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# Tourist Attitudes toward Elk Management in the Pine Ridge Region of Northwestern Nebraska

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# TOURIST ATTITUDES TOWARD ELK MANAGEMENT IN THE PINE RIDGE REGION OF NORTHWESTERN NEBRASKA

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**ABSTRACT**—We interviewed 200 tourists at Fort Robinson State Park and Chadron State Park in the Pine Ridge region of northwestern Nebraska during July and August of 1997 to determine attitudes toward elk (*Cervus elaphus*) and elk management in Nebraska. Fifty-nine percent of the respondents were aware that elk occupied the Pine Ridge, 95% favored free-ranging elk, and 55% favored hunting as a means of managing the population. Nebraska residents were more aware of elk and elk hunting in the Pine Ridge than were nonresidents. Also, more residents had observed elk and were willing to drive longer distances to view elk in the Pine Ridge. Respondents in older age groups (55–64) were more knowledgeable about elk. More urban tourists were in favor of elk than those from rural communities, but attitudes toward elk hunting were similar between urban and rural residents. Seventy-six percent of respondents wanted an increase in the population of elk. Men were more aware of elk populations than women and more supportive of hunting as the best method to manage the population. We found no differences between gender for maintaining free-ranging elk, knowledge of hunting seasons, or willingness to drive, pay, or spend time to view elk. Our results revealed that tourists had positive attitudes toward free-ranging elk and management practices in Nebraska. Elk herds should be managed to provide maximum opportunity for both consumptive and nonconsumptive uses while minimizing negative impacts to property owners and the ecosystem.

**Key Words:** *Cervus elaphus*, elk, human dimensions, Nebraska, public knowledge, tourist attitudes

## INTRODUCTION

Participation in nonconsumptive uses of wildlife in 2006 was >71 million people, which is an increase of over 8 million since 1996 (U.S. Fish and Wildlife Service [USFWS] 1996, 2006). Managers have opportunities to optimize economic benefits in regions with exceptional wildlife resources given growing interest in nonconsumptive uses (Vickerman 1988). Nonconsumptive use of wildlife and other resources may be as profitable as any other type of use, if not more, as Americans spent approximately \$18 billion annually on wildlife viewing, photography, travel, and feeding wild animals in 1991, and nearly \$46 billion in 2006 (USFWS 1993, 2006). Awareness of the nonconsumptive user's expectations, motivations, and satisfaction will allow more precise integration of the human component to minimize human-wildlife conflicts and maximize

enhancement of wildlife species (Duffus and Dearden 1990). Understanding the motivation for participation in nontraditional activities such as wildlife viewing may become more important as those who enjoy nonconsumptive activities become a larger proportion of the beneficiaries of wildlife management (Decker and Enck 1996).

Tourism is an important industry in the United States. In Nebraska, tourism was the third largest source of revenue in 1996 (after agriculture and manufacturing), generating \$2 billion, and revenue from tourism increased to \$3.3 billion in 2006 (Nebraska Department of Economic Development, Division of Research 1996, 2006). Each dollar a tourist spends is estimated to produce an additional \$2.70 in business income.

The public has become increasingly aware and involved in wildlife and natural resource management in the last few decades. It is important for resource managers to monitor change in public attitudes (Decker and Enck 1996). Societies have been moving toward nonutilitarian values and have exhibited increasingly

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negative attitudes toward hunting (Manfredo and Zinn 1996; Manfredo et al. 2003). Resource managers can anticipate future demands as well as ecological threats to wildlife by monitoring these changes (Mangun 1992). Wildlife agencies have improved their ability to predict public reaction to management decisions and have increased their credibility and effectiveness through monitoring public attitudes toward controversial programs (Decker and Enck 1996; Decker et al. 1996).

Surprisingly little is known about the attitudes of tourists toward elk and their management. We found little information on the subject despite our direct contact with various state and government agencies in the Rocky Mountain region, including Yellowstone National Park and the National Elk Refuge in Jackson, WY. Caughlan (2002) explored stakeholder involvement on the influence of resource management and decision making on the National Elk Refuge and Grand Teton National Park in Wyoming and used this information to build a decision-making framework. A similar study was conducted by Neff (2007) at the National Elk Refuge near Jackson, WY. Regional economies in ecotourism areas depend on healthy ecosystems for tourism, wildlife viewing, hunting, and outfitting (Loomis and Caughlan 2004). Social and economic pressures may cause difficulty for managers to change management regimes if challenged by stakeholders who perceive their interests are harmed (Neff 2007).

