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BROWN/GRIZZLY BEAR

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STATEWIDE HARVEST AND POPULATION STATUS

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

Brown bear harvests continued to be relatively high, although the harvest was slightly less than that for last year. The highest recorded harvest was achieved in Unit 9 (190 bears), followed by Unit 8 (169 bears), and Unit 13 (140 bears). The killing of bears because of defense-of-life-or-property (DLP) situations remains a significant source of bear mortality. Because of the continuing problem of noncompliance with reporting and sealing requirements, the mortality data for bears in remote areas, particularly northwest Alaska, greatly underestimate the mortality.

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

Steven R. Peterson
Chief of Research

Unit	Bears taken by hunters	Defense of life or property kills
1	19	3
4	96	6
5	29	1
6	50	4
7 & 15	15	3
8	169*	15
9	190	15
10	5	--
11	9	--
12	21	--
13	140	--
14	10	--
16	73	1
17	51	2
18	4	1
19	25	--
20	56	3
21	6	1
22	51	4
23	34	--
24	10	--
25	16	--
26	42**	--

* Includes 4 bears killed illegally by sport hunters.

** Includes 11 bears known to have been taken in 26A by North Slope residents but not sealed.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1

GEOGRAPHICAL DESCRIPTION: Southeast mainland

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Mortality

Based on brown bear sealing documents, the 1986 sport harvest in Unit 1 was 19 bears (11 males, 7 females, and 1 of unknown sex). In addition 3 nonsport kills (2 males and 1 female) were recorded; 2 bears were killed out of season in Subunit 1C, and one was killed in Subunit 1B without the required tags. Resident hunters accounted for 16 bears (including 3 nonsport kills), and nonresidents took five. Guided hunts accounted for 1 bear in Subunit 1C and 4 bears in Subunit 1D; all were taken by nonresidents.

Mean skull size of males in 1986 was 21.6 inches (n = 12), and the mean cementum age was 7.4 years (n = 10). The 26-year-average skull size and cementum age for males were 22.2 inches and 7.6 years, respectively.

Management Summary and Recommendations

The 1986 sport harvest of 19 bears is smaller than the 1985 take (22 bears), but it exceeds the mean harvest for the previous 25 years (16 bears).

The length of the hunting season for Subunit 1D remained unchanged for 1986. Residents of Haines believe that the high brown bear population causes a reduction in moose calf production. Age and skull-size data for Subunit 1D do not indicate any drastic change in the population. Also, the average number of days spent hunting by successful hunters has not changed, suggesting that the number of bears has not substantially increased in the subunit.

No changes in season or bag limit are recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 4

GEOGRAPHICAL DESCRIPTION: Admiralty, Baranof, Chichagof, and Adjacent Islands

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

In July aerial surveys were conducted over about 80% of the alpine and grass-flat areas of Admiralty Island. During the surveys, 223 brown bears were counted. Research conducted in the northern portion of the island using marked bears found the sightability index of brown bears during this period to be 0.27 (J. Schoen, unpubl. data). Assuming a sightability index of 0.20 for the area surveyed, the population estimate is 1,115 bears. The density of bears in the northern portion of Admiralty Island has been estimated to be about 1 bear/mi^2 (J. Schoen, unpubl. data). The surveys indicate that the density of bears in the remainder of Admiralty Island may be similar to the northern portion.

Mortality

In 1986 the sport harvest of brown bears in Unit 4 was 96 animals (Table 1), continuing a trend of increasing harvests that began in 1983. The current harvest statistics are similar to those of the past 25 years; however, the mean age and skull size of males may be declining (Table 1). Six bears were reported killed in defense of life or property.

Management Summary and Recommendations

Unit 4, which is usually the 3rd most important producer of brown bears for sport hunters, continues to be a major area for both consumptive and nonconsumptive users. There are currently 3 areas specifically closed to brown bear hunting.

