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ANCHORAGE

Grizzly Bear Population Ecology in the Western Brooks Range, Alaska

By: Harry V. Reynolds, III

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AR-91/04

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Harry V. Reynolds, III

Alaska Department of Fish and Game
1300 College Road
Fairbanks, AK 99701

in cooperation with

U.S. National Park Service
and
Bureau of Land Management

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SUMMARY

An intensive grizzly bear (Ursus arctos horribilis) research effort conducted during 1986-89 was designed to provide information on the role of unhunted productive population reservoirs in providing immigrants for adjacent populations. This central issue will be addressed using long-term data collections on changes in population structure and dynamics, productivity, mortality, movements, and fidelity to maternal home range. The Utukok Uplands of the northwestern Brooks Range contains a grizzly population that was studied intensively from 1977 to 1979 and has been monitored during subsequent years. Including the 91 captures made during 1986-89, 183 individual bears from the area have been handled. Radio contact has been maintained with 21 grizzlies since 1977-78, and 25 bears were monitored from 1977 until their deaths. Sixteen bears have been monitored since they were cubs and 11 of these are now adult females that have been observed consorting with males or have produced offspring. Of 30 reproductively mature females observed in the area in 1989, 15 produced a total of 34 cubs, the highest annual production of cubs recorded in this study. In comparison, 32 adult females were observed during 1986, 30 in 1987, and 31 in 1988; 14 produced 24 cubs in 1986, 8 produced 14 cubs in 1987, and 5 produced 8 cubs in 1988. In contrast, during the 1983-85 period, only 11 young were produced. Survival of cubs during the first year of life was also the highest recorded during 1977-89 with 26 surviving from 13 litters. Mean annual number of cubs which survived their first year during the 1977-88 period was 4.6 cubs/annual cohort, with a range of 0-10. Mean litter size during 1986-88 was 2.00 from 41 litters. Although the population has shown pulses of high potential productivity, it had low realized productivity due to low survival rates of offspring. Twenty-nine of the 46 cubs (64.4%) observed with their mothers died during 1986-88, but only 8 of 34 (23.5%) died during 1989. Four adult females and 1 weaned yearling were killed and eaten by adult males, and 6 other females that died of unknown causes were eaten by other bears. Four bears weaned as yearlings died of apparent starvation in winter dens; a fifth, very emaciated, was killed by another bear after it emerged from the den. Fourteen young-aged females were followed subsequent to weaning; 12 or 13 remained in the vicinity of their mother's home range. Seven young-aged males stayed within their maternal home ranges for 1-2 years after weaning, 3-4 left the year they were weaned, and only 3 were observed within the area after 5 years. Additional measures of

the degree of immigration, emigration, and fidelity to maternal home ranges will be determined from analysis of genetic relationships within the population. Samples for genetic investigations were collected during 1988-89 and will be analyzed using genetic fingerprinting techniques.

I. BACKGROUND

During 1989, research studies of the population ecology of grizzly bears in the western Brooks Range of Alaska continued. The basic rationale and direction of the study remains the same as reported for the 1986-88 seasons and is included here for purposes of better understanding. This report includes progress made in data collection and updating of the most important findings to date. References which have become available since 1986 will be included in the final report.

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 populations throughout North America and the world have been particularity susceptible to loss of habitat and effects from human activities because of their low productive capacities, relatively sparse distribution, and wide-ranging movements.

Grizzly bears inhabiting Alaska's North Slope 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 aspects of population dynamics which would be more difficult to analyze 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 was determined in 1978 after 2 years of an intensive capture and marking program. From 1979 to the present, we have continued to monitor marked animals in the area and been able to maintain a reasonable sample of marked bears by recapturing bears in years when funds were available. We have collected data for 13 years on the movements, home ranges, survival, and reproduction of individual 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 young 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, both in and adjacent to these areas.

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, 1987; Reynolds and Hechtel 1984a,b). These studies, however, were largely descriptive or were of relatively short duration (2-3 years). Grizzlies do not mature until 4 to 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; Reynolds and Hechtel 1984b; Bunnell and Tait 1980; Knight and Eberhardt 1985). Though long-term studies are necessary for understanding and accurately predicting grizzly bear population dynamics and responses to changing patterns of human use, none have been completed and few are presently ongoing in Alaska.

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 declines, 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 patterns of den selection by adult females in relation to production and survival of offspring.

III. STUDY AREA

The 5,200 km^2 study area lies in the mountains and foothills of the western Brooks Range. The approximate boundaries of the study area were: Archimedes Ridge ($69^{o}10'$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 ($160^{o}15'$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 spp.) was the predominant vegetative type in the area. In addition, wet sedge meadow communities were found on poorest drained sites and Dryas spp. or fellfield communities on ridge slopes and mountains. Patches of willows (Salix spp.) 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 darted from helicopters with dart guns using immobilizing drugs Telazol (50% tiletamine and 50% zolazepam, A. H. Robins Co., Richmond, Va.; or Zoletil 100; Reading Laboratories, L'Hay les Roses, France), Sernylan (phencyclidine hydrochloride, Bio-Ceutic Laboratories, St. Joseph, Mo.), or M-99 (etorphine hydrochloride, D-M Pharmaceuticals, Inc., Rockville, Md.). Acepromazine maleate (Ayerst Laboratories, New York, N.Y.) was used as a tranquilizer in conjunction with Sernylan injections. Ivermectin (22,23-dehydroavermectin B1, Merck, Sharp, and Dohme, Rahway, N.J.) was used to treat bear lice infestations on 3 bears during 1988.

All bears captured were measured and weighed, marked with individually coded ear flags visible from the air, and in selected instances fitted with radiocollars (Telonics, Mesa, Ariz.). Offspring which accompanied their mothers were usually 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 bears fitted with transmitters or observing bears during 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 first 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, "offspring" were defined as those bears in cub, yearling, and 2-year-old cohorts, comprised of bears usually accompanied by their mothers; "young-age" bears, as those 3 to 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.

During 1988, tissues were collected for analysis of genetic relationships within the population and among other Alaskan populations. Tissues collected for analysis included whole blood, serum, ear cartilage (from ear tag holes),

and a 3 x 6 mm muscle sample. Muscle samples were collected from a 2 cm incision in the belly of the forearm muscles and placed in liquid nitrogen within 10 min. On the advice of a veterinarian, the incision site was chosen to facilitate drainage and rapid healing; antibiotics were applied.

During 1989, samples were collected for genetic fingerprinting tests, which can be conducted using whole blood rather than muscle tissue. Genetic sample material from 1988, as well as some samples from other years, may be usable for this process.

Some mortalities were directly observed but others were assumed. Because 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

Logistical Considerations

The degree of success in accomplishing the objectives in this study and the validity of findings is dependent upon achieving 2 related goals: (1) long-term continued annual observation of individual grizzly bears in the population, and (2) maintaining representative samples by equal capture effort throughout all portions of the study area. When the present research effort was proposed, the project was based at Driftwood, an airstrip on the banks of the Utukok River, 5 km downstream from its confluence with Driftwood Creek. Driftwood was located in the approximate center of the study area and was ideally situated for access to all portions of the study area. Unfortunately, changing river channels and flooding of the Utukok River in 1985 and 1986 made

the airstrip unsuitable for landing planes carrying aircraft fuel. As a result, the logistical efforts were based at Eagle Creek, an airstrip on a tributary of the Kukpowruk River. Although the southwestern edge of the study area was 40 km from this site, the northeastern corner was 175 km distant. This resulted in less efficient and therefore more expensive achievement of goals which require the capture or monitoring of bears. Similarly, problems with weather affected our efforts for equal capture in all portions of the study area. In 1986, late snow storms hampered capture and monitoring efforts. In 1987, 35-50 mph south winds grounded aircraft for 3 days and reduced their availability by that amount. In 1988, high north winds precluded working in the southern quarter of the area for much of the capture period and even on the leeward side of ridges during the last 2 days that we were present. During 1989, weather conditions were conducive to capture, but the helicopter had mechanical problems which resulted in our losing 3 working days. The logistical problems of remoteness and weather have affected our efficiency but, at the same time, similar problems have kept hunting and other human impacts to the bear population in this area at a minimum. The quality of the long-term data remains high and has allowed us to improve our understanding of population dynamics. Sampling inconsistencies resulting from these logistical problems can be addressed by future data collection.

Immobilization Drugs

During 1986, we began using the experimental drug Telazol as a substitute for Sernylan or M99 to immobilize bears. Sernylan was no longer manufactured and difficult to obtain, and M99 had undesirable side effects. We have continued to use Telazol since then because, like Sernylan, it provides a wide tolerance of safe use for grizzly bears. Its effects are similar to Sernylan in terms of thermoregulation, heart rates, and respiration rates; major advantages of its use were that both induction and recovery times were shorter than Sernylan. Data on the use of Telazol in 1986-87 are included in a paper submitted to the Journal of Wildlife Management by Taylor et al. (1989). Records of Telazol use to immobilize grizzlies in this study area during 1986-89 are included in Appendix A.

Further experience with using Telazol for immobilization of grizzly bears indicates that dosages of 8-9 mg/kg are preferable to dosages of <8 mg/kg.

The possible exception for use of higher dosages would be on bears very recently emerged from dens or for females with cubs of the year during May-early June. Use of higher dosages results in shorter induction times, and thus less stress on the bear, without substantially increasing the length of time that a bear is under the effects of the drug. Body temperature is usually less elevated as well because bears do not tend to run as far before induction. Heavier doses seem to only increase the down time from approximately 50 min to 60-65 min. No other side effects of the heavier dosages were observed.

Captures

During 1986-89, 91 individual bears were captured in the study area a total of 111 times (Table 1). Of those, 42 were males and 49 were females; 60 had not been previously captured, but 22 were offspring of previously marked bears. Of the 83 bears which were originally captured in 1977-78, contact has been maintained until at least 1986 for 21 bears and until the time of their deaths for another 25 bears (Table 2). In addition, we have maintained contact with 16 bears from the time they were first observed with their mothers; 11 females which were originally captured with their mothers have either produced their own offspring or been observed consorting with adult males.

Since the study began in 1977, 183 individual bears have been captured. Of those, 114 were captured only once, 50 were captured 2-3 times, and 21 were captured $\geq$4 times, for a total of 335 captures (Appendix B). Bears which were captured during the last 4 years were much less likely to be captured more than once because collar replacement for adults is only necessary every 3-4 years. Of the 335 captures, no capture-related mortalities could be substantiated. Although it is possible that 3 mortalities could have occurred, the evidence is equivocal.

Of the 3 possible capture-related mortalities, one bear was found dead of unknown causes 16 km from the capture site 10 days after capture. Another, immobilized with an apparent optimal dose of M99 and observed recovered following administration of the antagonist, was found dead 12 km from her capture site during her next location observation 11 months later. The third possible capture-related mortality may have occurred when a female and her 3

cubs were captured and 1 of the cubs was not observed with the family group 2 days following the capture. The cub may have become disoriented and been separated from the family group during recovery from immobilization. However, this cub was unusually small, 5.4 kg compared with 9.1 kg for her 2 siblings, and therefore may have been even more likely to die from natural causes. Observed cub mortality rate in the study area during that period, 1986-88, was 64% (see Mortality section).

Morphometrics

Weights and measurements were collected from all bears captured. Data from this study area were included in an analysis of sexual differences in growth and weight of northern grizzly bears (Kingsley et al. 1988; Appendix C). Further analysis of morphometric relationships, especially those between weight and heart girth, is being prepared for publication (Mastellar et al., in prep.).

Population Size

During the 1977-79 period, population size in the study area was estimated at 119 using the direct count method (Reynolds 1980, Reynolds and Hechtel 1984b). For comparative purposes, the same method will be used to estimate population size in 1991 or 1992. This method may be more useful in this study than in most others because of (1) the long-term effort to maintain contact with individual marked bears, (2) the likelihood, over 13 years, of marking most resident bears in the study area, including breeding bears and family groups, and (3) the lack of cover in this Arctic habitat, compared with other physiographic regions, making location and capture of bears much more likely. Capture of a representative sample size sufficient to calculate population size using the same direct count technique employed during 1977-78 will not be completed for at least another year. Nevertheless, we recognize a number of biases inherent in this method of estimating population size; for instance, it is not possible to calculate a variance because 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, estimates of population size and density will be calculated using other techniques for comparative purposes.

Population Structure

Eighty-one individual males and 100 females have been captured in the study area since 1977 (Table 1). These figures probably do not reflect sexual structure of this unhunted population, but final analysis will not be completed until capture effort is completed. Sex and age structure of captured bears and of the population at the beginning and end points of the study will be presented in the final report. 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 most offspring which died while under maternal care was unknown.

Genetics

As the first step in determining familial relationships of individuals of unknown lineage or family background, tissues were collected during 1988 for genetic analysis from most bears except cubs. Genetic matrilineal relationships will be determined from electrophoretic analysis of mitochondrial DNA by Fred Allendorf and Kathy Knudsen of the University of Montana. Several sample sets from mother and offspring family groups were collected to serve as controls. Samples were also collected from grizzlies in other areas of Alaska for comparative purposes (Knudsen et al., in prep.).

A more useful genetic technique, for purposes of this study, may be genetic fingerprinting. This technique utilizes both genomic and mitochondrial DNA to determine an individual genetic fingerprint and may allow determination of matrilineal, patrilineal, and sibling relationships within the population. Using this information, it should be possible to determine not only familial relationships within the population, but also measures of immigration, emigration, and the importance of reservoir populations. Observed intraspecific relationships, including membership in family groups, and

breeding partners should help provide control data for these investigations (Appendix C). Genetic fingerprinting of bears in this population will be determined and analyzed by Dr. Ernest Vyse and Lance Craighead of Montana State University, using collections from both past and future samples (Appendix D).

Productivity

During 1989, 31 potentially productive females 6 or more years of age were present in the study area (Tables 3, 4). Of these, 16 were observed with cubs of the year, 6 were observed with older offspring, and 9 may have bred during 1988 but were not seen with cubs in 1989. Of the 9 which did not produce cubs in 1989, 3 were mature and bred but did not have cubs which survived until late May, 2 were not observed until mid-June and may have produced cubs but lost them, 1 was young and may not have actually been reproductively mature, and the status of 3 was unknown in 1988 so they may not have bred.

For comparison, during 1988, 31 potentially productive females 6 or more years of age were observed in the study area (Tables 3, 4). Of these, 5 were observed with cubs of the year, 6 were observed with older offspring, and 20 may have bred during 1987 but did not produce cubs in 1988. Of the 20 which did not produce cubs in 1988, 6 were mature and bred but did not have cubs, 5 were young and may not have actually been reproductively mature, 2 lost cubs in 1987 and may not have subsequently bred, the status of 5 was unknown in 1987, and 2 were found dead, probably killed by adult males (which would have likely killed the cubs as well).

For annual comparison, during 1987, 30 potentially reproductively mature females were observed in the study area (Table 3). Of these, 9 were accompanied by cubs of the year, 5 were with older offspring, and 16 may have bred during 1986 but did not produce cubs in 1987. Of the 16 which did not produce cubs in 1987, 4 were mature and bred but did not have cubs, 4 were young and may not have actually been reproductively mature, 3 lost cubs in 1986 and may not have subsequently bred, the status of 4 was unknown in 1986, and 1 was found dead, probably killed by an adult male.

Similarly, during 1986, a minimum of 32 potentially reproductively mature females were present in the study area. Of these, 15 were accompanied by cubs of the year, 2 had older offspring, 4 bred during 1985 but did not produce cubs in 1986, 6 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. Four others were known to have bred during 1986 because they produced cubs in 1987; however, they were not observed in 1986 and may have also weaned offspring or produced cubs which died.

More females were observed with cubs during 1986-88 than in any other 3-year period since the study was initiated (Tables 3, 4). During 1989 this trend continued when 15 females were observed with 34 cubs. This is the highest number of females with cubs observed during the study. Although there may be several plausible explanations for this observation, it is most likely the result of the availability of microtines during a high population cycle in 1986, access to caribou (Rangifer tarandus) of the steadily increasing Western Arctic Caribou Herd, and moderate weather patterns. During 1983-85, 8, 13, and 18 adult females were observed in each respective year, but only 0, 2, and 9 young were produced. This pattern of low production 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 24 females which produced cubs that were observed during 1986-88 had a mean litter size of 1.88 cubs/litter; however, mean litter size in 1989 was 2.27 (Table 3, 4). Including data from 1989 with that of 1986-88 results in a total production for the period of 41 litters of a mean size of 2.00 cubs per litter by 31 individual females. 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.

