briefly presented, intended largely to provide a general overview of differences in basic attitudes toward the timber wolf. Knowledge scale results are also included in this presentation to provide a comprehensive summary of fundamental group variations in cognitive and affective perceptions of the timber wolf.

Highly significant differences occurred in basic attitudes toward the timber wolf among the major sample groups (Table 90). Figure 3 particularly illustrates the fundamental differences found among farmers, trappers, hunters, twin cities and northern counties residents.

Farmers were the most inclined to support the practical exploitation and dominance of the timber wolf, as suggested by very high utilitarian and dominionistic scale scores. Additionally, trappers had relatively

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*The ecologistic scale is not regarded as a strong or particularly valid measure of this attitude toward the timber wolf.

TABLE 90

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY MAIN GROUPS

	TWIN CITIES	NORTHERN COUNTIES	FARMERS	HUNTERS	TRAPPERS
DOMINIONISTIC	.233	.321	.460	.367	.415
F = 16.9 SIG OF F .0001 SIG OF F TC/NC =.0003					
ECOLOGISTIC	.411	.309	.198	.295	.307
F = 9.6 SIG OF F .0001 SIG OF F TC/NC =.001					
MORALISTIC	.292	.241	.166	.182	.142
F = 8.4 SIG OF F .0001 SIG OF F TC/NC =.05					
NATURALISTIC	.544	.460	.288	.475	.585
F = 10.4 SIG OF F .0001 SIG OF F TC/NC =.02					
NEGATIVISTIC	.124	.164	.248	.152	.109
F = 7.3 SIG OF F .0001 SIG OF F TC/NC =.04					
UTILITARIAN	.168	.256	.437	.307	.369
F = 21.5 SIG OF F .0001 SIG OF F TC/NC =.0001					
KNOWLEDGE	58.0	63.2	64.4	67.5	70.8
F = 24.8 SIG OF F .0001 SIG OF F TC/NC =.0001					

KNOWLEDGE AND ATTITUDES TOWARD TIMBER WOLF SCALE SCORES OF GENERAL PUBLIC, FARMERS, HUNTERS AND TRAPPERS IN MINNESOTA, 1984

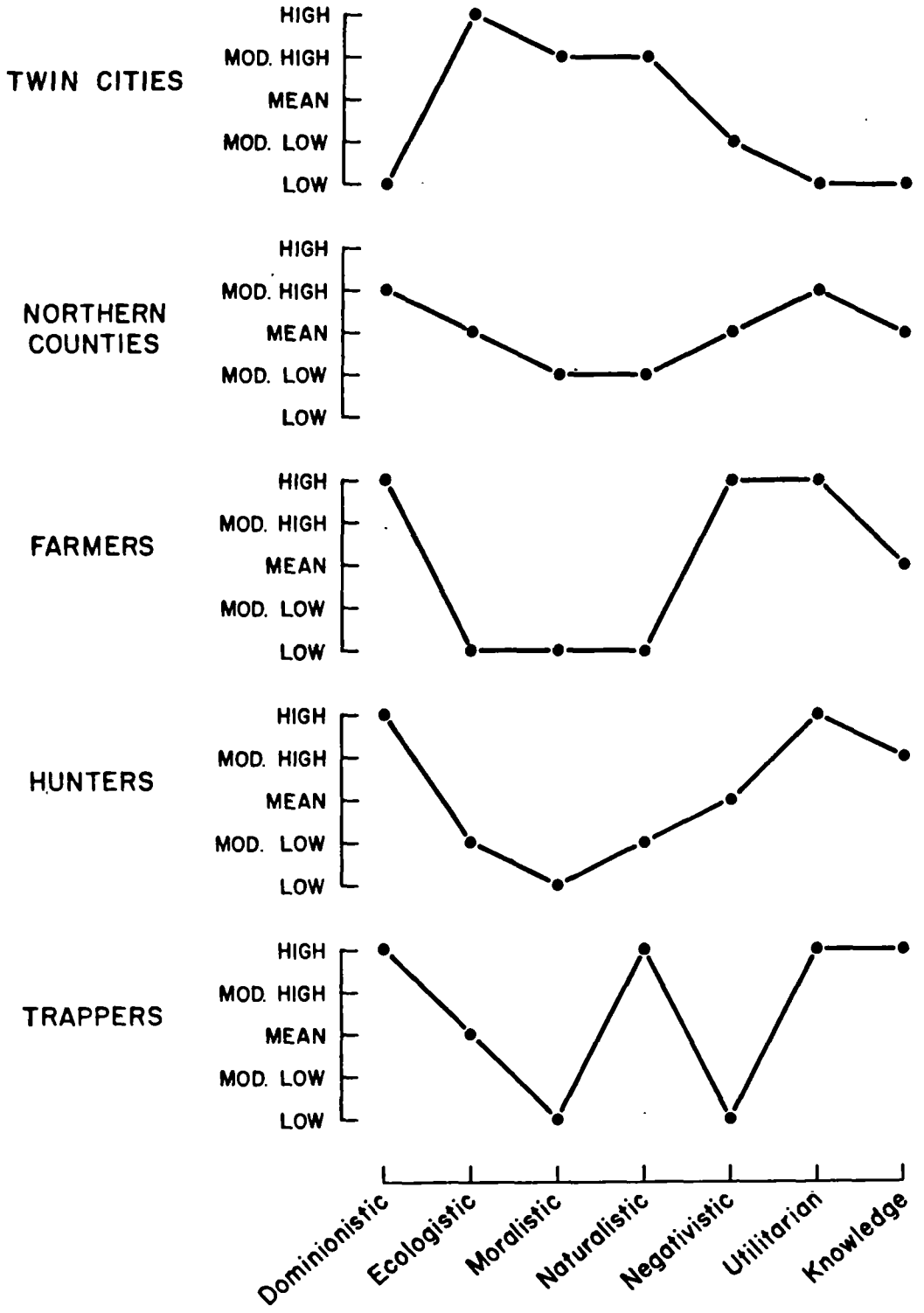

FIGURE 3

high utilitarian and the highest dominionistic scale scores. In contrast, residents of the twin cities and northern counties obtained significantly lower scores on these two scales, although northern counties residents had higher utilitarian and dominionistic scores than twin cities respondents (possibly indicative of a more pragmatic and authoritarian perception of the timber wolf among persons living in closer proximity to this animal).

The most protectionist attitude toward the timber wolf occurred among the general public, particularly twin cities residents, as suggested by significantly higher moralistic and ecologistic scores. In contrast, far less concern for suffering, exploitation, and the ecological value of the timber wolf was found among farmers. Additionally, hunters and trappers obtained much lower moralistic scores in comparison to the general public.

Relatively strong outdoor recreational and wilderness interest in the timber wolf was found among trappers and, to a less pronounced extent, twin cities residents, as reflected by comparatively high naturalistic scale scores. Additionally, these two groups, especially trappers, revealed the least dislike or fear of the timber wolf, as suggested by significantly lower negativistic scores. Despite a more appreciative attitude toward the timber wolf among twin cities residents, this group had the lowest knowledge scores of any sample group. In contrast, trappers had the highest knowledge scores. Thus, trappers were similar to twin cities residents in the extent of their outdoor appreciation and affection for the timber wolf, but substantially different in being far

more knowledgeable, and accepting of the human right to exploit and dominate this animal.

Hunters, in many ways, obtained attitude and knowledge scores similar to trappers, although less outstanding. In general, hunters were less interested, knowledgeable, or pragmatic, but slightly more protectionist than trappers in their perceptions of the timber wolf.

Substantially less recreational interest, and a good deal more antipathy toward the timber wolf was found among farmers, who obtained the lowest and highest scores, respectively, on the naturalistic and negativistic attitude scales.

Major attitude scale differences were also found among varying demographic groups. Significant age variations occurred on the dominionistic, utilitarian, negativistic, ecologistic, and naturalistic scales (Table 91). In general, elderly respondents were more hostile, exploitative, and unappreciative in their attitudes toward the timber wolf. In contrast, young adults expressed more protectionist feelings, and tended to regard the wolf more as an object of recreational enjoyment than as a threat or resource to be exploited. Despite these differences, insignificant variations occurred among age groups in relative knowledge of the timber wolf.

Somewhat similar contrasts occurred among varying educational groups (Table 92). College-educated respondents were more appreciative of the timber wolf, and tended to be more concerned about its protection than persons of less than a high school education. Less educated respondents also expressed more support for the practical exploitation of the timber

TABLE 91

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY AGE

	18 - 35	36 - 55	56+
DOMINIONISTIC	.225	.270	.379
F = 13.8 SIG OF F .0001			
ECOLOGISTIC	.387	.389	.277
F = 4.8 SIG OF F .009			
MORALISTIC	.255	.277	.276
F = 0.3 SIG OF F .70			
NATURALISTIC	.519	.546	.418
F = 3.8 SIG OF F .02			
NEGATIVISTIC	.110	.110	.244
F = 19 SIG OF F .0001			
UTILITARIAN	.171	.185	.315
F = 14.1 SIG OF F .0001			
KNOWLEDGE	60.5	61.4	59.5
F = 0.8 SIG OF F .43			

TABLE 92

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY EDUCATION

	≤ 11TH GRADE	HIGH SCHOOL/VOC	COLLEGE
DOMINIONISTIC	.399	.292	.235
F = 8.7 SIG OF F .0002			
ECOLOGISTIC	.387	.389	.277
F = 3.9 SIG OF F .02			
MORALISTIC	.262	.295	.229
F = 2.7 SIG OF F .07			
NATURALISTIC	.437	.494	.539
F = 1.6 SIG OF F .26			
NEGATIVISTIC	.252	.167	.082
F = 17.2 SIG OF F .0001			
UTILITARIAN	.372	.236	.144
F = 19.65 SIG OF F .0001			
KNOWLEDGE	59.0	60.6	61.2
F = 0.7 SIG OF F .49			

wolf and the right to dominate this animal, as reflected in much higher utilitarian and dominionistic scale scores.

Less pronounced differences occurred among varying income groups (Table 93). In general, level of education was a better predictor of basic attitudes toward the timber wolf than the relative income of the respondents. Nevertheless, higher income respondents indicated more appreciation and protectionist sentiment toward the timber wolf than persons with incomes of less than $10,000.

Insignificant male-female differences occurred on most attitude toward timber wolf scales with the exception of dominionistic, negativistic, and knowledge results (Table 94). In general, female respondents were less inclined to express an attitude of dominance over the timber wolf, although they revealed greater fear and lack of knowledge of this animal.

