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GRIZZLY BEAR POPULATION ECOLOGY IN THE WESTERN BROOKS RANGE, ALASKA

BY: HARRY V. REYNOLDS, III, AND JOHN L. HECHTEL, Alaska Dept. of
Fish and Game, 1300 College Road, Fairbanks, Alaska 99701

December 1987

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PROGRESS REPORT

Grizzly Bear Population Ecology in the Western Brooks Range, Alaska

Harry V. Reynolds, III

and

John L. Hechtel

Alaska Department of Fish and Game
1300 College Road
Fairbanks, AK

in cooperation with
U.S. National Park Service
and
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Summary

An intensive grizzly bear capture effort started in 1986 will provide important long-term data on changes in population structure and dynamics, productivity, mortality, movements, and home range. The Utukok Uplands of the North Slope contains a grizzly population that was studied in depth from 1977 to 1979 and has been monitored during subsequent years. Including the 16 captures during 1986, 134 bears from the area have been marked. Radio contact has been maintained for 16 since 1977-78 and 25 bears were monitored from 1977 until their deaths. Fifteen bears have been monitored since they were cubs and 10 of these are now adult females that have been observed consorting with males or produced offspring. Of 25 mature females in the area during 1986, 14 produced 24 cubs (\bar{x} of 1.71 cubs/litter). This contrasted with the previous 3 years during which only 2 young were produced. Thirteen of the 24 cubs (54.1%) died during 1986. One adult female was killed and eaten by a large boar, and 3 other adult females that died of unknown causes were eaten by other bears. Ten young-aged females were followed subsequent to weaning; 8 or 9 remained in the vicinity of their mother's home range. Six young-aged males stayed within their maternal home ranges for 1-2 years after weaning, 3 left the year they were weaned, and only 2 were observed within the area after 7 years.

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I. Background

An understanding of the population biology of any species is crucial to maintenance and wise stewardship of that species, whether or not a particular population occurs in an area free from habitat destruction or heavy hunting pressure. Brown and grizzly bear (*Ursus arctos horribilis*) populations throughout North America and the world have been particularly susceptible to loss of habitat and effects of human activities because of their low reproductive potential, relatively sparse distribution, and wide-ranging movements.

Grizzly bears inhabiting Alaska's North Slope tundra live at the northern limit of grizzly bear range. Winters are long and severe, summers short and cool, and the tundra vegetation is relatively unproductive. Bears have

only 4 to 5 months to accumulate fat reserves for 7 to 8 months of hibernation. Study of bears in this area may reveal factors affecting population dynamics which would be more difficult to ascertain in more complex or diverse ecosystems.

The Alaska Department of Fish and Game initiated a study of grizzly bears in the Utukok Uplands in 1977 as part of an assessment of natural resources for the National Petroleum Reserve-Alaska 105-C studies. Grizzly bear population size and structure were determined in 1978 after 2 years of intensive capture and marking. From 1979 to the present, we have continued to monitor marked animals in the area and have followed a reasonable sample of marked bears by recapturing bears in years when funds were available. We have collected data for 9 years on movements, home ranges, survival, and reproduction of certain bears. An intensive capture effort, similar to that of 1977 and 1978 (Reynolds 1980) will provide additional information on the population dynamics of Brooks Range bears. The intensive capture effort and the monitoring of recently weaned bears will provide insight into home range fidelity and how home ranges are established. This information will be helpful in determining how population reservoirs that occur in national parks influence grizzly bear abundance and population dynamics.

Natural history studies of grizzly bears in Alaska provide an adequate data base on some aspects of reproductive biology, food habits, habitat use, and home range size (Dean 1976; Reynolds 1976, 1980; Murie 1981; Miller and Ballard 1982; Miller and McAllister 1982; Miller 1984; Reynolds and Hechtel 1984). These studies, however, were largely descriptive or were of relatively short duration (2-3 years). Grizzlies do not mature until 4-10 years of age, so observed (as opposed to extrapolated) measures of productivity, survival, and movement patterns must be collected over a 4- to 10-year period to be accurate and most useful (Craighead et al. 1974, 1976; Reynolds 1976; Bunnell and Tait 1980; Reynolds and Hechtel 1984; Knight and Eberhardt 1985).

Two problems which require long-term study and are important to managers of grizzly bear populations are: (1) how observed variations in productivity, survival, emigration, and immigration affect population increases or

decline, and (2) whether population reservoirs exist and what effects increased mortality outside such reservoirs would have on the reservoir population. Population reservoirs are those populations characterized by high productivity or survival rates which supplement adjacent populations; in other words, those populations which increase or remain stable even though emigration exceeds immigration. If reservoirs exist, it is important to determine if increased exploitation in adjacent areas constitutes compensatory or additive mortality in the reservoir population.

II. Objectives

1. Relate changes in grizzly bear population size and structure to long-term rates of, and variation in, productivity, survival, emigration, and immigration.
2. Determine the fidelity of grizzly bear offspring to their maternal home ranges.
3. Determine the relationship between fidelity to home range and productivity and survival.
4. Examine den site selection by adult females in relation to production and survival of offspring.

III. Study Area

The 5,200 km² study area lies in the mountains and foothills of the western Brooks Range. The approximate boundaries of the study area were: Archimedes Ridge (69° 10'N latitude) on the north, the Kokolik River on the west, the crest of the Brooks Range on the south, and a line running from Thunder Mountain to the Utukok River (160° 15'W longitude) on the east. The physiography of the southern one-fourth of the area is mountainous with elevations of about 600 m in river or creek valleys to 1,300 m for the highest peaks. The northern three-fourths of the area is characterized by a series of east/west-oriented rolling hills, ridges, and buttes of 600-900 m elevation which are cut through by 2 major north-south flowing rivers, the Utukok and Kokolik. The lowest elevation on the northern edge of the area is 400 m.

Tussock tundra characterized by cottongrass (Eriophorum sp.) and sedges (Carex sp.) was the predominant vegetative type on the area. In addition, wet sedge meadow communities were found on poorest drained sites, and Dryas sp. or fellfield communities on ridge slopes and mountains. Patches of willows (Salix sp.) are usually stunted but grow to heights of 0.5-2.5 m along broad braided river channels (Spetzman 1959, Hechtel 1985).

IV. Methods

Bears were captured from helicopters by dart guns using immobilizing drugs Sernylan (phencyclidine hydrochloride), M99 (etorphine hydrochloride, D-M Pharmaceuticals, Inc., Rockville, Md.) or Telazol (Zoletil 100; 50% tiletamine and 50% zolazepam, Reading Laboratories, L'Hay les Roses, France). Acepromazine maleate (Ayerst Laboratories, New York, N.Y.) was used as a tranquilizer in conjunction with Sernylan injections. All bears captured were marked with individually coded ear flags visible from the air, and selected bears were fitted with radio collars (Telonics, Mesa, Ariz). Offspring which accompanied their mothers were not collared until the year in which they were judged ready to be weaned (2- to 4-year-olds, depending on individual family group and year). Most bears were relocated from aircraft either by radio-tracking or by locating bears through aerial searches. Relocations were used to construct minimum home range polygons, a standard method used in other grizzly bear studies (Craighead and Craighead 1972).

Age structure, age at 1st production of cubs, mean litter size, and reproductive interval were used as indicators of population productive potential. Ages were determined by examination of cementum annuli of premolar teeth (Mundy and Fuller 1964). In the discussion of age classes the definitions were: "offspring" as cub, yearling, and 2-year-old cohorts, comprised of bears usually accompanied by their mothers; "young-age" bears as those 3-5 years of age; and adults as all cohorts 6 years of age and older. Reproductive status was estimated from (1) the size, coloration, and lactating condition of mammae; (2) observations of male-female pairing; and (3) the number and age of offspring observed in family groups.

Some mortalities were directly observed but others were assumed. Since we saw no evidence of survival of cubs or yearlings which were not accompanied by their mothers, we assumed that their absence from their radio-collared mothers meant that these offspring had died. Also, we have not observed any abrupt shifts in the established home ranges of adult radio-collared females. Therefore, we presumed that those females which had known home ranges but which we were unable to relocate after 2 years of intensive aerial searches were dead. Although we recognize that there is a potential source of bias in treating these females as mortalities, our present data indicate that this bias is small, especially for bears older than 19 years. We did not treat males in the same way because of their larger home range sizes and wide-ranging movement patterns.

V. Results and Discussion

Captures

During 1986, 16 bears were captured and marked in the study area (Table 1). Of those, 7 were males and 9 were females; 9 had not been previously captured, but 4 were offspring of previously marked bears. Of the bears which were originally captured in 1977-78, contact has been maintained until 1986 for 16 bears and until the time of their deaths for another 25 bears (Appendix A). In addition, we have maintained contact with 15 bears from the time they were first observed with their mothers; 10 females which were originally captured with their mothers have either produced their own offspring or been observed consorting with adult males.

Most bears in this study have been captured using Sernylan in combination with acepromazine maleate as the immobilizing drug. This drug has a wide margin of safety in immobilizing bears of varying ages and physical condition; during this study there have not been any capture-related mortalities, despite 196 immobilizations with Sernylan, 31 with M99, 4 with Telazol, and 5 without drugs (cubs only). In general, capture took place during June; drug doses used for immobilization were 1.8 mg of Sernylan/kg of estimated body weight. To account for annual or seasonal variations in effective dosage, we adjusted estimated doses based on the effects observed on the 1st 4-5 immobilizations for each capture period. We also reduced

the estimated dosage for bears recently emerged from dens or for females which were accompanied by offspring; similarly, we increased our estimated doses during late July through September, when bears were in better physical condition.

The mean effective Sernylan dosage for those bears which were immobilized with moderate or optimum effect was 1.87 mg/kg during June (Table 2). The mean light and heavy dosages administered during June were 1.58 mg/kg and 2.07 mg/kg, respectively (Table 1). Most light dosages allowed initial handling of the animals but the bears required additional drug during processing; heavy dosages resulted in immobilization for periods of up to 12 hours, but no bears died as a result of overdosing.

