

Visitor Perceptions of Roadside Bear Viewing and Management in Yellowstone National Park

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VIEWING BOTH GRIZZLY BEARS (*Ursus arctos*) and American black bears (*Ursus americanus*) along roadside habitats has long been a popular recreation activity enjoyed by visitors to Yellowstone National Park (YNP). Both the nature of this activity, as well as the management of bears using park road corridors, have evolved significantly over the last century. For instance, while it was common by the 1920s for black bears to beg for human food on the roadsides (Schullery 1992), large numbers of visitors observing and interacting with human-habituated and food-conditioned bears led to a high incidence of human injuries and property damage from bears through the 1960s (Haroldson and Gunther 2013). This led to an evolution in bear management within YNP, which started somewhat informally from the park's creation in 1872 through the 1950s, with overly troublesome bears removed as necessary on a case-by-case basis (Gunther 1994). By 1960, a more formal National Park Service bear management program was implemented, aimed at reducing bear-caused human injuries and property damage, and re-establishing bears in a more natural state (National Park Service 1960; Gunther 1994). In 1970 a new, more intensive bear management program was initiated (Leopold et al. 1969). The number of bear-human conflicts within YNP declined significantly in the following years, with a large portion of the decline coming from reduced black bear-caused injuries on roadsides (Gunther 1994). While this outcome was due in part to changes in policies and regulations, it required a monumental shift in visitor attitudes and habits, altering the way visitors perceived bears and their role in Yellowstone (Wondrak Biel 2006).

Today, rather than relocating or hazing habituated bears along park roadways, YNP management focuses on managing people viewing roadside bears. This informal adaptive management strategy began in the early 1990s in an effort to reduce the number of bears being removed along park roads, as well as to allow the bears to continue using high-quality roadside habitat (Gunther and Biel 1999). Under this current management strategy, visitors

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have the opportunity to view bears foraging on naturally occurring foods along roadways (Haroldson and Gunther 2013). Indeed, the number of traffic jams on YNP's roads due to drivers stopping to view bears, referred to as "bear jams," has grown exponentially over the last few decades (Gunther and Wyman 2008) and is expected to remain at current levels or increase in the future (Haroldson and Gunther 2013). While existing data collected by YNP can be used to show trends in bear jams and other impacts of the current management policy, little is known about how visitors perceive roadside bear management policy in YNP. To better understand visitors' behavior and perceptions regarding the recreational activity of bear viewing and various aspects of bear management within YNP, a visitor survey was conducted in the summer of 2009. The remainder of this article discusses survey design and data collection, and presents the results.

Survey design and data collection

A visitor survey was developed in the summer of 2008 as a collaborative effort between a team of interdisciplinary scientists at the Yale School of Forestry and Environmental Studies, the National Park Service, and the US Geological Survey. The survey was designed to capture a wide range of information on visitor behavior and opinions related to bear viewing in YNP. The survey instrument was split into seven sections, each with a different focus, and survey questions were developed based on discussions with scientists at YNP's Bear Management Office, the US Geological Survey's Interagency Grizzly Bear Study Team, and the US Geological Survey's Fort Collins Science Center.

In collaboration with park staff, four types of visitor intercept locations that reflected the variety of visitor types to YNP were identified. These included visitor centers, restaurants, trailheads, and road pullouts. Specific intercept sites included Canyon Visitor Center, the "old" Old Faithful Visitor Center, Tower Fall general store and restaurant, Albright Visitor Center at Mammoth, Hayden Valley road pullouts and trailheads, Fishing Bridge road pullouts and trailheads, and Lamar Valley road pullouts and trailheads. To capture YNP's primary bear viewing season, surveys were administered from May through September of 2009. Sampling occurred over 12 weekdays, balanced across the days of the week, and eight weekend days. At each survey location, every third visitor, 18 years and older, was intercepted while exiting. A mail-back survey method was used; visitors who agreed to participate in the study were asked their name and contact information and were given a cover letter, the survey packet, and a postage-paid return envelope. In sum, 70 visitors refused to take the survey, 978 visitors agreed to take the survey, and 663 visitors mailed the survey back, for an overall response rate of 63.3% when taking the initial refusals into account, and a response rate of 67.8% to the mailed survey. This is a high response rate considering the length of the survey (eight pages) and the lack of an incentive to complete it. Various demographic statistics for survey respondents are shown in Table 1.

The role of bear viewing in visitation

Visitors coming to YNP in the summer months participate in a wide variety of activities. Survey respondents were presented with a list of activities and asked to identify all that they

Table 1. Demographics of survey respondents.