The goal of this study was to determine the awareness and attitudes of tourists in the Pine Ridge region of northwestern Nebraska regarding elk and management of elk. Specific objectives were to determine (1) the knowledge of residents and nonresidents regarding elk and elk hunting in the Pine Ridge, and (2) the effects of gender and place of residence on the attitudes of tourists toward elk and their management.

## STUDY AREA

Elk were present throughout Nebraska until market and subsistence hunting led to their extirpation in the late 1880s (Jones 1962). During the late 1960s, elk were translocated from Yellowstone National Park to the Rawhide Buttes in eastern Wyoming. Some of these elk moved eastward to the Pine Ridge region of northwestern Nebraska (Fricke et al. 2008). By the 1980s elk were seen regularly in the Pine Ridge region, and by 1999 the population had grown to 150–200 animals (Stillings 1999) with a population estimate in 2007 of 900 animals (Nebraska Game and Parks Commission 2007). The

Nebraska Elk Management Plan (Nebraska Game and Parks Commission 1995) established goals to maintain a population of elk that provides recreation for Nebraska residents and landowners in the area and to reduce landowner complaints of damage caused by elk.

The Pine Ridge lies in the northwestern corner of Nebraska (Fig. 1). It is approximately 160 km long and between 1 and 8 km wide, covering 120,000 ha. The lands are partly privately owned interspersed with public land managed by the U.S. Forest Service, Nebraska National Forest, and the Nebraska Game and Parks Commission. The Pine Ridge consists of ponderosa pine (*Pinus ponderosa*) forests interspersed with grass pastures of big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Kentucky bluegrass (*Poa pratensis*), and brome grass (*Bromus* spp.). Cropland areas are planted in winter wheat, alfalfa, and oats (Cover 2000).

Fort Robinson State Park and Chadron State Park are located in the heart of the Pine Ridge and are known for their historic features and recreational opportunities including camping, hiking, fishing, horseback riding, and wildlife viewing. In 1996, 355,000 and 331,000 people visited Fort Robinson State Park and Chadron State Park, respectively (Nebraska Department of Economic Development 1996). We chose these parks to interview tourists because of their location in the Pine Ridge and the large population of tourists. We defined a tourist as a person who was camping or staying in a cabin at Fort Robinson State Park or Chadron State Park. Due to the sampling design we were unable to survey the population of tourists not using these state parks.

## METHODS

### Survey Design

The survey consisted of 16 multiple choice questions regarding knowledge, opinions, and willingness to pay, along with four demographic questions that included age, gender, state of residence, and place of residence (urban or rural). The survey included seven questions from a concurrent survey of landowners in the Pine Ridge (Crank 1998) and 13 original questions. The survey was reviewed by biologists from the Nebraska Game and Parks Commission and the superintendents of Fort Robinson State Park and Chadron State Park. The survey was approved by the University of Nebraska–Lincoln Institutional Review Board (UNL-IRB #97-07-387EX).

