

## OF GRIZZLY BEARS AND COMMERCIAL OUTFITTERS IN BRIDGER-TETON NATIONAL FOREST, WYOMING

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*Abstract:* Information on grizzly bear (*Ursus arctos horribilis*) distribution and relative seasonal abundance in the Bridger-Teton National Forest, Wyoming, was gathered by direct observation of bears and bear sign and by outfitter interviews in 1977–78. Operation of commercial outfitting camps was examined and case histories of bear–human interactions documented in 1978 to assess the potential for bear–human conflict. We compiled 394 reports of grizzly bear for 1968–78, including 228 reports for 1977–78. Report localities were distributed widely throughout the northern portion of the Forest, but concentrated in Teton Wilderness (Buffalo Ranger District). An estimated 45 grizzlies occurred on the Forest during May–November 1977: 15 single bears and 10 females with 20 young. In 1978, 37–38 grizzly bears were tallied during May–November: 21–22 single bears and 7 females with 9 young. Each of 20 outfitter camps examined had conspicuous bear attractants, including low-hanging racks of game meat, open garbage pits, and unsealed livestock and human foods. Attractants were near human quarters and concealment cover for bears. Eighteen camps had histories of bear encounters. Management guidelines could reduce attraction of camps for bears.

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One of the largest grizzly bear populations south of Canada occurs in Yellowstone National Park and surrounding National Forests (Craighead et al. 1974; R. Knight et al., unpubl. annu. reps., Interagency Study Team, U.S. Dep. Int., Park Serv., Bozeman, Mont., 1975, 1976, 1977, 1978, 1980). Although grizzly bears had been reported in the Bridger-Teton National Forest south of the Park prior to 1977, little was known about the distribution and relative abundance of bears in the area.

In 1975, the grizzly bear was listed federally as a "threatened" species, which placed added responsibilities on land management agencies which had grizzlies. Forest management objectives included maintaining and/or enhancing grizzly habitat and minimizing potential for human–grizzly conflict. To provide a data base for management, the Forest in 1977 initiated investigations of grizzly bear relative abundance and distribution and of grizzly–human interactions. Study objectives were to: (1) document distribution and relative seasonal abundance of grizzly bears; (2) measure, map, and describe outfitting camp layouts, with attention to juxtaposition of potential bear attractants and human quarters, and describe operating procedures related to these; (3) compile case histories of bear–human encounters at camps; and (4) make management recommendations.

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### STUDY AREA

The Bridger-Teton National Forest (NF) in northwestern Wyoming (1,276,846 ha) stretches over 160 km southward from a common boundary with Yellowstone National Park and encompasses portions of the Absaroka, Gros Ventre, Snake River, Washakie, Wyoming, and Wind River Mountain Ranges. Field investigations were confined to the Buffalo and Gros Ventre Ranger Districts (Fig. 1). Physical and biological attributes of these and adjacent lands were described by Reed (1952), Love and Reed (1968), Cole (1969), Keefer (1972), and Craighead and Craighead (1972).

The Continental Divide bisects the Buffalo Ranger District (RD) and forms the eastern



