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BROWN/GRIZZLY BEAR

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STATEWIDE HARVEST AND POPULATION STATUS

Brown/grizzly bear populations, statewide, continue to exist at high levels. While population density data are difficult to obtain with this species and are often "educated guesses," populations generally appear healthy and abundant. Only in a few localized situations are problems with overharvests suspected.

Brown bear harvests continued to be relatively high, although success was curtailed in a number of units this year by a late spring and inclement weather. The highest recorded harvest was achieved in Unit 9 (227 bears), followed by Unit 8 (187 bears), and Unit 13 (146 bears). Mortality of bears due to "defense of life or property" (DLP) situations continues to increase and in some units (e.g., Unit 8) is becoming a significant source of bear mortality. Mortality data for bears in remote areas, particularly northwest Alaska, greatly underestimate true mortality, due to the continuing problem of noncompliance with reporting and sealing requirements.

The known take of bears, by unit, is summarized on the following page.

Robert A. Hinman
Deputy Director

Unit	Bears taken by hunters	DLP kill
1	22	4
4	87	5
5	30*	--
6	39	3
7 & 15	15**	2
8	187	24
9	227	10
10	7	--
11	6	--
12	21	--
13	146**	--
14	10	--
16	92**	--
17	57**	10
18	20	2
19	24	--
20	35	3
21	11	--
22	53	2
23	37	--
24	3	3
25	15	2
26	17	3

* Includes both sport-hunted and DLP bears.

** Record high harvest for this unit.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1

GEOGRAPHICAL DESCRIPTION: Southeast mainland

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Mortality

Based on brown bear sealing documents, the 1985 sport harvest in Unit 1 was 22 bears (10 males, 9 females, and 3 of unknown sex). In addition, 4 bears were taken in defense of life or property as follows: Subunit 1A, 1 male; Subunit 1C, 1 female; and Subunit 1D, 2 males. Resident hunters accounted for 17 bears and nonresidents for 5.

Eleven bears (6 males, 3 females, and 2 of unknown sex) were taken during the spring season, all in May. Eleven bears (4 males, 6 females, and 1 of unknown sex) were taken during the fall season: September, 6 bears; October, 4 bears; and November, 1 bear.

The mean skull size of males in 1985 was 22.6 inches ($\underline{n}$ = 10) and the mean cementum age was 9.3 years ($\underline{n}$ = 8). The 25-year average male skull size and cementum age were 22.2 inches and 7.7 years, respectively.

Management Summary and Recommendations

The 1985 sport harvest of 22 bears was higher than the previous 24-year average annual harvest of 15.7 animals. Since 1961, annual harvest levels have fluctuated greatly because of changes in the resident hunter take, either in 1 subunit or a combination of the 4 subunits.

An increase in hunting pressure and harvest is anticipated in Unit 1 as human populations and development of remote areas increase. Bear harvest levels in these areas should be closely monitored to maintain proper population levels.

Residents of Haines have expressed a desire to increase the take of brown bear in the Chilkat River drainage. Some people

believe that brown bear population numbers are high and causing a reduction in moose calf survival.

No changes in season or bag limit are recommended.

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BROWN BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 4

GEOGRAPHIC DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent Islands

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Mortality

The 1985 total known kill of brown bears from Unit 4 was 92 (87 sport and 5 nonsport). Sport harvest statistics for 1961-86 are shown in Table 1.

Management Summary and Recommendations

The 1985 kill was slightly above the desired annual harvest (60-80 bears) but characteristics of the harvest (Table 1) were within normal ranges for the unit. For unknown reasons, the percentage of the harvest taken in fall (48%) was considerably higher than the 1961-84 fall season mean (30%). Mean age of male bears taken during 1981-85 (6.4 years) was lower than the mean for 1969-80 (7.3 years). I believe the reduction in mean age is a reflection of the shorter season and less selectivity by sport hunters, rather than a reduction in the age of males in the population at large.

Population trend and/or composition counts should be initiated in the unit. In the absence of other information, kill data may no longer be an adequate basis for management decisions. Spring beach counts, alpine counts in July, and stream counts when bears are concentrating on salmon should be tested in conjunction with research activities.

No changes are recommended in season or bag limits.

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Table 1. Brown bear sport harvest, 1961-85, Unit 4.

Calendar year	Total kill	Kill in spring (%)	Males (%)	Nonresident kill (%)	Skull size[a]		Mean age			
					$\bar{x}$	n	Male	n	Female	n
1961	39	72	79	62	24.7	12	--	--	--	--
1962	44	73	67	66	23.9	8	--	--	--	--
1963	26	69	73	58	22.4	9	--	--	--	--
1964	55	73	69	44	23.7	13	--	--	--	--
1965	68	63	66	52	23.5	11	--	--	--	--
1966	76	65	68	67	22.4	24	--	--	--	--
1967	69	61	68	48	23.0	20	--	--	--	--
1968	50	74	78	32	22.2	30	--	--	--	--
1969	65	66	75	55	22.7	46	6.5	32	5.6	9
1970	72	79	72	51	22.0	50	7.1	37	7.9	5
1971	79	78	71	52	22.5	47	7.5	47	8.0	19
1972	77	66	75	53	22.5	56	8.4	54	6.0	17
1973	99	72	68	40	21.6	64	7.2	63	7.9	31
1974	86	73	75	50	22.1	54	7.1	58	7.3	21
1975	105	72	70	57	22.3	69	7.5	68	6.0	28
1976	142	79	65	61	22.4	90	9.1	89	8.2	49
1977	67	84	71	55	21.6	43	6.8	44	8.0	17
1978	67	73	75	54	21.6	49	7.2	47	7.3	16
1979	51	69	68	71	21.1	31	6.3	29	6.0	13
1980	65	60	67	55	22.1	39	7.2	42	7.9	21
1981	62	65	68	61	21.3	40	6.3	42	7.8	20
1982	51	55	71	49	21.5	33	6.2	35	5.3	15
1983	80	57	78	49	21.7	60	6.6	62	8.4	15
1984	111	68	67	47	21.7	73	6.5	72	6.2	27
1985	87	52	62	57	21.5	50	6.5	52	7.4	31

[a] Skull size equals total skull length plus zygomatic width.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 5

GEOGRAPHICAL DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf Coast

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Unlike 1984, problems with bear-human interactions were few in 1985. The reduction in bear problems was probably not caused by a change in population level but rather by a late spring. Deep snow levels, persisting on the forelands through mid-May, probably altered bear movement patterns. Also, emergence of herbaceous vegetation was delayed, similarly affecting bear movement patterns. Harvest levels were similar to those of the past 7 years, indicating a stable population.

Systematic scat surveys were conducted along the Harlequin Lake Road for the 3rd consecutive year (Table 1). The late spring and persistent snow accumulations probably caused the late peak counts (Table 2). No bear scats contained moose hair during the 10-week count period. The number of scats/mile of road during the peak period was higher compared with the previous 2 years.

Mortality

Four brown bears were killed under "defense of life or property" (DLP) provisions during 1985. Three bears, 1 male and 1 female and her male cub, were killed in early May; another male was killed in mid-June. All 4 bears were killed by members of the public in the immediate vicinity of Yakutat residences. A reliable report was made to Department staff that at least 6 bears were killed illegally in Subunit 5B during the report period.

During the spring sport season, 8 bears (4 males and 4 females), were taken by 5 nonresident and 3 resident hunters (Table 3). The fall harvest (9 males, 8 females, and 1 of unknown sex) was taken by 15 nonresident and 3 resident

hunters. Successful spring sport hunters averaged 7.8 days afield (n = 8); successful fall sport hunters averaged 2.9 days (n = 18) afield. All spring bears were killed in Subunit 5A. During the fall, 6 bears were killed in Subunit 5B, and 12 bears were taken in Subunit 5A.

The mean age of 8 male bears taken in the spring was 6.2 years (range = 2.4-11.4). Nine fall males ranged from 3.8 to 8.8 years ($\bar{x}$ = 5.5) and 8 fall females ranged from 4.8 to 14.8 years ($\bar{x}$ = 7.6). Spring male and female bears had skull sizes averaging 22.0 and 20.8 inches, respectively. Fall skull sizes averaged 22.3 inches for males and 21.5 inches for females.

Management Summary and Recommendations

During the past 25 years, the mean skull size of the annual harvest has remained similar, averaging 22.2 inches. The largest bear ever recorded from Yakutat, taken in 1973, had a skull size of 29 inches. The 25-year average age of male bears is 5.9 years, similar to the 1985 mean of 5.8. The mean age of the kill has been similar since 1976, ranging from 5.1 to 8.3 years. The total male bear harvest has increased since about 1974; the record high kill was in 1984 (25). The record total harvest was also in 1984. The 25-year mean male harvest is about 13 bears.

Considering the increasing trend in harvest level since the mid-1970's, data from bears killed, especially age, should be monitored closely. Indication of reduced average age may warrant adjusting seasons. Early information from the spring 1986 season indicates that hunting effort has increased. Thus, harvest data should be evaluated to detect possible trends.

Little progress has been made in reducing bear use of the city's landfill. The City of Yakutat made some attempts to upgrade the fence, but not to a "bear-proof" level. Efforts to improve the landfill situation, with emphasis on standards for proper garbage disposal, will be continued with the city of Yakutat, the Department of Environmental Conservation, local restaurants, and the public.

No changes in seasons or bag limits are recommended at this time.

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Table 1. Bear scat counts along Harlequin Lake Road, Yakutat Forelands, 1985.

Date	Transect miles	Scat count	Scats/mile	Survey location
9 April	2.5	0	0.0	Paved road to log camp
15 April	2.5	0	0.0	Paved road to log camp
4 June	10.7	0	0.0	Paved road to 10 mile logging road
18 June	29.8	9	0.3	Paved road to Dangerous River
27 June	29.8	15	0.5	Paved road to Dangerous River
18 July	21.0	109	5.2	Pavement to Sockeye Creek
23 July	7.4	52	7.3	Sockeye Creek to Dangerous River

Table 2. Unit 5 bear scat counts, 1983-85.

Year	Transect miles	Scat count	Scats/mile	Peak[a]
1983	96.1	276	2.9	21 May
1984	219.7	183	0.8	2 July
1985	103.7	185	1.8	18 July

[a] Indicates date on which highest scat density was recorded.

Table 3. Historic Unit 5 brown bear harvest, 1961-85.

Year	Harvest[a]			
	M	F	Unk	Total
1961	6	2	1	9
1962	4	2	1	7
1963	4	0	1	5
1964	5	8	0	13
1965	12	5	0	17
1966	11	10	2	23
1967	12	9	0	21
1968	11	5	0	16
1969	10	10	0	20
1970	7	4	0	11
1971	12	8	2	22
1972	16	12	0	28
1973	14	9	0	23
1974	8	5	0	13
1975	10	6	0	16
1976	13	4	0	17
1977	10	5	1	16
1978	19	7	0	26
1979	14	8	0	22
1980	18	7	1	26
1981	21	10	1	32
1982	18	13	0	31
1983	21	11	1	33
1984	25	10	1	36
1985	17	12	1	30

[a] Includes sport and nonsport kills.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 6

GEOGRAPHICAL DESCRIPTION: Prince William Sound and North Gulf Coast

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Campbell (1986) identified a minimum of 33 individual bears on the West Copper River Delta between May and July 1985. These bears comprised 12 adults, 5 juveniles (2-5 years), 10 yearlings, 3 cubs-of-the-year and 3 of undetermined age.