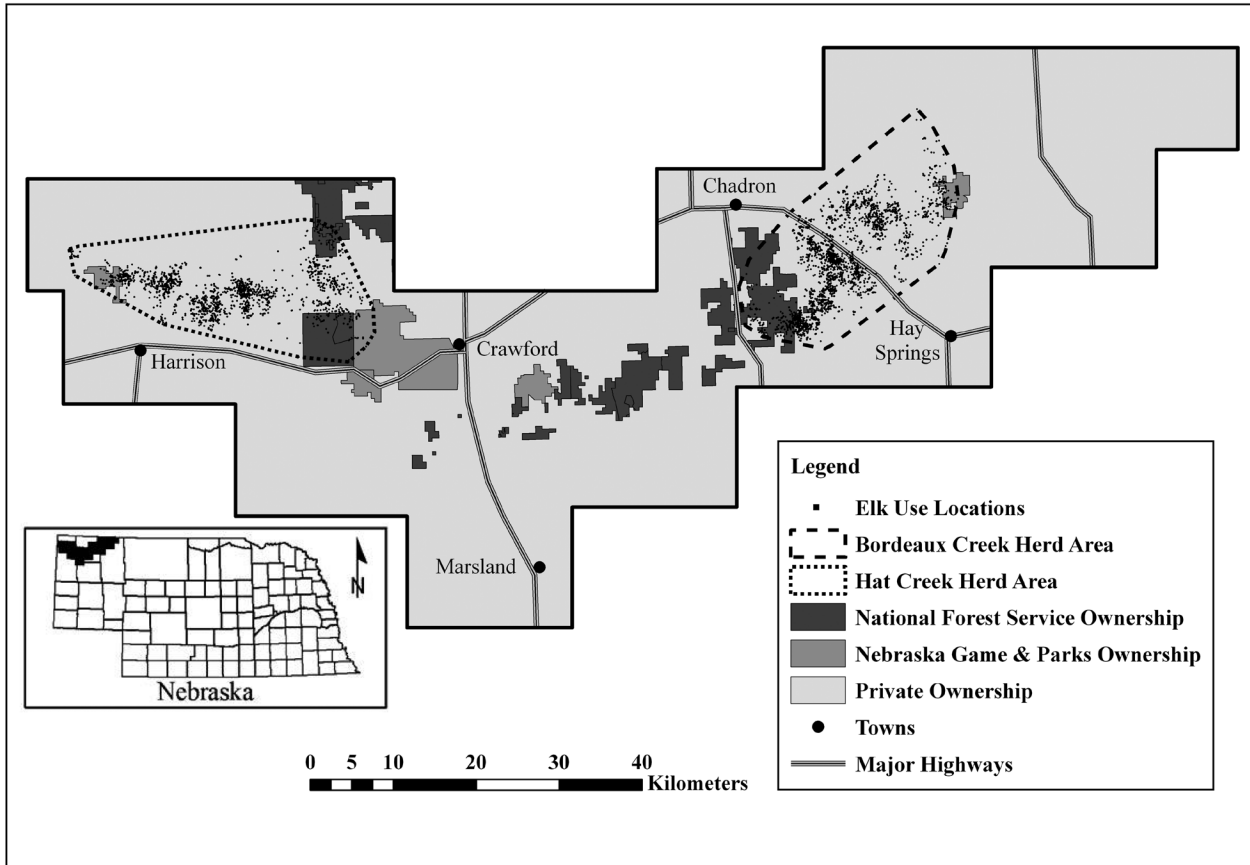


Figure 1. Map of the Pine Ridge region of northwestern Nebraska.

### Survey Methods

We personally interviewed 100 tourists at each of the two state parks during July and August of 1997. We used a sample size of 100 at each park based on a sample size table constructed by Salant and Dillman (1994), allowing for  $\pm 10\%$  sampling error and a 50/50 split in responses. We conducted interviews on 14 randomly chosen evenings between the hours of 1800 and 2100. We randomly selected tourists by campsite number and gender. We only interviewed tourists  $>18$  years of age due to parental consent requirements established by the UNL-IRB. If the respondent was not present at the campsite during the initial visit, we continued to visit the site until the respondent was found. After approaching the campsite, we identified ourselves as researchers from the University of Nebraska–Lincoln and asked if the respondent would participate in a survey. We provided the respondent with a cover letter that explained the intent of the study, their right to abstain from answering

any questions, confidentiality, and who they could contact regarding the study. If  $>1$  person fitting the gender category was present at the campsite, we chose the respondent based on whose birth date was closer to a randomly selected date (June 1). We had a 100% response rate; all campers approached agreed to be interviewed. Each respondent was asked the same questions in identical order. We continued interviews until all categories of gender and residence were represented equally.

### Data Analysis

We entered data from the survey into an Excel 5.0 spreadsheet (Microsoft Corporation 1993–94). We verified the data by cross-referencing with the original data sheets. We used the Statistical Package for the Social Sciences (SPSS 1997) to construct frequency tables and run cross-tabulations, chi-square, and analysis of variance tests. We compared responses from the two state parks and found similar results, so the data were pooled

for further analysis. We used a log-linear analysis (PROC CATMOD; SAS Institute 1990) to determine if any interactions existed among the independent variables: gender, residence, social setting (urban or rural), and park location. The questions concerning future populations of elk, willingness to drive, time spent to see elk, and willingness to pay, were analyzed using analysis of variance. We also calculated effect size and categorized it into three classes, low (0.07–0.21), moderate (0.22–0.35), and high ( $\geq 0.36$ , ES, Baugh and Thompson 2001, Kirk 2001, and Tabachnick and Fidell 1989).

