

## FINAL REPORT

### **Wildlife Road Survey and Human Interactions On and Off Road**

West District Resource Management  
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#### **INTRODUCTION**

Studies were conducted in Yellowstone National Park to examine the effects of winter recreation on wildlife by Aune (1981) and Hardy (2001), and the effects of road grooming on bison by Bjornlie and Garrott (2001). Monitoring winter wildlife distribution and wildlife-human interactions along the road corridor between the West Yellowstone and Old Faithful was initiated during the 2001-2002 winter as part of the effort to reduce resource impacts and improve visitor safety and enjoyment in Yellowstone National Park. Methods from Hardy (2001) were expanded so this year's monitoring could be compared to results from her study.

Three biological technicians were hired for winter monitoring efforts beginning on December 11. The first three weeks were used for training, protocol testing and project development. A total of 170 road surveys were conducted on 74 days, December 27 through March 10, with an average duration of 2.4 hours and 3,498 wildlife groups documented, and a total of 510 site-specific human-wildlife interaction events were recorded during the study. Staff logged over 9,000 miles on two snowmobiles. The two primary objectives of these surveys were to (1) document seasonal and diurnal wildlife distribution and activity, and visitor wildlife viewing opportunities along the road corridor, and (2) document human behavior in relation to wildlife and wildlife responses to human behavior associated with snowmobile and snowcoach use.

#### **METHODS**

Staff conducted surveys to document wildlife visible from the road between the West Entrance and Old Faithful. Three types of surveys were conducted. Daily wildlife road surveys were conducted primarily to document wildlife distribution and activities. Road surveys typically began between 0730 and 0830 hours at Madison Junction and were

conducted to West Yellowstone and Old Faithful. Survey routes included the main road, plowed pullouts, parking lots (excluding Old Faithful), Riverside Drive, and Firehole Canyon Drive. In January, surveys were conducted in varied directions and times to cover the daylight hours with additional surveys randomly scheduled on two weekdays and both weekend days each week, alternating between survey routes. Site-specific "off road" human-wildlife surveys were conducted in conjunction with the wildlife road surveys and opportunistically at other times of the day to document both the wildlife and human behavior when animals were located within the road corridor and not on the roads. The staff chose sites where high numbers of people stopped to view wildlife, varying species and animal distance from the road. Site-specific "on road" human-wildlife surveys were also conducted in conjunction with the wildlife road surveys and opportunistically at other times of the day when animals were located on the roads to document the interactions and responses of wildlife and people.

All observations were recorded from the roads. Wildlife was located with the unaided eye and binoculars were used to identify group composition and animal activity. Beginning and end times and mileages were recorded as a measure of survey effort. Visibility was categorized as good, fair, or poor, and weather was categorized as clear, light snow, heavy snow, or fog. When conditions or visibility varied within the survey time, the predominant condition was used to classify the entire survey. "Fair" indicated small, patchy areas of low visibility while "poor" indicated larger areas of low visibility within 100 meters of the road. Even with poor visibility, most animals were detectable within 100 meters of the road.

For all surveys conducted, we recorded the survey route or drainage and all groups of animals visible, including single animals (Figure 2). Each survey route was divided into 4-5 segments. We recorded animal activity and behavioral responses to human presence for all animals located, and group composition for animals within 100m of the road and on the road. Locations of animals were documented in Universal Transverse Mercator (UTM) NAD 83 coordinates using a non-differentially corrected global positioning system (Garmin GPS12) on the road perpendicular to where animals were visible. When off-road, animal locations were noted as right or left of the road with Madison Junction as the origin and the distance from the road was estimated in meters in four increments: 1-25, 26-60, 61-100, and >100. The habitat occupied by animal groups was added to

survey protocol on January 8 and categorized as aquatic, forest, burned forest, wet meadow or riparian, thermal, and dry meadow. Sex and age composition of groups was classified as calf of the year, cow, bull, or unknown for bison and elk, and adult or juvenile for swans and eagles. Coyotes and wolves were recorded as unknown. Animal activity was recorded as feeding, traveling, or resting. Feeding was defined as animals actively feeding or moving in search of forage. The category of traveling was used when animals were walking, swimming, or flying in sustained movement. The category of resting was used when animals were stationary, lying or standing, and not feeding (Bjornlie and Garrott 2001).