Mortality

Thirty-nine brown bears including 27 males and 12 females were reported killed in Unit 6. Fourteen were killed during spring and 25 (64%) during the fall season. Nonresident hunters killed 12 of these bears. Three additional females were killed in defense of life or property.

Skull size of males averaged 22.5 inches (n = 26), and their average age was 6.4 years (n = 27). Skull size of females averaged 20.4 inches (n = 12), and their average age was 6.3 years (n = 12).

The distribution of bears killed in Unit 6 was as follows: Montague Island, 3; Hinchinbrook Island, 5; Valdez to Cordova, 7; Cordova to Copper River, 2; Copper River to Ragged Mountains, 3; Ragged Mountains to Icy Bay, 20; and Kayak Island, 2.

Management Summary and Recommendations

The reported sport kill of 39 brown bears was 6 more than the previous 24-year mean. Distribution of harvest remained similar in most areas; the largest deviation was an increase in bears killed between the Ragged Mountains and Icy Bay, where bears killed increased from 12 to 20.

I recommend the current Unit 6 brown bear season and bag limit be retained. Population parameters obtained through the sealing program do not indicate deviation from desired management objectives.

Literature Cited

Campbell, B. H. 1986. Brown bear activity and impacts on nesting geese on the West Copper River Delta - 1985. Prog. Rep. Alaska Dep. Fish and Game. Anchorage. 31pp.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 7 & 15

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Estimates of brown bear densities in Units 7 and 15 are currently not available. However, based on historical harvest data and on incidental bear observations made by Department personnel, it is believed that bear populations have remained relatively stable over the past 2 decades.

Mortality

The reported sport harvest was 15 brown bears, and included 9 males, 5 females, and 1 bear of unspecified sex. Mean ages of males and females were 8.2 years and 10.8 years, respectively. All bears were killed by resident hunters. An additional 2 female brown bears were reported taken in defense of life or property.

Management Summary and Recommendation

The 1985 bear-hunting season resulted in a record high harvest of 15 brown bears; however, it should be noted that the 1980 and 1981 harvests were 14 bears each. Although the annual sport harvest of bears has gradually increased over the past decade, bear mortality is believed to be well within the limits of what is considered safe for this population.

Presented in Table 1 is information pertaining to the age characteristics of brown bears taken on the Kenai Peninsula since 1965. The mean age of males, the proportion of males $\geq$5 years of age, and the proportion of males $\geq$10 years of age have increased since 1980. The mean age of females has remained the same, the proportion of females $\geq$5 of age has decreased slightly, and the proportion females $\geq$10 years of age has increased since 1980. Although elaborate interpretation of these data is unjustified, it is apparent that this population continues to

sustain a relatively high proportion of older-age bears of either sex.

No changes in seasons or bag limit are recommended.

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Table 1. Age characteristics of sport-harvested brown bears on the Kenai Peninsula, 1965-85.

Age statistic	Pre-1980		1980-85		1985	
	Males	Females	Males	Females	Males	Females
n	36	26	29	32	9	5
Mean[a]	6.2	5.8	8.1	5.8	8.8	8.8
Standard deviation	5.4	3.8	5.8	4.4	6.3	3.9
n ≥ 5 years	13	11	17	12	5	3
% ≥ 5 years	36.1	42.3	58.6	37.5	55.5	60.0
n ≥ 10 years	8	4	8	7	3	2
% ≥ 10 years	22.2	15.3	27.5	21.8	33.3	40.0
Range[a]	1.8-20.8	1.8-13.8	2.8-21.8	1.8-17.4	2.8-21.8	2.8-11.8

[a] Age in years.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 8

GEOGRAPHICAL DESCRIPTION: Kodiak and adjacent islands

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

The brown bear population appears to be stable on Kodiak and adjacent islands. An increasing trend in both sport harvest and hunter numbers on northeastern Kodiak Island and Afognak Island has occurred. A slightly increasing trend in harvest of breeding age females has been indicated. The relatively high mean age, high percentage of males in the harvest, and continued good hunter success indicate a stable population of bears.

Population Composition

Brown bear surveys were conducted on selected salmon streams on southwestern Kodiak Island by the U. S. Fish and Wildlife Service from 23 July-6 August. Eight hundred bears were classified as follows: single bears, 434 (54%); maternal females, 110 (14%); yearling and older young, 189 (24%); and cubs-of-the-year, 67 (8%). For 6 complete replicates of the streams surveyed, an average of 100 bears per survey was observed. Peak numbers of bears on Sturgeon River, Connecticut Creek, and Pinnell Creek were at or near the highest counts on record.

Mortality

Sport hunters killed 187 bears including 123 males (66%), 62 females (33%), and 2 bears of unknown sex. Included in these numbers were 6 bears killed illegally by sport hunters. The kill during the fall season was 86 bears including 52 males, 32 females, and 2 of unknown sex. The kill during the spring season was 101 bears including 71 males and 30 females. The fall harvest was the highest in 25 years. The previous high kill was 66 bears in 1965 and 1972.

Twenty-four brown bear mortalities were recorded from other sources. Fourteen bears were killed in defense of life or

property (6 males, 8 females). Eight of the 14 were killed by deer hunters. Seven natural mortalities were found (6 females, 1 unknown sex). Two males died from capture attempts and 1 bear was killed illegally at the dump near the village of Port Lions. The total recorded brown bear mortality during 1985 was 211 bears (131 males, 77 females, 3 unknown sex).

Unconfirmed reports were received that at least 10 bears were killed near the village of Port Lions, but were not reported as required. Residents of Port Lions reported an unusually large number of bears visiting the village during 1985. Late vegetative green-up, a poor berry crop, and failure of the salmon run in nearby Barbara Lake were contributing factors that increased the number of nuisance bear problems (Smith and Van Daele 1986).

Hunters reported wounding 7 bears. The number wounded represents a ratio of 1 bear wounded per 100 hunters afield, approximately equivalent to 4% of the total sport kill.

The mean age of males killed by sport hunters was 7.2 years (n = 120). In comparison, the mean age of males taken between 1969 and 1984 was 6.6 years. The mean age of females killed by sport hunters was 7.5 years (n = 60) compared with 7.2 years for the previous 16 years. The mean age of all bears killed (sport hunting kills included) was 7.0 years and the median age was 6.1 years (n = 128). The mean age of all females killed was 8.3 years and the median age was 5.9 years (n = 73). The mean age of both sexes combined was 7.5 years and the median age was 6.0 years (n = 201).

Seven hundred thirty-five permittees reported hunting during 1985. Of those hunters, 594 were Alaskan residents and 141 were nonresidents. Overall, hunter success was 25%. Resident hunters were 16% successful and nonresident hunters were 60% successful.

Two hundred forty-six hunters including 140 residents and 106 nonresidents participated in drawing hunts. Hunter success was 44% for residents, 75% for nonresidents, and 57% overall.

The registration hunt held on northeastern Kodiak and Afognak Islands had 489 participants including 454 residents and 35 nonresident hunters. Hunter success was 8% for residents, 17% for nonresidents, and 9% overall.

Management Summary and Recommendations

The 187 bears killed in the sport harvest was the 3rd highest annual kill in 25 years. Increased hunting effort on northeastern Kodiak Island and on Afognak Island contributed to the high harvest.

This year the number of hunters increased to 349 during the fall season and hunting effort doubled from 1,043 days afield to 2,146 days afield. Hunters killed 47 bears in the registration hunt, well above the mean of 26 bears recorded annually from 1976-84. The fall bear harvest in the registration hunt is mostly taken opportunistically by hunters pursuing deer and elk.

Hunting effort in the drawing permit hunts (246 hunters) was similar to that of the previous year (243 hunters). Unusually cold weather and persistent snow to sea level during the spring season reduced hunter success. Hunter success was higher this fall (67%) than during fall of 1984 (56%). The poor berry crop and slow vegetative growth due to a cooler-than-normal summer may have resulted in bears feeding later in coastal hunting areas in 1985. Bears fed unusually late on salmon in streams on southwestern Kodiak Island (Victor Barnes, pers. commun.).

Males dominated the sport kill by a ratio of 66:34. Sixty-two females were killed, which was higher than the mean kill of 52 females for 1961-84, but below the peak kill of 89 females killed in 1966.

Harvest characteristics do not indicate a change in population composition. The mean ages of males and females were within the range of mean ages recorded during the previous several years. A slightly increasing trend in the harvest of breeding age females was apparent. Thirty-three females 5 years of age or older were killed by sport hunters during 1985 and 35 were killed during 1984. That contrasts with the previous 16-year mean of 26 breeding age females killed. Six additional females 5 years of age or older were killed in defense of life or property for a total of 39 in 1985.

The harvest in all 5 harvest subunits was above the desired level. The guideline levels set in 1976 were based on historical harvest in these 5 subunits. Recent studies indicate that the bear population on northern Kodiak Island is greater than was previously estimated. Studies on southwestern Kodiak Island suggest that previous estimates of population density were based on seasonal concentrations and may not have been representative of the entire area (Victor Barnes, pers. commun.). Results of these studies suggest that a revision of guideline harvest levels is warranted.

If the bear kill continues to increase in registration permit areas, a limitation on hunting permits or a change in season dates may be necessary. Five of the 7 illegal bear kills (71%) and 3 of 14 "defense of life or property" kills (21%) occurred in the registration hunting area. Management of bears for trophies on a sustained yield basis will be difficult if a high

number of illegal kills and opportunistic killing of bears incidental to deer and elk hunts continue.

Management plans for brown bears in Unit 8 will be revised in 1986. Recommendations for changes in hunting regulations will be made subsequent to completion of those plans.

Literature Cited

Smith, R. B., and L. J. Van Daele. 1986. Terror Lake hydroelectric project. Report on brown bear studies, 1985. Alaska Dep. of Fish and Game. 39pp.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9

GEOGRAPHICAL DESCRIPTION: Alaska Peninsula

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

The only quantitative data to indicate trends in bear population composition and abundance are sex and age information from the harvest and from aerial surveys conducted along salmon streams where bears congregate to feed. Interpretation of data from either source alone can be misleading. Combining information from both of these sources, however, plus considering information obtained from long-time residents and hunting guides, can provide a more reliable indication of bear population status. Although researchers have identified biases that can be associated with aerial surveys of brown bears, several areas on the Alaska Peninsula are suitable for conducting these surveys. Survey techniques have become standardized to minimize the number of variables, and repetitive surveys in specific areas can provide a quantitative indication of population status. The Black Lake study area was surveyed during 8 years from 1962-69. The highest single count from each of these years averaged 103 bears (ranges 67 to 123) with an average of 38 bears counted per hour. From 1982-85 surveys in this area were flown using the same procedures. The best single count from each of the past 4 years was 148 (51 bears per hour), 173 (56 bears per hour), 171 (64 bears per hour) and 215 (68 bears per hour) for 1982-85, respectively. Combining all 13 surveys conducted from 1982-85, an average of 157 bears (54 bears per hour) has been seen, about 50% higher than the average for 41 surveys made during the 1960's. These bear surveys were not designed to measure population density and may not reflect trends outside the study area. Noted increase in sample sizes and bears per hour, combined with harvest statistics and other observations, however, suggest a large, stable (or slightly increasing) population in Unit 9.