## RESULTS

### Tourist Demographics

The average age of the 200 survey respondents was 45 years (range: 19–77). Most respondents (47%) were 30–50 years old. Sixty-six percent of respondents described their place of residence as urban, with the remaining 34% as rural. Fifty percent of the respondents were Nebraska residents. Eleven percent of tourists were from Colorado, 5% from California, with the remaining 34% from 15 other states, and one from Germany. Preferred outdoor activities of tourists included: camping (70%), wildlife viewing (66%), hiking (43%), and horseback riding (25%). Other activities included family reunions (2%), picnics (2%), and golf (1%) based on our survey.

### Tourist Awareness and Attitudes

Most respondents (59%) were aware that elk occupy the Pine Ridge. More males (69%) were aware of elk populations than females (48%,  $P = 0.0026$ , ES = 0.27). We also found more Nebraska residents (75%) were aware of elk populations than nonresidents (41%,  $P < 0.0001$ , ES = 0.27; Fig. 2). Respondents in the youngest age group (19–24) were the least knowledgeable about elk populations, whereas those in the 55 to 64-year-old age group were the most knowledgeable. No differences were found between urban and rural respondents for awareness of elk ( $P = 0.8066$ ).

Ninety-five percent of respondents were in favor of free-ranging elk. No differences were found when comparing knowledge of the presence of elk with favoring elk ( $P = 0.8625$ ). The number of males that favored free-ranging elk (95%) was similar to the number of females (96%,  $P = 0.7328$ ). More tourists from urban areas (66%) were in favor of free-ranging elk than tourists from rural areas (34%,  $P < 0.001$ , ES = 0.33). Reasons for favoring

elk were: opportunity to see elk (73%), return of a native species (69%), increased species diversity (55%), and opportunity to hunt elk (17%). The majority of tourists that opposed elk populations ( $n = 9$ ) were from rural Nebraska. Reasons for opposition to free-ranging elk were: grazing competition with cattle (77%), damage to crops or property (66%), disease transmission to cattle (44%), and vehicle collisions (44%).

Few tourists (17%) had observed elk in the Pine Ridge. Residents who had observed elk were from throughout the state. More residents of Nebraska had observed elk than nonresidents ( $P = 0.0239$ ). Observations of elk were similar among genders ( $P = 0.2587$ ).

Fifty-one percent of respondents thought that the number of elk in the Pine Ridge was too low and 46% thought the number was about right. Gender and resident status affected attitudes toward the number of elk in the Pine Ridge. Twenty-five percent more males ( $P = 0.0015$ ) and 22% more nonresidents ( $P = 0.0109$ ) thought the number of elk in the Pine Ridge was too low (Fig. 3). Place of residence (urban or rural) had no effect on attitudes of tourists toward the number of elk in the Pine Ridge ( $P = 0.0910$ ). No differences were found between knowledge of the presence of elk and attitudes toward the current population of elk in the Pine Ridge ( $P = 0.3174$ ).

Seventy-five percent of respondents wanted an increase in the population of elk and very few (3%) wanted a decrease. More nonresidents favored increases in the population of elk than residents ( $P = 0.019$ , ES = 0.26). Residents were also more likely (5:1) to favor a decrease in the population of elk ( $P < 0.001$ , ES = 0.47, Fig. 3). Increased knowledge of damage caused by elk (crop depredation, property damage) may have affected attitudes toward future population levels. More rural respondents (3:1) wanted reductions in populations of elk in the future compared to urban tourists.

Few nonresident tourists (8%) were aware of hunting seasons for elk in Nebraska. Awareness of hunting was similar across gender ( $P = 0.9749$ ) and more residents than nonresidents (3:1) were aware of elk hunting seasons ( $P = 0.0018$ ; Fig. 2). Fifty-five percent of tourists favored elk hunting. More respondents (6:1) who were unaware of hunting were opposed to hunting seasons for elk. Nearly twice as many females were opposed to hunting seasons as males ( $P = 0.0532$ ; Fig. 4). Respondents in the youngest age category (19–24) were the most negative toward hunting (54% against), whereas those in the oldest age group ( $> 65$ ) were the least negative (6% against). No differences occurred across urban or rural residence for attitudes toward hunting seasons for elk ( $P = 0.5188$ ).