Demographic Statistic	Percentage of Respondents	Demographic Statistic	Percentage of Respondents
Gender (n=658)		Education (n=659)	
Male	51%	Some high school	1%
Female	49%	High school diploma/GED	4%
Age (n=660)		Some college	30%
18-20 years	2%	Bachelor's degree	30%
21-35 years	20%	Graduate degree	35%
36-50 years	31%	Household income (n=645)	
51-65 years	35%	Less than \$25,000	7%
65 years and above	12%	\$25,000-\$49,999	16%
Employment Status (n=657)		\$50,000-\$99,999	29%
Employed (full-time or part-time)	77%	\$100,000-\$149,999	28%
Retired	20%	\$150,000 or greater	20%
Unemployed	3%		
Residence (n=660)			
United States	97%		
Other	3%		

participated in on their most recent trip to YNP. The results of this question reveal that a majority of all respondents participated in geyser viewing (97%); sightseeing (88%); viewing of any wildlife, including bears (81%); and bear viewing specifically (55%) (Figure 1).

To gather additional information about the importance of various activities and natural resources in visitors' decisions to take trips to YNP throughout the year, survey respondents were asked to rate each activity from Figure 1 on a four-point scale ranging from "Not at all important" to "Very important." Regarding bear viewing, 62% of respondents indicated that viewing bears is very important in their decision to take trips to YNP throughout the year, while 24% reported that it is moderately important, and 13% reported that it is somewhat important. Respondents were then presented with a list of 21 different mammals and birds and asked to select the top five that they would most like to see on their trips to YNP. Bears ranked the highest, with 81% of respondents listing them as one of the top five they would most like to see.

Respondents were also asked to indicate their preference regarding the type of bear-viewing experience they would prefer in terms of distance from the animal and number of other viewers (Figure 2). Nearly half (46%) of all respondents indicated that the habituation or wariness of a bear does not matter when they see a bear. Around 16% of respondents indi-

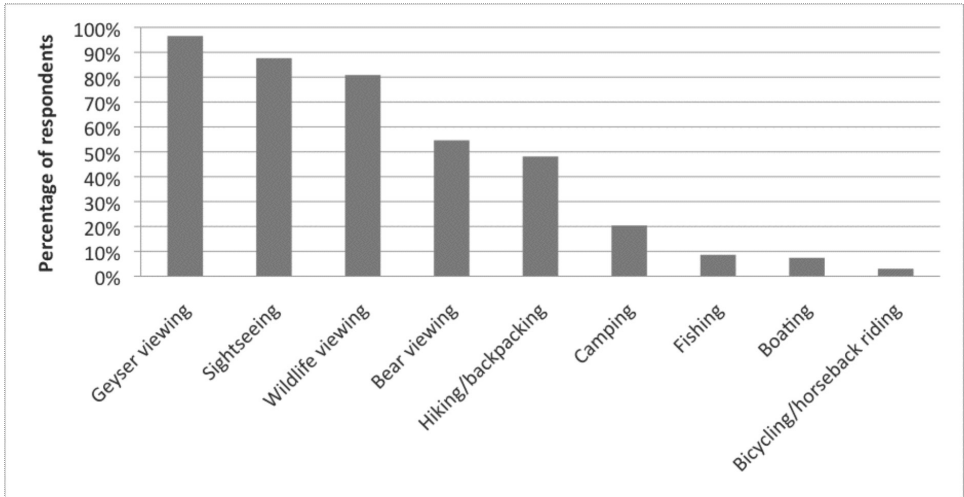


Figure 1. Activities participated in during respondents' most recent trip to YNP.

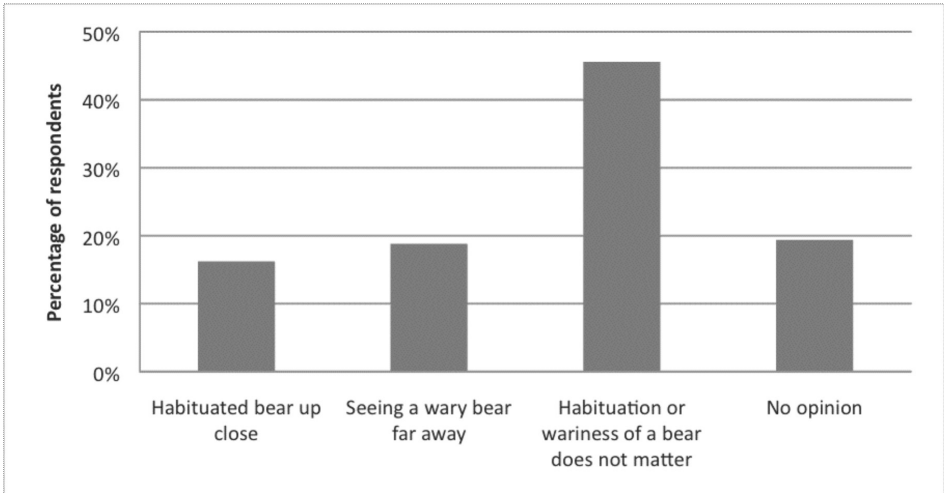


Figure 2. Survey respondents' preferences toward a specific type of bear-viewing experience.

cated that they would prefer to see a habituated bear up close involved in natural activities surrounded by a large number of people, whereas 19% indicated that they would prefer to see a wary bear far away with a spotting scope with fewer other people watching, and 19% had no opinion.