The number of cubs observed emerging from natal dens represents potential production by the population of adult females (Table 5) because there is a high mortality rate among cubs. On the other hand, the number of offspring which are weaned by the adult female segment of the population represents realized productivity (Table 6). During the 1986-89 period, the observed potential production of the population was at least 84 cubs, but the observed realized production of weaned bears was only 17 offspring. Although the high production of cubs in 1989 may result in reduction of this disparity between potential and realized productivity, continued high production and survival will be necessary before present patterns will change. Furthermore, of the 6 offspring which were weaned as yearlings, only one survived winter denning and it was killed by another bear within a month after emergence from the den. This attrition illustrates that even the number of weaned offspring is not a good measure of recruitment into the population.

During 1977-88, 141 offspring were observed accompanying their mothers. Of these, only 22 were known to still be alive in 1988 (9 were with their mothers in 1988), the status of 48 was unknown, and 71 were known dead or presumed dead (Table 7). By 1989, these measures changed because of the large 1989 cohort; however, the patterns were similar. Of 165 offspring observed with their mothers during 1977-89, only 35 were still alive in 1989 (27 were with their mothers), the status of 47 was unknown, and 83 were known or presumed dead.

The availability of calving caribou is related to the productivity of the grizzly bear population in this area (Reynolds and Garner 1987). The Western Arctic Caribou Herd continues to grow and contained an estimated 340,000 caribou in 1987 (ADF&G files). Although the location of the core calving grounds may shift from year to year, it is usually located north of the study area. Availability of calving caribou to bears varies annually and is difficult to quantify; however, as the herd grows, it is logical to expect that calving will take place over a wider area and be more available. Subjectively, it appeared that in 1986, 1987, and 1989 the presence of calving caribou in the area was about average. In 1988, caribou calved northeast of the study area, but the number of yearlings and adults which died during migration to the calving grounds seemed much higher than usual. In the past,

it has been unusual to observe dead caribou unscavenged by grizzlies, but during 1988 they were often seen. In addition to this food source, cyclic microtine populations were high in the study area in 1986 and 1987 and were heavily utilized by bears.

Survival and Mortality

During 1986-89, 56 mortalities were observed in the study area; 18 in 1986, 16 in 1987, 10 in 1988, and 12 in 1989. This compares with 43 or an average of 6.1 determined during the 1977-83 period (Reynolds and Hechtel 1984b). Fourteen of the 56 mortalities were adult bears. Observations indicate that 4 adult females and 1 weaned yearling were killed and eaten by adult male grizzlies; 1 very thin 2-year-old, which had been weaned as a yearling, was killed by another bear of unknown sex; 6 were eaten by other bears, but the causes of their deaths were unknown. Four bears from 2 litters which had been weaned as yearlings died in their dens, apparently from starvation. Hunters killed 3 bears and 1 apparently died in a rock-slide. At least 29 of the 45 cubs (64.4%) born in 1986-88 died during the period, an expected pattern because 44.1% of cubs died during the 1977-83 period (Reynolds and Hechtel 1984b). In 1989, however, only 8 of 34 cubs were known to have died, a mortality rate of 24%.

Movement Patterns and Fidelity to Home Range

The fidelity of young-aged bears to their maternal home ranges varied (Table 8). Females appear to be more likely to stay within the area of their mother's home range than do males. Of 14 young-aged females which we followed subsequent to weaning, 12 or 13 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. In 1987, she spent midsummer near the Noatak River, but moved to her maternal home range in the spring and fall, apparently denning there. She was observed with a cub there in May 1989, but her radiocollar was apparently not functioning when subsequent relocations were attempted. 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.

Only 3 young-aged males were observed within the vicinity of their maternal home ranges for 5 years subsequent to weaning. Seven others, observed within their maternal home ranges the year in which they were weaned, died from starvation in their dens during the following winter, were killed by other bears, or died from other causes. In addition, 3 or 4 other young-aged males left their maternal home ranges the same year they were weaned.

Fidelity to maternal home ranges was not known for 28 weaned offspring (7 males, 6 females, 15 of unknown sex) because they were either not fitted with radiocollars or could not be located. Twelve of these were weaned during 1988-89 and so are more likely to be captured in the future than those weaned prior to 1987. However, because mortality appears to be high during the first year following weaning, many of these young bears may no longer be alive. Certainly, there are biases in our collection of data on fidelity to maternal home ranges because we are more likely to determine whether bears stay in the study area than if they leave.

Due to fluctuations in productivity and survival of offspring, patterns of fidelity to maternal home ranges have only been determined for bears in the population prior to 1986. Opportunities to monitor movements of recently weaned offspring have been minimal during the 1986-89 period. No offspring were weaned by radio-monitored females in 1986; 3 yearlings were weaned during 1987, but all of them died. During 1988, contact with 2 females accompanied by 6 3-year-olds was lost prior to weaning. Similarly, during 1989, 2 2-year-olds were weaned before they could be captured. Collection of additional movement data from recently weaned offspring will be important to improve our understanding of dispersal by young bears in this population. If survival of the cubs born in 1989 continues to be high, up to 28 2- or 3-year-olds may be weaned during 1991 and provide an opportunity to determine patterns of dispersal and fidelity to maternal home ranges. In addition, determination of parental lineage using genetic fingerprinting should provide a much more complete picture of fidelity to maternal home ranges and immigration rates into the area.

The knowledge of an individual bear's presence or absence in the study area (Tables 2, 9) is based on observations of that bear. Most of these

observations are of radio-collared or recently marked bears; causes of unknown presence in the area include instances of collar malfunction, unsuccessful or incomplete searches of home ranges, ear-marker loss, death, or emigration. The fact that a bear's residency in the area is unknown should not be construed as evidence that the bear is not present until thorough searches of the bear's home range can be made in several successive years. At least 26 bears which were not observed for periods of 2-9 years were later recaptured within the study area. Patterns of adult fidelity to the home ranges within the study area will be addressed more fully in future reports.

Denning

Patterns of den selection by grizzlies in the study area will be analyzed in future reports.

VI. CONCLUSIONS

In 1986, research was begun to relate demographic changes which have occurred in a western Brooks Range grizzly bear population since 1977-79 to long-term rates of productivity, survival, emigration, and immigration. These investigations should enhance insight into the population reservoir concept and provide the information necessary to improve current grizzly bear population dynamics models used throughout North America. 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. Population dynamics, fidelity to maternal home range, survival and movement patterns of young-aged bears, realized population productivity, and determination of genetic lineage investigations should be emphasized during the next 3 years. More capture effort should be directed toward the eastern portions of the study area during 1990-92 so that the capture sample will be more representative of the entire area; therefore, population sex and age structure should be determined in 1992. The use of genetic "fingerprinting" may allow the determination of familial relationships of individuals of unknown lineage or family background within the population;

furthermore, it could provide another means of determining the fate of unmarked offspring of marked bears.

VII. ACKNOWLEDGMENTS

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Table 1. Capture and marking characteristics of 184 grizzly bears in the western Brooks Range, Alaska, 1977-89.

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	5/24/77	175	Utukok R.	2.6/H	889/890	P/O
	7	9/17/79	430	N. Meat Mtn.	A/M	17827/17826	P/O
	8	7/7/80	380	Disappoint-ment Cr.	2.8	504/503	P/O
		8/15/80	400	Utukok R.	3.0/L	504/503	P/O
	12	9/14/84	--	Utukok R.	1.8M99/L	504/503	P/O
		9/16/84	440	Utukok R.	4.0/M	338/339	lB/R
	15	6/19/87	360	Driftwood Cr.	6.0T/M	565/564	lB/R
	17	6/15/89	415	Elbow Cr.	6.5/M	128/129	lB/R
1082M	13	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	6/27/78	425	Kokolik R.	2.8/L	892/893	Bk
	15	6/28/79	480	Kokolik R.	A/M	313/312	--
	16	8/17/80	520	Kokolik R.	5.0/L	538/539	dB/P
	23	6/18/87	370	Utukok R.	5.2T/H	554/555	W/R
1083M	7	5/25/77	265	Utukok R.	2.0/M	894/895	plaque
		6/2/77	--	Utukok R.	2.6/L	894/895	Bk
	8	7/2/78	360	Utukok R.	2.7/M	894/895	Bk
	9	6/30/79	355	Utukok R.	3.4/H	894/	--
	14	5/26/84	360[c]	Meat Mtn.	1.8M99/M	3350/3319	dB/lB
	15	6/4/85	345	Utukok R.	2.6/M	422/423	dB/lB
1084M	7	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	5/27/77	280	Meat Mtn.	A/L	899/898	--
1086F	16	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	9/16/79	400[c]	N. Meat Mtn.	A/L	205/206	--
1087F	1	5/29/77	31	Meat Mtn.	0.13/M	207/208	/G
	3	6/30/79	170	Meat Mtn.	1.1/M+	314/208	Bk/
	4	7/7/80	205	Meat Mtn.	A/M	506/505	lB/Bk
	8	5/25/84	220[c]	Meat Mtn.	2.0M99/M	3195/3237	lB/Bk
	13	6/19/89	220	Seismo Cr.	3.5/M	208/209	lB/Bk
1088M	4	5/31/77	270	Eskimo Hill	2.0/M	210/209	--
1089F	4	6/1/77	122	Adventure Cr.	A/M	214/213	--
		6/10/77	126	Adventure Cr.	1.7/M	243/240	W/W
	12	6/4/85	245	Adventure Cr.	2.0/M	401/402	W/W
	15	6/28/88	277	Tupik Mtn.	3.8T/M	416/415	W/W
1090F	18	6/1/77	220	Utukok R.	A/H	215/216	--
1091M	19	6/4/77	350	Utukok R.	3.0/H	217/218	--

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage[a]	Ear tags (left/right)	Marking[b]
1092F	8	6/4/77	220	Ilingnorak	2.2/M	227/226	--
	11	8/19/80	320	Ilingnorak	4.0	549/548	O/G
	14	6/21/83	--	Ilingnorak	3.8M99/M	3389/3466	O/G
	16	9/6/85	375	Ilingnorak	A/L	356/357	O/G
1093F	Cub	6/4/77	38	Ilingnorak	0.1/M	228/229	lB/
1094M	4	6/5/77	175	Meat Mtn.	2.0/H	225/230	lB/dB
1095F	6	6/5/77	200	N. Meat Mtn.	1.5/M	231/233	O/W
	16	6/24/87	220	Thunder Cr.	3.6/M	596/597	Y/Y
	18	6/15/89	245	Colville R.	4.5/M	137/138	Y/Y
1096M	7	6/5/77	325	Meat Mtn.	2.6/M	236/237	--
	8	6/28/78	395	Utukok R.	2.8/M	774/775	lB
	9	6/28/79	--	N. Meat Mtn.	A/H	774/893	/lB
	10	8/17/80	505	Meat Mtn.	4.2/L	536/537	O/lB
1097F	8	6/5/77	225	Meat Mtn.	1.8/M	235/234	--
		6/19/77	--	Utukok R.	1.4/M	235/234	--
	11	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	9/19/83	305	Utukok R.	5.0M99/M	3236/3480	Bk/P
	16	6/5/85	220	Colville R.	1.7/M	432/433	Bk/R
	18	5/25/87	240[c]	Utukok R.	3.2T/M	594/429	R/Bk
	20	6/23/89	310	Utukok R.	3.8T/M	371/429	R/Bk
1098M	3	6/8/77	108	Utukok R.	1.2/H	238/239	O/lB
	14	6/23/89	500	Utukok R.	6.0T/M	-/-	O/O
1099M	10	6/11/77	365	Utukok R.	3.2/M	245/244	--
	11	6/27/78	450[c]	Kokolik R.	2.8/M	773/772	--
	12	6/26/79	450	Utukok R.	3.0/M	773/772	--
	16	9/20/83	495	Utukok R.	6.0M99/H	3238/3485	R/R
1100F	6	6/11/77	200	Meat Mtn.	2.4/M	247/246	--
	7	6/9/78	240[c]	Utukok R.	2.5/H	247/246	P
	8	7/1/79	220	Driftwood Cr.	1.9/M	247/246	P
1101M	2	6/12/77	145	Utukok R.	1.2/L	249/248	G/W
1102F	2	6/12/77	125	Utukok R.	1.2/L	251/250	W/G
	3	6/18/78	140	Utukok R.	1.4/M	251/250	--
	5	8/18/80	210	Kokolik R.	3.0	544/545	W/G
1103M	8	6/12/77	320	Utukok R.	2.6/H	253/252	--
	9	6/12/78	--	Utukok R.	A/H	253/252	--
	16	6/8/85	430	Utukok R.	2.4/L	202/201	O/mG
	21	6/29/88	556	Kokolik R.	6.0T/M	497/498	lB/R
1104F	9	6/12/77	215	Utukok R.	1.6/M	255/254	--
		6/17/77	--	Utukok R.	1.2/L	255/254	--
	12	7/10/80	250	Nimwutik Cr.	1.5/L	517/518	P/G
	15	6/22/83	190	Nimwutik Cr.	3.8M99/M	3468/3471	G/G
	17	6/10/85	240	Utukok R.	1.5/L	203/204	mG/mG
	18	6/26/86	245[c]	Utukok R.	2.5T/M	254/204	Y/mG