We recorded animal response behaviors for all individuals in each group. Animal response behaviors were recorded as no apparent response, look/resume, walk/swim, attention/alarm, and flight (Chester 1976). Additional response behaviors recorded were rise from bed, agitate (buck, kick, bison tail-raise), jump snow berm, and charge. When animals displayed several responses, we used the highest (most extreme) coded response.

Staff documented the number of over snow vehicles (OSVs) that stopped during all surveys, which included snowmobiles and snowcoaches, however, the staff were not included in the numbers of snowmobiles recorded. Whether OSVs stopped further than or within 25m from wildlife was recorded. When an OSV stopped within 25m of animals, the distance to the animals was estimated in meters. Wildlife movement blocked by OSVs was also documented, as well as behavior to draw animals' attention, including yelling, whistling, or throwing objects. During road and off-road human-wildlife interactions surveys, numbers of people on snowmobiles and individuals that left their snowcoach were recorded. Human activity recorded while viewing wildlife included whether people stayed on their snowmobiles, stepped off onto the road, or left the road. When people left the road, their distance from the road and the animals was recorded. During on-road human-wildlife interaction surveys, only the number of OSVs was recorded. Additional data documented during on-road surveys included the number of OSVs that passed wildlife appropriately with minimal disturbance or herded wildlife down the road.

# RESULTS

The total number of animals counted during road surveys was 25,173. Bison, elk, swans, bald eagles, and coyotes were the most numerous species counted and are summarized below. Less common species sighted during surveys, which included moose, mule deer, muskrat, wolf, golden eagle, and double crested cormorant, were excluded from the summary tables.

Eighty-seven percent (n=21,936) of total number of animals observed during road surveys had no visible response to OSVs. Of the 13% (n=3,263) of total animals counted that exhibited an observable response, 68% looked directly at the people viewing them and resumed their activity. Thirty-two percent of the responses were more active, including walk/swim away, rise from bed, attention/alarm, flight, agitate (buck, kick, bison tail-raise), jump snow berm, and charge. Of the 17,209 animals counted within 100m of the road, 17% (n=2,966) showed an observable response to the presence of OSVs that stopped, while 3% (n=297) of the 7,924 animals counted further than 100m from the road showed a visible response (Table 1).

Table 1. Animals counted and percent observable response less than (<) 100 meters and more than (>) 100 meters from the road during wildlife distribution and human interaction surveys conducted. Percent of Look-Resume reported (in parentheses) is of the total responses.

Species	Animals observed < 100m			Animals observed >100m		Total counts
	Counts <100m	Observable Response (%)	Look-Resume (%)	Counts >100m	Observable Response (%)	
<b>Bison</b>	11,480	1,175 (10)	896 (76)	6,780	90 (1)	18,260
<b>Elk</b>	2,154	1,072 (50)	793 (74)	1,026	164 (16)	3,180
<b>Swans</b>	3,382	618 (18)	266 (43)	56	37 (66)	3,438
<b>Bald Eagles</b>	152	72 (47)	57 (79)	50	1 (2)	202
<b>Coyotes<sup>a</sup></b>	41	29 (71)	16 (55)	12	5 (42)	53
<b>Total</b>	17,209	2966 (17%)	2028 (68%)	7,924	297 (3%)	25,133 <sup>b</sup>

<sup>a</sup>small sample size <sup>b</sup>excludes less common species

Distance of animals from the road differed by species. Most bison and elk located were 61-100m from the roads. Most swans, however, were found 26-60m from the roads because the road system in the Madison and Firehole drainages is situated close to the rivers (Figure 1).