Population Composition

Five hundred ninety-nine bears including 129 (22%) females with young, 278 (46%) cubs and yearlings, and 192 (32%) single bears

were seen during 3 replicate surveys of the Black Lake study area in August 1985. The percentages of single bears, females with offspring, and total young were similar to percentages from 1983 and 1984. The high cub-of-the-year cohort produced in 1983 was reflected in the "yearling" classifications of both 1984 and 1985 (i.e. 2.5-year-old young cannot accurately be distinguished from 1.5-year-olds). Litter size has averaged 2.2 for cubs-of-the-year since 1982.

Mortality

Hunters killed 227 brown bears in Unit 9 in 1985; all but 2 were taken during the fall season. This represents the largest fall harvest ever recorded in Unit 9 and, to some extent, may be the result of the season being 1 week longer than the previous 8 fall seasons. Despite steadily increasing harvests since the mid-1970's, characteristics of the harvest, including percent males (56%), mean ages (males, 6.2 years; females, 8.6 years), and number and mean age of adult males (38 males averaging 9.5 years) are well within the values of other fall hunts for the past 10 years.

Nonsport mortality was estimated at between 25 and 30 bears. Only 14 of these nonsport kills were reported and the hides salvaged. Ten more were confirmed dead but not salvaged.

Management Summary and Recommendations

The registration permit hunt in the Naknek drainage was designed to minimize bear-human conflicts in the most heavily settled portion of Unit 9. In 1985, 4 bears were taken under this hunt, 2 males in the spring and 1 male and 1 female in the fall. Two of these bears were problem bears and were killed at private residences. In addition, 2 other bears were killed in "defense of life or property" situations in the local area. The registration hunt has been conducted for the past 10 years and has proven partially successful in reducing the threat of problem bears.

The registration permit hunt in the Cold Bay area was designed to serve a similar management objective in that community. In 1983, however, the Izembek National Wildlife Refuge staff expressed concern that the number of local bears was too low, and observed that nuisance bears were no longer common. Consequently, the Board of Game authorized that this registration hunt be conducted only when it was determined that problem bears were present. In 1985, with no troublesome bears near the town, neither the spring or fall hunt was held.

Following analysis of past harvest statistics and information from stream surveys, a 1984 report to the Board of Game recommended lengthening the general fall bear season by 1 week.

This proposal was strongly supported by guides, Alaska sport hunters, and local residents, and was instituted for the fall 1985 season. The resulting record high harvest was due to more nonresident hunters. Many guides mentioned that a higher than usual number of clients cancelled their hunts, thus keeping the harvest from being even higher.

Close monitoring of future harvests plus continued surveying of bears along salmon streams are recommended to ensure that management objectives listed in the 1984 Board Report are met.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 10

GEOGRAPHICAL DESCRIPTION: Unimak Island

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Mortality

Seven bears were killed on Unimak Island in 1985 including 2 males during the spring season, and 3 males and 2 females during the fall season.

Management Summary and Recommendations

The spring bear season was conducted under the normal drawing permit system. Seven permits were issued; however, only 3 hunters participated. During a Board of Game meeting in June, the hunt was changed to a registration permit hunt, with permits available only in Cold Bay. It was anticipated that anyone who received a registration permit would hunt. The average annual harvest since 1980 has been 4 bears. The Board determined that a maximum of 8 permits would be issued during the 1985-86 regulatory year. Six permits were issued for the fall season and 5 bears were taken. Only 2 permits will be available for the spring 1986 season.

The administrative problems associated with the registration permit hunt and many complaints from the public have prompted both the U. S. Fish and Wildlife Service and the Division of Game to recommend returning to the drawing permit system.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Surveys to determine bear population status and trend are not conducted in Unit 11. Observations of bears by Department staff and the public suggest a relatively abundant and well-distributed population of brown bears.

Mortality

Six brown bears were reported killed during 1985. One female was taken during the spring season and 5 bears including 4 males and 1 female were taken during the fall season. The mean age for all males was 14.8 years and for females was 6.1 years. Nonresident hunters took 3 bears.

Management Summary and Recommendations

Both hunting pressure and the number of bears killed have remained low since 1979 when Unit 11 was included in Wrangell-St. Elias National Park/Preserve. Under current federal regulations, sport hunting in this unit is allowed on lands designated as preserve. Prior to federal restrictions on sport hunting, the average annual harvest (1969-78) was 17 bears. The current low annual harvest has an insignificant impact on the brown bear population in Unit 11.

The closing date for the spring season in Unit 11 should be lengthened from 25 May to 31 May. This extension would result in simultaneous closing dates for both Units 11 and 13, thus simplifying the hunting regulations. A 6-day season extension is not expected to result in an increased harvest.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12

GEOGRAPHICAL DESCRIPTION: Upper Tanana and White Rivers

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Grizzly bears are relatively abundant and well distributed throughout Unit 12. No current trend in the bear population is evident.

No standardized surveys of bears are conducted in Unit 12. Bear density is estimated to be 5.0-6.7 bears/100 mi^2 based upon an ongoing study in the Alaska Range to the west.

Mortality

Hunters reported taking 21 grizzly bears in 1985. This is 17% above the 25-year average of 18 bears, but substantially lower than the 37 bears reported taken in 1984. Investigations have revealed that there is an unknown degree of false harvest reporting due to differences in bag limits among units, complicating interpretation of harvest data. During 1985, at least 4 bears (all males) were probably shot in other units and falsely reported as killed in Unit 12. Nevertheless, the harvest in 1985 is believed to be well within the sustainable limit.

Of the 20 known-sex bears reported taken, 11 (55%) were females and 9 (45%) were males. Four bears (3 males and 1 female) were taken during the spring; 16 bears (5 males, 10 females, and 1 of unknown sex) were taken during the fall. Among males taken, 3 were less than 5 years old and 4 were adults. The harvest of females consisted of 4 bears less than 5 years old, 6 adults, and 1 bear of unknown age. The harvest was well distributed throughout the unit.

Nonresident hunters took 38% of the bears, and residents took 62%. Historically, nonresidents have accounted for over 50% of the harvest. The liberal bag limit of 1 bear/year and the lack

of a resident bear tag requirement are believed responsible for the increased proportion of harvest by resident hunters in recent years. Most bear harvest by residents was incidental to hunts which were primarily for ungulates.

Management Summary and Recommendations

The management objective of providing maximum opportunity to participate in hunting grizzly bears is currently being met with a liberal season and bag limit.

Grizzly bear numbers appear to be stable and relatively abundant in Unit 12 with an estimated 430-570 bears in the population. The reported harvest of only 21 bears in 1985 represents a conservative harvest of only 3.7-4.9% of the estimated population. Even though more females than males were taken during 1985, this has occurred in 6 other years since 1965. No trend is evident.

A larger bear harvest would be desirable to complement ungulate management in Unit 12, but no further changes in season or bag limit are recommended at this time. To overcome false reporting problems, a requirement that all bears taken in Unit 12 must be sealed there should be considered.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13

GEOGRAPHICAL DESCRIPTION: Nelchina Basin

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

A grizzly bear census conducted along a portion of the upper Susitna River resulted in a density estimate of 1 bear/13.8 mi^2 (Miller et al., in press). This density estimate was slightly higher than the 1 bear/16 mi^2 reported previously (Miller and Ballard 1982).

Surveys to determine population status and trend were not conducted in other portions of the unit; however, frequent sightings suggest that bears are numerous.

Population Composition

Miller (1985) found mean litter sizes of 2.1 cubs-of-the-year, 1.7 yearlings, and 1.6 2-year-olds for radio-collared bears along the Susitna River.

Mortality

Hunters reported taking 146 grizzly bears during 1985. This was an increase of 49% over the 5-year (1980-84) average annual harvest of 98 bears. Seventy-six (53%) of these bears were males, 67 (47%) were females, and 3 were of unknown sex. The spring harvest was 55 bears including 34 males, 20 females, and 1 sex unknown; the fall harvest was 91 bears including 42 males, 47 females, and 2 of unknown sex. Nonresident hunters killed 33 (23%) bears.

The mean age for all bears killed during the spring season was 7.7 years; during the fall season the average was 5.9 years. The average age for males in the harvest was 6.1 years, similar to the 17-year average of 6.0 years; the average age of females was 7.2 years, slightly above the 17-year average of 7.0 years.

Natural mortality among cubs-of-the-year and yearlings belonging to radio-collared females appeared to be high. Miller (1985) observed a 39% loss of cubs-of-the-year and a 29% loss of yearlings accompanying radio-collared females.

No brown bears were reported killed in defense of life or property in Unit 13 during 1985. One adult male brown bear was found dead, apparently killed by another bear.

Management Summary and Recommendations

The grizzly bear harvest in Unit 13 has been increasing since hunting regulations were liberalized in 1980. The recent harvest of 146 grizzlies is the highest on record. Annual changes in population characteristics are primarily monitored by comparing differences in composition of the harvest. Current harvest data do not indicate the increased harvest has resulted in a decline in mean age or size of bears taken during 1985. One major concern with utilizing harvest data to determine population trends, however, is our inability to detect illegally sealed bears taken in other units and sealed as being taken in Unit 13. Unit 13 has a bag limit of 1 bear per year; other units allow 1 bear every 4 years. The number of bears taken in other units and sealed in Unit 13 because of the bear-every-year regulation is unknown. This possible source of error may distort the character of harvest information.

Harvest rates of marked bears in Unit 13 suggest the current take of grizzlies may exceed the sustained yield. Miller (1985) estimated a minimum harvest rate of 13% for radio-collared bears in the upper Susitna. Currently, 8-10% harvest rates for grizzlies are considered to be within sustained yield limits. Areas where marked bears are located, however, are popular hunting areas, and harvest rates observed there may not apply to other areas within the unit.

Bear hunting in Unit 13 has been increasing in popularity for a number of reasons. Hunters are turning their attention to grizzlies as hunting opportunities to hunt other big species decline. Additionally, concern over property damage and bear predation on moose contributes to the public perception that increased bear harvests are desirable.

A substantial increase in the number of bears killed in Unit 13 has occurred and requires that the bear population be monitored carefully. To accomplish this, a periodic census should be conducted to determine population trends. Until more population data are collected, no changes in seasons or bag limits are recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 14

GEOGRAPHICAL DESCRIPTION: Upper Cook Inlet

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Mortality

Ten brown bears including 4 males, 4 females, and 2 of unknown sex were reported killed in Unit 14. One bear was taken from Subunit 14A, 6 from Subunit 14B, and 3 from Subunit 14C.

No bears were reported taken in defense of life or property.

Management Summary and Recommendations

Unit 14 has never experienced a large brown bear harvest. Between 1961 and 1971, the average annual harvest was 10 bears. From 1972 through 1985, the annual harvest was 8. There appears to be little interest in brown bear hunting in Unit 14.