White-nonwhite differences were insignficant on all the attitude scales although, as previously noted, nonwhites had substantially lower knowledge scale scores (Table 95).

Attitude scale differences were also examined among a small number of animal-related activity groups. Respondents who were more aware of the wolf controversy obtained significantly higher ecologistic and naturalistic, and substantially lower utilitarian and negativistic scale scores than those unaware of the issue (Table 96). Respondents who reported killing or capturing a timber wolf had significantly higher dominionistic and utilitarian, as well as far lower ecologistic and moralistic scale scores than those who had not killed or captured this animal (Table 97).

TABLE 93

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY INCOME

	<$9,999	$10,000-19,999	$20,000-49,999	$50,000+
DOMINIONISTIC	.373	.311	.241	.254
F = 4.9 SIG OF F .002				
ECOLOGISTIC	.311	.345	.396	.350
F = 1.3 SIG OF F .25				
MORALISTIC	.275	.293	.261	.167
F = 1.4 SIG OF F .24				
NATURALISTIC	.453	.509	.549	.425
F = 1.6 SIG OF F .19				
NEGATIVISTIC	.218	.154	.115	.100
F = 4.8 SIG OF F .002				
UTILITARIAN	.308	.229	.170	.193
F = 5.9 SIG OF F .0007				
KNOWLEDGE	58.5	62.5	60.9	62.1
F = 1.5 SIG OF F .21				

TABLE 94

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY GENDER

	FEMALE	MALE
DOMINIONISTIC	.250	.306
F = 5.3 SIG OF F .02		
ECOLOGISTIC	.350	.371
F = 0.45 SIG OF F .50		
MORALISTIC	.272	.261
F = 0.19 SIG OF F .66		
NATURALISTIC	.479	.527
F = 1.7 SIG OF F .18		
NEGATIVISTIC	.167	.119
F = 6.7 SIG OF F .01		
UTILITARIAN	.206	.217
F = 0.2 SIG OF F .64		
KNOWLEDGE	57.4	63.8
F = 34.9 SIG OF F .0001		

TABLE 95

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY ETHNICITY

	NONWHITE	WHITE
DOMINIONISTIC	.244	.279
F = 0.3 SIG OF F .59		
ECOLOGISTIC	.365	.359
F = 0.02 SIG OF F .94		
MORALISTIC	.282	.267
F = 0.04 SIG OF F .83		
NATURALISTIC	.415	.505
F = 0.8 SIG OF F .36		
NEGATIVISTIC	.236	.141
F = 3.2 SIG OF F .07		
UTILITARIAN	.225	.211
F = 0.05 SIG OF F .82		
KNOWLEDGE	54.8	60.7
F = 3.9 SIG OF F .04		

TABLE 96

ATTITUDE AND KNOWLEDGE SCALES STANDARDIZED MEAN SCORES
BY AWARE OR UNAWARE OF MINNESOTA WOLF ISSUE

	AWARE*	UNAWARE*
DOMINIONISTIC	.285	.309
F = 0.6 SIG OF F .43		
ECOLOGISTIC	.404	.306
F = 6.1 SIG OF F .01		
MORALISTIC	.270	.270
F = 0 SIG OF F .99		
NATURALISTIC	.535	.451
F = 3.5 SIG OF F .06		
NEGATIVISTIC	.110	.222
F = 19.1 SIG OF F .0001		
UTILITARIAN	.199	.261
F = 4.1 SIG OF F .04		
KNOWLEDGE	64.3	54.7
F = 54.5 SIG OF F .0001		

*AWARE = MODERATELY OR VERY AWARE, *UNAWARE = LIMITED OR NO KNOWLEDGE OF THE TIMBER WOLF ISSUE.

TABLE 97

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY EVER CAPTURED OR KILLED A TIMBER WOLF

	YES	NO
DOMINIONISTIC	.519	.321
F = 20.9 SIG OF F .0001		
ECOLOGISTIC	.200	.327
F = 6.4 SIG OF F .01		
MORALISTIC	.148	.231
F = 4.2 SIG OF F .04		
NATURALISTIC	.391	.476
F = 1.9 SIG OF F .17		
NEGATIVISTIC	.163	.158
F = 0.02 SIG OF F .88		
UTILITARIAN	.439	.266
F = 14.4 SIG OF F .0002		
KNOWLEDGE	70.7	62.7
F = 18.1 SIG OF F .0001		

Finally, birdwatchers had significantly higher naturalistic and knowledge, as well as substantially lower negativistic scale scores than non-birdwatchers (Table 98).

TABLE 98

ATTITUDE AND KNOWLEDGE SCALES
STANDARDIZED MEAN SCORES BY BIRDWATCHERS

	BIRDERS	NONBIRDERS
DOMINIONISTIC	.257	.314
F = 2.3 SIG OF F .10		
ECOLOGISTIC	.422	.301
F = 1.8 SIG OF F .16		
MORALISTIC	.288	.239
F = 0.06 SIG OF F .64		
NATURALISTIC	.592	.435
F = 2.9 SIG OF F .05		
NEGATIVISTIC	.059	.180
F = 4.4 SIG OF F .01		
UTILITARIAN	.155	.252
F = 1.8 SIG OF F .16		
KNOWLEDGE	65.6	60.0
F = 8.6 SIG OF F .0002		

VI. SYMBOLIC PERCEPTIONS OF THE TIMBER WOLF

This section will explore feelings of affection and dislike for the timber wolf relative to other animal species, as well as a variety of contrasting symbolic impressions (e.g., good vs. bad, mean vs. kind) of the wolf. Additionally, the latter characterizations will be used to develop a perception of timber wolf scale. It should be noted the questions used to measure these perceptions of the timber wolf were among the first items on the survey and, thus, least subject to the possible testing affects associated with a questionnaire focusing on this animal.

Respondents indicated on a five point like-dislike scale their relative preference for 18 comparatively well-known animals native to the United States. The 18 animals included 16 vertebrates and two invertebrate species, with every vertebrate class represented. Additionally, an attempt was made to balance commonly liked and disliked animals.

Responses to this question were interpreted in two ways -- the "absolute" rating of the animal and its rank relative to other species. Figure 4 and Tables 99 and 100 indicate both results. On an absolute scale, twin cities residents and trappers indicated a moderate liking of the timber wolf. The mean response of northern counties residents and hunters placed the wolf in the neither like nor dislike category. Only the average response of farmers revealed a moderate dislike for the timber wolf. Relative to other animals, however, the timber wolf received an unfavorable judgment by all sample groups, ranking no higher than 12th, although no lower than 14th, among the 18 animals included in this question. The wide variability of answers to this question among

FIGURE 4

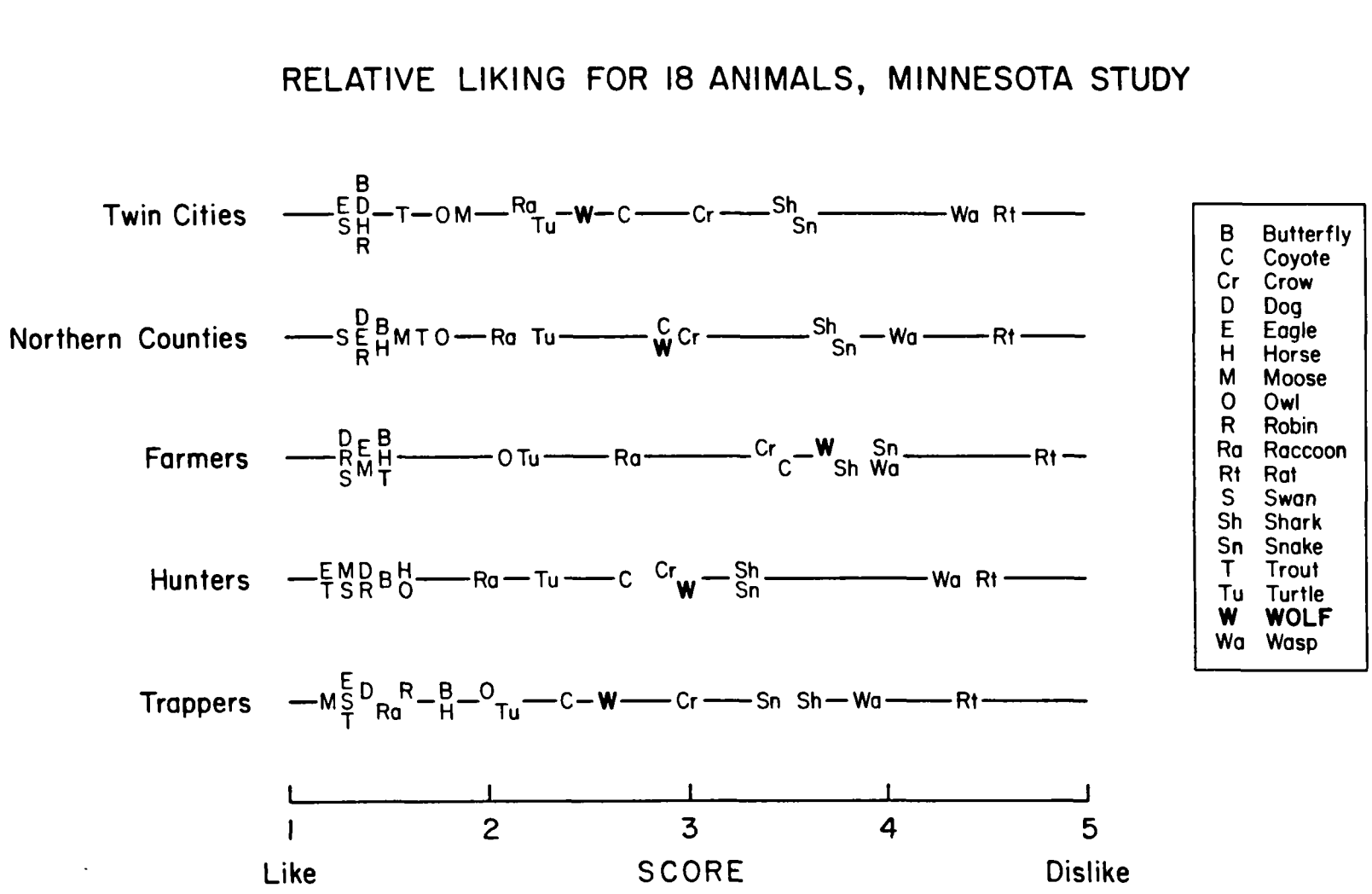
RELATIVE LIKING FOR 18 ANIMALS, MINNESOTA STUDY
Twin Cities
Northern Counties
Farmers
Hunters
Trappers
B
E D
S H
R
T O M Ra Tu W C Cr Sh Sn Wa Rt
D
S E B
R H
M T O Ra Tu C W Cr Sh Sn Wa Rt
D B
R E H
S M T
O Tu Ra Cr C W Sh Sn Wa Rt
E M D B H
T S R O
Ra Tu C Cr W Sh Sn Wa Rt
E
M S D R B H O
T Ra Tu C W Cr Sn Sh Wa Rt
1 2 3 4 5
Like
SCORE
Dislike
B Butterfly
C Coyote
Cr Crow
D Dog
E Eagle
H Horse
M Moose
O Owl
R Robin
Ra Raccoon
Rt Rat
S Swan
Sh Shark
Sn Snake
T Trout
Tu Turtle
W WOLF
Wa Wasp

TABLE 99

LIKING OF THE TIMBER WOLF BY MAIN SAMPLE GROUPS*

	MEAN	STANDARD DEVIATION
TWIN CITIES	2.53	1.23
NORTHERN COUNTIES	2.91	1.44
FARMERS	3.71	1.41
HUNTERS	3.02	1.50
TRAPPERS	2.55	1.66

F = 12.2

SIG OF F = <.001

*THE LOWER THE MEAN SCORE, THE GREATER THE LIKING OF THE WOLF. THE RESPONSE RANGE WAS 1 = STRONGLY LIKE, 2 = LIKE, 3 = NEITHER LIKE OR DISLIKE, 4 = DISLIKE, 5 = STRONGLY DISLIKE.