During 1986, we used the experimental drug Telazol to immobilize 10 bears, 7 in the western Brooks Range and 3 in the Alaska Range south of Fairbanks (Table 3). During this limited trial, Telazol, like Sernylan, appeared to provide a wide tolerance of safe use for grizzly bears. Its effects appeared similar to Sernylan in terms of thermoregulation, heart rates, and respiration rates; major advantages of its use were that both induction times and recovery times were shorter than for Sernylan. Further tests will be conducted on the use of Telazol during 1987.

Population Size

Population size during the 1977-79 period was determined using the direct count method (Reynolds 1980, Reynolds and Hechtel 1984). Capture of a sample size sufficient to calculate population size in the same manner will not be completed until summer 1988. We recognize a number of biases inherent in this method of estimating population size; for instance, it is difficult to calculate a variance since the estimate is based in part on an estimated number of bears living in the area which were not captured. However, other methods such as capture-recapture ratios were not funded in this study and may also be biased, especially in areas of low bear density such as the north slope of the Brooks Range (Reynolds et al. 1987). By marking a large proportion of the population, the degree of bias should be

minimized when the direct count approach is used. In addition, if additional funding becomes available, population size and density estimates will be made using other techniques for comparative purposes.

Population Structure

Fifty-eight males and 74 females have been captured during the study (Table 1). These figures probably do not reflect sexual structure of this unhunted population, but final analysis will not be completed until the capture effort is completed in 1988. During tagging operations, bears were captured as they were encountered, so that, over time, structure based on occurrence in the capture sample should be representative of the population. The only exception to this practice occurred with offspring under maternal care; to avoid the effects of handling, those bears were usually not captured until just prior to weaning. Because of this practice, the sex of unmarked offspring that died while under maternal care is unknown.

Productivity

During 1986, 25 potentially reproductively mature females were observed in the study area. Of these, 14 were observed with cubs of the year, 5 bred during 1985 but did not produce cubs in 1986, 5 were young and may not have actually been reproductively mature, and 1 may have had cubs but was killed by an adult male before verification could be made. More females were observed with cubs in 1986 than in any other year since the study was initiated (Table 4). Although there may be several plausible explanations for this observation, it is most likely the result of the availability of large numbers of microtines during a high population cycle coupled with moderate weather patterns. During 1983-85, 24, 13, and 10 adult females were observed in each respective year, but only 1, 1, and 0 young were produced. This pattern was likely due to unseasonably cold and/or long winters, perhaps aggravated by declines in vegetative food production. Another explanation for the high cub production during 1986 is that following several years when cubs were not being produced, fewer females were accompanied by older offspring and a larger proportion of adult females in the population bred in 1985.

The 14 females which produced cubs had a mean litter size of 1.71 cubs/litter. This compares with the mean of 1.98 cubs/litter for the 1977-83 period, but is within the range reported for that time of 1.67 to 2.50 cubs/litter. The relationship between long-term production rates for the population and for individual females will be discussed more fully as additional data are collected.

Survival and Mortality

During 1986, 18 mortalities were observed in the study area; this compares with 43 or an average of 6.1 determined during the 1977-83 period (Reynolds and Hechtel 1984). Five of the 18 mortalities occurred to adult bears, more than have been recorded in any other year. Four of the adults were females. Observations indicate that 1 was killed and eaten by an adult male grizzly; the other 3 were eaten by other bears, but their cause of death was unknown. At least 13 of the 24 cubs (54.1%) born in 1986 died during the year, an expected pattern, since 44.1% of cubs died during the 1977-83 period (Reynolds and Hechtel 1984).

Movement Patterns and Fidelity to Home Range

The fidelity of young-age bears to their maternal home ranges varied (Table 5). Females appear to be more likely to stay within the area of their mother's home range than do males. Of 10 young-aged females which we followed subsequent to weaning, 8 or 9 have apparently remained in the vicinity of their mother's home range. Female no. 1179 traveled 100 km south and used an area near the Noatak River, before coming back to her maternal home range and then returning south again. Another female, no. 1102, was located near her maternal home range until she was age 6 and produced a litter of cubs, but was not seen afterwards; she may have either moved or died. Six young-aged males stayed within their maternal home ranges for 1-2 years after weaning, but only 2 were observed within the area after 7 years. In addition, 3 other young-aged males left their maternal home ranges the same year they were weaned. Certainly, there are biases in our collection of data on fidelity to maternal home ranges since we are more likely to determine whether bears stay in the study area than if they leave. Additional data collected during the study will improve our understanding of dispersal by young bears. Patterns of adult fidelity to

the home ranges within the study area will be addressed in future reports (Appendix A, B).

Denning

Den site selection by grizzlies in the study area will be analyzed in future reports.

VI. Conclusions

In 1986, a 3-year intensive capture and marking project was started to estimate the size and sex and age structure of a grizzly bear population inhabiting the Utukok Uplands of the north slope of the Brooks Range. Two more years of capture and tracking will allow us to refine our population estimate based on year 1987 and allow us to compare it with the estimate obtained 10 years ago. Long-term data collection on productivity, mortality, survival, movements, denning, home range fidelity, and fate of offspring is providing important insights into grizzly bear population ecology that cannot be obtained in studies of less than 10 years duration. Future reports will present and analyze this information in greater detail.

VII. Acknowledgments

This study was funded in 1986 by the U.S. National Park Service. Data collected during 1986 build on a long-term grizzly research project begun in 1977, supported and funded over the years by U.S. Bureau of Land Management, Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, Office of Naval Research, and Naval Arctic Research Lab at Barrow, Alaska. Success of 1986 field work was due in large part to the conscientious hard work and expertise of Layne Adams. Volunteers Derek Craighead and Tim Langdon ably assisted with field work and data compilation, respectively. The safety and success of capture and tracking were due to expertise of Super Cub pilots Jim Rood and Ben Smith and helicopter pilot Ron Warbelow.

VIII. Literature Cited

- Bunnell, F. L., and D. E. N. Tait. 1980. Bears in models and reality--implications to management. Pages 15-23 in C. J. Martinka and K. L. McArthur, eds. Bears--Their biology and management. Bear Biology Assoc. Ser. No. 3. U.S. Gov. Print. Off. Washington, D.C.
- Craighead, F. C., Jr., and J. J. Craighead. 1972. Grizzly prehibernation and denning activities as determined by radio-tracking. Wildl. Monogr. 32.
- Craighead, J. J., F. C. Craighead, and J. Sumner. 1976. Reproductive cycles and rates in the grizzly bear, Ursus arctos horribilis, of the Yellowstone ecosystem. Pages 337-356 in M. R. Pelton, J. W. Lentfer, and G. E. Folk, eds. Bears--Their biology and management. IUCN New Ser. 40.
- _____, J. R. Varney, and F. C. Craighead, Jr. 1974. A population analysis of Yellowstone grizzly bears. Montana For. and Conserv. Sta. Bull. 40. School of Forestry, Univ. of Montana, Missoula. 20pp.
- Dean, F. C. 1976. Aspects of grizzly bear population ecology in Mount McKinley National Park. Pages 111-119 in M. Pelton, J. Lentfer, and G. Folk, eds. Bears--Their biology and management. IUCN New Ser. 40.
- Hechtel, J. L. 1985. Activity and food habits of barren-ground grizzly bears in Arctic Alaska. M.S. Thesis, Univ. of Montana, Missoula. 74pp.
- Knight, R. R., and L. L. Eberhardt. 1985. Population dynamics of Yellowstone grizzly bears. Ecology 66(2):323-334.
- Miller, S. 1984. Big game studies. Vol. VI. Black Bear and Brown Bear. Susitna Hydroelectric Project, 1983 Annual Report. Alaska Dep. Fish and Game. Anchorage. 174pp.
- _____, and W. B. Ballard. 1982. Density and biomass estimates for an interior Alaskan brown bear population. Can. Field-Nat. 96(4):448-454.
- _____, and D. C. McAllister. 1982. Big game studies. Vol. VI. Black Bear and Brown Bear. Final Phase I Report. Susitna Hydroelectric Project. Alaska Dep. Fish and Game. Anchorage. 233pp.
- Mundy, K. R. D., and W. A. Fuller. 1964. Age determination in the grizzly bear. J. Wildl. Manage. 28:863-866.

- Murie, A. 1981. The grizzlies of Mount McKinley. Sci. Monogr. Ser. No. 14. U.S. Dep. Inter. Nat. Park Serv., Washington, D.C. 251pp.
- Reynolds, H. 1976. North Slope grizzly bear studies. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Final Rep. Proj. W-17-6 and 7. Jobs 4.8R, 4.9R, 4.10R, and 4.11R. Juneau. 20pp.
- _____. 1980. North Slope grizzly bear studies. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-17-11. Jobs 4.14 and 4.15R. Juneau. 75pp.
- _____, and J. L. Hechtel. 1984. Population structure, reproductive biology, and movement patterns of grizzly bears in the northcentral Alaska Range. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-2. Job 4.16R. Juneau. 30pp.
- _____, _____, and D. J. Reed. 1987. Population dynamics of a hunted grizzly bear population in the northcentral Alaska Range. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 4.19R. Juneau. 59pp.
- Spetzman, J. 1959. Vegetation of the Arctic Slope of Alaska. U.S. Geol. Surv. Prof. Pap. 302:19-58.

