

Preliminary Assessment of Attitudes and Knowledge of Jackson Hole Residents Toward Grizzly Bears and Wolves in Teton County

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Abstract

This paper presents results of a pilot study conducted in the summer of 1996 assessing knowledge and attitudes of Jackson Hole residents toward grizzly bears (*Ursos arctos horribilis*) and gray wolves (*Canis lupus*) in the Greater Yellowstone Ecosystem (GYE). A structured survey was administered through in-person interviews to 66 residents of Jackson Hole, including ranchers, hunters, concessionaires, business owners, and the general public.

Overall, the Jackson Hole community tends to hold favorable attitudes toward grizzly bears and wolves. However, this study indicates that people hold more favorable attitudes toward grizzly bears than wolves. Differences in attitudes were also revealed regarding specific management issues, and these differences are discussed. Management issues evaluated by respondents include control methods for grizzlies and wolves that prey on livestock or wander onto the National Elk Refuge, the impact of grizzlies and wolves on hunting, tourism, and recreation, how to handle illegal killing of these species, and the role of government agencies in their management. The study suggests that differences in attitudes toward these issues may exist within and among groups such as ranchers, hunters, park concessionaires, small business owners, and environmentalists.

Knowledge of these species and relevant management practices concerning them were also assessed and are discussed in relation to the attitudes measured. Direct experience with grizzlies and wolves is assessed, as well as sources of information on and interest in the species. Implications of the pilot study and suggestions for further study are presented.

This study and past studies have revealed that the socioeconomic factors affecting and affected by grizzly bear and wolf recovery are equally as complicated and important as the ecological ones. Public opinion and behavior directly affect the success of recovery efforts. Understanding public attitudes and knowledge is therefore vital for designing effective management programs, public education programs, and for addressing concerns held by the public. Further study must be done to gain a more complete picture of public attitudes toward grizzly bear recovery and wolf reintroduction in the GYE. A larger sample size using a revised version of this survey with questions about specific management options is recommended.

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Introduction

The Greater Yellowstone Ecosystem (GYE) is the largest relatively intact ecosystem in the United States, with the exception of Alaska. It is one of the few places in the lower 48 states that provides suitable habitat for, among other wildlife, the grizzly bear (*Ursos arctos horribilis*) and gray wolf (*Canis lupus*). Efforts by government agencies to restore grizzly bears began in 1975 when it was listed as threatened under the Endangered Species Act. Wolf reintroduction to Yellowstone National Park and Idaho began in 1995.

As populations of grizzly bears and wolves increase, they are expanding their ranges into areas with high human density, such as areas in and around Teton County.¹ Additionally, efforts to ensure viable populations of grizzly bears and wolves in the GYE are occurring simultaneously with the development of oil fields, mines, recreational resorts, outfitting operations, roads, subdivisions, and the existing use of agricultural land for ranching (Fritts 1990; *Grizzly Bear Compendium* 1987; U.S. Fish and Wildlife Service 1993; Vales and Peek 1990). The combination of increasing human activity and expanding grizzly bear and wolf populations makes the potential for human-predator conflict great. One example of such controversy is the conflict over how to manage grizzly bears such as bears that prey on cattle.

Recognizing the need to consider humans and the potential for human-predator conflict is not new (Bath 1989, Bath 1991, Clark et al. 1996, Craighead 1979, Huber et al. 1992, 1993, Kellert et al. 1996, Primm 1996, Promberger and Schröder 1993, Reading et al. 1994, Tilt et al. 1987; U.S. Fish and Wildlife Service 1993). Successful management of grizzly bears and wolves requires not only an understanding of biological and physical factors, but also social, institutional, and valuational factors (Kellert 1991; Kellert & Clark 1991, Reading et. al 1994). People's acceptance of, tolerance for, or resistance to predators will ultimately affect the success of recovery efforts. It is becoming increasingly important for the survival of grizzly bears and wolves to understand residents' tolerance or intolerance of these species.

In sponsoring this survey, officials at the cooperating agencies—Grand Teton National Park, the National Elk Refuge, the Northern Rockies Conservation Cooperative, and Yale University—are attempting to identify people's knowledge and concerns regarding grizzly bear and wolf management in Jackson Hole and the reasons for those concerns. Thus, in addition to assessing overall attitudes of the public toward grizzly bear recovery and wolf reintroduction, the survey is designed to assess the attitudes of people regarding specific management issues. These issues include timber management, grazing and livestock, housing development, effects on other wildlife species, roads, outfitters, hunting, garbage management, and the development of mining, oil, and gas.

This study builds on past research. Studies assessing people's attitudes toward endangered species and wildlife management (Bath 1989, Bath 1991, Fritts 1990, Kellert 1979, Kellert 1986, Kellert 1991, Kellert 1993, Reading et al. 1994) found that most North Americans hold favorable attitudes toward bears (Kellert 1991), and found support for wolf reintroduction in Minnesota (Kellert 1985), Michigan (Kellert 1990), Montana (Bath 1989, Fritts 1990), and Wyoming (Bath 1989, Fritts 1990). Widespread support among the general public for wolf and grizzly bear recovery, however, does not preclude ambivalence within certain groups, such as the elderly and resource-dependent groups, toward these species and specific management issues (Kellert 1996).