TABLE 100

LIKING OF THE TIMBER WOLF RELATIVE TO 17 OTHER ANIMALS*

TWIN CITIES				NORTHERN COUNTIES			
	MEAN	STANDARD DEVIATION	RANK		MEAN	STANDARD DEVIATION	RANK
SWAN	1.31	0.71	1	SWAN	1.34	0.71	1
EAGLE	1.33	0.82	2	EAGLE	1.39	0.92	2
BUTTERFLY	1.36	0.75	3	ROBIN	1.42	0.79	3
DOG	1.39	0.75	4	DOG	1.43	0.84	4
ROBIN	1.40	0.72	5	HORSE	1.45	0.84	5
HORSE	1.43	0.72	6	BUTTERFLY	1.47	0.86	6
TROUT	1.63	0.90	7	MOOSE	1.60	0.90	7
OWL	1.79	1.02	8	TROUT	1.67	1.01	8
MOOSE	1.85	1.02	9	OWL	1.81	1.03	9
RACCOON	2.23	1.13	10	RACCOON	2.10	1.10	10
TURTLE	2.27	1.08	11	TURTLE	2.31	1.07	11
WOLF	2.53	1.23	12	COYOTE	2.91	1.24	12
COYOTE	2.65	1.23	13	WOLF	2.91	1.44	13
CROW	3.12	1.30	14	CROW	2.96	1.29	14
SHARK	3.46	1.33	15	SHARK	3.67	1.33	15
SNAKE	3.62	1.36	16	SNAKE	3.83	1.31	16
WASP	4.37	0.98	17	WASP	4.11	1.19	17
RAT	4.55	0.94	18	RAT	4.57	0.95	18

*THE LOWER THE MEAN SCORE, THE GREATER THE LIKING OF THE ANIMAL.

TABLE 100 CONTINUED

LIKING OF THE TIMBER WOLF RELATIVE TO 17 OTHER ANIMALS

FARMERS	MEAN	STANDARD DEVIATION	RANK	HUNTERS	MEAN	STANDARD DEVIATION	RANK
ROBIN	1.26	0.62	1	EAGLE	1.16	0.64	1
SWAN	1.33	0.67	2	TROUT	1.24	0.53	2
DOG	1.33	0.75	3	SWAN	1.25	0.53	3
EAGLE	1.38	0.77	4	MOOSE	1.30	0.64	4
MOOSE	1.42	0.79	5	DOG	1.40	0.73	5
BUTTERFLY	1.47	0.83	6	ROBIN	1.40	0.82	6
HORSE	1.47	0.96	7	BUTTERFLY	1.45	0.78	7
TROUT	1.52	0.94	8	HORSE	1.59	0.87	8
OWL	2.11	1.13	9	OWL	1.61	0.77	9
TURTLE	2.25	1.10	10	RACCOON	2.03	0.99	10
RACCOON	2.68	1.26	11	TURTLE	2.33	1.02	11
CROW	3.37	1.33	12	COYOTE	2.73	1.21	12
COYOTE	3.52	1.32	13	CROW	2.93	1.24	13
WOLF	3.71	1.41	14	WOLF	3.02	1.50	14
SHARK	3.77	1.17	15	SHARK	3.32	1.39	15
WASP	3.95	1.38	16	SNAKE	3.32	1.39	16
SNAKE	3.96	1.27	17	WASP	4.27	1.18	17
RAT	4.78	0.71	18	RAT	4.46	1.01	18

TABLE 100 CONTINUED

LIKING OF THE TIMBER WOLF RELATIVE TO 17 OTHER ANIMALS

TRAPPERS

	MEAN	STANDARD DEVIATION	RANK
MOOSE	1.17	0.43	1
EAGLE	1.25	0.73	2
TROUT	1.30	0.70	3
SWAN	1.34	0.68	4
DOG	1.42	0.72	5
RACCOON	1.47	0.72	6
ROBIN	1.55	0.80	7
BUTTERFLY	1.77	0.80	8
HORSE	1.83	1.03	9
OWL	2.00	1.33	10
TURTLE	2.11	1.03	11
COYOTE	2.38	1.55	12
WOLF	2.55	1.66	13
CROW	3.04	1.47	14
SNAKE	3.38	1.43	15
SHARK	3.55	1.20	16
WASP	3.92	1.28	17
RAT	4.40	1.13	18

hunters, farmers, and northern counties residents was indicated by the wolf having the highest standard deviation of any animal. Interestingly, the relative ranking of the timber wolf was similar to results obtained in a national study of American attitudes toward animals, employing a somewhat different group of animals (Table 101).

The most preferred species in the present study tended to be aesthetically appealing (e.g., swan, butterfly), culturally, important (e.g., eagle), game animals (e.g., trout, moose), or domestic species (e.g., dog, horse). The most disliked animals were typically dangerous (e.g., wasp), harmful (e.g., snake, shark), associated with human disease (e.g., rat), or generally regarded as unattractive (e.g., crow). As noted, the timber wolf ranked closer to the negatively perceived animals, although the wolf did not receive a mean "dislike" score in contrast to the scores of the shark, snake, wasp, and rat. It should also be indicated that all major sample groups, except twin cities residents, ranked the timber wolf more unfavorably than the coyote.

Among demographic groups, signficant age, ethnic, education, and income differences were found (Table 102). The greatest affection for the timber wolf occurred among young, white, college-educated, and middle to higher income respondents. In contrast, less favorable ratings of the timber wolf were most characteristic of older, nonwhite, less educated, and lower middle to lower income respondents.

Eight contrasting adjectives were used to describe the timber wolf: beautiful-ugly, brave-cowardly, good-bad, dangerous-harmless, kind-mean, rare-abundant, scary-not scary, and valuable-useless. Respondents were

TABLE 101

RELATIVE PREFERENCE FOR VARYING ANIMAL SPECIES, NATIONAL SAMPLE (N = 3,107)*

RANK		MEAN	STANDARD DEVIATION	RANK		MEAN	STANDARD DEVIATION
1.	DOG	1.70	0.98	18.	BEAR	2.97	1.57
2.	HORSE	1.79	0.85	19.	FROG	3.18	1.44
3.	SWAN	1.97	0.98	20.	GORILLA	3.74	1.67
4.	ROBIN	1.99	1.02	21.	WOLF	3.98	1.86
5.	BUTTERFLY	2.04	1.01	22.	COYOTE	4.02	1.70
6.	TROUT	2.12	1.04	23.	CROW	4.06	1.67
7.	SALMON	2.26	1.11	24.	LIZARD	4.13	1.85
8.	EAGLE	2.29	1.34	25.	SKUNK	4.42	1.93
9.	ELEPHANT	2.63	1.31	26.	SHARK	4.82	1.77
10.	OWL	2.66	1.42	27.	VULTURE	4.91	1.65
11.	TURTLE	2.69	1.28	28.	BAT	5.35	1.69
12.	CAT	2.74	1.70	29.	RATTLESNAKE	5.66	1.58
13.	LADYBUG	2.78	1.49	30.	WASP	5.68	1.46
14.	RACCOON	2.80	1.50	31.	RAT	6.26	1.18
15.	MOOSE	2.81	1.39	32.	MOSQUITO	6.27	1.06
16.	WHALE	2.88	1.51	33.	COCKROACH	6.45	1.00
17.	WALRUS	2.90	1.41				

*THE RESPONSE RANGE INCLUDED: 1 = STRONGLY LIKE; 2 = LIKE; 3 = SLIGHTLY LIKE; 4 = NEITHER LIKE NOR DISLIKE; 5 = SLIGHTLY DISLIKE; 6 = DISLIKE; 7 = STRONGLY DISLIKE

SOURCE: S. KELLERT AND J. BERRY, "KNOWLEDGE, AFFECTION AND BASIC ATTITUDES TOWARDS ANIMALS IN AMERICAN SOCIETY," U.S. GOVERNMENT PRINTING OFFICE, SUPERINTENDENT OF DOCUMENTS, STOP: S.S.M.C., WASHINGTON, D.C., # 024-010-00-625-1, 1981.

TABLE 102

LIKING OF THE TIMBER WOLF RELATIVE TO 17 OTHER ANIMALS BY DEMOGRAPHIC GROUPS

		MEAN	RANK
AGE			
	18 - 35	2.63	12TH
	36 - 55	2.53	13TH
	56+	3.11	13TH
F = 5.4		SIG OF F = .005	
GENDER			
	MALE	2.58	12TH
	FEMALE	2.85	12TH
F = 3.5		SIG OF F = .06	
ETHNICITY			
	WHITE	2.69	12TH
	NONWHITE	3.54	14TH
F = 4.9		SIG OF F = .02	
EDUCATION			
	≤11TH GRADE	3.18	13TH
	HIGH SCHOOL	2.82	13TH
	COLLEGE	2.49	12TH
F = 3.5		SIG OF F = .005	
INCOME			
	≤ $9,999	3.00	14TH
	10-19,999	3.05	14TH
	20-50,000	2.52	12TH
	50,000+	2.70	13TH
F = 3.7		SIG OF F = .01	

asked to rate the timber wolf on these contrasting depictions using a five point scale. The results of this "semantic differential" test were interpreted both relatively across the various groups and in an absolute manner. Figure 5 provides a graphic indication of the overall judgment of the timber wolf on these adjective contrasts.

