Grizzlies

STATUS OF GRIZZLY BEARS IN THE YELLOWSTONE SYSTEM

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Abstract: The Interagency Grizzly Bear Study Team was initiated to provide current data on the ecology of the Yellowstone grizzly, specifically population status and size. Accurate estimates of the total population will be difficult to obtain. Population trends may be more meaningful and measurable than a number estimate. Radio telemetry is the only effective method to gather significant volumes of data on grizzly bears. Female reproductive rates of the Yellowstone grizzly are significantly lower than previously documented; however, higher cub survival may be a compensating factor. The present mortality rate should not exceed five grizzlies per year.

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INTRODUCTION

In 1975 the grizzly bear (Ursus arctos) south of Canada was declared a "threatened" species. Under the Endangered Species Act of 1973 Federal agencies must avoid destruction or adverse modification of grizzly bear "critical habitat." Compliance with this provision was hampered by the lack of data on both habitat requirements and current populations of Yellowstone grizzly bears. Earlier research on grizzly bears within Yellowstone National Park provided data for the period 1959-67 (Craighead et al. 1974). Changes in bear management policies beginning in 1967 (Meagher and Phillips 1980) altered some population parameters.

The Interagency Grizzly Bear Study was initiated in 1973 to define and evaluate the population dynamics of the Yellowstone grizzly bear. Specific objectives of the study were to determine the status and trend of the population, the use of habitats and food items by the bears, and the effects of land management practices on the population. The study area and methods were described by Knight et al. (1978).

Several aspects of the ecology of the Yellowstone grizzly bear have been intensively studied since 1975 when logistic and telemetric problems were overcome and techniques were standardized. A backlog of movement and habitat data is now in the process of analysis or publication (Judd et al., in prep.; Blanchard 1980; Kendall 1980; Knight and Judd 1980). Population data has been gathered since 1975; this phase is still in progress.

The study is funded by the National Park Service, the U. S. Fish and Wildlife Service, and the State of Wyoming. Cooperating agencies include Yellowstone National Park, the U. S. Forest Service, and the State wildlife departments of Idaho and Montana. The assistance of many Interagency Grizzly Bear Study seasonal technicians and pilots, Dave and Roger Stradley, is gratefully acknowledged, as are the Forest Service district offices and Yellowstone Park in providing field facilities. Dr. R. J. Mackie and Dr. R. Moore critically reviewed the paper.

POPULATION SIZE

Accurate estimates of the number of grizzly bears inhabiting the Yellowstone system have eluded us for several reasons. The study area cover 7700 square miles (20,000 km^2) of rugged, often isolated terrain which is 70 to 75 percent timber covered. Even our most optimistic population estimate of 350 places the density of grizzlies at only one per 20 square miles (50 km^2). The most

pessimistic estimate of 84 or less (Craighead et al. 1974) places the density at one bear per 95 square miles (245 km^2). Given these natural low densities, nocturnal habits of Yellowstone grizzlies, and the physiography of the study area, accurate estimation of the entire population is difficult.

Only a small proportion of the grizzly bear population is observed during any one year. During routine flights to radio-track instrumented grizzlies, collared bears were aerially observed without the aid of the radio an average of only once every 33.5 hours. Unmarked grizzlies were observed an average of once every 7 hours of flight time. This indicates that only a small portion of the Yellowstone grizzly bear population has been trapped and marked during this study.

Radio telemetry is the only effective method to gather significant volumes of data on grizzly bears. Early attempts to identify individual unmarked bears were unsuccessful, except for family groups. Annual observations of grizzlies have varied substantially due to weather patterns, plant phenology, and seasonal food source abundances (Knight et al. 1978, Blanchard 1980, Meagher and Phillips 1980). Even the number of instrumented bears we are able to locate varies daily.

Population consultants (Eberhardt, pers. comm.; Caughley, pers. comm.) concluded that a Lincoln index would be the most statistically sound method for estimating the size of the

Yellowstone grizzly bear population. The sampling procedure would require a minimum of 20 marked animals and need to be replicated at least nine times. During the fall of 1977 we had the required number of marked animals, but weather conditions prevented an estimate. Inspite of the limiting factors, we will still attempt to make an estimate.

Indices of population trends may be more meaningful and measurable than any "number" in this situation. Trends are a function of production and survival; therefore, accurate estimates of grizzly bear mortality and cub production may provide the means to monitor the stability of the population. In the future this study will be placing more emphasis on this aspect rather than a number estimate.