Understanding residents' attitudes toward grizzly bears and wolves will not ensure sound policy, but such understanding is a necessary component to creating effective policy. Sociological data can help to identify the areas of greatest or least knowledge among the public to better focus public education efforts. Perhaps more importantly, these data can help decision-makers anticipate responses to management alternatives. Policy that balances conflicting demands for resource extraction, tourism, development, and endangered species and ecosystem preservation will require such data (Reading et al. 1994). By understanding public opinions on issues related to grizzly bear recovery and wolf reintroduction, the cooperating agencies are working toward improving social relations and their management decisions.

¹ Teton County had a population of approximately 13,110 in 1995, with a projected increase of 9.6% by the year 2000 (Community Profile)

Methods

We administered a structured, in-person survey to 66 Jackson Hole residents in August of 1996. The survey serves as a pilot study for a full-scale study planned for 1997. In-person interviews conducted by the author were necessary for this pilot study to help with survey design for the full-scale study. Initial contact was made by phone to set up appointments for in-person interviews.

Table 1 shows the composition of the sample population according to demographic characteristics. These data are compared to the U.S. Census Data available for Teton County. There are almost an equal number of male and female respondents, which corresponds to gender distribution in Teton County. The majority of respondents are white, own their own homes, consider Jackson Hole their primary residence, are at least 36 years old, and earn \$25,000 or more. While the majority of respondents did not grow up in Jackson Hole, 70% either grew up in Jackson Hole or have lived there at least ten years.

The study's population consists of a stratified sample of ranchers with grazing allotments in the Bridger-Teton and Targhee National Forests, concessionaires in Grand Teton National Park, business owners in the town of Jackson, and the general public living in Jackson Hole. An attempt was made to survey all ranchers and all concessionaires, since these populations are relatively small ($N=9$ and $N=35$, respectively). Of the 9 ranchers targeted, 8 were contacted. The participation rate for contacted ranchers is 100% and 89% for targeted ranchers. Ranchers without allotments on public land were also interviewed as they were contacted randomly from the sample of the general public. Of the 35 concessionaires targeted, 21 were contacted and 19 completed surveys. This represents a 90.5% participation rate for contacted concessionaires, and 54.2% participation rate for all concessionaires. Of a random sample of 20 businesses, 17 were contacted and 12 completed surveys. This represents a 70.6% participation rate for businesses contacted and a 60% for the random sample. Fifty-nine out of 76 members of the general public chosen randomly were contacted, and thirty of those agreed to complete the survey. This represents a participation rate of 50.8% of those

contacted, and 39% for the random sample. Many people were on vacation, out of town, or leaving town at the time of contact.

The survey consists of 134 closed-ended questions dealing with five major areas related to grizzly bear recovery and wolf reintroduction: interest and attitudes, personal experiences, management issues, knowledge, and demographics. The interest and attitudes and the management questions assess general attitudes toward nature and wildlife and specific attitudes toward wolves and grizzlies in the GYE, gray wolf reintroduction in Yellowstone National Park, livestock depredation by grizzly bears and wolves, wolves and grizzlies on the National Elk Refuge, and government agencies and their management of wolves and grizzlies. The knowledge questions assess knowledge of wolf behavior, management, conservation, and reintroduction; grizzly bear behavior, management, and conservation; and people's sources of information on wolves, grizzlies, and other wildlife. Participants in the survey answer on a five-point Likert agree/disagree scale (Petty and Cacioppo 1996). There was also an open-ended comment section.

Data are analyzed with the MINITAB statistical package. Chi-square tests are used to determine statistically significant differences. Because this is a pilot study and all interviews were conducted in-person over a relatively large geographic area, the sample size is too small to create scales, conduct factor analysis, or conduct similar statistical tests. The survey is designed for such analysis, which should be used to help interpret the data in future studies.

Table 1: Demographic characteristics of respondents (n=66)

	Sample	Teton County ¹
<i>Highest grade or year of school completed</i>		
Eighth grade or less	3%	
High school or vocational school graduate	18%	
Some college	29%	
College or graduate school graduate	50%	30%
<i>Age</i>		
Less than 25	14%	
25-54	56%	
55 or over	30%	
<i>Gender</i>		
Male	56%	52%
Female	44%	48%
<i>Race</i>		
White	94%	
Black	1%	
Asian	0%	
Native American	5%	
Hispanic	0%	
<i>Residency</i>		
Do not own home	24%	27%
Own home	76%	38%
Less than 1 acre	43%	
1 to 5 acres	16%	
More than 5 acres	17%	
Data not available		35%
Jackson Hole is primary residence	91%	
Jackson Hole is not primary residence	9%	
Grew up within fifty miles of a city	65%	
Did not grow up within 50 miles of a city	35%	
Grew up in Jackson Hole area	23%	
Did not grow up in Jackson Hole area	77%	
Moved here less than 2 years ago	13%	
Moved here 3-10 years ago	17%	
Moved here more than 10 years ago	47%	
<i>Household income²</i>		
Less than \$15,000	4%	6.6%
\$15,000 to \$24,999	9%	8.1%
\$25,000 to \$49,999	30%	18%
\$50,000 to \$99,999	25%	7%
Over \$100,000	17%	1.7%
No response	15%	41.2%

¹1990 Census Data for comparable categories.²The number of non-responses should be noted, especially for Census Data information; the actual percentages may therefore not reflect the actual distribution of income in Teton County.

Results

The results of the survey are grouped by subject area rather than by the order in which they appear on the survey. Subject areas include: areas of greatest agreement, perceptions of wolves and grizzly bears, management issues, and knowledge. Where relevant, responses are broken down according to sub-populations of the sample.