Table 1. Capture and marking characteristics of 134 grizzly bears in the western Brooks Range, Alaska, 1977-86.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Marking ^b
1081M	5.5	5/24/77	175	Utukok R.	2.6/H	889/890	P/O
	7.5	9/17/79	430	N. Meat Mtn.	A/M	17827/17826	P/O
	8.5	7/7/80	380	Disappoint Cr.	2.8	504/503	P/O
		8/15/80	400	Utukok R.	3.0/L	504/503	P/O
	12.5	9/14/84	--	Utukok R.	1.8M99/L	504/503	P/O
		9/16/84	440	Utukok R.	4.0/M	338/339	1B/R
1082M	13.5	5/25/77	370	Kokolik R.	2.0/M	892/893	O/G/O
		6/13/77	365	Kokolik R.	2.3/M	892/893	--
		6/25/77	380	Kokolik R.	2.7/M	892/893	--
		8/10/77	--	Kokolik R.	2.7/L	892/893	--
	14.5	6/27/78	425	Kokolik R.	2.8/L	892/893	Bk
	15.5	6/28/79	480	Kokolik R.	A/M	313/312	--
	16.5	8/17/80	520	Kokolik R.	5.0/L	538/539	dB/P
1083M	7.5	5/25/77	265	Utukok R.	2.0/M	894/895	plaque
		6/2/77	--	Utukok R.	2.6/L	894/895	Bk
	8.5	7/2/78	360	Utukok R.	2.7/M	894/895	Bk
	9.5	6/30/79	355	Utukok R.	3.4/H	894/	--
	14.5	5/26/84	360 ^c	Meat Mtn.	1.8M99/M	3350/3319	dB/1B
	15.5	6/4/85	345	Utukok R.	2.6/M	422/423	dB/1B
1084M	7.5	5/26/77	220	Utukok R.	A/L	897/896	P/P
		6/2/77	--	Driftwood Cr.	2.2/L	897/896	Bk/W
1085F	19.5	5/27/77	280	Meat Mtn.	A/L	899/898	--
1086F	16.5	5/29/77	205	Meat Mtn.	2.0/L	205/206	--
		6/24/77	235	Meat Mtn.	1.3/L	205/206	--
		8/8/77	265	Driftwood Cr.	1.9/M	205/206	--
	18.5	9/16/79	400 ^c	N. Meat Mtn.	A/L	205/206	--
1087F	1.5	5/29/77	31	Meat Mtn.	0.13/M	207/208	/G
	3.5	6/30/79	170	Meat Mtn.	1.1/M	314/208	Bk/
	4.5	7/7/80	205	Meat Mtn.	A/M	506/505	1B/Bk
	8.5	5/25/84	220 ^c	Meat Mtn.	2.0M99/M	3195/3237	1B/Bk
1088M	4.5	5/31/77	270	Eskimo Hill	2.0/M	210/209	--
1089F	4.5	6/1/77	122	Adventure Cr.	A/M	214/213	--
		6/10/77	126	Adventure Cr.	1.7/M	243/240	W/W
	12.5	6/4/85	245	Adventure Cr.	2.0/M	401/402	W/W
1090F	18.5	6/1/77	220	Utukok R.	A/H	215/216	--
1091M	19.5	6/4/77	350	Utukok R.	3.0/H	217/218	--
1092F	8.5	6/4/77	220	Ilingnorak	2.2/M	227/226	--
	11.5	8/19/80	320	Ilingnorak	4.0	549/548	O/G
	14.5	6/21/83	--	Ilingnorak	3.8M99/M	3389/3466	O/G
	16.5	9/6/85	375	Ilingnorak	A/L	356/357	O/G
1093F	0.5	6/4/77	38	Ilingnorak	0.1/M	228/229	1B/

Table 1. Continued.

Bear No. and sex	Gen. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Marking ^b
1094M	4.5	6/5/77	175	Meat Mtn.	2.0/H	225/230	1B/1B
1095F	6.5	6/5/77	200	N. Meat Mtn.	1.5/M	231/233	O/W
1096M	7.5	6/5/77	325	Meat Mtn.	2.6/M	236/237	--
	8.5	6/28/78	395	Utukok R.	2.8/M	774/775	1B
	9.5	6/28/79	--	N. Meat Mtn.	A/H	774/893	/1B
	10.5	8/17/80	505	Meat Mtn.	4.2/L	536/537	O/1B
1097F	8.5	6/5/77	225	Meat Mtn.	1.8/M	235/234	--
		6/19/77	--	Utukok R.	1.4/M	235/234	--
	11.5	7/6/80	300	Utukok R.	1.8/M	510/511	Pp/P
		8/16/80	270	Utukok R.	A/L	510/511	Pp/P
	14.5	9/19/83	305	Utukok R.	5.0M99/M	3236/3480	Bk/P
	16.5	6/5/85	220	Colville R.	1.7/M	432/433	Bk/R
1098M	3.5	6/8/77	108	Utukok R.	1.2/H	238/239	O/1B
1099M	10.5	6/11/77	365	Utukok R.	3.2/M	245/244	--
	11.5	6/27/78	450 ^c	Kokolik R.	2.8/M	773/772	--
	12.5	6/26/79	450	Utukok R.	3.0/M	773/772	--
	16.5	9/20/83	495	Utukok R.	6.0M99/H	3238/3485	R/R
1100F	6.5	6/11/77	200	Meat Mtn.	2.4/M	247/246	--
	7.5	6/9/78	240 ^c	Utukok R.	2.5/H	247/246	P
	8.5	7/1/79	220	Driftwood Cr.	1.9/M	247/246	P
1101M	2.5	6/12/77	145	Utukok R.	1.2/L	249/248	G/W
1102F	2.5	6/12/77	125	Utukok R.	1.2/L	251/250	W/G
	3.5	6/18/78	140	Utukok R.	1.4/M	251/250	--
	5.5	8/18/80	210	Kokolik R.	3.0	544/545	W/G
1103M	8.5	6/12/77	320	Utukok R.	2.6/H	253/252	--
	9.5	6/12/78	--	Utukok R.	A/H	253/252	--
	16.5	6/8/85	430	Utukok R.	2.4/L	202/201	O/mG
1104F	9.5	6/12/77	215	Utukok R.	1.6/M	255/254	--
		6/17/77	--	Utukok R.	1.2/L	255/254	--
	12.5	7/10/80	250	Nimwutik Cr.	1.5/L	517/518	P/G
	15.5	6/22/83	190	Nimwutik Cr.	3.8M99/M	3468/3471	G/G
	17.5	6/10/85	240	Utukok R.	1.5/L	203/204	mG/mG
	18.5	6/26/86	245 ^c	Utukok R.	2.5T/M	254/204	Y/mG
1105F	7.5	6/13/77	225	Kokolik R.	1.5/M	257/256	--
		6/26/77	245	Tupikchak Mtn.	1.5/L	257/256	--
	8.5	6/28/78	285	Kokolik R.	1.7/L	257/301	--
	10.5	7/10/80	260	Iligluruk Cr.	1.8/M	522/521	W/O
	13.5	9/18/83	310	Tupikchak Mtn.	6.0M99/H	3309/3258	W/O
	15.5	8/7/85	185	Tupikchak Mtn.	2.0/M	209/210	W/O
1106F	11.5	6/14/77	210	Adventure Cr.	1.5/H	258/259	--
1107F	0.5	6/14/77	7	Adventure Cr.	None	None	None
1108F	0.5	6/14/77	20	Adventure Cr.	None	/260	/W
1109F	0.5	6/14/77	18	Adventure Cr.	None	261/	W/

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Markings
1110F	24.5	6/15/77	245	Ilingnorak	A/H	262/263	1B/1B
	25.5	7/1/78	--	Ilingnorak	1.9/L	262/263	dB
	26.5	6/30/79	235	Ilingnorak	1.7/H	262/263	--
1111F	14.5	6/18/77	240	Colville R.	1.7/M	269/268	--
1112M	4.5	6/18/77	250	Colville R.	1.7/M	267/266	dB/G
1113F	4.5	6/18/77	150 ^c	Colville R.	1.5/M	270/271	G/dB
1114M	16.5	6/19/77	450	Utukok R.	1.7/L	273/272	O/G/O
1115M	5.5	6/22/77	175	Meat Mtn.	1.5/H	275/274	dB/O
1116M	5.5	6/23/77	175	Utukok R.	1.5/M	276/277	O/dB
1117M	19.5	6/23/77	315	Driftwood Cr.	A/M	279/278	Pp/W/Pp
1118F	17.5	6/23/77	185	Driftwood Cr.	1.3/H	281/280	W/Pp
	24.5	9/14/84	275	Driftwood Cr.	AM99/M	321/322	W/Pp
1119F	6.5	6/24/77	190	N. Meat Mtn.	1.7/L	282/283	O/P
1120M	16.5	6/24/77	390	N. Meat Mtn.	2.6/M	284/285	Pp/lB/Pp
1121F	11.5	6/25/77	245	Kokolik R.	A/H	287/286	--
	18.5	9/17/84	320	Kokolik R.	A/L	383/384	R/Y
1122M	0.5	6/25/77	30	Kokolik R.	0.12/M	/288	/G
1123F	0.5	6/25/77	27	Kokolik R.	0.12/M	289/	G/
1124M	17.5	6/26/77	360	Tupikchak Mtn.	2.6/M	291/290	dB/W/dB
	24.5	9/17/84	390	Tupikchak Mtn.	4.0/L	385/386	Y/Y
1125F	3.5	6/27/77	145	Utukok R.	1.4/H	/292	/W
1126M	13.5	6/28/77	345	Kokolik R.	2.7/M	293/294	O/W/O
1127F	26.5	6/28/77	295	Kokolik R.	1.5/L	295/	P/W/P
1128F	7.5	6/30/77	240 ^c	Tupikchak Mtn.	1.8/M	297/296	P/P/P
1129F	1.5	6/30/77	90	Tupikchak Mtn.	0.5/M	299/298	P/P
1130F	21.5	6/30/77	255	Elbow Cr.	1.9/M	300/900	O/O/O
1131M	8.5	7/1/77	235	Driftwood Cr.	2.5/H	3085/3086	G/O
1132F	2.5	7/2/77	67	Archimedes	--	1498/3082	1B/P
1133M	2.5	7/2/77	80	Archimedes	--	3088/1499	P/1B
	4.5	6/27/79	150	Utukok R.	1.4/M	310/309	P/1B
1134F	14.5 ^c	7/5/77	230 ^c	Utukok R.	2.0/L	3089/3090	O
1135M	17.5 ^c	7/12/80	285	Utukok R.	2.8/H	526/527?	Bk/G
1136M	20.5 ^c	6/20/83	165	Utukok R.	A/H	--	--
1137F	1.5	7/5/77	57	Utukok R.	--	3091/3092	O/O
1138F	1.5	7/5/77	48	Utukok R.	--	3093/	O/
1139F	1.5	7/5/77	58	Utukok R.	--	/3094	/O
1138F	23.5	8/10/77	250	Katangnak Cr.	1.9/M	None	O
	24.5	6/16/78	265	Katangnak Cr.	A/L	759/758	dB/dB/dB
1139F	11.5	6/7/78	200 ^c	Utukok R.	1.3/M	651/654	W
	16.5	6/22/83	180	Utukok R.	3.6M99/M	3226/3229	mG/G
1140M	10.5	6/7/78	21	Utukok R.	None	/655	/O
	11.5	6/7/78	25	Utukok R.	None	657/656	W
	14.5	6/22/83	--	Utukok R.	3.6M99/M	3227/3228	W