When the timber wolf was depicted as beautiful versus ugly, trappers and twin cities residents were significantly more inclined to rate this animal as beautiful, particularly in contrast to farmers (Table 103). All groups, however, tended to place the wolf on the "beautiful " end of the rating continuum. Among demographic groups, older, nonwhite, and less educated respondents were less likely to regard the wolf as beautiful than younger, better educated, and upper income persons.

Few significant contrasts occurred when the timber wolf was depicted as brave versus cowardly, with most sample groups regarding the wolf as a moderately brave animal. One exception was the significantly lower "brave" ratings of elderly respondents in contrast to persons less than 55 years of age (Table 104).

When the timber wolf was described as good-bad, most respondents rated the wolf as relatively good. On the other hand, farmers were significantly less inclined to regard the wolf as good, particularly in comparison to twin cities residents (Table 105). Among demographic groups, older, nonwhite, and poorly educated respondents had significantly lower "good" scores than young, white, and college-educated persons.

When characterized as dangerous-harmless, most respondents rated the timber wolf in roughly the mid-point of the continuum -- i.e., as neither

FIGURE 5

SEMANTIC DIFFERENTIAL PROFILE OF TIMBER WOLF, MINNESOTA PUBLIC

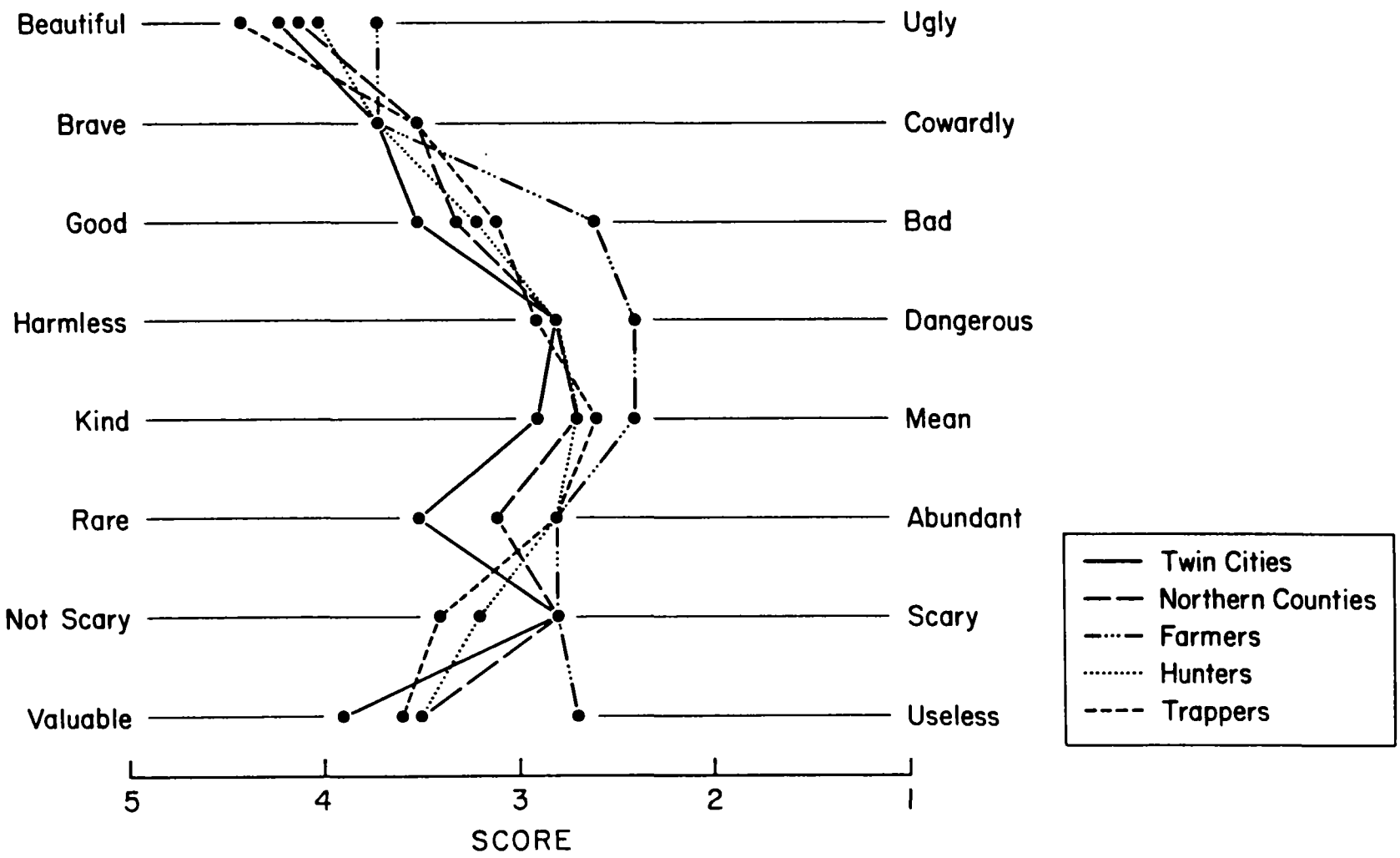

TABLE 103

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS BEAUTIFUL VS. UGLY*

MAIN GROUPS

	MEAN
TWIN CITIES	4.18
NORTHERN COUNTIES	4.10
FARMERS	3.67
HUNTERS	4.03
TRAPPERS	4.42

F = 5.1, P = .0004

GENERAL POPULATION

AGE	MEAN
18 - 35	4.26
36 - 55	4.32
56+	3.70

F = 11.9, P = .0001

GENDER	
MALE	4.19
FEMALE	4.08

F = 1.04, P = .30

ETHNICITY	MEAN
WHITE	4.16
NONWHITE	3.46

F = 5.7, P = .01

EDUCATION	
≤ 11TH GRADE	3.74
HIGH SCH./VOC.	4.11
COLLEGE	4.29

F = 4.7, P = .009

INCOME

≤ $9,999	4.18
$10,000 - 19,999	3.99
$20,000 - 49,999	4.23
$50,000+	4.30

F = 1.15, P = .33

*HIGHER SCORE = MORE "BEAUTIFUL" RANKING

TABLE 104

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS BRAVE VS. COWARDLY*

MAIN GROUPS

	MEAN
TWIN CITIES	3.65
NORTHERN COUNTIES	3.54
FARMERS	3.68
HUNTERS	3.67
TRAPPERS	3.50

F = 0.63, P = .64

GENERAL POPULATION

AGE	MEAN
18 - 35	3.70
36 - 55	3.69
56+	3.28

F = 6.1, P = .002

GENDER	MEAN
MALE	3.55
FEMALE	3.64

F = 0.68, P = .41

ETHNICITY	MEAN
WHITE	3.59
NONWHITE	3.77

F = 0.4, P = .52

EDUCATION	MEAN
≤ 11TH GRADE	3.33
HIGH SCH./VOC.	3.61
COLLEGE	3.64

F = 1.6, P = .19

INCOME

≤ $9,999	3.48
$10,000 - 19,999	3.57
$20,000 - 49,999	3.60
$50,000+	3.74

F = 0.36, P = .78

*HIGHER SCORE = MORE "BRAVE" RANKING

TABLE 105

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS GOOD VS. BAD*

MAIN GROUPS

	MEAN
TWIN CITIES	3.51
NORTHERN COUNTIES	3.30
FARMERS	2.61
HUNTERS	3.23
TRAPPERS	3.14

F = 9.2, P = .0001

GENERAL POPULATION

AGE	MEAN
18 - 35	3.51
36 - 55	3.56
56+	3.03

F = 6.6, P = .001

GENDER	
MALE	3.39
FEMALE	3.42

F = 0.05, P = .82

ETHNICITY	MEAN
WHITE	3.42
NONWHITE	2.93

F = 2.3, P = .12

EDUCATION	
≤ 11TH GRADE	2.91
HIGH SCH./VOC.	3.36
COLLEGE	3.62

F = 6.8, P = .001

INCOME

≤ $9,999	3.37
$10,000 - 19,999	3.39
$20,000 - 49,999	3.49
$50,000+	3.65

F = 0.41, P = .74

*HIGHER SCORE = MORE "GOOD" RANKING

particularly dangerous or harmless. However, farmers and lower income respondents were more inclined to regard the wolf as dangerous in comparison to other sample groups (Table 106).

Most respondents rated the wolf as neither especially kind nor mean. A significantly higher "kind" rating was found among twin cities residents, younger, college-educated, and higher income respondents (Table 107). In contrast, farmers, older, lower income, and less educated persons obtained mean scores slightly on the "mean" side of the adjective contrast.

When depicted as rare-abundant, the timber wolf was more likely to be regarded as rare by twin cities and northern counties residents and by most demographic groups. In contrast, hunters, trappers, and farmers were less inclined to see this animal as rare, although the mean scores of these groups still were more often rare than abundant (Table 108).

Most respondents were ambivalent on rating the timber wolf as scary versus not scary. Hunters and trappers were the only groups that clearly regarded the timber wolf as not scary Table 109). Among demographic groups, older, female, and less educated respondents perceived the wolf as more "scary" than other sample groups.

Finally, when described as valuable-useless, most respondents regarded the timber wolf as moderately valuable. Farmers were the only group to indicate an ambivalent response, as suggested by significantly less "valuable" ratings. Among demographic groups, older and less educated residents obtained lower valuable scores (Table 110).