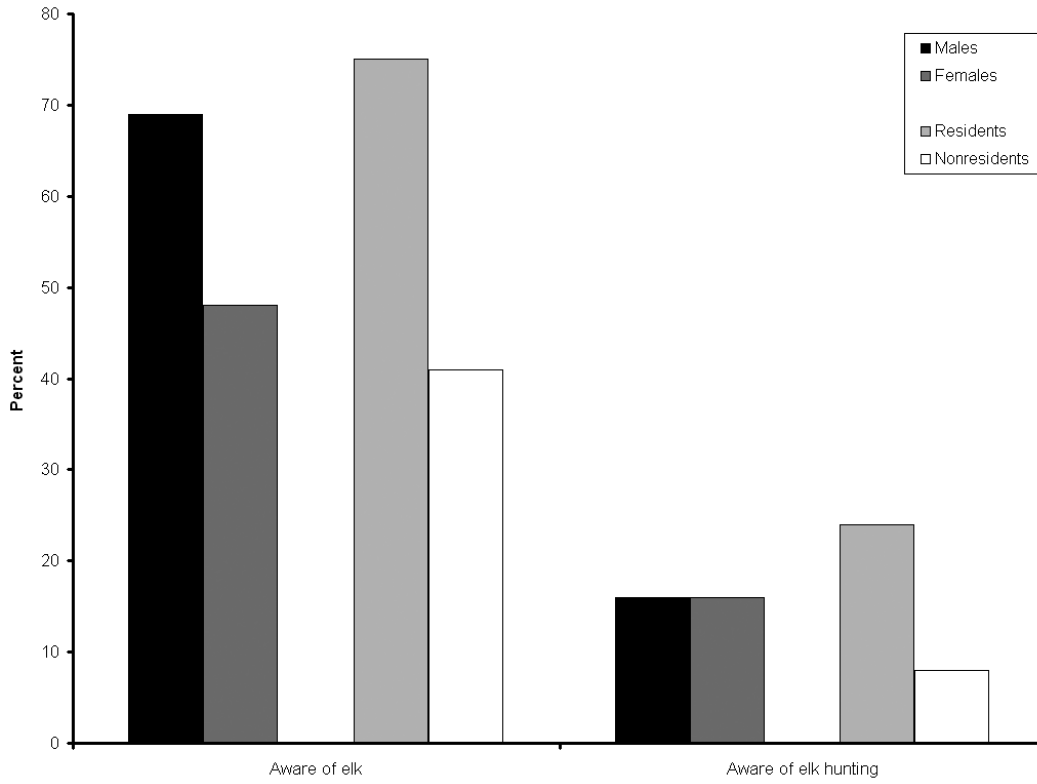


Figure 2. Knowledge of tourists regarding elk and elk hunting in the Pine Ridge of northwestern Nebraska, 1997.

