

GRIZZLY BEAR MANAGEMENT ON THE FLATHEAD INDIAN RESERVATION, MONTANA

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Abstract: Grizzly bears (*Ursus arctos horribilis*) inhabit the Mission Mountains on the Flathead Indian Reservation in western Montana. Their spring and fall foraging brings them to low elevations (975 m), where they have coexisted with a ranching economy since the 1900s. The goal of the 1981 Reservation Grizzly Bear Management Plan is to "secure and/or maintain a viable, self-sustaining population in essential habitat occupied in the Mission Mountains." Bears that prey on livestock are usually removed from the population. We examined the circumstances of livestock depredations by grizzly bears from 1960 to 1982 and found that subadults and adults of both sexes were involved with depredations. There are at least 2 factors leading to livestock depredation and "problem" bear status: individual bear behavior and human environment. Our systematic determination of "problem or nuisance" bear status is crucial, because initiation of bear trapping causes intense public interest and agency commitment. Selective bear removal has broadened human tolerance, potentially increasing survival of the bear population. Grizzly bear mortalities from nonhunting causes have been reduced from an annual average of 2.25 bears for 1972–79 to 1.33 bears for 1980–82 after intensive management effort.

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Grizzly bear distribution in the conterminous 48 states has been drastically reduced since 1800 (Schneider 1977). Consequently, grizzly bears were listed as a threatened species on 1 September 1975 under the Endangered Species Act (U.S. Fish and Wildl. Serv. 1982). This legislation mandated that wildlife and land management agencies secure data to evaluate the effects of their activities on grizzly bear habitat. In 1977, a wildlife program, including the collection of bear data, began on the Flathead Indian Reservation (FIR). Grizzly bears became a priority because data showed many bears were living close to people and to areas of proposed timber sales in grizzly bear habitat. Research by the Border Grizzly Project, Univ. Mont., began in 1977; from 1978 to 1980 it was funded by the Bureau of Indian Affairs (BIA)-Forestry and the Confederated Salish and Kootenai Tribes (CS&KT).

A management plan for grizzly bears on the Flathead Reservation (Flathead Indian Reservation grizzly bear management plan, CS&KT and BIA, unpubl. rep. 1981) is 1 product of the intensive research. The management goal is "to secure and/or maintain a viable, self-sustaining population in essential habitat occupied in the Mission Mountains."

In this paper we assess grizzly bear mortality, describe a system developed to minimize human-bear conflicts and mortality, and evaluate their impact on the grizzly bear population.

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STUDY AREA

The FIR (Fig. 1) forms the southwestern corner of the NCDGBE. This includes approximately 1,032 km² of the Reservation. We have also included habitat adjacent to the Reservation (Fig. 2) based on bear location data to form the Mission Mountain subpopulation area of the NCDGBE.

Grizzly bears inhabit the Mission Mountains (highest point McDonald Peak 2,993 m) on the eastern side of the FIR. The gradient from mountains to valley floor (975 m), is abrupt and foothills are limited. Soils and vegetation types important to grizzly bears in the area have been described (C. Servheen and L. Lee, unpubl. rep.). Riparian vegetation along streams and around low-elevation spring-seep areas is important to bears for food and daytime cover. Domestic fruits, especially apples (*Malus* spp.) and wild fruits such as serviceberry (*Amelanchier alnifolia*) attract bears (Servheen 1983).

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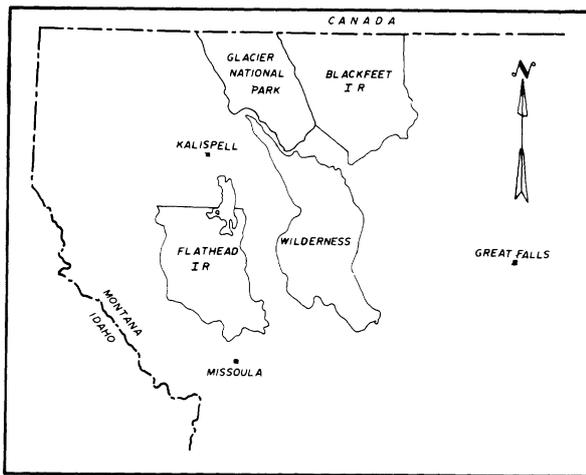


Fig. 1. Flathead Indian Reservation, Blackfoot Indian Reservation, and surrounding areas. The area marked Wilderness includes the Great Bear, Bob Marshall, and Scapegoat wildernesses.