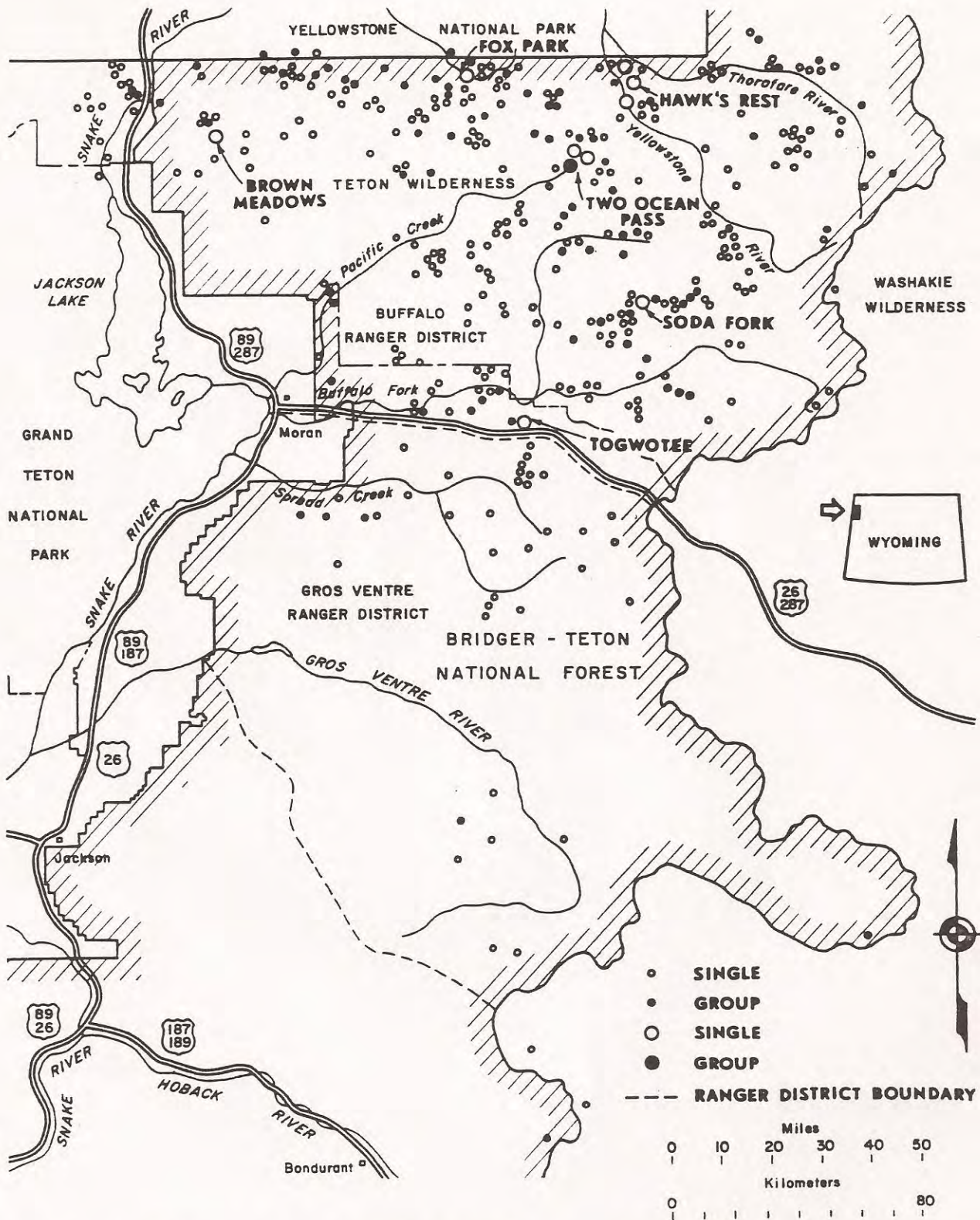


Fig. 1. Distribution of grizzly bear reports in Bridger-Teton National Forest, Wyoming, 1968-78. Larger symbols note 5 reports in one location. IGBST (Interagency Grizzly Bear Study Team) radio-collared grizzly #35 accounted for 21 plottings in the Gros Ventre Ranger District.



boundary for the remainder of the study area. Elevations range from approximately 1,800 to 3,700 m. The region west of the Continental Divide is dominated by timbered ridges interspersed with mountain meadows and grassy slopes. High plateaus, mountain peaks, deep valleys, and extensive riparian communities characterize areas east of the Continental Divide.

Habitat types in the subalpine fir (*Abies lasiocarpa*) series dominate timbered areas, with habitat types in the spruce (*Picea* spp.), Douglas-fir (*Pseudotsuga menziesii*), and whitebark pine (*Pinus albicaulis*) series also occurring (Cooper 1975, Steele et al. 1977). Lodgepole pine (*Pinus contorta*) covers extensive areas, mostly in seral stands. Nonforested habitats highly valued as grizzly forage sites (Mealey et al. 1977) occur throughout the study area.

Much of northern Bridger-Teton NF is accessible only by horseback or foot travel. The Buffalo RD is comprised almost entirely of Teton Wilderness, whereas the Gros Ventre RD has limited road systems.

## METHODS

### Field Investigations

Based on a review of limited Agency reports and interviews with local outfitters, we concentrated fieldwork in the Buffalo RD. Extensive backcountry trips were made in search of sight or sign of grizzly bears. The age of each sign was estimated. Bear track morphology was noted in detail, and main pad, claw, and total print dimensions measured. Stride length was measured where possible. Substrate type and condition were described for each set of tracks, and corresponding slope angle estimated. Grizzly bear tracks were distinguished from those of black bears (*Ursus americanus*) according to characteristics noted by Wright (1909), Murie (1954), and Greer and Craig (unpubl., Montana Dep. Fish, Wildl. and Parks, Helena, 1971).

