NORTHEASTERN MINNESOTA ELK

A study of landowner and public attitudes toward potential elk restoration in Minnesota

Final Summary

A cooperative study conducted by:

Minnesota Cooperative Fish and Wildlife Research Unit

Department of Fisheries, Wildlife and Conservation Biology, University of Minnesota

Fond du Lac Band of Lake Superior Chippewa

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A study of landowner and public attitudes toward potential elk restoration in Minnesota

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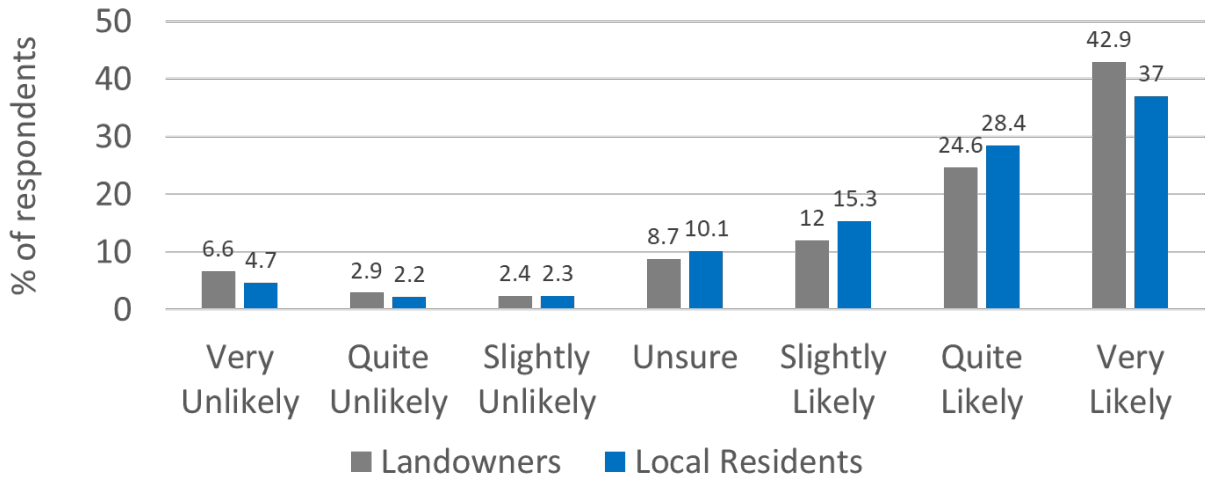
Executive Summary

Understanding the public's attitudes and acceptance of elk and their potential impacts are key components of assessing the viability of elk restoration. The University of Minnesota, in collaboration with the Fond du Lac Band of Lake Superior Chippewa, conducted a self-administered mail-back questionnaire of landowners and local residents in northeastern Minnesota to determine their attitudes toward restoring an elk population. We surveyed 4,500 private landowners and 4,000 local residents in northeastern Minnesota to describe landowner and local resident attitudes toward potentially restoring an elk population to northeastern Minnesota. The population of interest in this study was private landowners and local residents within the study area that covered portions of Carlton, Pine, and St. Louis Counties. Three potential restoration areas for elk were identified based on recommendations from local natural resource professionals. These areas were selected due to abundant public land, while minimizing potential conflict from other land uses (e.g., agriculture). A random sample was used for: (1) private landowners ($\geq$10 acres) within five miles of the restoration areas, and (2) local residents matched to census blocks within four areas that correspond to county boundaries and major landmarks (e.g., roads, river). Among landowners, we had an adjusted response rate of 60% for full-length surveys, and a total response rate of 67% including nonresponse surveys. Among local residents, we had an adjusted response rate of 46% for full-length surveys, and a total response rate of 49% including nonresponse surveys.

Support for Elk Restoration

Overall landowners and local residents within the study areas strongly supported restoring wild, free-ranging elk to the study areas in northeastern Minnesota (80% and 81%; Figure S-1) and Minnesota in general (78% and 78%). About 12% of landowners and 9% of local residents were unlikely to support elk restoration. Landowner support for restoration in northeastern Minnesota was highest in the Cloquet Valley Study Area (82%) and lowest in the Fond du Lac Study Area (75%). Support from landowners in the Nemadji Study Area was 81%. Among local residents support was highest in southern St. Louis County (83%) followed by Duluth (82%), northern Pine County (78%) and Carlton County (75%). Overall, a majority of landowners were supportive of restoring elk on their own property (70%) and within five miles of their property (76%). Landowners and local residents within each study area and group strongly supported restoring elk, although landowners were slightly less supportive of restoring elk within close proximity to their own property.

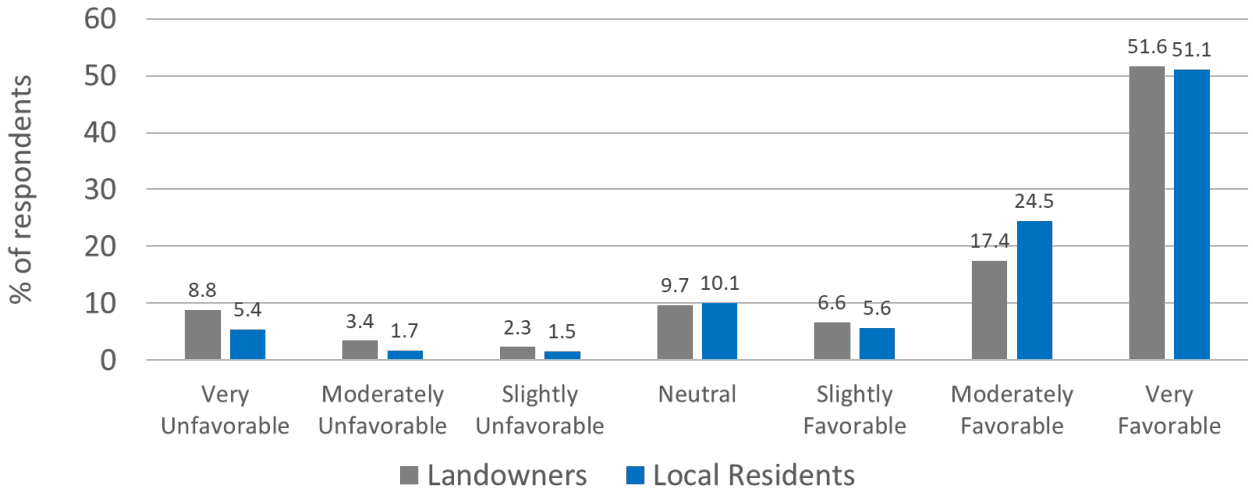
Figure S-1. Support for restoring wild, free-ranging elk to the study areas in Minnesota.



Hunters were more supportive of restoring elk to the study areas in Minnesota than non-hunters among both landowners (81% vs 75%) and local residents (80% vs 75%). Among landowners, non-farmers were more supportive of restoring elk to the study areas in Minnesota than farmers (82% vs 73%). Timber producing landowners were less supportive of restoring wild, free-ranging elk to the study areas in Minnesota than non-producers (76% vs 81%).

Overall, both landowners (76%) and local residents (81%) also expressed favorable feelings toward elk restoration in the identified study areas and on average held positive attitudes toward supporting the restoration of elk in these areas (Figure S-2). About 12% of landowners felt moderately to very unfavorably toward restoring elk in the study areas, while only 7% of local residents felt moderately to very unfavorably toward restoring elk. Over 70% of landowners and local residents also held normative beliefs that people who are important to them think they should support the restoration of elk in the study areas. Overall, attitudes toward supporting restoration of elk and normative beliefs about supporting the restoration of elk, explained a large amount of the variance in landowners' (63%) and local residents' (52%) level of support for restoring elk.

Figure S-2. Feelings expressed toward restoring wild, free ranging elk to the study areas in Minnesota.



Landowners and local residents were presented with a series of 14 potential outcomes from restoring a wild, free-ranging elk population within the study areas in Minnesota and asked the likelihood of each outcome. Respondents believed that the most likely outcomes from restoring an elk population were: (1) providing opportunities to view elk, (2) restoration of a native wildlife species, and (3) providing opportunities to hunt elk. Respondents believed that the least likely outcomes from restoring an elk population were: (1) negatively impact other wildlife populations, (2) increase risk of disease transmission to livestock and wildlife, and (3) increase damage to trees and forest vegetation. The beliefs that had the largest positive influence on landowner and local resident support for elk restoration included: (1) restoration of a native wildlife species; (2) providing economic opportunities; (3) increase youth involvement and interest in the outdoors; (4) providing hunting opportunities for elk; and (5) providing opportunities to view elk. Beliefs that had the largest negative influence on support included: (1) negatively impact other wildlife populations, (2) increase risk of disease transmission to livestock and wildlife, and (3) increase damage to trees and forest vegetation.

Importance of Issues Related to Elk Restoration

Understanding landowners' and local residents' preferences for management objectives allows managers to understand stakeholder desires for potentially restoring elk to study areas in Minnesota and improve implementation of tools, such as education. We used a Best-Worst Scaling (BWS) approach to determine preferences regarding the most important and least important objectives to stakeholders. Landowners and local residents ranked management objectives similarly. The most important management objectives for landowners were: (1) minimizing impacts to existing wildlife populations (e.g., disease, resource competition), (2) restoration of a native species, and (3) minimizing impacts to deer populations and deer hunting. The least important management objectives for landowners were: (8) minimizing costs of government elk management actions, (9) providing elk viewing opportunities, and (10) maximizing economic opportunities through elk-related tourism and recreation. The most important management objectives for local residents were: (1) minimizing impacts to existing wildlife populations (e.g., disease, resource competition), (2) restoration of a native species, and (3) maximizing sustainable elk population

size. The least important management objectives for local residents were: (8) providing elk hunting opportunities, (9) maximizing economic opportunities through elk-related tourism and recreation, and (10) providing elk viewing opportunities.

Benefits and Risks of Restoring Elk

We were interested in understanding landowners' and local residents' perceptions of the potential risks and benefits from restoring wild, free-ranging elk within the study areas in Minnesota. Landowners and local residents perceived that there would potentially be moderate risk from restoring elk within the study areas. Landowners and local residents thought that having elk within the study areas would pose little to moderate threat to the respondents' own economic well-being (agriculture, personal property) or health/safety (vehicle collisions, etc.). Similarly, landowners and local residents believed that having elk within the study areas would pose little to moderate threat to the economic well-being (agriculture, personal property) or health/safety (vehicle collisions, etc.) of other individuals in the local community. Landowners and local residents perceived that having elk within the study areas would pose moderate threat to other wildlife in the area (disease, etc.) and to trees and forest vegetation. Overall, landowners and local residents perceived that elk would pose the greatest threat to the health/safety of other individuals in the local community (vehicle collisions, etc.) and the least threat to the respondents' own economic well-being (agriculture, personal property).

Landowners and local residents believed that there would potentially be moderate to high potential benefits from restoring elk within the study areas. Respondents were neither certain nor uncertain about the potential risks and benefits of restoring elk within the study areas. Landowners and local residents were perceived that they would have moderate personal control to limit risk to themselves if elk are restored within the study areas in Minnesota. Landowners believed that they would have little control to limit elk damage to their own agricultural and personal property or trees and forest vegetation. Landowners also believed that they would have little control to limit impact to deer and other wildlife in the study areas. Landowners and local residents believed that they would have little control to influence elk management decisions in the study areas.

Knowledge about Elk in Minnesota

Landowners and local residents were asked three questions to estimate their knowledge of elk in Minnesota. Each question contained a factual statement about elk in Minnesota and respondents were asked whether they knew this information prior to receiving the questionnaire. On average, landowners and local residents had moderate knowledge of elk in Minnesota. Hunters were more knowledge about elk in Minnesota than non-hunters among landowners and local residents. On average, hunters had moderate knowledge of elk in Minnesota and non-hunters had low knowledge.

Importance of Elk in Minnesota

Landowners and local residents were asked three questions to indicate the importance to the respondent of restoring wild, free-ranging elk to the study areas in Minnesota. A majority of landowners (64%) and local residents (69%) agreed with the statement "it is important that Minnesota someday have an abundant elk population within the study areas." A majority of landowners (70%) and local residents (76%) also agreed with the statement "whether or not I would get to see an elk, it is important to me that they could exist within the study areas." Most landowners (73%) and local residents (79%) also agreed with the statement "it is important to establish elk populations within the study areas so future generations can enjoy them."

Trust in Wildlife Managers

Respondents were asked to rate their agreement with three statements addressing their trust in wildlife managers. On average, landowners and local residents had similar levels of agreement for each trust statement, though only slightly agreed with each statement. Landowners and local residents agreed most with the statement that wildlife managers would be open and honest in the things they do and say when making elk management decisions. Non-hunters were more trusting of wildlife managers than hunters among landowners and local residents. Among landowners, non-farmers were more trusting of wildlife managers than farmers, though both groups only slightly agreed with each trust statement.

Elk-Related Recreation

Respondents were asked about interest in participating in elk-related recreation if an elk population is restored to the study areas in Minnesota, including wildlife viewing and hunting. A majority of landowners (61%) and local residents (64%) indicated that they would likely make a trip to view, photograph or hear elk within the study areas in Minnesota. Over 40% of landowners (46%) and local residents (41%) indicated that they had ever visited a National Park or similar destination in North America for which an important part of the trip was viewing, photographing or hearing elk.

Landowners and local residents were asked whether they have hunted elk or applied for an elk license in Minnesota or elsewhere in North America. Few landowners (2%) and local residents (0.2%) have applied for or have been drawn for an elk hunting license in Minnesota, although more respondents have hunted elk or applied to hunt elk elsewhere in North America (landowners: 21%; local residents: 8%). About one-quarter of landowners (24%) and but fewer than 1 in 5 local residents (16%) indicated that they plan to apply for a Minnesota elk hunting license in the future. A majority of landowners (52%) and local residents (71%) did not plan to apply for a Minnesota elk hunting license in the future. In general, landowners were more likely than local residents to have applied for or have drawn an elk license or apply for one in the future. About 1 in 10 landowners (10%) and local residents (12%) indicated that they have lived in an area where elk where common.

Outdoor Activities and Membership

Respondents were asked about their participation in outdoor recreation during the past 12 months. Among landowners, the greatest proportion of respondents participated in: (1) fishing (68%), (2) deer hunting (63%), (3) ATV riding (60%), and (4) hiking (60%). Among local residents, the greatest proportion of respondents participated in: (1) hiking (67%), (2) fishing (56%), (3) wildlife watching and photography (50%), and (4) feeding wildlife (41%).

Landowner Property Characteristics

Landowners were asked to describe their property within the study areas in Minnesota. Landowners that responded owned 94 acres on average with Fond du Lac landowners having the largest property sizes (Cloquet Valley: $\bar{x}$ = 72.2; Fond du Lac: $\bar{x}$ = 113.2; Nemadji: $\bar{x}$ = 97.3 acres). Most landowners indicated their property was used primarily as their primary residence (49%) or seasonal/recreational residence (47%). A majority of properties within the Nemadji study area were considered seasonal/recreational residences (67%). Landowners that described their property as a seasonal or recreational residence spent about two months annually on the property and 45% indicated their full-time residence was in the 7-county Twin Cities metro (Hennepin, Ramsey, Dakota, Anoka, Washington, Scott, and Carver Counties).

Landowners were asked to indicate activities had occurred on their property within the past 5 years. The most common land use activities reported by respondents were: (1) hunting (78%); (2) residential use (55%); (3) timber production (23%); and (4) hay production (22%). Row crops (corn, beans) (6%), small grains (wheat, oats) (6%), and commercial/Industrial use (2%) were the least common activities.

When asked about current uses, a majority of respondents indicated that at least some of their property was used for private residence, such as houses, lawns, and associated buildings (62%). Woodlands, such as natural forest and tree plantings, were the most common habitat type with 84% of respondents indicating at least some of their property contained woodlands. One-quarter of respondents indicated that they improve wildlife habitat on their property by creating wildlife food plots (25%). Hayfields (28%) and livestock pasture (13%) were the most common agricultural land types among respondents. Small grains (6%), row crops (5%), and other property types (6%) were present on a limited number of properties.

Demographic Characteristics of Landowners and Local Residents

On average, landowners ($\bar{x}$ = 60 years) were older than local residents ($\bar{x}$ = 49 years), but both landowners and local residents reported having lived in Minnesota a majority of their lives (90% vs 87%). A majority of landowners were male (81%). Local resident respondents tended to be male (66%), but we weighted local residents to reflect a near 50/50 proportion of males and females as well as correcting the age distribution to reflect census information for the study areas. Overall, a majority of landowners (53%) and local residents (65%) have attended at least some college. On average, the household income of landowners was larger than local residents ($98,667 vs $77,839). While more than 20% of landowners reported at least some haying activities, less than 20% of landowners (17%) reported that at least a portion of their household income was derived from farming. Half of landowners (51%) and about 4 out of 10 local residents (42%) were raised primarily in a rural area as a youth, either on a farm or not.

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Introduction

Elk (*Cervus canadensis*) have historically ranged over most of the state of Minnesota but were functionally extirpated in the early 1900s due to overharvest and habitat loss (Hazard, 1982). Although two small populations have been restored to northwest Minnesota, they are currently managed at low levels to reduce human-wildlife conflict (Minnesota Department of Natural Resources [MNDNR], 2016). Forested areas of the state, however, might avoid some of these conflicts and see significant ecological and economic benefits from returning elk to the landscape. Re-establishing this keystone herbivore could help restore the state's traditional wildlife heritage, diversify the large mammal community, increase tourism from wildlife viewers, and eventually provide additional hunting opportunities. Additional benefits include adapting to future climate change through assisted dispersal of a climate hardy species like elk and protecting against unforeseen events which could lead to the extirpation of Minnesota's current small and isolated elk populations. Finally, a landscape actively managed for elk will benefit other species adapted to young forests and brushlands. Evidence from other eastern states indicates elk restoration can be successful, but success is dependent on active forest management and public support for elk by local communities (Larkin, Cox, Wichrowski, Dzialak, & Maehr, 2004; Maehr, Noss, & Larkin, 2001; Popp, Toman, Mallory, & Hamr, 2014).

Understanding the public's attitudes and acceptance of elk and their potential impacts are key components of assessing the viability of elk restoration. Long-term management of elk will require an adaptive impact approach in which management objectives and strategies are guided by the preferences of the impacted public. The University of Minnesota, in collaboration with the Fond du Lac Band of Lake Superior Chippewa, conducted a self-administered mail-back questionnaire of landowners and local residents in northeastern Minnesota to determine their attitudes toward restoring an elk population. We surveyed 4,500 private landowners and 4,000 local residents in northeastern Minnesota to describe landowner and local resident attitudes toward potentially restoring an elk population to northeastern Minnesota.

Study Purpose and Objectives

The goal of this study was to understand the attitudes of private landowners and local residents toward potentially restoring elk to northeastern Minnesota. Specific objectives were to:

1) Understand citizens' attitudes toward elk and elk restoration;
2) Acceptance and tolerance of potential elk impacts;
3) Preference for management objectives concerning elk restoration including elk population size and geographic distribution; and
4) Preferences for management strategies to address potential conflicts with elk.

Methods

Study Area

The populations of interest in this study included private landowners and local residents within the study area that covered portions of Carlton, Pine, and St. Louis Counties. Three potential restoration areas for

elk were identified based on recommendations from local natural resource professionals. These areas were selected due to abundant public land, while minimizing potential conflict from other land uses (e.g., agriculture). The land cover types present within these counties were primarily deciduous and mixed forest, along with wetland and grasslands occurring less frequently. Based on the 2010 U.S. Census, the median age of respondents within these counties was approximately 41 years old with a nearly equal gender distribution (50.8% male, 49.2% female) and a majority identifying as racially white (92.4%) (U.S. Census Bureau, 2018).

Sampling

Three study areas were defined for landowners by creating a five mile buffer around each potential restoration area. The three study areas for the landowner survey included: (1) Cloquet Valley State Forest in St. Louis County, (2) Fond du Lac State Forest and Fond du Lac Indian Reservation in St. Louis and Carlton Counties, and (3) Nemadji State Forest in Pine County (Figure I-1). Local residents were stratified using four study areas matched to census blocks that correspond to county boundaries and major landmarks (e.g., roads, rivers). The four study areas for the local resident survey include: (1) southern St. Louis County south of the St. Louis River, (2) Carlton County, (3) northern Pine County north of Minnesota Highway 48, and (4) city of Duluth and the surrounding suburbs. We obtained the sample from a commercial vendor (https://www.m-s-g.com/Pages/genesys/), that used digitized maps we provided of the studies areas to define a sampling frame of households within census blocks that corresponded to the study areas.

A random stratified sample was used for private landowners within five miles of the restoration areas (n = 4,500). Landowner data were obtained using parcel ownership information from county tax records. The sample was stratified by the total number of acres owned by the landowner within the study area: (1) 10 to 40 acres, and (2) >40 acres. A stratified random sample was used for local residents (n = 4,000) within four study areas using contact information for households obtained from a third-party vendor.

Data Collection

Data were collected using a self-administered mail-back questionnaire based on an adapted Tailored Design Method (Dillman, Smyth, & Christian, 2014). Survey recipients were contacted three times between February and June 2018 using a full-length questionnaire for landowners (Appendix A) and local residents (Appendix B). In the initial contact, a personalized cover letter, survey questionnaire, and business-reply envelope were mailed to all potential study participants. The personalized cover letter explained the purpose of the study and asked recipients to complete and return the questionnaire. Approximately one month later, a second letter with another copy of the survey and business-reply envelope was sent to study participants who had not responded to the first mailing and had valid mailing addresses. Approximately two months after the second mailing, a third mailing that included a personalized cover letter and replacement questionnaire with business-reply envelope was sent to all individuals with valid addresses that had yet to reply. The 1st and 3rd mailings included an incentive ($2 and $1, respectively) to increase the likelihood of survey completion. Due to a lagging response rate, a fourth questionnaire with a $1-incentive was sent to local residents within the Carlton (n = 563) and Duluth study areas (n = 500). A shortened version of the questionnaire was mailed to non-respondents in June 2018 to serve as a non-response check for landowners (Appendix C) and local residents (Appendix

D). We did not send the shortened non-response survey to Carlton or Duluth because they were sent a full-length survey during this 4th mailing.

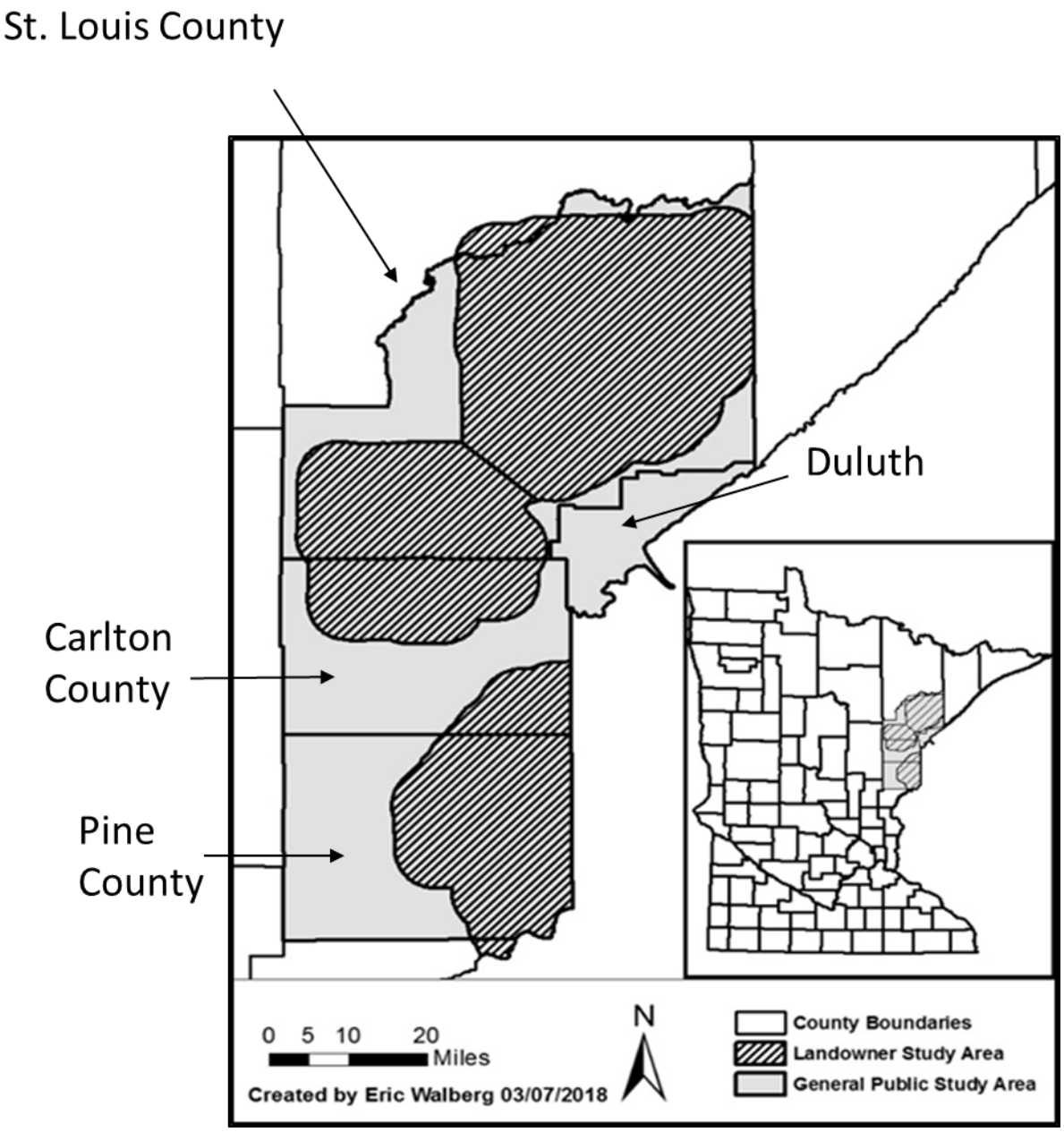

Figure I-1. Study area in northeastern Minnesota. The area includes portions of Carlton, Pine, and St. Louis Counties. Data were collected from a stratified, random sample of 4,500 landowners and 4,000 local residents.

Survey Instrument

The data collection instrument was a 12-page self-administered questionnaire with 11 pages of questions and a title page. Landowners (Appendix A) and local residents (Appendix B) were provided different versions of the questionnaire. The questionnaire addressed the following topics:

Section 1: Attitudes toward and support for elk restoration
Section 2: Importance of issues related to elk restoration
Section 3: Benefits and risks of restoring elk
Section 4: Knowledge about elk in Minnesota
Section 5: Importance of elk in Minnesota
Section 6: Trust in wildlife managers
Section 7: Elk-related recreation
Section 8: Outdoor activities and membership
Section 9: Landowners property characteristics
Section 10: Demographic characteristics of landowners and local residents

Data Entry and Analysis

Data were entered using REDCap electronic tools hosted at the University of Minnesota (Harris et al., 2009). Data were analyzed using program R (Version 3.5.2, www.r-project.org, accessed 29 March 2019). We computed descriptive statistics and frequencies within each study group. Results between landowners and local residents were not combined. Questionnaires returned after August 2018 were excluded from our analyses.

Survey Response Rate

Of the 4,500 questionnaires mailed to private landowners, 221 were undeliverable or otherwise invalid. Of the remaining 4,279 surveys, a total of 2,550 were returned, resulting in an overall response rate of 59.6%. An additional 338 shortened non-response surveys, used to gauge nonresponse bias, were returned for a total response rate of 67.5%. Respondents within the Cloquet Valley study area completed 841 full-length surveys (58.7%) and 110 non-response surveys (66.4%). Respondents within the Fond du Lac study area completed 797 full-length surveys (55.9%) and 116 non-response surveys (64.1%). Respondents within the Nemadji study area completed 912 full-length surveys (64.2%) and 112 non-response surveys (72.1%).