Areas of greatest agreement

There were certain statements with which the entire sample population tended to agree or disagree. Most people strongly or moderately agree about the potential danger of grizzly bears to people, about the grizzly bear's symbolic importance in nature, about having feelings of love for animals, and about providing ranchers with more information on protecting their livestock. Most people oppose using poisons to limit predator numbers.

Positive and Negative Perceptions of wolves and grizzly bears

Comparison of attitudes regarding wolves to attitudes regarding grizzlies

While the survey addresses attitudes regarding both wolves and grizzly bears, people differed in their attitudes toward these species. Many responses indicate the sample population cares more about grizzly bears than wolves, hold more pride in having grizzly bears than wolves in Wyoming, are more willing to donate money toward grizzly bear than wolf conservation, and hold greater fear of grizzly bears than of wolves.

Management Issues Regarding Wolf and Grizzly Bear Conservation

Attitudes toward wolf reintroduction

Although the majority of respondents support wolf reintroduction, are proud to live in a state conserving the wolf, feel it is important to have wolves in Wyoming, and agree that government officials should keep the wolf from going extinct again, 32% oppose the reintroduction efforts. Whether they support or oppose reintroduction, a majority of respondents disagree that the practical value of wolves affects their opinions.

While the majority of respondents think wolves should be allowed to reach a natural balance without restrictions, 17% responded no wolves should be allowed, and 56% of respondents support limiting the number of wolves if they become too numerous. While almost three-quarters of respondents disagree that wolves in Canada and Alaska have any bearing on the importance of restoring them to the GYE, just over half agree that wolves in Yellowstone National Park preclude the necessity to establish them in Grand Teton National Park. However, a significantly larger proportion of ranchers agree with this statement than non-ranchers. Additionally, just over half of respondents disagree that more wolves should be reintroduced in this area.

The majority of respondents see wolves' ecological role and their right to exist as the primary reasons for reintroduction. Respondents disagreed most with recreational and extractive reasons for reintroducing wolves, including harvesting pelts, hunting, and tourism.

Grizzly bears, wolves, and adjacent public lands

Respondents reported strong attitudes toward eliminating or not eliminating wolves that prey on elk on the National Elk Refuge. While the majority strongly disagree that wolves that prey on elk on the refuge should be killed, almost 20% strongly agree that they should be killed. More people support eliminating wolves than eliminating coyotes that prey on elk on the refuge. A majority of respondents disagree that grizzly bears and wolves should be restricted from the area or destroyed if they wander onto the National Elk Refuge. The majority of respondents do not believe that grizzly bears that wander outside Yellowstone Park boundaries should be relocated or destroyed. However, there is almost equal support for and opposition to taking no action if grizzly bears start to disappear from Grand Teton National Park.

Development

The majority of respondents support restrictions on the development of lands regarded as important for grizzly bear and wolf conservation, although 18% strongly oppose such restrictions. Respondents are more divided on the issue of taxing large scale development to protect wolves and grizzly bears—only a slightly higher percentage favor

such taxes. The majority of respondents are opposed to limiting the number of people rather than wolves in the GYE. A majority of people disagree that environmentalists are using grizzly bears and wolves to try to stop development.

Recreation and tourism

A number of questions refer to issues relating to recreation and tourism. The majority of respondents would tolerate road closures on national forest land, although 24% strongly disagree they would tolerate road closures. A higher percentage of backpackers would tolerate road closures on national forest land than non-backpackers.

While most respondents would like to visit areas with grizzly bears and wolves and would hike to see a grizzly bear in the wild, they do not think the presence or absence of these predators influences tourism and park visitation. A small majority of people believe that wolves will not increase tourism in Jackson Hole. Additionally, most respondents reported that wolves would not increase their visitation to the forests, refuges, and parks in the area. Most people agree wolves would not deter their visitation.

Hunting and trapping

The majority of respondents are not opposed to recreational hunting and do not support large fines for accidental killings of wolves. While 52% of respondents support rewards for hunters and trappers who report illegal killing and capturing of wolves, only 20% strongly agree and 21% strongly disagree with such rewards. Additionally, the majority of respondents believe trapping causes animals to suffer greatly. Almost half of respondents said they know someone who would shoot a wolf in the wild, although the majority strongly disagree that they themselves would shoot a wolf.

The majority of people do not see an annual wolf hunt as a reason for reintroduction and oppose killing wolves for their fur. Rather than keeping wolves out of areas where hunters have difficulty locating game animals, a large percentage support restrictions on hunting to protect wolves during hunting season. Most respondents do not see such restrictions on hunting in Teton County as a threat to hunting in Wyoming. A large percentage of hunters, however, believe restricting hunting in Teton County will affect hunting throughout Wyoming.

Personal commitment

People seem willing to make some personal effort for wolf and grizzly conservation. Most respondents would store their garbage inside or in bear proof containers, while only 28% would give up their vegetable garden. Almost half of the respondents would help establish a wild population of wolves in Teton County, and most would donate money for grizzly bear and wolf conservation.

Helping ranchers protect their livestock

The survey addresses the issue of ranching by asking general questions about management issues pertaining to ranching, and by using the case study of Togwotee Pass Management. People seem to support helping ranchers troubled by predation, but not without considering the well-being of wolves and grizzlies. Most respondents see a need to provide ranchers with information about protecting livestock, and most support paying ranchers for livestock unquestionably killed by wolves and grizzly bears. Respondents are more divided on providing ranchers with funds to purchase materials to protect their livestock. There is also no clear distinction between respondents' opinions about paying ranchers for livestock lost on private versus public land.