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Markings ^b
1141F	0.5	6/7/78	16	Utukok R.	None	655/	C/
	2.5	7/13/80	165	Utukok R.	2.1	532/533	W/O
	6.5	9/16/84	260	Archimedes	2.6/L	397/398	W/O
	7.5	6/5/85	220	Archimedes	1.8/M	397/398	W/O
1142F	14.5	6/9/78	250 ^c	Utukok R.	A/H	658/657	Bk
1143F	9.5	6/9/78	210 ^c	Utukok R.	1.8/H	704/705	1B/W
1144F	1.5	6/9/78	38	Utukok R.	0.4/H	717/718	Pp/G
	8.5	9/4/85	345	Elbow Cr.	A/H	260/261	mG/R
1145F	2.5	6/10/78	95	Elbow Cr.	1.7/H	720/719	1B/G
1146F	14.5	6/10/78	230 ^c	Elbow Cr.	2.5/H	721/722	G/1B
1147M	3.5	6/10/78	205	Utukok R.	1.3/M	723/724	P/G
	5.5	7/10/80	305	Tupikchak Cr.	2.8/H	516/515	P/dB
	9.5	9/15/84	388	Utukok R.	4.0/L	327/328	R/dB
	11.5	6/30/86	395	Kokolik R.	3.2/M	242/243	R/1B
1148M	6.5	6/10/78	205	Utukok R.	1.3/M	725/728	dB/W
1149F	4.5	6/11/78	180	Utukok R.	1.3/M	736/733	W/dB
1150M	5.5	6/16/78	185	Utukok R.	1.2/M	751/747	Bk/P
1151F	3.5	6/16/78	112	Kantangnak Cr.	--	752/753	Bk/Bk
	8.5	6/22/83	165	Plunge Cr.	3.8M99/M	3469/	Bk/
1152M	3.5	6/16/78	142	Kantangnak Cr.	--	754/755	O/Bk
1153F	2.5	6/16/78	70	Kantangnak Cr.	--	756/757	Bk/O
	9.5	6/8/85	185	Utukok R.	1.8/M	215/216	R/O
1154F	12.5	6/21/78	220	Tupik Cr.	1.8/M	760/761	W/O/W
1155M	1.5	6/21/78	75	Tupik Cr.	0.50/M	763/762	G/W
1156F	6.5	6/21/78	205	Kogruk Cr.	2.0/M	765/764	P/Bk
1157M	5.5	6/24/78	210	Driftwood Cr.	A/H	766/767	P/G/P
	6.5	6/30/79	275	Driftwood Cr.	2.4/H	766/767	Bk/P
1158F	7.5	6/24/78	180	Elbow Cr.	1.4/M	769/768	P/W
1159M	10.5	6/24/78	295	Driftwood Cr.	1.7/M	770/771	G/P
	12.5	8/16/80	--	Utukok R.	A/L	535/534	G/P
	15.5	9/16/83	--	Utukok R.	--	--	--
1160M	0.5	7/1/78	25	Ilingnorak	None	303/	dB/
1161M	0.5	7/1/78	21	Ilingnorak	None	/302	/dB
1162M	2.5	7/1/78	95	Iligluruk Cr.	1.1/M	304/305	1B/Bk
1163M	2.5	7/3/78	92	Iligluruk Cr.	A/H	306/307	Bk/1B
1164M	3.5	5/7/79	185	Meat Mtn.	1.3/M	308/311	G/Bk
	4.5	7/6/80	270	Meat Mtn.	1.9/M	512/311	Bk/G.
	8.5	9/18/84	370	Meat Mtn.	4.0/L	584/419	1B/G
	10.5	7/1/86	350	Kokolik R.	2.8/M	510/509	1B/G
1165M	3.5	9/17/79	200 ^c	N. Meat Mtn.	A/H	318/319	G/dB
	8.5	9/14/84	335	Meat Mtn.	AM99/M	332/333	R/W
1166F	10.5	9/18/79	390	N. Meat Mtn.	A/L	284/317	dB/O
	11.5	7/7/80	265	Utukok R.	2.1/H	502/317	1B/O
	14.5	6/22/83	--	Utukok R.	3.6M99/H	3221/3228	mG/1B
	5.5	7/1/86	290	Utukok R.	2.6/M	511/512	1B/O

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Markings ^b
1167F	7.5	9/18/79	235	N. Meat Mtn.	2.8/H	271/315	C/dB
1168F	0.5	9/18/79	55	N. Meat Mtn.	0.60/M	274/296	None
1169F	11.5	7/5/80	290	Kokolik R.	2.2/L	513/514	Bk/dB
1407F	14.5	6/21/83	--	Plunge Cr.	3.8M99/M	3467/3465	mG/Bk
	17.5	9/6/85	360	Kantangnak Cr.	A/M	259/255	mG/Bk
1170F	0.5	7/5/80	34	Kokolik R.	0.10	114/112	dB/
1171M	0.5	7/5/80	32	Kokolik R.	0.10	115/113	Bk/
1172M	11.5	7/6/80	360	Utukok R.	3.2/H	509/508	W/LB
	15.5	9/16/84	400	Archimedes	4.6/H	325/326	W/LB
1173M	0.5	7/10/80	32	Kokolik R.	0.14	525/101	/O
	4.5	5/25/84	120 ^c	Tupikchak Mtn.	1.8M99/H	--	--
	5.5	6/7/85	143	Tupikchak Mtn.	1.5/M	495/496	W/mG
1174F	0.5	7/10/80	28	Kokolik R.	0.14	501/507	O/
	4.5	5/25/84	110 ^c	Tupikchak Mtn.	1.8M99/H	--	--
	5.5	6/7/85	113	Tupikchak Mtn.	1.5/M	222/221	mG/W
	6.5	6/27/86	195	Tupikchak Mtn.	1.8/M	222/293	mG/W
1175M	7.5	7/12/80	400	Iligluruk Cr.	2.6	528/529	LB/LB
1176F	18.5	7/13/80	345	Utukok R.	2.0/M	531/530	G/G
	22.4	9/16/84	280	Archimedes	A/H	399/400	G/B
1177F	1.5	7/10/80	91	Nimwutik Cr.	0.38/L	520/519	G/G
	4.5	9/18/83	195	Utukok R.	4.0M99/M	3262/	O
	6.5	6/10/85	170	Avingak Cr.	1.6/M	233/234	R/LB
	7.5	6/30/86	220	Nimwutik Cr.	1.6/M	389/390	R/LB
1178F	13.5	8/18/80	250	Utukok R.	3.0	540/541	LB/Bk
1179F	2.5	8/18/80	135	Utukok R.	1.4/L	542/543	LB/O
	5.5	6/22/83	--	--	3.8M99/L	3230/3231	dB/mG
	7.5	6/10/85	200	Utukok R.	1.9/L	439/438	LB/mG
1180F	0.5	8/18/80	31	Kokolik R.	0.30/L	/547	/LB
1181F	0.5	8/18/80	34	Kokolik R.	0.40/M	546/	LB/
	3.5	9/15/83	225	Utukok R.	A/H	--	LB/dB
	4.5	5/26/84	145 ^c	Nimwutik Cr.	1.8M99/H	546/-	LB/dB
	5.5	6/6/85	185	Meat Mtn.	A/M	3394/352	LB/dB
1232M	4.5 ^c	9/18/83	190	Utukok R.	6.0M99/M	3399/3317	W/R
1233M	11.5 ^c	9/18/83	430	Kokolik R.	6.0M99/M	3261/3395	dB/O
	13.5 ^c	6/10/85	400	Utukok R.	A/L	207/208	dB/O
1234F	5.5 ^c	9/18/83	280	Utukok R.	6.0M99/M	3253/3400	O/W
	7.5 ^c	6/6/85	200	Utukok R.	2.0/M	3253/594	O/W
1261M	10.5	6/22/83	345	Utukok R.	5.0M99/M	3457/3470	mG/dB
1401M	11.5	5/25/84	370 ^c	Tupikchak Mtn.	6.0M99/H	3042/3403	W/Bk
1402M	3.5	5/25/84	80 ^c	N. Meat Mtn.	3.0M99/H	--	--
	4.5	6/5/85	115	Colville R.	1.2/H	218/217	Bk/dB
	5.5	6/29/86	180	Nuka R.	1.8/M	218/217	Bk/dB
1403F	3.5	5/25/84	95	N. Meat Mtn.	1.0M99/H	3475/3474	W/Bk
	4.5	6/5/85	125	Colville R.	1.2/L	206/205	W/Bk
	5.5	7/1/86	190	Utukok R.	2.6T/M	511/512	W/Bk