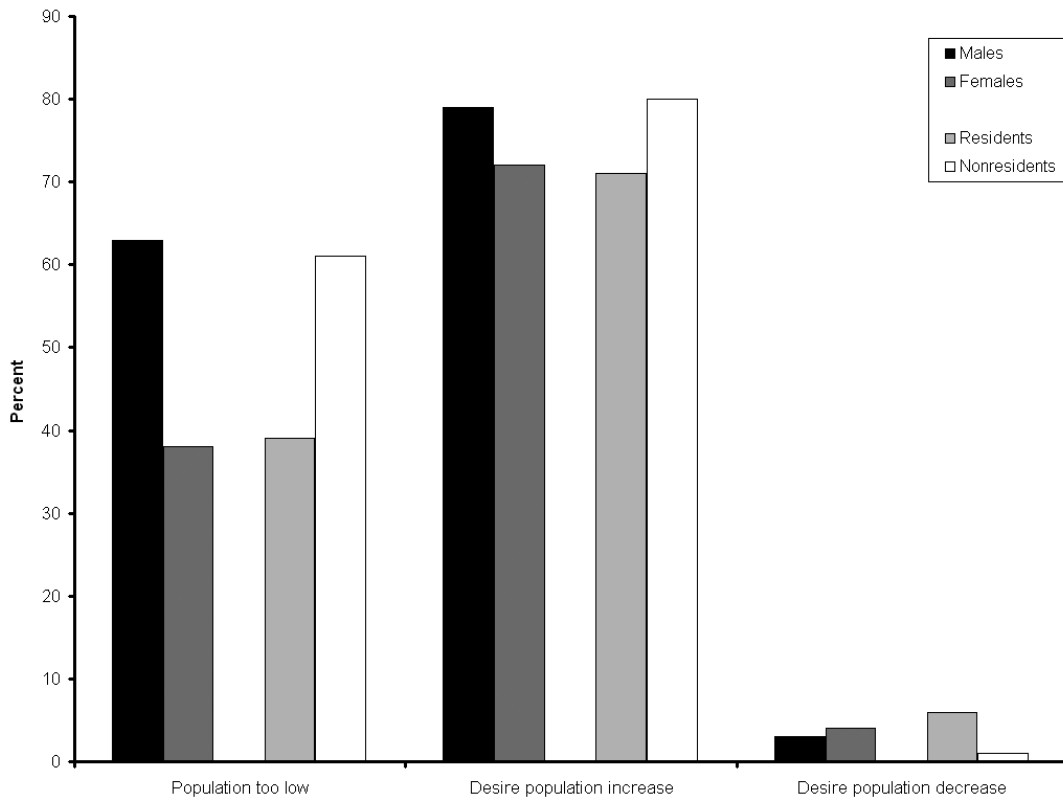


Figure 3. Attitudes of tourists toward population levels of elk in the Pine Ridge of northwestern Nebraska, 1997.

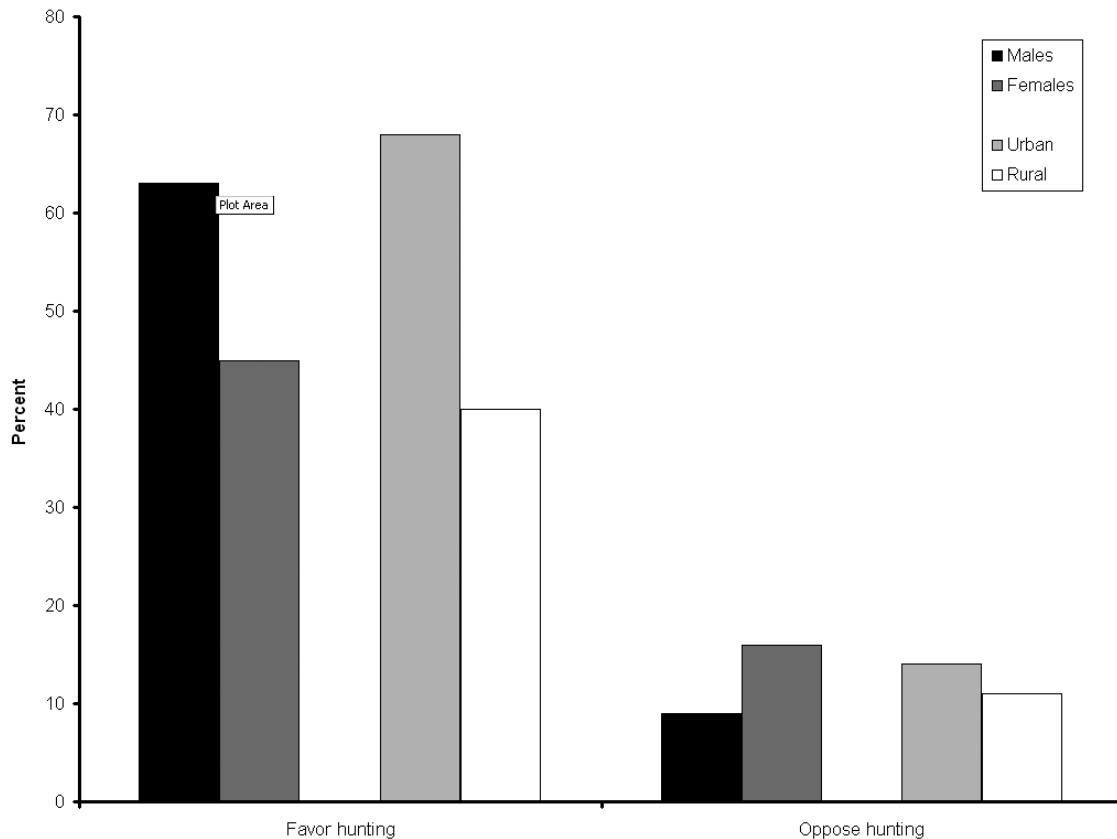


Figure 4. Attitudes of tourists toward elk hunting in the Pine Ridge of northwestern Nebraska, 1997.

Forty-five percent of the respondents thought the population of elk should be controlled primarily through hunting rather than environmental population control. Nearly twice as many males favored hunting as a control method than females ( $P = 0.0002$ ). More resident males had positive attitudes toward hunting as a control method ( $P = 0.0001$ ) than resident females.