Of the 4,000 questionnaires mailed to local residents, 566 were undeliverable or otherwise invalid. Of the remaining 3,434 surveys, a total of 1,574 were returned, resulting in an overall response rate of 45.8%. An additional 120 shortened non-response surveys were returned for a total response rate of 49.3%. Respondents within the Carlton study area completed 373 full-length surveys (42.1%). Respondents within the Duluth study area completed 359 full-length surveys (43.3%). Instead of a non-response survey, participants in Carlton and Duluth were sent full-length surveys. Respondents within the Pine study area completed 393 full-length surveys (46.6%) and 66 non-response surveys (54.4%). Respondents within the St. Louis study area completed 449 full-length surveys (51.4%) and 54 non-response surveys (57.6%). Response rates for each stratum are summarized in Table I-1.

Table I-1. Survey response rate.

	Initial sample Size	Number invalid	Valid sample size	Full surveys completed	Full survey response rate	Non-response Survey	Total surveys returned	Total survey response rate
Landowners	**4,500**	**221**	**4,279**	**2,550**	**59.6%**	**338**	**2,888**	**67.5%**
Cloquet Valley	1,500	67	1,433	841	58.7%	110	951	66.4%
Fond du Lac	1,500	75	1,425	796	55.9%	116	913	64.1%
Nemadji	1,500	79	1,421	913	64.2%	112	1,024	72.1%
Local Residents	**4,000**	**566**	**3,434**	**1,574**	**45.8%**	**120**	**1,694**	**49.3%**
Carlton	1,000	113	887	373	42.1%	N/A	373	42.1%
Duluth	1,000	170	830	359	43.3%	N/A	359	43.3%
Pine	1,000	156	844	393	46.6%	66	459	54.4%
St. Louis	1,000	127	873	449	51.4%	54	503	57.6%
Total	**8,500**	**787**	**7,713**	**4,124**	**53.5%**	**458**	**4,582**	**59.4%**

Data Weighting

Because landowners were sampled using stratification within and across the study areas, we calculated two sets of weights to accurately reflect the actual population proportions (Vaske, 2008). First, we calculated weights within each study area (Cloquet Valley, Fond du Lac, and Nemadji) to reflect: 1) the population proportions of landowners in each study area who owned: (a) 10 to 40 acres; and (b) > 40 acres. Next, we calculated weights to correct for both the stratification of owned acres and the difference in the size of the landowner populations across the three study areas to obtain estimates at the overall study level. The weights applied at each level for landowners are summarized in Tables I-2 and I-3.

The general public data were weighted to reflect the population proportions in the four study areas (Carlton County, northern Pine County, southern St. Louis County, and Duluth) as well as to correct for gender and age distribution differences between the study populations in these areas and the sample of respondents. (We used information from the US census database to calculate weights that is available at: https://censusreporter.org/). As with landowners, we calculated two sets of weights. The first set of weights corrected for oversampling of males and older respondents compared to the study populations within each of the four study areas, and the second set of weights corrected for gender and age distributions as well as the population proportion across each study area. The two sets of weights are summarized in Tables I-4 through I-7.

Nonresponse check

We compared responses to the full-length survey (i.e., respondents) to those who responded to a shortened survey (i.e., non-respondents) to gauge nonresponse bias. A shortened one-page, two sided questionnaire was mailed to landowner and local resident non-respondents in June 2018. We did not find a significant difference between respondents to the questionnaire and non-respondents based on age and length of residence in Minnesota. Data were not weighted based on the non-response returns and results.

Table I-2. Weights for landowner estimates within study areas.

	Population of landowners >10 acres			Returned Sample Surveys			Population Proportions within Study Areas		Sample Proportions within Study Areas		Weights for estimates within study areas	
	N	10 to 40 acres	>40 acres	Total Surveys	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres
Landowners	**9284**	**5119**	**4165**	**2,550**	**1197**	**1353**						
Cloquet Valley	3205	1838	1367	841	404	437	0.573	0.427	0.480	0.520	1.194	0.821
Fond du Lac	3271	1808	1463	796	360	436	0.553	0.447	0.452	0.548	1.222	0.816
Nemadji	2808	1473	1335	913	433	480	0.525	0.475	0.475	0.525	1.106	0.904

Table I-3. Weights for landowner estimates across study areas.

	Population of landowners >10 acres			Returned Sample Surveys			Population Proportions across Study Areas		Sample Proportions across Study Areas		Weights for estimates across study areas	
	N	10 to 40 acres	>40 acres	Total Surveys	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres	10 to 40 acres	>40 acres
Landowners	**9284**	**5119**	**4165**	**2,550**	**1197**	**1353**						
Cloquet Valley	3205	1838	1367	841	404	437	0.198	0.147	0.158	0.171	1.250	0.859
Fond du Lac	3271	1808	1463	796	360	436	0.195	0.158	0.141	0.171	1.379	0.922
Nemadji	2808	1473	1335	913	433	480	0.159	0.144	0.170	0.188	0.934	0.764

Table I-4. Weights for general public estimates within and across study areas (Carlton).

Study Areas Carlton	Population	% within strata	% total study area	Sample[1]	% within strata sample	% total study area sample	Weight within strata	Weight total study area
Total Study	N = 140475			n=1480				
Carlton	N = 26586		0.189	n=348		0.235		
Male:	13899	0.523	0.099	221	0.635	0.149		
20 to 29 years	2165	0.081	0.015	9	0.026	0.006	3.149	2.534
30 to 39 years	2528	0.095	0.018	23	0.066	0.016	1.439	1.158
40 to 49 years	2457	0.092	0.017	33	0.095	0.022	0.975	0.784
50 to 59 years	2837	0.107	0.020	54	0.155	0.036	0.688	0.554
60 to 69 years	2296	0.086	0.016	60	0.172	0.041	0.501	0.403
70 to 79 years	956	0.036	0.007	24	0.069	0.016	0.521	0.420
80 years and over	660	0.025	0.005	18	0.052	0.012	0.480	0.386
Female:	12687	0.477	0.090	127	0.365	0.086		
20 to 29 years	1737	0.065	0.012	6	0.017	0.004	3.789	3.050
30 to 39 years	2022	0.076	0.014	15	0.043	0.010	1.764	1.420
40 to 49 years	2079	0.078	0.015	24	0.069	0.016	1.134	0.913
50 to 59 years	2563	0.096	0.018	32	0.092	0.022	1.048	0.844
60 to 69 years	2078	0.078	0.015	26	0.075	0.018	1.046	0.842
70 to 79 years	1178	0.044	0.008	15	0.043	0.010	1.028	0.827
80 years and over	1030	0.039	0.007	9	0.026	0.006	1.498	1.206

[1]Sample sizes represent respondents that provided both gender and age information on their returned surveys.

Table I-5. Weights for general public estimates within and across study areas (Duluth).

Study Areas Duluth	Population	% within strata	% total study area	Sample[1]	% within strata sample	% total study area sample	Weight within strata	Weight total study area
Total Study	N=140475			n=1480				
Duluth	N=82729		0.589	n=337		0.228		
Male:	40936	0.495	0.291	198	0.588	0.134		
20 to 29 years	10941	0.132	0.078	14	0.042	0.009	3.183	8.234
30 to 39 years	6568	0.079	0.047	24	0.071	0.016	1.115	2.883
40 to 49 years	6091	0.074	0.043	24	0.071	0.016	1.034	2.674
50 to 59 years	6940	0.084	0.049	44	0.131	0.030	0.643	1.662
60 to 69 years	5718	0.069	0.041	57	0.169	0.039	0.409	1.057
70 to 79 years	2821	0.034	0.020	23	0.068	0.016	0.500	1.292
80 years and over	1857	0.022	0.013	12	0.036	0.008	0.630	1.630
Female:	41793	0.505	0.298	139	0.412	0.094		
20 to 29 years	9735	0.118	0.069	15	0.045	0.010	2.644	6.838
30 to 39 years	5881	0.071	0.042	13	0.039	0.009	1.843	4.766
40 to 49 years	5961	0.072	0.042	22	0.065	0.015	1.104	2.855
50 to 59 years	7368	0.089	0.052	23	0.068	0.016	1.305	3.375
60 to 69 years	6133	0.074	0.044	29	0.086	0.020	0.861	2.228
70 to 79 years	3494	0.042	0.025	23	0.068	0.016	0.619	1.601
80 years and over	3221	0.039	0.023	14	0.042	0.009	0.937	2.424

[1]Sample sizes represent respondents that provided both gender and age information on their returned surveys.

Table I-6. Weights for general public estimates within and across study areas (Pine).

Study Areas Pine	Population	% within strata	% total study area	Sample[1]	% within strata sample	% total study area sample	Weight within strata	Weight total study area
Total Study	N=140475			n=1480				
Pine	N=13546		0.096	n=373		0.252		
Male:	7458	0.551	0.053	248	0.665	0.168		
20 to 29 years	1018	0.075	0.007	3	0.008	0.002	9.344	3.575
30 to 39 years	1288	0.095	0.009	23	0.062	0.016	1.542	0.590
40 to 49 years	1340	0.099	0.010	29	0.078	0.020	1.272	0.487
50 to 59 years	1601	0.118	0.011	49	0.131	0.033	0.900	0.344
60 to 69 years	1124	0.083	0.008	79	0.212	0.053	0.392	0.150
70 to 79 years	734	0.054	0.005	50	0.134	0.034	0.404	0.155
80 years and over	353	0.026	0.003	15	0.040	0.010	0.648	0.248
Female:	6088	0.449	0.043	125	0.335	0.084		
20 to 29 years	773	0.057	0.006	2	0.005	0.001	10.643	4.072
30 to 39 years	786	0.058	0.006	18	0.048	0.012	1.202	0.460
40 to 49 years	982	0.072	0.007	18	0.048	0.012	1.502	0.575
50 to 59 years	1336	0.099	0.010	28	0.075	0.019	1.314	0.503
60 to 69 years	1117	0.082	0.008	33	0.088	0.022	0.932	0.357
70 to 79 years	779	0.058	0.006	21	0.056	0.014	1.021	0.391
80 years and over	315	0.023	0.002	5	0.013	0.003	1.735	0.664

[1]Sample sizes represent respondents that provided both gender and age information on their returned surveys.

Table I-7. Weights for general public estimates with and across study areas (St. Louis).

Study Areas St. Louis	Population	% within strata	% total study area	Sample[1]	% within strata sample	% total study area sample	Weight within strata	Weight total study area
Total Study	N=140475			n=1480				
St. Louis	N=17614	1.000	0.125	n=422	1.000	0.285		
Male:	9414	0.534	0.067	323	0.765	0.218		
20 to 29 years	962	0.055	0.007	6	0.014	0.004	3.841	1.689
30 to 39 years	1274	0.072	0.009	25	0.059	0.017	1.221	0.537
40 to 49 years	1457	0.083	0.010	34	0.081	0.023	1.027	0.451
50 to 59 years	2368	0.134	0.017	87	0.206	0.059	0.652	0.287
60 to 69 years	2118	0.120	0.015	101	0.239	0.068	0.502	0.221
70 to 79 years	937	0.053	0.007	54	0.128	0.036	0.416	0.183
80 years and over	298	0.017	0.002	16	0.038	0.011	0.446	0.196
Female:	17614	1.000	0.125	422	1.000	0.285		
20 to 29 years	9414	0.534	0.067	323	0.765	0.218		
30 to 39 years	962	0.055	0.007	6	0.014	0.004	3.841	1.689
40 to 49 years	1274	0.072	0.009	25	0.059	0.017	1.221	0.537
50 to 59 years	1457	0.083	0.010	34	0.081	0.023	1.027	0.451
60 to 69 years	2368	0.134	0.017	87	0.206	0.059	0.652	0.287
70 to 79 years	2118	0.120	0.015	101	0.239	0.068	0.502	0.221
80 years and over	937	0.053	0.007	54	0.128	0.036	0.416	0.183

[1]Sample sizes represent respondents that provided both gender and age information on their returned surveys.

Section 1. Understanding Support for Elk Restoration

We wanted to assess landowners' and local residents' level of support for restoration of a wild, free-ranging elk population to the study areas in northeastern Minnesota. In addition, we wanted to understand the specific attitudes and beliefs about the outcomes of restoring an elk population, and how these attitudes and beliefs are related to support for elk restoration. Primarily, we used an approach well-developed within social psychological research for understanding attitudes and their influence on behavior as outlined by Fishbein and Ajzen (2010) that has been used to study other wildlife management issues (Schroeder et al. 2016, Fulton et al. 2004, Whittaker et al. 2001).

Support for Elk Restoration

To assess support for elk restoration, we asked landowners and local residents how likely are unlikely they are to support restoring wild, free-ranging elk to the study areas or in Minnesota in general. A 7-point scale ranging from "very unlikely" (1) to "very likely" (7) was used to determine support for restoring elk. A majority of landowners (78%) and local residents (78%) indicated that they would likely support restoring wild, free-ranging elk to Minnesota in general (Table 1-1). Support for restoring elk to Minnesota varied significantly between strata for landowners ($F = 4.89$, $p < .01$) but not for local residents ($F = 2.12$, *n.s.*). A large majority of landowners and local residents were supportive within each stratum, with landowner support lowest in Fond du Lac (75%) and highest in Cloquet Valley (80%). Among local residents support was highest in Duluth (80%) and lowest in Carlton County (72%).

Table 1-1. Support for restoring wildlife, free-ranging elk to Minnesota in general.

	n	Very Unlikely						Very Likely	Mean[2]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,491**	**6.1%**	**2.7%**	**2.6%**	**10.7%**	**12.3%**	**25.0%**	**40.7%**	**5.6**	
Cloquet Valley	824	6.3%	1.6%	2.5%	9.8%	12.5%	24.2%	43.1%	5.6	F = 4.89**
Fond du Lac	770	6.0%	4.2%	2.9%	12.5%	12.5%	26.3%	35.8%	5.4	η^2 = .004
Nemadji	897	5.9%	2.3%	2.2%	9.6%	11.9%	24.4%	43.6%	5.7	
Local Residents	**1,546**	**4.5%**	**2.4%**	**1.9%**	**13.3%**	**15.3%**	**27.8%**	**34.8%**	**5.6**	
Carlton	363	6.3%	4.1%	1.9%	15.4%	16.0%	21.5%	34.7%	5.3	
Duluth	354	3.1%	2.0%	2.0%	13.0%	15.5%	30.2%	34.2%	5.6	F = 2.12 n.s.
Pine	388	4.9%	2.8%	1.5%	14.1%	12.6%	28.2%	35.9%	5.6	
St Louis	442	6.5%	2.0%	1.8%	10.8%	14.9%	25.5%	38.4%	5.6	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Similarly, over three-quarters of landowners (80%) and local residents (81%) would likely support restoring wild, free-ranging elk to the study areas in northeastern Minnesota (Table 1-2). Support for restoring elk to the study areas in northeastern Minnesota varied significantly between strata for landowners ($F = 8.51$, $p < .001$) and local residents ($F = 3.55$, $p < .05$) although a large majority (>70%) of landowners and local residents were supportive within each stratum. On average, landowners within the Fond du Lac strata (75%) and local residents within Carlton County (75%) and Pine County (78%) were only slightly less likely to support restoring elk to the study areas in northeastern Minnesota than other respondents (>80%).

Table 1-2. Support for restoring wild, free-ranging elk to the study areas in Minnesota.

	n	Very Unlikely						Very Likely	Mean[2]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,472**	**6.6%**	**2.9%**	**2.4%**	**8.7%**	**12.0%**	**24.6%**	**42.9%**	**5.6**	
Cloquet Valley	815	6.3%	1.7%	2.5%	7.4%	12.4%	24.4%	45.5%	5.7	F = 8.51 ***
Fond du Lac	763	7.6%	4.1%	2.2%	11.3%	12.2%	25.8%	36.9%	5.4	η^2 = .007
Nemadji	894	5.9%	2.9%	2.5%	7.3%	11.4%	23.4%	46.6%	5.7	
Local Residents	**1,531**	**4.7%**	**2.2%**	**2.3%**	**10.1%**	**15.3%**	**28.4%**	**37.0%**	**5.6**	
Carlton	358	7.0%	3.1%	3.4%	11.5%	17.9%	21.3%	35.9%	5.4	
Duluth	350	3.1%	2.0%	2.3%	10.3%	16.0%	30.0%	36.3%	5.7	F = 3.55*
Pine	382	4.7%	3.1%	1.0%	12.9%	11.5%	27.6%	39.1%	5.6	η^2 = .007
St Louis	441	7.0%	1.1%	1.4%	7.9%	9.8%	31.3%	41.5%	5.7	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely
F compares strata within study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Landowners were also asked whether they would be unlikely or likely to support restoring wild, free-ranging elk on their own property or within five miles of their own property. A majority of landowners indicated that they would likely support restoring elk within five miles of their property (76%) (Table 1-3) or on their property (70%) (Table 1-4). Support for restoring elk within five miles of ($F = 7.51$, $p < .001$) or on their own property ($F = 6.27$, $p < .01$) varied significantly between strata, although a majority of respondents were supportive within each stratum. On average, landowners within the Fond du Lac strata were less likely to support restoring elk on the respondents' property or within five miles than landowners in the other two study areas, but even in the Fond du Lac study area 73% supported restoring elk within 5 miles of their property and 67% supported restoring elk on their property.

Table 1-3. Support for restoring wild, free-ranging elk within five miles of respondents' property.

	n	Very Unlikely						Very Likely	Mean[2]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,472**	**9.0%**	**2.8%**	**2.7%**	**9.3%**	**10.3%**	**23.1%**	**42.8%**	**5.5**	
Cloquet Valley	816	8.2%	2.3%	2.8%	9.2%	10.3%	22.2%	45.0%	5.5	F = 7.51 ***
Fond du Lac	766	10.4%	3.5%	2.6%	10.7%	11.6%	24.4%	36.7%	5.3	η^2 = .006
Nemadji	890	8.4%	2.4%	2.7%	7.6%	8.8%	22.7%	47.5%	5.6	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 1-4. Support for restoring wild, free-ranging elk on respondents' property.

	n	Very Unlikely						Very Likely	Mean[2]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,474**	**11.7%**	**3.3%**	**3.2%**	**11.8%**	**8.5%**	**20.6%**	**40.8%**	**5.3**	
Cloquet Valley	817	10.4%	3.4%	2.7%	12.4%	9.1%	19.6%	42.3%	5.3	F = 6.27 **
Fond du Lac	764	13.5%	3.5%	4.1%	12.4%	9.8%	21.0%	35.7%	5.1	η^2 = .005
Nemadji	893	11.1%	2.9%	2.9%	10.5%	6.4%	21.3%	44.9%	5.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Attitudes toward Elk Restoration in Study Areas of Northeastern Minnesota

Following standard procedures that are well-developed and tested within social psychological research (Fishbein & Ajzen 2010), we assessed respondents' attitudes toward supporting elk restoration in the study areas of northeast Minnesota using four questions. First, respondents were asked to describe their feelings about potentially restoring wild, free-ranging elk within the study areas in northeastern Minnesota (Table 1-5). Responses were measured on a 7-point scale ranging from "very unfavorable" (1) to "very favorable" (7). Three-quarters of landowners (76%) and 8 out of 10 local residents (81%) had favorable attitudes toward potentially restoring elk. Among landowners, attitudes about restoring wild, free-ranging elk varied significantly between strata ($F = 4.05$, $p < .05$) although a majority of responses were favorable for each stratum. Among local residents, attitudes about restoring wild, free-ranging elk varied significantly between strata ($F = 4.49$, $p < .01$) although a majority of responses were favorable for each stratum.

Table 1-5. Feelings about potentially restoring wild, free-ranging elk within the study areas in Minnesota.

	n	Very Unfavorable	Moderately Unfavorable	Slightly Unfavorable	Neutral	Slightly Favorable	Moderately Favorable	Very Favorable	Mean[1]	ANOVA
Landowners	**2,506**	**8.8%**	**3.4%**	**2.3%**	**9.7%**	**6.6%**	**17.4%**	**51.6%**	**5.6**	
Cloquet Valley	828	8.6%	1.9%	2.2%	8.7%	6.5%	18.1%	54.0%	5.7	F = 4.05 *
Fond du Lac	774	8.8%	5.0%	2.6%	11.1%	7.4%	18.1%	47.1%	5.4	η^2 = .003
Nemadji	904	9.3%	3.2%	2.3%	9.3%	5.9%	16.0%	54.0%	5.6	
Local Residents	**1,558**	**5.4%**	**1.7%**	**1.5%**	**10.1%**	**5.6%**	**24.5%**	**51.1%**	**5.9**	
Carlton	365	9.0%	2.2%	2.5%	11.2%	5.8%	21.1%	48.2%	5.6	
Duluth	354	3.1%	0.8%	0.6%	11.0%	5.6%	27.7%	51.1%	6.0	F = 4.49 **
Pine	392	7.4%	2.0%	5.1%	10.9%	3.8%	21.6%	49.1%	5.6	η^2 = .010
St Louis	447	8.3%	3.8%	0.9%	5.1%	5.8%	20.6%	55.5%	5.8	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very unfavorable, 2 = moderately unfavorable, 3 = slightly unfavorable, 4 = neutral, 5 = slightly favorable, 6 = moderately favorable, 7 = very favorable

F compares strata within each study area.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

In addition, we asked, landowners and local residents whether supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is negative/positive, harmful/beneficial, or bad/good. A 7-point scale from "very negative" (1) to "very positive" (7) was used for beliefs about supporting an elk restoration. On average, landowners ($\bar{x}$ = 5.6) and local residents ($\bar{x}$ = 5.9) believed supporting the restoration of an elk population is positive (Table 1-6). Over 70% of landowners (71%) and local residents (74%) believed that supporting an elk restoration would be positive. Landowners' belief that supporting an elk restoration would be negative or positive varied significantly between strata (F = 8.35, $p < .001$), but 65% of landowners or more were felt it would be positive in each study area. Local residents' beliefs that supporting an elk restoration would be negative or positive also varied significantly between strata (F = 5.12, $p < .001$), but 70% or more felt elk restoration would be positive in each area.

Table 1-6. Evaluation of supporting the restoration of a wild, free-ranging elk population in study areas in Minnesota as negative or positive.

	n	Very negative	Quite negative	Slightly negative	Neither	Slightly positive	Quite positive	Very positive	Mean[2]	ANOVA
Landowners	**2,454**	**5.0%**	**2.7%**	**5.0%**	**16.0%**	**12.0%**	**23.0%**	**36.4%**	**5.4**	
Cloquet Valley	815	4.4%	2.3%	3.6%	15.5%	12.4%	23.4%	38.4%	5.5	F = 8.35 ***
Fond du Lac	761	5.5%	3.7%	6.7%	17.7%	13.4%	20.2%	32.8%	5.2	η^2 = .007
Nemadji	878	5.0%	1.9%	4.9%	14.7%	9.9%	25.5%	38.1%	5.5	
Local Residents	**1,525**	**2.7%**	**1.2%**	**3.9%**	**18.7%**	**11.8%**	**29.2%**	**32.6%**	**5.5**	
Carlton	363	5.2%	1.4%	6.3%	19.8%	11.5%	27.7%	28.0%	5.3	
Duluth	351	1.4%	0.9%	3.1%	19.1%	10.8%	30.2%	34.5%	5.7	F = 5.12 ***
Pine	389	4.1%	2.1%	6.2%	16.5%	15.5%	26.0%	29.6%	5.3	η^2 = .012
St Louis	422	4.3%	1.2%	1.7%	15.7%	15.0%	28.5%	33.7%	5.6	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very negative, 2 = quite negative, 3 = slightly negative, 4 = neutral, 5 = slightly positive, 6 = quite positive, 7 = very positive

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

We also asked respondents if they believed supporting elk restoration would be harmful or beneficial using a 7-point scale from "very harmful" (1) to "very beneficial" (7). On average, landowners ($\bar{x}$ = 5.1) and local residents ($\bar{x}$ = 5.3) believed supporting the restoration of an elk population is beneficial (Table 1-7). Over 60% of landowners (63%) and 66% of local residents believed that supporting elk restoration would be beneficial. Landowners' belief that supporting an elk population would be harmful or beneficial varied significantly between strata (F = 8.55, $p < .001$), with 57% of Fond du Lac landowners believing restoration would be beneficial and 64% or more of landowners in both Cloquet Valley and Nemadji believing elk restoration would be beneficial. Less than 20% of landowners in all three study areas believed it would be harmful. Local residents' belief that supporting an elk restoration would be harmful or beneficial also varied significantly between strata (F = 6.59, $p < .001$), with Duluth residents (68%) most likely to see restoration as beneficial and Carlton residents (58%) least likely.

Table 1-7. Evaluation of supporting restoration of a wild, free-ranging elk population in study areas in Minnesota as harmful or beneficial.

	n	Very harmful	Quite harmful	Slightly harmful	Neither	Slightly beneficial	Quite beneficial	Very beneficial	Mean[2]	ANOVA
Landowners	**2,432**	**5.4%**	**3.6%**	**6.7%**	**21.9%**	**13.3%**	**19.1%**	**30.1%**	**5.1**	
Cloquet Valley	807	5.4%	2.8%	5.6%	19.7%	13.7%	19.8%	33.0%	5.2	F = 8.55 ***
Fond du Lac	752	5.9%	5.1%	7.2%	24.7%	13.8%	18.1%	25.3%	4.9	η^2 = .007
Nemadji	873	4.8%	2.7%	7.4%	21.1%	12.3%	19.5%	32.2%	5.2	
Local Residents	**1,522**	**2.9%**	**2.2%**	**4.6%**	**24.6%**	**14.8%**	**23.8%**	**27.0%**	**5.3**	
Carlton	359	6.2%	3.9%	5.9%	26.3%	16.0%	18.8%	23.0%	4.9	
Duluth	348	2.0%	1.2%	4.7%	23.8%	17.2%	22.1%	29.1%	5.4	F = 8.31***
Pine	387	6.5%	2.4%	8.4%	24.9%	13.9%	17.8%	26.2%	5.4	η^2 = .013
St Louis	428	4.0%	1.6%	4.7%	24.4%	15.2%	21.5%	28.6%	5.2	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very harmful, 2 = quite harmful, 3 = slightly harmful, 4 = neutral, 5 = slightly beneficial, 6 = quite beneficial, 7 = very beneficial

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Finally, we had respondents report with they believed elk restoration was bad or good, using a 7-point scale from "very bad" (1) to "very good" (7). On average, landowners ($\bar{x}$ = 5.3) and local residents ($\bar{x}$ = 5.4) believed supporting the restoration of an elk population is good (Table 1-8). Over 65% of landowners (66%) and local residents (68%) believed that supporting an elk population would be good. Landowners' beliefs that supporting an elk population would be bad or good varied significantly between strata (F = 9.98, $p < .001$), with a lower percentage of Fond du Lac landowners (62%) than Cloquet Valley (65%) or Nemadji (69%) landowners responding that restoration would be good. Local residents' beliefs that supporting an elk restoration would be bad or good also varied significantly between strata (F = 6.05, $p < .01$), with a larger percentage of Duluth (71%) and southern St. Louis County (68%) residents responding that restoration would be good compared to residents in Carlton (62%) or northern Pine (61%) counties.