No changes in seasons or bag limits are recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 16

GEOGRAPHICAL DESCRIPTION: West side of Cook Inlet

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Observation of bears by Department staff and the public indicates an abundant population of brown bears in Unit 16.

Mortality

The kill of 92 bears was the largest in the unit's history. The spring kill of 34 bears (30 males, 2 females, and 2 sex unknown) exceeded the annual harvest for all but 7 of the past 24 years. The fall harvest of 58 bears (27 males, 27 females, and 4 sex unknown) was higher than any previous year's total. Mean male skull size for the spring harvest was 25.4 inches (n = 29) and for the fall was 21.4 inches (n = 24). Mean male ages for the spring and fall were 11.1 (n = 29) and 6.3 years (n = 27), respectively. Age data are not comparable with those of previous years when means for the small harvest could be influenced by the presence or absence of a few older-age-class bears.

Management Summary and Recommendations

The season in Unit 16 was greatly liberalized during the 1984-85 regulatory year with an increase in season length from 77 days to 267 days. This was the 1st full year of the expanded season dates being in effect--a factor which contributed to the high harvest. The late spring was also a factor which contributed to the harvest, as snow conditions allowed hunters to use ski-equipped aircraft to access areas not hunted during more normal break-up patterns.

Brown bear populations in Unit 16 are healthy and appear to have increased in the past 10 years. Under previous conservative seasons, the harvest levels were low and did not have a significant impact on the population. The relatively old average age for bears killed during this report period (8.8 years

for males and 7.6 years for females) is evidence that older-age-class bears are common. If future harvest levels remain high, changes in these data will be monitored for indications of over-harvest.

Because the size of the Unit 16 brown bear population is unknown, the impact of the 1985 harvest cannot be determined. Casual observation and comments by the public suggest that brown bears remain abundant and that current harvest levels are not excessive. No changes in seasons or bag limits are recommended at this time.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 17

GEOGRAPHICAL DESCRIPTION: Northern Bristol Bay

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

No data are available to evaluate the status or trend of the 1985 brown bear population. Brown bears are found throughout the mainland portions of Unit 17 and population density is generally considered high. The status of brown bears is unknown in Subunit 17A; however, the population appears to be stable in Subunit 17B where most of the sport harvest occurs. Local residents have reported increasing densities of bears during the past 5 years in Subunit 17C.

Mortality

Hunters killed 57 brown bears including 31 males, 21 females, and 5 of unknown sex. This was the highest harvest recorded in 25 years. Fifteen bears including 12 males, 2 females, and 1 of unknown sex were taken in spring, and 42 bears including 19 males, 19 females, and 4 of unknown sex were taken in fall. Nonresident hunters accounted for 58% of the harvest. Three bears were reported as nonsport kills. Reported harvest, by subunit, was as follows: Subunit 17A, 5; Subunit 17B, 46; Subunit 17C, 5; and 1 bear in which the location of kill was not reported. In addition, 7 bears were taken by Togiak residents, but not reported.

Management Summary and Recommendations

The brown bear population is considered high in most areas of Unit 17, and the reported kill of 57 bears was probably below the sustainable yield for this unit.

Miller and Ballard (1982) have estimated bear density of the Susitna River study area to be 1/16 mi^2. Using my familiarity with that area (Unit 13) as a basis for hypothesizing a density for Unit 17, I would estimate the density in Subunit 17A to be

1 bear/15-20 mi^2 and in Subunits 17B and 17C to be 1 bear/ 10-15 mi^2. At these densities, the total population for Unit 17 would range between 1,180 and 1,750 bears. Using 5% as the optimum harvest level, annual harvests could range between 59 and 88 bears. The annual harvest is approaching this magnitude in Unit 17B, but is well below this level in 17A and 17C. Regulatory changes promulgated during this reporting period, permitting hunters in Units 17A and 17C to take 1 bear every year and extending the subsistence spring season an additional 30 days, should increase the harvest rates in these subunits.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 18

GEOGRAPHICAL DESCRIPTION: Yukon-Kuskokwim Delta

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Reports from the public and from agency personnel indicate that grizzly bear populations in Unit 18 are stable in number and moderate in density. Bears are found primarily in 2 areas within Unit 18; the Kilbuck Mountains southeast of the Kuskokwim River and the Andreafsky and Illivit Mountains north of the Yukon River. Few bears are observed in the vast lowland of the Yukon-Kuskokwim Delta although they are occasionally sighted in the Cape Romanzof area and in the flats south of Marshall and Russian Mission. We believe the Kilbuck population occurs at higher densities than the Andreafsky population although quantitative documentation is lacking. The Kilbuck population is probably similar in density to the highly productive populations to the east in Unit 17. A wide distribution of salmon, and similar available habitat and climate are characteristics shared by the 2 regions.

Unit 18 contains approximately 11,000 mi^2 of fair-quality bear habitat. Approximately 6,000 mi^2 lies in the Kilbuck Mountains and 5,000 mi^2 in the Andreafsky Mountains. Using estimates derived from research done in other areas of Alaska, we believe bear densities in Unit 18 probably lie between 1 bear/16 mi^2 and 1 bear/35 mi^2 (Reynolds 1982, Machida 1984). Based upon these density estimates, we believe the Unit 18 bear population numbers 300-700 bears. The Kilbuck population may contain approximately 170-400 bears, and the Andreafsky population 140-300 bears. Since the validity of using density estimates from other areas to derive population estimates is questionable, these population estimates should be regarded as preliminary and viewed with caution.

Mortality

Data gathered from sealing certificates indicate that 20 bears were harvested by hunters and 2 were taken in defense of life

or property in Unit 18 during 1985. The reported harvest since 1979 has averaged 16 bears per year with the highest harvest reported in 1982 at 24 bears (Table 1). Fourteen bears were killed during the spring and 8 during the fall. As reported in past years, the majority of the harvest (68%) came from the Kilbuck Mountains. Since 1970 when the 1st harvested bear from Unit 18 was sealed, 76% of the harvest was reported taken from the Kilbuck Mountains.

A serious management problem concerns the high unreported harvest occurring along the Kuskokwim River and in the Kilbuck Mountains. The unreported harvest occurring in the Andreafsky Mountains is mostly related to defense of life or property situations and is believed to be minimal and within sustained yield limits. Unconfirmed reports, however, indicate that 15 or more bears are harvested annually by local hunters in the Kilbuck Mountains and along the Kuskokwim River. The spring melt came late during 1985 and hunters enjoyed unusually good access by snow machine into the Kilbucks. Unofficial reports from knowledgeable local hunters indicate that as many as 20 bears were harvested just from the villages of Goodnews Bay and Kwethluk. We believe, therefore, that the unreported harvest was considerably higher than normal during 1985.

Reynolds and Hechtel (1983) postulated that the harvest of North Slope and Interior Alaska grizzly bears should not exceed 2-4% of the estimated population size. Since the productivity and density of bears in Unit 18, particularly in the Kilbucks, is probably higher than observed further north, the above harvest limits may be overly conservative when applied to Unit 18 populations. In spite of such considerations, however, we believe the 1985 harvest in the Kilbucks is excessive. The probable harvest of 35 or more bears from the Kilbucks during 1985 represents at least 10% of the estimated population.

If overharvests were consistently occurring in Unit 18 and other productivity and mortality factors remained constant each year, we would expect a decline in mean age of the harvest over time, particularly among spring males. Our limited data do not suggest such a decline (Table 2). However, problems with the data make interpretation difficult. The sample sizes are minimal. Data from Andreafsky bears are included and would tend to mask any declining trend in mean age occurring in the Kilbucks. If the Andreafsky bears are removed, the sample sizes would be much too small for meaningful analysis. Also, the data primarily represent the ages of bears killed by sport hunters who tend to selectively harvest larger, older bears. An overharvest situation caused by subsistence hunters who would probably harvest from sex and age classes in proportion to their occurrence in the wild would not show up in the age data for many years or possibly not show up at all (Caughley 1974).

Management Summary and Recommendations

Grizzly bears continue to be abundant in the northern and eastern portions of Unit 18. As reported in past years, a majority of the harvest came from the eastern portion of the unit in the Kilbuck Mountains.

The unreported harvest of bears taken for subsistence and in defense of life or property needs to be properly documented. Most rural hunters consider the current grizzly bear regulations overly restrictive and many do not comply. A regulatory and harvest monitoring system addressing local use patterns needs to be designed and implemented. A solution is particularly needed in the Kuskokwim drainage and Kilbuck Mountains where overharvest may be occurring.

Better estimates of the number of bears in Unit 18, particularly in the Kilbucks, is needed. Currently, management decisions concerning bears are often based solely on the harvest and age data. The utility of such data would be greatly enhanced if population size and density were known. Additional research concerning the density and population biology of bears in the Kilbuck Mountains is recommended.

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Table 1. Unit 18 reported bear harvest, 1979-85.

Year	Season	Total harvest[a]	Location	
			Andreafsky Mts.	Kilbuck Mts.
1979	Spring	6	5	1
	Fall	6	1	5
1980	Spring	5	5	0
	Fall	9	0	9
1981	Spring	6	2	4
	Fall	18	0	18
1982	Spring	5	3	2
	Fall	9	0	9
1983	Spring	5	2	3
	Fall	11	0	11
1984	Spring	6	0	6
	Fall	7	2	5
1985	Spring	14	4	10
	Fall	8	3	5
Total	Spring	47	21	26
	Fall	68	6	62

[a] Bears killed in defense of life or property are included in spring harvest.

Table 2. Mean age (years) of male bears harvested in Unit 18 during spring and fall, 1979-85.

Year	Spring			Fall		
	Total bears	Mean age (years)	Standard error	Total bears	Mean age (years)	Standard error
1979-80	6	11.7	2.0	7	6.2	1.3
1981-82	7	11.5	1.2	14	4.9	0.9
1983-84	8	12.8	2.7	13	5.7	1.4
1985	4	11.9	6.6	3	12.5	12.4

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY REPORT

GAME MANAGEMENT UNIT: 19

GEOGRAPHICAL DESCRIPTION: Middle and upper Kuskokwim River

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

No bear surveys were conducted in Unit 19; however, rough population estimates can be made based on bear densities found in similar habitat in Subunit 20A. In that area, research studies estimated grizzly bear density to be 6 bears/100 mi^2. Using that figure as the estimated density in good brown bear habitat, Unit 19 contains from 830 to 930 bears on the following basis: Subunits 19A and 19D, which are densely timbered and with poor bear habitat, would contain 170-200 and 75-110 bears, respectively; Subunit 19B, which has good bear habitat, would contain 275-310 bears; and Subunit 19C, which has 4,500 mi^2 of good bear habitat very similar to that in Subunit 20A, and 1,500 mi^2 of poor bear habitat, would contain 310 bears.

Mortality

Only 24 bears (10 males, 14 females) were reported taken in Unit 19 during 1985. This is well below the 25-year average of 33 bears, and slightly higher than the 19 taken last year. The harvest was up slightly over the 25-year average in Subunit 19A, about average in 19B and 19D, and down considerably in 19C. In 19B, where the permit requirement of the previous 3 years was eliminated, only 1 bear was taken during spring and 10 were taken during fall, which was slightly more than were taken under the permit system. These figures contrast with the average take of 25 bears in Subunit 19B during the period of heavy harvests of the 1970's.