POPULATION PARAMETERS

The grizzly bear population is dependent upon the rates of reproduction, death, immigration, and emigration. Movement of grizzly bears in and out of the Yellowstone system is essentially zero due to the political boundary lines and intensity of human activity surrounding the study area. Calculation of reproductive rate requires knowledge of the sex and age structure of the population.

Reproduction.

The female reproductive rate is the number of young produced per breeding female per year. Several methods can be used to

calculate this rate (Table 1). The most identifiable segment of the population is marked bears. Since this is a very small sample, we feel the most meaningful data can be obtained from the next most identifiable segment, which is females with young-of-the-year. From this data we can calculate female reproductive rates.

Craighead et al. (1974) used known reproductive histories of 30 marked or otherwise recognizable females followed through one to four complete reproductive cycles to obtain an average rate over a 9-year period. We can use this same method, but we have only five individual females over a 4-year period on which to base our calculations. McCullough (1979) thought this method underestimated the reproductive rate.

Reproductive rate can also be calculated by dividing the total number of cubs observed in the population during a year by the estimated number of breeding females in the population that year. The number of breeding females is estimated over a 3-year period since we have calculated a 3-year average reproductive cycle per female.

Using either method, it is evident from Table 1 that the female reproductive rate of Yellowstone grizzlies is lower today than during the 1959-67 period.

Since the 1959-67 population was not considered "threatened," current equivalent parameters would indicate a point of recovery for the grizzly bear. A recovery plan will have to address means

Table 1. Comparison of reproductive parameters between the periods 1959-67 and 1974-79.

	Female with cub groups	Mean litter size	Female reproductive rate[a]	Female reproductive rate[b]	Reproductive cycle
1959-67[c]	14.8	2.2	0.648 (30)[d]	0.740 (130)	3.4
1974-79	12	1.9	0.555 (5)	0.632 (72)	3.0

[a]Calculated from known life histories of marked females; cubs-of-the year/No. females with cubs (average reproductive cycle).

[b]Observed cubs-of-the-year/breeding females in the population.

[c]From Craighead et al. 1974.

[d]Sample size.

of reaching this point.

The nonthreatened population was characterized by an annual average observation of 14.8 females with cubs. This was at a census efficiency of 58 to 77.3 percent (Cowan et al. 1974, Craighead et al. 1974), indicating 25.5 to 19.4 females with cubs were actually present each year. From 1974 through 1979 we have monitored an average of 12 females with cubs annually. We have not yet determined what proportion of the total population this represents, although observability of instrumented bears indicates that it is significantly less than 77 percent.

Changes in other population parameters will change the relationship between reproductive rate and population level and stability. During the 1959-67 period the average age for the first breeding of females was 4.5 years. Data from seven females from 1975-79 indicate an average age at first breeding to be 5.5 years. An increase in breeding age will lengthen the mean generation time and dampen the rate of increase for the population.

Average litter size during 1959-67 was calculated to be 2.2 cubs per litter for a population with a high-energy food source available at garbage dumps. The 1974-79 average litter size was 1.9 cubs/litter, which is probably not going to change under present conditions. Black bears feeding on garbage have been found to reproduce at younger ages and have higher reproductive rates than those feeding on natural foods (Rogers 1977). Similar results may

be expected with the Yellowstone grizzly bear.

Survival and Mortality.

Survival of young is an important factor in determining the relationships between reproductive rate and population stability. During the 1959-67 period, Craighead et al. documented an average annual cub mortality of 20 to 25 percent. Mortality of cubs associated with radio-collared females during the 1975-79 period was 7 percent. Comparison of cub:female observations with yearling:female observations the following year indicates a cub mortality of 5 percent. Dumps with rich food supplies probably resulted in initially high cub production during 1959-67, but also created stressful bear concentrations resulting in high cub mortality. A higher rate of cub survival will lower the reproductive rate needed for a stable population.

Mortality, especially for females, directly affects the reproductive rate, population size, and population stability, and is the only parameter that we can directly alter. The known man-caused mortality for the last 5 years has averaged 11 grizzly bears. During any one year approximately one-third of these deaths have been confirmed and documented by other agencies. The remainder were made known to us through concerned individuals and the investigative work of our employees. The number of deaths remaining unknown cannot be estimated, although it is probably substantial. These unreported mortalities can be largely attributed to

sheepherders (Knight and Judd 1980), poachers, and outfitters.