Table 1-8. Evaluation of supporting restoration of a wild, free-ranging elk population in study areas in Minnesota as bad or good.[1]

	n	Very bad	Quite bad	Slightly bad	Neither	Slightly good	Quite good	Very good	Mean[2]	ANOVA
Landowners	**2,430**	**5.7%**	**3.2%**	**4.2%**	**20.6%**	**10.3%**	**20.5%**	**35.4%**	**5.3**	
Cloquet Valley	805	5.6%	2.6%	2.7%	21.1%	9.7%	20.0%	38.3%	5.4	F = 9.98 ***
Fond du Lac	753	6.5%	4.1%	6.0%	21.5%	13.1%	18.1%	30.7%	5.1	η^2 = .008
Nemadji	872	5.0%	2.8%	4.0%	19.0%	7.7%	24.0%	37.5%	5.4	
Local Residents	**1,519**	**3.2%**	**1.6%**	**3.3%**	**24.0%**	**9.8%**	**26.2%**	**31.8%**	**5.4**	
Carlton	358	5.9%	3.6%	4.8%	24.1%	10.1%	24.6%	26.9%	5.1	
Duluth	346	2.0%	0.6%	2.9%	23.6%	9.5%	27.9%	33.6%	5.6	F = 6.05***
Pine	387	4.1%	2.1%	5.9%	26.6%	11.4%	20.9%	28.9%	5.2	η^2 = .010
St Louis	428	5.4%	2.6%	0.9%	23.2%	10.1%	25.5%	32.3%	5.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very bad, 2 = quite bad, 3 = slightly bad, 4 = neutral, 5 = slightly good, 6 = quite good, 7 = very good

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

We assessed whether the four items together formed a reliable scale for assessing attitudes toward elk restoration in the study areas and found that the three items summarized in Tables 1-6, 1-7. and 1-8 formed a more reliable scale for both landowners (Cronbach's $\alpha = 0.95$) and local residents (Cronbach's $\alpha = 0.94$) (Table 1-9) than a scale with all four items (Cronbach's $\alpha = 0.90$). For this reason, we created a scale consisting of mean score for each respondent on these three items to measure attitudes toward elk restoration in the study areas for subsequent analyses (Fishbein & Ajzen 2010).

Table 1-9. Reliability assessment of evaluative statements to measure attitudes toward supporting restoration of elk in study areas in Minnesota.[1,2]

	Corrected Item-total Correlation	Cronbach's Alpha	Cronbach's Alpha if Item Deleted	Mean
Landowners		.947		5.3
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is negative or positive?	.860		.944	
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is harmful or beneficial?	.889		.922	
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is bad or good?	.918		.899	
Local Residents		.940		5.4
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is negative or positive?	.833		.944	
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is harmful or beneficial?	.885		.904	
Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is bad or good?	.909		.886	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = very negative/harmful/bad, 2 = quite negative/harmful/bad, 3 = slightly negative/harmful/bad, 4 = neutral, 5 = slightly positive/beneficial/good, 6 = quite positive/beneficial/good, 7 = very positive/beneficial/good

Beliefs about Outcomes from Restoring an Elk Population

Landowners and local residents were presented with a series of 14 potential outcomes from restoring a wild, free-ranging elk population within the study areas in Minnesota and asked the likelihood of each outcome (Table 1-10). We used a 7-point scale from "very unlikely" (1) to "very likely" (7) to assess their beliefs about the likelihood of outcomes. Respondents believed that the most likely outcomes from restoring an elk population were: (1) provide opportunities to view elk, (2) restore a native wildlife species, and (3) provide opportunities to hunt elk. Respondents believed that the least likely outcomes from restoring an elk population were: (1) negatively impact other wildlife populations, (2) increase risk of disease transmission to livestock and wildlife, and (3) increase damage to trees and forest vegetation. Beliefs about the likelihood of each potential outcome were similar for landowners and local residents except increasing economic opportunities through elk-related tourism ($t = -5.06$, $p < .001$), increasing damage to agriculture and personal property ($t = 2.27$, $p < .05$), and increase damage to trees and forest vegetation ($t = 2.35$, $p < .05$).

Table 1-10. Beliefs about the likelihood of potential outcomes from restoring a wild, free-ranging elk population within the study areas in Minnesota.

	Group	N	Mean[1]
Increase youth involvement and interest in outdoors	Landowners	2,493	4.8
	Local Residents	1,550	4.9
Restore a native wildlife species	Landowners	2,491	5.5
	Local Residents	1,553	5.8
Increase economic opportunities through elk-related tourism	Landowners	2,486	4.8
	Local Residents	1,542	5.2
Provide opportunities to hunt elk	Landowners	2,479	5.2
	Local Residents	1,549	5.3
Increase damage to agriculture and personal property	Landowners	2,484	4.3
	Local Residents	1,549	4.0
Shift management focus from other wildlife species such as deer and moose	Landowners	2,486	4.1
	Local Residents	1,552	4.0
Conflict between elk and deer	Landowners	2,477	4.0
	Local Residents	1,552	3.9
Conflict between elk and moose	Landowners	2,484	3.8
	Local Residents	1,554	3.8
Negatively impact other wildlife populations	Landowners	2,485	3.5
	Local Residents	1,547	3.4
Increase conflict among people due to elk	Landowners	2,490	3.8
	Local Residents	1,551	3.5
Increase damage to trees and forest vegetation	Landowners	2,486	3.8
	Local Residents	1,554	3.7
Increase risk of disease transmission to livestock and wildlife	Landowners	2,488	3.7
	Local Residents	1,548	3.7
Increase cost to taxpayers	Landowners	2,487	4.2
	Local Residents	1,551	4.2
Provide opportunities to view elk	Landowners	2,492	5.5
	Local Residents	1,553	5.6

[1]All results reflect weighted values correcting for stratification, gender, and age.
Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7= very likely

Evaluation of Outcomes of Restoring an Elk Population

Landowners and local residents were presented with the same series of 14 possible outcomes from restoring a wild, free-ranging elk population within the study areas in Minnesota and asked how bad or good each outcome would be (Table 1-11). A 7-point scale from "very bad" (1) to "very good" (7) was used to evaluate potential outcomes from potentially restoring an elk population. Respondents evaluated five potential outcomes as good and the other nine to be bad, though each potentially bad outcome was, on average, considered to be only slightly bad. Respondents' believed that the best potential outcomes from restoring an elk population were: (1) restoring a native wildlife species, (2) increasing youth involvement and interest in the outdoors, and (3) providing opportunities to view elk. Respondents' believed that the worst potential outcomes were: (1) increasing risk of disease transmission to livestock and wildlife, (2) increasing costs to taxpayers, and (3) increasing damage to trees and forest vegetation. The evaluation of each potential outcome was similar for landowners and local residents except increasing economic opportunities through elk-related tourism ($t = -3.35$, $p < .001$) and providing opportunities to view elk ($t = -5.23$, $p < .001$).

Table 1-11. Evaluation of potential outcomes from restoring a wild, free-ranging elk population within the study areas in Minnesota as good or bad.

	Group	N	Mean[1]
Increase youth involvement and interest in outdoors	Landowners	2,462	5.5
	Local Residents	1,527	5.7
Restore a native wildlife species	Landowners	2,454	5.7
	Local Residents	1,524	5.9
Increase economic opportunities through elk-related tourism	Landowners	2,437	5.1
	Local Residents	1,519	5.5
Provide opportunities to hunt elk	Landowners	2,444	5.3
	Local Residents	1,507	5.3
Increase damage to agriculture and personal property	Landowners	2,439	3.6
	Local Residents	1,495	3.4
Shift management focus from other wildlife species such as deer and moose	Landowners	2,440	3.7
	Local Residents	1,504	3.8
Conflict between elk and deer	Landowners	2,442	3.7
	Local Residents	1,514	3.7
Conflict between elk and moose	Landowners	2,443	3.7
	Local Residents	1,514	3.6
Negatively impact other wildlife populations	Landowners	2,421	3.7
	Local Residents	1,508	3.5
Increase conflict among people due to elk	Landowners	2,429	3.6
	Local Residents	1,516	3.7
Increase damage to trees and forest vegetation	Landowners	2,439	3.6
	Local Residents	1,516	3.5
Increase risk of disease transmission to livestock and wildlife	Landowners	2,443	3.5
	Local Residents	1,517	3.3
Increase cost to taxpayers	Landowners	2,435	3.6
	Local Residents	1,515	3.5
Provide opportunities to view elk	Landowners	2,440	5.4
	Local Residents	1,511	5.7

[1]All results reflect weighted values correcting for stratification, gender, and age.
Mean based on scale: 1 = very bad, 2 = quite bad, 3 = slightly bad, 4 = neutral, 5 = slightly good, 6 = quite good, 7 = very good

Normative Beliefs about Other People/Groups Support for Restoring an Elk Population

Respondents were asked whether they believe people who are important to them believe that they should or should not support restoring a wild, free-ranging elk population within the study areas in Minnesota (Table 1-12). We used a 7-point scale ranging from "very much should not" (1) to "very much should" (7) to assess whether respondents' believe most people important to them believe they should support elk restoration in the study areas of northeastern Minnesota. Such beliefs are referred to as normative beliefs (Fishbein & Ajzen 2010). Over 70% of landowners (74%) and local residents (73%) indicated that most people important to them would believe that the respondent should support restoring an elk population. Landowners' responses varied significantly among strata ($F = 5.51$, $p < .01$) with Fond du Lac landowners (71%) perceiving the least support among people important to the respondent for restoring an elk population. Local residents' responses did not significantly vary among strata.

Table 1-12. At what level would most people important to the respondent think that they should or should not support restoring a wild, free-ranging within the study areas in Minnesota.

	n	Very much should not	Moderately should not	Slightly should not	Neither	Slightly should	Moderately should	Very much should	Mean[2]	ANOVA
Landowners	**2,472**	**5.0%**	**3.6%**	**2.4%**	**15.1%**	**11.9%**	**29.4%**	**32.5%**	**5.4**	
Cloquet Valley	819	4.4%	3.5%	2.0%	13.9%	11.2%	31.3%	33.7%	5.5	$F = 5.51$ **
Fond du Lac	772	5.4%	3.8%	2.3%	17.9%	13.9%	29.4%	27.2%	5.3	$\eta^2 = .004$
Nemadji	881	5.1%	3.4%	3.1%	13.3%	10.4%	27.2%	37.5%	5.5	
Local Residents	**1,546**	**2.6%**	**1.4%**	**1.8%**	**21.1%**	**14.0%**	**33.1%**	**26.1%**	**5.5**	
Carlton	365	3.8%	4.4%	2.7%	19.0%	17.3%	27.7%	25.0%	5.2	
Duluth	352	1.1%	0.6%	1.1%	23.3%	13.6%	35.2%	25.0%	5.5	$F = 2.34$ n.s.
Pine	390	3.8%	2.1%	2.3%	19.2%	9.5%	37.2%	25.9%	5.4	
St Louis	439	5.9%	1.1%	1.8%	16.4%	15.0%	28.2%	31.6%	5.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very much should not, 2 = moderately should not, 3 = slightly should not, 4 = neither, 5 = slightly should, 6 = moderately should, 7 = very much should

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Respondents also were asked whether they would be motivated to do what people who are important to them think that they should do regarding supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota (Table 1-13). A 7-point scale from "strongly disagree" (1) to "strongly agree" (7) was used to determine respondents' motivation to comply with the beliefs held by individuals important to the respondent. A majority of landowners (51%) agreed that they wanted to do what people important to them want the respondent to do regarding supporting the restoration of an elk population within the study areas in Minnesota, but only about 4 out of 10 (42%) local residents agreed with this statement. Landowners' and local residents' motivation to comply with the beliefs of people important to the respondent did not vary significantly between strata.

Table 1-13. Whether respondent wants to do what people important to them think they should do regarding supporting the restoration of wild, free-ranging elk population within the study areas in Minnesota.[1]

	n	Strongly disagree	Moderately disagree	Slightly disagree	Neither	Slightly agree	Moderately agree	Strongly agree	Mean[1]	ANOVA
Landowners	**2,438**	**8.5%**	**5.3%**	**3.4%**	**31.4%**	**13.5%**	**19.8%**	**18.0%**	**4.7**	
Cloquet Valley	811	8.8%	4.2%	3.7%	31.7%	13.7%	19.4%	18.6%	4.7	F = 0.38 n.s.
Fond du Lac	758	8.7%	5.6%	3.7%	31.2%	13.9%	20.8%	16.1%	4.6	
Nemadji	869	8.2%	6.3%	2.8%	31.2%	12.9%	19.2%	19.4%	4.7	
Local Residents	**1,525**	**9.0%**	**5.6%**	**4.5%**	**39.0%**	**13.1%**	**16.6%**	**12.2%**	**4.4**	
Carlton	361	10.8%	4.7%	5.0%	36.1%	13.6%	17.5%	12.2%	4.4	
Duluth	348	8.0%	6.0%	3.7%	41.4%	11.8%	16.7%	12.4%	4.4	F = 0.21 n.s.
Pine	384	9.6%	3.6%	9.6%	34.3%	13.8%	17.4%	11.7%	4.4	
St Louis	432	9.0%	6.7%	1.9%	37.3%	16.7%	16.2%	12.3%	4.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither, 5 = slightly agree, 6 = moderately agree, 7 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Respondents were presented with 12 categories of people/groups and were asked the likelihood that the people or group think the respondent should support restoring a wild, free-ranging elk population within the study areas in Minnesota (Table 1-14). Landowners and local residents believed that most hunters they know, local hunting organizations, and the MNDNR were most likely to believe that the respondent should support restoring an elk population with the study areas in Minnesota. Local farmers, livestock producers, and local agricultural groups were thought to be least likely to think that the respondent should support restoring an elk population. Respondents were also asked about the likelihood that they would do what the people or groups want them to do concerning supporting the restoration of an elk population within the study areas in Minnesota (Table 1-15). Respondents were most likely to do what their family, friends, and other hunters want concerning supporting the restoration of an elk population. Respondents

were least likely to do what local agricultural groups, the local timber industry, and local farmers and livestock producers want concerning supporting the restoration of an elk population.

Table 1-14. Likelihood that people/groups think respondent should support restoring a wild, free-ranging elk population within the study areas in Minnesota.

	Group	n	Mean[1]
Most of their family and friends	Landowners	2,460	5.3
	Local Residents	1,524	5.2
Most hunters they know	Landowners	2,460	5.4
	Local Residents	1,525	5.5
Most local hunting organizations	Landowners	2,444	5.3
	Local Residents	1,516	5.4
Most local government officials	Landowners	2,441	4.6
	Local Residents	1,520	4.5
Most local landowners	Landowners	2,451	4.5
	Local Residents	1,524	4.2
Minnesota DNR	Landowners	2,445	5.3
	Local Residents	1,520	5.4
Local farmers & livestock producers	Landowners	2,446	3.6
	Local Residents	1,525	3.7
Most local residents	Landowners	2,455	4.6
	Local Residents	1,520	4.7
Most of their neighbors	Landowners	2,452	4.8
	Local Residents	1,521	4.8
Local conservation/environmental organizations	Landowners	2,443	5.2
	Local Residents	1,515	5.3
Local timber industry	Landowners	2,447	4.3
	Local Residents	1,516	4.1
Local agricultural groups	Landowners	2,453	3.7
	Local Residents	1,523	3.8

[1]All results reflect weighted values correcting for stratification, gender, and age.
Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 1-15. Likelihood of landowner doing what people/groups want them to do concerning supporting an elk population in northwest Minnesota.

	Group	n	Mean[1]
Most of their family and friends	Landowners	2,384	4.6
	Local Residents	1,509	4.5
Most hunters they know	Landowners	2,387	4.5
	Local Residents	1,504	4.2
Most local hunting organizations	Landowners	2,373	4.3
	Local Residents	1,505	4.0
Most local government officials	Landowners	2,377	3.8
	Local Residents	1,503	3.6
Most local landowners	Landowners	2,375	4.1
	Local Residents	1,497	3.8
Minnesota DNR	Landowners	2,376	4.4
	Local Residents	1,499	4.3
Local farmers & livestock producers	Landowners	2,376	3.7
	Local Residents	1,499	3.7
Most local residents	Landowners	2,382	4.1
	Local Residents	1,502	3.9
Most of their neighbors	Landowners	2,372	4.2
	Local Residents	1,506	4.0
Local conservation/environmental organizations	Landowners	2,384	4.2
	Local Residents	1,504	4.2
Local timber industry	Landowners	2,379	3.7
	Local Residents	1,502	3.4
Local agricultural groups	Landowners	2,383	3.6
	Local Residents	1,500	3.5

[1]All results reflect weighted values correcting for stratification, gender, and age.
Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Relationship among Support for, Attitudes toward, Beliefs about the Outcomes of, and Normative Beliefs of Restoring an Elk Population

Based on results of regression analysis, attitudes toward and normative beliefs about restoration of a wild, free-ranging elk populations in the study areas are both strong predictors of actual support of elk restoration for both landowners ($R^2 = 0.63$; attitude $\beta = 0.36$, $p < 0.001$; normative beliefs $\beta = 0.47$, $p < 0.001$)) and local residents ($R^2 = 0.52$; attitude $\beta = 0.43$, $p < 0.001$; normative beliefs $\beta = 0.36$, $p < 0.001$) (Table 1-16). Following well-established research approaches on attitudes and beliefs (Fishbein & Ajzen 2010), we wanted to identify which beliefs about the outcomes of supporting elk restoration were most related to attitudes. To do so, we regressed attitudes toward supporting elk restoration onto the set of 14 beliefs about outcomes of supporting elk restoration for landowners (Table 1-17) and local residents (Table 1-18) separately.

Table 1-16. Regression of support for restoration of a wild, free-ranging within the study areas in Minnesota on attitudes and normative beliefs.

	B	SE	β	t	p	R^2
Landowners						0.63
(Constant)	2.429	.100		24.321	.000	
Attitude toward supporting elk restoration in study areas	.382	.022	.362	17.566	.000	
Normative beliefs about whether most others think respondent should support elk restoration in study areas	.498	.022	.474	22.960	.000	
Local Residents						0.52
(Constant)	2.822	.130		21.719	.000	
Attitude toward supporting elk restoration in study areas	.468	.027	.430	17.454	.000	
Normative beliefs about whether most others think respondent should support elk restoration in study areas	.396	.027	.356	14.433	.000	

[1]All results reflect weighted values correcting for stratification, gender, and age.

Results indicate that for landowners' beliefs that restoration of elk would lead to restoring a native species, increase economic opportunities through elk-related tourism, increasing youth involvement and interest in the outdoors, providing elk hunting opportunities, and elk viewing opportunities were all strong positive predictors of positive attitudes toward elk restoration (Table 1-17). Conversely, beliefs that restoration of elk would negatively impact other wildlife, increase costs to taxpayers, increase risk of disease transmission to livestock and wildlife, and lead to conflict between deer and elk were negatively related to holding positive attitudes toward elk restoration.

Table 1-17. Regression of attitudes on beliefs about outcomes of supporting restoration of a wild, free-ranging within the study areas in Minnesota—Landowners.

	B	SE	β	T	p	Zero-order
(Constant)	.311	.039		7.864	.000	
Restore a native wildlife species	.367	.024	.352	15.419	.000	.716
Increase economic opportunities through elk-related tourism	.088	.021	.094	4.112	.000	.630
Increase youth involvement and interest in outdoors	.116	.021	.119	5.621	.000	.629
Provide opportunities to hunt elk	.063	.019	.066	3.341	.001	.576
Provide opportunities to view elk	.079	.02	.069	3.879	.000	.532
Increase damage to agriculture and personal property	-.032	.018	-.032	-1.762	.078	-.393
Increase conflict among people due to elk	-.004	.018	-.004	-0.194	.846	-.395
Conflict between elk and moose	.011	.023	.01	0.465	.642	-.400
Shift management focus from other wildlife species such as deer and moose	-.049	.019	-.047	-2.64	.008	-.403
Increase damage to trees and forest vegetation	-.031	.021	-.031	-1.499	.134	-.438
Conflict between elk and deer	-.039	.025	-.037	-1.54	.124	-.453
Increase risk of disease transmission to livestock and wildlife	-.062	.022	-.057	-2.839	.005	-.472
Increase cost to taxpayers	-.025	.018	-.025	-1.397	.163	-.492
Negatively impact other wildlife populations	-.086	.024	-.081	-3.654	.000	-.501

[1]All results reflect weighted values correcting for stratification, gender, and age. $R^2 = 0.60$

For local residents there was a similar pattern of results except that provide opportunities to hunt elk and increasing youth involvement and interest in the outdoors were not as strongly related to positive attitudes (Table 1-18).

Table 1-18. Regression of attitudes on beliefs about outcomes of supporting restoration of a wild, free-ranging within the study areas in Minnesota—Local Residents.

	B	SE	β	t	p	Zero-order
(Constant)	.163	.051		3.216	.001	
Restore a native wildlife species	.453	.03	.41	15.34	.000	.659
Increase economic opportunities through elk-related tourism	.116	.028	.115	4.177	.000	.536
Provide opportunities to view elk	.139	.025	.126	5.635	.000	.471
Increase youth involvement and interest in outdoors	.005	.023	.005	0.231	.817	.447
Provide opportunities to hunt elk	.000	.023	0	0.017	.987	.411
Shift management focus from other wildlife species such as deer and moose	-.023	.022	-.023	-1.058	.290	-.263
Conflict between elk and moose	.063	.033	.063	1.904	.057	-.303
Conflict between elk and deer	-.035	.034	-.035	-1.037	.300	-.354
Increase conflict among people due to elk	-.001	.022	-.001	-0.032	.974	-.354
Increase damage to agriculture and personal property	-.046	.024	-.048	-1.925	.054	-.379
Increase cost to taxpayers	-.052	.022	-.055	-2.352	.019	-.382
Increase damage to trees and forest vegetation	-.097	.026	-.099	-3.659	.000	-.402
Increase risk of disease transmission to livestock and wildlife	-.116	.028	-.112	-4.127	.000	-.435
Negatively impact other wildlife populations	-.029	.03	-.028	-0.955	.340	-.436

[1]All results reflect weighted values correcting for stratification, gender, and age. $R^2 = 0.53$

Among both landowners and local residents, beliefs that most of their family and friends, most of their neighbors, most hunters they know, and most local residents and landowners level of support for elk restoration was strongly correlated to normative beliefs that most people they know think they should support elk restoration (Table 1-19 and Table 1-20).

Table 1-19. Regression of normative beliefs on beliefs about whether others think respondents should support restoration of a wild, free-ranging within the study areas in Minnesota—Landowners.

	B	SE	β	T	p	Zero-order
(Constant)	.833	.088		9.473	.000	
Most of my family and friends	.536	.022	.553	24.433	.000	.818
Most hunters I know	.215	.028	.212	7.565	.000	.743
Most of my neighbors	.041	.027	.039	1.532	.126	.688
Most local residents	.062	.027	.054	2.279	.023	.650
Most local landowners	.059	.024	.054	2.500	.012	.648
Most local hunting organizations	-.056	.025	-.051	-2.201	.028	.629
Local conservation/environmental organizations	.071	.019	.061	3.697	.000	.510
Local farmers & livestock producers	.020	.022	.018	.905	.365	.477
Local timber industry	-.032	.022	-.026	-1.467	.142	.464
Minnesota DNR	-.004	.019	-.003	-.206	.837	.446
Most local government officials	-.041	.020	-.032	-2.029	.043	.427
Local agricultural groups	.022	.023	.019	.969	.333	.405

[1]All results reflect weighted values correcting for stratification, gender, and age. $R^2 = 0.69$

Table 1-20. Regression of normative beliefs on beliefs about whether others think respondents should support restoration of a wild, free-ranging within the study areas in Minnesota—Local Residents.

	B	SE	β	T	p	Zero-order
(Constant)	1.326	.131		10.098	.000	
Most of my family and friends	.409	.026	.445	15.514	.000	.698
Most of my neighbors	.067	.035	.068	1.929	.054	.607
Most hunters I know	.161	.039	.167	4.180	.000	.585
Most local residents	.107	.035	.100	3.029	.002	.565
Most local hunting organizations	.018	.037	.019	.491	.623	.522
Most local landowners	.017	.030	.017	.559	.576	.481
Minnesota DNR	-.007	.026	-.006	-.256	.798	.364
Local conservation/environmental organizations	.027	.023	.028	1.174	.241	.350
Local timber industry	.029	.029	.026	.977	.329	.343
Local farmers & livestock producers	-.009	.031	-.009	-.299	.765	.330
Local agricultural groups	.064	.033	.061	1.973	.049	.319
Most local government officials	-.065	.027	-.057	-2.401	.016	.302

[1]All results reflect weighted values correcting for stratification, gender, and age. $R^2 = 0.54$

Importance of Management Decisions

Landowners and local residents were asked how important or unimportant decisions regarding the potential restoration of wild, free-ranging elk with the study areas in Minnesota were to the respondent personally (Table 1-21). A 7-point scale ranging from "very unimportant" (1) to "very important" (7) was used to measure the importance of the decisions concerning elk restoration. Management decisions regarding potentially restoring elk were important for landowners and local residents across all strata. Over 70% of landowners (75%) and local residents (74%) indicated that decisions regarding the potential restoration of wild, free-ranging elk were important to them. There was no significant difference in the importance of management decisions between strata for landowners and local residents.

Table 1-21. Importance of decisions regarding the potential restoration of wild, free-ranging elk within the study areas in Minnesota.

	n	Very Unimportant						Very Important	Mean[2]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,507**	**4.3%**	**2.9%**	**2.1%**	**15.4%**	**18.7%**	**27.9%**	**28.7%**	**5.2**	
Cloquet Valley	826	4.6%	2.2%	2.4%	15.3%	19.1%	27.2%	29.2%	5.4	F = 2.91 n.s.
Fond du Lac	776	4.9%	3.3%	1.8%	16.2%	19.6%	28.3%	25.9%	5.3	
Nemadji	905	3.2%	3.3%	2.2%	14.5%	17.4%	28.0%	31.3%	5.5	
Local Residents	**1,560**	**2.9%**	**3.0%**	**2.9%**	**17.0%**	**28.0%**	**26.5%**	**19.8%**	**5.3**	
Carlton	368	2.7%	3.8%	3.0%	18.0%	28.9%	22.9%	20.7%	5.2	F = 2.70 n.s.
Duluth	356	2.8%	2.2%	3.7%	17.1%	30.3%	26.7%	17.1%	5.2	
Pine	391	2.3%	2.6%	1.8%	22.0%	21.5%	22.8%	27.1%	5.3	
St Louis	445	3.6%	4.0%	1.6%	11.0%	21.6%	34.4%	23.8%	5.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = very unimportant, 2 = moderately unimportant, 3 = slightly unimportant, 4 = neither, 5 = slightly important, 6 = moderately important, 7 = very important
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Affective reactions toward Elk Restoration

Landowners and local residents were asked whether they feel worried, interested, and/or supportive when thinking about potentially restoring wild, free-ranging elk within the study areas in Minnesota. An 11-point scale from "none" (0) to "a lot" (10) was used to determine the occurrence of each feeling. On average, landowners ($\bar{x}$ = 2.2) and local residents ($\bar{x}$ = 2.2) indicated that they felt low levels of worry when thinking about potentially restoring elk (Table 1-22). About half of landowners (49%) and 4 out of 10 local residents (42%) indicated that they did not feel worried (none) about potentially restoring elk within the study areas. Landowners' feelings of worry varied significantly between strata (F = 7.17, p < .001) with Fond du Lac landowners expressing the highest level of worry ($\bar{x}$ = 2.6). Local residents' feelings of worry also varied significantly between strata (F = 7.07, p < .001) with Carlton ($\bar{x}$ = 2.7) and Pine County ($\bar{x}$ = 2.8) residents expressing the highest level of worry. However, less than 10% of landowners or local residents expressed more than moderate levels (>7) of worry.

