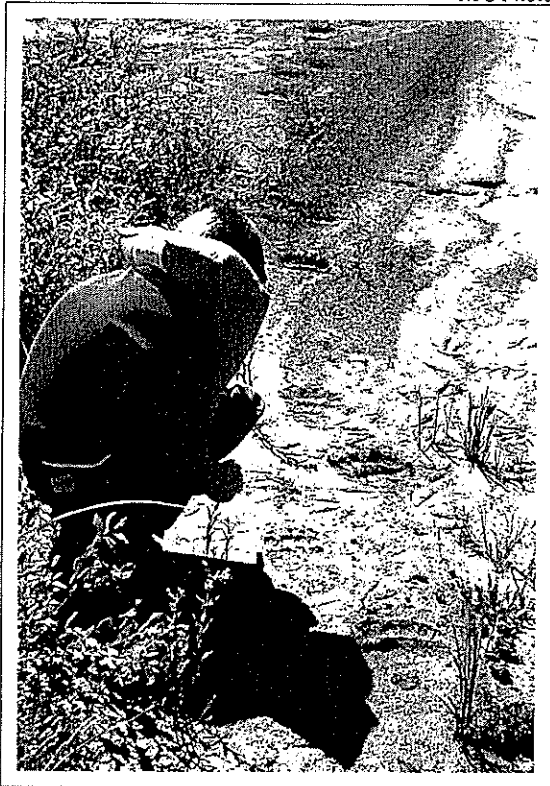


Bear-Inflicted Human Injuries in Yellowstone, 1970-1994

NPS Photo



A cautionary and instructive guide to who gets hurt and why

by Kerry Gunther and Hopi Hoekstra

Yellowstone's bears have been an important tourist attraction for many years, but both the bears and the tourists have suffered because of this familiarity. From 1930 through 1969, an average of 45 people per year were injured by black bears in the park. During the same time period, grizzly bears injured an average of 2 people per year. Most of these injuries occurred along roadsides or in developed areas and involved human foods or garbage as bear attractants.

Due to concerns for human safety and potential loss of free-ranging wild bears, bear management policy within Yellowstone National Park (YNP) has been progressively intensified over time, especially since 1970, the year the last park dump was closed. These improvements in management actions, along with public education, may be responsible for the

decline in bear-inflicted human injuries from 1970 through 1994, despite the continuing increase in park visitation (Table 1). This paper reviews bear injuries during the past 25 years, and shows what activities and types of behavior by people are most likely to result in human injuries.

To compile this report, we reviewed 25 years of YNP files, including case incident reports, personal statements, and newspaper articles. We included only injuries that were verified by park personnel; all dubious cases were excluded. Information obtained from the files included date, approximate time, and location (developed area, roadside, or backcountry) of bear-caused human injury. Developed area injuries are defined as those that occurred in or adjacent to human developments. Roadside injuries

included all incidents that occurred within or immediately adjacent to the road corridor. Backcountry is defined as all areas excluding roadsides and developed areas. Further information collected included the number of people in the party, gender of the injured person, activity of the party prior to injury, reaction of the person to the attacking bear, species of bear involved, and sex and age class of bear, if known. The extent of the injury, whether minor (requiring less than a day of hospitalization or less than 35 sutures) or severe (requiring more than one day of hospitalization or 35 or more sutures) was also recorded.

How Many Injuries, and Where?

The total number of YNP visitors steadily increased since 1970 and reached



Grizzly bear sows with young of the year were statistically the most likely to be involved in backcountry bear attacks.

Table 1. Number of park visitors, number of bear-inflicted human injuries, and number of injuries per million visitors in Yellowstone National Park, 1970-1994.

Year	Number of visitors	Number of injuries	Injuries per million visitors
1970	2,297,290	12	5.2
1971	2,120,487	9	4.3
1972	2,246,827	8	3.6
1973	2,061,537	6	2.9
1974	1,937,768	7	3.6
1975	2,246,132	3	1.3
1976	2,525,174	8	3.2
1977	2,487,084	3	1.2
1978	2,623,141	2	0.8
1979	1,891,927	3	1.6
1980	2,009,581	1	0.5
1981	2,544,242	4	1.6
1982	2,404,862	0	0.0
1983	2,405,653	2	0.8
1984	2,262,969	5	2.2
1985	2,262,455	0	0.0
1986	2,405,063	3	1.3
1987	2,618,249	0	0.0
1988	2,219,128	0	0.0
1989	2,680,376	1	0.4
1990	2,857,096	0	0.0
1991	2,957,856	0	0.0
1992	3,186,190	1	0.3
1993	2,912,193	0	0.0
1994	3,046,645	4	1.3

an all time high of more than 3 million visitors per year in 1992. Backcountry use nights increased through the 1970s, dropped during the early 1980s, and in-

creased again in the early to mid-1990s. During the same period, however, total bear-inflicted human injuries have steadily decreased, while the bear-in-

flicted injury rate in the backcountry remained relatively constant.