Seasonal lengths, especially the spring season, have been shortened to their practicable limits for offering sport hunts of reasonable quality; however, if the upward trend in the

harvest continues, it may be necessary to enact regulations to reduce it, particularly if skull sizes and ages continue to decline. For example, these alternative regulations could initiate drawing permits, impose short-term closures for specific areas, increase tag fees, or limit the number of bears that can be taken by an individual hunter during a given time period. No increase in hunting opportunities should be considered at this time. The annual kill of 60-80 animals endorsed by the Board of Game should be evaluated because it may be overly restrictive.

No changes in season or bag limit are recommended.

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Table 1. Brown bear sport harvest, Unit 4, 1961-86.

Calendar year	Total kill	Spring kill (%)	Males (%)	Nonresident kill (%)	Male skull size[a]		Age			
							Males		Females	
					$\bar{x}$	n	$\bar{x}$	n	$\bar{x}$	n
1961	39	72	79	62	24.7	12	--	--	--	--
1962	47	73	67	66	23.9	8	--	--	--	--
1963	26	69	73	58	22.4	9	6.4	1	5.4	1
1964	55	73	69	44	23.7	13	6.6	1		1
1965	68	63	66	52	23.5	11	9.1	3	15.4	2
1966	76	65	68	67	22.4	24	2.1	2	2.4	1
1967	69	61	68	48	23.0	20	7.2	4		
1968	50	74	78	32	22.2	30	5.7	9	9.1	3
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	78	78	71	52	22.5	46	7.5	46	8.0	19
1972	77	66	75	53	22.5	56	8.4	54	6.0	17
1973	102	72	68	40	21.6	65	7.2	65	7.9	32
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	63	65	68	61	21.3	40	6.3	42	7.8	21
1982	51	55	71	49	21.5	33	6.2	35	5.3	15
1983	61	57	78	49	21.7	60	6.6	62	8.4	16
1984	111	68	67	47	21.7	73	6.6	72	8.4	28
1985	87	52	62	57	21.5	50	6.5	54	7.4	32
1986	96	69	66	54	20.6	60	6.1	63	7.1	29
All years[b]	1,896	69	69	54	21.0	1,082	7.1	959	7.3	395

[a] Skull size equals total length plus zygomatic width.
[b] Sample size for spring kill = 1,303; male % = 1,301; and nonresident % = 1,017.

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 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Similar to 1985, few problems from bear-human interaction were reported. Only 1 defense-of-life-or-property (DLP) kill was reported in 1986. The low incidence of bear-human encounters was not interpreted as caused by reduced population levels. A minimal amount of snow accumulation during the winter followed by mild weather in the spring allowed for widespread access to vegetation. Harvest levels were similar to those of the past 7 years (Table 1); males composed two-thirds of the harvest, indicating a stable population.

Systematic scat surveys were conducted along the Harlequin Lake Road for the 4th consecutive year (Table 1). Only 1 bear scat containing moose hair was located during the 16-week count period; similarly, only 1 scat was found to contain fish. The number of scats/mile of road during the peak period was much lower, compared with the high number observed in 1985 (Table 2). The more consistent number of scats per trip found this year reflected, perhaps, either the refinement of techniques or the low snow-cover conditions in the spring that allowed bears to disperse more. A noticeable progression of food items in scats was noticed during the course of the surveys: early samples showed essentially all grass, mid-summer scats had mixed grass/berry, and later scats contained mostly berries. Scats found closer to the Harlequin Lake end of the transect contained virtually no berries.

Mortality

One brown bear was killed under DLP provisions during 1986. This bear was killed by Division of Fish and Wildlife Protection staff at a commercial fish camp on the Akwe River

in May. The hide and skull of this young male bear were not salvaged because the body was covered with large, open sores.

During the spring season, 7 male and 4 female bears, including the DLP bear, were taken by 9 nonresident and 2 resident hunters (Table 3). The fall harvest (13 males and 6 females) was taken by 10 nonresident and 9 resident hunters. The largest bear killed during the report period was a 10.8-year-old male, while the oldest bear was a 17.8-year-old female; skull sizes for each were 27.4 and 25.8 inches, respectively.

Successful spring and fall sport hunters averaged 7.6 and 3.7 days afield, respectively. Spring and fall hunters used the following methods of transport, respectively: aircraft, 50% and 63%; boat, 40% and 26%; and highway vehicle, 10% and 11%. All spring bears were killed in Subunit 5A, while 6 and 13 fall bears were killed in Subunits 5B and 5A, respectively.