Based on cumulative responses for all eight adjective contrasts, a

TABLE 106

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS HARMLESS VS. DANGEROUS*

MAIN GROUPS

	MEAN
TWIN CITIES	2.78
NORTHERN COUNTIES	2.78
FARMERS	2.41
HUNTERS	2.83
TRAPPERS	2.88

F = 2.3, P = .05

GENERAL POPULATION

AGE	MEAN
18 - 35	2.79
36 - 55	2.93
56+	2.58

F = 2.5, P = .07

GENDER	MEAN
MALE	2.87
FEMALE	2.70

F = 2.0, P = .15

ETHNICITY	MEAN
WHITE	2.77
NONWHITE	2.92

F = 0.24, P = .62

EDUCATION	MEAN
≤ 11TH GRADE	2.56
HIGH SCH./VOC.	2.72
COLLEGE	2.92

F = 2.1, P = .11

INCOME

≤ $9,999	2.57
$10,000 - 19,999	2.51
$20,000 - 49,999	2.96
$50,000+	2.80

F = 3.62, P = .01

*HIGHER SCORE = MORE "HARMLESS" RANKING

TABLE 107

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS KIND VS. MEAN*

MAIN GROUPS

	MEAN
TWIN CITIES	2.87
NORTHERN COUNTIES	2.67
FARMERS	2.35
HUNTERS	2.66
TRAPPERS	2.58

F = 4.2, P = .002

GENERAL POPULATION

AGE	MEAN
18 - 35	2.93
36 - 55	2.79
56+	2.44

F = 6.9, P = .001

GENDER	MEAN
MALE	2.78
FEMALE	2.77

F = 0.02, P = .88

ETHNICITY	MEAN
WHITE	2.76
NONWHITE	2.93

F = 0.3, P = .57

EDUCATION	MEAN
≤ 11TH GRADE	2.43
HIGH SCH./VOC.	2.65
COLLEGE	2.99

F = 7.2, P = .0008

INCOME

≤ $9,999	2.44
$10,000 - 19,999	2.58
$20,000 - 49,999	2.94
$50,000+	2.95

F = 4.9, P = .002

*HIGHER SCORE = MORE "KIND" RANKING

TABLE 108

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS RARE VS. ABUNDANT*

MAIN GROUPS

	MEAN
TWIN CITIES	3.51
NORTHERN COUNTIES	3.14
FARMERS	2.80
HUNTERS	2.82
TRAPPERS	2.75

F = 8.9, P = .0001
TC/NC = P = .004

GENERAL POPULATION

AGE	MEAN
18 - 35	3.35
36 - 55	3.32
56+	3.30

F = 0.04, P = .96

GENDER	
MALE	3.28
FEMALE	3.37

F = 0.53, P = .46

ETHNICITY	MEAN
WHITE	3.32
NONWHITE	3.42

F = 0.07, P = .79

EDUCATION	
≤ 11TH GRADE	3.36
HIGH SCH./VOC.	3.23
COLLEGE	3.41

F = 0.78, P = .45

INCOME

≤ $9,999	3.35
$10,000 - 19,999	2.99
$20,000 - 49,999	3.49
$50,000+	3.20

F = 2.9, P = .03

*HIGHER SCORE = MORE "RARE" RANKING

TABLE 109

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS NOT SCARY VS. SCARY*

MAIN GROUPS

	MEAN
TWIN CITIES	2.81
NORTHERN COUNTIES	2.83
FARMERS	2.78
HUNTERS	3.22
TRAPPERS	3.40

F = 3.7, P = .004

GENERAL POPULATION

AGE	MEAN
18 - 35	2.88
36 - 55	3.05
56+	2.42

F = 6.0, P = .002

GENDER	
MALE	3.07
FEMALE	2.53

F = 13.0, P = .0003

ETHNICITY	MEAN
WHITE	2.81
NONWHITE	2.85

F = 0.01, P = .93

EDUCATION	
≤ 11TH GRADE	2.56
HIGH SCH./VOC.	2.69
COLLEGE	3.07

F = 4.1, P = .01

INCOME

≤ $9,999	2.75
$10,000 - 19,999	2.65
$20,000 - 49,999	3.01
$50,000+	2.80

F = 1.4, P = .21

*HIGHER SCORE = MORE "NOT SCARY" RANKING

TABLE 110

STANDARDIZED MEAN SCORES OF TIMBER WOLF AS VALUABLE VS. USELESS*

MAIN GROUPS

	MEAN
TWIN CITIES	3.85
NORTHERN COUNTIES	3.50
FARMERS	2.73
HUNTERS	3.47
TRAPPERS	3.57

F = 12.0, P = .0001

GENERAL POPULATION

AGE	MEAN
18 - 35	3.86
36 - 55	3.87
56+	3.10

F = 13.9, P = .0001

GENDER	MEAN
MALE	3.62
FEMALE	3.73

F = 0.74, P = .39

ETHNICITY	MEAN
WHITE	3.68
NONWHITE	3.67

F = 0.0 P = .98

EDUCATION	
≤ 11TH GRADE	3.20
HIGH SCH./VOC.	3.62
COLLEGE	3.89

F = 5.2, P = .005

INCOME

≤ $9,999	3.40
$10,000 - 19,999	3.68
$20,000 - 49,999	3.81
$50,000+	3.40

F = 1.9, P = .11

*HIGHER SCORE = MORE "VALUABLE" RANKING

positive perception of timber wolf scale was constructed. Significantly lower scale scores -- i.e., a less favorable overall perception of the timber wolf -- occurred among farmers, older, and less educated respondents (Table 111). The most positive views of the timber wolf were found among twin cities residents, young to middle-aged adults, the college educated, and moderate to upper income respondents.

TABLE 111

STANDARDIZED MEAN SCORES ON POSITIVE PERCEPTION OF TIMBER WOLF SCALE

MAIN GROUPS

	MEAN
TWIN CITIES	.719
NORTHERN COUNTIES	.675
FARMERS	.595
HUNTERS	.663
TRAPPERS	.667

F = 12.0, P = .0001

GENERAL POPULATION

AGE	MEAN
18 - 35	.721
36 - 55	.720
56+	.627

F = 16.2, P = .0001

GENDER	MEAN
MALE	.694
FEMALE	.700

F = 0.13 P = .71

ETHNICITY	MEAN
WHITE	.697
NONWHITE	.674

F = 0.33 P = .56

EDUCATION	MEAN
≤ 11TH GRADE	.632
HIGH SCH./VOC.	.687
COLLEGE	.729

F = 8.8, P = .0002

INCOME

≤ $9,999	.676
$10,000 - 19,999	.675
$20,000 - 49,999	.719
$50,000+	.707

F = 2.5, P = .05

VII. BEHAVIORAL INTERACTIONS WITH THE TIMBER WOLF*

The final results section will consider a variety of respondent activities and behaviors involving contact with the timber wolf. These activities were defined broadly and included not only direct contacts with the timber wolf, but also vicarious experiences such as reading books or seeing movies about the wolf. Only the activities of the main sample groups are reviewed.

A surprisingly large number of respondents reported seeing a timber wolf in the wild (Table 112). Approximately 60% or more of northern counties residents, hunters, trappers, and farmers, and 25% of twin cities residents, said they had seen a timber wolf at least once in the wild. Moreover, more than 30% of farmers and trappers reported seeing timber wolves six or more times (Table 113). In a limited attempt to explore the possibility that people who reported seeing a timber wolf may have been observing a coyote, responses to the wolf viewing question were cross-tabulated with answers to the knowledge question concerning the difference between a brush wolf and timber wolf (Table 114). Only 36% of twin cities residents who reported seeing a timber wolf knew the difference between a brush wolf and a timber wolf, suggesting the possibility that many of those twin cities respondents who indicated seeing a wolf may have been observing a coyote. On the other hand,the great majority (77% and more) of hunters, trappers, and northern counties residents who

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*An indication of respondent participation in a variety of nonwolf animal-related activities is provided in Appendix C. These activities included raising livestock, hunting (and anti-hunting sentiment), trapping, birdwatching, and membership in various animal conservation organizations.

TABLE 112

HAVE YOU EVER SEEN A TIMBER WOLF IN THE WILD?

	YES	NO
TWIN CITIES	25.3	74.3
NORTHERN COUNTIES	59.0	41.0
FARMERS	63.9	36.1
HUNTERS	63.7	36.3
TRAPPERS	66.0	34.0

$X^2 = 71.8$, P = .0001

TABLE 113

IF YES, HOW OFTEN SEEN WOLF IN WILD?

	1 TIME	2 - 3 TIMES	4 - 5 TIMES	6+ TIMES
TWIN CITIES	8.6	8.6	4.8	3.2
NORTHERN COUNTIES	12.6	18.6	6.6	21.3
FARMERS	5.2	15.5	9.3	34.0
HUNTERS	15.7	15.7	6.7	25.5
TRAPPERS	9.4	18.9	7.6	30.2

$X^2 = 94.1$, P = .0001

TABLE 114

EVER SEEN TIMBER WOLF IN WILD
BY TIMBER WOLVES AND BRUSH WOLVES ARE SAME ANIMAL

TIMBER WOLF AND BRUSH WOLF SAME ANIMAL	REPORTED SEEING TIMBER WOLF IN WILD				
	TWIN CITIES	NORTHERN COUNTIES	FARMERS	HUNTERS	TRAPPERS
CORRECT ANSWER	36	77	84	83	89
INCORRECT/DON'T KNOW ANSWER	64	23	16	17	11

reported seeing a timber wolf knew the difference between a brush wolf a timber wolf.

A large number of respondents also reported hearing a timber wolf howl in the wild. Specifically, two-thirds and more of hunters, trappers, farmers, and northern counties residents, and nearly 40% of twin cities respondents said they had heard a timber wolf howl in the wild (Table 115). As with the previous result, some doubt exists regarding the possible confusion between the timber wolf and other canids. On the other hand, the opportunity to see or hear a timber wolf was suggested by the large proportion of respondents who reported ever having lived within 100 miles of known timber wolf populations (including even 24% of twin cities residents) (Table 116). Additionally, roughly one-half of the hunters, trappers, farmers, and northern counties residents indicated they had lived within 10 miles of known timber wolf populations (Table 117).

Relatively few respondents reported having had an animal killed by a timber wolf. On the other hand, 19% of the farmers did make this claim, and 7% reported wolf predation of their animals six or more times (Tables 118 & 119). Additionally, 38-43% of northern counties residents, hunters and trappers, 58% of farmers, and even 11% of twin cities residents, reported knowing someone who had an animal killed by a timber wolf (Table 120).

It should be noted, however, that with relatively small sample sizes, low confidence can occur in the validity of the results when only a limited proportion of respondents answer in a particular way. Confidence limits can be calculated in these circumstances to indicate the percent-

TABLE 115

HAVE YOU EVER HEARD A TIMBER WOLF HOWL IN THE WILD?

	YES	NO
TWIN CITIES	39.8	60.2
NORTHERN COUNTIES	64.5	35.5
FARMERS	67.0	33.0
HUNTERS	79.4	20.6
TRAPPERS	62.3	37.7

$X^2 = 51.1$, $P = .0001$

TABLE 116

DO YOU PRESENTLY OR HAVE YOU EVER LIVED WITHIN 100 MILES OF KNOWN TIMBER WOLF POPULATIONS?