In the 25-year period 1970-1994, 82 people were injured in 77 separate incidents in YNP (Table 2). Of these injuries, 60 (73%) were considered minor, 19 (23%) were severe, and 3 (4%) resulted in fatalities. Black bears and grizzly bears were involved in 32 (39%) and 42 (51%) of the injuries, respectively. The species of bear involved could not be determined for 8 (10%) of the injuries. Only one person was injured in most (94%) bear attacks, but in each of 5 (6%) cases 2 persons were injured. There were no incidents reported in which more than 2 people were injured. In 4 of the 5 (80%) incidents in which more than 1 person was injured, female bears with cubs-of-the-year (COY) were involved. Overall, female bears with young (COY or yearlings) were involved in 29 (35%) of the injuries. Fifty-nine (72%) of the people injured were male and 22 (27%) were female; 1 (1%) report did not list the gender of the injured person. All injuries occurred from May through November; most injuries occurred during August (37%). Injuries occurred in developed areas (13%), along roadsides (43%), in backcountry areas (41%), and during research or management handling of bears (2%).

The trend in the location of bear-inflicted injuries has changed dramatically from 1970-1994. Whereas roadside injuries predominated (56%) during the period 1970-1979, there were no roadside injuries reported from 1980-1994. From 1980 through 1994, most (80%) bear-inflicted injuries occurred in the backcountry.

There was also a change over time in the species of bear involved in human injuries. During the period from 1970 through 1979, when most injuries occurred along roadsides, 40 (66%) of all bear-inflicted human injuries were reportedly caused by black bears, 15 (24%) by grizzly bears, and 6 (10%) by unidentified species. From 1980 through 1994, when most injuries occurred in the backcountry, 17 (81%) of all bear-inflicted human injuries were caused by grizzly bears, 2 (10%) by black bears, and 2 (10%) by unidentified bear species. Whereas black bear-caused injuries de-

Table 2. Number of visitors, backcountry use nights (BUN), and bear-inflicted human injuries by grizzly bears, black bears, and unknown species of bears in Yellowstone National Park, 1970-1994.

Year	Visitation	Bear-inflicted human injuries																
		BUN	Total			Developed area			Roadside			Backcountry			Handling			
			Gr	Bl	Un	Gr	Bl	Un	Gr	Bl	Un	Gr	Bl	Un	Gr	Bl	Un	
1970	2,297,290		4	6	2	2	1	1	0	5	1	0	0	0	0	0	0	0
1971	2,120,487		0	9	0	0	0	0	0	9	0	0	0	0	0	0	0	0
1972	2,246,827		2	5	1	0	0	1	0	5	0	2	0	0	0	0	0	0
1973	2,061,537	36,219	0	5	1	0	0	1	0	3	0	0	2	0	0	0	0	0
1974	1,937,768	41,282	0	7	0	0	0	0	0	7	0	0	0	0	0	0	0	0
1975	2,246,132	44,374	2	1	0	0	0	0	0	1	0	2	0	0	0	0	0	0
1976	2,525,174	50,580	4	4	0	2	0	0	0	4	0	2	0	0	0	0	0	0
1977	2,487,084	55,331	1	2	0	0	1	0	0	0	0	1	1	0	0	0	0	0
1978	2,623,141	52,795	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0
1979	1,891,927	51,182	2	0	1	0	0	0	0	0	0	2	0	1	0	1	0	0
1980	2,009,581	54,874	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1981	2,544,242	55,060	2	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0
1982	2,404,862	49,400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	2,405,653	43,738	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1984	2,262,969	34,936	5	0	0	1	0	0	0	0	0	4	0	0	0	0	0	0
1985	2,262,455	32,532	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	2,405,063	31,414	2	0	1	0	0	0	0	0	0	2	0	1	0	0	0	0
1987	2,618,249	32,906	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	2,219,128	25,188	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	2,680,376	32,747	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1990	2,857,096	37,318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	2,957,856	41,476	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	3,186,190	42,124	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
1993	2,912,193	45,135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	3,046,645	45,460	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0

creased dramatically with the decrease in roadside panhandling by black bears, injuries inflicted by grizzly bears in backcountry areas remained relatively constant over time.