Ranchers differed significantly from non-ranchers on questions regarding paying ranchers. A statistically significantly higher percentage of ranchers who receive more than 50% of their annual income from ranching support compensation for livestock losses on private and public land.

In terms of methods of controlling wolves and grizzlies, most groups seem to agree. A majority of respondents oppose using poisons or eliminating offspring to control livestock depredation, agree the government should require ranchers to raise livestock in ways that discourage wolves and grizzly bears, agree that only wolves or grizzlies that killed livestock should be shot or trapped, and agree that problem wolves and grizzlies should be captured and relocated to areas with little or no livestock.

More non-ranchers strongly agree that ranchers should be required to raise livestock in ways that discourage wolves and grizzly bears, while ranchers seem divided on the issue. A larger percentage of ranchers agree that ranchers should be required to

raise livestock in ways that discourage wolves and grizzly bears, although a quarter strongly disagree.

Attitudes regarding Togwotee Pass Management

While people seem sympathetic toward ranchers' needs, they do not agree that ranchers' needs should come unconditionally before those of grizzly bear conservation. Most respondents agree that ranchers who graze their livestock in areas with grizzly bears should expect some losses. A majority of respondents also disagree that ranchers should be allowed full control over the management of the public land they use for grazing, and they disagree that any grizzly bear responsible for killing cattle on Togwotee Pass should be relocated or destroyed immediately. They also think that Togwotee Pass should remain a part of the grizzly bear recovery zone. Additionally, a majority of respondents disagree that ranchers should be unconditionally reimbursed for all grizzly bear-related cattle losses. However, respondents are almost evenly divided on the issue of ranchers moving their cattle to another grazing allotment with a smaller threat of grizzly depredation (43% agree, 48% disagree) and on whether a range rider who shot a grizzly bear would be justified for his actions (44% agree, 47% disagree).

Regarding action taken by the government on Togwotee Pass, the majority of respondents do not believe government agencies acted irresponsibly and illegally by removing the problem grizzly from the area in September of 1995, but the majority of respondents also disagree that the government has the situation under control. More respondents agree that environmentalists have used the situation to further their own agendas, but 15% are undecided.

Ranchers differ significantly on a number of questions regarding Togwotee Pass. Specifically, almost half of the ranchers who responded to the survey agree that grizzly bears responsible for killing cattle on Togwotee Pass should be relocated or destroyed immediately. It is important to note, however, that one quarter of ranchers strongly disagree with this statement. It is also notable that while 100% of non-ranchers agree that ranchers should expect some losses if they graze their cattle in areas of high grizzly bear density, 18% of ranchers disagree with this statement.

Whether a respondent grew up in a rural (did not grow up within 50 miles of a city) or urban (grew up within 50 miles of a city) setting is correlated more strongly with responses regarding Togwotee Pass than if a respondent is a rancher. A larger percentage of rural residents agree that any grizzly bear responsible for killing cattle on Togwotee Pass should be relocated or destroyed immediately. Additionally, more rural residents (74%) than urban residents (34%) disagree that ranchers should move their cattle to another grazing allotment where the risk of grizzly depredation is less serious.

Role of government agencies in managing grizzly bears and wolves

A majority of respondents believe state agencies should have major control over managing wolves and grizzlies in Wyoming, although it is important to note that 18% of respondents strongly disagree with this statement. Based on mean scores of ratings of different government agencies responsible for grizzly bear and wolf management, it seems that people have the most confidence in the Wyoming Department of Game and Fish, followed by the U.S. Fish and Wildlife Service, the National Park Service, and finally the U.S. Forest Service for managing wolves and grizzly bears. However, all agencies received between a 2 and 3 (on a scale of 1 to 5 with 1 being great confidence and 5 being none), which represents a relatively high level of confidence overall.

People seem to have mixed reactions regarding the belief that government agencies are using wolves and grizzly bears to gain more control over the area and to restrict use of public lands. Only 18% strongly agree that they fear wolf recovery is a government strategy to gain more control over Teton County, while 33% strongly disagree, and only 14% strongly agree that grizzly recovery is used as an excuse to restrict use of public lands, while 36% strongly disagree. A majority of people agree that government officials should prevent the wolf from going extinct again, although 17% strongly disagree. A majority of respondents also agree that wolf and grizzly bear populations in the Jackson Hole area should be managed by a task force including local citizens.

Knowledge about grizzly bears, wolves, and Togwotee Pass Management

The majority of respondents rate themselves as knowing a lot about grizzly bears and wolves and indicate that they know most about endangered species, then grizzly bears, and lastly wolves. Only 11% of respondents felt they knew a lot about wolves compared to 18% for grizzlies and 23% for endangered species.

Knowledge about wolves

The majority of respondents (83%) answered that they heard or read at least a fair amount about wolf reintroduction in Yellowstone. A section of the survey that includes true and false questions to test people's knowledge shows that despite the number of people who said they have read a great deal or fair amount about the issue of wolf reintroduction, there were a large percentage of responses of "don't know." People rated lowest on knowledge about wolf management as a responsibility of federal agencies and about the number of wolves currently present in the GYE. Other questions with a large percentage of "don't knows" include the size of wolf packs, the previous status of wolves as extinct in Wyoming, the diet of wolves, and the current status of the GYE wolf population as experimental. Of people who did not respond "don't know" to these questions, the majority of respondents were correct in a majority of their answers.