### Outfitter Survey

Grizzly bear information was sought from all persons encountered in the field. Outfitters and guides were systematically and repeatedly queried. High priority was placed on rapid verification of recent, credible reports. We evaluated reports of grizzly bears using: (1) personal field ob-

servations, (2) accuracy and detail of the report, (3) criteria for distinguishing bear species (Greer and Craig, unpubl., Montana Dep. Fish, Wildlife and Parks, Helena, 1971), (4) reliability and experience of the observer, and (5) comparisons with other reports.

In 1978, we examined outfitter camps to assess potential for grizzly-human conflict. We noted (1) methods of handling human foods, game meat, and livestock foods; and (2) distances among travel routes, human quarters, potential bear-food sources, and concealment cover for bears (as defined by Mealey, unpubl. rep., U.S. Dep. Agric., For. Serv., Denver, Colo., 1979, after Thomas et al. 1976).

### Population Estimation

Reports of bears were scrutinized for similarities in sizes, coloration, and approximate ages of bears, group size and composition, and track data. Using these criteria, we conservatively estimated the number of grizzlies by consolidating similar reports. Reports lacking distinguishing descriptions of grizzlies were grouped by spatial and/or temporal similarities. In some cases, reports from distant areas (10–20 km apart) were merged to represent one bear or family group. This was consistent with the grizzly's generally acknowledged ability to range widely. By rigorously coalescing reports, we sought to minimize the possibility of overestimating the population (see Craighead 1972).

## RESULTS

### Summary of the Survey Effort

In 2 field seasons totaling 147 days, 242 man-days were expended. In the Buffalo RD, 17 field trips ranged from 3–15 days each. Traveling on horseback throughout the District, we covered 3,490 km both on and off trails. In the Gros Ventre RD, 6 1-day field searches were made, covering approximately 161 km. An additional 100 plus man-days were expended and approximately 600 km traveled in interview circuits before and after the field season.

### Grizzly Bear Reports

We compiled 394 reports of bear occurrence for 1968–78, including 228 for the latter 2 years



Table 1. Observation types and temporal distribution for grizzly bear reports from Bridger-Teton National Forest, Wyoming, 1968–1978. Percentages given in parentheses.<sup>a</sup>

Year	Observation type					Season distribution			Total
	Sighting	Scat	Tracks	Bed-den	Other	Spring	Summer	Fall	
1968	11	0	0	0	0	3	5	3	11(3)
1969	26	0	4	0	2	5	14	12	31(8)
1970	7	0	1	0	0	0	1	6	8(2)
1971	8	0	4	0	0	4	2	3	10(3)
1972	2	0	1	0	0	0	1	1	3(tr)
1973	3	0	3	0	0	0	2	3	6(2)
1974	19	0	9	0	2	7	7	15	28(7)
1975	19	0	18	0	3	6	15	14	37(9)
1976	19	0	10	0	6	0	8	24	32(9)
1977	51	3	58	1	8	5	25	82	113(29)
1978	27	8	78	1	8	5	39	71	115(29)
Totals	192(49)	11(3)	186(47)	2(1)	29(7)	32(8)	119(31)	234(61)	394

<sup>a</sup> Percentages computed as fraction of total reports which cited the particular type of evidence. Many reports contained 2 or more types of evidence; thus, percentages sum to more than 100%.

<sup>b</sup> Spring = April–May, summer = June–August, fall = September–December. Nine reports did not indicate season.

(Table 1). Sightings (49%) and tracks (47%) were the most commonly reported observation types. Reports for the fall season (September–November) accounted for 60% of all reports. Approximately 95% of the reports occurred on the Buffalo RD, 5% on the Gros Ventre RD, and less than 1% from southern portions of the Forest. Reports of grizzly bears occurred throughout the Buffalo RD with concentrations in the north, south, and southeast portions (Fig. 1).

### Abundance and Population Composition

An estimated 45 grizzlies occurred in the study area during May–November 1977: 15 single bears (33%) and 10 family groups totaling 30 grizzlies (67%). Average number of young/sow was 2.0. Reports were sufficiently detailed to permit age classification of most immature grizzlies; 3 2-year-olds, 2 yearlings, and 12 cubs of the year could be distinguished.

In 1978, 37–38 grizzly bears occurred on the study area: 21–22 single bears (57–58%) and 7 family groups totalling 16 individuals (42–43%). Average number of young/sow was 1.29. Immature bears were classified as 6 cubs of the year, 2 yearlings, and 1 large cub or yearling. The estimated population, number of family groups reported, total offspring, and average number of young/sow were lower in 1978.