Injuries in Developed Areas

From 1970 through 1994, 11 bear-caused injuries occurred in developed areas in YNP; 9 (82%) of these injuries occurred prior to 1979. Only 2 (18%) of the injuries in developed areas occurred during the last 16 (1979-1994) years. All

injuries in developed areas occurred in (91%) or near (9%) roadside campgrounds: 4 at Grant Village, 3 at Fishing Bridge, 2 at Canyon, and 1 each at Bridge Bay and Madison. Grizzly bears and black bears were involved in 5 (46%) and 3 (27%) of the injuries, respectively. The species of bear involved could not be determined for 3 (27%) of the injuries. Injuries in developed areas occurred during July (27%), August (55%), and September (18%). All injuries caused by grizzly bears in developed areas occurred between 1:00 and 4:00 a.m. All injuries

caused by black bears in developed areas occurred between 5:30 a.m. and 2:30 p.m. Female grizzly bears with COY were involved in 36% (4) of the injuries and single adult bears (1 grizzly bear, 1 black bear) in 18% (2). The age class of the bear involved could not be determined for 46% (5) of the injuries. Fifty-five percent of the injuries (4 by grizzly bear, 2 by black bear) were considered severe and 45% (1 by a grizzly bear, 1 by a black bear, and 3 by unknown species) were minor. Only one person was injured in most (90%) attacks that occurred in de-



Overnight camping in Yellowstone's backcountry demands careful attention to sanitation. Visitors staying in park campgrounds should be extremely careful with food storage. Not only should they follow all regulations, but also they should feel free to be a little nosy and make sure their neighbors are doing the same.

veloped areas. The only incident in which more than one person was injured involved an adult female grizzly bear with a cub that injured 2 people.

Of the 11 people injured by bears in developed areas, 4 (45%) were involved in improper behavior: 4 (3 by grizzly bears, 1 by unknown species) involved improper food storage and 1 (by a black bear) occurred in an illegal camp. Of these 5 injuries, 2 involved people who were sleeping outside "under the stars" in sleeping bags next to improperly stored food, 1 involved a person who had left food stored next to his tent at night, 1 injury resulted from a man leaving his trailer to attempt to chase a female grizzly bear with cubs away from an improperly stored cooler at night, and one incident involved a person who was sleeping outside in a sleeping bag in an illegal camp.

Six attacks were considered unprovoked: 2 (1 by a grizzly bear, and 1 by a black bear) involved people sleeping in tents, 2 (1 by a grizzly bear, 1 by an unknown species) involved people sleeping outside "under the stars" in sleeping bags, 1 incident (by an unknown species) involved a person walking through a developed area, and 1 incident involved a black bear attempting to carry off an

infant that was sleeping outside in a playpen. Ten (91%) of the people injured in developed areas were male (4 by grizzly bears, 3 by black bears, 3 by unknown species). Only 1 (9%) of the injured people was female (by a grizzly bear).

Injuries Along Roadsides

From 1970 through 1994, there were 35 people injured in 34 separate incidents along roadsides; all occurred prior to 1977. Black bears were involved in 34 (97%) of the roadside injuries, while the species of bear could not be determined for 1 (3%) of the injuries. No grizzly bear-caused human injuries along roadsides were reported. Roadside injuries occurred during June (11%), July (26%), August (37%), and September (26%). All roadside injuries occurred between 8:00 a.m. and 8:00 p.m.; most occurred between 11:00 a.m. and 3:00 p.m. (59%). Adult and subadult bears of unknown sex were involved in 7 (20%) and 4 (11%) of the injuries, respectively. Female bears with COY were involved in 2 (6%) injuries, a female with a yearling in 1 (3%), an adult male in 1 (3%), and a lone adult female bear in 1 (3%). The sex and age class of the bear could not be determined for 19

(54%) of the injuries.