Knowledge about grizzly bears

A section was also included in the survey to test people's knowledge about grizzly bears. The majority of respondents answered correctly on questions regarding grizzly bears. However, almost half of respondents did not know how many cubs grizzly bears average. A large percentage of people were also unsure about the number of grizzly bears in the continental United States, the origin of the name "grizzly," the listing of the grizzly bear on the Endangered Species Act, whether a grizzly bear will attack a bison, and the habits of grizzlies during hibernation.

Knowledge of Togwotee Pass Management

At least 30% of people responded "don't know" to every question regarding Togwotee Pass. However, a majority of people know the ranchers are grazing their cattle legally, that ranchers suffer cattle losses to causes other than grizzly bears, and that

Wyoming Game and Fish removed one problem grizzly. Only 1% of people reported knowing of the study conducted by Wyoming Game and Fish to assess the ranchers' losses, and only 14% reported knowing that part of Togwotee Pass is delineated as Management Situation One Habitat for grizzly bear recovery.

Sources of information about Wyoming's wildlife

The survey also assesses people's sources of information. Ninety-seven percent of respondents said they use the newspaper sometimes or often to get their information about Wyoming's wildlife, and 95% and 91% of respondents said they have read articles about grizzlies and wolves, respectively. A large percentage of respondents also report getting information from magazines and books (84%) and from the radio (78%), and a small majority subscribe to wildlife-related publications. People use the television, government agencies, and local or regional talks less often as sources of information. Twenty-six percent of respondents, the largest percentage of any source, prefer newspapers as their source of information. Almost half belong to conservation or wildlife-related organizations, and a majority are interested in the ecology and scientific discussions of wolves and grizzly bears.

Discussion and Suggestions for Further Study

While this was a pilot study with a limited sample size, the results are substantiated by previous, larger-scale studies. The results of this study are thus strong enough both to suggest current managerial directions and to indicate the utility of continuing with a full-scale survey.

It is important to note that the survey was designed to be analyzed according to wildlife value scales and, in more depth, according to sub-populations within the sample population (e.g., business owners, ranchers, environmentalists). The sample size prevented such analysis from being statistically significant. Future study with an adequate sample size will allow for more in-depth and comparative statistical analysis.

That said, the pilot study suggests overall support for grizzly bear and wolf conservation among residents of Jackson Hole. People even seem willing to make small changes, such as tolerating road closures or storing their garbage in ways that deter bears, to support grizzly bear and wolf conservation. However, there were differences in attitudes toward grizzly bears and wolves. Respondents in this study tend to hold more favorable attitudes toward the grizzly bear than the wolf, despite the higher perception of danger associated with grizzly bears. This is consistent with studies done in other states on grizzly bears and wolves (Kellert 1996).

One of the major issues separating the two species is government reintroduction efforts to restore the wolf. While a majority of respondents favor wolf reintroduction, citing the wolves' ecological role and their right to exist as the strongest justification for reintroduction, a large percentage strongly oppose such reintroduction. Some respondents commented that wolves should come down from Alaska and Canada on their own (Appendix 1).

The pilot study also suggests that differences may exist among and within groups in the sample population, such as ranchers, hunters, and those who grew up in rural as opposed to urban settings. Those who grew up in rural settings tend to be more sympathetic with ranching communities, and ranchers and hunters tend to be more supportive of strategies that require human intervention. Previous studies (Kellert 1990;

1985) have indicated that the elderly, the less educated, and ranchers display more antagonistic views toward wildlife, while hunters have expressed concern and sympathy for the wolf. Differences among groups in the GYE should be further explored through a larger-scale social survey. A larger sample size will allow more extensive comparisons among sample groups.

In addition to examining differences *among* groups, differences *within* groups should be further explored. While the majority of ranchers in this pilot study reported antagonistic views toward wolves and grizzly bears, a significant minority reported less extreme and more sympathetic attitudes. The results of this pilot study suggest that factors such as age or birthplace may lead to differences *within* groups.

One area requiring further examination is treatment of wolves and grizzly bears that wander onto the National Elk Refuge. This issue represents a point of disagreement among respondents of this study. While most people agree it would be natural to see grizzly bears and wolves on the Elk Refuge, respondents seem extreme but varying in their views on how to handle this situation. Residents in areas of Alaska that saw reduced populations of ungulates reported similar variation in their attitudes toward wolf control (Kellert 1996).

The results on tourism are also important to examine. The apparent discrepancy between the belief that wolves do not increase public land visitation and the belief that the presence of grizzly bears increases visitation may be a result of the sample population. Many respondents commented that since they already live in the GYE and frequently use the federal lands for recreation, wolves would not impact their recreational land use (Appendix 1). Additionally, while 59% of respondents do not believe attracting tourists is a reason to increase grizzly bear numbers in Grand Teton National Park, this does not necessarily indicate opposition to expanding populations of grizzlies. Some residents may not wish to see tourism increase, while others may not believe that expanding grizzly populations will increase tourism. The 65% of respondents who strongly disagree that they would spend less time in the backcountry of Teton County indicates that while people may not see grizzly bears as a tourist attractant, they do not view them as a deterrent, either.