The average age of male bears taken was 8.0 years, which is similar to the long-term average of 7.9 years. Among females taken the average age was 6.0 years, which is the youngest average age ever recorded for Unit 19 female grizzly harvests. Eight of the 14 females taken were 3 years old or less.

Nonresidents took 71% of the bears compared with the 25-year average of 81%. Forty-two percent of the harvest were males and 58% females; the long-term average harvest is 58% males and 42% females.

Management Summary and Recommendations

Harvest remains low and apparently well within sustainable levels. In the late 1970's, following the heavy exploitation of the population in Subunit 19B, there was a decline in average skull size and age of bears taken; these measurements have since stabilized. In the other subunits there have been no noticeable changes in age, skull size, or number of bears harvested during the 25-year period in which bears have been sealed.

In some other areas of Alaska, sustainable harvest rates between 4% and 10% have been estimated. Based on these estimates, annual kill should not exceed 7 to 20 bears in 19A; 11 to 31 in 19B; 12 to 31 in 19C; and 3 to 11 in 19D.

Management goals for Subunits 19A and 19D emphasize maximum production of moose and caribou for local consumption, so brown bear harvest levels near the maximums should be encouraged. Management goals for Subunits 19B and 19C emphasize balanced sustainable harvests of all species, so the guidelines for bear harvests should be conservative at approximately 15 bears per year.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20

GEOGRAPHICAL DESCRIPTION: Central Tanana-middle Yukon Valley

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

General observations suggest that grizzly bear numbers in Unit 20 are stable and at a moderate density. However, in the Alaska Range portion of Subunit 20A, minimum estimated grizzly densities declined from 5.5 bears/100 mi^2 in 1982 to 4.3 bears/100 mi^2 in 1985 (Reynolds and Hechtel 1986).

Mortality

Hunters killed 35 grizzly bears in Unit 20 during 1985; 24 males (69%) and 11 females (31%) (Table 1). Eight bears were taken during the spring, 27 during the fall. Resident hunters took 27 bears and nonresidents took 8 bears. An additional 3 bears were killed in defense of life or property.

The difference between spring and fall harvests is related to greater hunter effort associated with moose and caribou hunting during fall. Since 1980, the fall season has accounted for 69-79% of the annual kill.

The 1985 harvest represents a 51% reduction from the 1984 harvest; it was 37% below the previous 5-year (1980-84) mean annual harvest. With the exception of Subunit 20F, where only 2 bears were reported killed, harvests declined in all subunits during 1985. Poor weather (which lowered hunting efforts during fall) and deep snow during spring (which delayed emergence from dens) contributed to the reduced harvest.

The mean age of harvested bears during 1985 was 7.3 years for both males and females. Previous 5-year (1980-84) mean ages for bears harvested were 7.5 years and 7.7 years for males and females, respectively. Mean skull sizes of bears harvested during 1985 were 21.4 inches for males and 19.3 inches for females; these are similar to figures for previous years.

The continued high percentage of males in the harvest and the stable mean ages of harvested bears indicate that, overall, harvest rates for grizzly bears in Unit 20 are not excessive. However, in Subunits 20A and 20E, mean ages and the proportion of males in the harvest suggest the kill in recent years may have approached or exceeded mean annual recruitment. For analysis, because annual sample sizes were small, data have been combined for 2 3-year periods (1980-82 and 1983-85), then statistically compared.

In Subunit 20A, the percentage of males dropped from 58% ($\underline{n}$ = 60) of the harvest in 1980-82 to 48% ($\underline{n}$ = 46) in 1983-85 ($\underline{P}$ = 0.15). There was no significant difference between the periods in mean ages of males ($\underline{P}$ = 0.70) or females ($\underline{P}$ = 0.50) in 20A. However, at least in the Alaska Range portion of 20A, cub production has declined in recent years (Reynolds and Hechtel 1986). Consequently, recruitment into the 3- to 5-year age classes has declined. The reduced availability of young bears to hunters contributes to an older age kill, confounding interpretation of harvest age data.

In Subunit 20E, the percentage of males in the harvest dropped from 73% ($\underline{n}$ = 33) in 1980-82 to 56% ($\underline{n}$ = 50) in 1983-85 ($\underline{P}$ < 0.05). The mean age of 1983-85 hunter-killed male bears ($\underline{\bar{x}}$ = 06.7 years; $\underline{n}$ = 26) was significantly lower ($\underline{P}$ < 0.02) than for males killed during 1980-82 ($\underline{\bar{x}}$ = 10.2; $\underline{n}$ = 21). There was no significant difference in mean age of females killed during the 2 periods in 20E ($\underline{P}$ > 0.50). The lowered harvest mean age and percentage of males in 20E reflects a substantial harvest increase associated with removal of the "1 bear every 4 years" restriction in 20E beginning in fall 1982. If current harvest levels are maintained in 20E, females may make up an increasing proportion of the harvest and the female mean age will decline.

Management Summary and Recommendations

Opportunistic take by moose and caribou hunters accounts for a large part of the annual grizzly harvest in Unit 20. In 1985, poor weather during fall and deep spring snow resulted in reduced hunter effort; consequently, the 1985 harvest was 51% below that of 1984. The harvest declined in all subunits except 20F. The high proportion of males in the harvest and the stable mean age among harvested bears indicate that overall harvest rates in Unit 20 are sustainable.

Only 7 bears were harvested in Subunit 20A during 1985, a 65% reduction from the previous 5-year average. That reduced harvest rate is sustainable. However, high harvests in earlier years, combined with periodic poor cub production, caused a decline in bear numbers in the Alaska Range portion of 20A. A

current research program monitors the effects of harvest on the sex and age structure and the population level of bears in Subunit 20A. To allow assessment of various harvest levels, I recommend the increased harvest levels of recent years be allowed to continue in 20A.

Regulation changes in 1982, designed to reduce bear predation on moose calves in 20E, have increased harvests and changed the sex and age structure of the harvest. Harvest of females will probably increase during the next few years in 20E. The present management goal of temporarily reducing bear numbers in important calving areas of 20E should be maintained. To accomplish this goal, I recommend retention of the waiver of the $25 resident tag fee and the 1 bear/year bag limit; if necessary to minimize false reporting, bears taken in this subunit should be sealed only at Tok or Eagle. In addition, a fall season opening on 20 August and a spring season closure on 15 June should be considered. Also, there is some evidence that supplemental feeding of grizzlies during the moose calving period may result in increased moose calf survival. This evidence should be more carefully investigated for management applicability.

Literature Cited

Reynolds, H. V., and J. L. Hechtel. 1986. Population structure, reproductive biology, and movement patterns of grizzly bears in the northcentral Alaska Range. Fed. Aid in Wildl. Rest. Final Rep. Proj. W-21-2, W-22-2, W-22-3, and W-22-4. Job 4.16R. Juneau. 53pp.

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Table 1. Unit 20 grizzly bear harvest, 1985.

Subunit	Fall harvest			Spring harvest			Total
		Sex			Sex		
	Number	M	F	Number	M	F	
20A	7	2	5	0	0	0	7
20B	4	4	0	1	0	1	5
20C	3	2	1	0	0	0	3
20D	6	4	2	1	1	0	7
20E	5	3	2	6	6	0	11
20F	2	2	0	0	0	0	2
Total	27	17	10	8	7	1	35

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 21

GEOGRAPHICAL DESCRIPTION: Middle Yukon (Tanana to Paimiut)

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Field observations, nuisance reports, hunter sightings, and pilot observations indicate Unit 21 has a moderate bear population which has been slowly growing over the past 10 years.

Mortality

Hunting pressure on bears in most of Unit 21 is low. In spring 1985, the season opened on 1 April in Subunits 21B, 21D, and 21E, which increased access to bears in the Nulato Hills. Seven males were taken by nonresidents on guided hunts in this area. Four of the bears were large enough for inclusion in Boone and Crockett records.

Four bears (2 males, 2 females) were taken during fall by resident hunters; 3 were from the Beaver Mountains area and 1 from the Melozitna River drainage. The number of bears that were shot at fish camps during summer and not reported is unknown, but probably equals the reported harvest.

Management Summary and Recommendations

The annual grizzly bear harvest in Unit 21 is small and probably has an insignificant impact on the population. In Subunits 21B, 21D, and 21E, seasons have been liberalized, and although more bears have been taken during spring, the harvest is still below sustained-yield levels. Seasons could also be liberalized in Subunits 21A and 21C without affecting the populations.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 22

GEOGRAPHICAL DESCRIPTION: Seward Peninsula

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

During the early 1900's, miners and reindeer herders were probably responsible for reduction of the Seward Peninsula grizzly bear population to low numbers. Following the decline of the mining and reindeer industry from 1905 to 1945, grizzly bear numbers slowly began to increase, and the population recovered to pre-1900 levels by the 1960's. From 1970 to 1978 the annual reported harvest of grizzly bears in Unit 22 was relatively low, ranging from 1 to 14 with a mean of 5.6. Harvests during this period probably had little impact on the population. In 1979 the spring hunting season was opened 2 weeks earlier than any other area in northwest Alaska. This season liberalization prompted a substantial increase in guiding effort resulting in a harvest of 50 bears, more than 3 times any previous annual harvest. In 1979, nonresidents accounted for 76% of the reported harvest. Because of concern over possible overharvest, a drawing permit system for nonresidents only was implemented and the annual harvest was reduced to 31 or fewer bears during 1980-83. Resident tag fees were abolished in spring 1984 in an effort to improve rural compliance with sealing requirements. This action resulted in an overall increase in hunting effort by local residents and recent harvests have exceeded 50 bears annually. Harvests of this magnitude have probably reduced bear numbers in several areas, but bears remain relatively numerous throughout most of Unit 22.

When annual harvests were low, obtaining accurate data on population size and trend or bear density was not considered essential. However, as harvests have escalated, the lack of such data has become an increasing management concern. Currently, no reliable technique is available for accurately censusing bears without investing a considerable amount of time and money. In the past I have conducted spring reconnaissance flights to determine relative bear abundance and distribution.

Such a flight was conducted on 26 April 1985, and several sets of tracks were observed. But, as other investigators have pointed out, interpreting population trends from these data is highly suspect because environmental conditions and bear behavior vary from year to year. Stratified systematic sampling has promise, but baseline population information in Unit 22 is currently inadequate for us to apply this technique. Therefore, to arrive at a population estimate, I used data from research conducted in Units 26, 20A, and 13 and made the following assumptions for Unit 22. Bear density on very good habitat is 1 bear/16 mi^2. This condition probably occurs in less than 1/5 of Unit 22, primarily in Subunit 22A. In most cases a high bear density for Unit 22 would be 1 bear/20 mi^2. A medium density would be 1 bear/40 mi^2, and a low density would be 1 bear/80-100 mi^2. Subjectively assigning the appropriate density (high, medium, or low) to each of the 5 subunits in Unit 22 results in a unit-wide population estimate of 300-1,000 bears. I believe the actual number of bears is 500-800.