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage[a]	Ear tags (left/right)	Marking[b]
1105F	7	6/13/77	225	Kokolik R.	1.5/M	257/256	--
		6/26/77	245	Tupikchak Mtn.	1.5/L	257/256	--
	8	6/28/78	285	Kokolik R.	1.7/L	257/301	--
	10	7/10/80	260	Iligluruk Cr.	1.8/M	522/521	W/O
	13	9/18/83	310	Tupikchak Mtn.	6.0M99/H	3309/3258	W/O
	15	6/7/85	185	Tupikchak Mtn.	2.0/M	209/210	W/O
1106F	11	6/14/77	210	Adventure Cr.	1.5/H	258/259	--
1107F	Cub	6/14/77	7	Adventure Cr.	None	None	None
1108F	Cub	6/14/77	20	Adventure Cr.	None	/260	/W
1109F	Cub	6/14/77	18	Adventure Cr.	None	261/	W/
1110F	24	6/15/77	245	Ilingnorak	A/H	262/263	1B/P/1B
	25	7/1/78	--	Ilingnorak	1.9/L	262/263	dB
	26	6/30/79	235	Ilingnorak	1.7/H	262/263	--
1111F	14	6/18/77	240	Colville R.	1.7/M	269/268	--
1112M	4	6/18/77	250	Colville R.	1.7/M	267/266	dB/G
1113F	4	6/18/77	150[c]	Colville R.	1.5/M	270/271	G/dB
1114M	16	6/19/77	450	Utukok R.	1.7/L	273/272	O/G/O
1115M	5	6/22/77	175	Meat Mtn.	1.5/H	275/274	dB/O
1116M	5	6/23/77	175	Utukok R.	1.5/M	276/277	O/dB
1117M	19	6/23/77	315	Driftwood Cr.	A/M	279/278	Pp/W/Pp
1118F	17	6/23/77	185	Driftwood Cr.	1.3/H	281/280	W/Pp
	24	9/14/84	275	Driftwood Cr.	AM99/M	321/322	W/Pp
1119F	6	6/24/77	190	N. Meat Mtn.	1.7/L	282/283	O/P
1120M	16	6/24/77	390	N. Meat Mtn.	2.6/M	284/285	Pp/1B/Pp
1121F	11	6/25/77	245	Kokolik R.	A/H	287/286	--
	18	9/17/84	320	Kokolik R.	A/L	383/384	R/Y
1122M	Cub	6/25/77	30	Kokolik R.	0.12/M	/288	/G
1123F	Cub	6/25/77	27	Kokolik R.	0.12/M	289/	G/
1124M	17	6/26/77	360	Tupikchak Mtn.	2.6/M	291/290	dB/W/dB
	24	9/17/84	390	Tupikchak Mtn.	4.0/L	385/386	Y/Y
1125F	3	6/27/77	145	Utukok R.	1.4/H	/292	/W
1126M	13	6/28/77	345	Kokolik R.	2.7/M	293/294	O/W/O
1127F	26	6/28/77	295	Kokolik R.	1.5/L	295/	P/W/P
1128F	7	6/30/77	240[c]	Tupikchak Mtn.	1.8/M	297/296	P/P/P
1129F	1	6/30/77	90	Tupikchak Mtn.	0.5/M	299/298	P/P
1130F	21	6/30/77	255	Elbow Cr.	1.9/M	300/900	O/O/O
1131M	8	7/1/77	235	Driftwood Cr.	2.5/H	3085/3086	G/O
1132F	2	7/2/77	67	Archimedes	--	1498/3082	1B/P
1133M	2	7/2/77	80	Archimedes	--	3088/1499	P/1B
	4	6/27/79	150	Utukok R.	1.4/M	310/309	P/1B
1134F	14[c]	7/5/77	230[c]	Utukok R.	2.0/L	3089/3090	O
	17[c]	7/12/80	285	Utukok R.	2.8/H	526/527?	Bk/G
	20[c]	6/20/83	165	Utukok R.	A/H	--	--
1135M	1	7/5/77	57	Utukok R.	--	3091/3092	O/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)	Marking[b]
1136F	1	7/5/77	48	Utukok R.	--	3093/	O/
	12	6/28/88	220	Elbow Cr.	3.8T/H	424/425	Y/O
	12	7/1/88	--	Elbow Cr.	4.2/T/M	424/425	Y/O
1137F	1	7/5/77	58	Utukok R.	--	/3094	/O
1138F	23	8/10/77	250	Kantangnak Cr.	1.9/M	None	O
	24	6/16/78	265	Kantangnak Cr.	A/L	759/758	dB/dB/dB
1139F	11	6/7/78	200[c]	Utukok R.	1.3/M	651/654	W
	16	6/22/83	180	Utukok R.	3.6M99/M	3226/3229	mG/G
1140M	Cub	6/7/78	21	Utukok R.	None	/655	/O
1141F	Cub	6/7/78	16	Utukok R.	None	656/	O/
	2	7/13/80	165	Utukok R.	2.1	532/533	W/O
	6	9/16/84	260	Archimedes	2.6/L	397/398	W/O
	7	6/5/85	220	Archimedes	1.8/M	397/398	W/O
	9	5/25/87	190[c]	Disappoint-ment Cr.	3.0T/M	491/492	W/Y
	10	6/25/88	230	Disappoint-ment Cr.	4.4T/M	500/499	W/Y
	11	6/20/89	255	Utukok R.	3.8/M	500/317	W/Y
1142F	14	6/9/78	250[c]	Utukok R.	A/H	658/657	Bk
1143F	9	6/9/78	210[c]	Utukok R.	1.8/H	704/705	lB/W
1144F	1	6/9/78	38	Utukok R.	0.4/H	717/718	Pp/G
	8	9/4/85	345	Elbow Cr.	A/H	260/261	mG/R
1145F	2	6/10/78	95	Elbow Cr.	1.7/H	720/719	lB/G
1146F	14	6/10/78	230[c]	Elbow Cr.	2.5/H	721/722	G/lB
1147M	3	6/10/78	205	Utukok R.	1.3/M	723/724	P/G
	5	7/10/80	305	Tupikchak Cr.	2.8/H	516/515	P/dB
	9	9/15/84	388	Utukok R.	4.0/L	327/328	R/dB
	11	6/30/86	395	Kokolik R.	3.2/M	242/243	R/lB
	13	6/27/88	375	Utukok R.	6.0T/M	471/472	Y/lB
1148M	6	6/10/78	205	Utukok R.	1.3/M	725/728	dB/W
1149F	4	6/11/78	180	Utukok R.	1.3/M	736/733	W/dB
	13	6/24/87	245	Utukok R.	5.4T/M	558/559	Y/Pp
1150M	5	6/16/78	185	Utukok R.	1.2/M	751/747	Bk/P
1151F	3	6/16/78	112	Kantangnak Cr.	--	752/753	Bk/Bk
	8	6/22/83	165	Plunge Cr.	3.8M99/M	3469/	Bk/
1152M	3	6/16/78	142	Kantangnak Cr.	--	754/755	O/Bk
1153F	2	6/16/78	70	Kantangnak Cr.	--	756/757	Bk/O
	9	6/8/85	185	Utukok R.	1.8/M	215/216	R/O
1154F	12	6/21/78	220	Tupik Cr.	1.8/M	760/761	W/O/W
1155M	1	6/21/78	75	Tupik Cr.	0.50/M	763/762	G/W
1156F	6	6/21/78	205	Kogruk Cr.	2.0/M	765/764	P/Bk
	15	6/23/87	215	Elbow Cr.	3.4T/L	532/533	dB/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)	Marking[b]
1157M	5	6/24/78	210	Driftwood Cr.	A/H	766/767	P/G/P
	6	6/30/79	275	Driftwood Cr.	2.4/H	766/767	Bk/P
	14	6/23/87	260	Elbow Cr.	5.6T/M	538/539	W/dB
	16	6/18/89	375	Utukok R.	7.0/M	221/220	W/dB
1158F	7	6/24/78	180	Elbow Cr.	1.4/M	769/768	P/W
	17	7/1/88	260	Elbow Cr.	4.2T/M	412/411	lB/mG
1159M	10	6/24/78	295	Driftwood Cr.	1.7/M	770/771	G/P
	12	8/16/80	--	Utukok R.	A/L	535/534	G/P
	15	9/16/83	--	Utukok R.	--	--	--
1160M	Cub	7/1/78	25	Ilingnorak	None	303/	dB/
1161M	Cub	7/1/78	21	Ilingnorak	None	/302	/dB
1162M	2	7/1/78	95	Iligluruk Cr.	1.1/M	304/305	lB/Bk
1163M	2	7/3/78	92	Iligluruk Cr.	A/H	306/307	Bk/lB
1164M	3	5/7/79	185	Meat Mtn.	1.3/M	308/311	G/Bk
	4	7/6/80	270	Meat Mtn.	1.9/M	512/311	Bk/G
	8	9/18/84	370	Meat Mtn.	4.0/L	584/419	lB/G
	10	7/1/86	350	Kokolik R.	2.8/M	510/509	lB/G
1165M	3	9/17/79	200[c]	N. Meat Mtn.	A/H	318/319	G/dB
	8	9/14/84	335	Meat Mtn.	AM99/M	332/333	R/W
	13	6/19/89	335	Colville R.	7.0/M	222/223	R/W
1166F	10	9/18/79	390	N. Meat Mtn.	A/L	284/317	dB/O
	11	7/7/80	265	Utukok R.	2.1/H	502/317	lB/O
	14	6/22/83	--	Utukok R.	3.6M99/H	3221/3228	mG/lB
1167F	7	9/18/79	235	N. Meat Mtn.	2.8/H	271/315	O/dB
	15	6/18/87	200	Seismo Cr.	2.6T/L	551/600	mG/dB
1168F	Cub	9/18/79	55	N. Meat Mtn.	0.60/M	274/296	None
1169F	11	7/5/80	290	Kokolik R.	2.2/L	513/514	Bk/dB
	14	6/21/83	--	Plunge Cr.	3.8M99/M	3467/3465	mG/Bk
	17	9/6/85	360	Kantangnak Cr.	A/M	259/255	mG/Bk
1170F	Cub	7/5/80	34	Kokolik R.	0.10	114/112	dB/
1171M	Cub	7/5/80	32	Kokolik R.	0.10	115/113	Bk/
1172M	11	7/6/80	360	Utukok R.	3.2/H	509/508	W/lB
	15	9/16/84	400	Archimedes	4.6/H	325/326	W/lB
1173M	Cub	7/10/80	32	Kokolik R.	0.14	525/101	/O
	4	5/25/84	120[c]	Tupikchak Mtn.	1.8M99/H	--	--
	5	6/7/85	143	Tupikchak Mtn.	1.5/M	495/496	W/mG
1174F	Cub	7/10/80	28	Kokolik R.	0.14	501/507	O/
	4	5/25/84	110[c]	Tupikchak Mtn.	1.8M99/H	--	--
	5	6/7/85	113	Tupikchak Mtn.	1.5/M	222/221	mG/W
	6	6/27/86	195	Tupikchak Mtn.	1.8/M	222/293	mG/W
	7	6/19/87	175	Tupikchak Mtn.	A,T/M	575/574	lG/
1175M	7	7/12/80	400	Iligluruk Cr.	2.6	528/529	lB/lB
1176F	18	7/13/80	345	Utukok R.	2.0/M	531/530	G/G
	22	9/16/84	280	Archimedes Rg.	A/H	399/400	G/B
	25	6/22/87	260	Archimedes Rg.	3.1T/L	502/501	lG/lG

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage[a]	Ear tags (left/right)	Marking[b]
1177F	1	7/10/80	91	Nimwutik Cr.	0.38/L	520/519	G/G
	4	9/18/83	195	Utukok R.	4.0M99/M	3262/	O
	6	6/10/85	170	Avingak Cr.	1.6/M	233/234	R/lB
	7	6/30/86	220	Nimwutik Cr.	1.6/M	389/390	R/lB
1178F	13	8/18/80	250	Utukok R.	3.0	540/541	lB/Bk
1179F	2	8/18/80	135	Utukok R.	1.4/L	542/543	lB/O
	5	6/22/83	--	--	3.8M99/L	3230/3231	dB/mG
	7	6/10/85	200	Utukok R.	1.9/L	439/438	lB/mG
	9	6/22/87	265	Noatak R.	3.1T/L	515/516	lB/G
1180F	Cub	8/18/80	31	Kokolik R.	0.30/L	/547	/lB
1181F	Cub	8/18/80	34	Kokolik R.	0.40/M	546/	lB/
	3	9/15/83	225	Utukok R.	A/H	--	lB/dB
	4	5/26/84	145[c]	Nimwutik Cr.	1.8M99/H	546/-	lB/dB
	5	6/6/85	185	Meat Mtn.	A/M	3394/352	lB/dB
1232M	4[c]	9/18/83	190	Utukok R.	6.0M99/M	3399/3317	W/R
1233M	11[c]	9/18/83	430	Kokolik R.	6.0M99/M	3261/3395	dB/O
	13[c]	6/10/85	400	Utukok R.	A/L	207/208	dB/O
	16[c]	6/30/88	435	Archimedes Rg.	6.0T/M	-/420	-/O
1234F	5	9/18/83	280	Utukok R.	6.0M99/M	3253/3400	O/W
	7	6/6/85	200	Utukok R.	2.0/M	3253/594	O/W
1261M	10	6/22/83	345	Utukok R.	5.0M99/M	3457/3470	mG/dB
1401M	11	5/25/84	370[c]	Tupikchak Mtn.	6.0M99/H	3042/3403	W/Bk
1402M	3	5/25/84	80[c]	N. Meat Mtn.	3.0M99/H	-- --	--
	4	6/5/85	115	Colville R.	1.2/H	218/217	Bk/dB
	5	6/29/86	180	Nuka R.	1.8/M	218/217	Bk/dB
1403F	3	5/25/84	95	N. Meat Mtn.	1.0M99/H	3475/3474	W/Bk
	4	6/5/85	125	Colville R.	1.2/L	206/205	W/Bk
	5	7/1/86	190	Utukok R.	2.6T/M	511/512	W/Bk
	6	5/25/87	170[c]	Amo Cr.	2.6T/M	484/485	W/Bk
1404M	3	5/25/84	90[c]	N. Meat Mtn.	1.0M99/H	3472/3487	Bk/W
	4	6/5/85	150	Colville R.	1.2/L	421/420	Bk/W
1405M	7	5/26/84	215[c]	N. Meat Mtn.	2.3M99/H	3047/3043	Bk/O
	10	6/20/87	330	Utukok R.	3.4T/M	478/479	R/Y
1406F	10	9/13/84	275	Utukok R.	5.0M99/L	324/323	R/mG
1407F	10	9/14/84	275	E. Meat Mtn.	AM99/M	334/335	G/O
	13	6/18/87	240	Meat Mtn.	3.0T/M	542/543	mG/Y
	15	6/20/89	235	Meat Mtn.	4.0/M	542/543	mG/Y
1408M	10	9/15/84	300[c]	Utukok R.	AM99/M	382/381	O/R
1409M	Cub	9/16/84	31	Archimedes	0.3/H	329/330	O/O
1410F	20	9/16/84	265	Archimedes	A/H	336/337	G/O
1411M	9	6/4/85	410	Plunge Cr.	2.4/M	424/425	G/R
	12	6/24/88	476	Iligluruk Cr.	6.0T/M	485/494	mG/R
	12	6/28/88	--	Utukok R.	6.0T/M	485/494	mG/R
1412M	14	6/4/85	360	Ilingnorak	2.4/L	403/404	mG/lG
1413F	6	6/8/85	200	Archimedes	1.9/2.0	223/224	lB/lB
	9	6/25/88	270	Utukok R.	4.4T/L	452/451	lB/lB

Table 1. Continued.

Bear No. and sex	Cem. age (yr)	Date of capture	Bear wt. (lb)	Location	Drug dosage[a]	Ear tags (left/right)	Marking[b]
1414F	2	6/8/85	105	Archimedes	1.4/1.0	213/214	dB/mG
1415F	12	9/5/85	375	Utukok R.	A/L	244/245	lB/O
1416F	11	9/5/85	405	Elbow Cr.	A/L	264/265	G/Bk
	14	6/28/88	255	Elbow Cr.	4.2T/M	462/461	lG/Bk
1417F	8	9/6/85	355	Spike Cr.	A/L	266/267	mG/mG
	11	6/21/88	262	Spike Cr.	3.6T/M	389/390	mG/mG
1418M	12	9/6/85	425[c]	Archimedes	A/M	263/262	R/G
1418F	11	6/24/86	240	Squirrel R.	2.6T/M	377/376	Y/Y
1419M	12	6/24/86	415	Squirrel R.	AT/M	--	--
1420M	6	6/25/86	345	Kokolik R.	2.8/M	284/285	dB/W
	8	6/24/88	330	Kokolik R.	3.6T/L	491/492	dB/W
1421M	8	6/25/86	475	Kokolik R.	3.2/L	347/346	O/lB
	11	6/19/89	440	Utukok R.	7.0/M	-/-	O/lB
1422F	Cub	6/26/86	15	Utukok R.	0.15/L	-/283	-/Y
1423M	Cub	6/26/86	11	Utukok R.	0.15/M	282/-	Y/-
1424F	10	6/27/86	285	Kokolik R.	2.2/L	270/271	R/R
	12	6/29/88	330	Kokolik R.	AT/L	489/490	Pk/Pk
1425F	8	6/29/86	200	Kokolik R.	2.5T/M	350/351	O/dB
	10	6/24/88	220	Kokolik R.	4.5T/M	477/478	O/dB
1426F	Cub	6/29/86	18	Kokolik R.	0.1/L	-/288	-/Y
1427M	Cub	6/29/86	22	Kokolik R.	0.25/M	289/-	Y/-
1428F	7	6/30/86	240	Utukok R.	3.2T/M	290/291	dB/G
1429M	18	7/2/86	380	Squirrel R.	5.0T/M	508/506	Bk/Bk
	19	5/25/87	400[c]	Spruce Cr.	A,T/M	523/506	Bk/Bk
1430F	8	5/22/87	190[c]	Kiana Hills	3.0T/M	547/546	R/R
1431F	8	5/23/87	250[c]	Timber Cr.	A,T/L	540/541	mG/mG
1432M	9	5/23/87	260[c]	Timber Cr.	3.2T/M	588/589	lB/lB
1433M	12[c]	5/23/87	400[c]	Timber Cr.	5.5T/M	552/553	Y/R
	14[c]	6/20/88	440[c]	Omar R.	7.0T/M	-/-	-/-
1434M	Cub	6/18/87	20	Seismo Cr.	0.14T/L	-/449	-/R
1435F	Cub	6/18/87	20	Seismo Cr.	0.14T/L	450/-	R/-
1436F	Cub	6/18/87	12	Seismo Cr.	0.8T/L	-/-	-/-
1437F	9	6/19/87	160	Sulungatak Rg.	2.8T/H	563/562	dB/R
1438F	13	6/20/87	220	Sulungatak Rg.	2.8T/L	586/587	dB/dB
1439F	9	6/20/87	210	Sulungatak Rg.	4.0T/M	572/573	mG/dB
1440F	13	6/20/87	220	Sulungatak Rg.	3.0T/M	387/388	R/Bk
	14	6/27/88	250	Spike Cr.	4.0T/M	387/388	O/Bk
1441F	15	6/20/87	270	Kokolik R.	3.0T/M	556/557	W/Pp
1442M	Cub	6/20/87	24	Kokolik R.	--	583/-	R/-
	1	6/24/88	60	Tupikchak Cr.	2.2T/M	365/366	lG/R
1443M	Cub	6/20/87	25	Kokolik R.	--	-/582	-/R
	1	6/24/88	50	Tupikchak Cr.	2.2T/M	483/484	W/R
1444M	Cub	6/20/87	24	Kokolik R.	--	588/589	-/-
	1	6/24/88	60	Tupikchak Cr.	2.2T/M	335/336	O/mG
1445F	1	6/20/87	60	Utukok R.	1.6T/M	568/569	dB/lB
1446M	9	6/22/87	410	Utukok R.	5.0T/M	544/545	mG/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)	Marking[b]
1447M	4	6/23/87	220	Utukok R.	3.4T/M	576/577	Bk/mG
1448M	8	6/24/87	260	Spike Cr.	5.6T/M	434/435	dB/Pp
1449M	1	6/24/87	42	Spike Cr.	0.6T/M	578/579	lB/W
1450F	1	6/24/87	38	Spike Cr.	0.6T/M	592/593	R/W
1451F	12	6/24/87	240	Utukok R.	3.2T/M	536/537	Y/R
1452F	5[c]	6/20/88	200	Omar R.	4.4T/M	-/-	-/-
1453M	14	6/25/88	400	Disappointment Cr.	6.0T/M	475/476	R/R
1454F	12	6/25/88	290	Disappointment Cr.	4.0T/M	488/487	lG/Bk
1455M	6	6/25/88	345	Utukok R.	6.0T/M	370/369	B/B
1456M	9	6/26/88	450	Kokolik R.	6.4T/M	360/359	mG/lG
1457F	10	6/26/88	235	Kokolik R.	4.0T/M	496/495	R/Pk
1458F	9	6/27/88	230	Spike Cr.	2.8T/M	469/470	R/Y
1459M	13	6/27/88	380	Spike Cr.	6.0T/M	465/466	lG/lB
1460F	10	6/27/88	245	Spike Cr.	4.2T/M	468/467	R/mG
1461F	12	6/27/88	--	--	3.0T/M	--	W/lB
1462M	4	6/27/88	205	Adventure Cr.	2.6T/L	458/457	GY/lB
1463M	11	6/28/88	325	Kidney Cr.	6.0T/H	463/464	lG/Bk
1464F	13	6/29/88	290	Adventure Cr.	4.2T/M	480/479	Y/dB
1465F	12	6/29/88	280	Tupikchak Mtn.	4.2T/M	486/482	O/Y
	13	6/14/89	255	Kokolik R.	5.0/M	486/482	O/Y
1466M	1	6/29/88	135	Kokolik R.	2.6T/M	455/456	W/O
	2	6/19/89	174	Disappointment Cr.	3.0/M	455/206	W/O
1467F	9	6/29/88	270	Kokolik R.	4.2T/M	460/459	W/R
1468F	16	6/30/88	300	Archimedes Rg.	4.0T/M	403/404	Bk/O
1469M	1	7/1/88	70	Elbow Cr.	2.2T/M	407/419	Y/G
1470M	1	7/1/88	70	Elbow Cr.	2.2T/M	410/409	W/lG
1471M	Cub	7/1/88	39	Elbow Cr.	0.6T/M	405/367	none
1472M	Cub	7/1/88	40	Elbow Cr.	0.6T/M	400/406	none
1473F	6[c]	6/14/89	155	Spike Cr.	4.0/M	132/131	Bk/lB
1474F	4	6/14/89	145	Iligluruk Cr.	4.0/M	133/134	mG/Bk
1475F	24	6/15/89	245	Storm Cr.	6.5/M	125/126	O/Y
1476M	10	6/15/89	360	Nuka R.	7.0/M	129/130	Bk/Y
1477M	9	6/15/89	400	Colville R.	7.0/M	782/783	Bk/Bk
1478M	12	6/18/89	365	Kokolik R.	7.0/M	779/212	lG/dB
1479F	9	6/18/89	230	Kokolik R.	4.6/M	214/215	lB/Y
1480M	Cub	6/18/89	20	Seismo Cr.	0.25/M	none	none
1481F	Cub	6/18/89	15	Seismo Cr.	0.25/M	none	none
1482M	Cub	6/18/89	17	Seismo Cr.	0.25/M	none	none
1483F	Cub	6/18/89	235	Seismo Cr.	0.4/M	none	none
1484F	Cub	6/18/89	22	Seismo Cr.	0.4/M	none	none
1485M	Cub	6/20/89	36	Utukok R.	0.25L	none	none