Thirty-four of the injuries that occurred along roadsides were minor; only one roadside injury was considered severe. The severe injury involved a person bitten on the arm by a black bear that was attempting to get food from an occupied vehicle along the roadside. The person sustained a broken arm and lacerations that required more than 100 sutures. In 33 of 34 incidents that occurred along roadsides, only one person was injured. In one incident, a subadult black bear of unknown sex bit two children who approached to get their picture taken with it.

Fifteen (43%) of the people injured reported improper behavior as a cause for injury: 9 (26%) fed bears, 3 (9%) attempted to touch or pet bears, 2 (6%) attempted to have their pictures taken with bears, and 1 (3%) approached bears for a better view. The remaining 20 (57%) reported that they were either viewing (43%) or photographing (14%) bears when the injury occurred. However, the percentage of people being injured due to improper behavior may be under-reported because of the repercussions involved



An annual average of 48 people were injured by bears between 1930 and 1970, most along park roads. The prohibition of roadside feeding of black bears has almost completely eliminated roadside bear-caused human injuries since the 1970s, and has greatly reduced the mortality of black bears as well.

with improper behavior (i.e. fear of citations, fines, or embarrassment). Of the people injured along roadsides, 22 (63%) were male and 12 (34%) were female; 1 (3%) of the reports did not list the gender of the injured person.

Injuries in the Backcountry

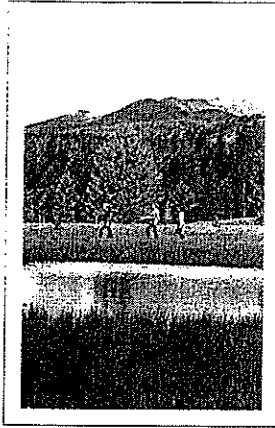
Backcountry injuries have ranged from zero to four per year from 1970 through 1994. The annual number of injuries in the backcountry has remained relatively constant despite a steady increase in the number of visitors to YNP. A total of 34 people were injured by bears in 31 separate incidents in the backcountry. In each of 3 incidents, 2 people were injured; all 3 of these incidents involved female bears with COY (2 by grizzly bears, 1 by a black bear).

Grizzly bears and black bears were involved in 26 (76%) and 4 (12%) of the injuries, respectively. The species of bear involved could not be determined for 4 (12%) of the injuries. Backcountry injuries occurred during May (6%), June (29%), July (18%), August (29%), September (12%), October (3%), and November (3%). Backcountry injuries occurred throughout the day and night. Most injuries occurred from June through September (88%) and between 10:00 a.m. and 7:00 p.m. (91%).

Most (68%) backcountry injuries involved female bears with cubs (50%) or yearlings (18%). These percentages may be underestimated because young often run off as the sow charges and thus may not be seen. Eighteen (53%) of the bear-caused injuries that occurred in the backcountry were minor, 13 (38%) were considered severe and 3 (9%) resulted in fatalities. Two of the three fatalities occurred in backcountry campsites. Of the 34 people injured by bears in the backcountry, 25 (74%) were men and 9 (26%) were women.

Thirty-one people were injured while hiking (24 by grizzly bear, 3 by black bear, and 4 by unknown species): 16 (52%) were hiking off trail and 15 (48%) were hiking on trail. Thirty of these 31 incidents involved surprise encounters with bears, while 1 is believed to have been caused by a photographer approaching a grizzly bear. The photographer was

NPS Photos



Hiking parties of three or more were less likely to be attacked by a bear, probably because they make more noise as they travel.

killed and partially consumed by the bear. Two of the people injured while hiking off-trail surprised bears on carcasses.

Only three backcountry injuries (2 by grizzly bear, 1 by black bear) involved people who were camping. Two of these three incidents resulted in fatalities. Both fatalities in backcountry campsites involved grizzly bears and occurred at night.

Another important factor involved in backcountry injuries is the number of people travelling in the party. The average number of people hiking into the backcountry of YNP with an overnight permit was 3.2 people per party for the period 1987-1992; stock parties averaged 4.6 persons per party. The average size of parties with at least one person being injured by bears was 1.8 people per party. Fourteen (45%) of the injuries involved a party size of 2 people and 13 (42%) of the injured people hiked alone. Only 3 (9%) of the people injured by bears in backcountry areas reported hiking with 3 or more people.

Of the 31 people injured while hiking, only 4 (13%) reported that they were making an effort to make noise as they hiked. Of these, one was hiking near a waterfall, which may have muffled the noise she was making, and one was wearing only a small jingle bell, the noise from which probably did not carry far.