Mortality

The reported harvest in 1985 was 53 bears which is 1 less than the record 54 bears killed the previous year. The annual harvest has increased substantially during the past 2 years because of 4 principal factors: 1) the spring season was lengthened 10 days beginning in 1984; 2) residents who hunted in Unit 22 were not required to purchase a $25 resident bear tag; 3) the number of local residents hunting bears increased; and 4) guiding effort in Subunits 22A and 22B increased.

Alaska residents killed 33 bears (62%) and nonresidents 20 bears (38%) during 1985. The percentage of bears harvested by nonresidents declined from 76% in 1979 to a low of 20% in 1982, but increased in 1983 and 1984. This increase has occurred despite a substantial numerical increase in the resident harvest during 1980-85 (Table 1).

The harvest was distributed almost equally between spring and fall hunting seasons with 28 (52%) and 25 (48%) bears taken, respectively. The sex of the recorded harvest was 31 males (58%) and 22 females (42%). During the past 3 years the number and proportion of females in the harvest increased; 15 females were taken in 1984 and 12 in 1983. The mean harvest of females during the 10-year period from 1972 to 1982 was only 3.7 sows.

Harvest reporting falls into 2 basic categories: 1) sealing bears taken for food or hides during established hunting seasons; and 2) reporting nuisance bears killed in defense of life or property (usually during closed seasons). People residing in larger communities such as Nome and Unalakleet have had a relatively high level of reporting compliance in both these

categories. I estimate that 95% of the bears killed by Nome hunters are reported. In contrast, voluntary compliance with sealing requirements in rural villages during the hunting season is usually not higher that 50-80%, and in some villages it is probably less than 30%. Most bears killed in defense of life or property during summer are not reported. Many rural residents consider bears to be undesirable pests, and they do not believe it is worth their time or effort to skin the bear and report the incident, especially if the State will retain the hide. Two bears were reported killed during 1985 in defense of life and property, bringing the total reported harvest to 55 bears. In addition, I estimate that 10-30 bears were killed but not reported.

The highest reported harvest occurred in Subunits 22A and 22B, but bears were also killed in most major drainages in Subunits 22C and 22D (Table 2). The mean age of harvested males was 6.8 years, of females 7.3 years, and of both sexes combined 7.0 years. Bears 5 years old or younger composed 62% of the harvest; 6-10 years, 21%; 11-15 years, 10%; and 16 or older, 8%. The oldest bear in the sample was a female 28 years old; the oldest male was 21. The age data indicate that younger bears have composed a larger portion of the harvest in recent years.

Management Summary and Recommendations

Nonresidents were first required to obtain drawing permits in fall 1980. Permits were required because the bear harvest increased from 14 in 1978 to 50 in 1979, and 76% of the 1979 harvest was taken by nonresidents. Permits were eliminated in Subunit 22A beginning in fall 1982 because of a relatively high bear density and a low harvest. However, permit requirements were retained in all other subunits with a total of 20 permits available per year. These regulatory changes have remained in effect until the present. Drawing permits were often undersubscribed from 1982 through 1984 (Table 3). In 1984 the Board of Game provided that drawing permits which were not issued could be reissued on a first-come, first-served basis. Since then, all 20 permits available in the spring and fall seasons have been issued (Table 3). Because guiding activity has increased, I anticipate that most, if not all, permits will be issued in the future.

The resident tag fee ($25) was first eliminated in spring 1984 in Unit 22 and 23. In part, this regulatory change was intended to increase compliance with the sealing requirement in rural areas, particularly in the villages. In 1984 and 1985, residents of Units 22 and 23 sealed 75 bears, but only 15 (25%) were from communities other than Nome, Unalakleet, and Kotzebue (Table 4). Of the 15 bears taken by rural village residents, about 50% were sealed by teachers, construction workers, and

others with short village residency. In 1983, when bear tags were last required in Units 22 and 23, 5 of 33 bears (20%) that were harvested by unit residents came from rural villages. On the surface it appears that the level of bear sealing compliance in villages has not changed significantly since the resident tag fee was eliminated.

One trend did seem apparent; annual resident harvests in Unit 22 increased from 20 bears in 1983 to 32 and 33 bears in 1984 and 1985, respectively. When the tag fee was not required, more bears were killed incidentally by hunters pursuing other species, and more people were in the field hunting bears.

Improved compliance with bear sealing requirements will not be forthcoming until conventional wildlife management principles are more widely accepted in rural Alaska. Some hunters in Unit 22 do not purchase hunting licenses; nor do they hunt entirely within established seasons. Until this much larger problem is resolved, lack of compliance with bear sealing requirements will continue.

Developing acceptance of game management principles in rural Alaska will require patience and time. Success to date ranges from very good to poor. The speed with which this success is achieved is related to the compatability of management programs with people's desires and lifestyles. Many rural residents consider the $25 bear tag fee unnecessary and inconsistent with their way of life and hunting methods. Many hunters do not make hunting plans days or even hours before heading into the field, but hunt opportunistically depending on weather and wildlife availability. Many hunters do not feel compelled to spend $25 on the chance they may see a bear during the hunting season, but are tempted to shoot a bear when the opportunity arises.

The level of compliance with bear sealing regulations is too low to allow use of the data for determining trends in bear population status. However, current bear harvest information does provide an index of relative hunting pressure; this information is valuable for management. Because unreported harvest probably has remained relatively stable, we believe any substantial increase in reported harvest is attributable to an increase in hunting pressure and/or hunting success.

Liberalization of regulations and some increase in guiding effort resulted in record harvests of grizzly bears in 1984 and 1985. Harvests may have exceeded sustained yield in some areas. Based upon research conducted throughout the state, I assume that a sustainable annual harvest is 5% and that a harvest of 10% probably exceeds sustained yield. Using the minimum-to-maximum population estimate of 300-1,000 bears, a

sustainable harvest is 15-50 bears and a harvest of 30-100 bears is near or exceeds sustained yield. I estimated the harvest in 1984 and 1985 was 63-85 bears annually, including the estimated unreported kill. Even if the Unit 22 population numbers 1,000 bears, a harvest of 63-85 bears exceeds the assumed limits of sustained yield. Because the bear harvest was confined primarily to 3 subunits and the population probably numbers considerably less than 1,000 bears, the likelihood of overharvest, particularly in accessible areas, is high. Although population and harvest estimates are not precise, these data indicate areas where overharvest might be occurring, especially when examined on a subunit basis (Table 5).

I believe the risk of management error is highest in Subunit 22C. I estimate the maximum allowable harvest is 2-9 bears annually based on a harvest of 10% of the estimated 20-90 bears in the Subunit. The 1984 and 1985 harvests of 15 and 9 bears, respectively, equal or greatly exceed the upper limit of 9 bears. The magnitude of overharvest is probably more severe than the above figures indicate since additional unreported bears were not included.

Hunting conditions during spring 1985 were excellent. Extensive snowcover and unseasonable cool temperatures were ideal for tracking bears by snowmachine. Despite heavy hunting pressure by Nome residents, relatively few bear tracks were sighted in Subunit 22C and hunters reportedly had difficultly finding bears. Many hunters expanded their search into Subunit 22B. This effort resulted in the Subunit 22B harvest increasing from 14 bears in 1984 to 19 bears in 1985.

If the management objective for Subunit 22C is to maintain a reproductively viable bear population, hunting restrictions should be imposed soon. Because Subunit 22C is small (1,800 mi^2), I believe bears immigrate from adjacent subunits, and/or home ranges of bears in adjacent subunits extend into Subunit 22C. However, continued immigration into Subunit 22C may be dependent on the magnitude of future harvests. Continued high harvests in adjacent subunits may significantly reduce bear densities, and could result in near extirpation of bears in Subunit 22C.

Some citizens have expressed a desire to maintain low bear numbers in Subunit 22C because predation on reindeer is a recurring problem and bears pose a threat to human safety. On the other hand, many hunters would prefer to maintain bears at moderate numbers. Such desires are at cross-purposes and not easily resolved. A management plan for Subunit 22C bears should be developed and ideally would incorporate public opinion for preferred management options.

The highest bear harvests occurred in Subunits 22A and 22B with 18 and 19 bears taken, respectively. I estimate the range of sustainable harvest for these subunits is 8-30 bears annually in Subunit 22A and 9-34 bears annually in Subunit 22B (Table 5). Assuming that bear populations in these subunits are near the high density estimate and that a 10% harvest is sustainable, current harvest is within sustained yield. However, the unreported kill is unknown, and population estimates have wide ranges. Recent harvests are nearly twice the mean harvest from 1979 to 1983. The potential for overharvest within Subunits 22A and 22B is high. Therefore, harvest trend should be carefully monitored in these subunits. Annual harvests in Subunits 22D and 22E have been low, and the kill is probably well below sustained yield.

Recommendations:

1) I believe that bear numbers in Subunit 22C have been significantly reduced. Until more precise population information is obtained, the spring hunting season should be shortened or closed. I recommend a season no longer than 10-25 May; this was the hunting season in effect prior to 1979.

2) If the spring hunting season is reduced in Subunit 22C, a method to provide for the harvest of grizzly bears that prey on reindeer should be considered. Issuing special registration permits to residents and then opening the hunting season in a small area to remove a problem bear may be an acceptable solution. The local public would have a limited opportunity to hunt bears in Subunit 22C before 10 May, and reindeer herders would not be faced with the problem of shooting problem bears and then meeting the mandatory requirements for a bear taken out of season.

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Table 1. Unit 22 resident and nonresident grizzly bear harvests, 1976-85.

Year	Resident harvest			Nonresident harvest			Total harvest			Percent harvest by nonresidents
	S[a]	F[a]	Totals	S	F	Totals	S	F	Totals	
1976	4	5	9	1	1	2	5	6	11	18%
1977	5	2	7	2	3	5	7	5	12	42%
1978	4	2	6	4	4	8	8	6	14	57%
1979	7	5	12	33	5	38	40	10	50	76%
1980	10	2	12	15	4	19	25	6	31	61%
1981	15	6	21	1	6	7	16	12	28	25%
1982	10	2	12	0	3	3	10	5	15	20%
1983	6	14	20	1	7	8	7	21	28	29%
1984	18	14	32	11	11	22	29	25	54	41%
1985	20	13	33	8	12	20	28	25	53	38%

[a] S = spring; F = fall.

Table 2. Unit 22 grizzly bear harvest by subunit and drainage, 1985.

22A		22B		22C		22D		22E	
Drainage	Harvest	Drainage	Harvest	Drainage	Harvest	Drainage	Harvest	Drainage	Harvest
Unalakleet	9	Fish	6	Flambeau/ Eldorado	4	Pilgrim	3	--	--
St. Michael area	3	Niukluk	5	Sinuk	3	Kuzitrin	2	--	--
				Penny	1	Pt. Clarence	1	--	--
Pikmiktalik	1	Koyuk	5	Solomon	1	Imuruk Basin	1	--	--
Nunakogok	1	Tubutulik	1	--	-	--	-	--	--
Nunavulnuk	1	Inglutalik	1	--	-	--	-	--	--
Golsovia	1	Golovin Bay	1	--	-	--	-	--	--
Kogok	1	--	-	--	-	--	-	--	--
Ungalik	1	--	-	--	-	--	-	--	--
Totals	18	--	19	--	9	--	7	--	0

Table 3. Number of permits available and number issued for Unit 22 nonresident grizzly bear drawing hunts, 1980-85.