Opinions of tourists varied regarding who should pay for elk management (Fig. 5). More nonresident males thought the Nebraska Game and Parks Commission (NGPC) should pay for management, while resident males thought only elk hunters should fund management. More resident females thought all hunters should pay for elk management.

We also examined tourists' willingness to drive, spend time, and pay to observe elk. Most tourists (53%) would drive  $\leq 80$  km to see elk. Residents and urbanites were twice as likely to drive 160–800 km to see elk as nonresidents and rural tourists, but we observed no significant difference ( $P = 0.257$ ) among all distance categories. Most tourists (81%) would spend  $\leq 6$  hours to observe elk, while residents were willing to spend more

time ( $>6$  hours) viewing elk ( $P = 0.046$ ). More rural respondents (3:1) would spend 6–12 hours to view elk than would urbanites. Over half (56%) of all respondents reported they would pay up to \$20 to view elk. No differences were determined across residence ( $P = 0.566$ ) or gender status ( $P = 0.241$ ). Only 2% would spend  $\geq \$50$  to observe elk. More rural respondents (2:1) were willing to pay \$20–\$50 to view elk than urbanites.

One-third of all respondents would prefer easier access to information about elk in Nebraska. We found no differences across resident status ( $P = 0.8646$ ) or gender ( $P = 0.3231$ ). By extrapolating across all tourists who visit the area, we estimate that about 200,000 people per year would use information concerning elk if it were available.

## DISCUSSION

We found that gender, age, and place of residence affected tourists' awareness of the presence of elk in the Pine Ridge. The differences found in awareness between genders may be attributed to the involvement of males in hunting, thus being more informed about

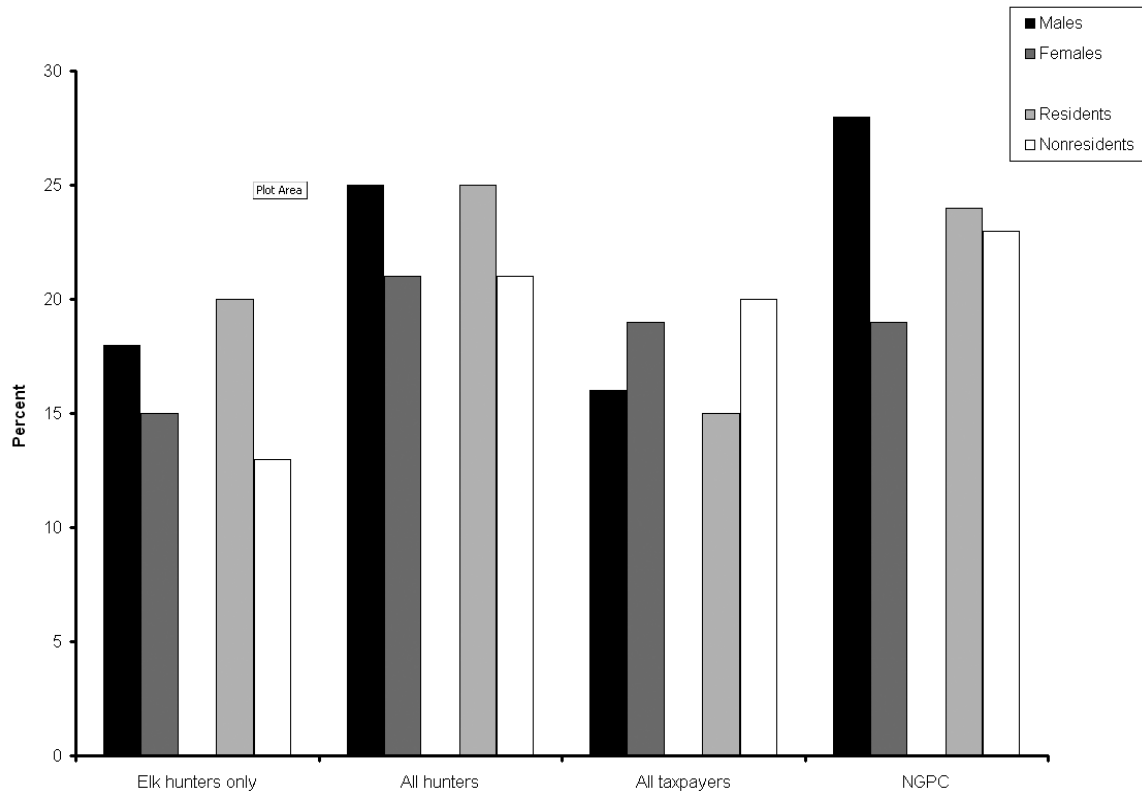


Figure 5. Opinions of tourists regarding who should pay for elk management in the Pine Ridge of northwestern Nebraska, 1997.