Of necessity bears forage at low elevations in spring and fall in areas where they have historically coexisted with a ranching economy and rural-residential areas. Seasonal density of people, livestock, and bears on the FIR is probably unequaled in North America. Relations between humans and bears in the past were almost symbiotic in that bears ate livestock carrion in the spring, and the ranchers benefitted from carcass removal. Thus human tolerance of grizzly bears is critical for bear survival and population stability. When livestock depredations by grizzly bears occur, bears are usually killed. Throughout the ecosystem, management agencies do not act immediately when livestock depredations by bears occur.

In the past 5 years, the historical rural economy of western Montana has changed, as more people move into the area. Now boneyards are not as acceptable as in the past because they cause the bears to wander farther into the valley and remain close to people during feeding. An important aspect of the FIR management plan is to relocate or remove these historic boneyards.

METHODS

Established snare trapping (Flowers 1977), immobilization (Pearson et al. 1968, Hebert and McFetridge 1981), and radiotelemetry (Mech 1974) techniques were used during research and management actions. On the FIR, grizzly bear ages (Fig. 3) are based on tooth sectioning to count cementum layers (Stoneberg and Jonkel 1966); bear ages from

BIR (Fig. 4) were visually estimated by U.S. Fish and Wildl. Serv. personnel.

During the intensive research phase from 1977 to 1980 (Servheen 1983, Servheen and Klaver 1983) management was based on radiolocations and visual observations of grizzly bears. We developed a procedure in 1980 to interview people that report bear incidents and make a field appraisal of the environmental conditions. We could then identify a nuisance bear by noting its behavior and whether the bear was artificially drawn by human actions or intrusions. The personal interview and field appraisal, conducted immediately by a biologist, included:

1. Date, time, and location of the complaint
2. Facts used to determine whether a black or grizzly bear caused the incident and its age and sex, e.g., through hair, scat, track measurements, observations, and so forth.
3. Distance from people, residences, livestock, fruit trees, boneyards
4. Behavior of bear(s), i.e., aggressive toward people or livestock and whether natural or unnatural

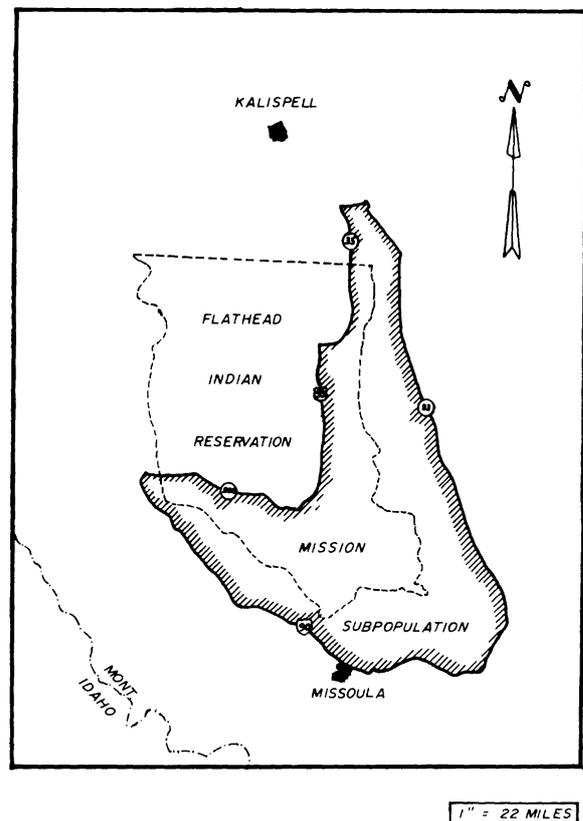


Fig. 2. Mission Mountain subpopulation of the Northern Continental Divide Grizzly Bear Ecosystem area bounded by highways.