The mean age of 6 male bears taken in the spring was 8.6 years (range = 2.4-17.4), while 4 females averaged 4.2 years (range = 2.4-6.4). The ages of 13 fall males ranged from 3.8 to 12.8 years ($\bar{x}$ = 7.1); 6 fall females ranged from 3.8 to 17.8 years ($\bar{x}$ = 6.6). Spring male and female bears had skull sizes averaging 24.8 and 19.5 inches, respectively. Fall skull sizes averaged 22.8 inches for males and 21.3 inches for females.

Management Summary and Recommendations

During the last 26 years, the mean skull size of the annual harvest has remained similar, averaging 21.6 inches. The 26-year-average age of male bears is 5.9, similar to three of the last 6 years. In terms of population stability, the meaning of the variation in male and female average ages over these years is unclear. Since 1978 the total bear and male harvests have been consistently higher than the 26-year average. Since 1978 the male percentage of the total harvest has ranged from 57% to 73%, averaging 65%.

The harvest of bears in Unit 5 continues to remain above the long-term average. Data from bears killed (including age, skull size, and sex ratio) should be monitored closely. Implications of vacillating average age by sex in the harvest should be further explored.

Some progress was made toward reducing bear use of the City of Yakutat's landfill. Efforts were made by the Department of Environmental Conservation (DEC) to ensure the city's compliance with its solid-waste permit. While the city requested a relaxation in the criteria to be followed, the DEC recommended

that an incinerator be employed at this site. No changes in seasons or bag limits are recommended at this time.

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Table 1. Bear scat transects along Harlequin Lake Road, Yakutat Forelands, 1986.

Date	Transect miles	Scat count	Scats/mile	Survey location
30 April	9.5	0	0	Paved road to Situk River
9 June	28.9	4	0.1	Paved road to Dangerous River
24 June	28.9	35	1.2	Paved road to Dangerous River
8 July	28.9	44	1.5	Paved road to Dangerous River
31 July	28.9	41	1.4	Paved road to Dangerous River
12 August	28.9	40	1.4	Paved road to Dangerous River
20 August	28.9	15	0.5	Paved road to Dangerous River

Table 2. Unit 5 bear scat counts, 1983-86.

Year	Transect miles	Scat count	Scats/mile	Peak date
1983	96.1	276	2.9	21 May
1984	219.7	183	0.8	2 July
1985	103.7	185	1.8	18 July
1986	182.9	179	1.0	8 July

Table 3. Number, percentage of males, skull size[a], and age of brown bear harvest[b], Unit 5, 1961-86.

Year	Total kill	Males (%)	Mean skull size		Mean age	
			Males	Females	Males	Females
1961	9	67	23.5	22.2	4.4	--
1962	7	57	20.0	20.0	--	--
1963	5	80	23.8		--	
1964	13	29	--	--	--	--
1965	17	71	25.1	--	--	6.8
1966	23	48	25.0	19.3	2.8	1.8
1967	21	57	22.8	19.5	4.8	8.8
1968	16	69	22.6	21.7	9.2	--
1969	20	50	21.9	20.0	6.6	5.6
1970	11	64	19.3	20.2	4.6	5.7
1971	22	55	22.2	19.1	5.4	3.4
1972	28	57	21.0	19.9	3.7	5.4
1973	23	61	22.8	21.4	8.4	9.0
1974	13	62	21.7	19.9	4.2	7.0
1975	16	63	19.7	19.5	3.7	4.2
1976	17	76	22.1	20.4	6.5	5.1
1977	10	63	22.0	19.3	8.3	3.0
1978	19	73	23.5	21.4	6.6	6.5
1979	14	64	22.2	20.5	6.3	7.5
1980	26	69	21.1	19.6	5.1	3.6
1981	32	66	21.0	20.9	5.5	5.6
1982	31	58	22.9	20.5	7.6	6.8
1983	33	64	21.9	20.8	5.9	7.6
1984	36	69	22.8	19.9	7.5	5.1
1985	30	57	22.2	21.3	5.8	7.4
1986	30	67	23.4	20.1	7.6	5.6
Means	20.9	62.7	22.3	20.3	5.9	5.8

[a] Skull size = total length + zygomatic width.