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage ^a	Ear tags (left/right)	Markings ^b
1404M	3.5	5/25/84	90 ^c	N. Meat Mtn.	1.0M99/H	3472/3487	Bk/W
	4.5	6/5/85	150	Colville R.	1.2/L	421/420	Bk/W
1405M	7.5	5/26/84	215 ^c	N. Meat Mtn.	2.3M99/H	3047/3043	Bk/O
1406F	10.5	9/13/84	275	Utukok R.	5.0M99/L	324/323	R/mG
1407F	10.5	9/14/84	275	E. Meat Mtn.	AM99/M	334/335	G/O
1408M	10.5	9/15/84	300 ^c	Utukok R.	AM99/M	382/381	O/R
1409M	0.5	9/16/84	31	Archimedes	0.3/H	329/330	O/O
1410F	20.5	9/16/84	265	Archimedes	A/H	336/337	G/O
1411M	7.5 ^c	6/4/85	410	Plunge Cr.	2.4/M	424/425	G/R
1412M	15.5 ^c	6/4/85	360	Ilingnorak	2.4/L	403/404	mG/lG
1413F	9.5	6/8/85	200	Archimedes	1.9/2.0	223/224	lB/lB
1414F	2.5	6/8/85	105	Archimedes	1.4/1.0	213/214	dB/mG
1415F	14.5 ^c	9/5/85	375	Utukok R.	A/L	244/245	lB/O
1416F	8.5 ^c	9/5/85	405	Elbow Cr.	A/L	264/265	G/Bk
1417F	8.5 ^c	9/6/85	355	Spike Cr.	A/L	266/267	mG/mG
1418M	17.5 ^c	9/6/85	425 ^c	Archimedes	A/M	263/262	R/G
1418F	15.5 ^c	6/24/86	240	Squirrel R.	2.6T/M	377/376	Y/Y
1419M	9.5 ^c	6/24/86	415	Squirrel R.	AT/M	--	--
1420M	7.5 ^c	6/25/86	345	Kokolik R.	2.8/M	284/285	dB/W
1421M	13.5 ^c	6/25/86	475	Kokolik R.	3.2/L	347/346	O/lB
1422F	0.5	6/26/86	15	Utukok R.	0.15/L	-/283	-/Y
1423M	0.5	6/26/86	11	Utukok R.	0.15/M	282/-	Y/-
1424F	8.5 ^c	6/27/86	285	Kokolik R.	2.2/L	270/271	R/R
1425F	7.5 ^c	6/29/86	200	Kokolik R.	2.5T/M	350/351	O/dB
1426F	0.5	6/29/86	18	Kokolik R.	0.1/L	-/288	-/Y
1427M	0.5	6/29/86	22	Kokolik R.	0.25/M	289/-	Y/-
1428F	7.5 ^c	6/30/86	240	Utukok R.	3.2T/M	290/291	dB/G
1429M	13.5 ^c	7/2/86	380	Squirrel R.	5.0T/M	508/506	Bk/Bk

^a Dosage in cc of phencyclidine hydrochloride or M99; A denotes multiple injections with unknown effective dosage. Drug effects were as follows:
L = light, M = optimum, H = heavy.

^b Marker designations:

Colors: P, pink; W, white; G, light green; mG, medium green; O, orange; dB, dark blue; lB, light blue; Bk, black; Pp, purple.

Marker types:

One or 2 color combinations were used for ear flags; e.g., O/W is orange in left ear, white in right ear; /G is no flag, left; green, right. Three flag combinations were used in nylon rope collars; e.g., OOW is 2 identical clusters of OOW flags on opposite sides of the collar.

^c Estimate after close examination.

Table 2. Grizzly bear captures in the Brooks Range of Alaska using Sernylan (Phencyclidine hydrochloride) with effective doses rated by month, 1977-86.

Capture date	Bear No.	Sex	Age	Wt. (kg)	Dose (mg/kg)
<u>May</u>					
5/7/79	1164	M	3.5	84	1.55
5/25/77	1082	M	13.5	168	1.28
5/25/77	1083	M	7.5	120	1.67
5/31/77	1088	M	4.5	123	1.63
May captures: $n = 4$, $\bar{x} = 1.53$, $\sigma = 0.032$, $SD = 0.180$					
<u>June</u>					
6/1/77	1089	F	4.5	55	2.73
6/4/77	1092	F	8.5	100	2.20
6/4/85	1083	M	15.5	157	1.66
6/4/85	1089	F	12.5	111	1.80
6/4/85	1411	M	7.5	186	1.29
6/5/77	1095	F	6.5	91	1.65
6/5/77	1096	M	7.5	148	1.76
6/5/77	1097	F	8.5	102	1.76
6/5/85	1097	F	16.5	100	1.70
6/5/85	1141	F	7.5	100	1.80
6/6/85	1234	F	7.5	91	2.20
6/7/78	1139	F	11.5	91	1.43
6/7/85	1105	F	15.5	84	2.38
6/7/85	1173	M	5.5	65	2.31
6/7/85	1174	F	5.5	51	2.94
6/8/85	1153	F	9.5	84	2.14
6/8/85	1413	F	9.5	91	2.09
6/8/85	1414	F	2.5	48	2.92
6/10/77	1089	F	4.5	57	2.98
6/10/78	1147	M	3.5	93	1.40
6/10/78	1148	M	6.5	93	1.40
6/10/85	1177	F	6.5	77	2.08
6/11/77	1100	F	6.5	91	2.63
6/11/78	1149	F	4.5	82	1.59
6/11/85	1099	M	10.5	166	1.93
6/12/77	1104	F	9.5	98	1.63
6/13/77	1105	F	7.5	102	1.47
6/13/77	1082	M	13.5	166	1.39
6/16/78	1150	M	5.5	84	1.43
6/18/77	1111	F	14.5	109	1.56
6/18/77	1112	M	4.5	114	1.49
6/18/77	1113	F	4.5	68	2.21
6/18/78	1102	F	3.5	64	2.19
6/21/78	1154	F	12.5	100	1.80
6/21/78	1156	F	6.5	93	2.15
6/23/77	1116	M	5.5	80	1.89

Table 2. Continued.

Capture date	Bear No.	Sex	Age	Wt. (kg)	Dose (mg/kg)
6/24/77	1120	M	16.5	177	1.50
6/24/78	1158	F	7.5	82	1.71
6/24/78	1159	M	10.5	134	1.27
6/25/77	1082	M	13.5	173	1.56
6/25/86	1420	M	7.5	157	1.78
6/26/77	1124	M	17.5	164	1.59
6/26/79	1099	M	12.5	205	1.46
6/27/78	1099	M	11.5	205	1.37
6/27/79	1133	M	3.5	68	2.06
6/27/86	1174	F	6.5	89	2.02
6/28/77	1126	M	13.5	157	1.72
6/28/78	1096	M	8.5	180	1.56
6/28/79	1082	M	15.5	218	1.48
6/29/86	1402	M	5.5	82	2.20
6/30/77	1128	F	7.5	109	1.65
6/30/77	1130	F	21.5	116	1.64
6/30/86	1147	M	11.5	180	1.78
6/30/86	1177	F	7.5	100	1.60
6/30/86	1428	F	7.5	109	2.94

June captures: $n = 55$, $\bar{x} = 1.870$, $\sigma = 0.198$, $SD = 0.445$

July

7/1/78	1162	M	2.5	43	2.56
7/1/79	1100	F	8.5	100	1.90
7/1/86	1164	M	10.5	159	1.76
7/2/78	1083	M	8.5	164	1.65
7/6/80	1097	F	11.5	136	1.32
7/6/80	1164	M	4.5	123	1.54
7/7/80	1087	F	4.5	93	1.51
7/10/80	1105	F	10.5	118	1.53
7/13/80	1176	F	18.5	157	1.27

July captures: $n = 9$, $\bar{x} = 1.67$, $\sigma = 0.133$, $SD = 0.365$

August

8/8/77	1086	F	16.5	120	1.58
8/10/77	1138	F	23.5	114	1.67

August captures: $n = 2$, $\bar{x} = 1.63$, $\sigma = 0.002$, $SD = 0.045$

September

9/16/84	1081	M	12.5	200	2.00
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^a Excludes captures of cubs and yearlings, and all captures with dosages rated as "light" or "heavy."

Table 3. Grizzly bear captures in the Brooks and Alaska Ranges, Alaska, using Telazol, 1986.

Location ^a	Date of capture	Bear No./sex	Age	Wt. (kg)	Dose (mg/kg) ^b	Induction time/effect ^c
WBR	6/24/86	1418 F	15.5 ^d	109	4.75	-/M
WBR	6/26/86	1104 F	18.5	111	4.49	5/M
WBR	6/26/86	1422 F	0.5	7	4.27	3/L
WBR	6/26/86	1423 M	0.5	5	5.98	3/M
WBR	6/29/86	1425 F	7.5 ^d	91	5.50	2/M
WBR	7/01/86	1403 M	5.5	86	6.07	-/M
WBR	7/02/86	1429 M	13.5 ^d	173	5.76	5/M
AKR	6/13/86	1375 M	6.5	186	4.84	-/L
AKR	6/13/86	1376 F	14.5	130	4.62	-/M
AKR	8/28/86	1377 M	2.5	132	6.07	-/L

^a WBR = Western Brooks Range; AKR = Alaska Range south of Fairbanks.

^b Drugs were administered at a concentration of 200 mg/cc.

^c Time in minutes; effects were estimated as light, L, or moderate, M.

^d Estimate after close examination.