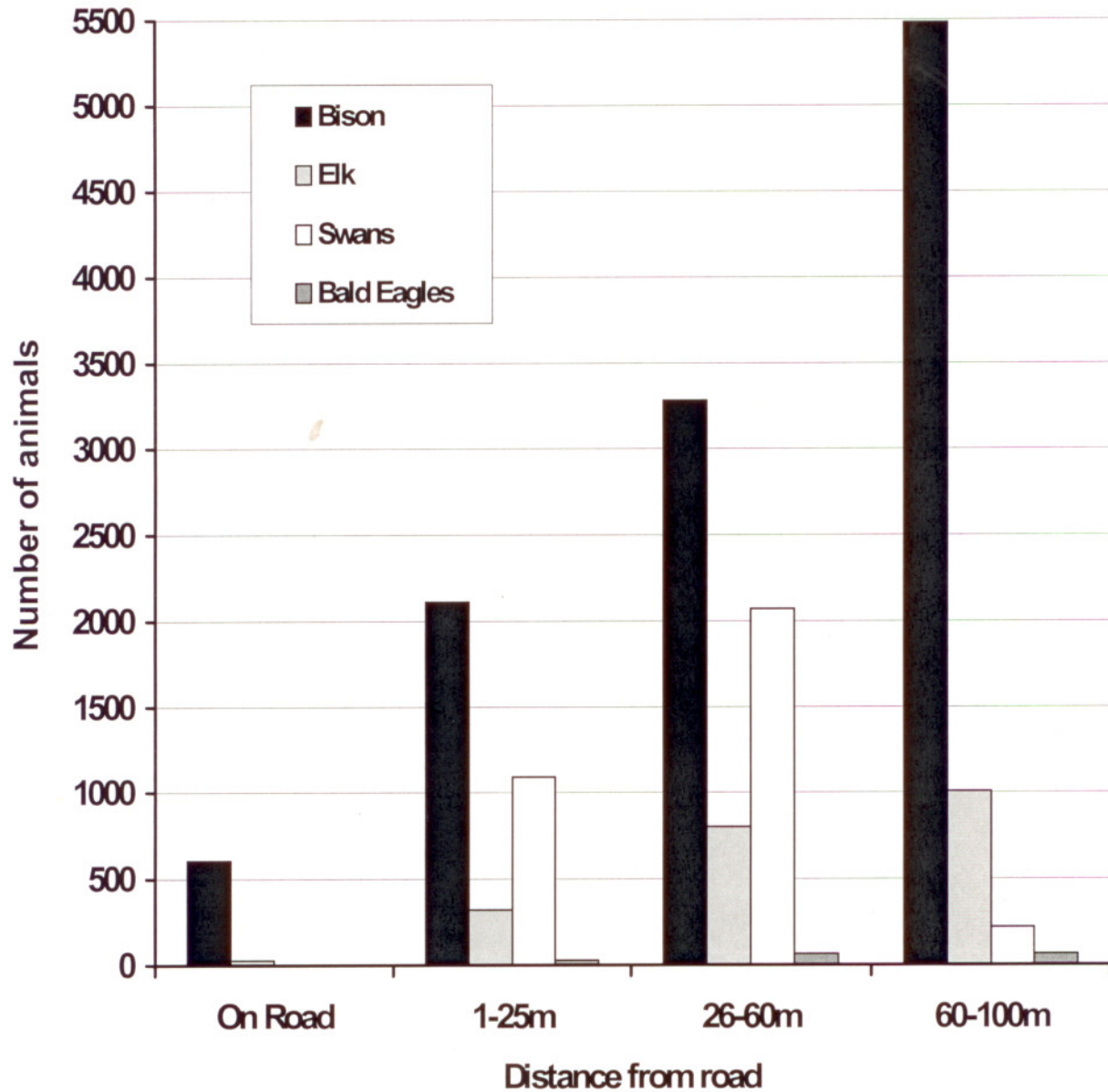
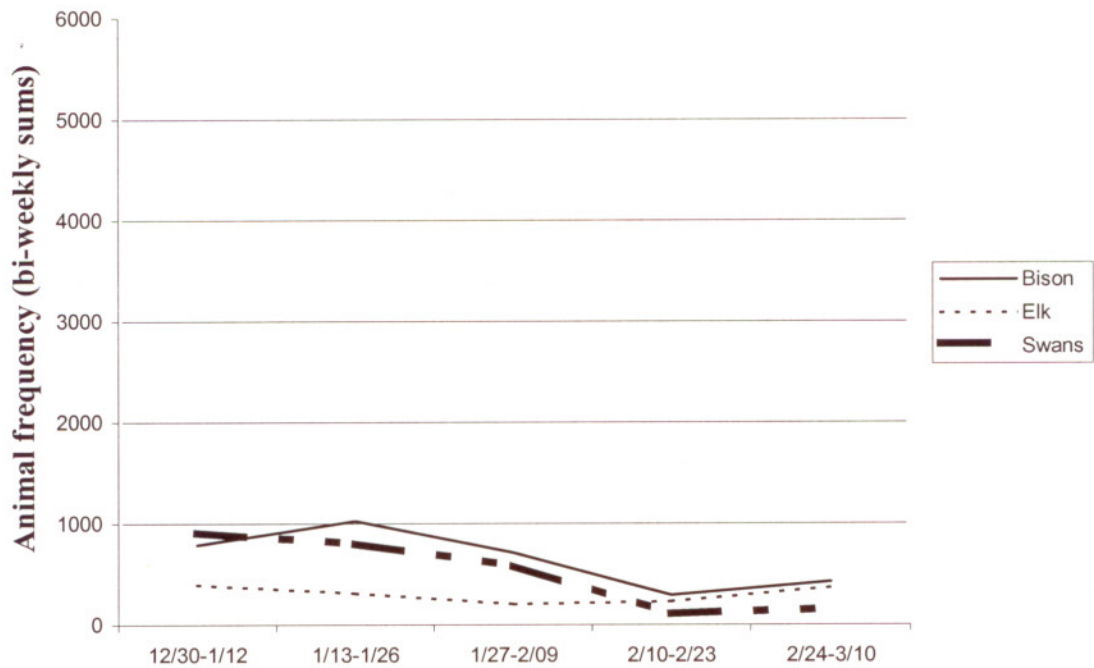