Table 1. Continued.

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[a] Dosage in ml of sernylan, Telazol, or M99; no designation indicates use of Sernylan, T of Telazol, and M99 of 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. History and status of grizzly bears marked in the western Brooks Range, Alaska study area 1977-89.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1081 M	5	5/24/77	9/17/79 7/7/80 8/15/80 9/14/84 9/16/84 6/19/87 6/15/89	6/19/89	2/1977 3/1979 14/1980 13/1981 5/1982 2/1983 1/1984 4/1985 2/1986 2/1987 4/1988 3/1989	Functional collar
1082 M	13	5/25/77	6/13/77 6/25/77 8/10/77 6/27/78 6/28/79 8/17/80 6/18/87	6/1/89	24/1977 20/1978 18/1979 3/1980 4/1981 2/1987 1/1988 1/1989	Dead
1083 M	7	5/25/77	6/2/77 7/2/78 6/30/79 5/20/84 6/4/85	6/18/87	24/1977 15/1978 6/1979 16/1980 1/1981 2/1984 5/1985 2/1986 1/1987	Unknown
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 14/1978 9/1979 14/1980	Presumed dead
1086 F	16	5/29/77	6/24/77 8/8/77 9/16/79	7/19/80	33/1977 28/1978 25/1979 13/1980	Presumed dead

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1087 F	1	5/29/77	6/30/79 7/7/80 5/25/84	6/20/89	10/1979 1/1980 3/1984 6/1985 5/1986 6/1987 2/1988	Functional collar
1088 M	4	5/31/77	--	6/3/79	8/1977 1/1978 2/1979	Dead, hunter kill
1089 F	4	6/1/77	6/10/77 6/4/85 6/28/88	6/20/89	10/1977 5/1978 1/1979 3/1986 4/1987 2/1988 4/1989	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	9/20/87	20/1977 20/1978 2/1980 5/1981 5/1982 3/1983 1/1984 3/1985 3/1986 4/1987	Dead, hunter kill
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	6/24/87 6/15/89	6/14/89	1/1977 1/1978 2/1987 2/1989	Functional collar

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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 5/25/87 6/23/89	6/23/88	22/1977 20/1978 15/1979 19/1980 23/1981 13/1982 3/1984 4/1985 5/1986 9/1987 1/1988 3/1989	Functional collar
1098 M	3	6/8/77	6/23/89	6/17/89	2/1977 1/1978 2/1988 1/1989	Functional collar
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

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1103 M	8	6/12/77	6/12/78 5/8/85 6/29/88	6/18/89	20/1977 6/1978 1/1985 1/1986 1/1988 3/1989	Functional collar
1104 F	9	6/12/77	6/17/77 7/10/80 6/22/83 6/10/85 5/26/86	9/23/87	23/1977 17/1978 2/1979 9/1981 24/1982 2/1983 3/1984 7/1985 4/1986 4/1987	Dead, killed by adult male
1105 F	7	6/13/77	6/17/77 7/10/80 6/22/83 6/7/85	9/9/87	23/1977 21/1978 10/1979 5/1980 6/1981 13/1982 2/1984 3/1985 4/1986 4/1987	Hunter kill 1987
1106 F	11	6/14/77	--	5/4/79	23/1977 17/1978 1/1979	Killed by bear no. 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 killed by bear no. 1099
1109 F	Cub	6/14/77	--	5/4/79	23/1977 17/1978 1/1979	Presumed killed by bear no. 1099

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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
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	Presumed dead
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	Dead; killed?, eaten by other bear fall 1986

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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
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, starved?; eaten by other bear
1135 M	1	7/5/77	--	5/5/79	18/1977	Presumed dead

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1136 F	1	7/5/77	6/28/88 7/1/88	7/1/88	18/1977 15/1978 1/1979 2/1988	Functional collar
1137 F	1	7/5/77	--	5/5/79	18/1977, 15/1978 1/1979	Unknown
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	5/21/84	16/1978 13/1979 1/1980 1/1983 1/1984	Dead
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 5/25/87 6/25/88 6/20/89	6/20/89	16/1978 13/1979 4/1980 8/1981 9/1982 3/1985 4/1986 6/1987 3/1988 5/1989	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 other bear?
1145 F	2	6/10/78	--	5/4/80	15/1978 5/1979 1/1980	Unknown

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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 6/27/88	6/18/89	2/1978 1/1984 2/1985 1/1986 4/1987 3/1988 4/1989	Functional collar
1148 M	6	6/10/78	--	9/21/78	8/1978	Unknown
1149 F	4	6/11/78	6/24/87	6/19/89	3/1978 2/1987 1/1988 4/1989	Functional collar
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
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	6/23/87	6/28/88	1/1978 2/1987 1/1988	Dead, killed by other bear?
1157 M	5	6/24/78	6/30/79 6/23/87 6/18/89	6/18/89	1/1978 2/1979 1/1987 1/1989	Functional collar

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1158 F	7	6/24/78	7/1/88	5/31/89	1/1978 2/1988 1/1989	Unknown, shed collar
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	--	7/26/78	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	5/21/87	1/1979 1/1980 1/1984 4/1985 3/1986 1/1987	Dead, hunter kill
1165 M	3	9/17/79	7/13/80 9/14/84 6/19/89	6/19/89	1/1979 1/1980 2/1984 2/1985 3/1986 1/1987 2/1988 2/1989	Functional collar
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	Alive, nonfunctional collar
1167 F	7	9/18/79	6/18/87	6/19/89	1/1979 5/1987 2/1988 3/1989	Functional collar
1168 F	Cub	9/18/79	--	9/18/79	1/1979	Unknown

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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 6/19/87	10/10/88	1/1980 1/1984 3/1985 6/1986 4/1987 5/1988	Alive, shed collar
1175 M	7	7/12/80	--	7/12/80	1/1980	Unknown
1176 F	18	7/13/80	9/16/84 6/22/87	9/23/87	2/1980 26/1981 1/1982 1/1984 3/1985 3/1986 6/1987 4/1988	Dead, old age?
1177 F	1	7/10/80	9/18/83 6/10/85 6/30/86	4/15/88	2/1980 1/1983 4/1984 5/1985 3/1986 2/1987 1/1988	Alive, shed collar

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
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 6/22/87	6/1/89	1/1980 7/1981 1/1983 1/1984 5/1985 2/1986 4/1987 3/1988 1/1989	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 1/1987	Dead at 1986/87 den
1232 M	4	9/18/83	--	9/18/83	1/1983	Unknown
1233 M	11	9/18/83	6/8/85 6/10/85 6/30/88	6/16/89	1/1983 1/1985 1/1986 1/1988 1/1989	Unknown, shed collar
1234 F	5	9/18/83	6/6/85	4/15/88	1/1983 1/1985 1/1986 2/1987 1/1988	Unknown, nonfunctional 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

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1403 F	3	5/25/84	6/5/85 7/1/86 5/25/87	5/21/88	2/1985 2/1986 5/1987 1/1988	Dead, killed by other bear
1404 M	3	5/25/84	6/5/85	11/8/86	1/1984 2/1985 2/1986	Unknown, shed collar
1405 M	7	5/26/84	6/20/87	6/16/89	1/1984 2/1987 3/1988 1/1989	Functional collar
1406 F	10	9/13/84	--	9/13/84	1/1984	Dead, eaten by other bear
1407 F	10	9/14/84	6/20/89	6/20/89	1/1984 3/1985 3/1986 6/1987 4/1989	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	6/24/88 6/28/88	6/18/89	1/1985 2/1988 1/1989	Functional collar
1412 M	15	6/4/85	--	5/5/86	1/1985 2/1986	Dead, hunter kill
1413 F	9	6/8/85	6/25/88	6/28/88	2/1985 3/1986 3/1987 2/1988	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

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1416 F	9	9/5/85	6/28/88	6/19/89	1/1985 3/1986 2/1987 3/1988 3/1989	Functional collar
1417 F	9	9/6/85	6/21/88	6/18/89	2/1986 1/1987 2/1988	Functional collar
1418 M	17	9/6/85	--	9/6/85	1/1985	Unknown
1420 M	7	6/25/86	6/24/88	6/4/88	2/1986 1/1987 2/1988	Functional collar heard, not located
1421 M	13	6/25/86	--	9/23/87	1/1986 4/1987 1/1988	Unknown, shed collar
1422 F	Cub	6/26/86	--	6/30/86	2/1986	Dead by 9/30/86
1423 M	Cub	6/26/86	--	6/30/86	2/1986	Dead by 9/30/86
1424 F	8	6/27/86	6/29/88	6/18/89	2/1986 1/1987 2/1988 3/1989	Functional collar
1425 F	7	6/29/86	6/24/88	6/14/89	3/1986 5/1987 3/1988 2/1989	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	--	4/15/88	2/1986 1/1988	Unknown
1434 M	Cub	6/18/87	--	9/23/87	3/1987	
1435 F	Cub	6/18/87	--	9/23/87	3/1987	
1436 F	Cub	6/18/87	--	6/18/87	1/1987	Dead by 6/23/87

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1437 F	9	6/19/87	--	6/17/89	3/1987 1/1988 2/1989	Functional collar
1438 F	13	6/20/87	--	4/15/88	3/1987 1/1988	Unknown
1439 F	9	6/20/87	--	4/15/88	2/1987 1/1988	Unknown, shed collar
1440 F	13	6/20/87	6/27/88	6/17/89	3/1987 2/1988 2/1989	Functional collar
1441 F	15[a]	6/20/87	--	6/14/89	3/1987 3/1988 2/1989	Functional collar
1442 M	Cub	6/20/87	6/24/88	10/10/88	3/1987 2/1988	Dead in den with 1443
1443 M	Cub	6/20/87	6/24/88	10/10/88	3/1987 2/1988	Dead in den with 1442
1444 M	Cub	6/20/87	6/24/88	6/18/89	3/1987 2/1988 3/1989	Dead, killed by other bear
1445 F	1	6/20/87	--	9/17/87	4/1987	Dead, killed by no. 1447
1446 M	9	6/22/87	--	6/22/87	1/1987	Unknown
1447 M	4	6/23/87	--	9/17/87	2/1987	Functional collar
1448 M	8	6/24/87	--	9/2/87	2/1987	Unknown, shed collar
1449 M	1	6/24/87	--	6/24/87	1/1987 1/1988	Dead in shallow den with 1450
1450 F	1	6/24/87	--	6/24/87	1/1987 1/1988	Dead in shallow den with 1449

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1451 F	12	6/24/87	--	6/15/89	1/1987 2/1988 1/1989	Functional collar
1453 M	14	6/25/88	--	6/20/89	2/1988 2/1989	Functional collar
1454 F	12	6/25/88	--	6/25/88	1/1988	Functional collar
1455 M	6	6/25/88	--	6/25/88	1/1988	Unknown, not collared
1456 M	9	6/26/88	--	10/10/88	2/1988	Dead, hunter kill
1457 F	10	6/26/88	--	6/17/89	2/1988 1/1989	Functional collar
1458 F	9	6/27/88	--	6/17/89	1/1988 3/1989	Functional collar
1459 M	13	6/27/88	--	6/19/89	1/1988 4/1989	Functional collar
1460 F	10	6/27/88	--	6/17/89	1/1988 2/1989	Functional collar
1461 F	12	6/27/88	--	6/14/89	1/1988 1/1989	Functional collar
1462 M	4	6/27/88	--	6/18/89	1/1988 2/1989	Functional collar
1463 M	11	6/28/88	--	6/28/88	1/1988	Unknown, not collared
1464 F	13	6/29/88	--	10/10/88	2/1988	Alive, shed collar
1465 F	12	6/29/88	6/14/89	6/17/89	2/1988 4/1989	Functional collar
1466 M	1	6/29/88	6/19/89	6/19/89	2/1988 2/1989	Functional collar
1467 F	9	6/29/88	--	10/10/88	2/1988	Unknown
1468 F	16	6/30/88	--	6/20/88	1/1988 3/1989	Functional collar

Table 2. Continued.