If current population parameters are below the desired level, the only effective method of altering them is through reduction of man-related mortalities. Until sufficient data are available to calculate the population status and trend, we recommend that annual mortality in the Yellowstone population not exceed five grizzlies.

FUTURE RESEARCH

Beginning with the 1980 field season, the Interagency Grizzly Bear Team will be focusing research efforts on needs dictated by a recovery plan. Methods to monitor the trend and status of the population will be developed, in addition to continuing efforts to estimate the population size. To supplement field efforts, computer programs are being developed to analyze and progressively update population dynamics and trends as new data are obtained. Emphasis will be placed on behavior, especially aggression and its relation to human-grizzly encounters.

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CHAPTER I

RECOVERY PLAN
For The
GRIZZLY BEAR
In The
GREATER YELLOWSTONE ECOSYSTEM

Part I. Introduction

Part II. Plan Objectives

Primary Objective: Secure and/or maintain a viable, self-sustaining grizzly bear population in its Greater Yellowstone range.

1. Determine the level at which the grizzly bear population is viable and self-sustaining.

The grizzly bear population in the Greater Yellowstone Area will be determined to be viable and self-sustaining when monitoring efforts[1] document the following statistics, close approximations[2] or their biological equivalents[3] computed as running six-year averages.

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1 Monitoring efforts which most closely approximate the sampling intensity of Craighead et al.(1974) during the 1959-66 period.

2 One or all of the population parameters changed indicating a viable population which could be fundamentally different from that of the 1959-1969 period.

3 Examples of biological equivalents:

a) $\frac{\text{litter size}}{\text{reproductive cycle}}$ = reproductive rate = r

$$\frac{2.2}{3.4} = .647; \quad \frac{1.5}{2.3} = .647; \quad \frac{2.4}{3.7} = .647; \quad \frac{1.9}{2.9} = .647$$

All are equivalent parameters giving the same reproductive rates.

b) 15 females x 2.2 cubs/sow = 33 cubs r = .647
17.3 females x 1.9 cubs/sow = 32.8 cubs r = .5588

The population sizes in terms of population recruitment are approximately the same, with all other factors being equal, the population with the lower r value is less resistant to perturbations.

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The population sizes in terms of population recruitment are approximately the same, with all other factors being equal, the population with the lower r value is less resistant to perturbations.

Reproductive Rate	:	.647	(Craighead et al., 1974)
Breeding Females	:	15.0	(Craighead et al., 1974)
Cubs/Sow	:	2.2	(Craighead et al., 1974)
Reproductive Cycle	:	3.4	(Craighead et al., 1974)

The above statistics represent: 1) The Greater Yellowstone Area grizzly bear population from 1959-66; 2) a census efficiency computed to be 77.3%; and, 3) a population which was increasing at a rate up to 2.4% annually with an age structure of 18.6% cubs, 13% yearlings, 24.9% sub-adults, 43.7% adults and an average annual mortality of 30.1 bears of which an average of 15.8 were known to be man-caused.

11. Determine present population characteristics.

The grizzly bear population in the Greater Yellowstone Area can currently be described in terms of the following statistics computed as six-year averages:

Reproductive Rate	:	.558	(Knight et al., 1979)
Breeding Females	:	12.0	(Knight et al., 1979)
Cubs/Sow	:	1.9	(Knight et al., 1979)
Reproductive Cycle	:	3.4*	(Craighead et al., 1974)

The above statistics (Knight et al., 1979) are assumed to approximate the census efficiency of Craighead et al. (1974) during the 1959-66 period.

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* Reproductive cycle from Craighead et al. (1974) was used to compute reproductive rate; Knight et al. (1979) data were insufficient to calculate a meaningful reproductive cycle.

12. Identify the man-related population limiting factors if present population characteristics are different from the characteristics judged necessary to sustain a viable population.

121. Identify sources of direct mortality

1211. Illegal hunting

12111. Poaching

12112. Accidental losses resulting from mistaken identity by black bear hunters

1212. Accidental deaths

12121. Road kills

12122. Scientific error

1213. Control measures

12131. Agency (State or USFWS) control

121311. Livestock conflicts

121312. Other property damage

121313. Life threatening situations

12132. Private citizen control

121321. Livestock operators

121322. Commercial outfitters and other permittees

121323. Commercial camp or resort operators

121324. Self-defense

122. Identify activities which indirectly limit grizzly population through adverse habitat changes, grizzly-human conflict or adverse conflict resolution.