Table 4. Reproductive history and litter size for female grizzly bears in the western Brooks Range, Alaska, 1977-86.^a

Bear No.	Age in 1986 ^b	Reproductive history and litter size ^c									
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1085	23	B	B	NB?	NB	PD	--	--	--	--	--
1086	19	2y1g	2 2yr		2cb/PD	--	--	--	--	--	--
1087	10				NB	B	B	UN	B	B	2cb/B?
1089	13	NB	B	2cb	UN	UN	1cb?	UN	UN	B	2cb
1090	23	3y1g	3 2yr	3 3yr/?B	UN	UN	PD	--	--	--	--
1092	17	1cb	1 y1g	1 2yr	B	B	B	B	B?	B?	B?
1095	15	?B	?B	UN	UN	UN	UN	UN	UN	UN	UN
1097	17	B	B	2cb/B	2cb/B	3cb	3y1g	3 2yr	3 3yr	3 4yr/B	B
1100	15	NB	B	2cb/B	B	UN	UN	UN	UN	UN	UN
1102	11	NB	NB	B	2cb	B	1cb	UN	UN	UN	UN
1104	18	2 2yr/B	1cb/B	1cb	1y1g	1 2yr/B	2y1g	B	2 4yr	2 5yr/B	2cb
1105	16	B	B	1cb/B	2cb	2y1g	2 2yr	2 3yr	2 4yr	2 5yr/B	B
1106	13	3cb	2y1g	2 2yr/D							
1110	28	B	2cb	2y1g	2 2yr	2 3yr/PD	--	--	--	--	--
1111	23	2 4yr/B	B	3cb/B	UN	UN	UN	UN	UN	UN	UN
1118	26	B	2cb	2y1g	UN	UN	UN	UN	UN/B?	B?	B?
1119	15	B	B	UN	UN	UN	UN	UN	UN	UN	UN
1121	20	2cb	2y1g	2yr/B	2cb	UN	UN	UN	UN	B	1cb/B
1127	28	B	UN	PD	--	--	--	--	--	--	--
1128	16	1y1g/B	3cb	UN	UN	UN	UN	UN	UN	UN	UN
1130	26	2cb	1y1g	UN	UN	UN	UN/PD	--	--	--	--
1134	20	3y1g	2 2yr	2-3yr/B?	cb?/B?	B	3cb	B?D	--	--	--
1138	26	2 2yr,	2 3yr,	UN	PD	--	--	--	--	--	--
		1y1g	1 2yr								
1139	18	UN/B	2cb	2y1g	2 2yr/B	3cb	3y1g	2 2yr	B	D	
1141	8					NB	B	UN	UN	R	1cb
1142	22	UN/PO	B	UN	UN	UN	1 2yr?	UN	UN	UN	UN
1143	17	2cb	2y1g	2 2yr	UN	UN	UN	UN	UN	UN	UN
1146	22	1-2y1g	1 2yr	1 3yr/B	UN	UN	UN	UN	UN	UN	UN

Table 4. Continued.

Bear No.	Age in 1986	Reproductive history and litter size ^c									
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1151	11							NPO/NB	UN	UN	UN
1153	10									NPO/E?	2cb?
1154	20	1cb	ylg	1 2yr	1 3yr/B	2cb	UN	UN	UN	UN	UN
1166	17		NPO	B?	B	3cb	ylg	1 2yr/B	B?	B	1cb
1167	14		UN/B	1cb	B	B	B	UN	UN	UN	UN
1169	17		UN	B	2cb	B	2cb	2ylg	2/B	3cb/B?	D
1176	24				UN/B	2cb	ylg	UN	2cb	B	1cb
1177	7							NPO/NB	NB	NB	P
1178	19				1 2yr	1 3yr/B	2cb/B	UN	UN	UN	UN
1179	8									NPO/B	B
1181	6 ^d									NPO/E	2cb/B?
1234	8									B	2cb
1403	5									NB	NPO/B
1406	10								D		
1407	12								NPO	B	2cb/B
1410	22								B	UN	UN
1413	10 ^d									NPO/E	3cb/B?
1415	15 ^d									PO/B?	UN
1416	9 ^d								UN	B	1cb/B?
1417	9 ^d								UN	NPO/B?	B
1424	8 ^d									UN	PO/B
1425	7 ^d								UN	UN/B	2cb/B?
1428	7 ^d									UN	NPO/B

^a Designations are as follows: PO, evidence of previous offspring; NPO, no evidence of previous offspring; UN, unobserved; B, bred during that season; NB, did not breed; D, documented death; PD, presumed dead after intensive search of home range or because of advanced age; cb, ylg, 2yr, 3yr, female accompanied by cub, yearling, 2-year-old, 3-year-old young; cb/B, cubs lost prior to breeding season, subsequent breeding by female; ylg/B, 2yr/B, etc., offspring weaned, then subsequent breeding by female.

Table 4. Continued.

b These ages were determined from cementum annuli during the year of capture, but the ages reported here include years subsequent to the bear's capture. However, in cases of bears known or presumed dead, the data listed represent their ages in the year of their death.

c Litter sizes should be viewed as minimum since mortality to other offspring may have occurred prior to observation.

d Estimate after close examination.

Table 5. Movement of grizzly bears from maternal home ranges subsequent to weaning, western Brooks Range, Alaska, 1977-86.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
1086	1087	F	1979	3 yr when weaned; within maternal home range (MHR)
			1980-86	4-10 yr; within MHR
1086	1164	M	1979	3 yr when weaned; within MHR
			1980	4 yr; within MHR
			1981-83	5-7 yr; unknown
			1984-86	8-10 yr; home range included MHR
1097	1402	M	1985	4 yr when weaned; moved approx. 30 km SE MHR
			1986	5 yr; home range approx. 40 km SE MHR; killed by hunter, September 1986
1097	1403	F	1985	4 yr when weaned; within MHR
			1986	5 yr; within MHR
1097	1404	M	1985	4 yr when weaned; located approx. 64 km W MHR by September 1985
			1986	5 yr; located 64 km WSW MHR October 1986
1104?	1101	M	1977	2 yr when weaned; established restricted home range; killed by adult male 6 October 1977
1104?	1102	F	1977	2 yr when weaned; established restricted home range
			1978-81	3-6 yr; continued using expanded home range which included 1977 range
			1982-86	7-11 yr; unknown
1104	1177	F	1981	2 yr when weaned
			1982-84	3-5 yr; within MHR
			1985	6 yr; moved 42 km N MHR, then returned
			1986	7 yr; within MHR
1105	1173	M	1985	5 yr when weaned; died in MHR fall 1985
1105	1174	F	1985	5 yr when weaned; remained within MHR
			1986	6 yr; within MHR

Table 5. Continued.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
1138	1151	F	1978 1979-82 1983	3 yr when weaned; within MHR 4-7 yr; no sightings 8 yr; 14 km S original capture site
1138	1152	M	1978 1979-84 1985 1986	3 yr when weaned; within MHR 4-7 yr; no sightings 9 yr; 32 km ENE original capture site No sightings
1138	1153	F	1978 1979-84 1985 1986	2 yr when weaned; within MHR No sightings 9 yr; 42 km ENE original capture site No sightings
1139	1140	M	1980	2 yr when weaned; no sightings
1139	1141	F	1980 1981-82 1983 1984-86	2 yr when weaned; remained within MHR 3-4 yr; within MHR 5 yr; no sightings 6-8 yr; used MHR
1143	1144	F	1979 1980-84 1985 1986	2 yr; with mother 3-7 yr; no sightings 8 yr; recapture within MHR 9 yr; killed by another bear, vicinity of MHR
1154	1155	M	1979 1981	2 yr when weaned; no subsequent sighting 4 yr when killed by hunter 45 km W MHR
1178	1179	F	1981 1982 1983 1984 1985 1986	3 yr when weaned; stayed within MHR 4 yr; within MHR 5 yr; moved 100 km S; denned 6 yr; 100 km S MHR; denned 7 yr; returned to MHR; then moved back 100 km S; denned 8 yr; remained 100 km S MHR; denned
Unknown	1133	M	1977 1978 1979	2 yr when weaned; observed 20 km S of capture site 3 yr; observed within 20 km capture site 4 yr; observed within 25 km capture site

Table 5. Continued.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
Unknown	1147	M	1978	3 yr; 1 subsequent sighting 26 km SW capture site
			1979	4 yr; no sightings
			1980	5 yr; 12 km W original capture site
			1981-83	6-8 yr; no sightings
			1984	9 yr; 11 km E original capture site
			1985-86	10-11 yr; remained in vicinity of original capture site

Appendix A. History and status of grizzly bears marked in the western Brooks Range, Alaska study area 1977-86.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1081 M	5	5/24/77	9/17/79	6/29/86	2/1977	Unknown, shed collar 9/5/85- 6/3/86
			7/7/80		3/1979	
			8/15/80		14/1980	
			9/14/84		13/1981	
			9/16/84		5/1982	
					2/1983	
					1/1984	
					4/1985	
					2/1986	
1082 M	13	5/25/77	6/13/77	9/22/81	24/1977	Unknown
			6/25/77		20/1978	
			8/10/77		18/1979	
			6/27/78		3/1980	
			6/28/79		4/1981	
			8/17/80			
1083 M	7	5/25/77	6/2/77	6/29/86	24/1977	Functional collar
			7/2/78		15/1978	
			6/30/79		6/1979	
			5/20/84		16/1980	
			6/4/85		1/1981	
					2/1984	
					5/1985	
					2/1986	
1084 M	7	5/26/77	6/2/77	9/1/84	4/1977	Dead, hunter kill
1085 F	19	5/27/77	--	8/20/80	20/1977	Presumed dead
					14/1978	
					9/1979	
					14/1980	
1086 F	16	5/29/77	6/24/77	7/19/80	33/1977	Presumed dead
			8/8/77		28/1978	
			9/16/79		25/1979	
					13/1980	
1087 F	1	5/29/77	6/30/79	9/30/86	10/1979	Functional collar
			7/7/80		1/1980	
			5/25/84		3/1984	
					6/1985	
					5/1986	