Initial Reaction of Hikers to Encounters With Bears

The reaction that hikers had to bears when first encountered also may have influenced the outcome of bear-human interactions. Running to or attempting to climb a tree during an encounter with a bear preceded 15 (48%) of the injuries



Grizzly bear claws up close: notice that one claw has been broken.

incurred while hiking. Attempting to run away from a bear after an encounter preceded 4 (13%) and yelling at a bear during an encounter preceded 4 (13%). Three (10%) of the injured people "stood their ground" or had no time to react when charged. In one (3%) incident a hiker sprayed a charging bear with bear spray before the bear made contact. The hiker received only a minor injury. However, the injury did occur after the bear was sprayed. Only one (3%) of the injured people reported that "playing dead" was their initial reaction to a surprise encounter with a bear. In one (3%) incident, the hiker dropped to the ground when charged, but then kicked at the charging bear and was bitten on the foot. The initial reaction of the people injured was not recorded for 2 (6%) separate attacks.

Reaction of Hikers After Initial Attack by Bears

Eleven of the 31 (36%) people injured in the backcountry reported that they played dead after being attacked by a bear. Of these, 9 (82%) stated that the bear left them alone as soon as they stopped resisting, and 7 of these 9 received only minor injuries. Bears continued to attack (for an unknown time period) 2 of the 11 people that played dead after the initial attack. Both were severely injured.

Five (16%) people reported that they



Left: casting a track from a black bear's foot. Black bears are too often thought of as harmless, but hundreds of people have been injured by Yellowstone black bears, some quite seriously.



A 1930s scene at Yellowstone Lake: black bear cubs on a picnic table.

continued to resist (usually by kicking, punching, or fending off an attacking bear) after initially being attacked, and 4 of the 5 received severe injuries. In 3 (10%) incidents, bears that had injured people were chased off by a second person. In one of those 3 incidents, the bear then attacked the second person. In 3 (10%) incidents, people reported that the attacking bear terminated the attack on its own and left. In 2 (6%) incidents, people were able to climb trees to escape from the attacking bear after being injured, and in 1 (3%) incident a person continued running from a bear after being injured and the bear terminated the attack. In 1 (3%) incident, a person that had been injured by a grizzly bear sprayed the bear with capsaicin spray. The spray also got into the hiker's eyes and the reaction of the bear was not observed. However, the bear terminated the attack some time after being sprayed. For 5 reports, the reac-

tion of the people after the initial attack started was not known or reported.

Habitats Types Associated With Injuries

Of the backcountry injuries, 21 of 31 (68%) incidents occurred in forested areas and 10 (32%) occurred in non-forested areas. Cover classes in which injuries occurred were not proportional to habitat availability. Injuries occurred more frequently in non-forested areas and less frequently in forested areas than would be expected based on the availability of the respective cover classes.

Elevation and Season Associated With Injuries

Elevations at which injuries occurred ranged from 1,711 to 2,892 m (5,614 to 9,488 ft.). The majority (74%) of injuries occurred between 2,300 and 2,600 m (7,595 and 8,530 ft.). Bear-inflicted human injuries occurred during the spring, summer and fall. Neither elevation class nor season was significantly correlated with injuries.

Bear Handling Accidents

Since 1970, two injuries to humans occurred during research (1) or management (1) handling of bears. In 1981, a researcher received minor lacerations when an immobilized grizzly bear awoke unusually quickly from the effects of a tranquilizer during a research trapping operation. In 1983, a park ranger was attempting to move an unconscious black bear (it had been hit by a car) off the road. The bear woke up and bit the ranger on

the leg. The ranger received small pinch-marks that did not penetrate the skin.

Some Conclusions

Prior to 1970, most bear management involved food-conditioned bears that were extensively influenced by the availability of human foods and garbage in developed areas and along roadsides. Management after 1970 involved bears that were largely uninfluenced by human food and garbage. From 1970 through 1978, bear-inflicted human injuries decreased significantly from previous levels to an average of 6 per year. Of these injuries, an average of 4 per year occurred along roadsides, 2 per year in backcountry areas, and 1 per year in developments.

By 1979, most bears with prior knowledge of sources of human foods were no longer in the population. At this time management emphasis changed from correction of a problem (sanitation) to awareness that a high level of preventive management must become a routine part of park operations. From 1979 through 1994, bear-inflicted human injuries declined further from previous levels to an average of 2 per year. During this period, bear-inflicted human injuries along roadsides and in developed areas became rare, while injuries in backcountry areas remained at about the same level as during the 1970-1978 period.