1221. Grazing operations

1222. Timber operations

1223. Mining and energy development

1224. Recreation operations

1225. Human development (sub-division)

2. Determine the habitat and space necessary to a viable, self-sustaining population of grizzly bears.

21. Review the space and habitat described as necessary to a viable and self-sustaining population as defined under 1. Craighead et al.(1974)and Craighead (1977):

"Described as a specific land area based on bear mortality records and the biological, physical and behavioral requirements of grizzly bear in the Greater Yellowstone Area. Encompasses approximately 5 million acres consisting of Yellowstone National Park and portions of surrounding National Forests with minor exclusions for towns and developed areas." (Craighead 1977) (Red line polygon)

212. Shoshone National Forest 779,000 acres

Management situation 1	404,000	acres
Management situation 2	361,000	acres
Management situation 3	14,000	acres

213. Targhee National Forest 504,250 acres

Management situation 1	161,490	acres
Management situation 2	218,600	acres
Management situation 3	23,300	acres

214.	Bridger-Teton National Forest	591,650	acres
	Management situation 1	543,900	acres
	Management situation 2	40,650	acres
	Management situation 3	7,100	acres
215.	Gallatin National Forest	550,000	acres
	Management situation 1	346,000	acres
	Other lands	204,000	acres
216.	Custer National Forest	64,000	acres
	Management situation 1	32,000	acres
	Other lands	32,000	acres
217.	Yellowstone National Park	2,221,773	acres
	Management situation 1	2,215,288	acres
	Management situation 3	6,485	acres
218.	Grand Teton National Park & John D. Rockefeller Jr. Memorial Parkway	252,737	acres
	Management situation 1	105,728	acres
	Management situation 2	138,630	acres
	Management situation 3	8,179	acres
219.	BLM lands	4,920	acres
220.	Private lands	116,000	acres
221.	Total acres included within red line	5,084,330*	acres

*BLM lands in Wyoming not included

22. Identify space and habitat determined to be necessary to a viable, self-sustaining population as outlined during the workshop on habitat, December 6 & 7, 1979 in Missoula, Montana. (Green line)

221.	Shoshone National Forest	1,261,000	acres
	Management situation 1	412,000	acres
	Management situation 2	830,000	acres
	Management situation 3	19,000	acres

222.	Targhee National Forest	389,390	acres
	Management situation 1	171,390	acres
	Management situation 2	217,000	acres
	Management situation 3	1,000	acres
223.	Bridger-Teton National Forest	734,100	acres
	Management situation 1	665,500	acres
	Management situation 2	61,500	acres
	Management situation 3	7,100	acres
224.	Gallatin National Forest	512,000	acres
	Management situation 1	346,000	acres
	Other lands in Forest	176,000	acres
225.	Custer National Forest	182,500	acres
	Management situation 1	32,000	acres
	Other lands in Forest	150,500	acres
226.	Yellowstone National Park	2,221,773	acres
	Management situation 1	2,215,288	acres
	Management situation 3	6,485	acres
227.	Grand Teton National Park & John D. Rockefeller Jr. Memorial Parkway	97,728	acres
	Management situation 1	95,373	acres
	Management situation 2	-0-	acres
	Management situation 3	2,355	acres
228.	BLM lands	2,800	acres
229.	Private lands	54,845	acres
230.	Total acres included within green line	5,466,136*	acres

*BLM lands in Wyoming not included

23. Identify differences between essential habitat designated by the Forest Service (1977) and the space and habitat determined necessary to a viable, self-sustaining population by the workshop in Missoula, December 6 and 7, 1979 (green line).