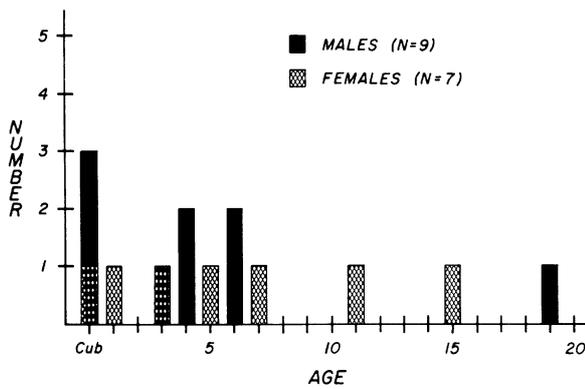


Fig. 3. Frequency distribution of nonhunting grizzly bear mortalities by age and sex in the Mission Mountain subpopulation, 1972-82.

aggression (Hornocker 1962, Herrero 1976, Jope 1982) or nonaggressive (natural aggression defined as defense of cubs, food, and so on; unnatural aggression as unwarranted attacks because of habituation or other factors)

5. Property damage
6. Circumstances caused by humans that contributed to the complaint.

Data recorded at the location include photographs, hair samples, and track measurements. Incidents involving depredations or unnatural aggression precipitate immediate action to live-trap the suspected bear or bears.

We summarized grizzly bear mortalities within the Mission Mountain subpopulation area (Fig. 2) for years 1960-82 (Table 1) (K. Greer, Mont. Dep. Fish, Wildl., and Parks Fed. Aid Wildl. Restor. Proj. W-120-R-2-13, 1970-81; BIA files). Reports on bear mortalities for 1960-71 were combined because reports of deaths on the FIR were incomplete during this period, and hunters from the adjacent state hunting districts were required only to report their kills to MDFWP from 1967 to present. Since 1977, at least 1 full-time wildlife biologist was assigned to the FIR; this improved reporting on bear mortalities.

RESULTS AND DISCUSSION

Mortalities

We examined the circumstances of 16 grizzly bear mortalities from nonhunting causes such as livestock depredations, other control actions, and poaching in the Mission Mountain subpopulation from 1972 to 1982 (Fig. 3). Bears involved included males, solitary females, and females with young. We do not include

cubs in the following totals because their presence results from their association with their mothers. Five of 6 males were 3-6 years old (Fig. 3), whereas females ranged 1-15 years old with no obvious grouping.

Data from 23 grizzly bear mortalities from nonhunting causes on the BIR during 1967-82 (Greer, MDFWP, op. cit.; U.S. Fish and Wildl. Serv. files) (Fig. 4) included both sexes, though 20 of the 23 bears were 2-6 years old. The observed grouping of bears in the 2-6 year age class may be a behavioral trait or an artifact of a truncated age structure. Despite a larger sample size for the mortalities on the BIR, the average ages of males and females are 4.3 and 4.1 years, respectively (Fig. 4). The average ages for male and female grizzly bears on the FIR were 4.7 and 6.0 (Fig. 3). This difference in average age of males and females is not because there were younger animals in the samples but because of a lack of older individuals.

The reported age distribution may be cause for concern for the status of grizzly bears on the BIR. Gilbert et al. (1978) noted that the change in average age is a clue to population status. The young age structure may indicate a high exploitation rate. Grizzly bears, with their long maturation time and low reproductive rate, require older animals in the population for stability (Craighead et al. 1974).

Management Action

Amidst a complex biopolitical situation, we developed a program that addresses Indian treaty rights and state and federal responsibilities while fulfilling the primary objective: to maintain the Mission Mountain grizzly bear population at a self-sustaining level.

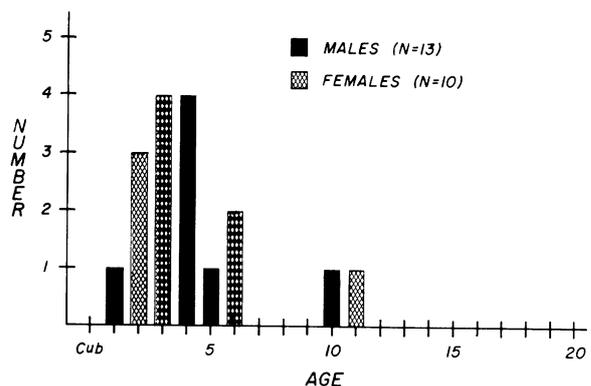


Fig. 4. Frequency distribution of nonhunting grizzly bear mortalities by age and sex on the Blackfoot Indian Reservation, 1967-82.