hunting opportunities in Nebraska or reading wildlife-related articles or news releases. A survey of tourists in Pennsylvania, in a popular elk viewing area, found 20% were members of local or national sportsmen’s groups, such as the National Rifle Association or the Rocky Mountain Elk Foundation (Strauss et al. 2005). Age-related awareness also differed in a study conducted by Kellert (1980), in which older age groups were more knowledgeable about the presence of wildlife. We found residents were more likely than nonresidents to have observed elk, which may be attributed to the increased likelihood of residents visiting the Pine Ridge. Differences may also be attributed to the possibility that more residents are aware of elk in Nebraska and have specifically set out to view them. Residents were more likely to view articles or news releases on elk and may be more informed about hunting opportunities in Nebraska. Fifty percent of Pennsylvania elk tourists reported word of mouth as the most prevalent source of information on elk (Strauss et al. 2005), thus advertising campaigns may be a useful tool to increase awareness of elk populations and viewing opportunities in Nebraska.

Opinions on population management between genders and rural and urban survey respondents varied. More females were opposed to hunting than males. People from urban environments typically are more negative toward hunting, and society is shifting toward nonutilitarian values (Kellert 1979; Gill 1996; Manfredo and Zinn 1996), which were inconsistent with our findings, but our respondents were interested in outdoor recreation (camping, wildlife viewing, etc.) and therefore may be more positive toward hunting. Tourists of Grand Teton National Park, the Bridger-Teton National Forest, and the National Elk Refuge were surveyed about winter feeding and options for managing elk populations (Loomis and Caughlan 2004). Options on management were: no change, reduced feeding and population levels, and increased feeding with increased hunter harvest. They found tourists favor the current feeding program and population levels, and tourist participation in elk and bison viewing would decrease 7% to 20% with changes in management practices.

We discovered a willingness among tourists to pay to view elk. Elk spend most of their time on private land in the Pine Ridge, and due to their cautious nature, are



seldom available for viewing opportunities. Managers would need viewable elk on a regular basis to enact sustainable fee-based elk viewing programs. Although our survey information may not lead to the development of a viewing program, it shows the possible economic value of nonconsumptive use of elk in Nebraska. Business generated by elk-related tourism in Pennsylvania was valued at approximately \$1 million per year in a two-county area in 1997–2000 (Strauss et al. 2005). The state of Oregon initiated a program in the late 1980s to identify wildlife viewing areas on both new state highway maps and state viewing guides, in an effort to increase tourism to specific locations (Vickerman 1988). Information on specific elk viewing areas could be included in brochures or in the *NEBRASKAland Magazine Wildlife Viewing Guide* (Knue 1997). Brochures could be distributed at parks in the Pine Ridge and other areas throughout Nebraska to help promote the Pine Ridge region and its resources. In addition, specific Internet sites could also be developed or expanded to provide more information about elk in Nebraska.

### Management Implications

Nearly all respondents (92%) were in favor of elk in the Pine Ridge for reasons of nonconsumptive use and conservation principles. Tourists that visit the Pine Ridge are interested in viewing elk and may be willing to pay for the opportunity. Our research has demonstrated that negative attitudes toward the objectives of the Nebraska Game and Parks Commission Elk Management Plan (1995) could pose conflicts in public relations, thus increased promotion of elk and elk viewing may be warranted. A program that provides more areas for nonconsumptive use could be managed adaptively and evaluated to determine if wildlife populations are disrupted (Duffus and Dearden 1990). Kutay (1989) and Edwards (1988) suggested that nonconsumptive use can be effective in promoting conservation and management of natural resources for long-term, sustainable economic development. Economic returns may provide the incentive to increase the promotion and development of nonconsumptive uses of elk in the Pine Ridge.

Although greater than half (59%) of all tourists were aware of elk, the low awareness by nonresidents (8%) may warrant increased public advertisement outside the state of Nebraska. Articles in nationwide outdoor magazines, news releases in regional newspapers, displays at sport shows, and other approaches could be used to promote elk and other wildlife in Nebraska to increase tourism and impact on the local economy.

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