In addition, injuries inflicted by black bears have been reduced significantly from 45 per year prior to 1970, to 2 per year from 1970 through 1994, and less than 1 per year from 1979 through 1994. During the same time period, human injuries inflicted by grizzly bears have been reduced slightly from an average of 2 per year from 1931-1969 to an average of 1 per year from 1970-1994.

The large reduction in injuries along roadsides and in developed areas following the significant reduction in the availability of human foods from these areas supports the theory that the high incidence of bear-inflicted human injuries occurring in the park prior to 1970 was due to the combination of food-conditioned bears and the availability of human foods and garbage in developed areas and along roadsides.

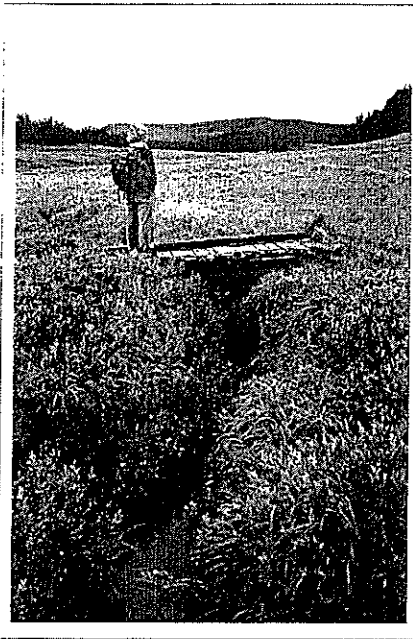
Bear Inflicted Human Injuries in Backcountry Areas

During the period 1979-1994, most bear-inflicted human injuries occurred in backcountry areas. Most backcountry injuries involved surprise encounters between hikers, hiking in small groups (less than 3 people) and female grizzly bears with young. Most of the people injured reacted to surprise encounters with bears by running, attempting to climb trees, or resisting an attack. More than half of the people injured by bears were hiking off-trail. The chance of being injured by a bear while hiking can be reduced by taking steps to avoid surprise encounters, hiking in groups of at least 3 people, and staying on maintained hiking trails. In most, but not all cases, running, attempting to climb a tree, or resisting an attack do not appear to be good alternatives during an encounter with a bear.

Although people who were hiking were injured more often than people in backcountry campsites, injuries to people in backcountry campsites tended to be more severe. All 3 injuries that occurred in backcountry campsites occurred at night and 2 of the 3 injuries resulted in fatalities. In both fatalities the people were partially consumed. This suggests that being aggressive and resisting attacks may be the most appropriate response to attacks that occur at night in backcountry campsites. When backcountry camping, keeping all food secured from bears appears to be very important. In 2 of 3 injuries in backcountry campsites, bears had gotten into food left unsecured by the injured person. In the third incident, the bear obtained the person's camp food even though it was apparently hung properly. It is not known whether the bear got into the food before or after attacking the backcountry camper.

Bears and Menstruating Women

On the evening of August 13, 1967, two women were attacked and killed by grizzly bears in separate incidents in Glacier National Park (GNP). Following these incidents, there was speculation that due to odors associated with menstruation, women may be more prone to attack by bears than are men. Many safety



brochures warn women against hiking or camping in bear country during their menstrual periods.

A recent study designed to test the hypothesis that bears are attracted to the odors of menstruation reported that when presented with a series of different odors (including seal scents, other food scents, nonmenstrual human blood, and used tampons), 4 captive polar bears elicited a strong behavioral response only to seal scents and menstrual odors (used tampons). This study also reported that free-ranging polar bears detected and consumed food scent samples and used tampons, but ignored nonmenstrual human blood and unused tampons. This suggests that polar bears may be attracted to odors associated with menstrual blood.

Another study analyzed the circumstances of hundreds of grizzly bear attacks on humans, including the attacks on the 2 women in GNP, and concluded that there was no evidence linking menstruation to any of the attacks. The responses of grizzly bears to menstrual odors has not been studied experimentally.