Bear no./sex	Initial capture Age	Initial capture Date	Recaptures	Date of last location	Locations/ year	Status, fall 1989
1469 M	1	7/1/88	--	7/1/88	1/1988	Unknown, not collared
1470 M	1	7/1/88	--	7/1/88	1/1988	Unknown, not collared
1471 M	1	7/1/88	--	7/1/88	1/1988	Unknown, not collared
1472 M	1	7/1/88	--	7/1/88	1/1988	Unknown, not collared
1473 F	6	6/14/89	--	6/14/89	1/1989	Functional collar
1474 F	4	6/14/89	--	6/14/89	1/1989	Functional collar
1475 F	24	6/15/89	--	6/15/89	1/1989	Unknown, not collared
1476 M	10	6/15/89	--	6/15/89	1/1989	Unknown, not collared
1477 M	9	6/15/89	--	6/15/89	1/1989	Unknown, not collared
1478 M	12	6/18/89	--	6/18/89	1/1989	Unknown, not collared
1479 F	9	6/18/89	--	6/18/89	1/1989	Functional collar
1480 M	Cub	6/19/89	--	6/19/89	3/1989	Alive, with mother
1481 F	Cub	6/19/89	--	6/19/89	3/1989	Alive, with mother
1482 M	Cub	6/19/89	--	6/19/89	3/1989	Alive, with mother
1483 F	Cub	6/19/89	--	6/20/89	4/1989	Alive, with mother
1484 F	Cub	6/19/89	--	6/20/89	4/1989	Alive, with mother
1485 M	Cub	6/20/89	--	6/20/89	5/1989	Alive, with mother

[a] Estimated age, based on comparison of tooth-wear patterns with those of known-aged bears.

Table 3. Reproductive history and litter size for female grizzly bears in the western Brooks Range, Alaska, 1977-89.[a]

Bear No.	Age[b] in 1989	Reproductive history and litter size[c]												
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1085	23	B	B	NB?	NB	PD								
1086	19	2y1	2 2y	2 3y/B	2c/PD									
1087	13				NB/NPO	B	B	UN	B	B	2c/B	1c	B	2c
1089	16	NB/NPO	B	2c	UN	UN	1c?	UN	UN	B	2c	1y1	B	3c
1090	23	3y1	3 2y	3 3y/?B	UN	UN	PD							
1092	19	1c	1 y1	1 2y	B	B	B	B	B?	B?	B?	B/D		
1095	18	?B	?B	UN	UN	UN	UN	UN	UN	UN/B	2+c	2 y1	2 2yr	2 3yr/B
1097	20	B	B	2c/B	2c/B	3c	3y1	3 2y	3 3y	3 4y/B	B	B	B	3c
1100	18	NB/NPO	B	2c/B	B	UN	UN	UN	UN	UN	UN	UN	UN	UN
1102	14	NB/NPO	NB	B	2c	B	1c	UN	UN	UN	UN	UN	UN	UN
1104	19	2 2y/B	1c/B	1c	1y1	1 2y/B	B	B	B	B	2cb	B/D		
1105	18	B	B	1c/B	2c	2y1	2 2y	2 3y	2 4y	2 5y/B	B	1+c/B/D		
1106	13	3c	3y1	2 2y/D										
1110	28	B	2c	2y1	2 2y	2 3y/PD								
1111	26	2 4y/B	B	3c/B	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN/PD
1118	28	B	2c	2y1	UN	UN	UN	UN	UN/B?	B	B?	UN	UN/PD	
1119	18	B	B	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
1121	22	2c	2y1	2 2y/B	2c	UN	UN	UN	B?	B	1c/B/D			
1127	28	B	UN	PD										
1128	19	1y1/B	3c	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN
1130	26	2c	1y1	UN	UN	UN	PD							
1134	21	3y1	2 2y	2-3y/B?	c?/B?	B	3c	D						
1136	13				NPO	UN	UN	UN	UN	UN	UN/B	2+c	2y1	UN
1138	27	2 2y, 1y1	2 3y, 1 2y	UN/2 4y, 1 3y/B	UN/PD									
1139	19	UN/B	2c	2y1	2 2y/B	3c	3y1	2 2y	B	D				
1141	10					NB	B	UN	UN	B	1c	c?/B	B	1c
1142	25	UN/PO	B	UN	UN	UN	1 2y?	UN	UN	UN	UN	UN	UN	UN
1143	20	2c	2y1	2 2y	2 3y/B?	UN	UN	UN	UN	UN	UN	UN	UN	UN
1144	9		NPO	UN	UN	UN	UN	UN	UN	NPO	D			

Table 3. Continued.

Bear No.	Age[b] in 1989	Reproductive history and litter size[c]												
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1146	25	1-2yl	1 2y	1 3y/B	UN	UN	UN	UN	UN	UN	UN	UN	UN	UN/PD
1149	15	NB/NPO?	NB	UN	UN	UN	UN	UN	UN	UN	UN	B	2c	2yl
1151	14		NPO	UN	UN	UN	UN	NPO/NB	UN	UN	UN	UN	UN	UN
1153	13		NPO	UN	UN	UN	UN	UN	UN	NPO/B?	2c?	UN	UN	UN
1154	23	1c	1yl	1 2y	1 3y/B	2c	UN	UN	UN	UN	UN	UN	UN	UN
1156	16		B/NPO?	UN	UN	UN	UN	UN	UN	UN	UN	B	D	
1158	18		B/NPO?	UN	UN	UN	UN	UN	UN	UN	UN	UN/B	2c	UN
1166	20		NPO	B?	B	3c	1yl	1 2y/B	B?	B	1c	UN	UN/B	UN/2+c
1167	17		UN/B	1c	B	B	B	UN	UN	UN	UN/B	3c	2yl	2 2yr/B
1169	17		UN	B	2c	B	2c	2yl	?/B	3c/B?	D			
1174	9				NPO/NB	NB	NB	NB	NB	NB	B	B	B	UN/1+c
1176	26				UN/B	2c	1yl	UN	2c	B	1c	1yl/B/D		
1177	10							NPO/NB	NB	NB	B	B	UN/B	UN/1+c
1178	22		UN/B	UN/1+c	1 2y	1 3y/B	2c/B	UN	UN	UN	UN	UN	UN	UN
1179	11									NPO/B	B	B	B	1c
1181	7									NPO/B	2c/B?	D		
1234	11							NPO	UN	B	2c	B	UN	UN
1403	7									NB	NPO/B	B	D	
1406	11								D					
1407	15								NPO	B	2c/B	B	B	3c/B?
1410	25								B	UN	UN	UN	UN	UN
1413	10									NPO/B	3c/B?	UN	c?/B	UN
1415	16									PO/B?	UN	UN	UN	UN
1416	14								UN	B	1c/B?	3c	2yl	2 2yr/B
1417	12								UN	NPO/B?	B	B	B?	B
1424	13									UN	PO/B	1c	1yl	1 2yr/B
1425	11								UN	UN/B	2c/B?	B	B	3c
1428	10									UN	NPO/B	UN	UN	UN
1437	11										B	1c	UN	B
1438	13								B	3c	3yl	3 2y	UN/B?	UN
1439	11								B	3c	3yl	3 2y	UN/B?	UN

Table 3. Continued.

Bear No.	Age[b] in 1989	Reproductive history and litter size[c]												
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1440	15											PO/B	B	1c
1441	17[d]										UN/B	3c	3y1/B	B
1451	14										UN/B?	PO/B	2c	2y1
1454	13												B	UN/3+c
1457	11												B?	B?
1458	10												B	2c
1460	11												B	3c
1461	13												B	B?
1464	14												B	UN/3+c
1465	13												B	3c/B?
1467	10												c?/B	UN
1468	17												B?	B
1473	6[d]													NPO/B
1474	4													NPO/NB
1475	24													NB?
1479	9													B

[a] Designations are as follows: PO, evidence of previous offspring; NPO, no evidence of previous offspring; UM, unmarked; 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; c, y1, 2y, 3y, female accompanied by cub, yearling, 2-year-old, 3-year-old young; c/B, cubs lost prior to breeding season, subsequent breeding by female; y1/B, 2y/B, etc., offspring weaned, then subsequent breeding by female.

[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 4. Observed spring litter size and number of offspring in cub, yearling, 2-year-old, and 3-year-old age classes, 1977-89.

Age class	Litter size	No. of litters													Total		$\bar{x}$
		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	No. of litters	No. of offspring	litter size
Cub	1	2	1	3	2	0	3	0	0	0	5	4	0	4	24	24	
	2	5	5	3	6	3	2	0	1	0	9	1	3	3	41	82	
	3	1	2	2	0	3	1	0	0	3	1	3	0	8	24	72	
No. offspring		15	17	15	14	15	10	0	2	9	27	15	6	34	89	178	2.00
Yearling	1	2	3	2	1	1	1	0	0	0	0	2	1	0	13	13	
	2	2	4	5	0	1	0	1	0	0	0	1	3	2	19	38	
	3	3	0	0	0	0	3	0	0	0	2	0	1	0	9	27	
No. offspring		15	11	12	1	3	10	2	0	0	6	4	10	4	41	78	1.90
2-year-old	1	0	1	2	2	1	1	0	0	0	0	0	0	1	8	8	
	2	2	3	3	3	0	1	1	0	0	0	0	1	2	16	32	
	3	0	1	0	0	0	0	1	0	0	0	2	0	0	4	12	
No. offspring	4	10	8	8	1	3	5	5	0	0	0	6	2	5	28	52	1.86
3-year-old	1	0	0	1	1	1	1	0	0	0	0	0	0	0	4	4	
	2	1	0	2	0	1	0	1	0	0	0	0	0	1	5	11	
	3	0	0	1	0	0	0	0	1	0	0	0	0	0	2	6	
No. offspring		2	0	8	1	3	1	2	3	0	0	0	0	2	11	21	1.91
Females >6 yrs observed with offspring		19	20	24	15	11	13	4	2	3	17	13	9	17			
Females >6 yrs observed without offspring		5	4	2	5	3	2	4	9	15	11	15	20	8			

Table 6. Annual number of adult female grizzly bears (≥6 years of age) observed in the study area, and their observed annual production of weaned offspring, western Brooks Range, Alaska, 1977-89.

Year	Adult females: Observed this year	Adult females: Observed subsequently[a]	Adult females: Total	Offspring weaned, by age (no. litters): 1-yr	2-yr	3-yr	4-yr	5-yr	Total
1977	19	5	24		4(2)[b]	2(1)	2(1)		8(4)
1978	22	0	22						0
1979	19	1	20		2(1)	6(3)	3(1)		11(6)
1980	18	0	18		2(1)	3(2)			5(3)
1981	12	0	12		1(1)	3(2)			4(3)
1982	14	0	14						0
1983	8	0	8		4(2)				4(2)
1984	11	2	13						0
1985	16	2	18				3(1)	2(1)	5(2)
1986	28	4	32						0
1987	28	2	30	3(2)[b]					3(2)[b]
1988	31	--	31	3(1)		6(2)			9(3)
1989	25	5	30		3(2)	2(1)			5(3)

[a] Females which were captured in subsequent years were very probably present in the population for at least 1 or 2 previous years. This is especially true for females accompanied by offspring; no such radio-collared females were observed to migrate to other areas. For those reasons, these females were assumed to be residents of the study area and were included in the adult female population in previous years.

[b] Includes recently weaned offspring of unknown parentage.

Table 7. Status of maternal grizzly bears and their offspring in the western Brooks Range, 1975-89.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1086	16	Presumed dead	1087 F	1976	3	Alive
			1164 M	1976	3	Hunter kill 1987
			UM	1980	--	Presumed dead 1980
			UM	1980	--	Presumed dead 1980
1087	1	Alive	UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986
			UM	1987	--	Presumed dead 1987
			1483 F	1989	--	With mother 1989
			1484 F	1989	--	With mother 1989
1089	4	Alive	UM	1979	--	Unknown since 1979
			UM	1979	--	Unknown since 1979
			UM	1982	--	Presumed dead 1982
			UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1987
			1704 F	1989	--	With mother 1989
			1705 M	1989	--	With mother 1989
			1706 F	1989	--	With mother 1989
1090	18	Presumed dead	UM	1976	3	Unknown since 1980
			UM	1976	3	Unknown since 1980
			UM	1976	3	Unknown since 1980
1092	8	Dead, hunter kill 1987	1093 F	1977	3	Unknown since 1980
1095	6	Alive	UM	1986	3	Unknown
			UM	1986	3	Unknown
1097	8	Alive	UM	1979	--	Presumed dead 1979
			UM	1979	--	Presumed dead 1979
			UM	1980	--	Presumed dead 1979
			UM	1980	--	Presumed dead 1979
			1402 M	1981	4	Hunter kill 1986
			1403 F	1981	4	Killed by male 1988
			1404 M	1981	4	Unknown, shed collar 1987
			1480 F	1989	--	With mother
			1481 F	1989	--	With mother
			1482 M	1989	--	Presumed dead 1989

Table 7. Continued.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1100	6	Unknown since 1980	UM	1979	--	Presumed dead 1980
			UM	1979	--	Presumed dead 1980
1102	2	Unknown since 1982	1180 F	1980	--	Presumed dead 1980
			1181 F	1980	--	Presumed dead 1980
			UM	1982	--	Unknown since 1982
1104	9	Dead 1987	1101 ?	1975	2	Killed by bear no. 1099 in 1977
			1102 F?	1975	2	Unknown since 1983
			UM	1978	--	Killed by 1099? in 1978
			1177 F	1979	2	Alive
			1422 F	1986	--	Presumed dead 1986
			1423 M	1986	--	Presumed dead 1986
1105	7	Hunter kill 1987	UM	1979	--	Presumed dead 1979
			1173 M	1980	5	Dead 1986
			1174 F	1980	5	Alive
			UM	1987	--	Presumed dead 1987
1106	11	Killed by male 1979	1107 F	1977	--	Dead 1978
			1108 F	1977	--	Presumed dead 1979
			1109 F	1977	--	Presumed dead 1979
1110	24	Presumed dead 1981	1160 M	1978	3	Unknown since 1981
			1161 M	1978	3	Unknown since 1981
1111	14	Unknown since 1979	1112 M	1973	5	Unknown since 1978
			1113 F	1973	5	Unknown since 1978
1118	17	Presumed dead 1988	UM	1978	--	Unknown since 1979
			UM	1978	--	Unknown since 1979
1121	11	Dead 1986	1122 M	1977	2	Unknown since 1979
			1123 F	1977	2	Unknown since 1979
1128	7	Unknown since 1978	1129	1976	--	Presumed dead 1977
			UM	1978	--	Unknown since 1978
			UM	1978	--	Unknown since 1978
			UM	1978	--	Unknown since 1978
1130	21	Presumed dead 1982	UM	1977	--	Presumed dead 1977
			UM	1977	--	Unknown since 1978

Table 7. Continued.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1134	14	Dead 1983	1135 M	1976	--	Presumed dead 1977
			1136 F	1976	3	Alive
			1137 F	1976	3	Unknown since 1979
			UM	1982	--	Presumed dead 1982
			UM	1982	--	Presumed dead 1982
			UM	1982	--	Presumed dead 1982
1136	1	Unknown since 1988	1469 M	1987	--	Unknown since 1988
			1470 M	1987	--	Unknown since 1988
1138	23	Presumed dead 1980	1151 F	1975	3	Unknown since 1978
			1152 M	1975	3	Unknown since 1978
			1153 F	1976	2	Unknown, possible sighting w/2c 1986
1139	11	Dead 1985	1140 M	1978	2	Unknown since 1980
			1141 F	1978	2	Alive
			UM	1981	--	Presumed dead 1982
			UM	1981	2?	Unknown since 1983
			UM	1981	2?	Unknown since 1983
1141	Cub	Alive	UM	1986	--	Presumed dead 1986
			UM?	1987	--	Presumed dead 1987
			1485 M	1989	--	With mother 1989
1142	14	Unknown since 1982	UM?	1980	--	Unknown since 1982
1143	9	Unknown since 1980	1144 F	1977	2-3	Killed by other bear, 1986
			UM	1977	2-3	Unknown since 1979
1146	14	Unknown since 1979	1145 F	1976	3	Unknown since 1979
1149	4	Alive	1486 M	1988	--	With mother 1989
			1487 F	1988	--	With mother 1989
1153	2	Unknown since 1986	UM	1986	--	Unknown since 1986
			UM	1986	--	Unknown since 1986
1154	12	Unknown since 1982	1155 M	1977	3	Hunter kill 1979
			UM	1981	--	Unknown since 1981
			UM	1981	--	Unknown since 1981