Year	Spring			Fall		
	Available permits	Permits issued by drawing[a]	Permits issued first-come first-served	Available permits	Permits issued by drawing[a]	Permits issued first-come first-served
1980	--	--	--	14	11	--
1981	6	5	--	14	15	--
1982	6	5	--	14	4	--
1983	6	4	--	10	3	--
1984	10	6	1	10	10	0[b]
1985	10	8	2	10	10	0[b]

[a] Ineligible applicants not included.

[b] None available.

Table 4. Reported grizzly bear harvests in Units 22 and 23 by Nome, Unalakleet, and Kotzebue hunters versus reported harvest by hunters from other villages within these units, 1984 and 1985.

	1984		1985		Total	
	Nome, Unalakleet, Kotzebue	Other unit villages	Nome, Unalakleet, Kotzebue	Other unit villages	Nome, Unalakleet, Kotzebue	Other unit villages
Unit 22	23	1	21	7	44	8
Unit 23	7	3	9	4	16	7
Totals	30	4	30	11	60	15

Table 5. Annual harvests[a] of grizzly bears in Subunits 22A-E, 1979-85 and comparison of estimated population size and estimated maximum harvest per year for each subunit.

Year	22A	22B	22C	22D	22E	Unit total
1979	10	28	8	3	1	50
1980	9	10	8	3	1	31
1981	9	4	13	1	1	28
1982	3	3	7	2	0	15
1983	11	12	0	4	1	28
1984	19	14	15	4	2	54
1985	18	19	9	7	0	53
Mean 1979-83	8	11	7	3	1	31
Population estimate	80-300	85-340	20-90	65-260	50-110	300-1,100
Maximum harvest estimate	8-30	9-34	2-9	6-26	5-11	30-110

[a] Harvest figures do not include bears taken in defense of life and property.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 23

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Grizzly bear surveys were last conducted in GMU 23 during April 1983. At that time, a density of 1 bear/40 mi^2 was estimated (Quimby 1984). Although quantitative survey data have not been obtained for the past 2 seasons, reports from hunters and Department staff suggest that a stable grizzly bear population exists in Unit 23.

Population Composition

In the absence of survey data, the composition of the Unit 23 grizzly bear population can only be inferred from harvest data. These data obviously provide no insight into numbers of cubs in the population.

The mean age of the 1985 reported harvest was 8.2 years (n = 31). This figure is only slightly higher than the 1969-85 mean of 8.0 years (n = 433) (Fig. 1). Mean age of male bears killed in 1985 was 8.4 years (n = 26), compared with a mean of 8.1 years for males killed between 1969 and 1985 (n = 312). The mean age of females killed in 1985 was 6.9 years (n = 5), slightly lower than the mean of 7.5 years for females killed between 1969 and 1985 (n = 121).

To test for possible trends in the age structure of harvested bears over time, linear correlations of mean age against time were calculated for male and female bears from 1969 to 1985. This resulted in a slightly negative slope for males (r = -0.3, 15 df, 0.25 > P > 0.1) and a slightly positive slope for females (r = 0.09, 15 df, P > 0.25). Neither of the regression coefficients is statistically significant. However, subtle changes over a 17-year period may not be verifiable statistically. Over the long term, these changes could prove to be biologically significant if the population structure changes

slowly. No obvious trends in the age structure of the bears in the harvest are apparent at this time.

Mortality

The 1985 reported harvest for Unit 23 was 37 bears: 28 males, 6 females, and 3 of unknown sex. Mean annual harvest for the period 1961-85 is 18.0 males and 5.8 (n = 252) females (Fig. 1).

Nonresident hunters took 25% of the reported harvest in 1985, compared with an average of 51% for the years 1961-85. A drawing permit system was implemented in 1980, limiting nonresidents to 25 permits. For the past 5 consecutive seasons, the annual reported harvest by nonresidents has been below 34% of the total reported harvest.

Between 1961-85, 52% of the reported harvest from Unit 23 came from within the Noatak River drainage. Forty-six percent were taken by nonresidents and 54% by residents (Table 1). Prior to implementation of the drawing permit system in 1980, 57% of the bears harvested from the Noatak drainage were killed by nonresidents.

An inherent bias exists in the reported resident versus nonresident harvest. Most nonresidents who hunt grizzly bears in northwestern Alaska are guided and compliance with reporting and sealing requirements is high. Many resident hunters, however, kill bears on an opportunistic basis. The meat and fur from bears is used for food and clothing without being reported or sealed. As a result, the actual number of bears killed by residents is substantially higher than reported. Likewise, the ratio of resident to nonresident take is higher than reported.

To assess changes occurring in the harvest level from year to year relative to the number of hunters afield, I combined annual harvest with hunting effort (hunting days/bear). By ranking the years 1961-85 from greatest to lowest in terms of total harvest and from lowest to greatest in terms of hunting effort, I derived an overall score for each year by adding the 2 rankings together. For example, the highest reported harvest occurred in 1979 (57) and the effort that year was 2.9 hunting days/bear. Therefore, by adding the harvest ranking for 1979 (1) to the effort ranking, an overall score of 8 was derived. Having the lowest overall score for all years, 1979 was recognized as the best year in terms of numbers of bears harvested relative to hunting effort exerted. This was followed by 1983 with an overall score of 10 (4 for harvest and 6 for hunting effort). The 1985 season ranked number 10 with an overall score of 21 (6 for harvest and 15 for hunting effort). Lowest in the ranking was 1971 with an overall score of 34 (17 for

harvest and 17 for hunting effort). Rankings, by year, for the period 1961-85, suggest no apparent pattern; trends could not be identified to characterize either an increase or a decrease in the number of harvestable bears or in the amount of hunting effort.

Management Summary and Recommendations

The Unit 23 grizzly bear population appears to be stable. Fluctuations in annual harvest levels and variations in hunting effort during the past 25 years appear to be following no apparent pattern or trend. The high percentage of bears harvested from the Noatak River drainage suggests the potential for localized overharvest; the situation should be reviewed annually. Observations of bears in this area, by hunters, guides, residents, and Department staff, suggest a stable population, however.

In June 1986, a 3-year grizzly study will be initiated to collect population composition and density information concerning bears inhabiting a portion of the Noatak River drainage. Quantitative data obtained through this study should enable us to make more definitive statements concerning the status and trend of the grizzly bear population in GMU 23.

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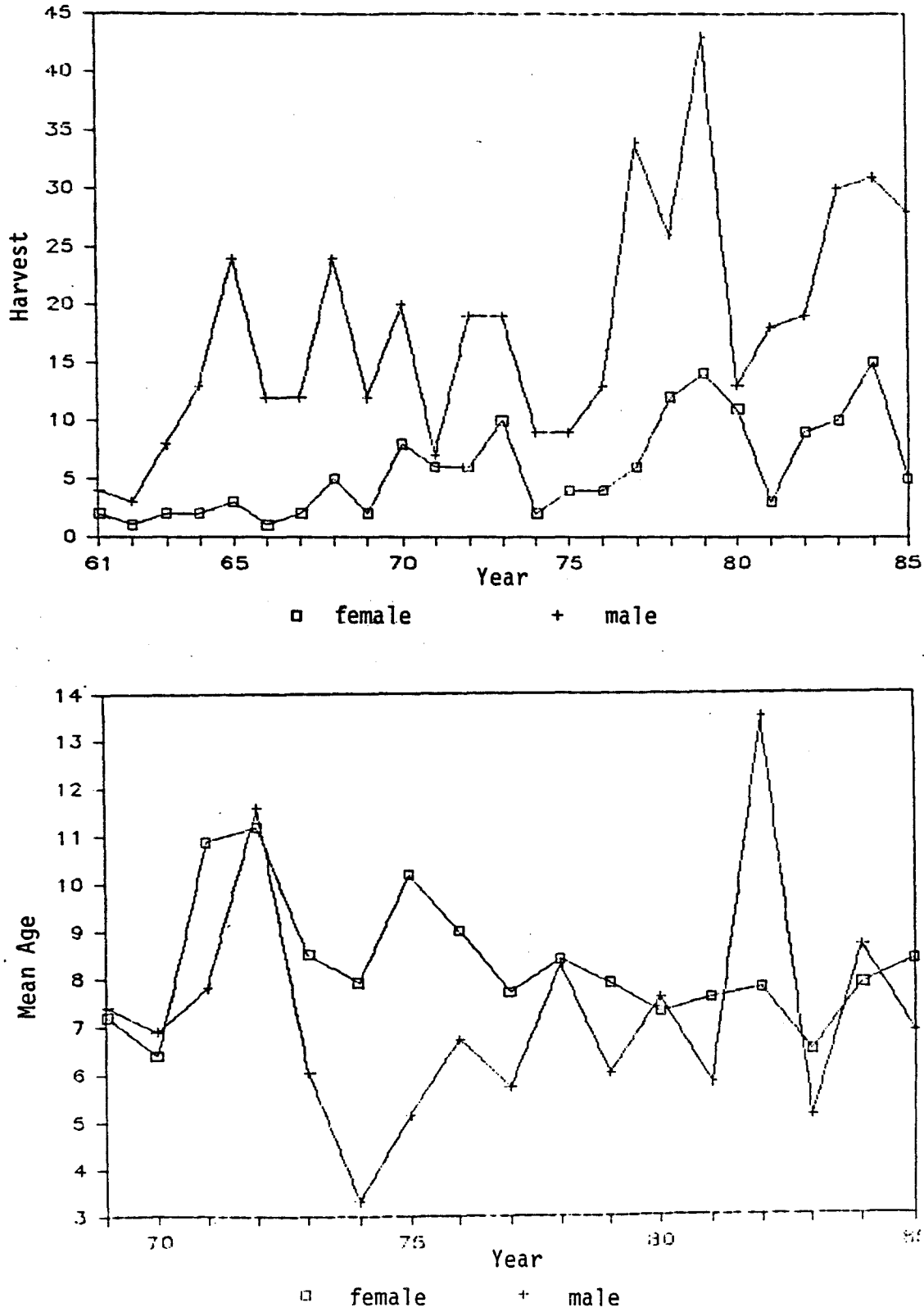

Fig. 1. Harvest and mean age of bears harvested in GMU 23, 1961-1985.

Table 1. Locations of reported grizzly bear harvests within GMU 23, 1970-85.