There does seem to be some agreement regarding the control of grizzly bear and wolf populations in relation to the National Elk Refuge, livestock depredation, recreation, and hunting. Most people prefer non-lethal methods such as relocating problem individuals. Compensation for livestock losses also received support, as did altering human activity by limiting development, closing roads on national forest land, and prohibiting the killing of coyotes to lessen the chance of wolves being accidentally shot.

These findings are consistent with previous surveys. Methods disapproved of in previous studies included killing offspring, poisons, and overall reduction of predators (Kellert 1979; Kellert 1985). Most preferred methods involved eliminating individuals that preyed on livestock, capturing and relocating wolves, compensating those who had lost livestock, and training guard dogs (Kellert 1985). Reducing the number of deer hunters or doing nothing were preferred alternatives in dealing with decreased deer populations from wolves in Minnesota (Kellert 1985).

Previous studies have found that most cattlemen approve of indiscriminate wildlife killing methods such as poisoning (Kellert 1979), but this finding is not consistent with this pilot study. Most ranchers in this study do not support indiscriminate killing. Of the ranchers who did support indiscriminate killing, age may be a contributing factor to their attitudes. This finding suggests both differences within groups and concern for humaneness and specificity in control procedures in the GYE, even among groups for which livestock depredation is personally relevant.

Another problem that has arisen in areas with recovering wolf populations is the illegal killing of wolves (Fritts 1990). The Yellowstone wolves are a vulnerable population and a large percentage of people reported knowing someone who would shoot a wolf if they saw one in the wild. Sparse forest cover and understory in the GYE increase visibility of the wolves and their vulnerability to poachers or hunters (Fritts 1990). Management options regarding illegal killing of wolves should be considered in anticipation of increased human-caused mortality of wolves.

Preliminary findings suggest support for a reward system for reporting illegal killing of wolves. Most respondents, with the exception of hunters, also support placing restrictions on hunting activities. Many hunters expressed the belief that hunting instills

fear in predators and reduces the likelihood of dangerous human-predator conflict (Appendix 1). Public attitudes toward management options dealing with illegal killing of predators can be explored in a more wide-scale survey.

While the survey results indicates some apprehension regarding the role of government agencies in the management of these species, the study indicated overall support for government agencies. People seem to prefer management by state agencies or ones whose work focuses on the GYE and surrounding geographic areas.

It is important to note responses on knowledge questions regarding the government's role in grizzly bear recovery and wolf reintroduction in relation to opinion questions. For example, there may be a relationship between the majority of respondents who were unaware that Togwotee Pass is designated as Management Situation One Habitat (86% answered incorrectly or responded "don't know" to a question regarding this status), the majority of respondents who know that state wildlife officials can capture and relocate problem grizzly bears (88% responded correctly), and the majority opinion (56%) that government agencies did *not* act illegally when removing a problem grizzly bear from Togwotee Pass in September 1995. People may be aware of the legality of moving problem individual bears from certain areas but may be unaware of the meaning and management implications of Management Situation One Habitat. The 29% response of "no opinion" regarding the legality and responsibility of government agencies in this situation may also be influenced by people's lack of knowledge.

Additionally, only 1% of respondents were aware that Wyoming Game and Fish was conducting a scientific study to assess the rancher's losses, which means they would be unaware of the implications that removing the bear would have on the study. Furthermore, only 15% of respondents know that federal agencies are primarily responsible for wolf management in Wyoming, which could further influence their opinion that government agencies did not act irresponsibly in the Togwotee Pass incident.

Lack of knowledge—or incomplete knowledge—about grizzly bear and wolf ecology could influence negative attitudes toward these species. For example, most people know that individual wolves are able to kill a deer and that wolves have not stayed within Park boundaries, but are not aware that there are less than 200 wolves in the GYE.

Additionally, only 39% of respondents know that wolves mostly feed on small mammals like mice and rabbits, while 76% know that wolves do not only kill animals that are sick and old and 86% know that wolves have not stayed within Yellowstone National Park.

Direct assessment of opinions toward specific management issues such as predator control and support of government actions can be augmented by case studies on reactions to particular incidents. For example, despite public attitudes supporting capture and relocation practices, reaction to the translocation of 3 wolves in Montana in 1989 serves as an indication that any deliberate killing of wolves or mortality of relocated wolves in the GYE may be viewed more adversely than previously thought (Fritts 1990). Unlike the Montana incident, this pilot study did not detect antagonism toward the incident involving the removal of Bear 209 from Togwotee Pass. The majority of respondents in this survey did not think that government agencies acted irresponsibly by removing Bear 209. However, it is important to keep in mind that the circumstances surrounding particular incidents can affect public attitudes, and support for certain management practices can change in the context of a particular incident.

Conclusions and Suggestions for Community Outreach

Although respondents expressed support for grizzly bears and wolves in the GYE, this study also clearly indicates much tension regarding the management of these species. A crisis seems inevitable without increasing efforts to understand public attitudes and to incorporate public attitudes into management decisions. For example, when wolves reach the National Elk Refuge and prey on elk, there is likely to be widespread controversy. The reaction by citizens and environmental groups to the removal of bears from Management Situation One Habitat and to the killing of Bear 209 in a national park are indicative of potential crisis situations. To avoid such crises, this survey points to two major recommendations. The first involves gathering more data about public opinion on issues regarding grizzly bear and wolf management. The second addresses community involvement in decisions before and after such data are gathered.