When presented with the option to see either a black or grizzly bear, 35% of all respondents indicated that they would prefer to see a grizzly bear, 5% would prefer to see a black bear, and 60% had no preference between the two. When asked about their experiences seeing bears, 68% of people reported that they had previously observed a bear in YNP and 67% saw a bear on their most recent trip to YNP.

Perceptions towards management practices and bear viewing

To better understand the acceptability of different management practices for roadside bear viewing in YNP, survey respondents were first informed of the park’s historical and current policies regarding roadside bears, as well as some of the issues associated with this policy. A portion of this text follows:

Yellowstone National Park policy is now “to manage human behavior” when “bear jams” develop and not to remove bears from roadside habitat (a “bear jam” is an expression used to describe traffic jams that occur “when the parked vehicles of people watching bears obstruct traffic”). Currently there are more “bear jams” than park rangers to manage them. This is a concern for visitor safety and a strain on existing park personnel.

Respondents were presented with several possible management techniques and asked to indicate the level at which each of the methods is acceptable to them (Table 2). The majority of survey respondents believe that YNP’s current policy of allowing bears to occupy roadside habitats is either generally acceptable or very acceptable. The more extreme management options, such as trapping bears for the purpose of removing them from the population, are not acceptable to the majority of respondents.

Respondents were then presented with a chart asking them to indicate “Yes,” “No,” or “No opinion” to a series of questions related to bear viewing in YNP (Table 3). Results show that over half of all respondents (59%) do not think that radio collars or other tagging detracts from their bear-viewing experience, and over half (63%) agreed that knowing about the benefits of radio collars and tagging makes these practices more acceptable to them. Though 51% of respondents did not agree that YNP needs more staff to manage roadside bear viewing, a substantial percentage (44%) did agree with that statement. In addition, 51% of respondents

Table 2. Acceptability of alternative roadside bear-viewing management practices in Yellowstone National Park.

Management Option	Not acceptable	Somewhat acceptable	Generally acceptable	Very acceptable	No opinion	N*
Acceptability of allowing bears to occupy roadside habitat	2.9%	9.8%	30.6%	56.0%	0.8%	663
Acceptability of discouraging bears from using roadside habitat by means of aversive conditioning (give a pain stimulus to the bear so that the bear associates the location with pain)	67.1%	15.2%	13.5%	3.2%	1.1%	653
Acceptability of discouraging bears from using roadside habitat by means of trapping and relocating (with low success)	42.0%	49.7%	6.3%	2.0%	0.0%	650
Acceptability of discouraging bears from using roadside habitat by means of trapping for purposes of removing the bear from the population (euthanizing)	99.1%	0.0%	0.6%	0.3%	0.0%	654

*Not all respondents provided responses for each management option

Question	Yes	No	No opinion	N*
Do radio collars or other tagging on the bear detract from your viewing experience?	18%	59%	23%	660
Radio-collaring and tagging bears is critical to acquiring information on bears' health, needs and movement patterns: does knowing about the benefits of radio collars and tagging make them acceptable to you?	63%	28%	9%	661
Do you think YNP needs more staff to manage roadside bear viewing?	44%	51%	4%	663
Do you feel unsafe when watching bears on roadsides?	20%	74%	6%	663
Do you think park rangers should provide more information on roadside locations where sightings of bears may be more common?	51%	36%	13%	651
Are glimpses of wary bears running across a meadow for tree cover as satisfying as watching a habituated bear forage next to a road?	74%	23%	3%	663
Do you value bears more because of roadside bear viewing opportunities?	52%	43%	5%	663
Does roadside bear viewing inspire you to accept bear conservation?	37%	59%	4%	662
Does roadside bear viewing inspire you to accept habitat protection?	66%	15%	19%	649
Does roadside bear viewing inspire you to accept some limits on development and recreation to protect bears?	62%	31%	7%	644

*Not all respondents provided responses for each question

Table 3. Perceptions of various bear-viewing scenarios in Yellowstone National Park.

think that YNP rangers should provide more information on roadside locations where sightings of bears may be more common. Slightly more than half (52%) of all respondents reported that they value bears more because of roadside viewing opportunities, 66% feel that roadside bear viewing inspires them to accept habitat protection, and 62% feel that roadside bear viewing inspires them to accept some limits on development and recreation to protect bears.