Table 1-22. When thinking about potentially restoring wild, free-ranging elk within study areas in Minnesota, how much does the respondent feel worried?

	n	None					Moderate					A lot	Mean	ANOVA
		0	1	2	3	4	5	6	7	8	9	10		
Landowners	**2,404**	**48.7%**	**9.2%**	**8.9%**	**5.4%**	**3.6%**	**10.6%**	**2.6%**	**2.4%**	**2.7%**	**1.2%**	**4.8%**	**2.2**	
Cloquet Valley	793	52.7%	9.1%	7.6%	5.4%	2.6%	11.2%	1.9%	2.0%	2.4%	0.8%	4.3%	2.0	F = 7.17 *** η^2 = .006
Fond du Lac	748	44.6%	8.0%	9.8%	5.1%	5.1%	10.3%	3.6%	3.2%	3.1%	1.7%	5.5%	2.6	
Nemadji	862	49.0%	10.7%	9.3%	5.8%	3.1%	10.0%	2.2%	1.7%	2.6%	0.9%	4.8%	2.1	
Local Residents	**1,503**	**41.5%**	**12.6%**	**11.6%**	**8.2%**	**4.8%**	**10.0%**	**2.1%**	**2.8%**	**2.2%**	**0.6%**	**3.6%**	**2.2**	
Carlton	357	37.5%	11.5%	7.6%	9.6%	5.1%	13.0%	2.5%	3.7%	3.1%	1.1%	5.4%	2.7	F = 7.07*** η^2 = .014
Duluth	347	43.5%	13.8%	14.1%	7.5%	5.2%	7.8%	1.4%	1.7%	1.7%	0.0%	3.2%	1.9	
Pine	377	36.8%	11.6%	6.9%	5.8%	4.5%	16.9%	4.8%	4.2%	2.9%	1.9%	3.7%	2.8	
St Louis	423	41.0%	10.1%	9.9%	10.8%	2.8%	9.9%	3.3%	5.2%	1.9%	0.2%	4.7%	2.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

On average, landowners ($\bar{x}$ = 7.4) and local residents ($\bar{x}$ = 7.2) expressed moderate to high levels of interest when thinking about potentially restoring wild, free-ranging elk (Table 1-23). Over 30% of landowners (37.1%) and 30% of local residents (29.6%) indicated a lot of interest about potentially restoring elk within the study areas. Landowners' interest varied significantly between strata (F = 9.27, p < .001) with Nemadji landowners expressing the highest level of interest ($\bar{x}$ = 7.7). Local residents' interest also varied significantly between strata (F = 7.48, p < .001) with St. Louis County residents expressing the most interest ($\bar{x}$ = 7.8).

Table 1-23. When thinking about potentially restoring wild, free-ranging elk within study areas in Minnesota, how much does the respondent feel interested?

	n	None				Moderate						A lot	Mean	ANOVA
		0	1	2	3	4	5	6	7	8	9	10		
Landowners	**2,434**	**5.7%**	**1.3%**	**1.8%**	**1.9%**	**2.3%**	**13.2%**	**5.8%**	**7.8%**	**13.3%**	**9.6%**	**37.1%**	**7.4**	
Cloquet Valley	804	5.0%	1.2%	2.1%	1.4%	2.4%	13.3%	5.6%	7.1%	12.7%	11.3%	37.9%	7.5	F = 9.27 ***
Fond du Lac	756	7.3%	1.7%	1.3%	2.9%	2.4%	14.0%	6.5%	8.9%	14.6%	7.9%	32.5%	7.1	η^2 = .008
Nemadji	874	4.7%	0.8%	2.1%	1.4%	2.1%	12.3%	5.3%	7.6%	12.5%	9.7%	41.7%	7.7	
Local Residents	**1,514**	**4.7%**	**2.0%**	**3.2%**	**1.8%**	**2.7%**	**12.2%**	**7.7%**	**11.0%**	**14.0%**	**11.1%**	**29.6%**	**7.2**	
Carlton	354	5.1%	1.4%	1.7%	1.7%	3.7%	15.9%	9.6%	10.2%	13.3%	10.2%	27.2%	7.0	
Duluth	350	4.9%	2.9%	4.3%	1.7%	3.4%	10.9%	7.2%	11.5%	13.5%	11.5%	28.4%	7.0	F = 7.48 ***
Pine	382	3.7%	0.8%	1.3%	2.4%	1.0%	14.7%	6.3%	9.2%	17.0%	9.7%	34.0%	7.5	η^2 = .012
St Louis	428	4.0%	0.9%	0.7%	1.2%	1.2%	8.6%	8.8%	12.6%	13.5%	12.3%	36.3%	7.8	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

On average, landowners ($\bar{x}$ = 7.3) and local residents ($\bar{x}$ = 7.3) expressed moderate to high levels of support when thinking about potentially restoring wild, free-ranging elk (Table 1-24). Over 30% of landowners (38%) and local residents (32%) indicated a lot of support for potentially restoring elk with the study areas. Landowners' support varied significantly between strata (F = 7.48, $p < .001$) with Fond du Lac landowners' expressing the least support ($\bar{x}$ = 6.9) and Nemadji landowners the most support ($\bar{x}$ = 7.5). Local residents' support also varied significantly between strata (F = 2.89, $p < .05$) with St. Louis County residents expressing the most support ($\bar{x}$ = 7.5) and Carlton County residents the least support ($\bar{x}$ = 7.5).

Table 1-24. When thinking about potentially restoring wild, free-ranging elk within study areas in Minnesota, how much does the respondent feel supportive?

	N	None				Moderate						A lot	Mean	ANOVA
		0	1	2	3	4	5	6	7	8	9	10		
Landowners	**2,477**	**7.4%**	**2.0%**	**2.0%**	**2.2%**	**2.8%**	**11.7%**	**4.8%**	**6.6%**	**12.1%**	**10.3%**	**38.2%**	**7.3**	
Cloquet Valley	822	6.8%	1.7%	2.2%	1.5%	2.3%	12.3%	4.1%	6.7%	11.5%	11.5%	39.4%	7.4	F = 7.48 ***
Fond du Lac	762	8.3%	2.9%	2.2%	3.1%	3.3%	11.5%	6.4%	7.6%	11.4%	8.4%	34.9%	6.9	η^2 = .006
Nemadji	893	6.9%	1.3%	1.5%	2.0%	2.8%	11.2%	3.8%	5.4%	13.4%	11.2%	40.5%	7.5	
Local Residents	**1,524**	**5.4%**	**2.0%**	**2.6%**	**2.4%**	**1.7%**	**11.1%**	**7.4%**	**10.1%**	**14.4%**	**10.7%**	**32.3%**	**7.3**	
Carlton	358	7.8%	3.1%	2.8%	1.7%	2.0%	12.9%	5.3%	11.8%	12.3%	9.8%	30.5%	6.9	
Duluth	349	4.3%	2.0%	2.9%	2.9%	1.7%	10.0%	8.6%	10.0%	14.3%	11.1%	32.3%	7.3	F = 2.89*
Pine	385	6.0%	2.1%	1.8%	2.3%	1.3%	14.5%	4.2%	6.0%	20.5%	7.8%	33.5%	7.3	η^2 = .009
St Louis	432	5.6%	1.4%	1.2%	1.6%	1.9%	9.5%	8.6%	10.0%	12.7%	12.0%	35.6%	7.5	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Hunter/Non-Hunter

We examined whether hunters and non-hunters differed in their support for restoring wild, free-ranging elk to the study areas in Minnesota. Respondents were determined to be hunters if they had participated in deer hunting and/or other hunting or trapping activities in the last 12 months. Hunters were significantly more supportive of restoring elk to the study areas in Minnesota than non-hunters among both landowners ($F = 11.97$, $p < .001$) and local residents ($F = 7.95$, $p < .01$) (Table 1-25). A slightly larger proportion of landowners (82% vs 75%) and local residents (80% vs 75%) who hunted were more supportive of restoring an elk population to the study areas than non-hunting respondents. Support for restoring elk to the study areas was not significantly different between strata for landowners ($F = 2.27$, $p = .10$; Cloquet Valley: 83%, Fond du Lac: 79%, Nemadji: 82%) or local residents ($F = 2.37$, $p = .07$; Carlton: 75%, Duluth: 86%, Pine: 78%, St. Louis: 83%) that hunted and local residents that do not hunt ($F = 1.93$, $p = .12$; Carlton: 70%, Duluth: 76%, Pine: 73%, St. Louis: 79%), although support was significantly different between strata for non-hunting landowners ($F = 7.61$, $p < .001$) with Fond du Lac landowners least likely to support restoring elk to the study areas (Cloquet Valley: 78%, Fond du Lac: 67%, Nemadji: 79%).

Table 1-25. Hunter/non-hunter support for restoring wild, free-ranging elk to the study areas in Minnesota.

	n	Strongly Oppose						Strongly Support	Mean[1]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,472**	**6.7%**	**3.0%**	**2.5%**	**8.5%**	**11.9%**	**24.4%**	**43.0%**	**5.6**	F = 11.97 *** η^2 = .005
Hunter	1,679	6.5%	3.1%	2.4%	6.5%	10.8%	25.0%	45.7%	5.7	
Non-hunter	793	7.1%	2.6%	2.8%	12.7%	14.2%	23.1%	37.5%	5.4	
Local Residents	**1,558**	**2.9%**	**3.0%**	**2.9%**	**17.0%**	**28.0%**	**26.5%**	**19.8%**	**5.3**	F = 7.95 ** η^2 = .005
Hunter	665	7.4%	3.0%	1.7%	8.1%	9.9%	26.0%	43.9%	5.6	
Non-hunter	853	6.3%	3.2%	2.6%	13.1%	16.5%	25.1%	33.2%	5.4	

[1] Mean based on scale: 1 = strongly oppose, 2 = moderately oppose, 3 = slightly oppose, 4 = neutral, 5 = slightly support, 6 = moderately support, 7 = strongly support

F compares strata within study area.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Farmer/Non-Farmer

We examined whether farmers and non-farmers differed in their support for restoring wild, free-ranging elk to the study areas in Minnesota. Respondents were determined to be farmers if they indicated that a portion of their household income was derived from agricultural activities. Analysis was limited to landowners since questions related to agriculture activities were excluded from the local resident questionnaire. Non-farmers were significantly more supportive of restoring elk to the study areas in Minnesota than farmers (Table 1-26). Non-farmers were significantly more supportive than farmers ($F = 27.86$, $p < .001$) with 73% of farmers and 82% of non-farmers supporting the restoration of an elk population to the study areas. Support for restoring elk to the study areas was not significantly different between strata for farmers ($F = 1.46$, $p = .23$; Cloquet Valley: 79%, Fond du Lac: 70%, Nemadji: 71%), though support was significantly different between strata for non-farmers ($F = 9.52$, $p < .001$) with Fond du Lac landowners least likely to support restoring elk to the study areas (Cloquet Valley: 84%, Fond du Lac: 77%, Nemadji: 85%).

Table 1-26. Support for restoring wild, free-ranging elk to the study areas in Minnesota based on farming income.

	N	Strongly Oppose 1	2	3	4	5	6	Strongly Support 7	Mean[1]	ANOVA
Landowners	**2,472**	**6.7%**	**3.0%**	**2.5%**	**8.5%**	**11.9%**	**24.4%**	**43.0%**	**5.6**	F = 27.86 *** η^2 = .012
Farmers	406	11.1%	5.9%	2.5%	7.9%	10.8%	22.7%	39.2%	5.3	
Non-farmers	1,924	4.9%	2.3%	2.5%	8.2%	12.0%	25.4%	44.8%	5.8	

[1] Mean based on scale: 1 = strongly oppose, 2 = moderately oppose, 3 = slightly oppose, 4 = neutral, 5 = slightly support, 6 = moderately support, 7 = strongly support

F compares strata within study area.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Timber producer/Non-Producer

We examined whether timber producers and non-producers differed in their support for restoring wild, free-ranging elk to the study areas in Minnesota. Respondents were determined to be timber producers if they indicated that they used a portion of their land for timber production during the last 5 years. Analysis was limited to landowners since questions related to land use activities were excluded from the local resident questionnaire. Non-producers were significantly more supportive of restoring wild, free-ranging elk to the study areas in Minnesota than timber producers ($F = 16.97$, $p < .001$) with 81% of non-producers and 76% of timber producers supporting the restoration of an elk population to the study areas (Table 1-27). Support for restoring elk to the study areas was not significantly different between strata for timber producers ($F = 2.14$, $p = .12$; Cloquet Valley: 81.8%, Fond du Lac: 73.0%, Nemadji: 72.2%), though support was significantly different between strata for non-producers ($F = 10.69$, $p < .001$) with Fond du Lac landowners least likely to support restoring elk to the study areas (Cloquet Valley: 81.4%, Fond du Lac: 74.9%, Nemadji: 84.7%).

Table 1-27. Timber producers/non-producers support for restoring wild, free-ranging elk to study areas in Minnesota.

	n	Strongly Oppose						Strongly Support	Mean[1]	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,472**	**6.7%**	**3.0%**	**2.5%**	**8.5%**	**11.9%**	**24.4%**	**43.0%**	**5.6**	F = 16.97 *** η^2 = .007
Producers	597	10.6%	4.5%	3.0%	6.4%	11.1%	25.3%	39.2%	5.4	
Non-producers	1,875	5.4%	2.5%	2.4%	9.2%	12.2%	24.1%	44.3%	5.7	

[1] Mean based on scale: 1 = strongly oppose, 2 = moderately oppose, 3 = slightly oppose, 4 = neutral, 5 = slightly support, 6 = moderately support, 7 = strongly support

F compares strata within study area.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 2. Importance of Issues Related to Elk Restoration

Measuring landowners and local residents preferences for management objectives allows managers to understand stakeholder desires for potentially restoring elk to study areas in Minnesota and improve implementation of tools, such as education (Cohen, 2003). We used a Best-Worst Scaling (BWS), or Maximum Difference (MaxDiff), approach to determine preferences regarding the most important and least important objectives to stakeholders. Respondents were presented with eight scenarios that included 5 objectives to consider related to elk restoration. Objectives for each scenario were randomly selected from a list of ten objectives based on suggestions from local stakeholders during focus groups and local natural resources professionals. Best-Worst Scaling tasks were created using Sawtooth software and the program was used to analyze results (Version 9.5.3, www.sawtoothsoftware.com, accessed 23 June 2018). Respondents were asked to identify the objective that they consider most important and least important within each objective set. Respondents were randomly assigned one of three versions of the survey that had different sets of random objectives, which allowed for more precise estimates and reduce context and order effects (Sawtooth Software Inc, 2013). Our analysis assigns a weight to each objective and rank to identify the objectives considered most/least important by stakeholders. Weights indicate the importance of each objective to the respondent with larger weights indicating the objective was more important to respondents. Weights were on a 0 to 100 scale with the total weight of all objectives equaling 100 and allowing comparison between objectives (i.e., an objective with a weight of 10 would be twice as important to a respondent as an objective with a weight of 5).

Based on the results of the BWS analysis, landowners and local residents ranked management objectives similarly (Table 2-1). The most important management objectives for landowners were: (1) minimizing impacts to existing wildlife populations (e.g., disease, resource competition), (2) restoration of a native species, and (3) minimizing impacts to deer populations and deer hunting. The least important management objectives for landowners were: (8) minimizing costs of government elk management actions, (9) providing elk viewing opportunities, and (10) maximizing economic opportunities through elk-related tourism and recreation. The most important management objectives for local residents were: (1) minimizing impacts to existing wildlife populations (e.g., disease, resource competition), (2) restoration of a native species, and (3) maximizing sustainable elk population size. The least important management objectives for local residents were: (8) providing elk hunting opportunities, (9) maximizing economic opportunities through elk-related tourism and recreation, and (10) providing elk viewing opportunities.

Table 2-1. Landowner and Local Resident Perception of Management Objective Importance Related to Restoring a Wild, Free-Ranging Elk Population to the Study Areas in Minnesota.

Objective	Landowners		Local Residents	
	Rank	Weight (95% CI)	Rank	Weight (95% CI)
Minimize costs of government elk management actions	8	7.4 (7.1, 7.7)	6	8.5 (8.0, 8.9)
Minimize damage to agriculture and personal property (e.g., fences, vehicles)	4	11.9 (11.5, 12.3)	4	11.5 (11.0, 12.0)
Minimize damage to trees and forest vegetation	7	7.7 (7.4, 8.0)	7	7.2 (6.9, 7.6)
Provide elk hunting opportunities	6	9.4 (8.9, 9.8)	8	6.5 (6.1, 7.0)
Provide elk viewing opportunities	9	3.6 (3.3, 3.9)	10	4.8 (4.4, 5.2)
Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	1	17.4 (17.1, 17.7)	1	17.5 (17.1, 18.0)
Maximum sustainable elk population size	5	11.6 (11.2, 12.0)	3	12.2 (11.7, 12.8)
Maximize economic opportunities through elk-related tourism and recreation	10	3.3 (3.1, 3.6)	9	5.3 (5.0, 5.7)
Restoration of a native species	2	14.0 (13.6, 14.5)	2	16.8 (16.2, 17.4)
Minimize impacts to deer populations and deer hunting	3	13.6 (13.3, 14.0)	5	9.6 (9.1, 10.0)

Section 3. Benefits and Risks of Restoring Elk

Risks

We were interested in understanding landowners' and local residents' perceptions of the potential risks and benefits from restoring wild, free-ranging elk within the study areas in Minnesota. Landowners and local residents were asked the severity of potential risks from restoring elk within the study areas (Table 3-1). A 7-point scale from "no risk" (1) to "extreme risk" (7) was used to determine perceptions of potential risks from restoring elk. On average, landowners ($\bar{x}$ = 3.7) and local residents ($\bar{x}$ = 3.6) perceived that there would potentially be moderate risk from restoring elk within the study areas. Perceptions of potential risks from restoring elk to the study areas varied significantly between strata for landowners (F = 10.22, $p < .001$) and local residents (F = 6.27, $p < .001$).

Table 3-1. Potential risks from restoring wild, free-ranging elk within the study areas in Minnesota.

	n	No Risk		Moderate Risk			Extreme Risk		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,388**	**9.6%**	**17.7%**	**17.0%**	**26.4%**	**16.2%**	**7.9%**	**5.1%**	**3.7**	
Cloquet Valley	785	11.2%	21.2%	17.4%	24.4%	15.0%	7.4%	3.6%	3.5	F = 10.22 ***
Fond du Lac	747	7.1%	15.5%	16.2%	28.8%	17.9%	8.4%	6.0%	3.9	η^2 = .009
Nemadji	856	11.0%	16.3%	17.5%	26.1%	15.4%	7.9%	5.7%	3.7	
Local Residents	**1,497**	**8.9%**	**16.1%**	**21.5%**	**28.8%**	**15.3%**	**6.6%**	**2.8%**	**3.6**	
Carlton	351	8.8%	10.3%	20.2%	30.2%	18.8%	6.6%	5.1%	3.8	
Duluth	338	9.7%	17.1%	22.7%	28.9%	13.6%	6.5%	1.5%	3.4	F = 6.27 ***
Pine	378	6.1%	15.3%	15.6%	27.8%	23.5%	7.9%	3.7%	3.9	η^2 = .011
St Louis	430	6.5%	20.2%	20.4%	29.7%	15.1%	3.2%	4.9%	3.6	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Landowners and local residents were asked how much threat having elk within the study areas would pose to: (1) respondents' own economic well-being (agriculture, personal property); (2) respondents' own health/safety (vehicle collisions, etc.); (3) the economic well-being of individuals in the local community (agriculture, personal property); (4) the health/safety of individuals in the local community (vehicle collisions, etc.); (5) other wildlife in area (disease, etc.); and (6) trees and forest vegetation. A 7-point scale from "no threat" (1) to "extreme threat" (7) was used to determine perceptions of threats from having elk within the study areas. On average, landowners ($\bar{x}$ = 2.2) and local residents ($\bar{x}$ = 2.2) perceived that having elk within the study areas would pose little threat to the respondents' own economic well-being (agriculture, personal property) (Table 3-2). Perceived threat from having elk within the study areas to the respondents' own economic well-being (agriculture, personal property) varied significantly between strata for landowners (F = 6.62, $p < .001$), and between strata for local residents (F = 4.49, $p <$ .01). On average, landowners ($\bar{x}$ = 2.8) and local residents ($\bar{x}$ = 3.0) perceived that having elk within the study area would pose little to moderate threat to the respondents' own health/safety (vehicle collisions, etc.) (Table 3-3). Perceived threat from having elk within the study areas to the respondents' own health/safety (vehicle collisions, etc.) varied significantly between strata for landowners (F = 7.67, $p <$ .001) and local residents (F = 7.97, $p < .001$).

Table 3-2. If elk were restored within the study areas, perceived threat from elk posed to… Own economic well-being (agriculture, personal property)?

	n	No Threat			Moderate Threat			Extreme Threat	Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,400**	**46.6%**	**21.5%**	**11.1%**	**12.3%**	**3.2%**	**2.5%**	**2.8%**	**2.2**	
Cloquet Valley	791	48.9%	20.8%	12.4%	11.1%	2.8%	2.1%	1.9%	2.1	F = 6.62 *** η^2 = .006
Fond du Lac	754	40.5%	23.4%	11.8%	15.0%	3.1%	2.8%	3.5%	2.4	
Nemadji	855	51.2%	20.0%	8.7%	10.4%	3.9%	2.7%	3.2%	2.2	
Local Residents	**1,510**	**43.8%**	**24.7%**	**13.7%**	**9.9%**	**4.0%**	**1.7%**	**2.0%**	**2.2**	
Carlton	357	42.4%	20.2%	11.8%	13.2%	7.3%	1.4%	3.7%	2.3	F = 4.49 ** η^2 = .005
Duluth	343	46.4%	26.4%	13.9%	7.0%	3.2%	2.0%	1.2%	2.1	
Pine	370	40.8%	22.9%	14.4%	13.9%	3.2%	2.1%	2.7%	2.3	
St Louis	425	37.3%	25.6%	14.2%	14.7%	3.3%	1.6%	3.3%	2.2	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-3. If elk were restored within the study areas, perceived threat from elk posed to… Own health/safety (vehicle collisions, etc.)?

	n	No Threat		Moderate Threat			Extreme Threat		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,403**	**24.5%**	**28.5%**	**16.1%**	**17.5%**	**5.5%**	**4.0%**	**4.0%**	**2.8**	
Cloquet Valley	793	24.2%	29.1%	16.6%	18.5%	4.2%	3.8%	3.8%	2.8	F = 7.67 ***
Fond du Lac	756	21.6%	26.3%	17.2%	18.4%	7.8%	4.2%	4.5%	3.0	η^2 = .007
Nemadji	854	28.3%	30.3%	14.0%	15.3%	4.3%	3.9%	3.9%	2.6	
Local Residents	**1,509**	**15.5%**	**30.8%**	**16.5%**	**21.8%**	**8.4%**	**3.6%**	**3.3%**	**3.0**	
Carlton	358	14.0%	24.9%	15.4%	24.0%	10.1%	4.7%	7.0%	3.2	
Duluth	341	16.9%	34.3%	17.2%	21.5%	5.8%	2.6%	1.7%	2.8	F = 7.97 ***
Pine	370	13.9%	24.8%	16.3%	22.9%	12.3%	6.4%	3.5%	3.1	η^2 = .011
St Louis	427	16.0%	28.5%	13.9%	20.0%	13.9%	4.6%	3.0%	3.0	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

On average, landowners ($\bar{x}$ = 2.7) and local residents ($\bar{x}$ = 2.8) perceived that having elk within the study area would pose little to moderate threat to the economic well-being of individuals in the local community (agriculture, personal property) (Table 3-4). Perceived threat from having elk within the study areas to the economic well-being of other individuals in the local community (agriculture, personal property) varied significantly between strata for landowners (F = 10.65, $p < .001$) and local residents (F = 6.49, $p < .001$). On average, landowners ($\bar{x}$ = 3.0) and local residents ($\bar{x}$ = 3.2) perceived that having elk within the study areas would pose moderate threat to the health/safety of other individuals in the local community (vehicle collisions, etc.) (Table 3-5). Perceived threat from having elk within the study areas to the health/safety of individuals in the local community (vehicle collisions, etc.) varied significantly between strata for landowners (F = 6.21, $p < .01$), and local residents (F = 5.47, $p = .001$). Overall, landowners and local residents perceived that elk would pose the greatest threat to the health/safety of other individuals in the local community (vehicle collisions, etc.) and the least threat to the respondents' own economic well-being (agriculture, personal property).

Table 3-4. If elk were restored within the study areas, perceived threat from elk posed to… The economic well-being of individuals in the local community (agriculture, personal property)?

	n	No Threat		Moderate Threat			Extreme Threat		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,385**	**22.9%**	**31.6%**	**17.6%**	**16.7%**	**5.3%**	**3.1%**	**2.7%**	**2.7**	
Cloquet Valley	785	26.3%	33.5%	16.8%	14.8%	5.1%	1.9%	1.6%	2.5	F = 10.65 ***
Fond du Lac	749	20.6%	29.3%	17.9%	20.1%	4.8%	4.0%	3.3%	2.9	η^2 = .009
Nemadji	851	21.9%	32.1%	18.2%	15.1%	6.1%	3.3%	3.3%	2.7	
Local Residents	**1,488**	**19.3%**	**29.6%**	**19.8%**	**20.1%**	**7.3%**	**1.8%**	**2.0%**	**2.8**	
Carlton	352	18.2%	23.1%	21.7%	21.1%	10.5%	1.4%	4.0%	3.0	
Duluth	337	21.6%	31.7%	18.0%	19.8%	5.9%	1.8%	1.2%	2.7	F = 6.49 ***
Pine	369	14.7%	27.8%	19.8%	20.1%	11.2%	3.7%	2.7%	3.0	η^2 = .009
St Louis	423	17.1%	29.7%	24.3%	18.9%	5.8%	2.6%	1.6%	2.7	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-5. If elk were restored within the study areas, perceived threat from elk posed to… The health/safety of individuals in the local community (vehicle collisions, etc.)?

	n	No Threat		Moderate Threat			Extreme Threat		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,383**	**16.4%**	**29.7%**	**18.5%**	**19.8%**	**7.5%**	**4.3%**	**3.9%**	**3.0**	
Cloquet Valley	784	17.6%	29.8%	19.5%	18.8%	7.0%	3.6%	3.7%	2.9	F = 6.21 ** η^2 = .005
Fond du Lac	751	13.6%	27.9%	19.2%	20.9%	9.1%	5.3%	4.0%	3.2	
Nemadji	848	18.3%	31.7%	16.6%	19.6%	6.2%	3.8%	3.9%	2.9	
Local Residents	**1,493**	**11.7%**	**26.6%**	**19.4%**	**24.4%**	**9.7%**	**4.5%**	**3.7%**	**3.2**	
Carlton	350	13.4%	23.1%	16.9%	25.7%	7.7%	5.7%	7.4%	3.3	F = 5.47 ***. η^2 = .005
Duluth	340	12.4%	28.2%	20.0%	25.0%	9.1%	2.9%	2.4%	3.1	
Pine	370	8.6%	22.7%	20.1%	20.6%	15.0%	9.4%	3.7%	3.4	
St Louis	425	11.5%	26.9%	19.2%	22.2%	11.9%	5.2%	3.0%	3.2	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

On average, landowners ($\bar{x}$ = 3.0) and local residents ($\bar{x}$ = 3.2) perceived that having elk within the study area would pose moderate threat to other wildlife in the area (disease, etc.) (Table 3-6). Perceived threat from having elk within the study areas to other wildlife in the area (disease, etc.) varied significantly between strata for landowners (F = 5.55, $p < .01$), though perceived threat was not significantly different between strata for local residents (F = .41, $p = .88$). On average, landowners ($\bar{x}$ = 3.0) and local residents ($\bar{x}$ = 3.1) perceived that having elk within the study area would pose moderate threat to trees and forest vegetation (Table 3-7). Perceived threat from having elk within the study areas to trees and forest vegetation varied significantly between strata for landowners (F = 3.89, $p < .05$), but perceived threat was not significantly different between strata for local residents (F = .11, *n.s.*). Overall, landowners and local residents perceived that elk would pose the greatest threat to the health/safety of other individuals in the local community (vehicle collisions, etc.) and the least threat to the respondents' own economic well-being (agriculture, personal property).

Table 3-6. If elk were restored within the study areas, perceived threat from elk posed to… Other wildlife in area (disease, etc.)?