Table 7. Continued.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1158	7	Unknown since 1989	1471 M	1988	--	Unknown since 1989
			1472 M	1988	--	Unknown since 1989
1166	10	Alive	UM	1981	--	Presumed dead 1981
			UM	1981	--	Presumed dead 1981
			UM	1981	2	Unknown since 1983
			UM	1986	--	Presumed dead 1986
			1701 M	1988	--	With mother 1989
			1702 F	1988	--	With mother 1989
1167	7	Alive	1168	1979	--	Presumed dead 1979
			1434 M	1987	2	Unknown, weaned 1989
			1435 F	1987	2	Unknown, weaned 1989
			1436 F	1987	--	Presumed dead 1987
1169	11	Killed by male 1986	1170 F	1980	--	Presumed dead 1980
			1171 F	1980	--	Presumed dead 1980
			UM	1982	--	Presumed dead 1983?
			UM	1982	--	Presumed dead 1983?
			UM	1985	--	Presumed dead 1985
			UM	1985	--	Presumed dead 1985
			UM	1985	--	Presumed dead 1985
1174	Cub	Alive	1497 M	1989	--	With mother 1989
1176	18	Dead 1988	UM	1981	--	Presumed dead 1981
			UM	1981	--	Unknown since 1982
			UM	1984	--	Presumed dead 1984
			1409 M	1984	--	Presumed dead 1984
			1445 M	1986	1	Killed by other bear 1987
1177	1	Alive	1496 M	1989	--	With mother 1989
1178	13	Unknown since 1982	1179 F	1978	3	Alive
			UM	1982	--	Presumed dead 1982
			UM	1982	--	Presumed dead 1982
1179	2	Alive	UM	1989	--	With mother 1989
1181	Cub	Dead 1987	UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986
1234	5	Unknown 1988	UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986

Table 7. Continued.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1407	10	Alive	UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986
			UM	1989	--	Presumed dead 1989
			UM	1989	--	Presumed dead 1989
			UM	1989	--	Presumed dead 1989
1413	9	Alive	UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986
			UM	1986	--	Presumed dead 1986
			UM	1988	--	Presumed dead 1988
1416	8	Alive	UM	1986	--	Presumed dead 1986
			UM	1987	--	Presumed dead 1987
			UM	1987	--	With mother 1989
			UM	1987	--	With mother 1989
1424	10	Alive	1466 M	1987	2	Alive
1425	7	Alive	1426 F	1986	--	Presumed dead 1986
			1427 M	1986	--	Presumed dead 1986
			1708 M	1989	--	With mother 1989
			1709 M	1989	--	With mother 1989
			1710 M	1989	--	With mother 1989
1437	9	Alive	UM	1987	--	Unknown since 1987
1438	7	Unknown	UM	1985	--	Unknown since 1987
			UM	1985	--	Unknown since 1987
			UM	1985	--	Unknown since 1987
1439	14	Unknown	UM	1985	--	Unknown since 1987
			UM	1985	--	Unknown since 1987
			UM	1985	--	Unknown since 1987
1440	13	Alive	1707 M	1989	--	With mother 1989
Unknown (maybe 1440?)			1449 M	1986	1	Dead in den 1988
			1450 F	1986	1	Dead in den 1988
1441	15	Alive	1442 M	1987	1	Dead 1989, in den
			1443 M	1987	1	Dead 1989, in den
			1444 M	1987	1	Dead 1989, killed by other bear

Table 7. Continued.

Maternal female			Related offspring			
Bear No.	Age at capture (yrs)	Present status	Bear no. and sex[a]	Year of birth	Age at weaning	Present status
1451	14	Alive	UM	1988	--	With mother 1989
			UM	1988	--	With mother 1989
1454	12	Alive	1498 F	1989	--	With mother 1989
			1499 M	1989	--	With mother 1989
			1500 F	1989	--	With mother 1989
1458	9	Alive	1494 M	1989	--	With mother 1989
			1495 F	1989	--	With mother 1989
1460	10	Alive	1492 M	1989	--	With mother 1989
			1493 M	1989	--	With mother 1989
			UM	1989	--	Dead 1989
1464	13	Alive	UM	1989	--	With mother 1989
			UM	1989	--	With mother 1989
			UM	1989	--	With mother 1989
1465	12	Alive	UM	1989	--	Presumed dead 1989
			UM	1989	--	Presumed dead 1989
			UM	1989	--	Presumed dead 1989
Unknown			1132 F	1975	2	Unknown since 1978
			1133 M	1975	2	Unknown since 1979
Unknown			1162 M	1976	2	Unknown 1979
			1163 M	1976	2	Dead 1979

[a] UM indicates unmarked; therefore, unknown.

Table 8. Movement of grizzly bears from maternal home ranges subsequent to weaning, western Brooks Range, Alaska, 1977-89.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
1086	1087	F	1979	3 yr when weaned; within maternal home range (MHR)
			1980-89	4-13 yr; within MHR; produced own cubs
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; larger home range included MHR
			1987	11 yr; killed by hunter 38 km W of MHR
1092	1093	F	1980	3 yr when weaned; unknown
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
			1986-87	5-6 yr; within MHR
			1988	7 yr; killed by male withn 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
			1987-89	6-8 yr; unknown
1102	1181	F	1983	3 yr when weaned; within MHR
			1984-86	4-6 yr; within MHR
			1987	7 yr; dead at den
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
			1986-87	7-8 yr; within MHR
			1988	9 yr; unknown
			1989	10 yr; within MHR; produced 1st? cubs

Table 8. Continued.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
1105	1173	M	1985	5 yr when weaned; died in MHR fall 1985
1105	1174	F	1985	5 yr when weaned; remained within MHR
			1986-88	6-8 yr; within MHR
			1989	9 yr; within MHR; produced 1st cub
1134	1136	F	1979	3 yr when weaned
			1978-87	3-11 yr; unknown
			1988	12 yr; within MHR; with 2 yearlings
			1989	13 yr; no sightings
1138	1151	F	1978	3 yr when weaned; within MHR
			1979-82	4-7 yr; no sightings
			1983	8 yr; 14 km S original capture site
			1984-89	9-14 yr; no sightings
1138	1152	M	1978	3 yr when weaned; within MHR
			1979-89	4-14 yr; no sightings
1138	1153	F	1978	2 yr when weaned; within MHR
			1979-84	3-8 yr; no sightings
			1985	9 yr; 42 km ENE original capture site
			1986-89	10-13 yr; no sightings
1139	1140	M	1980	2 yr when weaned; no subsequent sightings
1139	1141	F	1980	2 yr when weaned; remained within MHR
			1981-82	3-4 yr; within MHR
			1983	5 yr; no sightings
			1984-88	6-10 yr; used MHR
			1989	11 yr; within MHR; produced 1st surviving cub
1143	1144	F	1979	2 yr; with mother
			1980-84	3-7 yr; no sightings
			1985	8 yr; recapture within MHR
			1986	9 yr; killed by other bear, vicinity of MHR
1154	1155	M	1979	2 yr when weaned; no subsequent sighting
			1981	4 yr when killed by hunter 45 km W MHR
1167	1434	M	1989	2 yr when weaned; no subsequent sighting
	1435	F	1989	2 yr when weaned; no subsequent sighting
1176	1445	M	1987	1 yr when weaned; killed by 1447 within MHR

Table . Continued.

Maternal female no.	Bear No.	Sex	Year	Age and movement pattern
1178	1179	F	1981	3 yr when weaned; stayed within MHR
			1982	4 yr; within MHR
			1983	5 yr; moved 100 km S; denned
			1984	6 yr; 100 km S MHR; denned
			1985	7 yr; returned to MHR; then moved back 100 km S; denned
			1986	8 yr; remained 100 km S MHR; denned
			1987	9 yr; moved 100 km N to MHR by May; back to Noatak in June; return to MHR in September
			1988	10 yr; within MHR May-September; return to Noatak in September, denned
			1989	11 yr; produced cub at Noatak River
1424	1466	M	1989	2 yr when weaned; moved 93 km east of MHR
1441	1442	M	1988	1 yr when weaned; dead in den in MHR
1441	1443	M	1988	1 yr when weaned; dead in den in MHR
1441	1444	M	1988	1 yr when weaned; within MHR
			1989	2 yr; killed by other bear within MHR
Unknown, probably 1440	1449	M	1987	1 yr when weaned, died in den, vicinity of capture site
Unknown, probably 1440	1450	F	1987	1 yr when weaned, died in den, vicinity of capture site
Unknown	1098	M	1977	3 yr; weaned prior to capture
			1978	4 yr; in vicinity original capture site
			1979-87	5-13 yr; unknown
			1988-89	14-15 yr; in vicinity original capture site
Unknown	1133	M	1977	2 yr when weaned; observed 20 km S of capture site
			1978	3 yr; observed within 20 km capture site
			1979	4 yr; observed within 25 km capture site
			1980-89	5-13 yr; no sightings

Table 8. 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
			1985-87	10-12 yr; remained in vicinity original capture site
			1988	13 yr; unknown, dropped collar
			1989	14 yr; vicinity original capture site
Unknown	1149	F	1978	4 yr; 3 sightings in vicinity capture site
			1987-89	13-15 yr; vicinity original capture site; produced cubs in 1988
Unknown	1156	F	1978	6 yr
			1987	15 yr; vicinity original capture site
			1988	16 yr; dead, within vicinity original capture site
Unknown	1157	M	1978-79	5-6 yr; 3 sightings in vicinity capture site
			1987	15 yr; captured in vicinity original capture site
			1988	16 yr; no sightings
			1989	17 yr; captured in vicinity original capture site

Table 9. Observed presence or absence of marked grizzly bears in the western Brooks Range study area, by sex and age class, 1977-88. 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 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
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	18	A	A	A	A	A	A	A	A	A	A	A/D		
1095	6	18	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	A	A
1097	8	20	A	A	A	A	A	A	A	A	A	A	A	A	A
1100	6	17	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1104	9	19	A	A	A	A	A	A	A	A	A	A	A/D		
1105	7	17	A	A	A	A	A	A	A	A	A	A	A/D		
1106	11	13	A	A	D										
1110	24	28	A	A	A	A	PD								
1111	14	26	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD
1118	17	27	A	A	Unk	Unk	Unk	Unk	Unk	A	A	A	Unk	PD	
1119	6	18	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1121	11	21	A	A	A	A	Unk	Unk	Unk	A	A	A/D			
1127	26	28	A	Unk	PD										
1128	7	19	A	A	Unk	Unk	Unk	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/D							
1138	23	26	A	A	Unk	PD									
1139	11	18		A	A	A	Unk	Unk	A	A	A/D				
1142	14	25		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD
1143	9	20		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1146	14	25		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD

Table 9. Continued.

Bear No.	Age first observed	Age[a] in 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1154	12	23		A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1156	6	16		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	A/D	
1158	7	17	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	
1166	10	20			A	A	A	A	A	A	A	A	A	Unk	Unk
1167	7	17			A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	A	A
1169	11	17				A	A	A	A	A	A	A/D			
1176	18	26				A	A	A	A	A	A	A	A	D	
1178	13	22				A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1406	10	10								A/D					
1407	10	15								A	A	A	A	Unk	A
1410	20	25								A	A	A	Unk	Unk	Unk
1413	6	10									A	A	A	A	Unk
1415	12	16								A	Unk	Unk	Unk	Unk	
1416	11	16									A	A	A	A	A
1417	8	12									A	A	A	A	A
1424	10	13										A	A	A	A
1425	8	11										A	A	A	A
1428	7	10										A	Unk	Unk	Unk
1437	9	11											A	A	A
1438	13	15											A	Unk	Unk
1439	9	11											A	Unk	Unk
1440	13	15											A	A	A
1441	15[c]	17[c]											A	A	A
1451	12	14											A	A	A
1454	12	13												A	Unk
1457	10	11												A	A
1458	9	10												A	A
1460	10	11												A	A
1461	12	13[c]												A	A

Table 9. Continued.

Bear No.	Age first observed	Age[a] in 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1464	13	14												A	Unk
1465	12	13												A	A
1467	9	10												A	Unk
1468	16	17												A	A
1473	6[c]	6[c]													A
1475	24	24													A
1479	9	9													A
Young-aged Females															
1087	1	13	FG	FG	A	A	Unk	Unk	A	A	A	A	A	A	A
1089	4	16	A	A	A	A	Unk	Unk	Unk	Unk	A	A	A	A	A
1093	Cub	10	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1102	2	14	A	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1113	4	16	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1125	3	15	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1129	1	13	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1132	2	14	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1136	1	13	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	Unk
1137	1	13	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1141	Cub	11		FG	FG	A	A	A	Unk	Unk	A	A	A	A	A
1144	Cub	9	FG	FG	FG	Unk	Unk	Unk	Unk	Unk	A	A/D			
1145	2	13		FG	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1149	4	15		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	Unk	A
1151	2	14	FG	FG	Unk	Unk	Unk	Unk	A	A	Unk	Unk	Unk	Unk	Unk
1153	1	13	FG	FG	Unk	Unk	Unk	Unk	Unk	Unk	A	A	A	Unk	Unk
1174	Cub	9				FG	FG	FG	FG	FG	A	A	A	A	Unk
1177	Cub	10			FG	FG	A	A	A	A	A	A	A	Unk	Unk
1179	2	11				FG	A	A	A/M	M	A/M	M	A	A/M	A/M

Table 9. Continued.

Bear No.	Age first observed	Age[a] in 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1181	Cub	7				FG	FG	Unk	A	A	A	A	A/D		
1234	5	11							A	Unk	A	A	A	Unk	Unk
1403	Cub	6					FG	FG	FG	FG	A	A	A	A/D	
1414	2	6									A	A	Unk	Unk	Unk
1445	1	1											D		
1449	1	2											A	D	
1474	4	4													A
1481	Cub	Cub													A
1483	Cub	Cub													A
1484	Cub	Cub													A
Adult[b] Males															
1082	13	24	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	A	A	D
1083	7	18	A	A	A	A	A	Unk	Unk	A	A	A	A	Unk	Unk
1084	7	14	A	Unk	Unk	Unk	Unk	Unk	Unk	M/D					
1091	19	21	A	A	A/D										
1096	7	17	A	A	A	A	A	Unk	Unk	Unk	Unk	Unk	PD		
1099	10	16	A	A	A	A	A	Unk	A	A/M/D					
1103	8	20	A	A	Unk	Unk	Unk	Unk	Unk	Unk	A	A	A	A	A
1114	16	26	A	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD		
1117	19	26	A	Unk	Unk	Unk	Unk	Unk	Unk	PD					
1120	16	26	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	PD		
1124	17	26	A	Unk	Unk	Unk	Unk	Unk	Unk	A	A	PD			
1126	13	25	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1131	8	20	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1148	6	17		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1159	10	21		A	Unk	A	Unk	Unk	A	Unk	Unk	Unk	Unk	Unk	Unk

Table 9. Continued.

Bear No.	Age first observed	Age[a] in 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1172	11	20				A	Unk	Unk	Unk	A	A	Unk	Unk	Unk	Unk
1175	7	15				A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1233	11c	17[c]							A	Unk	A	A	Unk	A	Unk
1261	10	16							A	Unk	Unk	Unk	Unk	Unk	Unk
1401	11	16								A	A	Unk	Unk	Unk	Unk
1405	7	12								A	Unk	Unk	A	A	A
1408	10	15								A	Unk	Unk	Unk	Unk	Unk
1411	9	13									A	Unk	Unk	A	A
1412	14	18									A	A/M/D			
1418	12	16									A	Unk	Unk	Unk	Unk
1420	6	9										A	A	Unk	A
1421	8	11										A	A	Unk	Unk
1446	9	11											A	A	Unk
1448	8	10											A	A	Unk
1453	14	15												A	A
1455	6	7												A	Unk
1456	9	10												A	D
1458	9	10												A	A
1459	13	14												A	A
1463	11	12												A	Unk
1476	10	10													A
1477	9	9													A
1478	12	12													A
Young-aged Males															
1081	5	17	A	Unk	A	A	A	A	A	A	A	A	A	A	A
1094	4	10	A	Unk	Unk	Unk	Unk	Unk	M/D						
1098	3	15	A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	A

Table 9. Continued.

Bear No.	Age first observed	Age[a] in 1989	Presence in population during year												
			1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
1101	2	2	A/D												
1112	4	16	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1115	5	17	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1116	5	17	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1133	2	9	A	A	A	Unk	Unk	Unk	M/D						
1147	3	14		A	Unk	A	Unk	Unk	Unk	A	A	A	A	A	A
1148	6	17		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1150	5	16		A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1152	2	13	FG	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1155	Cub	4	FG	FG	FG	Unk	M/D								
1157	5	16		A	A	Unk	Unk	Unk	Unk	Unk	Unk	Unk	A	Unk	A
1164	1	11	FG	FG	A	A	Unk	Unk	Unk	A	A	A	D		
1165	3	13			A	A	Unk	Unk	Unk	A	A	A	A	Unk	A
1173	Cub	5				FG	FG	FG	FG	FG	A/D				
1232	4	10						A	Unk	Unk	Unk	Unk	Unk	Unk	Unk
1402	Cub	5				FG	FG	FG	FG	FG	A/M	M/D			
1404	Cub	8				FG	FG	FG	FG	FG	A/M	M	Unk	Unk	Unk
1447	4	6	A										A	Unk	Unk
1450	1	1	A										A	D	
1462	4	5												A	A
1466	1	2												A	A
1469	1	2												A	Unk
1470	1	2												A	Unk
1471	Cub	1												A	Unk
1472	Cub	1												A	Unk
1480	Cub	Cub													A
1482	Cub	Cub													A
1485	Cub	Cub													A

Table 9. Continued.