TWIN CITIES	23.7	76.3
NORTHERN COUNTIES	85.3	14.8
FARMERS	72.2	27.8
HUNTERS	63.7	36.3
TRAPPERS	54.7	45.3

$X^2 = 155.9$, $P = .0001$

TABLE 117

HAVE YOU EVER LIVED WITHIN 10 MILES OF KNOWN TIMBER WOLF POPULATIONS?

TWIN CITIES	10.8	89.3
NORTHERN COUNTIES	59.6	40.4
FARMERS	56.7	43.3
HUNTERS	55.9	44.1
TRAPPERS	47.2	52.8

$X^2 = 175.4$, $P = .0001$

TABLE 118

HAVE YOU EVER HAD AN ANIMAL KILLED BY A TIMBER WOLF?

	YES	NO	99% CONFIDENCE LIMITS
TWIN CITIES	0.0	100.0	-----
NORTHERN COUNTIES	3.8	96.2	+/- 4%
FARMERS	18.6	81.4	+/- 10%
HUNTERS	2.0	98.0	+/- 3.5%
TRAPPERS	1.9	98.1	+/- 5%

$X^2 = 55.8$, P = .0001

TABLE 119

IF YES, HOW MANY TIMES ANIMALS KILLED BY TIMBER WOLF ?

	1 TIME	2 - 3 TIMES	4 - 5 TIMES	6+ TIMES
TWIN CITIES	0.0	0.0	0.0	0.0
NORTHERN COUNTIES	1.1	2.2	0.0	0.6
FARMERS	3.1	5.2	3.1	7.2
HUNTERS	1.0	1.0	0.0	0.0
TRAPPERS	1.9	0.0	0.0	0.0

$X^2 = 68.1$, P = .0001

TABLE 120

DO YOU KNOW ANYONE WHO HAS HAD AN ANIMAL KILLED BY A TIMBER WOLF?

	YES	NO
TWIN CITIES	10.8	89.3
NORTHERN COUNTIES	38.3	61.8
FARMERS	57.7	42.3
HUNTERS	40.2	59.8
TRAPPERS	43.4	56.6

$X^2 = 74.6$, P = .0001

age range of results that can be expected to occur not by chance 99% of the time. These confidence limits were determined for the question on having had an animal killed by a timber wolf and these results are indicated in Table 118. As these figures suggest, some doubt exists regarding the generalizability of responses by hunters, trappers and northern counties residents for this question. On the other hand, the farmers response fell within the calculated plus or minus 10 percentage points that could be expected to occur 99% of the time.

A large and surprising number of respondents reported capturing or killing, or knowing someone who had captured or killed a timber wolf. Specifically, 3% of northern counties residents, 6% of hunters, 12% of farmers and 17% of trappers reported capturing or killing a timber wolf (Table 121). Moreover, 11% of the trappers and 8% of the farmers indicated killing or capturing a timber wolf 2 or more times (Table 122). It is very important to note again that the confidence limits associated with the relatively small sample sizes of particular groups can render some of these percentage results statistically unreliable. For example, the 1% of twin cities residents who reported killing or capturing a timber wolf, if taken literally as a percentage of the population engaging in this activity, could be extrapolated to more than 20,000 people. The confidence limits however are +/- 2%, thus, casting serious doubt on the generalizability of this result. Confidence limits for the other groups are indicated on Table 121.

A large percentage of respondents also reported knowing someone who had killed or captured a timber wolf. Specifically, more than 50% of

TABLE 121

EVER PERSONALLY CAPTURED OR KILLED A TIMBER WOLF?

	YES	NO	99% CONFIDENCE LIMITS
TWIN CITIES	1.0	98.9	+/- 2%
NORTHERN COUNTIES	3.3	96.7	+/- 3%
FARMERS	12.4	87.6	+/- 22%
HUNTERS	5.9	94.1	+/- 6%
TRAPPERS	17.0	83.0	+/- 5%

$X^2 = 30.2$, $P = .0001$

TABLE 122

HOW OFTEN CAPTURED OR KILLED A TIMBER WOLF?

	1 TIME	2 OR MORE TIMES
TWIN CITIES	1.0	0.0
NORTHERN COUNTIES	1.1	2.2
FARMERS	4.1	8.3
HUNTERS	1.0	4.9
TRAPPERS	5.7	11.3

$X^2 = 35.5$, $P = .003$

farmers, hunters and trappers, and 40% of northern counties and 16% of twin cities residents, reported knowing someone who had killed or captured a timber wolf (Table 123). Additionally, more than 22% of hunters, farmers and trappers reported knowing someone who had captured or killed a timber wolf 6 or more times (Table 124).

As regulations prohibiting the nonauthorized killing or capturing of timber wolves are relatively recent, one might expect this activity to be reported less often by younger trappers, hunters and farmers. When this calculation was made, significantly less younger than older trappers and farmers, but not hunters, reported knowing someone who had killed or captured a timber wolf (Table 126). On the other hand, only significantly less younger than older trappers, but not hunters and farmers, reported personally killing or capturing a timber wolf (Table 125).

A large number of respondents indicated seeing a timber wolf in a zoo, reading about wolves, and viewing films about this animal. Over 75% of the respondents reported seeing a timber wolf in a zoological park (Table 127). From 64% of twin cities residents to 91% of trappers indicated reading one or more articles about timber wolves during the past five years (Table 128). Additionally, 25% of the general public and 60% of trappers reported reading at least six articles about wolves during this time period (Table 129). Reading books about timber wolves was less frequent, although even this activity was reported by 33% of twin cities to 58% of trapper respondents (Table 130). 60% of the respondents indicated they had seen a film about timber wolves (Table 131). Finally, a large number of respondents reported owning or knowing someone

TABLE 123

KNOW ANYONE WHO HAS EVER CAPTURED OR KILLED A TIMBER WOLF?

	YES	NO
TWIN CITIES	15.6	84.4
NORTHERN COUNTIES	39.9	60.1
FARMERS	50.5	49.5
HUNTERS	53.9	46.1
TRAPPERS	56.6	43.4

$X^2 = 65.1$, P = .0001

TABLE 124

HOW OFTEN KNOW SOMEONE WHO KILLED A TIMBER WOLF?

	1 TIME	2 - 3 TIMES	4 - 5 TIMES	6+ TIMES
TWIN CITIES	7.5	4.3	1.1	2.7
NORTHERN COUNTIES	10.9	10.4	4.4	14.2
FARMERS	5.2	10.3	7.2	27.8
HUNTERS	18.6	9.8	3.9	21.6
TRAPPERS	9.4	11.3	3.8	32.1

$X^2 = 89.2$, P = .0001

TABLE 125

EVER CAPTURED OR KILLED TIMBER WOLF BY VARYING AGE GROUPS OF FARMERS HUNTERS AND TRAPPERS

FARMERS	YES	NO
18 - 35 YEARS	6.7	93.3
36 - 55 YEARS	12.5	87.5
56+ YEARS	14.7	85.3

$X^2 = 0.6$, P = .73

HUNTERS	YES	NO
18 - 35 YEARS	9.1	90.9
36 - 55 YEARS	5.1	94.9
56+ YEARS	3.3	96.7

$X^2 = 1.0$, P = .60

TRAPPERS	YES	NO
18 - 35 YEARS	4.6	95.4
36 - 55 YEARS	31.6	68.4
56+ YEARS	16.7	83.3

$X^2 = 5.2$, P = .07

TABLE 126

KNOW ANYONE WHO HAS EVER CAPTURED OR KILLED A TIMBER WOLF BY VARYING AGE GROUPS OF FARMERS, HUNTERS AND TRAPPERS

FARMERS	YES	NO
18 - 35 YEARS	26.7	73.3
36 - 55 YEARS	54.2	45.8
56+ YEARS	55.9	44.1
	$X^2 = 4.0$, P = .13	

HUNTERS	YES	NO
18 - 35 YEARS	51.5	48.5
36 - 55 YEARS	56.4	43.6
56+ YEARS	53.3	46.7
	$X^2 = 0.1$, P = .91	

TRAPPERS	YES	NO
18 - 35 YEARS	36.5	63.6
36 - 55 YEARS	79.0	21.1
56+ YEARS	58.3	41.7
	$X^2 = 7.5$, P = .02	

TABLE 127

EVER SEEN A TIMBER WOLF IN A ZOO?

	YES	NO
TWIN CITIES	79.6	20.4
NORTHERN COUNTIES	74.3	25.7
FARMERS	83.5	16.5
HUNTERS	83.3	16.7
TRAPPERS	79.3	20.8
	$X^2 = 4.8$, P = .30	

TABLE 128

READ ANY ARTICLES ABOUT TIMBER WOLVES DURING THE PAST FIVE YEARS?

	YES	NO
TWIN CITIES	64.0	36.0
NORTHERN COUNTIES	73.8	26.2
FARMERS	82.5	17.5
HUNTERS	85.3	14.7
TRAPPERS	90.6	9.4
	$X^2 = 28.0$, P = .0001	

TABLE 129

HOW OFTEN READ ARTICLES ABOUT TIMBER WOLVES DURING PAST 5 YEARS?

	1 TIME	2-3 TIMES	4-5 TIMES	6-10 TIMES	11+ TIMES
TWIN CITIES	9.1	22.0	11.3	11.3	10.2
NORTHERN COUNTIES	6.0	21.3	17.0	12.6	17.0
FARMERS	6.2	20.6	13.4	20.6	21.7
HUNTERS	2.0	23.5	16.7	22.6	20.6
TRAPPERS	3.8	17.0	9.4	26.4	34.0

$X^2 = 58.0$, P = .0001

TABLE 130

EVER READ ANY BOOKS ABOUT TIMBER WOLVES?

	YES	NO
TWIN CITIES	32.8	67.2
NORTHERN COUNTIES	35.0	65.0
FARMERS	44.3	55.7
HUNTERS	45.1	54.9
TRAPPERS	58.5	41.5

$X^2 = 15.3$, P = .004

TABLE 131

EVER SEEN ANY FILMS ABOUT TIMBER WOLVES?

	YES	NO
TWIN CITIES	56.5	43.6
NORTHERN COUNTIES	60.1	39.9
FARMERS	60.8	39.2
HUNTERS	62.8	37.3
TRAPPERS	69.8	30.2

$X^2 = 3.4$, P = .48

who had owned a timber wolf as a pet. Specifically, from 7.5% of twin cities residents to 23% of trappers indicated they knew somone who had a timber wolf as a pet (Table 132). Far fewer respondents reported personally owning a pet timber wolf, although 6% of hunters made this claim (Table 133). The 99% confidence limits for the hunters response, however, was +/- 6%.