### Outfitter Camps

Twenty Buffalo RD camps were examined. Operators of 14 camps (70%) acknowledged grizzly bear encounters in or adjacent to camp. Eight-

teen camps (90%) had 1 or more game-meat storage racks on site. In 15 camps (75%) racks were within 100 m of tents. Of 21 racks measured, 18 (86%) suspended elk carcasses within 3 m of the ground. Concealment cover for bears occurred within 100 m of potential bear foods at all 20 camps; often no open space separated bear cover from foods. Sleeping tents also were often within 100 m of bear foods.

Garbage disposal involved burial in at least 14 camps (70%). One camp cook simply dumped meal “leftovers” over a nearby embankment, and at another camp the cook poured surplus soup on the cooktent floor. Scavenging animals, including bears, opened 6 garbage pits after camps were vacated. Bears raided garbage pits at 2 camps during human occupancy.

Twelve camps (60%) employed some type of bear “deterrent” (e.g., dogs or people in camp, radios, mothballs), whereas 3 (15%) used no means to discourage bear investigations. Thirteen camps (65%) left caches of food and/or food containers on site from year to year. Eleven camps (55%) were within 100 m of Forest Service trails and all 20 were nearby or central to well established outfitters’ hunting trail systems.

### Bear–Human Encounters

We documented 20 grizzly bear–human encounters at camps in 1974–78 (Table 2). Because of outfitters’ reluctance to discuss bear problems, we consider this an incomplete record. Six incidents (30%) involved female/young groups. Foods were conspicuously present in each case, and in 9 instances (45%) bears were



Table 2. Grizzly bear-human encounters, Bridger-Teton National Forest, Wyoming, 1974-1978.

Group	Date	Object of bear's attention	Property damaged	Number of people present	Action taken
Single	Fall 1974	Cooktent	Tent	12	Bear killed
Single	Fall 1974		0	12	Bear run off by dog
Single	1974 or 1975	Horse carcass	0	12	Bear shot at
Single	Fall 1975	Cooktent	Tent	1	Bear killed
Sow and 2 cubs	16 Sep 1977	Meat rack, garbage pit	Meat	12	Sow later killed by another party
Single	Fall 1977		Tent	0	None
Single	Fall 1977	Horsefeed	Horse feed, tent	12	None
Single	2 Nov 1977	U.S. For. Serv. cabin	Dug up fence posts, gas cache	0	None
Sow and 1 young	24 Jun 1978	Cooktent, stove	Tent	0	None
Single	16 Jul 1978		0	0	None
Sow and yearling	Jul 1978	Groceries	Tent		
Adult and yearling	Jul 1978	Tent	Tent, groceries	Several	
Single	31 Jul 1978	U.S. For. Serv. cabin	0	4	None
Single	20 Sep 1978	Camp	0	1	None
Single	2 Oct 1978		Tent	5	None
Sow and cub	6 Oct 1978	Elk carcass 3km south of camp	Elk carcass	0	None
Single	10 Oct 1978		Tent	0	None
Sow and 2 yearlings	19 Oct 1978	Cooktent, graintent, meat rack	Cooktent, grain	Several	
Single		Cache shed, nail keg	Cache shed	0	None
Single		Camp	Tent	0	

clearly attracted to these. Eleven encounters (55%) occurred at camp attended by 1 or no persons. Twelve camps (60%) reported repeated incursions. Fifteen incidents (75%) occurred during September-November. Twelve encounters (60%) resulted in property damage. One case involved shooting after dark at a grizzly. Three encounters (15%) ended with confirmed grizzly mortality, and other bear deaths were suspected.

## DISCUSSION

### Limitations of the Study

Inability to positively identify individual grizzly bears, sampling biases, and use of second-hand information limited the precision of the population data. Many separate reports of grizzly bears necessarily were combined (only 1 bear tallied)



for lack of distinguishing detail. Hence, population estimates were crude but useful as general indices. Martinka (1972) believed that such estimates may approximate those derived by more sophisticated and costly methods. Bear populations in Glacier National Park (Martinka 1971) and Great Smoky Mountain National Park (Pelton 1972) have been monitored by similar methods.

Sampling procedures influenced temporal and spatial distributions of reports. First-hand information was obtained only during late summer and fall. Due to increased human use, reports of bears in September–October may be over represented relative to bear occurrence in other months. Despite widespread coverage of the study area by the combined efforts of our field personnel and cooperating outfitters, areas yielding the fewest grizzly bear reports were generally the least sampled.