Table 1. Human-induced grizzly bear mortalities in the Mission Mountain subpopulation, 1960–82.

Year	Males	Females	Unknown	Total
1960–71 ^a	5/4 ^b	0/3	0/2	5/9
1972	0/2	0/1	0/0	0/3
1973	0/1	0/0	0/0	0/1
1974	0/3	0/4	0/0	0/7
1975	0/0	0/0	0/0	0/0
1976	1/0	0/1	0/0	1/1
1977	0/1	0/0	0/0	0/1
1978	0/0	0/1	0/0	0/1
1979	0/1	0/2	0/1 ^c	0/4
1980	1/0	0/2	0/0	1/2
1981	0/2	0/0	0/0	0/2
1982	0/0	0/0	0/0	0/0
Total	7/14	0/14	0/3	7/31

^a Data incomplete for these years.

^b Number of mortalities by hunters/number mortalities due to nonhunting causes.

^c Carcass found near A-canal on FIR; circumstantial evidence indicated human-caused mortality.

In 1980, a major communication breakdown between the responsible agencies contributed to the death of an adult female grizzly bear and her female yearling. To prevent additional unnecessary deaths, we instituted an efficient system to receive and communicate complaints about bears any hour of the day, 7 days a week (Fig. 5). With this system it is possible to manage grizzly bears and address human-bear conflicts.

During spring and fall, grizzly bears must live near developed areas. We carefully evaluated each complaint to see if the bear in question really was causing a problem or was simply observed. If a control action was initiated, we also had to be careful to catch the right animal. Often 9 grizzly bears will spend the night in 10 ha of dense cover, and only 1 will cause a problem. Without some control over the management program, all bears could be removed from the subpopulation in short time. Determining problem or nuisance bear status was crucial, because initiating trapping efforts for a bear arouses intense public interest and ensures agency commitment.

Our field observations indicated at least 2 basic factors lead to human-bear conflicts and livestock depredations:

1. Individual bear behavior (such as daytime foraging near residences, habituation to human presence, and unnatural aggression toward humans) creates potential conflict situations.

2. Environmental conditions created by people (such as improper disposal of garbage, boneyards near a residence, domestic sheep in grizzly bear habitat, and residential development in once unsettled bear habitat) often constituted situations we readily identified and often corrected. We did not find any evidence that bears foraging on livestock carcasses led to depredations. Of 20 individually marked grizzly bears in the Mission Mountains from 1977 to 1982, only 2 have been involved in depredations, although practically all bears during spring and fall foraging are close to livestock and residences.

During 1980–82, 2 grizzly bears were identified as livestock depredators, trapped, and relocated. One male in 1981 was relocated out of the ecosystem, to British Columbia, and was therefore counted as a mortality. The other was a subadult male trapped and relocated within NCDGBE in 1982. We prefer these alternatives to bears being shot by residents, as happened with an adult female and her yearling female offspring in 1980.

Grizzly bear mortalities from nonhunting causes have been reduced by intensive management efforts and public involvement by CS&KT and BIA personnel in cooperation with MDFWP and U.S. Fish and Wildl. Serv. Annual nonhunting mortality rates averaged 2.25 bears for the period 1972–79 but decreased to 1.33 bears for 1980–82.

Population Implications

Grizzly bear density in the best habitat on the FIR is approximately 1 bear/49 km² (Servheen 1981). Based on this number, the Mission Mountain subpopulation numbers about 25 (Servheen 1981). This is below the range of 30–70 bears described by Shaffer (1978) as a minimum viable population, assuming secure habitat and no human-induced mortality. Neither of these assumptions are met, and management must therefore provide for continued immigration from adjacent areas (MacArthur and Wilson 1967, Diamond 1975, Terborgh 1975, Wilcox 1980). Current information indicates there is some movement

between the Mission Mountains and the Bob Marshall Wilderness (Servheen 1981).