	N	No Threat		Moderate Threat			Extreme Threat		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,385**	**16.2%**	**27.3%**	**20.5%**	**20.7%**	**7.6%**	**3.8%**	**4.1%**	**3.0**	
Cloquet Valley	787	16.6%	28.4%	22.8%	19.3%	6.6%	2.9%	3.3%	2.9	F = 5.55 **
Fond du Lac	750	14.4%	25.0%	20.4%	22.4%	8.4%	4.8%	4.5%	3.2	η^2 = .005
Nemadji	848	17.6%	28.7%	17.8%	20.3%	7.7%	3.5%	4.4%	3.0	
Local Residents	**1,486**	**11.9%**	**27.5%**	**19.0%**	**25.3%**	**9.1%**	**5.1%**	**2.2%**	**3.2**	
Carlton	349	14.2%	23.4%	18.8%	23.4%	12.4%	3.8%	4.0%	3.2	
Duluth	338	11.2%	28.8%	19.1%	25.6%	8.2%	5.9%	1.2%	3.1	F = .41 n.s.
Pine	369	16.3%	25.7%	16.0%	21.4%	10.2%	7.2%	3.2%	3.1	
St Louis	425	9.3%	28.0%	24.1%	25.5%	7.2%	3.3%	2.6%	3.1	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-7. If elk were restored within the study areas, perceived threat from elk posed to… Trees and forest vegetation?

	N	No Threat		Moderate Threat			Extreme Threat		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,397**	**20.2%**	**25.8%**	**19.1%**	**18.9%**	**8.6%**	**4.0%**	**3.5%**	**3.0**	
Cloquet Valley	789	20.1%	26.9%	21.1%	18.3%	7.8%	3.4%	2.4%	2.9	F = 3.89 *
Fond du Lac	755	18.0%	25.3%	18.1%	20.8%	8.6%	5.3%	4.0%	3.1	η^2 = .004
Nemadji	853	22.7%	25.0%	17.9%	17.4%	9.4%	3.4%	4.2%	2.9	
Local Residents	**1,497**	**16.0%**	**23.0%**	**18.9%**	**25.6%**	**9.3%**	**4.4%**	**2.8%**	**3.1**	
Carlton	352	18.9%	22.6%	17.5%	22.3%	11.7%	3.4%	3.4%	3.1	
Duluth	341	15.2%	22.4%	19.8%	27.1%	9.3%	3.8%	2.3%	3.1	F = .11 n.s.
Pine	371	16.0%	24.9%	19.3%	20.6%	8.0%	8.6%	2.7%	3.1	
St Louis	425	15.9%	25.2%	17.2%	25.6%	7.0%	5.4%	3.7%	3.0	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Benefits

Landowners and local residents were asked how great are the potential benefits of restoring wild, free-ranging elk within the study areas in Minnesota (Table 3-8). A 7-point scale from "no benefit" (1) to "extreme benefit" (7) was used to determine perceptions of potential benefits from restoring elk within the study areas. On average, landowners ($\bar{x}$ = 4.8) and local residents ($\bar{x}$ = 5.1) perceived that there would potentially be moderate to high potential benefits from restoring elk within the study areas. Perceptions of potential benefits from restoring elk within the study areas varied significantly between strata for landowners (F = 7.70, $p < .001$) and local residents (F = 9.12, $p < .001$).

Table 3-8. Potential benefits of restoring wild, free-ranging elk within the study areas in Minnesota.

	n	No Benefit			Moderate Benefit			Extreme Benefit	Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,415**	**7.1%**	**5.9%**	**5.9%**	**16.1%**	**22.2%**	**26.0%**	**16.8%**	**4.8**	
Cloquet Valley	796	6.4%	4.5%	5.0%	16.4%	21.8%	26.9%	18.9%	4.9	F = 7.70 ***
Fond du Lac	754	8.5%	7.2%	6.5%	16.8%	22.5%	25.7%	12.8%	4.7	η^2 = .008
Nemadji	865	6.5%	5.9%	6.2%	14.8%	22.4%	25.1%	19.1%	4.9	
Local Residents	**1,512**	**4.1%**	**2.8%**	**5.9%**	**15.3%**	**25.5%**	**32.3%**	**14.0%**	**5.1**	
Carlton	357	7.6%	5.9%	7.3%	15.4%	29.5%	23.6%	10.7%	4.7	
Duluth	344	2.9%	1.4%	6.1%	15.1%	24.6%	35.7%	14.2%	5.2	F = 9.12 ***
Pine	379	3.9%	4.7%	5.0%	16.6%	25.0%	29.2%	15.5%	5.0	η^2 = .011
St Louis	432	4.9%	2.5%	3.5%	15.7%	24.8%	32.9%	15.7%	5.1	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Certainty

Landowners and local residents were asked how certain they were about potential risks and benefits from restoring wild, free-ranging elk within the study areas in Minnesota (Table 3-9). A 7-point scale from "very uncertain" (1) to "very certain" (7) was used to determine respondents' certainty with the potential risks and benefits of restoring elk within the study areas. On average, landowners ($\bar{x}$ = 4.3) and local residents ($\bar{x}$ = 4.0) were neither certain nor uncertain about the potential risks and benefits of restoring elk within the study areas. Level of certainty about the potential risks and benefits from restoring elk within the study areas varied significantly, but not substantively among the strata for landowners (F = 3.82, p < .01) and local residents (F = 5.29, p < .001).

Table 3-9. Certainty about potential risks and benefits of restoring wild, free-ranging elk within the study areas in Minnesota.

	n	Very Uncertain						Very Certain	Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,413**	**6.7%**	**8.8%**	**11.5%**	**28.9%**	**19.1%**	**13.9%**	**11.1%**	**4.3**	
Cloquet Valley	794	7.4%	9.8%	11.4%	31.2%	18.1%	12.9%	9.2%	4.2	F = 3.82 ** η^2 = .004
Fond du Lac	755	5.8%	7.9%	11.9%	26.6%	21.0%	15.7%	11.1%	4.4	
Nemadji	864	6.7%	8.9%	11.1%	28.9%	18.1%	12.8%	13.4%	4.3	
Local Residents	**1,520**	**9.6%**	**10.5%**	**11.1%**	**31.9%**	**18.1%**	**12.7%**	**6.0%**	**4.0**	
Carlton	358	10.9%	10.1%	13.4%	31.6%	15.9%	10.9%	7.3%	3.9	
Duluth	344	9.9%	11.7%	9.6%	31.8%	18.4%	13.7%	5.0%	4.0	F = 5.29 *** η^2 = .012
Pine	375	6.1%	6.1%	11.5%	32.5%	19.7%	14.1%	9.9%	4.4	
St Louis	433	7.9%	8.5%	14.5%	32.8%	18.5%	11.1%	6.7%	4.1	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Personal Control

Landowners and local residents were asked how much personal control the respondent believes they would have to limit risk to themselves if wild, free-ranging elk are restored within the study areas in Minnesota (Table 3-10). A 7-point scale from "no control" (1) to "complete control" (7) was used to determine respondents' perceived personal control to limit risk if elk are restored within the study areas in Minnesota. On average, landowners ($\bar{x}$ = 3.5) and local residents ($\bar{x}$ = 3.9) were perceived that they would have moderate personal control to limit risk to themselves if elk are restored within the study areas in Minnesota. There was no significant difference in perceived personal control to limit risk to the respondent between strata for landowners (F = .01, *n.s.*) and small differences among local residents (F = 3.36, p = .05).

Table 3-10. Perceived personal control to limit risk to respondent if wild, free-ranging elk are restored within the study areas in Minnesota.

	n	No Control		Moderate Control			Complete Control		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,417**	**22.4%**	**14.1%**	**11.4%**	**19.2%**	**11.9%**	**11.5%**	**9.5%**	**3.5**	
Cloquet Valley	799	23.5%	14.0%	9.4%	20.8%	10.6%	11.7%	10.0%	3.5	F = .01 n.s.
Fond du Lac	756	21.5%	13.5%	13.9%	17.7%	14.0%	9.9%	9.5%	3.5	
Nemadji	862	22.2%	14.8%	10.8%	19.1%	11.0%	13.1%	8.9%	3.6	
Local Residents	**1,521**	**16.9%**	**12.1%**	**10.9%**	**19.7%**	**16.1%**	**14.4%**	**9.8%**	**3.9**	
Carlton	357	23.8%	13.7%	11.2%	16.5%	13.7%	10.1%	10.9%	3.6	
Duluth	343	14.3%	11.7%	10.8%	19.0%	18.1%	16.1%	9.9%	4.0	F = 3.36 * η^2 = .005
Pine	375	18.4%	9.1%	13.9%	22.7%	12.5%	15.2%	8.3%	3.8	
St Louis	436	16.7%	14.2%	11.4%	22.9%	14.2%	11.9%	8.7%	3.7	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Landowners were asked how much personal control the respondent believed they would have to: (1) limit elk damage to their agricultural and personal property; (2) limit elk damage to their trees and forest vegetation; (3) limit impact of elk to deer and other wildlife in the study areas; and (4) influence elk management decisions in the study areas. A 7-point scale from "no control" (1) to "complete control" (7) was used to determine respondents' perceived personal control to limit risk if elk are restored within the study areas in Minnesota. Local residents were asked how much personal control the respondents believed they would have to influence elk management decisions in the study areas. On average, landowners perceived that they would have little control to limit elk damage to their own agricultural and personal property ($\bar{x}$ = 2.6) (Table 3-11). Perceived personal control to limit elk damage to respondents' agricultural and personal property was not significantly different between strata for landowners (F = 1.99, *n.s.*). On average, landowners perceived they would have little control to limit elk damage to respondents' trees and forest vegetation ($\bar{x}$ = 2.4) (Table 3-12). Perceived personal control to limit elk damage to

respondents' trees and forest vegetation was significantly different between strata for landowners (F = 3.21, p = .05), but mean differences were quite small. On average, landowners perceived they would have little control to limit impact to deer and other wildlife in the study areas ($\bar{x}$ = 2.1) (Table 3-13). Perceived personal control to limit impact of elk to deer and other wildlife in the study areas was not significantly different between strata for landowners (F = .19, *n.s.*). On average, landowners ($\bar{x}$ = 2.5) and local residents ($\bar{x}$ = 2.4) perceived they would have little control to influence elk management decisions in the study areas (Table 3-14). Perceived personal control to influence elk management decisions in the study areas was not significantly different between strata for landowners (F = 1.42, *n.s.*) and local residents (F = .66, *n.s.*).

Table 3-11. If wild, free-ranging elk are restored within the study areas in Minnesota, how much perceived control does respondent have to… Limit elk damage to own agricultural and personal property?

	n	No Control		Moderate Control			Complete Control		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,407**	**37.3%**	**21.0%**	**9.0%**	**19.1%**	**5.5%**	**4.6%**	**3.5%**	**2.6**	
Cloquet Valley	792	37.1%	21.6%	8.7%	20.4%	4.3%	4.3%	3.6%	2.6	F = 1.99 n.s.
Fond du Lac	757	34.4%	21.4%	10.2%	18.9%	6.7%	4.9%	3.6%	2.7	
Nemadji	858	40.9%	19.8%	8.2%	17.9%	5.4%	4.5%	3.3%	2.5	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-12. If wild, free-ranging elk are restored within the study areas in Minnesota, how much perceived control does respondent have to… Limit elk damage to own trees and forest vegetation?

	n	No Control		Moderate Control			Complete Control		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,408**	**41.4%**	**21.7%**	**11.3%**	**15.7%**	**4.6%**	**3.0%**	**2.3%**	**2.4**	
Cloquet Valley	793	40.2%	22.2%	12.4%	15.8%	3.9%	3.0%	2.4%	2.4	F = 3.21 *
Fond du Lac	758	39.4%	21.5%	11.2%	16.8%	5.4%	3.2%	2.5%	2.4	η^2 = .002
Nemadji	857	45.4%	21.1%	10.0%	14.2%	4.6%	2.7%	2.0%	2.3	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-13. If wild, free-ranging elk are restored within the study areas in Minnesota, how much perceived control does respondent have to… Limit impact of elk to deer and other wildlife in the study areas?

	n	No Control		Moderate Control			Complete Control		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,406**	**47.1%**	**24.2%**	**9.8%**	**12.9%**	**3.5%**	**1.3%**	**1.3%**	**2.1**	
Cloquet Valley	793	46.9%	24.4%	10.2%	12.6%	3.4%	1.5%	1.0%	2.1	F = .19 n.s.
Fond du Lac	755	45.8%	25.5%	9.7%	12.6%	3.8%	1.2%	1.5%	2.1	
Nemadji	858	48.9%	22.4%	9.3%	13.7%	3.0%	1.4%	1.3%	2.1	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 3-14. If wild, free-ranging elk are restored within the study areas in Minnesota, how much perceived control does respondent have to… Influence elk management decisions in study areas?

	n	No Control		Moderate Control			Complete Control		Mean	ANOVA
		1	2	3	4	5	6	7		
Landowners	**2,410**	**33.3%**	**23.7%**	**14.3%**	**19.2%**	**5.0%**	**2.6%**	**2.0%**	**2.5**	
Cloquet Valley	793	30.7%	24.2%	14.5%	20.9%	5.0%	2.5%	2.3%	2.6	F = 1.42 n.s.
Fond du Lac	758	34.0%	23.9%	14.9%	18.1%	4.7%	2.5%	1.8%	2.5	
Nemadji	859	35.3%	22.8%	13.5%	18.9%	5.1%	2.7%	1.7%	2.5	
Local Residents	**1,520**	**39.5%**	**23.7%**	**12.9%**	**14.4%**	**6.3%**	**1.9%**	**1.4%**	**2.4**	
Carlton	356	40.2%	19.7%	16.6%	15.7%	5.3%	0.8%	1.7%	2.4	
Duluth	343	33.4%	27.3%	15.1%	16.0%	6.4%	0.9%	0.9%	2.4	F = .66 n.s.
Pine	376	33.7%	24.1%	16.7%	13.5%	8.8%	1.9%	1.3%	2.5	
St Louis	435	32.9%	30.1%	13.3%	15.2%	4.8%	2.8%	0.9%	2.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 4. Knowledge about Elk in Minnesota

Landowners and local residents were asked three questions to estimate their knowledge of elk in Minnesota. Each question contained a factual statement about elk in Minnesota and respondents were asked whether they knew this information prior to receiving the questionnaire. A scale of 0 to 3 was used based on the number of statements that the respondent knew prior to receiving the questionnaire. On average, landowners ($\bar{x}$ = 1.9) and local residents ($\bar{x}$ = 1.5) had moderate knowledge of elk in Minnesota (Table 4-1). Knowledge about elk was not significantly different between strata for landowners (F = 2.23, *n.s.*), though there was a significant difference between strata for local residents (F = 8.63, $p < .001$), with Duluth residents having less knowledge about elk in Minnesota on average.

We also examined knowledge of elk among hunters and non-hunters (Table 4-2). Respondents were determined to be hunters if they had participated in deer hunting and/or other hunting or trapping activities in the last 12 months. As expected, hunters had significantly more knowledge about elk in Minnesota than non-hunters among landowners (F = 305.70, $p < .001$) and local residents (F = 252.00, $p < .001$). On average, hunters had moderate knowledge of elk in Minnesota (landowners: $\bar{x}$ = 2.2; local residents: $\bar{x}$ = 2.0) and non-hunters had lower knowledge levels (landowners: $\bar{x}$ = 1.3; local residents: $\bar{x}$ = 1.1).

Table 4-1. Prior knowledge of elk in Minnesota.

	n	Question # (% Yes)			Mean[2]	ANOVA
		1	2	3		
Landowners	**2,505**	**70.7%**	**60.7%**	**58.1%**	**1.9**	
Cloquet Valley	825	69.9%	57.6%	56.9%	1.9	$F = 2.23^{n.s.}$ $\eta^2 = .002$
Fond du Lac	777	71.5%	58.4%	58.8%	1.9	
Nemadji	903	70.6%	67.0%	59.0%	2.0	
Local Residents	**1,535**	**60.0%**	**34.0%**	**33.5%**	**1.5**	
Carlton	363	58.5%	42.1%	38.1%	1.5	$F = 8.63^{***}$ $\eta^2 = .017$
Duluth	348	58.6%	27.7%	29.5%	1.3	
Pine	385	62.0%	42.9%	39.3%	1.5	
St Louis	434	67.6%	43.7%	38.5%	1.7	

[1]All results reflect weighted values correcting for stratification, gender, and age.
Question 1: Did you know that wild, free-ranging elk historically lived in most of Minnesota?
Question 2: Did you know that approximately 100 wild, free-ranging elk live in northwest Minnesota?
Question 3: Did you know that wild, free-ranging elk have previously been restored to parts of northwest Minnesota?
[2] Mean based on number of correct responses on three questions: 0 = zero correct, 1 = one correct, 2 = two correct, 3 = three correct
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 4-2. Prior knowledge of elk in Minnesota among hunters and non-hunters.

	n	Question # (% Yes)			Mean[1]	ANOVA
		1	2	3		
Landowners	**2,505**	**70.7%**	**60.7%**	**58.2%**	**1.9**	F = 305.70 *** η^2 = .109
Hunter	1,694	77.2%	73.7%	67.3%	2.2	
Non-Hunter	811	57.4%	37.3%	40.6%	1.3	
Local Residents	**1,530**	**60.0%**	**34.0%**	**33.5%**	**1.5**	F = 252.00 *** η^2 = .142
Hunter	678	77.6%	64.9%	60.4%	2.0	
Non-Hunter	852	54.2%	30.5%	27.3%	1.1	

Question 1: Did you know that wild, free-ranging elk historically lived in most of Minnesota?
Question 2: Did you know that approximately 100 wild, free-ranging elk live in northwest Minnesota?
Question 3: Did you know that wild, free-ranging elk have previously been restored to parts of northwest Minnesota?
[2] Mean based on number of correct responses on three questions: 0 = zero correct, 1 = one correct, 2 = two correct, 3 = three correct
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 5. Importance of Elk in Minnesota

Landowners and local residents were asked three questions to indicate the importance to the respondent of restoring wild, free-ranging elk to the study areas in Minnesota. A 7-point scale from "strongly disagree" (1) to "strongly agree" (7) was used to indicate respondents' agreement with each statement. Respondents were asked whether they agree or disagree with the statement "it is important that Minnesota someday have an abundant elk population within the study areas" (Table 5-1). A majority of landowners (64%) and local residents (69%) agreed that having an abundant elk population within the study areas is important. Responses among landowners ($F = 7.37$, $p < .001$) and local residents ($F = 6.03$, $p < .001$) varied significantly across the study strata with Fond du Lac landowners indicating less importance than landowners in other areas, and Carlton County residents indicating less importance than local residents in other areas.

Respondents were asked whether they agree or disagree with the statement "whether or not I would get to see an elk, it is important to me that they could exist within the study areas" (Table 5-2). A majority of landowners (70%) and local residents (76%) agreed that having elk within the study areas is important to them. Responses among landowners ($F = 6.51$, $p < .01$) and local resident ($F = 8.31$, $p < .001$) varied significantly across the strata, with a slightly smaller percentage (although still more than 67%) of Fond du Lac landowners and Carlton County residents agreeing than other respondents.

Respondents were asked whether they agree or disagree with the statement "it is important to establish elk populations within the study areas so future generations can enjoy them" (Table 5-3). A majority of landowners (73%) and local residents (79%) agreed that establishing an elk population within the study areas for the enjoyment of future generations was important to the respondent. Responses among landowners ($F = 8.18$, $p < .001$) and local residents ($F = 9.39$, $p < .001$) varied significantly between strata, with a smaller percentage of Fond du Lac landowners (69%) agreeing than Cloquet Valley (75%) or Nemadji landowners (74%). Local residents in Carlton County (69%) were less likely to agree with the statement than residents in Duluth (81%), Pine County (81%), or St. Louis County (83%).

Table 5-1. Important that Minnesota someday have an abundant elk population within the study areas.

	n	Strongly disagree	Moderately disagree	Slightly disagree	Neither	Slightly agree	Moderately agree	Strongly agree	Mean[2]	ANOVA
Landowners	**2,443**	**7.8%**	**6.8%**	**5.3%**	**16.2%**	**18.8%**	**24.2%**	**20.9%**	**4.9**	
Cloquet Valley	804	6.2%	6.6%	4.2%	16.5%	17.7%	26.4%	22.4%	5.0	$F = 7.37$ *** $\eta^2 = .007$
Fond du Lac	764	9.1%	7.4%	6.8%	16.4%	19.6%	23.9%	16.7%	4.7	
Nemadji	875	7.9%	6.3%	4.9%	15.4%	19.3%	22.1%	24.0%	4.9	
Local Residents	**1,527**	**4.5%**	**5.0%**	**4.0%**	**17.5%**	**25.3%**	**25.0%**	**18.6%**	**5.0**	
Carlton	357	8.9%	5.3%	5.6%	17.3%	27.9%	22.6%	12.3%	4.7	
Duluth	345	2.6%	5.2%	3.2%	16.5%	25.8%	26.1%	20.6%	5.2	$F = 6.03$ *** $\eta^2 = .007$
Pine	379	5.5%	4.2%	4.2%	21.1%	18.5%	26.1%	20.3%	5.0	
St Louis	436	6.2%	4.1%	4.6%	16.3%	27.1%	23.6%	18.1%	5.0	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2] Mean based on scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither, 5 = slightly agree, 6 = moderately agree, 7 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-2. Whether or not respondent gets to see an elk, it is important to them that elk could exist within the study areas.

	N	Strongly disagree	Moderately disagree	Slightly disagree	Neither	Slightly agree	Moderately agree	Strongly agree	Mean[1]	ANOVA
Landowners	**2,441**	**7.4%**	**5.1%**	**3.4%**	**13.9%**	**19.7%**	**24.2%**	**26.4%**	**5.1**	
Cloquet Valley	805	6.3%	4.7%	1.9%	13.4%	19.8%	25.7%	28.3%	5.2	$F = 6.51$ ** $\eta^2 = .005$
Fond du Lac	762	8.6%	5.2%	4.8%	14.3%	21.5%	23.2%	22.4%	4.9	
Nemadji	874	7.1%	5.4%	3.2%	14.0%	17.6%	23.7%	29.1%	5.2	
Local Residents	**1,518**	**4.4%**	**4.0%**	**2.7%**	**13.3%**	**21.8%**	**28.0%**	**25.8%**	**5.3**	
Carlton	357	8.7%	4.5%	4.2%	14.6%	23.6%	25.6%	18.8%	4.9	
Duluth	343	2.9%	4.3%	2.3%	12.2%	21.4%	29.6%	27.2%	5.4	$F = 8.31$ *** $\eta^2 = .010$
Pine	375	5.0%	2.1%	1.6%	17.5%	22.5%	26.7%	24.6%	5.3	
St Louis	433	4.1%	3.7%	2.5%	11.5%	22.7%	25.5%	30.0%	5.4	

[1] Mean based on scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither, 5 = slightly agree, 6 = moderately agree, 7 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 5-3. Important to establish elk populations within the study areas so future generations can enjoy them.

	n	Strongly disagree	Moderately disagree	Slightly disagree	Neither	Slightly agree	Moderately agree	Strongly agree	Mean[2]	ANOVA
Landowners	**2,444**	**7.3%**	**4.9%**	**2.9%**	**12.3%**	**17.5%**	**24.5%**	**30.6%**	**5.2**	
Cloquet Valley	806	5.9%	4.5%	2.5%	12.1%	16.1%	25.0%	33.9%	5.3	F = 8.18 *** η^2 = .007
Fond du Lac	764	8.5%	5.8%	3.5%	12.9%	19.7%	24.6%	25.0%	5.0	
Nemadji	874	7.4%	4.3%	2.9%	11.7%	16.6%	23.9%	33.2%	5.3	
Local Residents	**1,517**	**4.4%**	**2.6%**	**3.7%**	**11.1%**	**20.5%**	**28.8%**	**29.2%**	**5.4**	
Carlton	356	9.0%	3.4%	3.1%	15.2%	21.1%	25.0%	23.3%	5.0	F = 9.39 *** η^2 = .011
Duluth	342	2.3%	2.3%	4.7%	10.2%	20.1%	29.1%	31.4%	5.6	
Pine	376	4.7%	1.8%	2.1%	10.8%	21.4%	31.7%	27.4%	5.5	
St Louis	433	3.7%	3.2%	1.8%	8.5%	19.7%	33.9%	29.3%	5.6	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = strongly disagree, 2 = moderately disagree, 3 = slightly disagree, 4 = neither, 5 = slightly agree, 6 = moderately agree, 7 = strongly agree

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 6. Trust in Wildlife Managers

Respondents were asked to rate their agreement with three statements addressing their trust in wildlife managers using a strongly disagree (1) to strongly agree (5) scale. On average, landowners and local residents had similar levels of agreement for each trust statement. A majority of landowners (55%) and local residents (58%) agreed or strongly agreed that wildlife managers would be open and honest in the things they do and say when making elk management decisions (Table 6-1). A majority of landowners (51%) and local residents (60%) agreed that wildlife managers can be trusted to make decisions about elk management that are good for the resource, although Duluth residents agreed significantly more with the statement ($F = 7.75$, $p < .001$) (Table 6-2). Approximately half of landowners (49%) and 58% of local residents agreed or strongly agreed that wildlife managers will make decisions about elk management in a way that is fair. Duluth and St. Louis County residents agreed significantly more with the statement ($F = 8.32$, $p < .001$) than other local residents (Table 6-3).

Table 6-1. Trust in wildlife managers: Agreement/disagreement that... When deciding about elk management, wildlife managers would be open and honest in the things they do and say.

	N	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean[2]	ANOVA
Landowners	**2,440**	**7.5%**	**11.1%**	**26.8%**	**35.1%**	**19.5%**	**3.5**	
Cloquet Valley	808	6.4%	11.1%	27.1%	33.4%	21.9%	3.5	$F = 1.73$ n.s.
Fond du Lac	758	7.7%	10.7%	29.6%	35.4%	16.8%	3.4	
Nemadji	874	8.6%	11.5%	23.3%	36.8%	19.8%	3.5	
Local Residents	**1,522**	**4.2%**	**7.6%**	**30.1%**	**37.1%**	**20.9%**	**3.6**	
Carlton	357	5.9%	8.4%	32.3%	35.4%	18.0%	3.5	
Duluth	343	2.9%	6.4%	29.3%	39.1%	22.3%	3.7	$F = 4.29$ ** $\eta^2 = .005$
Pine	377	3.9%	10.0%	29.7%	35.0%	21.3%	3.6	
St Louis	435	5.7%	11.0%	31.6%	35.0%	16.7%	3.5	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2]Mean based on scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-2. Trust in wildlife managers: Agreement/disagreement that... Wildlife managers can be trusted to make decisions about elk management that are good for the resource.

	n	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean[2]	ANOVA
Landowners	**2,438**	**7.6%**	**11.8%**	**29.8%**	**38.4%**	**12.3%**	**3.4**	
Cloquet Valley	808	6.0%	12.1%	31.1%	37.3%	13.5%	3.4	$F = 1.51$ n.s.
Fond du Lac	758	8.3%	11.9%	31.1%	38.3%	10.4%	3.3	
Nemadji	872	8.7%	11.5%	26.8%	39.8%	13.2%	3.4	
Local Residents	**1,522**	**3.9%**	**7.7%**	**28.5%**	**44.9%**	**15.0%**	**3.6**	
Carlton	357	5.9%	11.0%	28.2%	43.9%	11.0%	3.4	
Duluth	343	2.6%	4.9%	28.1%	46.7%	17.7%	3.7	$F = 7.75$ *** $\eta^2 = .013$
Pine	377	3.2%	10.5%	34.7%	39.7%	11.8%	3.5	
St Louis	435	5.3%	12.2%	30.5%	40.6%	11.5%	3.4	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2]Mean based on scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-3. Trust in wildlife managers: Agreement/disagreement that... Wildlife managers will make decisions about elk management in a way that is fair.

	n	Strongly disagree	Disagree	Neither	Agree	Strongly agree	Mean[2]	ANOVA
Landowners	**2,439**	**7.6%**	**12.3%**	**31.5%**	**36.1%**	**12.4%**	**3.3**	
Cloquet Valley	807	5.4%	13.4%	32.5%	34.8%	13.9%	3.4	$F = 1.52$ n.s.
Fond du Lac	759	8.8%	11.3%	32.1%	37.7%	10.0%	3.3	
Nemadji	873	8.6%	12.1%	29.4%	36.4%	13.4%	3.3	
Local Residents	**1,518**	**4.4%**	**7.7%**	**30.0%**	**42.8%**	**15.2%**	**3.6**	
Carlton	357	7.6%	10.1%	30.1%	39.0%	13.2%	3.4	
Duluth	340	2.9%	5.0%	28.6%	46.1%	17.5%	3.7	$F = 8.32$ *** $\eta^2 = .018$
Pine	377	4.2%	11.1%	36.3%	37.9%	10.5%	3.4	
St Louis	434	5.5%	12.4%	32.6%	37.4%	12.2%	3.9	

[1]All results reflect weighted values correcting for stratification, gender, and age.
[2]Mean based on scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Hunter/Non-Hunter

We examined whether hunters and non-hunters differed in their trust of wildlife managers (Table 6-4). Respondents were determined to be hunters if they had participated in deer hunting and/or other hunting or trapping activities in the last 12 months. Non-hunters were significantly more trusting of wildlife managers than hunters among landowners and local residents. Hunters and non-hunters slightly agreed with each trust statement.