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[a] Age determined from cementum annuli. Age reported represents age in 1989 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.

Appendix A. Grizzly bears immobilized with Telazol, western Brooks Range, 1986-89.

	Age at capture	Date of capture	Weight (kg)	Dose[a] mg/kg	Induction time/effect[b]
Bear no., females ≥6 years of age					
1087	13	6/19/89	100	7.00	3/M
1089	15	6/28/88	126	6.03	6/M
1095	15	6/24/87	100	7.20	4/M
1095	17	6/15/89	111	8.10	8/M
1097	18	5/25/87	109[c]	6.61	4/M
1097	19	6/23/88	141	5.39	6/M
1097	20	6/19/89	100	8.00	3/M
1104	18	6/26/86	111	4.49	5/M
1136	12	6/28/88	100	7.60	3/H
1141	9	5/25/87	86[c]	6.98	7/M
1141	10	6/25/88	105	8.38	2/M
1141	11	6/20/89	116	6.55	2/M
1156	15	6/23/87	98	6.94	7/M
1158	17	7/1/88	118	7.12	2/M
1167	15	6/18/87	91	5.71	11/L
1174	7	6/19/87	80	7.50	4/M
1176	25	6/22/87	118	5.25	8/M
1179	9	6/22/87	120	5.17	4/L
1403	6	5/25/87	77	6.75	3/M
1407	13	6/18/87	109	5.50	5/M
1407	15	6/20/89	107	7.47	3/M
1413	12	6/25/88	123	7.15	6/L
1416	12	6/28/88	116	7.24	11/M
1417	12	6/21/88	119	6.05	3/M
1418	15	6/24/86	109	4.75	-/M
1424	10	6/29/88	150	4.80	4/M
1425	7	6/29/86	91	5.50	2/M
1425	9	6/24/88	100	9.00	2/M
1430	8	5/22/87	86[c]	6.98	3/M
1431	8	5/23/87	114	4.21	7/L
1432	9	5/23/87	118[c]	5.42	2/M
1437	9	6/19/87	73	7.67	3/H
1438	13	6/20/87	100	5.60	8/L
1439	9	6/20/87	95	8.42	3/M
1440	13	6/20/87	100	6.00	3/M
1440	14	6/27/88	114	7.02	5/M
1441	15	6/20/87	123	4.88	6/M
1451	12	6/24/87	109	5.87	8/M
1454	12	6/25/88	131	6.11	8/M
1457	10	6/26/88	107	7.48	5/M
1458	9	6/27/88	105	5.33	6/M

Appendix A. Continued.

	Age at capture	Date of capture	Weight (kg)	Dose[a] mg/kg	Induction time/effect[b]
1464	13	6/29/88	132	6.36	4/M
1465	12	6/29/88	127	6.61	4/M
1465	13	6/14/89	116	8.62	5/M
1467	9	6/29/88	123	6.83	3/M
1468	16	6/30/88	136	5.88	7/M
1473	6	6/14/89	70	11.40	2/M
1475	24	6/15/89	111	11.70	5/M
1479	9	6/18/89	105	8.76	2/M
Bear no., females ≤5 years of age					
1403	5	7/1/86	86	6.07	-/M
1422	Cub	6/26/86	7	4.27	3/L
1445	1	6/20/87	27	11.85	2/M
1452	5[c]	6/20/88	91	9.67	3/M
1474	4	6/14/89	66	12.12	4/M
1481	Cub	6/18/89	6.8	7.35	2/M
1483	Cub	6/18/89	10.7	7.47	5/M
1484	Cub	6/18/89	10	8.00	2/M
Bear no., males ≥6 years of age					
1081	15	6/19/87	164	7.32	1/M
1081	17	6/15/89	189	6.87	6/M
1082	23	6/18/87	168	6.19	4/H
1098	14	6/23/88	228	5.26	6/M
1103	19	6/29/88	253	4.74	15/M
1147	13	6/27/88	170	7.06	4/M
1157	14	6/23/87	118	9.49	2/M
1157	16	6/18/89	170	8.23	5/M
1165	13	6/19/89	152	9.21	8/M
1233	16	6/30/88	198	6.06	3/M
1405	10	6/20/87	150	4.53	4/M
1411	10	6/24/88	216	5.56	5/M
1420	9	6/24/88	150	--	M
1421	16	6/19/89	200	7.00	7/M
1429	18	7/02/86	173	5.76	5/M
1429	19	5/25/87	182[c]	5.49	5/M
1433	14	6/20/88	200[c]	7.00	6/M
1446	9	6/22/87	186	5.38	5/M
1448	8	6/24/87	118	9.49	2/M

Appendix A. Continued.

	Age at capture	Date of capture	Weight (kg)	Dose[a] mg/kg	Induction time/effect[b]
1453	14	6/25/88	182	6.59	4/M
1455	6	6/25/88	157	7.64	4/M
1456	9	6/26/88	205	6.24	4/M
1459	13	6/27/88	173	6.94	4/M
1463	11	6/28/88	148	8.11	3/H
1476	10	6/15/89	164	8.53	5/M
1477	9	6/15/89	182	7.69	4/M
1478	12	6/18/89	166	8.43	5/M
Bear no., males ≤5 years of age					
1423	Cub	6/26/86	5	5.98	3/M
1442	1	6/24/88	27	16.30	2/M
1443	1	6/24/88	23	19.13	2/M
1444	1	6/24/88	27	16.30	3/M
1447	4	6/23/87	100	6.80	5/M
1462	4	6/27/88	93	5.59	7/L
1466	1	6/29/88	61	8.52	3/M
1466	2	6/19/89	79	6.58	3/M
1469	1	7/1/88	32	13.75	<1/H
1470	1	7/1/88	32	13.75	2/M
1480	Cub	6/18/89	9	5.55	2/M
1482	Cub	6/18/89	7.7	6.49	2/M
1485	Cub	6/20/89	16	3.12	2/L

[a] Drugs were administered at a concentration of 200 mg/ml.

[b] Time in minutes; effects were estimated as light, L; moderate, M, or heavy, H.

[c] Estimate after close examination.

Appendix B. Total annual and cumulative captures of grizzly bears in the Western Brooks Range, 1977-89.

Year	Bear number: Initial captures	Bear number: Recaptures	Annual total captures: Initial captures	Annual total captures: Recaptures	Cumulative total captures: Initial captures	Cumulative total captures: Initial captures and recapture
1977	1081-1138	1082(3),1983,1084,1086(2), 1089,1097,1104,1105	58	11	58	69
1978	1139-1163	1082,1083,1096,1099,1100, 1102,1103,1105,1110,1138	25	10	83	104
1979	1164-1168	1081,1082,1083,1086,1087, 1096,1099,1100,1110,1133, 1157	5	11	88	120
1980	1169-1181	1081(2),1082,1087,1092, 1096,1097(2),1102,1104, 1105,1134,1141,1147,1159, 1164,1166	13	17	101	150
1981-82	None	None				
1983	1232-34, 1261	1092,1097,1099,1104,1105, 1134,1139,1151,1159,1166, 1169,1177,1179,1181	4	14	105	168
1984	1401-1410	1081(2),1083,1987,1118, 1121,1124,1141,1147,1164, 1165,1172,1173,1174,1176, 1181	10	16	115	194
1985	1411-1418	1083,1089,1092,1097,1103, 1104,1105,1141,1144,1153, 1169,1173,1174,1177,1179, 1181,1233,1234,1402,1403, 1404	8	21	123	223

Appendix B. Continued.

Year	Bear number: Initial captures	Bear number: Recaptures	Annual total captures: Initial captures	Annual total captures: Recaptures	Cumulative total captures: Initial captures	Cumulative total captures: Initial captures and recapture
1986	1420-1428	1104,1147,1164,1174,1177, 1402,1403	9	7	132	239
1987	1434-1451	1081,1082,1095,1097,1141, 1149,1156,1157,1167,1174, 1176,1179,1403,1405,1407	18	15	150	272
1988	1453-1472	1089,1103,1136(2),1141, 1147,1158,1233,1411(2), 1413,1416,1417,1420,1440, 1442,1443,1444	20	18	170	310
1989	1473-1485	1081,1087,1095,1097,1141, 1157,1165,1407,1421,1465, 1466	13	11	183	335

Appendix C. Intraspecific relationships of grizzly bears in the study area population, western Brooks Range, Alaska 1977-90.

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1081M	5/77	1977--NO; 1978--UNK; 1979--B/1097, UMF; 1980--B/1097, UMF; 1981--B/1167, 1087, UMF; 1982--B/UMF; 1983-88--NO; 1989--B/1416, 1157; 1990--NO
1082M	13/77	1977--B/1105, 1128, UMF; 1978--B/UMF; 1979--B/1105, UMF; 1980--NO; 1981--B/UMF; 1987--B/1403; 1988--NO, died
1083M	7/77	1977--B/1085; 1978--NO; 1979--B/1100; 1980--B/1100, UMF; 1981--aggressively followed 1086 and 2 UM cubs, killed them?; 1982-83 UNK; 1984-86--NO; 1987--B/1177; 1988-present--UNK
1084M	7/77	1977--NO; 1978-83--UNK, probably emigrated; 1984--hunter kill outside the study area.
1085F	19/77	1977--B/1099; 1978--NO; 1979--NO; 1980--NO; 1981-presumed dead
1086F	16/77	1977--2 ylg (1087, 1164); 1978--2 2yr; 1979--2 3yr, B/1096, 1099; 1980--2 UM cub, presumed dead (killed by 1083?)
1087F	1/77	1977--w/mother (1086) and sibl (1164); 1978--same; 1979--weaned; 1980--NO; 1981--B/1081; 1982--NO; 1983--UNK; 1984--B/UMM; 1985--NO; 1986--lost 2 UM cub, NO; 1987--lost 1 UM cub, NO; 1988--NO; 1989--2 cub (1483, 1484); 1990--2 ylg
1088M	4/77	1977--NO, outside study area; 1978--NO; 1979--B/UMF; 1980-88--UNK; 1989--hunter kill outside study area
1089F	4/77	1977--NO; 1978--NO; 1979--2 UM cub; 1980-81--UNK; 1982--1 UM cub; 1983-84--UNK; 1985--NO; 1986--2 UM cub; 1987--1 ylg; 1988--B/1411, UMM; 1989--3 cub; 1990--3 ylg (1704, 1705, 1706)
1090F	18/77	1977--3 ylg; 1978--3 2yr; 1979--3 3yr, NO; 1980-81--UNK; 1982--presumed dead
1091M	19/77	1977--NO; 1978--B/UMF; 1979--presumed dead
1092F	8/77	1977--1 cub (1093); 1978--1 ylg; 1979--1 2yr, NO; 1980--B/1175, UMM; 1981--NO; 1982--B/UMM; 1983--NO; 1984--NO; 1985--NO; 1986--NO; 1987--NO, hunter kill
1093F	C/77	1977-78--w/mother (1092); 1979--weaned; 1980--presumed emigrated

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1094M	4/77	1977--UNK; 1978-82--presumed emigrated; 1983--hunter kill outside study area
1095F	6/77	1977--NO; 1978--NO; 1979-84--UNK; 1985--NO; 1986--2 UM cub; 1987--2 ylg; 1988--2 2yr; 1989--2 3yr, B/1477, UMM; 1990--2 UM cub
1096M	7/77	1977--B/1097, 1104, UMF; 1978--B/1097, 1142; 1979--B/1102, 1086; 1980--B/1097; 1981--B/1167; 1982-present--UNK
1097F	8/77	1977--B/1096; 1978--B/1096; 1979--2 UM cub, B/1081, UMM; 1980--2 UM cub, B/1081, 1096, 1172; 1981--3 cub (1402, 1403, 1404); 1982--3 ylg; 1983--3 2yr; 1984--3 3yr; 1985--3 4yr/NO; 1986--NO; 1987--B/M?M; 1988--NO; 1989--3 cub (1480, 1481, 1482); 1990--2 ylg
1098M	3/77	1977--NO; 1978--UNK; 1979--possibly B/1100; 1980-88--UNK; 1989--B/UMF; 1990--UNK
1099M	10/77	1977--B/1085, UMF, killed 1101; 1978--killed cub of 1104?, B/1104; 1979--B/1086, 1102, probably killed 1106 and 2 2yr; 1980--NO; 1981--NO; 1982--B/1104; 1983--NO, hunter kill outside study area
1100F	6/77	1977--NO; 1978--NO; 1979--2 UM cub, B/1083, 1131, and 1159 or 1098?; 1980--B/1083; 1981-present--UNK
1101M	2/77	1977--mother probably 1104, weaned w/sibl (1102), killed by 1099
1102F	2/77	1977--mother probably 1104, weaned w/sibl (1101), 1978--NO; 1979--B/1096, 1099; 1980--2 cub (1180, 1181); 1981--NO; 1982--1 UM cub; 1983-present--UNK
1103M	8/77	1977--B/1104; 1978--B/UMF; 1979-84--UNK; 1985--B/1104; 1986-87--UNK; 1988--B/1468?, UMF; 1989--B/1424; 1990--UNK
1104F	9/77	1977--probably weaned 2 2yr (1101, 1102), B/1096, 1103; 1978--1 UM cub killed by 1099?, B/1099; 1979--1 cub (1177); 1980--1 ylg; 1981--1 2yr, B/UMM; 1982--B/1099, UMM; 1983--NO; 1984--B/1261, UMM; 1985--B/1103, 1233, UMM; 1986--2 UM cub lost both; 1987--NO, killed by MM in Sept

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1105F	7/77	1977--B/1082, 1124; 1978--B/1131?; 1979--1 UM cub, B/1082, UMM; 1980--2 cub (1173, 1174); 1981--2 ylg; 1982--2 2yr; 1983--2 3yr; 1984--2 4yr; 1985--2 5yr, B/UMM; 1986--NO; 1987--1+ UM cub, lost cub, B/1147, killed by hunter
1106F	11/77	1977--3 cub (1107, 1108, 1109); 1978--3 ylg, 1107 died at den emergence; 1979--killed by adult male (probably 1099), 2 2yr also probably killed
1107F	C/77	1977--w/mother (1106) and sibl (1108, 1109); 1978--died at den emergence
1108F	C/77	1977--w/mother (1106) and sibl (1107, 1109); 1978--w/1106, 1109; 1979--probably killed by 1099
1109F	C/77	1977--w/mother (1106) and sibl (1107, 1108); 1978--w/1106, 1108; 1979--probably killed by 1099
1110F	24/77	1977--NO; 1978--2 cub (1160, 1161); 1979--2 ylg; 1980--2 2yr; 1981--2 3yr; 1982--presumed dead
1111F	14/77	1977--2 4yr (1112, 1113), B/1131, returned to 2 4yr; 1978--2 5yr; 1979--3 UM cub; 1980-present--UNK
1112M	4/77	1977--w/mother (1111) and sibl (1113), weaned, then accepted again by mother; 1978--presumed emigrated
1113F	4/77	1977--w/mother (1111) and sibl (1112), weaned, then accepted again by mother; 1978-present--UNK
1114M	16/77	1977-9--NO; 1980-present--UNK
1115M	5/77	1977--NO; 1978-present--UNK
1116M	5/77	1977--NO; 1978-present--UNK
1117M	19/77	1977--NO; 1978-present--UNK
1118F	17/77	1977--NO; 1978--2 UM cub; 1979--2 ylg; 1980-83--UNK; 1984--NO; 1985--B/UMM; 1986--NO; 1987--presumed dead.
1119F	6/77	1977--NO; 1978--NO; 1979-present--UNK
1120M	20/77	1977--NO; 1978--NO; 1979-present--UNK