One way to help anticipate and avoid potential crises—one method of gathering more data—is to conduct a larger attitudinal survey to assess people's opinions on such issues and their reaction to management decisions. Such a survey should be largely based on this pilot study and should be mailed to allow for a larger sample size. The sample size should be calculated based on the number of issues addressed in the revised survey and the anticipated sampling error. The study should be focused in the Jackson Hole area to ensure the most meaningful and timely results.

While findings of this pilot study suggest the need for a larger study, they do not preclude certain actions that can be taken now. For example, ignorance by the public of events such as the Togwotee Pass Situation—despite extensive outreach—indicates the need for more innovative strategies of public participation than current public education and outreach. Newer and more innovative models of public participation and collaboration with the government might help to alleviate resentment about wolf reintroduction by federal agencies and mistrust of national agencies. These models should incorporate members of the Jackson Hole community and encourage dialogue among them and decision-makers in the decision-making process.

As this pilot study and past research have shown, the socioeconomic factors surrounding endangered species recovery are equally as complicated and important as the ecological ones. Grizzly bear and wolf management practices affect and are affected by not only by the biophysical environment, but also by the social environment. Managing for grizzlies and wolves also means managing humans—tourists, residents, park officials, ranchers, hunters, and business owners and operators—and considering their needs and desires. To reach resolutions to issues surrounding grizzly bear recovery and wolf reintroduction, management options must therefore consider not only the population dynamics and ecological sustainability of these species, but also the perspectives and potential actions of the human species. Sound management will require continual assessment of both the biophysical and social conditions that determine the success of recovery programs.

Appendix 1: Comments

Following are a list of paraphrased comments made by respondents during interviews. Overall comments are listed first, separated by category, and comments about specific questions are listed next.

Overall Comments

Survey

I am glad to see they are doing this.

Glad to see they are doing this, it is a good study.

I am glad the park is making an effort to get different groups.

It is good to acknowledge interest in getting opinions of people around here.

Additional groups to interview may be people with hunting licenses.

It was a thorough questionnaire.

It was hard for me to distinguish personal from business-related opinions.

The survey makes you one way or other, which isn't the way it is. Answers are ambiguous.

There should be more places on the survey for input.

Separate grizzly and wolf in questions (grizzlies not a problem in winter—hibernate).

Need to separate capture and relocated from destroyed.

A couple of questions deceptive. You need to separate wolves and grizzlies.

The questions are vague and poorly worded, so I couldn't give good answers. To elicit people's opinions, it may be more helpful to write an essay, or talk and have someone assess it rather than closed-ended.

Clarify questions.

Wolf reintroduction and recovery

I am against restoration, even though I am an environmentalist. I love animals more than people, but animals are extinct due to humans—leave them that way. The damage has been done by humans. They are happy in Canada, so leave them there. Leave them in the wild where there are not as many people. There are too many people in Jackson to reinstate wolves. The methods of relocation are also bad—drugging, leaving them in pens, then letting them loose to get shot.

Relocation is mean to wolves—capture, put here, then they get killed. Money would be better spent on swans.

I would love to get an information packet on wolves.

It is a wild goose chase expecting to bring wolves in and expect them to stay in boundaries, plus it costs a lot of money.

Reintroduction to Yellowstone is a joke. It is spending too much money on something not needed. The money should go to other things in the park (parts of the Park are closing down because they can't afford it). Wolves should be natural if done at all. I am not against wolves, but against reintroduction (closing down parts of parks hurts tourism, and that's income).

Wolves are ridiculous. It costs a lot of money for studies, for introduction, for what? That money could be put to better use. We got along all these years without wolves, why do we need them now? Just because people want to see them. Wolves will cause a lot of problems, but the grizzlies were already here.

Too much money is spent on wolves.

Wolf reintroduction has become too political. I hope the situation is resolved in a logical and balanced manner (too much is rancher versus environmentalist. Now, federal government is coming in and saying other things; people in DC who were never out here are voicing their opinions on what to do).

These species should be controlled because it is a recreational area. They will have sad experiences with wolves. I had friends who raised wolf pups from Canada, just like domestic pups, but took them back to Canada. People had a 5 year old daughter where they took wolves, and they let the wolves loose, and the wolves were stalking the little girl. They have a wild instinct, and it is scary with people picnicking in hills.

If wolves get restored, what will it do to existing wildlife populations—elk, wintering moose population is the biggest concern, and moose have just as much right as wolves; do we bring in one species at the demise of another?

Even though they are trying to get wolves to Jackson, they seem to want to head north; wolves need personal biologists; if experiment doesn't work, end it.

Wolves will establish themselves.

They'll move down on their own.

Ranching

People who love wildlife should be able to pay a "grazing fee" for a bear or wolf (like the adpot-a-rainforest).

There are pros and cons about grizzlies, mainly because of cattle livestock. For many cattle ranchers, it is their sole income. Usually when one cattle is killed, more than 1 is killed. Grizzlies have good memories—they go back. They should restrict permits in certain areas, such as from Togwotee to Cody. Every year, there are three to four episodes.

It is okay to have grizzlies; just get rid of ones that prey on livestock. We can have both, but it requires management. I don't care about bears being there, but we need predating bears taken care of.

Ranchers should be supported more—they need more leniency. Bears can't indiscriminately kill until nothing is left. A balance is needed, and there is none now. There is a false notion of rich ranchers; their land is worth a lot, but not a lot of income—ranchers need to be making a living. Grazing fees need to be based on the market. People ranch for the love of ranching—more bears and wolves make it harder, and take the fun out of it. Who will do it if you take the fun out of it, and people depend on ranching for meat.