Farmer/Non-Farmer

We examined whether farmers and non-farmers differed in their trust of wildlife managers (Table 6-5). Respondents were determined to be farmers if they indicated that a portion of their household income was derived from agricultural activities. Analysis was limited to landowners since questions related to agriculture activities were excluded from the local resident questionnaire. Among landowners, non-farmers were significantly more trusting of wildlife managers than farmers, though both groups only slightly agreed with each trust statement.

Table 6-4. Trust in wildlife managers among hunters and non-hunters.

	Landowners			Local Residents		
Trust statement	**Hunters**	**Non-hunters**	**ANOVA**	**Hunters**	**Non-hunters**	**ANOVA**
Statement 1	3.4 (n = 1,701)	3.6 (n = 739)	F = 9.24 ** η^2 = .004	3.4 (n = 672)	3.6 (n = 840)	F = 13.65 *** η^2 = .009
Statement 2	3.3 (n = 1,701)	3.5 (n = 737)	F = 17.13 *** η^2 = .007	3.3 (n = 672)	3.5 (n = 840)	F = 13.82 *** η^2 = .009
Statement 3	3.3 (n = 1,704)	3.5 (n = 735)	F = 16.36 *** η^2 = .007	3.3 (n = 671)	3.5 (n = 837)	F = 14.25 *** η^2 = .009

Mean based on scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree
F compares hunters and non-hunters.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 6-5. Trust in wildlife managers among farmers and non-farmers.

	Landowners		
Trust statement	**Farmers**	**Non-farmers**	**ANOVA**
Statement 1	3.4 (n = 409)	3.5 (n = 1,951)	F = 4.72 * η^2 = .002
Statement 2	3.2 (n = 408)	3.4 (n = 1,952)	F = 19.63 *** η^2 = .008
Statement 3	3.1 (n = 409)	3.4 (n = 1,952)	F = 20.55 *** η^2 = .009

Mean based on scale: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree
F compares farmers and non-farmers.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 7. Elk-Related Recreation

Wildlife-Viewing

Respondents were asked about interest in participating in elk-related recreation if an elk population is restored to the study areas in Minnesota, including wildlife viewing and hunting. Landowners and local residents were asked how likely they would be to make a trip to view, photograph or hear elk within the study areas in Minnesota (Table 7-1). Likelihood of making a trip to view, photograph or hear elk was assessed using a 7-point scale from "very unlikely" (1) to "very likely" (7). On average, landowners ($\bar{x}$ = 4.6) and local residents ($\bar{x}$ = 4.7) indicated that there would be slight likelihood of them making a trip to view, photograph or hear elk. Over 60% of landowners (61%) and local residents (64%) indicated that they would likely make a trip to view, photograph or hear elk. There was no significant difference in the likelihood of making a trip for viewing, photographing or hearing elk between strata for landowners (F = 2.91) but Pine County residents (70%) were more likely to take such a trip than other local residents (F = 4.53, $p < .01$). Over 40% of both landowners (46%) and local residents (41%) indicated that they had ever visited a National Park or similar destination in North America for which an important part of the trip was viewing, photographing or hearing elk.

Table 7-1. Likelihood of making trip for which viewing, photographing or hearing elk is an important part of the trip.

	N	Very unlikely	Quite unlikely	Slightly unlikely	Unsure	Slightly likely	Quite likely	Very likely	Mean[2]	ANOVA
Landowners	**2,436**	**12.8%**	**8.9%**	**6.2%**	**10.9%**	**18.8%**	**23.2%**	**19.1%**	**4.6**	
Cloquet Valley	804	12.9%	7.7%	5.7%	10.2%	20.6%	21.6%	21.4%	4.6	F = 2.91 n.s.
Fond du Lac	759	12.6%	10.8%	6.4%	12.9%	18.8%	22.4%	16.1%	4.5	
Nemadji	873	13.1%	8.2%	6.5%	9.4%	17.0%	26.0%	19.8%	4.7	
Local Residents	**1,517**	**9.7%**	**10.0%**	**4.7%**	**11.2%**	**19.5%**	**26.1%**	**18.7%**	**4.7**	
Carlton	357	12.0%	8.1%	5.9%	14.0%	20.9%	21.2%	17.9%	4.6	
Duluth	343	9.0%	11.0%	3.5%	11.3%	19.2%	28.2%	17.7%	4.8	F = 4.53 ** η^2 = .002
Pine	377	6.6%	6.3%	6.6%	10.5%	21.3%	21.3%	27.6%	5.1	
St Louis	434	10.8%	9.4%	7.1%	8.2%	18.1%	28.6%	17.8%	4.7	

[1]All results reflect weighted values correcting for stratification, gender, and age.

[2] Mean based on scale: 1 = very unlikely, 2 = quite unlikely, 3 = slightly unlikely, 4 = unsure, 5 = slightly likely, 6 = quite likely, 7 = very likely

F compares strata within study areas.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Hunting

Landowners and local residents were asked whether they have hunted elk or applied for an elk license in Minnesota or elsewhere in North America (Table 7-2). Few landowners (2%) and very few local residents (0.2%) have applied for or have been drawn for an elk hunting license in Minnesota, although more respondents have hunted elk or applied to hunt elk elsewhere in North America (landowners: 21%; local residents: 8%). Less than one-quarter of landowners (24%) and fewer than 1 in 5 local residents (16%) indicated that they plan to apply for a Minnesota elk hunting license in the future. A majority of landowners (52%) and local residents (71%) did not plan to apply for a Minnesota elk hunting license in the future. In general, landowners were more likely than local residents to have applied for or have drawn an elk license or apply for one in the future. About 10% of landowners and 12% local residents indicated that they have lived in an area where elk where common.

Table 7-2. Hunted elk or applied for an elk license in Minnesota or elsewhere in North America.

	Landowners	Cloquet Valley	Fond du Lac	Nemadji	Local Residents	Carlton	Duluth	Pine	St Louis
Applied for or have drawn a Minnesota elk license	2.0% (n = 50)	1.4% (n = 12)	1.8% (n = 16)	3.0% (n = 27)	0.2% (n = 3)	0.3% (n = 2)	0% (n = 0)	0.3% (n = 2)	0.9% (n = 4)
Plan to apply for a Minnesota elk license in the future	23.6% (n = 601)	22.9% (n = 192)	22.0% (n = 177)	26.1% (n = 237)	16.2% (n = 255)	17.2% (n = 64)	11.5% (n = 34)	25.2% (n = 75)	29.1% (n = 105)
Do not plan to apply for a Minnesota elk license in the future	51.7% (n = 1,318)	54.5% (n = 452)	53.9% (n = 420)	46.0% (n = 417)	71.3% (n = 1,120)	67.8% (n = 249)	76.8% (n = 277)	61.1% (n = 251)	54.5% (n = 257)
Hunted elk or applied to hunt elk elsewhere in North America	21.2% (n = 540)	17.5% (n = 151)	21.1% (n = 176)	25.4% (n = 238)	7.8% (n = 123)	11.8% (n = 48)	4.5% (n = 20)	15.8% (n = 56)	10.5% (n = 45)
n	2,550	841	796	913	1,571	373	358	393	447

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 8. Outdoor Activities and Membership

Respondents were asked about their participation in outdoor recreation during the past 12 months (Table 8-1). Among landowners, the greatest proportion of respondents participated in: (1) fishing, (2) deer hunting, (3) ATV riding, and (4) hiking. Among local residents, the greatest proportion of respondents participated in: (1) fishing, (2) hiking, (3) wildlife watching and photography, and (4) feeding wildlife. As expected, participation in outdoor recreational activities was slightly lower among Duluth respondents.

Table 8-1. Participation in recreational activities.

	Landowners	Cloquet Valley	Fond du Lac	Nemadji	Local Residents	Carlton	Duluth	Pine	St. Louis
Deer hunting	62.9%	58.1%	59.7%	72.2%	30.4%	37.8%	20.9%	51.1%	46.8%
Other hunting or trapping	42.3%	39.0%	42.2%	46.2%	18.8%	23.9%	12.3%	33.6%	31.8%
Wildlife watching or photography	53.7%	54.5%	52.3%	54.7%	50.3%	45.0%	50.3%	56.2%	54.8%
Feeding wildlife	52.2%	49.3%	52.9%	54.7%	38.4%	40.5%	31.6%	49.9%	54.8%
Snowmobiling	27.2%	29.5%	27.0%	24.6%	22.9%	24.7%	20.4%	19.6%	34.2%
ATV riding	59.6%	57.2%	59.2%	62.9%	37.3%	46.4%	27.4%	53.9%	55.7%
Hiking	59.7%	60.2%	57.4%	62.0%	66.6%	57.1%	70.7%	59.0%	66.7%
Fishing	67.5%	69.0%	67.0%	66.4%	55.6%	57.6%	50.6%	61.3%	68.5%
RV or tent camping	40.2%	39.8%	41.8%	38.7%	42.8%	42.9%	41.6%	40.5%	48.1%
Cross-country skiing	13.5%	16.2%	11.9%	12.0%	19.0%	11.5%	22.9%	7.9%	19.5%
None	3.5%	3.8%	4.3%	2.3%	9.4%	7.5%	11.7%	5.3%	5.1%
Other	6.9%	8.8%	6.2%	5.8%	7.0%	4.3%	7.8%	6.1%	7.8%
N	**2,455**	**806**	**768**	**881**	**1,571**	**358**	**347**	**382**	**436**

[1]All results reflect weighted values correcting for stratification, gender, and age.
Respondents able to select multiple responses. Column totals may equal greater than 100%.

Respondents were asked about their membership in environmental, conservation, or hunting organizations (Table 8-2). Among landowners and local residents, the greatest proportion of respondents were members of: (1) local sporting clubs, (2) Minnesota Deer Hunters Association, and (3) Sierra Club. Overall, membership rates were relatively low with local residents having lower membership rates than landowners.

Table 8-2. Membership in outdoor organizations.

	Landowners	Cloquet Valley	Fond du Lac	Nemadji	Local Residents	Carlton	Duluth	Pine	St. Louis
Rocky Mountain Elk Foundation	3.2%	2.9%	3.3%	3.6%	.8%	2.1%	0.0%	2.3%	1.3%
Minnesota Deer Hunters Association	9.9%	6.1%	12.2%	11.6%	3.4%	7.8%	1.4%	8.1%	2.9%
Quality Deer Hunters Association	1.4%	0.2%	0.8%	3.5%	.2%	0.3%	0.0%	1.0%	0.0%
Local sporting club	11.1%	10.8%	10.3%	12.3%	8.0%	6.2%	7.8%	8.7%	10.3%
Sierra Club	7.3%	8.8%	4.6%	8.5%	4.3%	2.1%	4.5%	4.3%	6.3%
The Nature Conservancy	1.9%	2.3%	1.3%	2.1%	3.5%	1.1%	5.0%	0.5%	2.9%
National Audubon Society	3.9%	4.4%	3.5%	3.8%	4.3%	1.1%	5.0%	0.5%	2.9%
Other	2.8%	2.3%	2.5%	4.1%	2.3%	1.6%	2.0%	3.1%	4.3%
N	**2,550**	**841**	**796**	**913**	**1,571**	**373**	**358**	**393**	**447**

[1]All results reflect weighted values correcting for stratification, gender, and age.
Respondents able to select multiple responses. Column totals may equal greater than 100%.

Section 9. Landowner Property Characteristics

Property Type within Study Areas in Minnesota

Landowners were asked to describe their property within the study areas in Minnesota. Analysis was limited to landowners since questions related to property characteristics were excluded from the local resident questionnaire. In 2017, landowners owned 94.1 acres with Fond du Lac landowners having the largest property sizes (Cloquet Valley: $\bar{x}$ = 72.2; Fond du Lac: $\bar{x}$ = 113.2; Nemadji: $\bar{x}$ = 97.3 acres). Landowners indicated their property was used primarily as their primary residence (49%) or seasonal/recreational residence (47%) (Table 9-1). Property type proportions were significantly different between strata for primary residences, agricultural production, rental properties, and seasonal/recreational residences. A majority of properties within the Nemadji study area were considered seasonal/recreational residences (67%). Landowners that described their property as a seasonal or recreational residence spent about two months annually on the property (Table 9-2) and 45% indicated their full-time residence was in the 7-county Twin Cities metro (Hennepin, Ramsey, Dakota, Anoka, Washington, Scott, and Carver Counties).

Table 9-1. Property type within the study areas in Minnesota.

	n	Primary residence	Agricultural production	Rental property	Business property	Seasonal or recreational residence
Landowners	**2,431**	**48.5%**	**9.2%**	**2.2%**	**2.1%**	**46.8%**
Cloquet Valley	805	54.7%	6.2%	2.1%	2.1%	42.2%
Fond du Lac	749	59.9%	12.3%	3.3%	2.5%	33.8%
Nemadji	877	28.1%	9.1%	1.0%	1.6%	67.1%
χ^2		χ^2 = 186.73 *p* < .001 V = .27	χ^2 = 21.40 *p* < .001 V = .09	χ^2 = 9.87 *p* < .01 V = .06	χ^2 = 1.67 *p* = .43 V = .03	χ^2 = 197.75 *p* < .001 V = .28

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
Respondents able to select multiple responses. Row totals may equal greater than 100%.

Table 9-2. Mean number of months residing at seasonal or recreational property.

	n	Months Residing at Property	ANOVA
Landowners	**928**	**2.1**	F = .53 n.s.
Cloquet Valley	282	2.2	
Fond du Lac	198	2.0	
Nemadji	448	2.1	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
Respondents that indicated property is seasonal or recreational property and resided there fewer than 12 months per year.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Land Use Activities

Landowners were asked to indicate activities that occurred on their property within the past 5 years (Table 9-3). The most common land use activities reported by respondents were: (1) hunting (78%); (2) residential use (55%); (3) timber production (23%); and (4) hay production (22%). Row crops (corn, beans) (6%), small grains (wheat, oats) (6%), and commercial/Industrial use (2%) were the least common activities. Properties in the Nemadji study area were more likely to be used for hunting and less likely for residential use.

Respondents were also asked to what extent their property was currently being used for a variety of activities. A majority of respondents indicated that at least some of their property was used for private residence, such as houses, lawns, and associated buildings (62%) (Table 9-4). Private residences were significantly more common ($F = 25.05$, $p < .001$) in the Cloquet Valley (68%) and Fond du Lac (67%) study areas than the Nemadji study area (51%). Woodlands, such as natural forest and tree plantings, were the most common habitat type with 84% of respondents indicating at least some of their property contained woodlands (Table 9-5). Woodlands were significantly more common among landowners within the Nemadji study area ($F = 35.55$, $p < .001$). Wetlands, including alder swamp and marsh, was also a common habitat type with 69% of respondents indicating at least some of their property contained wetlands (Table 9-6). Less than half of respondents (45%) indicated that at least some of their property was brushland, including abandoned, overgrown fields (Table 9-7). About one-quarter of respondents indicated that they improve wildlife habitat on their property by creating wildlife food plots (25%) (Table 9-8).

Hayfields (28%) (Table 9-9) and livestock pasture (12%) (Table 9-10) were the most common agricultural land types among respondents. Hayfields ($F = 28.52$, $p < .001$) and livestock pasture ($F = 4.413$, $p < .01$) were significantly more common within the Fond du Lac study area. Small grains (5%) (Table 9-11), row crops (5%) (Table 9-12), and other property types (6%) (Table 9-13) were present on a limited number of properties. Small grains ($F = 4.56$, $p < .01$) and row crops ($F = 11.03$, $p < .001$) were significantly less common among landowners within the Nemadji study area.

Table 9-3. Land use activities taking place on property.

	n	Row crops (corn, beans)	Small grains (wheat, oats)	Hay production	Livestock grazing	Timber production	Maple syrup production	Residential use	Commercial / Industrial use	Hunting	Other
Landowners	**2,550**	**6.2%**	**5.9%**	**21.7%**	**11.0%**	**22.7%**	**7.6%**	**55.1%**	**2.1%**	**77.9%**	**8.9%**
Cloquet Valley	841	4.4%	3.4%	16.2%	9.3%	22.2%	5.7%	61.7%	1.4%	74.1%	9.6%
Fond du Lac	796	6.3%	7.9%	30.9%	14.3%	21.7%	9.4%	62.2%	3.1%	75.3%	8.0%
Nemadji	913	8.2%	6.2%	17.3%	9.0%	24.5%	7.8%	39.4%	1.5%	85.4%	9.1%

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.

Table 9-4. Property land type: Private residence (house, lawns, associated buildings).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**37.7%**	**48.9%**	**4.1%**	**9.3%**	
Cloquet Valley	827	32.3%	52.5%	4.4%	10.8%	$F = 25.05$ ***
Fond du Lac	771	33.4%	51.4%	5.3%	9.9%	$\eta^2 = .017$
Nemadji	901	48.8%	42.0%	2.3%	6.9%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-5. Property land type: Woodlands (natural forest or tree plantings).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**15.6%**	**25.5%**	**45.2%**	**13.6%**	
Cloquet Valley	827	16.2%	25.8%	45.3%	12.7%	$F = 35.55$ ***
Fond du Lac	771	19.2%	30.2%	40.9%	9.7%	$\eta^2 = .027$
Nemadji	901	10.8%	20.0%	50.1%	19.2%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-6. Property land type: Wetlands (including alder swamp & marsh).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**31.3%**	**58.2%**	**8.3%**	**2.2%**	
Cloquet Valley	827	32.8%	56.7%	8.3%	2.2%	$F = 1.46$ n.s.
Fond du Lac	771	32.0%	57.7%	7.9%	2.3%	
Nemadji	901	28.9%	60.3%	8.7%	2.2%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-7. Property land type: Brushland (including abandoned, overgrown fields).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**54.8%**	**35.6%**	**7.1%**	**2.4%**	
Cloquet Valley	827	55.1%	35.1%	7.7%	2.1%	F = .93 n.s.
Fond du Lac	771	52.5%	38.1%	6.9%	2.6%	
Nemadji	901	57.2%	33.4%	6.8%	2.7%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-8. Property land type: Wildlife food plots.

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**74.9%**	**22.3%**	**1.6%**	**1.2%**	
Cloquet Valley	827	81.4%	16.5%	1.1%	1.1%	F = 14.66 ***
Fond du Lac	771	74.2%	23.3%	1.3%	1.2%	η^2 = .013
Nemadji	901	68.5%	27.6%	2.7%	1.2%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-9. Property land type: Hayfields.

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**72.5%**	**20.5%**	**5.6%**	**1.3%**	
Cloquet Valley	827	78.0%	16.8%	4.2%	1.0%	F = 28.52 ***
Fond du Lac	771	62.4%	27.5%	8.4%	1.7%	η^2 = .023
Nemadji	901	77.8%	16.8%	4.1%	1.3%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-10. Property land type: Livestock pasture.

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**87.7%**	**9.1%**	**2.2%**	**1.0%**	
Cloquet Valley	827	89.6%	7.9%	1.8%	0.7%	F = 4.43 **
Fond du Lac	771	84.3%	11.8%	2.7%	1.2%	η^2 = .004
Nemadji	901	89.6%	7.3%	2.1%	1.0%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-11. Property land type: Small grains (wheat, oats).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**94.7%**	**4.0%**	**.8%**	**.5%**	
Cloquet Valley	827	97.2%	2.3%	0.2%	0.2%	F = 4.56 **
Fond du Lac	771	96.4%	3.2%	0.3%	0.1%	η^2 = .004
Nemadji	901	92.5%	6.1%	0.9%	0.6%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-12. Property land type: Row crops (corn, beans).

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**95.4%**	**3.8%**	**.5%**	**.3%**	
Cloquet Valley	827	97.2%	2.3%	0.2%	0.2%	F = 11.03 ***
Fond du Lac	771	96.4%	3.2%	0.3%	0.1%	η^2 = .009
Nemadji	901	92.5%	6.1%	0.9%	0.6%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 9-13. Property land type: Other.

	n	None	Some	Most	All	ANOVA
Landowners	**2,499**	**94.1%**	**4.8%**	**.6%**	**.6%**	
Cloquet Valley	827	93.1%	5.7%	0.6%	0.6%	F = 1.09 n.s.
Fond du Lac	771	94.0%	4.8%	0.6%	0.5%	
Nemadji	901	95.2%	3.7%	0.6%	0.6%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.
F compares strata within study areas.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Section 10. Demographic Characteristics of Landowners and Local Residents

As described in the introduction, data were weighted to correct for disproportionate sampling on property size and population size across the study areas as well as gender and age among local residents to reflect known proportions for gender and age categories base on the U.S. Census figures. After weighting for property size, landowners ($\bar{x}$ = 60.2 years) were older than the weighted sample of local residents ($\bar{x}$ = 49.4 years) (Table 10-1). The age of local residents, after weighting, varied significantly across strata with Duluth residents having a slightly younger mean age (5.65, $p < .001$), but landowners did not vary significantly among strata (F = .89, *n.s.*). On average, landowners in the sample have lived in Minnesota ($\bar{x}$ = 54.0 years) longer than local residents ($\bar{x}$ = 42.8 years), although both groups have lived in Minnesota a majority of their lives (90% vs 87%) (Table 10-2). Landowners owned property in northeastern Minnesota ($\bar{x}$ = 23.6 years) longer on average than local residents that owned their current residence ($\bar{x}$ = 14.0 years) (Table 10-3). On average, local residents that rent their current residence have resided there 7.1 years. About 90% of local residents indicated that they owned their current residence, although ownership rates varied significantly among strata with 98% of St. Louis respondents owning their residence (Table 10-4). A majority of responding landowners and local residents were male (82% vs 66%, respectively), but after weighting 51% of the local resident respondents were male (Table 10-5). Overall, a majority of landowners (53%) and local resident (65%) respondents have at least attended some college (Table 10-6). On average, the household income of landowners was greater than local residents ($98,667 vs $77,839) (Table 10-7). Although more than a quarter of landowners reported hayfields on their property, less than 20% of landowners (17%) indicated that at least a portion of their household income was derived from farming which suggests that for some respondents farming activity does not lead to claimed income (Table 10-8). About half of landowners (51%) but fewer local residents (42%) were raised primarily in a rural area as a youth, either on a farm or not (Table 10-9).

Table 10-1. Respondent age.

	n	Mean	ANOVA
Landowners[a]	**2,446**	**60.2**	
Cloquet Valley	803	60.2	F = .89 n.s.
Fond du Lac	759	59.9	
Nemadji	884	60.8	
Local Residents[b]	**1,495**	**49.4**	
Carlton	353	50.4	
Duluth	341	47.9	F = 5.65***
Pine	377	51.6	
St Louis	424	52.9	

[a]Data weighted to reflect population proportions of landowners with 10 to 40 acres, and >40 acres in the total study area and individual area strata.

[b]Data weighted using U.S. Census information to reflect age and gender distributions of study area for the general public in total study area and individual area strata.

F compares strata within each study area.

n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-2. Years lived in Minnesota.

	n	Mean number of years	% of life	ANOVA
Landowners[a]	**2,465**	**54.0**	**90.0%**	
Cloquet Valley	807	52.5	87.7%	F = 6.23 **
Fond du Lac	765	55.0	91.8%	η^2 = .004
Nemadji	893	54.8	90.6%	
Local Residents[b]	**1,530**	**42.8**	**86.6%**	
Carlton	360	45.7	89.9%	F = 9.99 ***
Duluth	345	40.3	83.7%	η^2 = .012
Pine	380	46.6	89.4%	
St Louis	435	47.0	88.9%	

[a]Data weighted to reflect population proportions of landowners with 10 to 40 acres, and >40 acres in the total study area and individual area strata.
[b]Data weighted using U.S. Census information to reflect age and gender distributions of study area for the general public in total study area and individual area strata.
F compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-3. Length of property ownership/rental in northwest Minnesota.

	n	Mean number of years	% of life	ANOVA
Landowners	**2,396**	**23.6**	**37.6%**	
Cloquet Valley	782	24.4	38.8%	F = 5.18 **
Fond du Lac	740	24.6	39.4%	η^2 = .005
Nemadji	874	22.2	35.2%	
Local Residents	**1,503**	**14.0**	**31.3%**	
Carlton	356	15.1	30.6%	F = 8.80 ***
Duluth	339	12.6	28.1%	η^2 = .009
Pine	378	16.0	31.9%	
St Louis	427	17.7	33.9%	

F compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-4. Ownership or rental of current residence among local residents.

	n	Own	Rent	χ^2
Local Residents	**1,513**	**89.7%**	**10.3%**	
Carlton	357	90.2%	9.8%	
Duluth	343	87.6%	12.4%	$\chi^2 = 18.58$ *** V = .12
Pine	383	88.7%	1.3%	
St Louis	430	98.4%	1.6%	

χ^2 compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-5. Respondent gender.

	n	Male	Female	Other / Rather not identify	χ^2
Landowners[a]	**2,472**	**81.0%**	**17.9%**	**1.1%**	
Cloquet Valley	811	79.1%	19.9%	1.0%	$\chi^2 = 13.38$ ** V = .05
Fond du Lac	770	79.4%	19.2%	1.4%	
Nemadji	891	85.3%	13.9%	0.8%	
Local Residents[b]	**1,520**	**50.6%**	**48.7%**	**.7%**	
Carlton	363	51.0%	47.1%	1.9%	
Duluth	344	49.4%	50.3%	0.3%	$\chi^2 = 41.11$ *** V = .12
Pine	382	54.2%	45.3%	0.5%	
St Louis	431	53.8%	45.9%	0.2%	

[a]Data weighted to reflect population proportions of landowners with 10 to 40 acres, and >40 acres in the total study area and individual area strata.
[b]Data weighted using U.S. Census information to reflect age and gender distributions of study area for the general public in total study area and individual area strata.
χ^2 compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-6. Respondent education.

	n	GS	Some HS	HS degree	Some vo-tech	Vo-tech degree	Some college	4 yr. degree	Some grad. school	Grad. degree
Landowners[a]	**2,460**	**.2%**	**1.4%**	**17.6%**	**10.2%**	**17.6%**	**19.1%**	**18.1%**	**3.7%**	**12.0%**
Cloquet Valley	808	0.1%	1.9%	15.5%	8.9%	17.6%	17.9%	19.8%	4.3%	14.1%
Fond du Lac	763	0.4%	0.9%	19.7%	10.5%	18.6%	18.8%	17.4%	2.9%	10.8%
Nemadji	889	0.2%	1.5%	17.5%	11.6%	16.7%	20.7%	17.0%	3.9%	10.8%
Local Residents[b]	**1,505**	.1%	.9%	12.0%	7.5%	14.1%	18.1%	28.5%	3.4%	15.3%
Carlton	355	0.0%	1.4%	17.2%	7.9%	17.5%	19.7%	18.9%	5.1%	12.4%
Duluth	342	0.0%	0.6%	7.6%	6.4%	10.2%	18.6%	35.2%	3.5%	18.0%
Pine	375	1.1%	2.4%	18.4%	12.2%	25.3%	17.6%	13.8%	1.9%	7.4%
St Louis	426	0.2%	0.5%	17.4%	9.1%	17.7%	17.7%	23.3%	1.9%	12.3%

[a]Data weighted to reflect population proportions of landowners with 10 to 40 acres, and >40 acres in the total study area and individual area strata

[b]Data weighted using U.S. Census information to reflect age and gender distributions of study area for the general public in total study area and individual area strata.