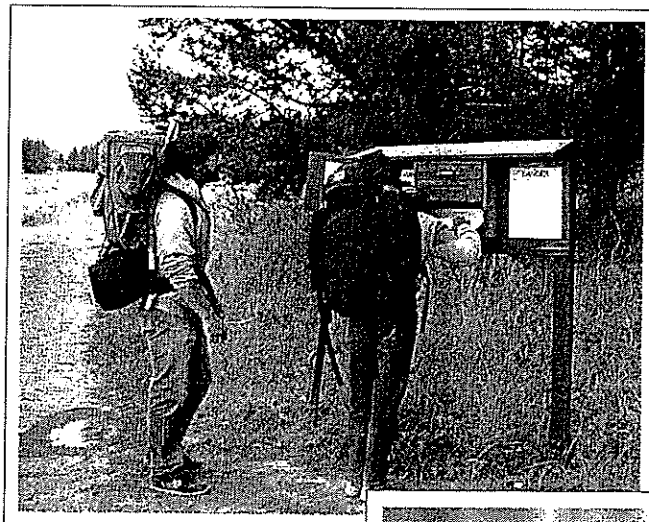
A third study recorded the responses of 26 free-ranging black bears to used tampons from 26 women and the responses of 20 free-ranging black bears to 4 menstruating women at different days of their flow. Menstrual odors were essentially ignored by black bears of all sex and age classes. In an extensive review of black bear attacks across North America, no instances of black bears attacking or be-

ing attracted to menstruating women were found.

Most injuries occurring in Yellowstone National Park prior to 1980 involved food-conditioned bears and human foods or garbage as attractants and were therefore probably unrelated to menstruation. After 1979, human food attractants had been largely eliminated and probably were not a factor in most bear-inflicted injuries. More than 38 million people visited Yellowstone during the 15-year period from 1980 through 1994. These visitors spent more than 8 million nights camping in developed area campgrounds and more than 600,000 nights camping in backcountry areas in the park. Although actual statistics are unavailable, many menstruating women undoubtedly hike and/or camp in the park each year. During the period 1980 through 1994, 21 people were injured by bears in the park. Of these 21 injuries, 15 (71%) were men, and 6 (29%) were women. Most (86%) of these injuries involved sudden, close encounters between bears and hikers and were therefore most likely unrelated to menstruation. Of the 3 (14%) incidents where people were injured while camping, 2 of the injured people were male and 1 was female. The woman was not menstruating at the time of the attack. There was no evidence linking menstruation to any of these 21 bear attacks.

The question of whether menstruating women attract bears has not been completely answered. There is no evidence that grizzly or black bears are attracted to menstrual odors more than any other odor and there is no statistical evidence that known grizzly or black bear attacks have been related to menstruation. It is extremely difficult to accurately compare the ratio of males to females that are injured by bears in Yellowstone because the park does not keep records of visitor use by gender. However, the injury data for Yellowstone National Park does not suggest that females are more likely to be attacked by bears than are males.

The use of internal tampons instead of external pads, as well as the careful treatment of used tampons in the same manner as garbage or other potential bear attractants, is most probably sufficient to reduce any greater risk to menstruating women.



Chuck Bartlebaugh

While on the trail, a hiker's highest priority in bear safety should be to avoid surprising a bear at close quarters.



Management Implications

The data presented here indicate that roadside feeding of black bears was responsible for the high number of black bear-inflicted human injuries that occurred along park roads prior to 1977. Public education efforts and effective enforcement of regulations has virtually eliminated bear-inflicted injuries along roadsides and must remain a permanent component of future bear management programs in the park.

The data also strongly suggest that the presence of food-conditioned bears, combined with the availability of human foods in park campgrounds, led to most bear-inflicted human injuries in developed areas. Public education programs and strict enforcement of sanitation regulations

have significantly reduced the number of bear-inflicted human injuries occurring in campgrounds and developed areas. Public education programs and information programs designed to prevent bears from obtaining human foods and garbage must remain a permanent bear management priority within YNP.

Despite the success of the 1970 bear management program in reducing the number of bear-inflicted injuries, an average of 1 bear-inflicted injury per year still occurs. These injuries most often involve surprise encounters between backcountry hikers and female grizzly bears with young. It will be difficult to reduce the frequency of this type of injury, especially if backcountry recre-

ational activity and the grizzly bear population in YNP both continue to increase. Public education programs that inform hikers on how to avoid surprise encounters, and how to react to encounters and attacks once they occur, may be the most useful tool in further decreasing the number and severity of bear-inflicted human injuries occurring in the park.

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