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1088 M	4	5/31/77	--	6/3/79	8/1977 1/1978 2/1979	Unknown
1089 F	4	6/1/77	6/10/77 6/4/85	10/1/86	10/1977 5/1978 1/1979 3/1986	Functional collar
1090 F	18	6/1/77	--	10/12/78	20/1977 17/1978	Presumed dead
1091 M	19	6/4/77	--	10/12/78	19/1977 11/1978	Presumed dead
1092 F	8	6/4/77	8/19/80 6/21/83 9/6/85	7/1/86	20/1977 20/1978 2/1980 5/1981 5/1982 3/1983 1/1984 3/1985 3/1986	Functional collar
1093 F	Cub	6/4/77	--	9/19/78	20/1977 20/1978	Unknown
1094 M	4	6/5/77	--	9/3/83	4/1977	Dead, hunter kill
1095 F	6	6/5/77	--	8/29/78	1/1977 1/1978	Unknown
1096 M	7	6/5/77	6/28/78 6/28/79 8/17/80	9/19/81	23/1977 25/1978 4/1979 7/1980 15/1981	Probable hunter kill
1097 F	8	6/5/77	6/19/77 7/6/80 8/16/80 9/19/83 6/5/85	9/30/86	22/1977 20/1978 15/1979 19/1980 23/1981	Functional collar

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
					13/1982 3/1984 4/1985 5/1986	
1098 M	3	6/8/77	--	7/9/78	2/1977 1/1978	Unknown
1099 M	10	6/11/77	6/27/78 6/26/79 9/20/83	10/26/84	20/1977 31/1978 11/1979 1/1980 1/1983 1/1984	Killed, DLP
1100 F	6	6/11/77	6/9/78 7/1/79	8/20/80	18/1977 13/1978 9/1979 12/1980	Unknown
1101 M	2	6/12/77	--	10/7/77	3/1977	Dead, killed by 1099
1102 F	2	6/12/77	6/18/78	6/14/82	3/1977 12/1978 2/1979 2/1980 6/1981 22/1982	Unknown
1103 M	8	6/12/77	6/12/78 5/8/85	6/30/86	20/1977 6/1978 1/1985 1/1986	Functional collar
1104 F	9	6/12/77	6/17/77 7/10/80 6/22/83 6/10/85 5/26/86	9/30/86	23/1977 17/1978 2/1979 9/1981 24/1982 2/1983 3/1984 7/1985 4/1986	Functional collar

Appendix A. Continued.

Bear No./Sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status fall 1986
	Age	Date				
1105 F	7	6/13/77	6/17/77 7/10/80 6/22/83 6/7/85	11/8/86	23/1977 21/1978 10/1979 5/1980 6/1981 13/1982 2/1984 3/1985 4/1986	Functional collar
1106 F	11	6/14/77	--	5/4/79	23/1977 17/1978 1/1979	Killed by another bear, 1099?
1107 F	Cub	6/14/77	--	4/20/78	23/1977 1/1978	Dead, spring 1978
1108 F	Cub	6/14/77	--	5/4/79	23/1977 17/1978 1/1979	Presumed dead
1109 F	Cub	6/14/77	--	5/4/79	23/1977 17/1978 1/1979	Presumed dead
1110 F	24	6/15/77	7/1/78 6/30/79	5/7/81	2/1977 14/1978 3/1979 11/1980 2/1981	Presumed dead
1111 F	14	6/18/77	--	7/11/79	19/1977 14/1978 2/1979	Unknown
1112 M	4	6/18/77	--	6/24/78	10/1977 1/1978	Unknown
1113 F	4	6/18/77	--	10/5/77	9/1977	Unknown
1114 M	16	6/19/77	--	5/31/79	3/1977 3/1978 1/1979	Unknown Unknown Unknown

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1115 M	5	6/22/77	--	6/27/77	3/1977	Unknown
1116 M	5	6/23/77	--	10/12/78	2/1977	Unknown
1117 M	19	6/23/77	--	6/23/77	1/1977	Presumed dead
1118 F	17	6/23/77	9/14/84	6/29/86	3/1977 1/1978 2/1984 3/1985 1/1986	Functional collar
1119 F	6	6/24/77	--	6/9/78	1/1977 1/1978	Unknown
1120 M	16	6/24/77	--	9/18/78	1/1977 1/1978	Unknown
1121 F	11	6/25/77	9/17/84	11/8/86	21/1977 11/1978 1/1980 1/1984 3/1985 3/1986	Functional collar
1122 M	Cub	6/25/77	--	8/25/78	21/1977 11/1978	Unknown
1123 F	Cub	6/25/77	--	8/25/78	21/1977 11/1978	Unknown
1124 M	17	6/26/77	9/17/84	6/9/85	7/1977 1/1984 2/1985	Unknown
1125 F	3	6/27/77	--	7/1/77	2/1977	Unknown
1126 M	13	6/28/77	--	6/28/77	1/1977	Unknown
1127 F	26	6/28/77	--	7/14/77	2/1977	Presumed dead
1128 F	7	6/30/77	--	8/31/78	3/1977	Unknown

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1129 F	1	6/30/77	--	7/27/77	3/1977	Unknown
1130 F	21	6/30/77	--	8/2/78	1/1977 1/1978	Presumed dead
1131 M	8	7/1/77	--	8/16/78	1/1977 2/1978	Unknown
1132 F	2	7/2/77	--	7/2/77	2/1977	Unknown
1133 M	2	7/2/77	6/27/79	6/2/83	2/1977 1/1978 1/1979	Dead, hunter kill
1134 F	14	7/5/77	7/12/80 6/20/83	6/20/83	18/1977 15/1978 1/1979 3/1980 1/1981 6/1982 3/1983	Dead, eaten by another bear, starved?
1135 M	1	7/5/77	--	5/5/79	18/1977 15/1978 1/1979	Unknown ^a
1136 F	1	7/5/77	--	5/5/79	18/1977 15/1978 1/1979	Unknown ^a
1137 F	1	7/5/77	--	5/5/79	18/1977 15/1978 1/1979	Unknown ^a
1138 F	23	8/10/77	6/16/78	10/27/78	2/1977 5/1978	Presumed dead
1139 F	11	6/7/78	6/22/83	5/25/85	16/1978 13/1979 1/1980 2/1984 1/1985	Dead

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1140 M	Cub	6/7/78	--	7/11/79	16/1978 13/1979	Unknown
1141 F	Cub	6/7/78	7/13/80 9/16/84 6/5/85	9/30/86	16/1978 13/1979 4/1980 8/1981 9/1982 3/1985 4/1986	Functional collar
1142 F	14	6/9/78	--	9/18/78	7/1978	Unknown
1143 F	9	6/9/78	--	7/28/79	2/1978 1/1979	Unknown
1144 F	1	6/9/78	9/4/85	10/1/86	2/1978 1/1979 1/1985 2/1986	Dead, killed by another bear ?
1145 F	2	6/10/78	--	5/4/80	15/1978 5/1979 1/1980	Unknown
1146 F	14	6/10/78	--	5/15/79	15/1978 1/1979	Unknown
1147 M	3	6/10/78	7/10/80 9/15/84 6/30/86	6/3/85	2/1978 1/1984 2/1985	Unknown
1148 M	6	6/10/78	--	9/21/78	8/1978	Unknown
1149 F	4	6/11/78	--	7/17/78	3/1978	Unknown
1150 M	5	6/16/78	--	6/16/78	1/1978	Unknown
1151 F	3	6/16/78	6/22/83	5/18/84	1/1983 1/1984	Unknown, shed collar
1152 M	3	6/16/78	--	10/2/78	2/1978	Unknown

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1153 F	2	6/16/78	6/8/85	8/8/85	2/1985 2/1986	Unknown; possible sighting with 2 cubs 1986
1154 F	12	6/21/78	--	6/9/80	2/1978 1/1979 1/1980	Unknown
1155 M	1	6/21/78	--	9/1/81	2/1978 1/1979	Dead, hunter kill
1156 F	6	6/21/78	--	6/21/78	1/1978	Unknown
1157 M	5	6/24/78	6/30/79	7/11/79	1/1978 2/1979	Unknown
1158 F	7	6/24/78	--	6/24/78	1/1978	Unknown
1159 M	10	6/24/78	8/16/80 9/16/83	9/16/83	2/1978 1/1980 1/1983	Unknown
1160 M	Cub	7/1/78	--	7/1/78	1/1978	Unknown
1161 M	Cub	7/1/78	--	7/1/78	1/1978	Unknown
1162 M	2	7/1/78	7/2/78	7/26/78	2/1978	Dead
1163 M	2	7/3/78	--	7/3/78	1/1978	Unknown
1164 M	3	5/7/79	7/6/80 9/18/84 7/1/86	9/30/86	1/1979 1/1980 1/1984 4/1985 3/1986	Functional collar
1165 M	3	9/17/79	7/13/80 9/14/84	7/1/86	1/1979 1/1980 2/1984 2/1985 3/1986	Functional collar

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1166 F	10	9/18/79	7/7/80 6/22/83	9/30/86	2/1979 1/1980 1/1983 2/1984 2/1985 4/1986	Functional collar
1167 F	7	9/18/79	--	9/18/79	1/1979	Unknown
1168 F	Cub	9/18/79	--	9/18/79	1/1979	Unknown
1169 F	11	7/5/80	6/21/83 9/6/85	5/26/86	1/1980 1/1983 1/1984 3/1985 1/1986	Dead, killed by male bear
1170 F	Cub	7/5/80	--	7/5/80	1/1980	Dead
1171 M	Cub	7/5/80	--	7/5/80	1/1980	Dead
1172 M	11	7/6/80	9/16/84	8/9/85	1/1980 1/1984 2/1985	Unknown, shed collar
1173 M	Cub	7/10/80	5/25/84 6/7/85	6/27/86	1/1980 2/1985 1/1986	Dead
1174 F	Cub	7/10/80	5/25/84 6/7/85 6/27/86	9/30/86	1/1980 1/1984 3/1985 6/1986	Unknown, shed collar
1175 M	7	7/12/80	--	7/12/80	1/1980	Unknown
1176 F	18	7/13/80	9/16/84	9/30/86	2/1980 1/1984 3/1985 3/1986	Functional collar
1177 F	1	7/10/80	9/18/83 6/10/85 6/30/86	9/30/86	2/1980 1/1983 4/1984 5/1985 3/1986	Functional collar

Appendix A. Continued.