Table 10-7. Gross annual household income.

	n	Mean	ANOVA
Landowners	**2,173**	**$98,666.59**	
Cloquet Valley	708	$98,040.25	F = 8.23 ***
Fond du Lac	691	$91,953.69	η^2 = .008
Nemadji	774	$105,232.56	
Local Residents	**1,371**	**$77,839.17**	
Carlton	330	$81,219.70	
Duluth	306	$74,493.46	F = 4.76 **
Pine	338	$70,584.32	η^2 = .010
St Louis	397	$83,784.63	

Assigned median value for each response category. Value of $250,000 used for "$200,000 or more" responses.
F compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-8. Total household income from farming.

	n	None	1-25%	26-50%	51-75%	76-100%	χ^2
Landowners	**2,389**	**83.3%**	**13.9%**	**1.9%**	**0.3%**	**0.7%**	
Cloquet Valley	788	86.5%	11.3%	1.6%	0.1%	0.5%	$\chi^2 = 4.65$ ** V = .00
Fond du Lac	748	80.8%	15.3%	3.1%	0.1%	0.7%	
Nemadji	853	82.6%	15.2%	0.8%	0.7%	0.7%	

[1]All results reflect weighted values correcting for stratification on property size and population in each study area.χ^2 compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

Table 10-9. Primary area respondent was raised as youth.

	n	Rural on a farm	Rural non-farm	Small town	Suburb	City	χ^2
Landowners[a]	**2,390**	**28.6%**	**22.8%**	**18.9%**	**13.7%**	**16.0%**	
Cloquet Valley	781	23.5%	26.9%	19.8%	11.5%	18.3%	$\chi^2 = 123.50$ *** V = .16
Fond du Lac	747	36.9%	25.1%	17.8%	9.9%	10.3%	
Nemadji	862	24.5%	15.5%	19.1%	20.5%	20.3%	
Local Residents[b]	**1,498**	**16.8%**	**25.1%**	**21.0%**	**12.4%**	**24.6%**	
Carlton	354	21.6%	26.7%	32.4%	7.7%	11.6%	
Duluth	342	10.3%	22.6%	18.2%	15.0%	34.0%	$\chi^2 = 203.90$ *** V = .21
Pine	371	31.7%	25.3%	19.5%	12.0%	11.5%	
St Louis	428	25.9%	34.8%	19.4%	7.2%	12.6%	

[a]Data weighted to reflect population proportions of landowners with 10 to 40 acres, and >40 acres in the total study area and individual area strata.
[b]Data weighted using U.S. Census information to reflect age and gender distributions of study area for the general public in total study area and individual area strata.
χ^2 compares strata within each study area.
n.s. = not significant, *p < 0.05, **p< 0.01, ***p< 0.001

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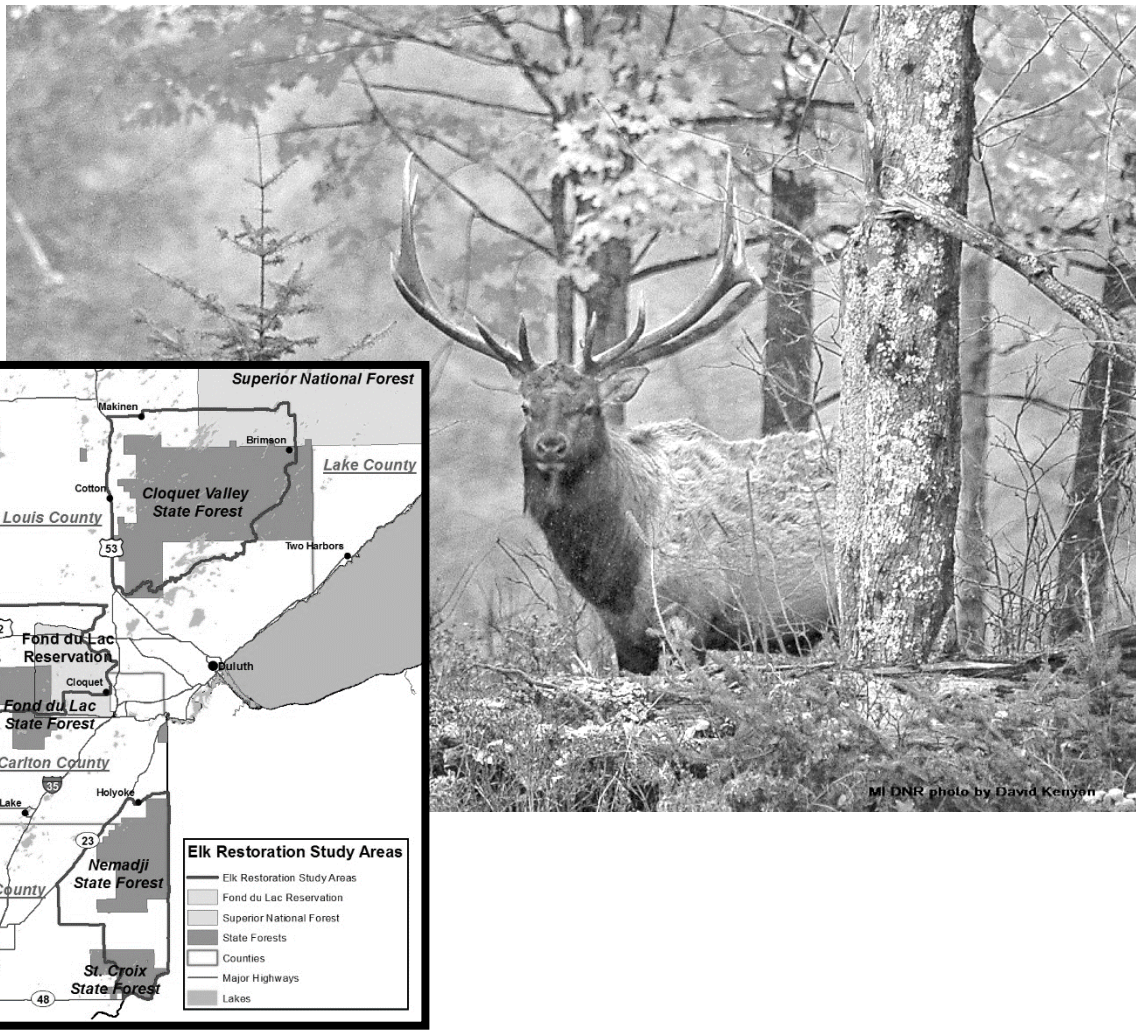
Appendix A:
Landowner Attitudes toward Potential Elk Restoration in Minnesota

Landowner Attitudes toward Potential Elk Restoration in Minnesota



Your help on this survey is greatly appreciated!

Please return your completed questionnaire in the enclosed envelope. The envelope is self-addressed and no postage is required. Thanks!

Minnesota Cooperative Fish & Wildlife Research Unit,
1980 Folwell Ave., 200 Hodson Hall
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota
St. Paul, MN 55108

V1

I. Your land in Minnesota

1. **First, we have a few questions about the property you own. How many total acres did you own at the end of 2017?**

   _____ Acres Owned

2. **Please indicate how much of your property within the study areas in Minnesota are in each of the following categories.** (*Please circle one number for each row below*)

Land Type	None	Some	Most	All
Private residence (house, lawns, associated buildings)	0	1	2	3
Hayfields	0	1	2	3
Livestock pasture	0	1	2	3
Row crops (corn, beans)	0	1	2	3
Small grains (wheat, oats)	0	1	2	3
Woodlands (natural forest or tree plantings)	0	1	2	3
Brushland (including abandoned, overgrown fields)	0	1	2	3
Wildlife food plots	0	1	2	3
Wetlands (including alder swamp & marsh)	0	1	2	3
Other (Please list:_____)	0	1	2	3

3. **Please indicate if you have used your land for any of the following activities in the last 5 years.** (*Select 'yes' or 'no' for each*)

Activity	Yes	No
Row crops (corn, beans)	❑	❑
Small grains (wheat, oats)	❑	❑
Hay production	❑	❑
Livestock grazing	❑	❑
Timber production	❑	❑
Maple syrup production	❑	❑
Residential use	❑	❑
Commercial/Industrial use	❑	❑
Hunting	❑	❑
Other (Please list: _____)	❑	❑

4. **Which best describes your property within the study areas in Minnesota?** (*Check all that apply*)
   - ❑ Primary residence
   - ❑ Agricultural production
   - ❑ Rental property
   - ❑ Business property
   - ❑ Seasonal or recreational residence ➡ ***If seasonal***:

     How many months of the year do you reside here?

     _____ MONTHS

     Where is your full-time residence? (*Please check one*)
     - ❑ 7-county Twin Cities metro (Hennepin, Ramsey, Dakota, Anoka, Washington, Scott, Carver)
     - ❑ Metropolitan area outside the Twin Cities (ex. St. Cloud, Duluth)
     - ❑ Rural area
     - ❑ Outside Minnesota

II. Knowledge about elk in Minnesota

5. **The remainder of the survey will address restoring wild, free-ranging elk within the 3 study areas in Minnesota. To estimate your knowledge of elk in Minnesota, please answer the following questions based on knowledge you had prior to receiving this questionnaire.** (*Please circle one number for each row below*)

	Yes	No
Did you know that wild, free-ranging elk historically lived in most of Minnesota?	1	2
Did you know that approximately 100 wild, free-ranging elk live in northwest Minnesota?	1	2
Did you know that wild, free-ranging elk have previously been restored to parts of northwest Minnesota?	1	2

III. Attitudes about elk restoration

6. **The following questions will help us determine your attitudes toward restoring wild, free-ranging elk within the study areas in Minnesota. Overall, how would you describe your feelings about potentially restoring wild, free-ranging elk within the study areas in Minnesota?** (*Please circle one number below*)

Very Unfavorable	Moderately Unfavorable	Slightly Unfavorable	Neutral	Slightly Favorable	Moderately Favorable	Very Favorable
1	2	3	4	5	6	7

7. **How important or unimportant are decisions regarding the potential restoration of wild, free-ranging elk within the study areas in Minnesota to you personally?** (*Please circle one number below*)

Very Unimportant	Moderately Unimportant	Slightly Unimportant	Neither	Slightly Important	Moderately Important	Very Important
1	2	3	4	5	6	7

8. **How unlikely or likely are you to support restoring wild, free-ranging elk…?** (*Please circle one number for each row*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
… To Minnesota in general?	1	2	3	4	5	6	7
… To the study areas in Minnesota?	1	2	3	4	5	6	7
… Within five miles of your property?	1	2	3	4	5	6	7
… On your property?	1	2	3	4	5	6	7

9. **We want to know how the idea of restoring wild, free-ranging elk within the study areas in Minnesota makes you feel. When thinking about potentially restoring elk within the study areas in Minnesota, how much do you feel…?** (*Circle one number for each row*)

	None				Moderate						A lot
Worried	0	1	2	3	4	5	6	7	8	9	10
Interested	0	1	2	3	4	5	6	7	8	9	10
Supportive	0	1	2	3	4	5	6	7	8	9	10

10. **Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is…?** (*Please circle one number for each row below*)

	Very	Quite	Slightly	Neither	Slightly	Quite	Very	
Negative	1	2	3	4	5	6	7	Positive
Harmful	1	2	3	4	5	6	7	Beneficial
Bad	1	2	3	4	5	6	7	Good

11. **Would most people who are important to you believe that you should or should not support restoring a wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number below*)

Very much should not	Moderately should not	Slightly should not	Neither	Slightly should	Moderately should	Very much should
1	2	3	4	5	6	7

12. **Do you disagree or agree that you want to do what people who are important to you think you should do regarding supporting the restoration of wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number below*)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

13. **How <u>unlikely or likely</u> do you believe the following potential outcomes are from restoring a wild, free-ranging elk population within the study areas in Minnesota…?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Increase youth involvement and interest in outdoors	1	2	3	4	5	6	7
Restore a native wildlife species	1	2	3	4	5	6	7
Increase economic opportunities through elk-related tourism	1	2	3	4	5	6	7
Provide opportunities to hunt elk	1	2	3	4	5	6	7
Increase damage to agriculture and personal property	1	2	3	4	5	6	7
Shift management focus from other wildlife species such as deer and moose	1	2	3	4	5	6	7
Conflict between elk and deer	1	2	3	4	5	6	7
Conflict between elk and moose	1	2	3	4	5	6	7
Negatively impact other wildlife populations	1	2	3	4	5	6	7
Increase conflict among people due to elk	1	2	3	4	5	6	7
Increase damage to trees and forest vegetation	1	2	3	4	5	6	7
Increase risk of disease transmission to livestock and wildlife	1	2	3	4	5	6	7
Increase cost to taxpayers	1	2	3	4	5	6	7
Provide opportunities to view elk	1	2	3	4	5	6	7

14. **How <u>bad or good</u> do you believe the following potential outcomes are from restoring a wild, free-ranging elk population within the study areas in Minnesota…?** (*Please circle one number for each row below*)

	Very Bad	Quite Bad	Slightly Bad	Neutral	Slightly Good	Quite Good	Very Good
Increase youth involvement and interest in outdoors	1	2	3	4	5	6	7
Restore a native wildlife species	1	2	3	4	5	6	7
Increase economic opportunities through elk-related tourism	1	2	3	4	5	6	7
Provide opportunities to hunt elk	1	2	3	4	5	6	7
Increase damage to agriculture and personal property	1	2	3	4	5	6	7
Shift management focus from other wildlife species such as deer and moose	1	2	3	4	5	6	7
Conflict between elk and deer	1	2	3	4	5	6	7
Conflict between elk and moose	1	2	3	4	5	6	7
Negatively impact other wildlife populations	1	2	3	4	5	6	7
Increase conflict among people due to elk	1	2	3	4	5	6	7
Increase damage to trees and forest vegetation	1	2	3	4	5	6	7
Increase risk of disease transmission to livestock and wildlife	1	2	3	4	5	6	7
Increase cost to taxpayers	1	2	3	4	5	6	7
Provide opportunities to view elk	1	2	3	4	5	6	7

15. **How <u>unlikely or likely</u> is it that the people/groups listed below think you <u>should</u> support restoring a wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Most of my family and friends	1	2	3	4	5	6	7
Most hunters I know	1	2	3	4	5	6	7
Most local hunting organizations	1	2	3	4	5	6	7
Most local government officials	1	2	3	4	5	6	7
Most local landowners	1	2	3	4	5	6	7
Minnesota DNR	1	2	3	4	5	6	7
Local farmers & livestock producers	1	2	3	4	5	6	7
Most local residents	1	2	3	4	5	6	7
Most of my neighbors	1	2	3	4	5	6	7
Local conservation/environmental organizations	1	2	3	4	5	6	7
Local timber industry	1	2	3	4	5	6	7
Local agricultural groups	1	2	3	4	5	6	7

16. **Next we would like to know how likely you are to do what those people and groups would want you to do regarding a wild, free-ranging elk population within the study areas in Minnesota. How <u>unlikely or likely</u> are you to do what the following people/groups want you to do concerning supporting the restoration of an elk population within the study areas in Minnesota?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Most of my family and friends	1	2	3	4	5	6	7
Most hunters I know	1	2	3	4	5	6	7
Most local hunting organizations	1	2	3	4	5	6	7
Most local government officials	1	2	3	4	5	6	7
Most local landowners	1	2	3	4	5	6	7
The Minnesota DNR	1	2	3	4	5	6	7
Local farmers & livestock producers	1	2	3	4	5	6	7
Most local residents	1	2	3	4	5	6	7
Most of my neighbors	1	2	3	4	5	6	7
Local conservation/environmental organizations	1	2	3	4	5	6	7
Local timber industry	1	2	3	4	5	6	7
Local agricultural groups	1	2	3	4	5	6	7

IV. Importance of Issues Related to Elk Restoration

17. **The following questions will help managers better understand what you believe are the most important issues when considering whether wild, free-ranging elk should be restored within the study areas in Minnesota. There are a variety of issues to consider in making decisions about restoration of an elk population. You will be presented with 8 scenarios that include 5 hypothetical objectives to consider related to elk restoration. For each scenario, please check one box for the objective you consider <u>most</u> important and one box for the objective you consider <u>least</u> important.**

Scenario 1. Please check the <u>one</u> objective you think is most important and the <u>one</u> objective that is least important.

Most Important	**Objectives**	Least Important
❑	Minimize costs of government elk management activities	❑
❑	Restoration of a native species	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑

Scenario 2. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Minimize damage to trees and forest vegetation	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk viewing opportunities	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Minimize impacts to deer populations and deer hunting	❑

Scenario 3. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk viewing opportunities	❑
❑	Provide elk hunting opportunities	❑

Scenario 4. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Provide elk viewing opportunities	❑
❑	Provide elk hunting opportunities	❑
❑	Minimize impacts to deer populations and deer hunting	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑

Scenario 5. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Provide elk hunting opportunities	❑
❑	Minimize impacts to deer populations and deer hunting	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximum sustainable elk population size	❑

Scenario 6. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Restoration of a native species	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Maximum sustainable elk population size	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Provide elk viewing opportunities	❑

Scenario 7. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Maximum sustainable elk population size	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Restoration of a native species	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk hunting opportunities	❑

Scenario 8. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximum sustainable elk population size	❑
❑	Restoration of a native species	❑
❑	Minimize impacts to deer populations and deer hunting	❑

V. Risks of restoring elk

18. **The following questions will help us understand your perceptions of the potential risks from restoring wild, free-ranging elk within the study areas in Minnesota. In general, how severe are the potential risks of restoring wild, free-ranging elk within the study areas in Minnesota***? (Please circle one number below where 1 = No Risk, 4 = Moderate Risk and 7 = Extreme Risk)*

No Risk 1 2 3 4 5 6 7 Extreme Risk

19. **In general, how great are the potential benefits of restoring wild, free-ranging elk within the study areas in Minnesota?** *(Please circle one number below where 1 = No Benefit, 4 = Moderate Benefit and 7 = Extreme Benefit)*

No Benefit 1 2 3 4 5 6 7 Extreme Benefit

20. **How certain are you about potential risks and benefits of restoring wild, free-ranging elk within the study areas in Minnesota?** *(Please circle one number below where 1 = Very Uncertain and 7 = Very Certain)*

Very Uncertain 1 2 3 4 5 6 7 Very Certain

21. **If wild, free-ranging elk are restored within the study areas in Minnesota, how much personal control do you believe you would have to limit risk to yourself?** *(Please circle one number below where 1 = No Control, 4 = Moderate Control and 7 = Complete Control)*

No Control 1 2 3 4 5 6 7 Complete Control

VI. Impacts of deer and elk

22. **The following questions will help us understand your perceptions of the potential impacts of restoring a wild, free-ranging elk population within the study areas in Minnesota compared to the current impacts of deer. Currently, how much of a threat do you think <u>DEER</u> within the study areas pose to…?** (*Please circle one number for each row below*)

	No Threat			Moderate Threat			Extreme Threat
… Your own economic well-being (agriculture, personal property)?	1	2	3	4	5	6	7
… Your own health/safety (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… The economic well-being of individuals in the local community (agriculture, personal property)?	1	2	3	4	5	6	7
… The health/safety of individuals in the local community (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… Other wildlife in area (disease, etc.)?	1	2	3	4	5	6	7
… Trees and forest vegetation?	1	2	3	4	5	6	7

23. **If elk were restored, how much threat do you think having <u>ELK</u> within the study areas would pose to…?** (*Please circle one number for each row below*)

	No Threat			Moderate Threat			Extreme Threat
… Your own economic well-being (agriculture, personal property)?	1	2	3	4	5	6	7
… Your own health/safety (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… The economic well-being of individuals in the local community (agriculture, personal property)?	1	2	3	4	5	6	7
… The health/safety of individuals in the local community (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… Other wildlife in area (disease, etc.)?	1	2	3	4	5	6	7
… Trees and forest vegetation?	1	2	3	4	5	6	7

24. **If wild, free-ranging elk are restored within the study areas in Minnesota, how much personal control do you believe you would have to…?** (*Please circle one number for each row below*)

	No Control			Moderate Control			Complete Control
… Limit elk damage to your agricultural and personal property?	1	2	3	4	5	6	7
… Limit elk damage to your trees and forest vegetation?	1	2	3	4	5	6	7
… Limit impact of elk to deer and other wildlife in the study areas?	1	2	3	4	5	6	7
… Influence elk management decisions in study areas?	1	2	3	4	5	6	7

VII. Importance of Elk in Minnesota

25. **Please identify if you disagree or agree with each of the following statements.** (*Circle one number for each row*)

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
It is important that Minnesota someday have an abundant elk population within the study areas.	1	2	3	4	5	6	7
Whether or not I would get to see an elk, it is important to me that they could exist within the study areas.	1	2	3	4	5	6	7
It is important to establish elk populations within the study areas so future generations can enjoy them.	1	2	3	4	5	6	7

VIII. Trust in wildlife managers

26. **Please let us know whether you disagree or agree with the following statements about wildlife management within the study areas in Minnesota if elk are restored to the study areas.** (*Circle one number for each row*)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
When deciding about elk management, wildlife managers would be open and honest in the things they do and say.	1	2	3	4	5
Wildlife managers can be trusted to make decisions about elk management that are good for the resource.	1	2	3	4	5
Wildlife managers will make decisions about elk management in a way that is fair.	1	2	3	4	5

IX. Elk-related recreation

27. **The next questions will help us understand your experience with elk and elk-related recreation. If a wild, free-ranging elk population is restored within the study areas in Minnesota, how likely or unlikely would you be to make a trip for which viewing, photographing or hearing elk is an important part of the trip?** (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

28. **Have you ever visited a National Park or similar destination in North America for which an important part of the trip was viewing, photographing or hearing elk?** (*Please check yes or no*)
    - ❑ Yes
    - ❑ No

29. **Have you ever lived in an area where elk were common?** (*Please check yes or no*)
    - ❑ Yes
    - ❑ No

30. **Have you hunted elk or applied for an elk license in Minnesota or elsewhere in North America?** (*Check all that apply*)

- ❑ I have applied for or have drawn a Minnesota elk license.
- ❑ I plan to apply for a Minnesota elk license in the future.
- ❑ I do not plan to apply for a Minnesota elk license in the future.
- ❑ I have hunted elk or applied to hunt elk elsewhere in North America.

X. Outdoor activities and membership

31. **In which of the following activities have you participated in the last 12 months?** (*Check all that apply*)

- ❑ Deer hunting
- ❑ Other hunting or trapping
- ❑ Wildlife watching or photography
- ❑ Feeding wildlife
- ❑ Snowmobiling
- ❑ ATV riding
- ❑ Hiking
- ❑ Fishing
- ❑ RV or tent camping
- ❑ Cross-country skiing
- ❑ None of the above
- ❑ Other (please specify): _____

32. **Are you currently a member of:** (*Check <u>all</u> that apply*)

- ❑ Rocky Mountain Elk Foundation
- ❑ Minnesota Deer Hunters Association
- ❑ Quality Deer Management Association
- ❑ Other environmental/conservation/hunting organization(s): *Please specify*: _____
- ❑ Local sporting club
- ❑ Sierra Club
- ❑ The Nature Conservancy
- ❑ National Audubon Society

XI. The last questions will help us know more about you.

33. **Which best describes the primary area where you were raised as a youth?** (*Check one*)

- ❑ Rural on a farm
- ❑ Rural non-farm
- ❑ Small town
- ❑ Suburb
- ❑ City

34. **Which of the following best represents your gross household income (before taxes) last year?** (*Check one*)

- ❑ Less than $10,000
- ❑ $10,000 to $19,999
- ❑ $20,000 to $29,999
- ❑ $30,000 to $39,999
- ❑ $40,000 to $49,999
- ❑ $50,000 to $59,999
- ❑ $60,000 to $69,999
- ❑ $70,000 to $79,999
- ❑ $80,000 to $89,999
- ❑ $90,000 to $99,999
- ❑ $100,000 to $124,999
- ❑ $125,000 to $149,999
- ❑ $150,000 to $174,999
- ❑ $175,000 to $199,999
- ❑ $200,000 or more

35. **What percent of your total household income is derived from agricultural activities?** (*Please check one*)

- ❑ None
- ❑ 1-25%
- ❑ 26-50%
- ❑ 51-75%
- ❑ 76-100%

36. **What is the highest level of education you have completed?** (*Check one*)

- ❑ Grade school
- ❑ Some high school
- ❑ High school diploma or GED
- ❑ Some vocational or technical school
- ❑ Vocational or technical school (associate's) degree
- ❑ Some college
- ❑ Four-year college (bachelor's) degree
- ❑ Some graduate school
- ❑ Graduate (master's or doctoral) degree

37. **How many years have you lived in Minnesota?** _____ Years

38. **How many years have you owned this property within the study areas in Minnesota?** _____ Years

39. **What is your gender?** ❑ Male ❑ Female ❑ Other / rather not identify

40. **What is your age?** _____ Years old

Thank you for your participation!

- ❑ Check this box if you would like us to email you when the results of the survey are posted online. Please provide your email address below.

  E-mail: _____

- ❑ Check this box if you would be willing to allow University of Minnesota researchers to measure woody and non-woody plants on your property in summer 2018. We would like to estimate potential elk forage available on public and private land within the study areas in Minnesota. This process typically takes less than one day. Please provide your email address or phone number below.