Figure 1. Number of animals from the road in increments of 0m (on the road), 1-25m, 26-60m and 61-100m.

### West Yellowstone-Madison Junction



### Madison Junction-Old Faithful

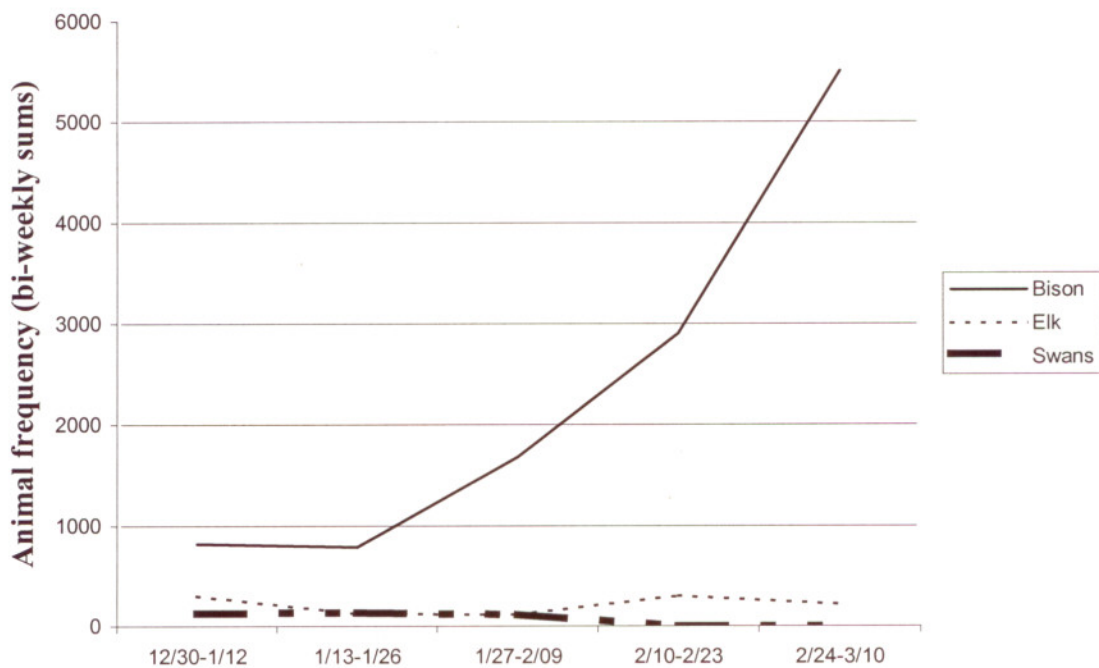


Figure 2. Bi-weekly summations of animal frequencies in the Madison and Firehole drainages.