Bear No./Sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status fall 1986
	Age	Date				
1178 F	13	8/18/80	--	8/18/80	1/1980 8/1981 22/1982	Unknown
1179 F	2	8/18/80	6/22/83 6/10/85	10/1/86	1/1980 7/1981 1/1983 1/1984 5/1985 2/1986	Functional collar
1180 F	Cub	8/18/80	--	8/20/80	1/1980	Presumed dead
1181 F	Cub	8/18/80	9/15/83 5/26/84 6/6/85	9/30/86	1/1980 1/1983 4/1984 6/1985 6/1986	Functional collar
1232 M	4	9/18/83	--	9/18/83	1/1983	Unknown
1233 M	11	9/18/83	6/8/85 6/10/85	7/1/86	1/1983 1/1985 1/1986	Unknown, shed collar
1234 F	5	9/18/83	6/6/85	6/29/86	1/1983 1/1985 1/1986	Functional collar
1261 M	10	6/22/83	--	6/22/83	1/1983	Unknown
1401 M	11	5/25/84	--	5/25/85	2/1984 2/1985	Unknown
1402 M	3	5/25/84	6/5/85 6/29/86		2/1985 1/1986	Dead, hunter kill
1403 F	3	5/25/84	6/5/85 7/1/86	9/30/86	2/1985 2/1986	Functional collar
1404 M	3	5/25/84	6/5/85	11/8/86	1/1984 2/1985 2/1986	Unknown, shed collar

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1405 M	7	5/26/84	--	5/26/84	1/1984	Unknown, not collared
1406 F	10	9/13/84	--	9/13/84	1/1984	Dead, eaten by another bear
1407 F	10	9/14/84	--	9/30/86	1/1984 3/1985 3/1986	Functional collar
1408 M	10	9/15/84	--	9/15/84	1/1984	Unknown, not collared
1409 M	Cub	9/16/84	--	9/16/84	1/1984	Presumed dead
1410 F	20	9/16/84	--	6/27/86	1/1984 3/1986	Unknown
1411 M	7	6/4/84	--	6/4/85	1/1985	Unknown, not collared
1412 M	15	6/4/85	--	5/5/86	1/1985 2/1986	Dead, hunter kill
1413 F	9	6/8/85	--	7/1/86	2/1985 3/1986	Functional collar
1414 F	2	6/8/85	--	6/8/85	1/1985	Unknown, not collared
1415 F	15	9/5/85	--	9/5/85	1/1985	Unknown
1416 F	9	9/5/85	--	7/1/86	1/1985 3/1986	Functional collar
1417 F	9	9/6/85	--	7/1/86	2/1986	Functional collar
1418 M	17	9/6/85	--	9/6/85	1/1985	Unknown
1420 M	7	6/25/86	--	11/8/86	2/1986	Functional collar
1421 M	13	6/25/86	--	6/25/86	1/1986	Functional collar
1422 F	Cub	6/26/86	--	6/30/86	2/1986	Dead by 9/30/86

Appendix A. Continued.

Bear no./sex	Initial capture		Recaptures	Date of last location	Locations/ year	Status, fall 1986
	Age	Date				
1423 M	Cub	6/26/86	--	6/30/86	2/1986	Dead by 9/30/86
1424 F	8	6/27/86	--	9/30/86	2/1986	Functional collar
1425 F	7	6/29/86	--	11/8/86	3/1986	Functional collar
1426 F	Cub	6/29/86	--	6/29/86	2/1986	Dead by 9/30/86
1427 M	Cub	6/29/86	--	6/29/86	2/1986	Dead by 9/30/86
1428 F	7	6/30/86	--	7/1/86	2/1986	Functional collar

^a One of 1134's 3 offspring (either 1135, 1136, or 1137) disappeared between 9/16/77 and 5/18/78 and is presumed dead. We do not know, however, which 2 of the 3 young survived until 5/5/79.

Appendix B. Observed presence or absence of marked grizzly bears in the western Brooks Range study area, by sex and age class, 1977-86. A = alive, in study area; M = moved from study area; D = dead; PD = presumed dead; FG = with mother in family group; Unk = unknown status.

Bear No.	Age											
	first observed	Age ^a in 1986	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Adult^b Females												
1085	19	23	A	A	A	A	PD					
1086	16	19	A	A	A	A/PD						
1090	18	23	A	A	Unk	Unk	Unk	PD				
1092	8	17	A	A	A	A	A	A	A	A	A	A
1095	6	15	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1097	8	17	A	A	A	A	A	A	A	A	A	A
1100	6	15	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk
1104	9	18	A	A	A	A	A	A	A	A	A	A
1105	7	16	A	A	A	A	A	A	A	A	A	A
1106	11	13	A	A	D	A	PD					
1110	24	28	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk
1111	14	23	A	A	A	Unk	Unk	Unk	Unk	A	A	A
1118	17	26	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1119	6	15	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1121	11	20	A	A	A	A	Unk	Unk	Unk	A	A	A
1127	26	28	A	Unk	PD		Unk	Unk	Unk			
1128	7	16	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1130	21	26	A	A	Unk	Unk	Unk	PD				
1134	14	20	A	A	A	A	A	A	A/D			
1138	23	26	A	A	Unk	PD						
1139	11	18		A	A	A	Unk	Unk	A	A	A/D	
1142	14	22		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1143	9	17		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1146	14	22		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1154	12	20		A	A	A	Unk	Unk	Unk	Unk	Unk	Unk
1166	10	17			A	A	A	A	A	A	A	A

Appendix B. Continued.

Bear No.	Age first observed	Age ^a in 1986	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1167	7	14			A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1169	11	17				A	A	A	A	A	A	A/D
1176	18	24				A	A	A	A	A	A	A
1178	13	19				A	Unk	Unk	Unk	Unk	Unk	Unk
1406	10	10				A				A/D		
1407	10	12								A		A
1410	20	22								A		A
1413	9	10								A		A
1415	14 ^C	15 ^C								A		Unk
1416	8 ^C	9 ^C								A		A
1417	8 ^C	9 ^C								A		A
1424	8 ^C	8 ^C								A		A
1425	7 ^C	7 ^C								A		A
1428	7 ^C	7 ^C								A		A

Young-aged Females

1087	1	10	FG	FG	A	A	Unk	Unk	A	A		A
1089	4	13	A	A	A	A	Unk	Unk	Unk	Unk	A	A
1093	Cub	7	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1102	2	11	A	A	A	A	A	A	Unk	Unk	Unk	Unk
1113	4	13	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1125	3	12	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1129	1	10	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1132	2	11	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1136	1	10	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1137	1	10	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1141	Cub	8		FG	FG	A	A	A	Unk	Unk	A	A
1144	Cub	9	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	A	A/D
1145	2	10	FG	FG	FG	A	Unk	Unk	Unk	Unk	A	Unk

Bear No.	Age first observed	Age in 1986	Age ^a in													
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986				
1149	4	12				Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1151	2	11	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1153	1	10	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1174	Cub	6				FG	FG	FG	FG	FG	FG	FG	FG	FG	FG	
1177	Cub	7			FG		A	A	A	A	A	A	A	A	A	
1179	2	8					A	A	A	A	A	A	A	A	A	
1181	Cub	6					FG	FG	FG	FG	FG	FG	FG	FG	FG	
1234	5 ^c	8														
1403	Cub	5					FG	FG	FG	FG	FG	FG	FG	FG	FG	
1414	2	3														
			Adult ^b Male													
1082	13	22	A	A	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	
1083	7	16	A	A	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	A	
1084	7	14	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	M/D	A		
1091	19	21	A	A	A/D											
1096	7	16	A	A	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	
1099	10	16	A	A	A	A	A	A	A	Unk	Unk	Unk	A/M/D	Unk	Unk	
1103	8	17	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	
1114	16	25	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1117	19	26	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD	Unk	Unk	
1120	16	25	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1124	17	26	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	Unk	Unk	
1126	13	22	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1131	8	17	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1148	6	14		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1159	10	18		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1172	11	17		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	
1175	7	13				A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	

Appendix B. Continued.

Bear No.	Age first observed	Age ^a in 1986	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1233	11 ^C	14 ^C							A	Unk	A	A
1261	10	13							A	Unk	Unk	Unk
1401	11	13								A	A	Unk
1405	7	9								A	Unk	Unk
1408	10	12								A	Unk	Unk
1411	7 ^C	8 ^C									A	Unk
1412	15 ^C	16 ^C									A	A/M/D
1418	17 ^C	18 ^C									A	Unk
1420	7 ^C	8 ^C										A
1421	13 ^C	14 ^C										A

Sub-adult Male

1081	5	14	A	Unk	A	A	A	A	A	A	A	A
1094	4	10	A	Unk	Unk	Unk	Unk	Unk	M/D	Unk	Unk	Unk
1098	3		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1101	2	2	A/D									
1112	4	13	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1115	5	14	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1116	5	14	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1133	2	9	A	A	A	A	A	A	M/D	A	A	A
1147	3	11		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1148	6	14		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1150	5	13		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1152	2	10	FG	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1155	Cub	4	FG	FG	FG	Unk	M/D	Unk	Unk	Unk	Unk	Unk
1157	5	13		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1164	1	10	FG	FG	A	A	Unk	Unk	Unk	A	A	A
1165	3	10			A	A	Unk	Unk	Unk	A	A	A
1173	Cub	5				FG	FG	FG	FG	FG	A/D	A/D

Appendix B. Continued.

1232	4	7				A	Unk	Unk	Unk
1402	Cub	5				FG	FG	A/M	M/D
1404	Cub	5	FG	FG	FG	FG	FG	A/M	M

^a Age determined from cementum annuli. Age reported represents age in 1986 or in year of death or presumed death.

^b Adult bears were 6 or more years old when initially captured.

^c Estimate after close examination.