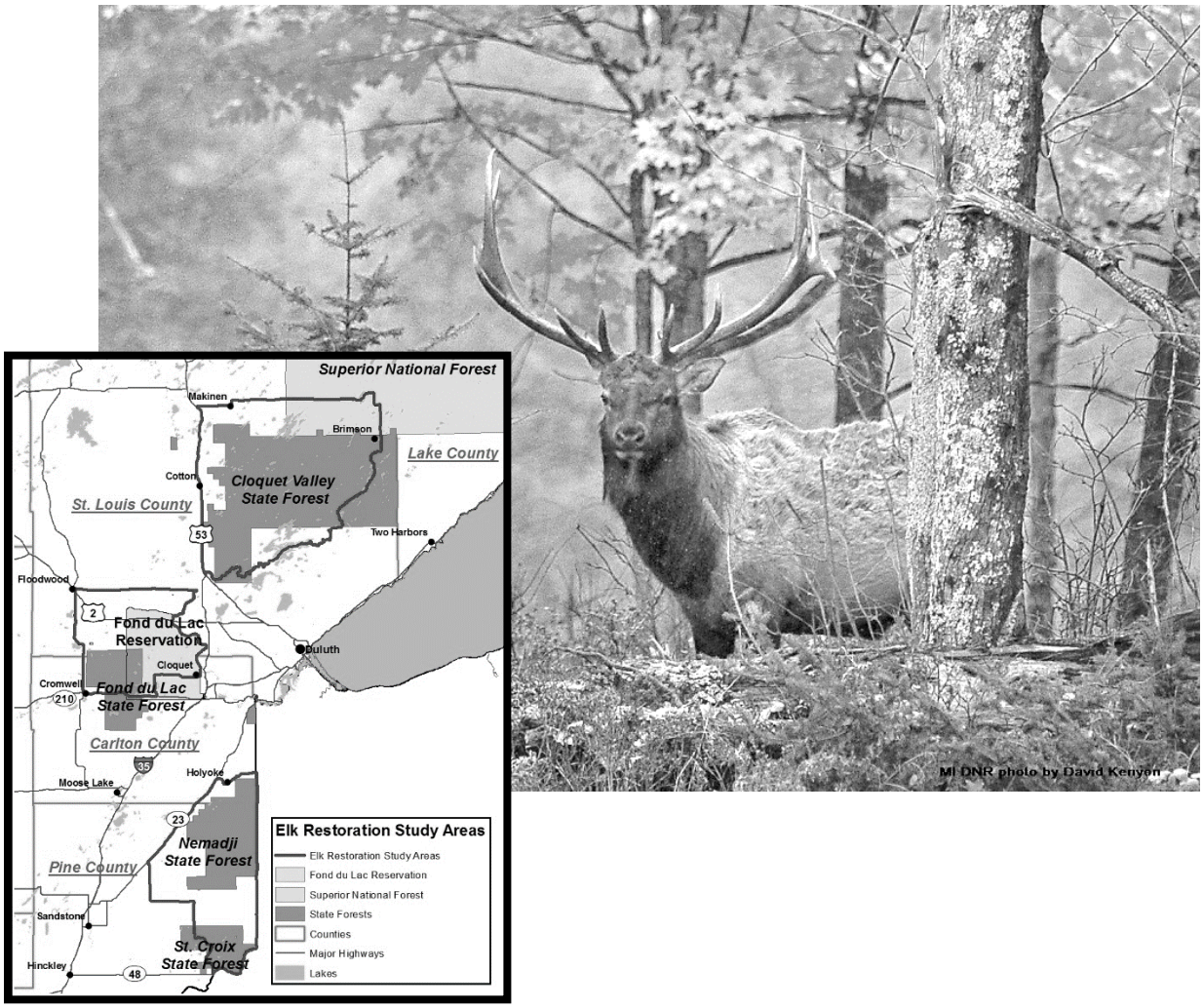
  Phone: _____

  E-mail: _____

Please write any comments you may have in the space below (feel free to include a separate page):

Appendix B:
Public Attitudes toward Potential Elk Restoration in Minnesota

Public Attitudes toward Potential Elk Restoration in Minnesota



Your help on this survey is greatly appreciated!

Please return your completed questionnaire in the enclosed envelope. The envelope is self-addressed and no postage is required. Thanks!

Minnesota Cooperative Fish & Wildlife Research Unit,
1980 Folwell Ave., 200 Hodson Hall
Department of Fisheries, Wildlife, and Conservation Biology
University of Minnesota
St. Paul, MN 55108

V1

I. Knowledge about elk in Minnesota

1. **This survey will address restoring wild, free-ranging elk within the 3 study areas in Minnesota. To estimate your knowledge of elk in Minnesota, please answer the following questions based on knowledge you had prior to receiving this questionnaire.** (*Please circle one number for each row below*)

	Yes	No
Did you know that wild, free-ranging elk historically lived in most of Minnesota?	1	2
Did you know that approximately 100 wild, free-ranging elk live in northwest Minnesota?	1	2
Did you know that wild, free-ranging elk have previously been restored to parts of northwest Minnesota?	1	2

II. Attitudes about elk restoration

2. **The following questions will help us determine your attitudes toward restoring wild, free-ranging elk within the study areas in Minnesota. Overall, how would you describe your feelings about potentially restoring wild, free-ranging elk within the study areas in Minnesota?** (*Please circle one number below*)

Very Unfavorable	Moderately Unfavorable	Slightly Unfavorable	Neutral	Slightly Favorable	Moderately Favorable	Very Favorable
1	2	3	4	5	6	7

3. **How important or unimportant are decisions regarding the potential restoration of wild, free-ranging elk within the study areas in Minnesota to you personally?** (*Please circle one number below*)

Very Unimportant	Moderately Unimportant	Slightly Unimportant	Neither	Slightly Important	Moderately Important	Very Important
1	2	3	4	5	6	7

4. **How unlikely or likely are you to support restoring wild, free-ranging elk…?** (*Please circle one number for each row*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
… To Minnesota in general?	1	2	3	4	5	6	7
… To the study areas in Minnesota?	1	2	3	4	5	6	7

5. **We want to know how the idea of restoring wild, free-ranging elk within the study areas in Minnesota makes you feel. When thinking about potentially restoring elk within the study areas in Minnesota, how much do you feel…?** (*Circle one number for each row*)

	None					Moderate					A lot
Worried	0	1	2	3	4	5	6	7	8	9	10
Interested	0	1	2	3	4	5	6	7	8	9	10
Supportive	0	1	2	3	4	5	6	7	8	9	10

6. **Would you say supporting the restoration of a wild, free-ranging elk population within the study areas in Minnesota is…?** (*Please circle one number for each row below*)

	Very	Quite	Slightly	Neither	Slightly	Quite	Very	
Negative	1	2	3	4	5	6	7	Positive
Harmful	1	2	3	4	5	6	7	Beneficial
Bad	1	2	3	4	5	6	7	Good

7. **Would most people who are important to you believe that you should or should not support restoring a wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number below*)

Very much should not	Moderately should not	Slightly should not	Neither	Slightly should	Moderately should	Very much should
1	2	3	4	5	6	7

8. **Do you disagree or agree that you want to do what people who are important to you think you should do regarding supporting the restoration of wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number below*)

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
1	2	3	4	5	6	7

9. **How <u>unlikely or likely</u> do you believe the following potential outcomes are from restoring a wild, free-ranging elk population within the study areas in Minnesota…?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Increase youth involvement and interest in outdoors	1	2	3	4	5	6	7
Restore a native wildlife species	1	2	3	4	5	6	7
Increase economic opportunities through elk-related tourism	1	2	3	4	5	6	7
Provide opportunities to hunt elk	1	2	3	4	5	6	7
Increase damage to agriculture and personal property	1	2	3	4	5	6	7
Shift management focus from other wildlife species such as deer and moose	1	2	3	4	5	6	7
Conflict between elk and deer	1	2	3	4	5	6	7
Conflict between elk and moose	1	2	3	4	5	6	7
Negatively impact other wildlife populations	1	2	3	4	5	6	7
Increase conflict among people due to elk	1	2	3	4	5	6	7
Increase damage to trees and forest vegetation	1	2	3	4	5	6	7
Increase risk of disease transmission to livestock and wildlife	1	2	3	4	5	6	7
Increase cost to taxpayers	1	2	3	4	5	6	7
Provide opportunities to view elk	1	2	3	4	5	6	7

10. **How <u>bad or good</u> do you believe the following potential outcomes are from restoring a wild, free-ranging elk population within the study areas in Minnesota…?** (*Please circle one number for each row below*)

	Very Bad	Quite Bad	Slightly Bad	Neutral	Slightly Good	Quite Good	Very Good
Increase youth involvement and interest in outdoors	1	2	3	4	5	6	7
Restore a native wildlife species	1	2	3	4	5	6	7
Increase economic opportunities through elk-related tourism	1	2	3	4	5	6	7
Provide opportunities to hunt elk	1	2	3	4	5	6	7
Increase damage to agriculture and personal property	1	2	3	4	5	6	7
Shift management focus from other wildlife species such as deer and moose	1	2	3	4	5	6	7
Conflict between elk and deer	1	2	3	4	5	6	7
Conflict between elk and moose	1	2	3	4	5	6	7
Negatively impact other wildlife populations	1	2	3	4	5	6	7
Increase conflict among people due to elk	1	2	3	4	5	6	7
Increase damage to trees and forest vegetation	1	2	3	4	5	6	7
Increase risk of disease transmission to livestock and wildlife	1	2	3	4	5	6	7
Increase cost to taxpayers	1	2	3	4	5	6	7
Provide opportunities to view elk	1	2	3	4	5	6	7

11. **How <u>unlikely or likely</u> is it that the people/groups listed below think you <u>should</u> support restoring a wild, free-ranging elk population within the study areas in Minnesota?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Most of my family and friends	1	2	3	4	5	6	7
Most hunters I know	1	2	3	4	5	6	7
Most local hunting organizations	1	2	3	4	5	6	7
Most local government officials	1	2	3	4	5	6	7
Most local landowners	1	2	3	4	5	6	7
Minnesota DNR	1	2	3	4	5	6	7
Local farmers & livestock producers	1	2	3	4	5	6	7
Most local residents	1	2	3	4	5	6	7
Most of my neighbors	1	2	3	4	5	6	7
Local conservation/environmental organizations	1	2	3	4	5	6	7
Local timber industry	1	2	3	4	5	6	7
Local agricultural groups	1	2	3	4	5	6	7

12. **Next we would like to know how likely you are to do what those people and groups would want you to do regarding a wild, free-ranging elk population within the study areas in Minnesota. How unlikely or likely are you to do what the following people/groups want you to do concerning supporting the restoration of an elk population within the study areas in Minnesota?** (*Please circle one number for each row below*)

	Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
Most of my family and friends	1	2	3	4	5	6	7
Most hunters I know	1	2	3	4	5	6	7
Most local hunting organizations	1	2	3	4	5	6	7
Most local government officials	1	2	3	4	5	6	7
Most local landowners	1	2	3	4	5	6	7
The Minnesota DNR	1	2	3	4	5	6	7
Local farmers & livestock producers	1	2	3	4	5	6	7
Most local residents	1	2	3	4	5	6	7
Most of my neighbors	1	2	3	4	5	6	7
Local conservation/environmental organizations	1	2	3	4	5	6	7
Local timber industry	1	2	3	4	5	6	7
Local agricultural groups	1	2	3	4	5	6	7

III. Importance of Issues Related to Elk Restoration

13. **The following questions will help managers better understand what you believe are the most important issues when considering whether wild, free-ranging elk should be restored within the study areas in Minnesota. There are a variety of issues to consider in making decisions about restoration of an elk population. You will be presented with 8 scenarios that include 5 hypothetical objectives to consider related to elk restoration. For each scenario, please check one box for the objective you consider most important and one box for the objective you consider least important.**

Scenario 1. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Minimize costs of government elk management activities	❑
❑	Restoration of a native species	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑

Scenario 2. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Minimize damage to trees and forest vegetation	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk viewing opportunities	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Minimize impacts to deer populations and deer hunting	❑

Scenario 3. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk viewing opportunities	❑
❑	Provide elk hunting opportunities	❑

Scenario 4. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Provide elk viewing opportunities	❑
❑	Provide elk hunting opportunities	❑
❑	Minimize impacts to deer populations and deer hunting	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑

Scenario 5. Please check the one objective you think is most important and the one objective that is least important.

Most Important	Objectives	Least Important
❑	Provide elk hunting opportunities	❑
❑	Minimize impacts to deer populations and deer hunting	❑
❑	Minimize damage to agriculture and personal property (e.g., fences, vehicles)	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximum sustainable elk population size	❑

Scenario 6. Please check the <u>one</u> objective you think is most important and the <u>one</u> objective that is least important.

Most Important	**Objectives**	Least Important
❑	Restoration of a native species	❑
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Maximum sustainable elk population size	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Provide elk viewing opportunities	❑

Scenario 7. Please check the <u>one</u> objective you think is most important and the <u>one</u> objective that is least important.

Most Important	**Objectives**	Least Important
❑	Maximum sustainable elk population size	❑
❑	Minimize impacts to existing wildlife populations (e.g., disease, resource competition)	❑
❑	Restoration of a native species	❑
❑	Minimize costs of government elk management activities	❑
❑	Provide elk hunting opportunities	❑

Scenario 8. Please check the <u>one</u> objective you think is most important and the <u>one</u> objective that is least important.

Most Important	**Objectives**	Least Important
❑	Maximize economic opportunities through elk-related tourism and recreation	❑
❑	Minimize damage to trees and forest vegetation	❑
❑	Maximum sustainable elk population size	❑
❑	Restoration of a native species	❑
❑	Minimize impacts to deer populations and deer hunting	❑

IV. Risks of restoring elk

14. **The following questions will help us understand your perceptions of the potential risks from restoring wild, free-ranging elk within the study areas in Minnesota. In general, how severe are the <u>potential risks</u> of restoring wild, free-ranging elk within the study areas in Minnesota***? (Please circle one number below where 1 = No Risk, 4 = Moderate Risk and 7 = Extreme Risk)*

No Risk 1 2 3 4 5 6 7 Extreme Risk

15. **In general, how great are the <u>potential benefits</u> of restoring wild, free-ranging elk within the study areas in Minnesota?** *(Please circle one number below where 1 = No Benefit, 4 = Moderate Benefit and 7 = Extreme Benefit)*

No Benefit 1 2 3 4 5 6 7 Extreme Benefit

16. **How certain are you about potential risks and benefits of restoring wild, free-ranging elk within the study areas in Minnesota?** *(Please circle one number below where 1 = Very Uncertain and 7 = Very Certain)*

Very Uncertain 1 2 3 4 5 6 7 Very Certain

17. **If wild, free-ranging elk are restored within the study areas in Minnesota, how much personal control do you believe you would have to limit risk to yourself?** *(Please circle one number below where 1 = No Control, 4 = Moderate Control and 7 = Complete Control)*

No Control	1	2	3	4	5	6	7	Complete Control

V. Impacts of deer and elk

18. **The following questions will help us understand your perceptions of the potential impacts of restoring a wild, free-ranging elk population within the study areas in Minnesota compared to the current impacts of deer. Currently, how much of a threat do you think <u>DEER</u> within the study areas pose to…?** (*Please circle one number for each row below*)

	No Threat			Moderate Threat			Extreme Threat
… Your own economic well-being (agriculture, personal property)?	1	2	3	4	5	6	7
… Your own health/safety (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… The economic well-being of individuals in the local community (agriculture, personal property)?	1	2	3	4	5	6	7
… The health/safety of individuals in the local community (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… Other wildlife in area (disease, etc.)?	1	2	3	4	5	6	7
… Trees and forest vegetation?	1	2	3	4	5	6	7

19. **If elk were restored, how much threat do you think having <u>ELK</u> within the study areas would pose to…?** (*Please circle one number for each row below*)

	No Threat			Moderate Threat			Extreme Threat
… Your own economic well-being (agriculture, personal property)?	1	2	3	4	5	6	7
… Your own health/safety (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… The economic well-being of individuals in the local community (agriculture, personal property)?	1	2	3	4	5	6	7
… The health/safety of individuals in the local community (vehicle collisions, etc.)?	1	2	3	4	5	6	7
… Other wildlife in area (disease, etc.)?	1	2	3	4	5	6	7
… Trees and forest vegetation?	1	2	3	4	5	6	7

20. **If wild, free-ranging elk are restored within the study areas in Minnesota, how much personal control do you believe you would have to influence elk management decisions in study areas?** (*(Please circle one number below where 1 = No Control, 4 = Moderate Control and 7 = Complete Control*)

No Control	1	2	3	4	5	6	7	Complete Control

VI. Importance of Elk in Minnesota

21. **Please identify if you disagree or agree with each of the following statements.** (*Circle one number for each row*)

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither	Slightly Agree	Moderately Agree	Strongly Agree
It is important that Minnesota someday have an abundant elk population within the study areas.	1	2	3	4	5	6	7
Whether or not I would get to see an elk, it is important to me that they could exist within the study areas.	1	2	3	4	5	6	7
It is important to establish elk populations within the study areas so future generations can enjoy them.	1	2	3	4	5	6	7

VII. Trust in elk managers

22. **Please let us know whether you disagree or agree with the following statements about wildlife management within the study areas in Minnesota if elk are restored to the study areas.** (*Circle one number for each row*)

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
When deciding about elk management, wildlife managers would be open and honest in the things they do and say.	1	2	3	4	5
Wildlife managers can be trusted to make decisions about elk management that are good for the resource.	1	2	3	4	5
Wildlife managers will make decisions about elk management in a way that is fair.	1	2	3	4	5

VIII. Elk-related recreation

23. **The next questions will help us understand your experience with elk and elk-related recreation. If a wild, free-ranging elk population is restored within the study areas in Minnesota, how likely or unlikely would you be to make a trip for which viewing, photographing or hearing elk is an important part of the trip?** (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

24. **Have you ever visited a National Park or similar destination in North America for which an important part of the trip was viewing, photographing or hearing elk?** *(Please check yes or no)*
    - ❑ Yes
    - ❑ No

25. **Have you ever lived in an area where elk were common?** *(Please check yes or no)*
    - ❑ Yes
    - ❑ No

26. **Have you hunted elk or applied for an elk license in Minnesota or elsewhere in North America?** (*Check all that apply*)
- ❑ I have applied for or have drawn a Minnesota elk license.
- ❑ I plan to apply for a Minnesota elk license in the future.
- ❑ I do not plan to apply for a Minnesota elk license in the future.
- ❑ I have hunted elk or applied to hunt elk elsewhere in North America.

IX. Outdoor activities and membership

27. **In which of the following activities have you participated in the last 12 months?** (*Check all that apply*)
- ❑ Deer hunting
- ❑ Other hunting or trapping
- ❑ Wildlife watching or photography
- ❑ Feeding wildlife
- ❑ Snowmobiling
- ❑ ATV riding
- ❑ Hiking
- ❑ Fishing
- ❑ RV or tent camping
- ❑ Cross-country skiing
- ❑ None of the above
- ❑ Other (please specify): _____

28. **Are you currently a member of:** (*Check <u>all</u> that apply*)
- ❑ Rocky Mountain Elk Foundation
- ❑ Minnesota Deer Hunters Association
- ❑ Quality Deer Management Association
- ❑ Other environmental/conservation/hunting organization(s): *Please specify*: _____
- ❑ Local sporting club
- ❑ Sierra Club
- ❑ The Nature Conservancy
- ❑ National Audubon Society

X. The last questions will help us know more about you.

29. **Which best describes the primary area where you were raised as a youth?** (*Check one*)
- ❑ Rural on a farm
- ❑ Rural non-farm
- ❑ Small town
- ❑ Suburb
- ❑ City

30. **Which of the following best represents your gross household income (before taxes) last year?** (*Check one*)
- ❑ Less than $10,000
- ❑ $10,000 to $19,999
- ❑ $20,000 to $29,999
- ❑ $30,000 to $39,999
- ❑ $40,000 to $49,999
- ❑ $50,000 to $59,999
- ❑ $60,000 to $69,999
- ❑ $70,000 to $79,999
- ❑ $80,000 to $89,999
- ❑ $90,000 to $99,999
- ❑ $100,000 to $124,999
- ❑ $125,000 to $149,999
- ❑ $150,000 to $174,999
- ❑ $175,000 to $199,999
- ❑ $200,000 or more

31. **What is the highest level of education you have completed?** (*Check one*)
- ❑ Grade school
- ❑ Some high school
- ❑ High school diploma or GED
- ❑ Some vocational or technical school
- ❑ Vocational or technical school (associate's) degree
- ❑ Some college
- ❑ Four-year college (bachelor's) degree
- ❑ Some graduate school
- ❑ Graduate (master's or doctoral) degree

32. **How many years have you lived in Minnesota?** _____ Years

33. **Do you own or rent your current residence?** ❑ Own ❑ Rent

34. **How many years have you owned/rented your current residence?** _____ Years

35. **What is your gender?** ❑ Male ❑ Female ❑ Other / rather not identify

36. **What is your age?** _____ Years old

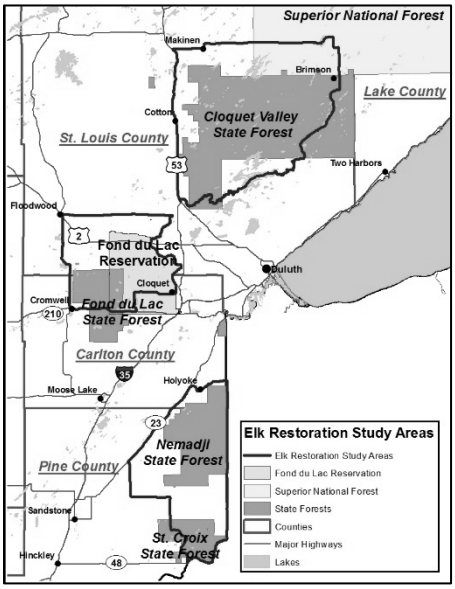
Thank you for your participation!

❑ Check this box if you would like us to email you when the results of the survey are posted online. Please provide your email address below.

E-mail: _____

Appendix C:
Shortened Survey of Landowners to Gauge Nonresponse Bias

Landowner Attitudes toward Potential Elk Restoration in Minnesota



Dear Landowner,
During the past few months, we have sent you several survey mailings. We are sending you this shortened survey because we are concerned that people who have not responded may differ from those who have already responded. We appreciate your willingness to complete this short survey as we conclude this effort to better understand issues related to potentially restoring elk to Minnesota. If you have questions or comments about this study, please contact Eric Walberg at **walbe032@umn.edu** or **612-625-3718 Ext. 1**.

Sincerely,

David Fulton, Ph.D., Adj. Professor

1. Why did you not respond to our earlier survey mailings? (*Please check all that apply*)
   - ❑ I am not interested in restoring elk.
   - ❑ Lack of knowledge about elk.
   - ❑ I did not have time.
   - ❑ The original survey was too long.
   - ❑ I never received the earlier mailings.
   - ❑ I misplaced my earlier mailings.
   - ❑ I intended to complete it, but did not get to it.
   - ❑ Challenge of returning postal survey.
   - ❑ I returned it.
   - ❑ The information and questions were too complicated.
   - ❑ Concerned about how the information would be used.
   - ❑ Other: _____

2. Which best describes your property within the study areas in Minnesota? (*Check all that apply*)
   - ❑ Primary residence
   - ❑ Agricultural production
   - ❑ Rental property
   - ❑ Business property
   - ❑ Seasonal or recreational residence

3. What percent of your total household income is derived from agricultural activities? (*Please check one*)
   - ❑ None
   - ❑ 1-25%
   - ❑ 26-50%
   - ❑ 51-75%
   - ❑ 76-100%

4. Overall, how would you describe your feelings about potentially restoring wild, free-ranging elk within the study areas in Minnesota? (*Please circle one number below*)

Very Unfavorable	Moderately Unfavorable	Slightly Unfavorable	Neutral	Slightly Favorable	Moderately Favorable	Very Favorable
1	2	3	4	5	6	7

5. How important or unimportant are decisions regarding the potential restoration of wild, free-ranging elk within the study areas in Minnesota to you personally? (*Please circle one number below*)

Very Unimportant	Moderately Unimportant	Slightly Unimportant	Neither	Slightly Important	Moderately Important	Very Important
1	2	3	4	5	6	7

6. How unlikely or likely are you to support restoring wild, free-ranging elk to Minnesota in general? (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

7. If a wild, free-ranging elk population is restored within the study areas in Minnesota, how likely or unlikely would you be to make a trip for which viewing, photographing or hearing elk is an important part of the trip? (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

8. Have you hunted elk or applied for an elk license in Minnesota or elsewhere in North America? (*Check all that apply*)
   - ❑ I have applied for or have drawn a Minnesota elk license.
   - ❑ I plan to apply for a Minnesota elk license in the future.
   - ❑ I do not plan to apply for a Minnesota elk license in the future.
   - ❑ I have hunted elk or applied to hunt elk elsewhere in North America.

9. How many years have you lived in Minnesota? _____ Years

10. How many years have you owned this property within the study areas in Minnesota? _____ Years

11. What is your gender? ❑ Male ❑ Female ❑ Other / rather not identify

12. What is your age? _____ Years old

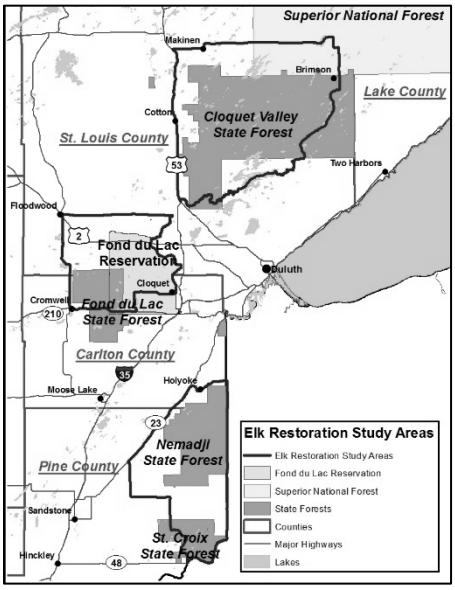
Please write any comments you may have in the space below (feel free to include a separate page).

THANK YOU FOR YOUR HELP!

Please return the completed questionnaire in the enclosed self-addressed, stamped envelope.

Appendix D:
Shortened Survey of Public to Gauge Nonresponse Bias

Public Attitudes toward Potential Elk Restoration in Minnesota



Greetings,
During the past few months, we have sent you several survey mailings. We are sending you this shortened survey because we are concerned that people who have not responded may differ from those who have already responded. We appreciate your willingness to complete this short survey as we conclude this effort to better understand issues related to potentially restoring elk to Minnesota. If you have questions or comments about this study, please contact Eric Walberg at **walbe032@umn.edu** or **612-625-3718 Ext. 1**.

Sincerely,

David Fulton, Ph.D., Adj. Professor

1. Why did you not respond to our earlier survey mailings? (*Please check all that apply*)
   - ❑ I am not interested in restoring elk.
   - ❑ Lack of knowledge about elk.
   - ❑ I did not have time.
   - ❑ The original survey was too long.
   - ❑ I never received the earlier mailings.
   - ❑ I misplaced my earlier mailings.
   - ❑ I intended to complete it, but did not get to it.
   - ❑ Challenge of returning postal survey.
   - ❑ I returned it.
   - ❑ The information and questions were too complicated.
   - ❑ Concerned about how the information would be used.
   - ❑ Other: _____

2. Overall, how would you describe your feelings about potentially restoring wild, free-ranging elk within the study areas in Minnesota? (*Please circle one number below*)

Very Unfavorable	Moderately Unfavorable	Slightly Unfavorable	Neutral	Slightly Favorable	Moderately Favorable	Very Favorable
1	2	3	4	5	6	7

3. How important or unimportant are decisions regarding the potential restoration of wild, free-ranging elk within the study areas in Minnesota to you personally? (*Please circle one number below*)

Very Unimportant	Moderately Unimportant	Slightly Unimportant	Neither	Slightly Important	Moderately Important	Very Important
1	2	3	4	5	6	7

4. How unlikely or likely are you to support restoring wild, free-ranging elk to Minnesota in general? (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

5. If a wild, free-ranging elk population is restored within the study areas in Minnesota, how likely or unlikely would you be to make a trip for which viewing, photographing or hearing elk is an important part of the trip? (*Please circle one number below*)

Very Unlikely	Quite Unlikely	Slightly Unlikely	Unsure	Slightly Likely	Quite Likely	Very Likely
1	2	3	4	5	6	7

6. Have you hunted elk or applied for an elk license in Minnesota or elsewhere in North America? (*Check all that apply*)
   - ❑ I have applied for or have drawn a Minnesota elk license.
   - ❑ I plan to apply for a Minnesota elk license in the future.
   - ❑ I do not plan to apply for a Minnesota elk license in the future.
   - ❑ I have hunted elk or applied to hunt elk elsewhere in North America.

7. How many years have you lived in Minnesota? _____ Years

8. What is your gender? ❑ Male ❑ Female ❑ Other / rather not identify

9. What is your age? _____ Years old

Please write any comments you may have in the space below (feel free to include a separate page).

THANK YOU FOR YOUR HELP!

Please return the completed questionnaire in the enclosed self-addressed, stamped envelope.