[b] Based on sealing records, 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 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Campbell and Griese (1987) identified a minimum of 35 individual bears in a portion of Subunit 6C between May and July 1986 while monitoring radio-collar relocations on the west Copper River Delta. Using a Lincoln-Petersen index, the calculated brown bear population on the delta in May was 32.5 ± 15 bears, or approximately 1 bear per 3.3-4.6 mi^2. This estimate was used to calculate the approximate number of bears in Subunits 6B and 6C: 85-120 and 60-86 bears, respectively.

Population Composition

Campbell and Griese (1987) observed 21 adults (60%), 8 juveniles (2-5 years) (23%), 3 yearlings (9%), and 2 cubs-of-the-year (6%) in Subunit 6C.

Mortality

Sealing records indicate that 54 bears were killed in Unit 6. The sport harvest was 50 bears: 23 males (46%), 24 females (48%), and three of unspecified sex (6%). Hunters killed 19 (38%) bears during spring and 31 (62%) during fall seasons. Nonresident hunters killed 20 bears, or 40% of the sport harvest. Three additional females and 1 male were killed in defense of life or property. Reliable sources reported a minimum of 7 additional illegally killed bears.

Skull size of sport-killed males averaged 23.8 inches ($\underline{n}$ = 21), and their average age was 8.3 years ($\underline{n}$ = 22). Skull size of females averaged 21.6 inches ($\underline{n}$ = 22), and their average age was 7.8 years ($\underline{n}$ = 23).

The distribution of bears (including the illegally killed bears) killed in Unit 6 was as follows: Montague Island, 12; Hinchinbrook Island, 9; Valdez to Cordova, 9; Cordova to Copper River, 5; Copper River to Ragged Mountains, 11; and Ragged Mountains to Icy Bay, 15.

Management Summary and Recommendations

The sport harvest in 1986 was the largest since 1968, largely because of increasing interest in combination fall hunts for brown bear and/or moose, goat, black bear, or Sitka black-tailed deer. The reported sport kill of 50 brown bears was 19 bears higher than the previous 25-year mean of 31. During the previous 25 years, 41% of the sport harvest occurred in the fall; in 1986, 59% of the annual harvest occurred during this period. The bear harvest was uniformly higher throughout the unit; however, an unusually high fall harvest in Subunit 6D suggests that deer and mountain goat hunters may have taken more bears than in the past. Also, a larger number of deer hunters complained that bears attempted to claim their deer kills, especially on the large islands in that subunit. The increased bear kill in the fall, as expected, increased the percentage of females in the harvest. The 25-year-mean percentage of females in the sport harvest is 38%; in contrast, females composed 56% of the annual harvest in 1986.

I recommend that the brown bear season and bag limit be liberalized in Subunits 6B and 6C. An increasing number of brown bears near Cordova is believed to be responsible for a decline in the dusky Canada goose population, a reduction in moose calf survival, and an increased number of bear-human conflicts. Estimates of brown bear numbers in Subunits 6C and 6B indicate that harvest is less than annual recruitment.

A proposed study to translocate up to 20 brown bears from the Copper River Delta (to locations 100 miles east in Subunit 6A) should help assess changes in dusky goose production and may identify the significance of brown bear predation.

Literature Cited

Campbell, B. H. and H. J. Griese. 1987. Management options for dusky Canada geese and their predators on the Copper River Delta, Alaska. Alaska Dep. of Fish and Game. Juneau. 91pp.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 7 & 15

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Estimates of brown bear population size in Units 7 and 15 are currently not available. However, based on historical harvest data and on field observations of bears 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, which included 4 males, 10 females, and 1 bear of unspecified sex. The spring kill was comprised of 1 male, 1 female, and 1 bear of unspecified sex, compared with the fall kill of 3 males and 9 females. Mean age of males was 10 years ($\underline{n}$ = 3; range, 1.8-27.8) and that of females was 7.5 years ($\underline{n}$ = 9; range, 2.8-15.8). Two of the sport-harvested bears were killed by nonresidents, and the other 13 were taken by residents. In addition to the sport harvest, 3 male bears were killed in defense of life or property.