TABLE 132

KNOW ANYONE WHO HAS OWNED A TIMBER WOLF AS A PET?

	YES	NO
TWIN CITIES	7.5	92.5
NORTHERN COUNTIES	14.6	85.3
FARMERS	14.4	85.6
HUNTERS	10.8	89.2
TRAPPERS	22.6	77.4

$X^2 = 10.6$, $P = .03$

TABLE 133

EVER PERSONALLY OWNED A TIMBER WOLF AS A PET?

	YES	NO	99% CONFIDENCE LIMITS
TWIN CITIES	1.1	98.9	+/- 2%
NORTHERN COUNTIES	2.2	97.8	+/- 3%
FARMERS	2.1	97.9	+/- 4%
HUNTERS	5.9	94.1	+/- 6%
TRAPPERS	1.9	98.1	+/- 5%

$X^2 = 6.7$, $P = .14$

VIII. CONCLUSIONS AND RECOMMENDATIONS

Various results have been presented regarding public attitudes, knowledge and behaviors toward the timber wolf in Minnesota. This final section will recapitulate and discuss some of these findings, particularly those relating to the possible management and conservation of the timber wolf. This discussion will inevitably reflect personal interpretations of the findings and, thus, this section should be regarded as primarily the author's conclusions not those of the advisory committee's or sponsoring organizations and individuals.

Most respondents supported the protection and conservation of the timber wolf in Minnesota, but not at the expense or sacrifice of important human needs. Most favored the maintenance of abundant and healthy timber wolf populations in northern Minnesota, but affirmed the right of farmers to protect their livestock from wolf predation. Additionally, most respondents were against limiting human habitation of northern Minnesota or curtailing the development of mineral resources in this area to preserve wolf habitat.

On the other hand, the majority of Minnesotans approved of the need to proceed cautiously in allowing human development activities in areas with existing timber wolf populations. Additionally, the most preferred methods for controlling wolf predation on livestock were more humane and directed at the individually offending animal. Most respondents (except farmers) disapproved of the use of poisons, indiscriminate elimination of wolves without proof of culpability, overall reductions in wolf numbers in areas where they are abundant, or killing wolf pups.

Conversely, the most preferred wolf control options were eliminating only individual timber wolves responsible for livestock damage, capture and relocation of wolves, compensating farmers for their losses, or training guard dogs. Furthermore, on another control issue, the most favored methods for increasing the deer herd in northern Minnesota among most respondents (except farmers) were reductions in the number of human hunters or do nothing, and the least preferred option was reducing the population of timber wolves.

Among the most disturbing results of the study was the possible indication of an inordinate rate of illegal or unauthorized killing of timber wolves in Minnesota. Approximately one-third of the farmers, hunters, and trappers indicated they would shoot a timber wolf if they saw one while deer hunting. The majority of respondents reported they would shoot a timber wolf if it threatened not necessarily attacked their pets. Most of the general public and, more importantly, one-third of the trappers indicated the belief that illegal killing of timber wolves would increase if a legal harvest and sale of wolf pelts were permitted in Minnesota. And, in terms of reported behavior, 12% of the farmers and 17% of the trappers indicated they had personally killed or captured a timber wolf (8% and 11%, respectively, two or more times). Even more remarkably, a majority of farmers, hunters, and trappers reported knowing someone who had killed a timber wolf. Finally, 23% of the trappers and 15% of the northern counties residents said they knew people who had owned a pet timber wolf, and 6% of the hunters admitted owning a timber wolf as a pet. While the validity of various individual statistics can

be questioned or qualified, collectively they suggest considerable concern regarding the possible rate of killing or capturing of timber wolves in Minnesota. The responses of trappers, a group in a unique position to recognize this problem, especially suggests a potential major law enforcement problem.

Considerable difference of opinion was expressed regarding the value of establishing a legal season for trapping timber wolves in Minnesota. Respondents were divided about the benefits derived from a legal trade in wolf pelts, assuming timber wolf populations could support this harvest. Most respondents disputed the notion that support for wolf conservation and management would increase if the timber wolf had greater economic value resulting from the legal sale of its pelt. The limited trophy or recreational hunting value of the timber wolf was indicated by most respondents disagreeing that hunting or trapping wolves was a challenging or rewarding activity.

One of the most consistent results of the study was a strong positive perception of the timber wolf among all sample groups except farmers. This favorable image was particularly evident when it involved the outdoor recreational or wilderness values of the timber wolf. Most respondents (except farmers) expressed a strong desire to see a timber wolf in the wild, the feeling that it would be wonderful to hear this animal howl, and the view that the timber wolf symbolized to them the beauty and wonders of nature (this latter finding even occurred among farmers). Additionally, most respondents perceived the timber wolf as an intregal part of Minnesota wilderness, and few believed this state would be

better without timber wolves or this animal should be confined to primitive areas of Alaska or Canada. Moreover, most respondents said it was important to them just to know the timber wolf existed in Minnesota even if they never saw this animal in the wild.

Despite a strongly favorable view of the timber wolf, this animal, relative to other species, was not among the most liked animals. Additionally, fear of the timber wolf was evident among some respondents, with one-third or more reporting they would be afraid if timber wolves lived near their homes, or they would be afraid if they encountered a timber wolf while in the woods. On the other hand, few regarded timber wolves as a threat to children or as an inherently cruel or mean animal.

Ambivalent views were expressed toward the possible consequences of instituting major administrative chances in the management of the timber wolf in Minnesota. Divided opinions were indicated regarding the impact of shifting management responsibility from the federal to state governments. Most of the general public, although not farmers and trappers, thought people would be confused by allowing trapping of timber wolves after all the years of protecting this animal as an endangered and threatened species. Considerable difference of opinion was expressed regarding the need to clear or burn more forest land to increase the deer herd in northern Minnesota to provide more prey for timber wolves. On the other hand, substantial support was indicated for establishing timber wolf recovery programs in other areas of the state or country. In this regard, capture and relocation of timber wolves was the most preferred wolf control methodology, and most respondents supported translocating

surplus timber wolves to other states under suitable conditions.

The need for greater factual understanding and knowledge of the timber wolf was found among a number of sample groups, particularly twin cities residents, nonwhites, females, and less educated respondents. A more encouraging result was the relatively substantial knowledge of timber wolves of trappers and, to a less pronounced extent, hunters and farmers.

Twin cities residents, despite less knowledge, were among the most positive, appreciative, and protectionist of all groups in their attitudes toward the timber wolf. Interestingly, trappers were the other group as positively oriented to the timber wolf, although they differed significantly from twin cities residents in being more knowledgeable, and inclined to support the right of humans to utilize and dominate this animal. Northern counties residents varied considerably from twin cities respondents in being less protectionist, more pragmatic and knowledgeable in their perceptions of the timber wolf.

The likelihood of a strongly ingrained anti-wolf bias among farmers was suggested by the results of this study. A wide variety of measures revealed farmers as being the most negative, unsympathetic, and hostile of all groups in their attitudes toward the timber wolf. The strength and intensity of these results suggested the likelihood that farmers would be opponents of most timber wolf conservation and protection measures, unless convincing efforts were made to demonstrate the practical and positive value of the timber wolf to the farming or rural way of life.

Most respondents indicated considerable nonconsumptive enjoyment of the timber wolf. The great majority reported a strong desire to see timber wolves in the wild, and most had viewed timber wolves in zoos, on film, or read articles and books about this animal.

The extent of this nonconsumptive enjoyment of the timber wolf suggested the potential for developing a major outdoor recreational tourist attraction around this animal in northern Minnesota. This possibility could constitute one element in a broad-based effort to establish a "common-ground" of concern for the management and conservation of the timber wolf. An additional element in building this mutual support might be a major educational effort to increase knowledge and appreciation of the timber wolf from a variety of value perspectives. A necessary component of such an effort would be the acceptance by all groups of the need to mitigate human conflicts with the timber wolf, but in a manner generally regarded as involving humane procedures, focusing on individually troublesome animals, and avoiding indiscriminate population reductions.

The potential for such "common-ground" was suggested by the results of this study. The various sample groups were alike in their perception of the timber wolf as indicative of nature's wonder and beauty. This common perspective, and the acceptance of the timber wolf as a source of human enjoyment and practical benefit, might facilitate agreement regarding the management and conservation of this species. With this common-ground, it might be possible to proceed with the conviction that a world made better for the timber wolf is also a world more attractive, meaningful, and productive for people. As Aldo Leopold once suggested, wild-

life reminds us of the link between ourselves and the land, inherent in the flow of energies and materials through a biotic pyramid of interrelationships among water, soils, plants, and animals. When we nurture the physical and social environment in the name of the timber wolf, we will have provided for ourselves a medium of human growth and personal understanding.

APPENDIX A: SURVEY

APPENDIX B: ATTITUDES TOWARD TIMBER WOLF SCALES

DOMINIONISTIC

I WOULD SHOOT A TIMBER WOLF IF IT THREATENED MY PETS.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

TIMBER WOLVES THAT KILL PET CATS AND DOGS HAVE TO BE ELIMINATED.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

PEOPLE HAVE A DUTY TO PROTECT WEAK AND DEFENSELESS CREATURES LIKE SHEEP FROM PREDATORS LIKE TIMBER WOLVES.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

CAPTURING A TIMBER WOLF WOULD BE A CHALLENGING AND REWARDING EXPERIENCE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

I ADMIRE THE SKILL AND COURAGE OF A MAN WHO TRIES TO HUNT A TIMBER WOLF IN THE WILD.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

IF I WERE HUNTING DEER AND SAW A TIMBER WOLF, I MIGHT SHOOT IT.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SCALE RANGE, 0 - 10; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 3.99

ECOLOGISTIC

I THINK WHEN TIMBER WOLVES KILL CATTLE AND SHEEP THEY MUST BE ELIMINATED.

STRONGLY AGREE = 2

IN MY OPINION, THE TIMBER WOLF IS ESSENTIAL FOR KEEPING THE DEER IN NORTHERN MINNESOTA IN A PROPER BALANCE WITH THE ENVIRONMENT.

STRONGLY AGREE = 2

I THINK TIMBER WOLVES ARE ESSENTIAL TO MAINTAINING THE BALANCE OF NATURE.

STRONGLY AGREE = 2

ECOLOGISTIC CONTINUED

I THINK TIMBER WOLVES ARE AMONG THE FEW ANIMALS WHO WILL KILL FOR THE PLEASURE OF KILLING.