## Wildlife-Human Interactions with Animals Off the Road

A total of 387 wildlife-human interaction events were documented when animals were off the roads. During these observations, 4,276 snowmobiles and 149 snow coaches stopped on the road to view animals. Of those, 2% (n=99) were recorded stopping within 25m of animals. People counted on snowmobiles and individuals that got out of their snowcoach totaled 5,618. Forty-seven percent (n=2643) of the people stayed on their snowmobiles while 53% (n=2,975) stepped out on foot from either their snowmobile or snowcoach, of which, 51% (n=2,839) stayed on the road while 2% (n=136) left the road. Distances from the road and animals were recorded for individuals that left the road. Eighty percent (n=109) of the people stayed within 5m of the road while 20% ventured further. Sixty percent of the people that left the road remained >25m from animals while 40% (n=44) ventured within 25m or closer. Those 44 individuals were 1% of the 2,975 people that left their OSV. Less than one percent (0.6%) of all people counted (n=5,618) yelled, whistled, or threw snowballs to draw animals' attention.

The total number of animals involved in these wildlife-human interactions was 2,963 (Table 2). The highest coded (most extreme) response of animals and humans was used in this summary. Animal percentages recorded off-road that responded to human presence were 5% (113) for bison, 31% (152) for elk, 21% (95) for swans, and 29% (6) for bald eagles.

Table 2. Animal responses during wildlife-human interactions while animals were off-road. Categories of response behaviors were: No Response (no apparent response), Look-Resume, Moderate Response and Agitation. The categories walk/swim away, rise from bed, attention/alarm were pooled as "Moderate", while the categories flight, agitate (buck, kick, bison tail-raise), jump snow berm, and charge were pooled as "Agitation". Percent of Look-Resume reported (in parentheses) is of the total animal responses.

Species	No.	Animal Response				
		No Response (%)	Total Responses (%)	Look-Resume (%)	Moderate Response (%)	Agitation (%)
<b>Bison</b>	2,000	1,887 (94)	113 (5)	77 (68)	32 (28)	4 (4)
<b>Elk</b>	489	337 (69)	152 (31)	109 (72)	33 (22)	10 (7)
<b>Swans</b>	448	353 (79)	95 (21)	52 (55)	43 (45)	0 (0)
<b>Bald Eagles*</b>	21	15 (71)	6 (29)	4 (67)	0 (0)	2 (33)
<b>Coyotes*</b>	5	2 (40)	3 (60)	2 (67)	0 (0)	1 (33)
<b>Total</b>	2,963	2,594 (88%)	369 (12%)	244 (66%)	108 (29%)	17 (5%)

\*small sample sizes

## Wildlife-Human Interactions with Animals On the Road

Data were collected for 133 wildlife/human interaction events when animals were on the roads including 122 bison, 8 elk, and 3 coyote events. These 131 events involved 921 observations of human interactions. Of the 3,187 total OSVs counted, 3,102 were snowmobiles and 85 were snowcoaches. Fifty-seven percent (1,818) of the vehicles passed animals appropriately, 24% (764) stopped appropriately further than 25m away prior to passing, while 14% (453) stopped  $\leq 25m$  from the animals. Five percent (154) of the vehicles herded animal on the roads and 2% (50) blocked animals in their line of travel. More than 1,764 people were present during the on-road events, of which 11 were observed yelling or whistling to draw the animals' attention. Animals involved in these interactions totaled 906 (Table 3). Of the bison recorded on the roads, 80% exhibited a behavioral response to OSVs. Of the few elk and coyotes recorded on the roads, 100% of the coyotes and 81% of the elk showed a response to OSVs. Again, the highest coded response of animals and humans was used in this summary.

Table 3. Animal responses during wildlife-human interactions while animals were on the roads. Categories of response behaviors were: no apparent response (None), look/resume, walk/swim away (Walk), rise from bed (Rise), attention/alarm (A/A). The categories walk and attention/alert were pooled as "Moderate Response", while flight, agitate (buck, kick, bison tail-raise), jump snow berm (J-B), and charge were pooled as "Agitation". Percent of Look-Resume reported (in parentheses) is of the total animal responses.

Species	No.	Animal Response				
		No Response (%)	Total Responses (%)	Look-Resume (%)	Moderate Response (%)	Agitation (%)
<b>Bison</b>	886	179 (20)	707 (80)	273 (37)	134 (19)	300 (42)
<b>Elk*</b>	16	3 (19)	13 (81)	9 (69)	1 (8)	3 (23)
<b>Coyotes*</b>	4	0 (0)	4 (100)	0 (0)	1 (25)	3 (75)
<b>Total</b>	906	182 (20%)	724 (80%)	282 (31%)	136 (19%)	306 (34%)

\*small sample sizes



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