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1121F	11/77	1977--2 cub (1122, 1123); 1978--2 ylg; 1979--2 2yr, NO; 1980--2 UM cub; 1981-83--UNK; 1984--NO; 1985--NO; 1986--1 UM cub, lost cub, B/UMM; 1987--killed by other bear, Sept-Oct
1122M	C/77	1977--w/mother (1121) sibl (1123); 1978--same; 1979--weaned; 1980-present--UNK
1123F	C/77	1977--w/mother (1121) sibl (1122); 1978--same; 1979--weaned; 1980-present--UNK
1124M	17/77	1977--B/1105; 1978-83--UNK; 1984--NO; 1985-present--UNK
1125F	3/77	1977--NO; 1978-present--UNK
1126M	13/77	1977--B/1127; 1978-present--UNK
1127F	26/77	1977--B/1126; 1978--UNK; 1979--presumed dead
1128F	7/77	1977--1 ylg (1129), weaned, B/1082; 1978--3 UM cub; 1979-present--UNK
1129F	1/77	1977--w/mother (1128), not seen w/mother after capture
1130F	21/77	1977--2 UM cub; 1978--1 ylg; 1979-81--UNK; 1982--presumed dead
1131M	8/77	1977--B/1111; 1978--B/1105?; 1979--B?/1100; 1980-present--UNK
1132F	2/77	1977--w/sibl (1133); 1978-present--UNK
1133M	2/77	1977--w/sibl (1132); 1978--NO; 1979--NO; 1980-82--UNK, emigrated?; 1983--hunter kill outside study area
1134F	14/77	1977--3 ylg (1135, 1136, 1137); 1978--2 2yr(1136, 1137); 1979--2 3yr, NO; 1980--1 UM cub, B/UNK male; 1981--B/UMM; 1982--3 UM cub; 1983--no ylg, dead
1135M	1/77	1977--w/mother (1134) and sibl (1136, 1137), presumed dead
1136F	1/77	1977--w/mother (1134) and sibl (1135, 1137); 1978--w/mother (1134) and sibl (1137); 1979--weaned; 1980--NO; 1981-86--UNK; 1987--UNK, 2+ cub; 1988--2 ylg (1469, 1470); 1989-present--UNK

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1137F	1/77	1977--w/mother (1134) and sibl (1135, 1136); 1978--w/mother (1134) and sibl (1136); 1979--weaned; 1980-present--UNK
1138F	23/77	1977--2 2yr (1151, 1153) and 1 ylg (1152); 1978--2 3yr, 1 2yr; 1979--UNK, presumed dead
1139F	11/78	1978--2 cub (1140, 1141); 1979--2 ylg; 1980--2 2yr, NO; 1981--3 UM cub; 1982--3 ylg; 1983--2 2yr; 1984--2 3yr, NO; 1985--dead
1140M	C/78	1978--w/mother (1139) and sibl (1141); 1979--same; 1980--weaned; 1981-present--UNK
1141F	C/78	1978--w/mother (1139) sibl (1140); 1979--same; 1980--weaned; 1981--NO; 1982--NO; 1983-84--UNK; 1985--NO; 1986--1 UM cub, lost cub; 1987--cub?, NO; 1988--B/1456, UMM; 1989--1 cub (1485); 1990--1 ylg
1142F	14/78	1978--B/1096, UMM; 1979-present--UNK
1143F	9/78	1977--2 cub (1144, UM); 1978--2 ylg; 1979--2 2yr; 1980-present--UNK
1144F	1/78	1978--w/mother (1143) and UM sibl; 1979-84--UNK; 1985--NO; 1986--dead, eaten by other bear
1145F	2/78	1978--w/mother (1146); 1979--weaned; 1980--NO; 1981-present--UNK
1146F	14/78	1978--1 2yr (1145); 1979--1 3yr, NO; 1980-present--UNK
1147M	3/78	1978- NO; 1979-83--UNK; 1984-86--NO; 1987--B/1174, 1425, 1105; 1988--UNK; 1989--B/1441, 1424; 1990--UNK
1148M	6/78	1978--NO; 1979-present--UNK
1149F	4/78	1978--NO; 1979-86--UNK; 1987--NO; 1988--2 cub (1486, 1487); 1989--2 ylg; 1990--2 2yr
1150M	5/78	1978--NO; 1979-present--UNK
1151F	3/78	1977--w/mother (1138) and sibl (1152, 1153); 1978--same; 1979--weaned, UNK; 1980-82--UNK; 1983-84--NO; 1985-present--UNK

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1152M	3/78	1977--w/mother (1138) and sibl (1151, 1153); 1978--same; 1979--weaned, UNK; 1980-present--UNK
1153F	2/78	1977--w/mother (1138) and sibl (1151, 1152); 1978--same; 1979--weaned, UNK; 1980-82--UNK; 1983--NO; 1984--NO; 1985--NO; 1986--2 UM cub; 1987-present--UNK
1154F	12/78	1978--1 ylg (1155); 1979--1 2yr; 1980--1 3yr, NO; 1981--2 UM cub; 1982-present--UNK
1155M	1/78	1977--w/mother (1154); 1978-79--same; 1980--weaned, NO; 1981--hunter kill outside study area
1156F	6/78	1978--NO; 1979-86--UNK; 1987--B/1157; 1988--w/cubs?, killed by other bear
1157M	5/78	1978--B/UMF; 1979-86--UNK; 1987--B/1156; 1988--UNK; 1989--NO; 1990--UNK
1158F	7/78	1978--NO; 1979-86--UNK; 1987--NO; 1988--2 cub (1471, 1472); 1989-present--UNK
1159M	10/78	1978--NO; 1979--B?/1100; 1980--NO; 1981-82--UNK; 1983--NO; 1984-present--UNK
1160M	C/78	1978--w/mother (1110) and sibl (1161); 1979-present--UNK
1161M	C/78	1978--w/mother (1110) and sibl (1160); 1979-present--UNK
1162M	2/78	1978--dead, probably sibl of 1163
1163M	2/78	1978--NO, probably sibl of 1162; 1979-present--UNK
1164M	3/79	1977--w/mother (1086) and sibl (1087); 1978--same; 1979-weaned; 1980--NO; 1981-83--UNK; 1984-85--NO; 1986--B/1413; 1987--hunter kill within study area
1165M	3/79	1979-80--NO; 1981-83--UNK; 1984-85--NO; 1986--B/1403, UMF; 1987--NO; 1988--NO; 1989--B/1167; 1990--UNK
1166F	10/79	1979-80--NO; 1981--3 UM cub, lost 2 cubs; 1982--1 ylg; 1983--1 2yr, NO; 1984-85--NO; 1986--1 UM cub; 1987-88--UNK; 1989--2+ cub, UNK; 1990--2 ylg (1701, 1702)

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1167F	7/79	1978--UNK; 1979--1 cub (1168) lost; 1980--B/UMM; 1981--B/1081, 1096; 1982--B/UMM; 1983-86--UNK; 1987--3 cub (1434, 1435, 1436), (lost 1434 prior to 6/23/87); 1988--2 ylg; 1989--2 2yr, B/1165; 1990--3 UM cub, lost cubs, NO
1168F	C/79	1979--w/mother (1167); 1980--dead
1169F	11/80	1980--2 cub (1170, 1171); 1981--B/M?M; 1982--2 UM cub; 1983--2 ylg (only 1 ylg 6/18/83); 1984--NO; 1985--3 UM cub; 1986--killed by other bear
1170F	C/80	1980--w/mother (1169), died
1171M	C/80	1980--w/mother (1169), died
1172M	11/80	1980--B/1097; 1981-83--UNK; 1984-85--NO; 1986-present--UNK
1173M	C/80	1980--w/mother (1105) and sibl (1174); 1981-84--same; 1985--weaned; 1986--died
1174F	C/80	1980--w/mother (1105) and sibl (1173); 1981-84--same; 1985--weaned; 1986--NO; 1987--B/1147; 1988--B/UMM; 1989--UNK, 1+ cub; 1990--1 ylg (1497)
1175M	7/80	1980--B/1092; 1981-present--UNK
1176F	18/80	1980--NO; 1981--2 cub; 1982--1 ylg; 1983--UNK; 1984--2 cub (1409, 1 UM); 1985--NO; 1986--1 cub (1445); 1987--weaned ylg, B/1446, 1405, 1421, dead
1177F	1/80	1979--w/mother (1104); 1980--same; 1981--weaned, UNK; 1982--UNK; 1983--NO; 1984--UNK; 1985--B/UMM; 1986--NO; 1987--B/1083; 1988--NO; 1989--UNK, 1+ cub; 1990--1 ylg (1496)
1178F	13/80	1979--UNK 1+ ylg; 1980--1 2yr (1179); 1981--1 3yr, B/UMM; 1982--2 UM cub, B/UMM, M?M; 1983-present--UNK
1179F	2/80	1980--w/mother (1178); 1981--NO; 1982--UNK; 1983--B/1261; 1984--UNK; 1985-87--NO; 1988--emigrated south to Noatak R.; 1989--1 UM cub; 1990--UNK
1180F	C/80	1980--w/mother (1102) and sibl (1181), dead
1181F	C/80	1980--w/mother (1102) and sibl (1180); 1981-82--UNK; 1983-85--NO; 1986--2 UM cub, B?; 1987--dead at den

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1232M	4/83	1983--NO; 1984-present--UNK
1233M	11/83	1983--B/1104; 1984--UNK; 1985--B/1104; 1986--NO; 1987--UNK; 1988-89--NO; 1990--UNK
1234F	5/83	1983--NO; 1984--UNK; 1985--NO; 1986--2 UM cub, lost?; 1987--NO; 1988-present--UNK
1261M	10/83	1983--B/1104, 1179; 1984-present--UNK
1401M	11/84	1984-85--NO; 1986-present--UNK
1402M	3/84	1981--w/mother (1197) and sibl (1403, 1404); 1982-84--same; 1985--weaned; 1986--moved SE, outside study area, B/UMF, hunter kill
1403F	3/84	1981--w/mother (1197) and sibl (1402, 1404); 1982-84--same; 1985--weaned; 1986--B/1165; 1987--B/1446, UMM; 1988--killed by other bear
1404M	3/84	1981--w/mother (1197) and sibl (1402, 1403); 1982-84--same; 1985--weaned; 1986-moved outside study area; 1987-present--UNK
1405M	7/84	1984--NO; 1985-86--UNK; 1987--B/1176; 1988-89--NO; 1990--UNK
1406F	10/84	1984--killed by other bear
1407F	10/84	1984-85--NO; 1986--2 UM cubs; 1987--lost cubs, NO; 1988--NO; 1989--3 UM cub, lost; 1990--B/UNK male
1408M	10/84	History unknown, not collared
1409M	C/84	1984--w/mother (1176) and UM sibl; 1985--presumed dead
1410F	20/84	1984--NO; 1985-present--UNK, presumed dead
1411M	7/85	1984--NO; 1985-87--UNK; 1988--B/1089; 1989--B/1417; 1990--UNK
1412M	15/85	1985--NO; 1986--NO, hunter kill
1413F	9/85	1985--NO; 1986--3 UM cub, B/1164; 1987--NO; 1988--cub?, NO; 1989-present--UNK

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1414F	2/85	History unknown, not collared
1415F	14/85	1985--NO; 1986-present--UNK
1416F	8/85	1985--NO; 1986--1 UM cub, lost cub, NO; 1987--3 UM cub; 1988--2 ylg; 1989--weaned 2 2yr, B/1081, re-unite w/2 2yr; 1990--wean 2 3yr, B/UNK male
1417F	8/85	1985-88--NO; 1989--B/1411, 1459; 1990--NO
1418M	15/86	History unknown, not collared
1420M	7/86	1986--B/1105; 1987--NO; 1988--B/1425; 1989-present--UNK
1421M	13/86	1986-88--NO; 1989-present--UNK
1422F	C/86	1986--w/mother (1104) and sibl (1423), dead
1423M	C/86	1986--w/mother (1104) and sibl (1422), dead
1424F	8/86	1986--NO; 1987--1 cub (1466); 1988--1 ylg; 1989--1 2yr, B/1147; 1990--2 UM cub, lost cubs, NO
1425F	7/86	1985--NO; 1986--2 cub (1426, 1427), lost cubs, NO; 1987--B/1147, UMM; 1988--NO; 1989--3 cub (1708, 1709, 1710); 1990--3 ylg
1426F	C/86	1986--w/mother (1425) and sibl (1427), dead
1427M	C/86	1986--w/mother (1425) and sibl (1426), dead
1428F	7/86	1986--NO; 1987--UNK; 1988--NO; 1989-present--UNK
1434M	C/87	1987--w/mother (1167) and sibl (1435, 1436), dead
1435F	C/87	1987--w/mother (1167) and sibl (1434, 1436); 1988--w/mother and sibl (1436); 1989--weaned, UNK; 1990--UNK
1436F	C/87	1987--w/mother (1167) and sibl (1434, 1435); 1988--w/mother and sibl (1435); 1989--weaned, UNK; 1990---UNK
1437F	9/87	1986--NO; 1987--1 UM cub; 1988--UNK; 1989--B/UMM; 1990--2 cub (1488, 1489)
1438F	13/87	1987--3 UM 2yr; 1988--NO; 1989-present--UNK

Appendix C. Continued

Bear no.& sex	Age/ year at capture	Year of status and description of intraspecific relationship[b]
1439F	14/87	1987--3 UM 2yr; 1988--NO; 1989-present--UNK
1440F	14/87	1987--B/UNK MM; 1988--B/1459; 1989--1 cub (1707); 1990--1 ylg
1441F	15/87	1987--3 cub (1442, 1443, 1444); 1988--3 ylg, weaned, B/UMM; 1989--B/1124, 1147; 1990--UNK
1442M	C/87	1987--w/mother (1441) and sibl (1443, 1444); 1988--weaned; 1989--killed by other bear
1443M	C/87	1987--w/mother (1441) and sibl (1443, 1444); 1988--weaned; 1989--died in den
1444M	C/87	1987--w/mother (1441) and sibl (1443, 1444); 1988--weaned; 1989--died in den
1445F	1/87	1986--w/mother (1176); 1987--weaned, killed by 1447
1446M	15/87	1987--B/1176, 1403; 1988-present--UNK
1447M	4/87	1987--killed 1445; 1988-present--UNK
1448M	8/87	1987--NO; 1988-present--UNK
1449M	1/87	1986--w/mother (probably 1440) and sibl (1450); 1987--weaned; 1988--died in den w/1450
1450F	1/87	1986--w/mother (probably 1440) and sibl (1449); 1987--weaned; 1988--died in den w/1449
1451F	14/87	1987--NO; 1988--2 UM cub; 1989--2 ylg; 1990--UNK
1453M	18/88	1988--B/1454; 1989--B/1468; 1990--UNK
1454F	10/88	1988--B/1453; 1989--3 cub (1498, 1449, 1500); 1990--3 ylg
1455M	7/88	1988--B/1141; 1989-present--UNK, not collared
1456M	10/88	1988--B/1441, 1141; 1989--hunter kill
1457F	10/88	1988-89--NO; 1990--UNK
1458F	7/88	1988--B/1459; 1989--2 cub (1494, 1495); 1990--2 ylg
1459M	17/88	1988--B/1440, 1458, 1460; 1989--B/1473, 1417, UMF; 1990--UNK

C. Continued

Age/ ear at apture	Year of status and description of intraspecific relationship[b]	onship[b]
8/88	1988--B/1459; 1989--3 cub; 1990--2 ylg (1492, 1493)	mother
/88	1988--B/1459, UMM; 1989--NO; 1990--UNK	mother
/88	1988-89--NO; 1990--UNK	
/88	History unknown, not collared	
/88	1988--NO; 1989--3 UM cub; 1990--3 ylg	
3/88	1988--NO; 1989--3 UM cub; 1990--no ylg, NO	
88	1987--w/mother (1424); 1988--same; 1989--weaned, moved out of study area; 1990--UNK	cub of
88	1988--produced cub?, B/1103?; 1989-present--UNK	
/88	1988--NO; 1989--B/1453, UMM; 1990--UNK	
88	1987--UNK, w/mother (1136) and sibl (1470); 1988--with mother and sibl; 1989-present--UNK	le or
88	1987--UNK, w/mother (1136) and sibl (1469); 1988--with mother and sibl; 1989-present--UNK	
88	1988--w/mother (1158) and sibl (1472); 1989-present--UNK	
/88	1988--w/mother (1158) and sibl (1471); 1989-present--UNK	
89	1989--B/1459; 1990--NO	
89	1989--NO; 1990--observed with UM small bear	
/89	1989--NO; 1990--UNK, not collared	
89	1989--NO; 1990--UNK, not collared	
/89	1989--B/1095; present--UNK, not collared	
89	1989--B/1479; present--UNK, not collared	
89	1989--B/1478; 1990--B/1405, 1491	
'89	1989--w/mother (1097) and sibl (1481, 1482); 1990--w/mother and 1 sibl (1 sibl dead)	