STRONGLY AGREE = 2 DISAGREE = 1

SCALE RANGE 0-8; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 2.6

MORALISTIC

IF FARMERS WERE MORE CAREFUL ABOUT HOW THEY TAKE CARE OF THEIR CATTLE, THERE WOULD BE FEWER LIVESTOCK KILLED BY TIMBER WOLVES.

STRONGLY AGREE = 2

IF HUNTING SEASON ON TIMBER WOLVES WERE ALLOWED AFTER ALL THE YEARS OF PROTECTING THIS ANIMAL AS AN ENDANGERED SPECIES, IT WOULD CONFUSE THE PUBLIC ABOUT THE NEED TO PROTECT ENDANGERED WILDLIFE.

STRONGLY AGREE = 2

I BELIEVE SO MANY TIMBER WOLVES ARE BEING ILLEGALLY KILLED IN MINNESOTA THAT IF SOMETHING IS NOT DONE TO STOP IT, THE TIMBER WOLF WILL SOON DISAPPEAR FROM THIS STATE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

I THING IT'S WRONG TO KILL TIMBER WOLVES BECAUSE THEY SEEM SO INTELLIGENT AND EMOTIONALLY SENSITIVE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

BECAUSE PEOPLE AND CATTLE LIVE PRACTICALLY EVERYWHERE IN THE UNITED STATES AND TIMBER WOLVES ONLY IN NORTHERN MINNESOTA AND ALASKA, I THINK MINNESOTA SHOULD MAKE SACRIFICES WHEN THERE IS A CONFLICT WITH THE TIMBER WOLF.

STRONGLY AGREE = 2

I THINK A HUNTING SEASON ON TIMBER WOLVES WOULD ENCOURAGE MORE ILLEGAL KILLING OF TIMBER WOLVES BECAUSE OF THE MONEY PEOPLE WOULD GET FOR SELLING THEIR FUR.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SCALE RANGE 0-12; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 2.7

NATURALISTIC

I THINK IT WOULD BE WONDERFUL TO HEAR A TIMBER WOLF HOWL IN THE WILD.

STRONGLY AGREE = 2

I WOULD VERY MUCH LIKE TO SEE A TIMBER WOLF IN THE WILD.

STRONGLY AGREE = 2

SEEING A TIMBER WOLF IN THE WILD WOULD BE ONE OF THE GREATEST OUTDOOR EXPERIENCES OF MY LIFE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

TO ME, THE TIMBER WOLF SYMBOLIZES THE BEAUTY AND WONDER OF NATURE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

TO ME, IT IS THE PRESENCE OF TIMBER WOLVES THAT MAKES A WILDERNESS EXPERIENCE SO WONDERFUL IN NORTHERN MINNESOTA.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SCALE RANGE 0-10; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 4.7

NEGATIVISTIC

IT UPSETS ME TO THINK HOW A TIMBER WOLF MUST ACTUALLY KILL A DEER.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

TO ME, A TIMBER WOLF'S HOWL IS ONE OF THE MOST FRIGHTENING SOUNDS IN NATURE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SOME ANIMALS LIKE TIMBER WOLVES AND RATTLESNAKES ARE NATURALLY CRUEL.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

MINNESOTA WOULD BE A NICER PLACE TO LIVE, IF FEWER DANGEROUS ANIMALS, LIKE TIMBER WOLVES, WERE FOUND HERE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

NEGATIVISTIC CONTINUED

I THINK ALL TIMBER WOLVES ARE DANGEROUS TO PEOPLE.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

BECAUSE WE NO LONGER HUNT TIMBER WOLVES, I BELIEVE THEY HAVE LOST THEIR FEAR OF PEOPLE AND NOW THREATEN CHILDREN.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

I WOULD BE AFRAID IF TIMBER WOLVES LIVED NEAR MY HOME.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SCALE RANGE 0-14; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 2.2

UTILITARIAN

IN AN AREA LIKE NORTHERN MINNESOTA WHERE SO MANY PEOPLE DEPEND ON THE LAND FOR A LIVING, TIMBER WOLF HUNTING SHOULD BE ALLOWED SO PEOPLE CAN MAKE MONEY FROM THE FURS OF THESE ANIMALS.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

IF THERE ARE ENOUGH TIMBER WOLVES, I THINK WE SHOULD ALLOW SOME OF THEM TO BE KILLED FOR THEIR FUR.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

IF TIMBER WOLVES CAN BE SAFELY HUNTED AFTER ALL THE YEARS OF PROTECTING THIS ANIMAL, IT WOULD BE A MAJOR SUCCESS FOR WILDLIFE MANAGEMENT.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

I THINK TIMBER WOLVES HAVE DESTROYED THE DEER IN NORTHERN MINNESOTA AND ONLY REDUCING THE NUMBER OF WOLVES WILL ALLOW THE DEER TO RETURN.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

IF NEW MINES IN NORTHERN MINNESOTA CREATE MORE JOBS, THEY HAVE TO BE DEVELOPED EVEN IF LAND NEEDED BY THE TIMBER WOLF IS DESTROYED.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

OUR COUNTRY IS IN BAD SHAPE WHEN WE CHOOSE TO PROTECT TIMBER WOLVES INSTEAD OF HARD WORKING FARMERS.

UTILITARIAN CONTINUED

STRONGLY AGREE = 2 MODERATELY AGREE = 1

BECAUSE MANY POOR MINNESOTANS DEPEND ON DEER FOR FOOD, I PREFER TO SEE THESE PEOPLE GET THE DEER INSTEAD OF THE TIMBER WOLF.

STRONGLY AGREE = 2 MODERATELY AGREE = 1

SCALE RANGE 0-14; $\bar{X}$ FOR ENTIRE SAMPLE (N = 621) = 3.9

APPENDIX C: NONWOLF ANIMAL-RELATED ACTIVITIES

TABLE 134

RAISED LIVESTOCK IN THE PAST TWO YEARS?

	YES	NO
TWIN CITIES	2.2	97.6
NORTHERN COUNTIES	15.3	84.7
FARMERS	82.5	17.5
HUNTERS	5.9	94.1
TRAPPERS	34.0	66.0

$X^2 = 274.9$, $P = .0001$

TABLE 135

RAISED LIVESTOCK AT ANY OTHER TIME IN YOUR LIFE?

	YES	NO
TWIN CITIES	22.0	78.0
NORTHERN COUNTIES	40.4	59.6
FARMERS	93.8	6.2
HUNTERS	40.2	59.8
TRAPPERS	62.3	37.7

$X^2 = 141.8$, $P = .0001$

TABLE 136

WAS RAISING LIVESTOCK EVER A MAJOR SOURCE OF INCOME FOR YOUR PARENTS?

	YES	NO
TWIN CITIES	23.7	76.3
NORTHERN COUNTIES	31.7	68.3
FARMERS	86.6	13.4
HUNTERS	32.4	67.7
TRAPPERS	52.8	47.2

$X^2 = 120.0$, $P = .0001$

TABLE 137

HUNTED IN THE PAST TWO YEARS?

	YES	NO
TWIN CITIES	19.4	80.7
NORTHERN COUNTIES	44.3	55.7
FARMERS	56.7	43.3
HUNTERS	96.1	3.9
TRAPPERS	96.2	3.8

$X^2 = 205.4$, $P = .0001$

TABLE 138

APPROVE HUNTING FOR RECREATION AND MEAT

	STRONGLY APPROVE	APPROVE	NEITHER	DISAPPROVE	STRONGLY DISAPPROVE
TWIN CITIES	23.7	21.5	25.3	11.3	18.3
NORTHERN COUNTIES	36.6	23.0	25.7	7.1	7.7
FARMERS	46.4	28.9	20.6	3.1	1.0
HUNTERS	65.7	24.5	7.8	2.0	0.0
TRAPPERS	67.9	22.6	9.4	0.0	0.0

$X^2 = 115.2$, $P = .0001$

TABLE 139

APPROVE TROPHY HUNTING

	STRONGLY APPROVE	APPROVE	NEITHER	DISAPPROVE	STRONGLY DISAPPROVE
TWIN CITIES	3.8	4.3	8.6	14.5	68.8
NORTHERN COUNTIES	5.5	4.4	12.6	14.8	62.8
FARMERS	7.2	9.3	19.6	15.5	48.5
HUNTERS	17.7	14.7	19.6	13.7	34.3
TRAPPERS	22.6	17.0	34.0	5.7	20.8

$X^2 = 98.9$, $P = .0001$

TABLE 140

TRAPPED WILD ANIMALS IN THE PAST TWO YEARS?

	YES	NO
TWIN CITIES	2.2	97.8
NORTHERN COUNTIES	3.3	96.7
FARMERS	12.4	87.6
HUNTERS	5.9	94.1
TRAPPERS	92.5	7.5

$X^2 = 384.6$, $P = .0001$

TABLE 141

TRAPPED WILD ANIMALS AT ANY OTHER TIME IN YOUR LIFE?

	YES	NO
TWIN CITIES	15.6	84.4
NORTHERN COUNTIES	25.7	74.3
FARMERS	54.6	45.4
HUNTERS	47.1	52.9
TRAPPERS	92.5	7.6

$X^2 = 134.7$, $P = .0001$

TABLE 141

BIRDWATCHED IN THE PAST TWO YEARS?

	YES	NO
TWIN CITIES	66.7	33.3
NORTHERN COUNTIES	59.6	40.4
FARMERS	58.8	41.2
HUNTERS	58.8	41.2
TRAPPERS	60.4	39.6

$X^2 = 3.0$, $P = .55$

TABLE 143

HOW MANY BIRD SPECIES CAN YOU IDENTIFY?

	≤ 10	10-40	41+
TWIN CITIES	35.5	57.5	7.0
NORTHERN COUNTIES	30.6	62.3	7.1
FARMERS	20.6	71.1	8.2
HUNTERS	20.6	67.6	11.8
TRAPPERS	3.8	62.2	34.0

$X^2 = 79.4$, P = .0001

TABLE 144

MEMBERSHIP IN WILDLIFE PRESERVATION ORGANIZATION?

	YES	NO
TWIN CITIES	4.3	95.7
NORTHERN COUNTIES	3.8	96.2
FARMERS	2.1	97.9
HUNTERS	1.0	99.0
TRAPPERS	5.7	94.3

$X^2 = 3.7$, P = .44

TABLE 145

MEMBERSHIP IN SPORTSMEN ORGANIZATION?

	YES	NO
TWIN CITIES	3.8	96.2
NORTHERN COUNTIES	6.0	94.0
FARMERS	8.3	91.8
HUNTERS	8.8	91.2
TRAPPERS	22.6	77.4

$X^2 = 21.9$, P = .0002

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