The influence of roadside bear viewing on intended visitation

Rather than relying only on professional judgment to determine how visitation might change with a management decision, survey instruments can be used to directly ask visitors how they would respond. This approach, referred to as contingent visitation or contingent behavior, allows agencies to augment professional judgment about potential changes in visitation with responses of the visitors themselves (Loomis and Caughlan 2004b). This technique has been used in past park surveys to estimate the percentage of YNP visitation attributable to wolves (Duffield et al. 2006), as well as to estimate changes in visitation associated with various elk and bison management strategies in Grand Teton National Park (Loomis and Caughlan 2004a, 2004b). In our 2009 visitor survey, respondents were first asked to report the number of trips made to YNP in the last year, and were then presented with the following question:

Would your decision to visit Yellowstone National Park change if bears were no longer allowed to stay along roadside habitats?

Respondents who answered “Yes” to this question were then asked to report the number of additional or fewer annual trips they would take. Results show that 2% of respondents would take more trips throughout the year, while 10% reported that they would take fewer trips throughout the year. Additional information regarding the economic impacts of changes in visitation based on these results can be found in Richardson et al. (2014). To examine the characteristics of those respondents who reported that they would take fewer trips to YNP throughout the year if bears were no longer allowed to stay along roadside habitats, a logistic regression model was used, with a binary dependent variable taking on a value of 1 if the respondent reported that they would take fewer trips, and 0 otherwise. The results of two models, Model 1, which includes all independent variables hypothesized to influence the dependent variable, and Model 2, which includes only those variables that had a statistically significant effect on the probability that an individual would take fewer trips throughout the year, are shown in Table 4. All variables refer to the respondents’ most recent trip to YNP unless otherwise stated.

The model results from Table 3 demonstrate that respondents who participated in viewing of wildlife other than bears on their most recent trip to YNP are more likely to report that they would take fewer trips to YNP throughout the year if bears were no longer allowed to stay along roadside habitats, all else constant, and this variable is significant at the 1% level. The number of trips taken to YNP in the last year also has a positive and statistically significant effect on the probability that a respondent would take fewer trips to YNP throughout the year. Individuals who saw a bear on their most recent trip to YNP were more likely to report that they would take fewer annual trips to YNP, and finally, as the income of a respondent

Table 4. Logistic regression of the decision to take fewer annual trips to YNP if bears were no longer allowed to stay along roadside habitats.

Variable	Model 1		Model 2	
	Coefficient	Std. Error	Coefficient	Std. Error
Participated in viewing wildlife other than bears (1 if yes, 0 if no)	1.226***	0.377	1.247***	0.374
Number of trips to YNP in last 12 months	0.131*	0.070	0.135**	0.070
Ever observed a bear in YNP (1 if yes, 0 if no)	0.433	0.321		
Saw a bear on this trip to YNP (1 if yes, 0 if no)	0.587*	0.335	0.590*	0.330
Gender (1 if male, 0 if female)	-0.071	0.285		
Age	0.008	0.011		
Education	0.041	0.068		
Currently employed (1 if full or part time, 0 if retired or unemployed)	0.346	0.238		
Live in the United States (1 if yes, 0 if no)	-0.131	0.781		
Income	0.000005***	0.000	0.000006***	0.000
Constant	-5.375***	1.190	-4.431***	0.534
	N = 634		N = 644	
	LR chi2 (10) = 30.72		LR chi2 (4) = 27.51	
	Prob > chi2 = 0.0007		Prob > chi2 = 0.0000	

*: p<0.10, **: p<0.05, ***: p<0.01

increases, so does the likelihood that they would take fewer trips to YNP if bears were no longer allowed to occupy roadside habitats.

Discussion

The recreational activity and experience of roadside bear viewing in YNP has changed significantly over the last century. Conducting periodic visitor surveys can help managers better understand the demand for various recreational activities within national parks, and help them systematically identify the range of visitor perceptions and opinions associated with different management practices. Surveys can also help to inform visitors about park policies, and the opportunities and challenges associated with them. Results of this 2009 visitor survey demonstrate that wildlife viewing in general and bear viewing in particular are popular recreation activities in YNP. Park visitors place a high economic value on bear-viewing opportunities (Richardson et al. 2014). The majority of survey respondents believe that YNP's current policy of allowing bears to occupy roadside habitats is either generally acceptable or very acceptable, while the more extreme management options, such as euthanizing roadside bears, are not acceptable to the majority of respondents. Responses to a contingent visitation question indicate that some visitors would change the number of trips taken to YNP throughout the year if bears were no longer allowed to stay along roadside habitats. Future surveys can be used to better understand the role of roadside bears in YNP and continue to help managers obtain feedback from visitors on various aspects of park management and policy.

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