231. Shoshone National Forest

Differences using only MS 1 land	+ 8,000	acres
Differences including MS 2 & 3 lands	+ 857,000	acres

232. Targhee National Forest

Differences using only MS 1 land	- 6,310	acres
Differences including MS 2 & 3 lands	+ 383,080	acres

233. Bridger-Teton National Forest

Differences using only MS 1 land	+ 66,000	acres
Differences including MS 2 & 3 lands	+ 134,600	acres

234. Gallatin National Forest

Differences using only MS 1 land	- 166,000	acres

235. Custer National Forest

Differences using only MS 1 land	- 150,500	acres

236. Yellowstone National Park

No differences

237. Grand Teton National Park & John D. Rockefeller Jr. Memorial Parkway

Differences using only MS 1 land	+ 95,373	acres
Differences including MS 2 & 3 lands	+ 97,728	acres

238. BLM lands + 2,800 acres

239. Private lands 54,845 acres

240. Totals:

MS 1 lands	3,937,551	acres =	72.0%
MS 2 lands	1,108,500	acres =	20.2%
MS 3 lands	35,940	acres =	0.7%
Public lands where management direction is undesignated or unavaible at this writing:	329,300	acres =	6.0%
Private lands	54,845	acres =	1.0%

3. Redress population limiting factors.

31. Reduce numbers of bears lost to the population through direct man-caused mortality.

a. The recommended annual grizzly mortality goal for expediting species recovery is zero. Since this goal will not likely be achieved, recovery remains possible if mortality is reduced to less than 11 bears per year (Knight et al.,(1979) and a concensus of the group meeting in Missoula, Montana, December 6 and 7, 1979) calculated as a running six-year average. This group further recommended the man-caused mortality be reduced to six bears or less in the entire ecosystem to expedite recovery.

b. The goal and limit will apply to all lands within the Greater Yellowstone Area.

c. The appointment of a grizzly bear mortality coordinator is recommended to tabulate annual bear mortalities in the Greater Yellowstone Area and assure that all agencies have the current grizzly mortality status. The coordinator should maintain key contacts with all agencies and keep detailed records of all conditions surrounding each mortality. Preparation of a standard form meeting the needs of all agencies is recommended.

d. Necessary removal of nuisance bear can be accomplished by a State licensed hunter supervised by a State representative.

e. Sport hunting is recognized as a legitimate and desirable tool for managing nuisance bear and controlling grizzly bear. once the population has recovered

311. Illegal hunting

3111. Provide a concerted law enforcement effort.

a. Develop a specially trained law enforcement team to minimize the illegal kill of grizzly bears.

1. The team would consist of one or more persons representing the Fish & Wildlife Service, National Park Service, Forest Service, State of Montana, State of Wyoming and the State of Idaho.

2. Each member would receive specialized training to work on illegal kills of grizzly bears. The team would be trained initially by the Interagency Grizzly Bear Study Team in such matters as distribution, home ranges of identifiable bears, movements by season, mating habits, current location of radioed bears and such other biological information that may be helpful to the team.

3. All incidents of grizzly bear kills, suspected illegal activities and rumors would be communicated between the enforcement team, their respective agencies and the Interagency Team on a daily basis or as often as is practical.

4. The group leader would keep all members of the enforcement team and the Interagency Team informed and would call them together as needed.

5. Special emphasis would be directed at covert operations which may be operating commercially. The enforcement team would operate through an interstate, interagency agreement under the direction of the U.S. Fish & Wildlife Service.

3112. Accidental losses resulting from mistaken identity by black bear hunters.

31121. Provide all black bear hunters with information enabling them to distinguish black and grizzly bears.

31122. Issue special warnings to black bear hunters using areas frequented by grizzlies.

31123. Use the special enforcement team to thoroughly investigate accidental grizzly kills and prosecute when negligent.

3113. Accidental deaths

31131. Reduce losses by increasing warning signs along highways in grizzly bear areas.

31132. Reduce losses by increasing efforts to clean up carrion along highways that serve as attractants to all bears. See "Guidelines"[1], pages 15, 30 and 36.

31133. Reduce losses by actively seeking the cooperation of railroad train crews to report all incidents of colliding with large animals that would serve

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[1] Guidelines For Management Involving Grizzly Bears In The Greater Yellowstone Area. (May 1979)

to attract grizzly bears; and provide for removal or burial of such animals.

31134. Reduce losses due to mishandling of bears, overdose of immobilizing drugs or by improper after care. Only experienced personnel that are certified by a sponsoring unit that he/she are knowledgeable in the application of tranquilizers, transporting and scientific data collecting, will handle grizzlies. Research personnel will prepare guidelines for trapping, immobilizing and handling grizzlies.

3114. Agency Control Measures

31141. For grizzlies involved in livestock conflicts, Animal Damage Control Officers follow "Guidelines", pages 11, 27, 35 and 57.