### Population

A decline in the ratio of reported sightings to tracks from 1977 (0.88) to 1978 (0.34) may be attributable to either reduced observability of grizzly bears, or a real decline in the population. Knight et al. (unpubl. annu. rep., Interagency Study Team, U.S. Dep. Inter., Park Serv., Bozeman, Mont., 1976) reported that observability of bears in the Yellowstone ecosystem appeared related to forage availability. Given the nature of the study, conclusions concerning short-term population trends would be inappropriate. However, in view of the grizzly bear's history of precipitous local and regional population declines (Craighead et al. 1974), continuation of the 1977–78 trend would be cause for concern.

The distribution of bear reports documented the widespread use of northern parts of the Bridger-Teton NF by grizzly bears. Concentrations of reports in those portions of the Buffalo RD close to Yellowstone National Park (Fig. 1) underscore the concept of the Park as the core of a larger Yellowstone grizzly bear ecosystem (Craighead 1976; Knight et al., unpubl. annu. rep., Interagency Study Team, U.S. Dep. Inter., Park Serv., Bozeman, Mont., 1980). Fewer grizzly reports on the Gros Ventre RD were due probably to increased distance from the Park and intensified human activity, including grazing and logging (Murie 1948, Russell 1967, Herrero

1972, Schneider 1977). Nonetheless, persistent and reliable reports of grizzlies in the Gros Ventre RD and data from radio-instrumented grizzlies confirmed the habitat value of that area. Although grizzly bear activity in the central part of the Bridger-Teton NF was very low, reliable reports suggest that grizzlies may range as far as 80 km south of Yellowstone National Park.

### Outfitter Camps and Bear–Human Interactions

Grizzly bears are highly intelligent animals noted for keen olfactory sensory capacity (Mills 1919, Hornaday 1922, Pearson 1975), omnivorous habits, and opportunistic behavior (Craighead and Craighead 1972, Mealey 1975). Bears' attraction to human-supplied foods has been discussed by Cole (1971), Marsh (1972), Craighead (1976), Harms (1977), Rutherglen and Herbison (1977), and Merrill (1978).

Rigelhuth (1966) stated that grizzly bear attacks were usually preceded by humans (1) approaching a bear in possession of a carcass (or, presumably, other food), (2) approaching a female with young at close range, and/or (3) surprising a bear at close range.

We documented that outfitter camps, as operated, represent a considerable attraction for bears and food odors were uncontrolled. Camps were easily accessible from travel routes (Jonkel 1975) and concealment cover (Merrill 1978) for bears. Hence, the potential for grizzly–human conflict was substantial.

No evidence existed for the Bridger-Teton NF which established aggressive behavior of incorrigible grizzlies as the cause of bear–human conflict. To the contrary, certain human behaviors in known grizzly bear range encourage undesirable interactions with bears.

### MANAGEMENT RECOMMENDATIONS

We endorse "Guidelines for management involving grizzly bears in the greater Yellowstone area" (U.S. Dep. Agric., For. Serv., Denver, Colo., 1979), and advise strict adherence to its definition of "nuisance bear." This document is a milestone in grizzly management policy which provides objective criteria for identifying problem sources when bear–human conflict arises.

Outfitters and other hunters/campers should be encouraged to: (1) keep all food and garbage



unavailable to bears at all times, (2) bury no food materials or emptied containers, (3) leave no food or food containers in caches between seasons, and (4) hang game carcasses out of reach of bears or pack out immediately. Based on Harms' (1977) observations, we recommend a meat-to-ground clearance no less than 4.6 m, a 3.1 m minimum clearance between suspension ropes and the highest access point, and a minimum of 2m between meat and the nearest vertical. Game meat and garbage availability for bears can be eliminated with some effort. Greer (unpubl. prog. rep., Montana Dep. Fish, Wildl. and Park, Helena, 1972) stated that even habituated grizzly bears "...did not linger around dwellings where garbage or edibles were not tempting and available."

Other food materials—notably livestock feeds—should be secured in bear-proof containers or out of reach of bears. Where this is not possible, we suggest the use of mothballs or naphthalene crystals as possible repellents. Although such agents are unproven, several reliable outfitters stated that bears avoided areas circumscribed by naphthalene.

Camps should be set up to maximize distances from food sources to human quarters and to bear cover.

Finally, we recommend the establishment of an ongoing monitoring system to trace grizzly bear population trends in Bridger-Teton NF. Rapport with outfitters should be maintained; they are knowledgeable and generally interested in the grizzly. State and Federal personnel working in grizzly range should be regularly briefed in correct identification and recording of bears and sign.

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