The ranching population has an extremely biased opinion.

Bison can hurt livestock in WY more than wolves and grizzlies put together.

Ranchers get cheaper land to graze, and the trade-off for cheaper land is the risk of grizzlies and wolves.

The government can't do anything; we can protect our own livestock.

It is impossible to find all kills.

We spend all our time looking for dead livestock; we don't raise livestock, we raise deadstock. Eight hours/day looking for dead livestock seems counterproductive. No one wants to pay for them, and we don't want to look for dead cattle.

The government is like landlord, and should treat us like any other tenant, especially with 97% of the land public.

You can't keep them out—no fence will stop them.

There are no more allotments.

Other management issues

It is wonderful to have wolves and bears reintroduced. I grew up in Minnesota, and we have many wolves in northern MN that don't run around and kill people. We don't have ranchers, but we have farmers, and the farmers really don't have a problem with the wolves (even with sheep). I am really excited about it, and one of reasons to live in this area is because of wildlife.

I have a concern about wolves—I raise horses. If I need to be compensated for a colt I have been breeding for years, it is hard to determine a value—who will set the value? Grizzly depredation is different because we know market value for cattle and it is easier to compensate.

For collared bears, whoever has collars is doing poor job of telling us where they are; would like them to stay away from riders.

I don't like out-of state people here for a few months making decisions that affect locals.

Keep grizzlies and wolves out of this region.

Preserving our wilderness heritage is absolutely critical to our national psyche, souls as human beings.

Mountain lions are more dangerous than grizzlies or wolves.

Grizzlies were here first—they have the first rights.

Outfitters practically have to live with them.

People will just have to adjust. I am not against grizzlies and wolves, but I want the government to consider people's needs. Grizzlies were here before wolves, now they are combining the two – problems with pets and livestock will follow. I hope they have solutions to problems before the problems happen.

I am opposed to bear destruction in conflict with human presence—relocation is okay.

Bison go out of Yellowstone, and it is stupid to shoot them. They, like wolves, don't really know where boundary is.

On all reintroduction/protection issues, the final outcome needs to be considered rather than the immediate situation. They need to consider why they are really doing it— not just neat to have them; help balance deer and elk (becoming too overpopulated, especially in Yellowstone).

Bison and elk should be controlled more natural balance. Look at great massacre of bison at early century—restore them now, but doing same thing. The government loses site of how they are managing things. There is a lot of stuff with national parks that I am not pleased with, like the Yellowstone closures.

My biggest concern is with the official number of grizzly bears they are stating are in the ecosystem (thin underestimated). Grizzly recovery was a success for everyone, now we all need to cooperate. Now they are restored in areas where they never were before. It is time to manage grizzlies as a recovered species.

Leave the grizzlies, but they need to be managed. They are well-beyond recovery goals.

Wyoming Game and Fish is honest, but the Forest Service is not.

The number of bears need to be controlled for bear's sake; scouts killed or kids taken from bus stop can lead to a knee-jerk reaction.

I am opposed to closing of roads to snowmobiling and horsepack trips. This is just making more wilderness we can't enjoy for the government's benefit. Instead, leave areas open for people to use. They know the risks. Don't close off areas to humans.

If the grizzlies are near my vegetable garden, it is too close.

Elk Refuge

Bear and wolf attacks in the Refuge are controversial (most people against death and destruction).

All the wolves will end up on the refuge, and they won't be able to do anything about it.

Elk are a problem, because the refuge is for express purpose of protecting them.

The general populace wouldn't understand if they saw wolf or grizzly take down an elk.

The elk refuge is like shooting fish in a barrel for the wolves.

Tourism

I already live in areas where grizzly bears and wolves can be found, and I live here for the animals.

Wolves have increased tourism; this concessionaire has people ask about wolves all the time.

Hunting

I am concerned about deer herds and moose. I don't see moose calves any more (bear got them). Wolves will get deer and elk (bears we don't worry about in winter – they will hibernate). People impacted by wolves and grizzlies have little to say (deer, moose impact).

I am not for hunting, but if a hunter kills animal in protection, he shouldn't have to go to trial

They should restrict hunting permits in certain areas (Togwotee to Cody). Every year, there are 3-4 episodes. Keep hunters out of there. I also strongly disagree with allowing any hunting in park. However, no restrictions on animals leads to overpopulation (balance lost). We need some hunting, just not in parks.

There is no longer a healthy fear of humans in predators— it doesn't exist, but should. Hunting is a good mechanism for control—bears will recognize that humans are a threat, and it will be safer for people. Grizzlies behave differently than they used to. They used to react to guns going off in 50s and 60s. The lack of fear makes the potential for human-bear conflict heightened. The government needs to be honest with the people.

Other

Specialty (wildlife, environmental groups) should be more open-minded regarding status of various species they feel are endangered, threatened with relation to other human habitation and economic enterprises; many listed species are not truly threatened or in danger of extinction. If cohabitation with predator species is to be successful, they have to realize there will be problem individuals of those species to be dealt with. Grizzlies and wolves are not just pets.

We screwed with the GYE too much.

Any "man-made" changes messes things up.

3rd Tuesday in May there was a talk about the wolf restoration program at wildlife museum. They should do more often, especially in the summer for tourists.

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