Sidorowicz and Gilbert (1981) found that the total mortality rate of adult grizzly bears should not exceed 5%, with sport harvest no more than 3%. Since the population estimate for the Mission Mountain subpopulation is 25 and conditions are comparable to a hunted population, we estimate that approximately 45% are adults (U.S. Fish and Wildl. Serv. 1982:18–19). In particular, Craighead et al. (1974) described a population structure analogous to that of the FIR. Thus the adult mortality rate should not exceed 0.56 bears annually. This mortality rate was exceeded from 1972 to 1982 with an average annual rate of 1.2 adult bears. Our population estimate and percent of adults in the population may be conservative, but unless one accepts unwarranted assumptions of $N = 50$ and 55% adults simultaneously, the mortality rate is excessive.

Tribal members have not historically hunted grizzly bears for sport. Even so, the CS&KT Council closed tribal member sport hunting of grizzly bears on 18 September 1981 due to concern for the population and on recommendations of the Salish and Kootenai religious and cultural committees. Nontribal hunting on the FIR has been closed since the 1930s by action of the MDFWP Commission and CS&KT.

All grizzly bear mortalities (hunting and non-hunting) from the Mission Mountain subpopulation area are counted in the annual quota of 25 bears for NCDGBE. A subquota for hunting districts in western Montana was proposed by MDFWP for the 1983 season. Twenty-two of 24 known bear mortalities in the Mission Mountain subpopulation area from 1972 to 1982 were caused by nonhunting losses (Table 1). It is obvious that excessive bear mortalities are not primarily derived from hunting. Although hunting restrictions will help this declining population, it must not be viewed as a cure-all because hunting losses only make up a small part of the human-caused mortality. Bear mortalities due to hunting (8%) can be sufficiently regulated by the quota system using management units. Management emphasis on the FIR will continue to deal with the nonhunting-caused mortalities (92%) in an effort to further reduce them.

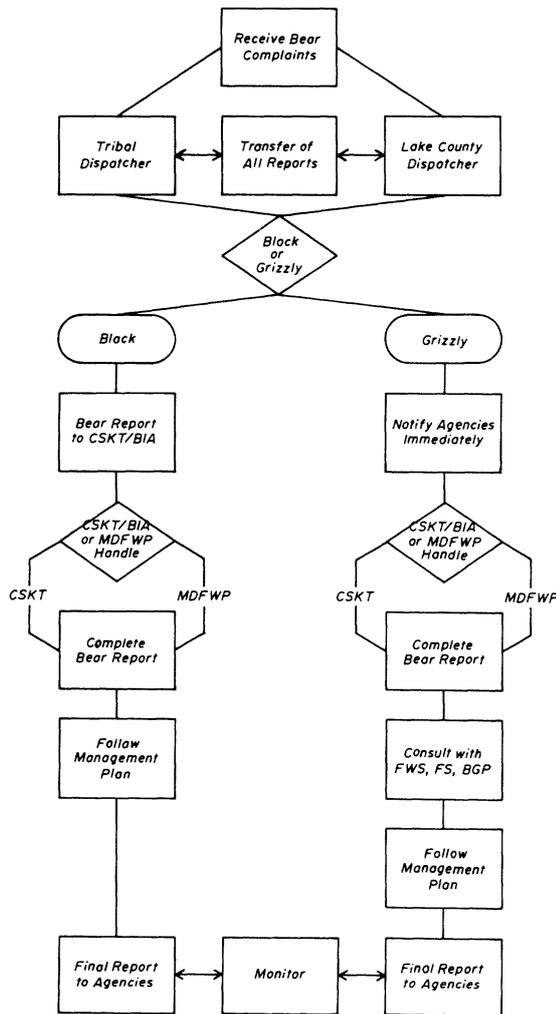


Fig. 5. Information network for bear complaints on the Flathead Indian Reservation. BGP = Border Grizzly Project; BIA = U.S. Dep. Int., Bur. Indian Affairs; CSKT = Confederated Salish and Kootenai Tribes; FS = U.S. Dep. Agric., For. Serv.; FWS = U.S. Dep. Int., Fish and Wildl. Serv.; MDFWP = Mont. Dep. Fish, Wildl. and Parks.

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