Year	Noatak	Kobuk	Selawik	Northern Seward Peninsula	Chukchi Sea coast	Unknown	Total
1970	15	7	0	5	1	1	29
1971	7	2	0	4	0	0	13
1972	22	3	0	2	0	1	28
1973	15	3	1	12	0	0	31
1974	5	1	0	8	0	0	14
1975	6	0	1	6	0	0	13
1976	9	1	1	6	0	1	18
1977	22	5	2	11	0	1	41
1978	24	5	1	9	0	0	39
1979	13	3	5	29	0	7	57
1980	7	5	1	13	0	0	26
1981	11	5	1	3	0	2	22
1982	20	5	1	5	0	0	31
1983	19	4	1	16	0	0	40
1984	32	7	0	8	1	0	48
1985	25	6	2	4	0	0	37
Total	252 (52%)	62 (13%)	17 (3%)	141 (29%)	2 (0.4%)	13 (3%)	487

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 24, 25, 26B, and 26C

GEOGRAPHICAL DESCRIPTION: Brooks Range drainages

PERIOD COVERED: 1 January 1985-December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Research indicates that the Brooks Range grizzly bear density ranges from 0.3 to 5.9 bears/100 mi^2, with an average density of approximately 1.0 bear/100 mi^2. Based on probable densities and food availability within various areas, the Brooks Range units are presently estimated to have a minimum population of 2,200-2,700 grizzlies.

Reduced harvest brought about by permit requirements may be allowing grizzly populations in Subunit 26B to recover from previous overharvest. Populations in Unit 24 and eastern Subunit 26A are probably stabilized or growing; numbers are probably increasing in Unit 25, western Subunit 26A, and Subunit 26C.

Population Composition

Recent population composition data are available only for the western Brooks Range near the headwaters of the Utukok and Kokolik Rivers. In that area, approximately 40% of the bears less than 1 year old are males and 60% are females. The sex ratio of cubs and yearlings is probably equal but may slightly favor females. Preliminary data from research conducted during 1982-85 in Subunit 26C indicate an even sex ratio for grizzlies older than yearling age class.

Percentages of bears, by age class, for the western Brooks Range were as follows: cubs, 13.0%; yearlings, 10.7%; 2-year-olds, 13.7%; 3- and 4-year-olds, 10.7%; and $\geq$5 years of age, 51.9%. For comparison, Arctic National Wildlife Refuge preliminary data indicated the following percentages by age classes: cubs, 19.6%; yearlings, 1.8%; 2-year-olds, 10.8%; 3- and 4-year-olds, 17.8%; and $\geq$5 years of age, 50.0%.

Quantified parameters of grizzly bear reproductive capacity for the eastern Brooks Range (1973-75 data), Arctic National Wildlife Refuge (1982-85 data), and western Brooks Range (1977-84 data) are as follows (listed as Wildlife Range, eastern and western Brooks Range, respectively): mean age at production of 1st litter of 10.1, 7.8, and 8.0 years; mean litter sizes of 1.8, 2.1, and 2.0 cubs; reproductive intervals of 4.2, 4.1, and 4.1 years; and mean reproductive rates of 0.42, 0.50, and 0.50 cubs/year.

Mortality

During 1985, 43 bears were reported killed in Units 24, 25, and 26 (including those taken illegally or in defense of life or property). This total includes 36 which were taken in areas where permits were required (northern Unit 24, Subunit 25A, and Unit 26) and 10 which were taken in portions of Units 24 and 25 where permits were not required (Table 1). In general, permits have been required in those units or portions of units where the potential for overharvest of grizzly populations is greatest. Harvest was similar to or lower than average harvests for the past 7 years, despite a liberalization of the permit system.

The permit season which had been in effect since 1977 changed during calendar years 1984 and 1985. Prior to and including the 1984 spring season, permits were required of both resident and nonresident grizzly bear hunters in the Brooks Range (Units 24, 25, and 26). However, beginning in fall 1984, permits were required for both resident and nonresident hunters in eastern Subunit 26A, Subunit 26B, and northern Unit 24, but only for nonresidents in Subunits 25A, western 26A, and in 26C. For fall 1985, registration permits rather than drawing permits were required in Subunits 25A and 26B.

Seven bears were taken in defense of life or property in Units 24, 25 and 26: 4 were taken near residences or summer camps, 2 by hunters, and 1 by river floaters. This is the highest "non-sport" take on record.

In Gates of the Arctic National Park only local subsistence hunters holding a registration permit may take grizzly bears. The 1985 subsistence harvest in the park was 1 bear in Subunit 26A; another bear was taken illegally. The sport harvest in Unit 24 outside the park was only 2 bears.

Management Summary and Recommendations

Grizzly bear harvest in the Brooks Range was lower than, or within levels appropriate for, the populations in the various subunits. Hunting pressure was generally well distributed and

no areas of overharvest were apparent. No changes in the present permit system are recommended at this time. Harvest in places outside permit areas in Units 24 and 25 was well within sustainable levels.

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Table 1. Human-caused mortality of grizzly bears in Units 24-26, 1977-85.

GMU	Estimated population	Mortality[a] 1977	1978	1979	1980	1981	1982	1983	1984	1985
Permit areas										
24	165-220	10	12	2	9	7	1	7[b]	5	3[b,c]
25A	360-470	13	4	10	5	9	15	16[b]	12	13[d]
26A west	315-350	2	2	1	8	6	2	4[b]	9	2
26A east	330-430	7	5	5	5	5	11	11[b]	5	8[d]
26B	150-240	8	3	5	8	2	4	9[b]	7[b]	4[b]
26C	220-320	3	4	1	1	1	4	2	3	6
Total	1,540-2,030	43	30	24	36	30	37	49	41	36
Nonpermit areas										
24	-[e]	1	8	5	4	5	3[b]	6	2[b]	3
25	-[e]	11	10	14	8	1	4	7	4	4
Total		12	18	19	12	6	7	13	6	7

[a] These figures include reported mortality only; additional illegal take very likely took place within permit areas and was reported as taken outside permit areas.

[b] Includes 1 killed in defense of life or property.

[c] Includes 1 killed illegally.

[d] Includes 2 killed in defense of life or property.

[e] Not calculated.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGMENT UNIT: 26A

GEOGRAPHICAL DESCRIPTION: Western Arctic Slope

PERIOD COVERED: 1 January 1985-31 December 1985

Season and Bag Limit

See Hunting Regulations Nos. 25 and 26.

Population Status and Trend

Research by Reynolds (1984) has shown that Brooks Range and North Slope grizzly bear densities vary from 0.3-5.9 bears/ 100 mi^2 depending on habitat type and topography. Mean density is 1 bear/100 mi^2. Based upon these densities, the Subunit 26A population is estimated at 645-780 bears.

Permit hunting requirements that were begun in the 1977-78 regulatory year appear to have favorably affected Brooks Range grizzly populations, including those in Subunit 26A. We believe populations in Subunit 26A are stable and may be at relatively high levels with respect to carrying capacity of the habitat.

Population Composition

The most recent composition and productivity data are available from Reynolds (1984) only for the western Brooks Range near the headwaters of the Utukok and Kokolik Rivers. In that area, approximately 40% of the bears more than 1 year old were males and 60% were females. The sex ratio of cubs and yearlings was probably near 50:50 but may slightly favor females. Age composition was as follows: cubs, 13.0%; yearlings, 10.7%; 2-year-olds, 13.7%; 3- and 4-year-olds, 10.7%; and bears over 5 years of age, 51.9%. Mean age at 1st reproduction was 8.0 years, mean litter size was 2.0 cubs, mean reproductive interval was 4.0 years, and mean productivity was 0.50 cubs/year.

Mortality

Ten bears were sealed in 1985. Three of the 10 were reported from Subunit 26A West and the remainder came from 26A East (Table 1). Three more bears were killed by North Slope residents but not sealed: a male near Alaktak River in July, a

male near the Colville River delta in May and a male at Nuiqsut in October. The known hunter-caused mortality was 13 bears for 1985.

We believe the actual number of bears killed by hunters was substantially higher, in the range of 22-26 bears. This estimate includes unreported mortalities due to guided nonresidents, Alaska residents from other areas of the state, and local residents residing in Subunit 26A. However, most of the unreported harvest is from residents of the subunit, who probably accounted for about 9 unreported bears in addition to the 3 described above.

The record high harvest of 1,145 brown/grizzly bears reported taken statewide for 1985 was not reflected in the Subunit 26A harvest. The 1985 reported harvest of 10 sealed bears from the subunit declined from the 22 sealed in 1984. If we assume that safe harvest limits should not exceed 4% of the population, the allowable sustained yield is approximately 26-31 bears. While the estimated 1984 harvest of 32-44 bears probably approached the upper limits of sustained yield, such was not observed in 1985 or in years prior to 1984.

Changes in hunting regulations, poor fall weather and logistical problems probably contributed to the reduction in reported harvest in 1985. In response to recent court decisions, the fall season in Subunit 26A East was conducted as a Tier I subsistence hunt. Only Alaska residents could participate. Although 65 residents did register to hunt, only 4 reported killing a bear. Most of these hunters were more interested in hunting moose. They were also hampered by inclement weather early in the season. The bear harvest in Subunit 26A West may also have been limited by the absence of aircraft which until recently were available at Pt. Lay.

However, a continued future decline in bear harvest is not likely for Subunit 26A. Analysis of reported bear harvest for Unit 26 during the past 25 years suggests a long-term increase that has occurred at a higher rate than observed in the statewide reported harvest. The reported statewide kill increased 66% from a mean of 596 bears/year during 1961-65 to 989 bears/year during 1981-85. In Unit 26, the reported harvest increased 151% during the same period. The mean number of bears harvested in 1961-65 was 8; during 1981-85 it was 20. Given the present pattern of economic development in Alaska, this trend toward increased harvest on the North Slope will probably continue.

No recent estimate of natural mortality among brown/grizzly bears in Subunit 26A is available. However, Reynolds and

Hechtel (1983) reported mortality rates among offspring accompanied by marked adult females in the western Brooks Range to be 44% for cubs, 9% for yearlings, and 14% for 2-year-olds during 1977-81.

Management Summary and Recommendations

A significant impediment to satisfactory bear management in Subunit 26A is that most local residents do not regularly report the bears they kill (Trent 1985). This management problem is due to at least 2 causes. Many local residents are either unaware or unsupportive of brown/grizzly bear hunting regulations. Second, these regulations are not always compatible with the way local people hunt bears. Usually bears are taken opportunistically as local conditions allow and most hunters consider seasons, bag limits, and tag requirements to be unwieldy and cumbersome. To gain more local participation and effectively gauge the level of harvest, the brown/grizzly bear regulations need to be extensively modified.

Accomplishing these changes will require significantly increased effort by Department staff in the area. Unless existing work priorities are rearranged or more funding becomes available, these changes cannot be made in the near future. The only alternative is to implement them gradually as time and budgets allow. Until the point is reached where most of the bears killed are actually reported, the Department must continue to make allowance for a "shadow harvest" of unreported bears that may easily be 50-100% more than the number of bears actually sealed.

Literature Cited

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Table 1. Reported harvest of grizzly bears in Unit 26A, 1977-85.

GMU	Estimated population	Harvest of 4%	Reported harvest[a]									
			1977	1978	1979	1980	1981	1982	1983	1984	1985	Mean
26A West	315-350	13-14	2	2	1	8	6	2	4[b]	10	3	4.2
26A East	330-430	13-17	7	5	5	5	5	11	11	12[c]	7	7.6
Totals	645-780	26-31	9	7	6	13	11	13	15	22	10	11.8

[a] Additional illegal harvest very likely took place within permit areas and was reported as outside permit areas.

[b] Includes 1 bear killed in defense of life or property.

[c] Includes 2 bears killed in defense of life or property and 1 killed for unknown reasons.