31142. For grizzlies involved in other property damage, Animal Damage Control Officers follow "Guidelines", page 57.

31143. All other Agency control related to grizzlies should be governed by "Guidelines" directions starting on page 57.

3115. Private Citizen Control

31151. The only legal citizen control of a grizzly bear is that related to self defense. The law enforcement team should carefully investigate each case of grizzly mortality alleged to be self defense.

31152. Preventive measures relating to grizzly-human conflict involving livestock, outfitters, commercial camps, resorts and other uses are discussed in the "Guidelines". Following the loss of property or the bear, the enforcement team will leave detailed instructions (written) on procedures for avoiding property damage or at least minimizing the chance of the confrontation.

3116. Control on Private Lands

31161. Follow "Guidelines" procedures page 57.

32. Reduce or eliminate activities which indirectly limit grizzly populations through adverse habitat changes, adverse grizzly-human conflict or adverse conflict resolution.

321. Grazing operations:

See "Guidelines", pages 11, 27, 35 and 57.

322. Timber operations:

See "Guidelines", pages 6, 21, 34 and 57.

323. Mining and energy operations:

See "Guidelines", pages 17, 32, 38 and 57.

324. Recreation activities:

See "Guidelines", pages 14, 28, 36 and 57.

4. Resolve differences between Forest Service designated essential habitat and the space and habitat determined necessary to a recovered population by the workshop in Missoula December 6 and 7, 1979 (green line).

41. Shoshone National Forest.

This Forest contains 412,000 acres of grizzly habitat that will be managed under Management Siutaiton 1, 830,000 acres that will be managed under Situation 2 and 19,000 in Management Situation 3; all within the green line determined to be the space and habitat necessary to a recovered population. The management direction under Management Situation 1 will favor the needs of the grizzly when competing with other land use values and the minimization of grizzly/human conflicts will receive the highest priority. Management Situation 2 makes adequate allowances for grizzly survival and for reclassification to Management Situation 1 of areas that are determined to be necessary to the survival of the species. Management Situation 3 management direction will be to minimize grizzly/human conflict by discouraging the presence of grizzlies in these areas of high human use, e.g. haul away garbage, bear proof containers, clean up carrion, etc. From this viewpoint and until research has data to the contrary, we will assume the Shoshone National Forest has provided adequate habitat protection to affect grizzly bear recovery. We suggest a change in the wording of the population and habitat conditions described under Management Situation 2 in the "Guidelines": The second sentence states, "The area is not necessary for species survival....." is suggested changed to "The area may not be necessary for species survival.....".

42. Targhee National Forest.

This Forest incorporates 171,390 acres of habitat that will be under the management direction for grizzlies of Situation 1, 217,000 acres under Management Situation 2 and 1,000 under Management Situation 3. Using the same logic and recommendations as stated above for the Shoshone, we believe the grizzly bears habitat is adequately protected. A potential for grizzly/human conflict exists where sheep are being grazed on National Forest lands.

43. Bridger-Teton National Forest.

665,500 acres of this Forest are managed under Management Situation 1, 61,500 under Management Situation 2 and 7,100 acres under Management Situation 3. In both the Targhee and the Bridger-Teton National Forests there have been special grizzly studies to evaluate habitat, their management direction reflects the results of these surveys. Efforts to implement the "Guidelines" and to reduce problems that lead to human/grizzly confrontations have been carried out on Shoshone, Bridger-Teton and Targhee National Forests with commendable results.

44. Gallatin National Forest.

Grizzly bears are known to use over a half-million acres of this Forest. The management direction of 68% of this Forest is under Management Situation 1. The management of the remaining 176,000 acres will be according to National Forest Management Planning Process. A major portion of this latter area is in wilderness classification. The major potential for grizzly/human conflicts will be livestock operations both in the wilderness and off and on adjacent private lands. Recreation and associated summer home development are also a problem in this area of checkerboard ownership.

45. Custer National Forest.

There are only 32,000 acres of this Forest that are under management direction of Management Situation 1; the other 150,500 acres space and habitat determined necessary for grizzly bears is in wilderness classification and will be managed under their wilderness management plan. The major potential grizzly/human conflict is recreational use. There are 1,500 acres of mining claims within both areas described above and they are presently inactive.

46. Yellowstone National Park.

The entire area of 2,215,288 acres, excepting 6,485 acres for roadways campgrounds and resort areas, will be managed under the "Guidelines" Management Situation 1.

47. Grand Teton National Park and John D. Rockefeller Jr. Memorial Parkway.

This area has 95,373 acres that will follow the management direction described in the "Guidelines" Management Situation 1. There are 2,355 acres of developed areas within the Park and Parkway that will be managed under Management Situation 3. There are no Management Situation 2 areas within the "green line"; however there are over 178,500 acres of area south and east of Jackson Lake being managed under "Guidelines" Management Situation 2 that may have grizzly bear use to a limited extent. The Park and Parkway have 48,000 acres under Management Situation 3.

48. Bureau of Land Management.

Within the presently described space and habitat necessary for a recovered population of grizzlies there are 2,800 acres of lands managed by the Bureau of Land Management. Seventy-eight per cent of these lands are in Idaho and are to be managed under the same management direction as adjacent Forest Service lands. The remaining 600 acres are in Montana and management direction is to be determined.

49. Private lands.

Except for provisions of laws, both State and Federal, that provide protection for grizzly bears on these lands, the only significant management will be an information and education effort and the handling of nuisance bears.

Public opinion has changed over the past decade in favor of the grizzly, but grizzlies on private property, especially if inhabited, will always be cause for concern of the landowner. Should any areas of private land become mortality sumps, or if they are corridors to specific habitats, these lands should be considered for acquisition.

Habitat as defined by Craighead (1977) that was used by the grizzly population during the study of 1959-67, (Craighead et al., 1974) was largely a population of bears habituated to, or at least knowledgeable of human food sources, both inside and outside of Yellowstone National Park, Grand Teton National Park and John D. Rockefeller Jr. Memorial Parkway. The public in general was more likely to view grizzlies as a threat and a nuisance than as a species that may be threatened. Hunting was permitted in Montana and Wyoming and no special emphasis was placed on habitat management by the land management agencies with grizzlies in mind. Since that era significant progress has been made in changing the attitude of the public, a protective attitude or at least an attitude that exhibits some constraint before eliminating all nuisance bears, and bears that may become a nuisance, now prevails.

Research has added to our knowledge on specific habitat needs of grizzly bears and their need for space. Federal land management agencies and State wildlife agencies have funded research, conducted surveys on grizzly habitat and have implemented changes in habitat management that have benefited grizzly bears.

One example of this is "Guidelines For Management Involving Grizzly Bears In The Greater Yellowstone Area" developed cooperatively with National Forest and National Park Service personnel. They have taken into consideration the best information available on grizzlies and their habitat needs and incorporated those needs in their land use management and planning. Refuse from towns, resorts, camps, etc. have been largely eliminated, because land management agencies are putting the "Guidelines" into effect. Other examples of habitat management improvement have been recommended by the Interagency Grizzly Bear Study Team, National Park and National Forest biologist, State biologist, University research personnel, John and Frank Craighead and private research efforts. All of the recommendations have not be adopted but those that have been implemented has been at considerable expense. The elimination of many direct or indirect causes of grizzly/human conflicts have resulted and the annual grizzly bear mortality caused by a wide range of confrontations is down significantly in recent years.

Therefore it seems logical that the application of the "Guidelines" that includes most of the recommendations from all sources above, to the habitat described by the workshop (green line) as necessary for recovery, accompanied by an obvious change in public opinion toward bears, and the implementation of the recommendations in the recovery plan, should provide a superior habitat and more space for grizzlies than the habitat known to have supported a viable, self-sustaining population during the 1959-66 period. (Craighead 1977) (Red line polygon)

STATE OF MONTANA
DEPARTMENT OF FISH AND GAME
HELENA, MONTANA

Office Memorandum

TO : Mr. Frank Craighead **DATE:** January 30, 1980

FROM : DON L. BROWN, Leader DLB.
Grizzly Bear Recovery Plan

SUBJECT: MINUTES OF DECEMBER 6 & 7 WORKSHOP
Missoula, Montana

Enclosed is the first draft of the minutes of the December workshop and hopefully the first draft of Chapter I of the recovery plan.

Your cooperation in reviewing this draft is requested and please feel free to re-write, edit, change in context, add to or shorten any or all sections. Any self-esteem I may have does not include being a lucid writer. Your changes and/or comments will be given every consideration in the next draft to the best of my ability.

If I do not receive your review by March 1, 1980 I will assume your concurrence.

2/28/80 Sent card
Will try to write letter later