Management Summary and Recommendations

Reported brown bear harvests on the Kenai Peninsula have been steadily increasing since 1970 (Table 1). The mean annual brown bear harvests (reported) for three 5-year periods (1970-1985) are as follows: 1970-1974, 7 bears; 1975-1979, 9 bears; and 1980-1985, 13 bears. The proportion of females in the sport harvest increased from 41% ($\underline{n}$ = 23) in 1970-79 to 54% ($\underline{n}$ = 43) in 1980-86. Reported harvests for all known mortality was 17 and 18 bears in 1985 and 1986, respectively. Based on a mean annual harvest of 16 bears, the projected harvest of 80 brown bears during 1985-1989 will be 25% higher than the previous 5-year period. The Kenai Peninsula brown bear harvest trend, harvest magnitude, and high proportion of

females in recent harvests indicate that annual harvests may be approaching or exceeding sustained yield. However, at present, the harvest impact cannot be accurately assessed because so little is known about the bears' population size or density. The Department should conduct a census of the Kenai Peninsula brown bear population in either FY 88 or FY 89. A census is justified because of concerns about increasing human-caused bear mortality, the high importance of the Kenai Peninsula for outdoor recreational activities, and the need for population data to make land-use decisions. An estimate of population size would help managers determine the annual sustainable yield of brown bears.

The Kenai Peninsula Interagency Brown Bear Team is an appropriate group to discuss the feasibility of funding and coordinating a capture-recapture population estimate. Once objective estimates of the population size and annual sustainable yield have been determined, hunting seasons and other hunt conditions can be adjusted to produce the desired harvest level.

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Table 1. Reported and mean harvests of Kenai Peninsula (Units 7 and 15) brown bears by 5-year intervals from 1961 to 1984 and 1985-86 combined.

Years	Sport harvest				Nonsport harvest				Mean annual reported harvest	Total reported harvest
	No. males	No. females	No. unk	Total	No. males	No. females	No. unk	Total		
1961-1964 [a]	8	9	-	17	-	-	-	-	4	17
1965-1969	18	13	-	31	6	4	-	10	8	41
1970-1974	15	13	-	28	3	5	-	8	7	36
1975-1979	17	10	-	27	4	10	2	16	9	43
1980-1984	21	28	1	50	7	7	-	14	13	64
1985 & 1986 [b]	13	15	2	30	2	3	-	5	18	35
Totals	92	88	3	183	22	29	2	53		236

[a] data for 4 years, no data available for 1960.
[b] data for 2 years.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 8

GEOGRAPHICAL DESCRIPTION: Kodiak and adjacent islands

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

The brown bear population appears to be stable on Kodiak and adjacent islands. Harvest characteristics and trends in number and composition of bears observed from aerial stream surveys indicate that the population is relatively high.

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 to 7 August. During this period, 805 bears were classified as follows: single bears, 445 (55%); maternal females, 115 (14%); yearlings and older young, 191 (24%); and cubs-of-the-year, 54 (7%). Counts in each survey ranged from 57 to 144 bears. Peak counts on Pinnell, Connecticut, and Southeast Creeks were the highest on record.

Mortality

Sport hunters killed 169 bears, including 96 males (56%) and 73 females (44%). Included in these numbers were 4 bears killed illegally by sport hunters. The kill during the spring season was 104 bears, including 70 (67%) males and 34 (33%) females. The kill during the fall season was 65 bears, including 26 males (40%) and 39 females (61%). Hunters reported wounding 4 bears: a ratio of 1 bear wounded per 143 hunters afield.

Twenty-five bear mortalities were recorded from other sources: 15 bears were killed in defense of life or property (8 males, 7 females); 8 bears died from unknown or suspected natural causes (1 male, 3 females, 4 unknown sex); 2 females were shot illegally, one at the Port Lions' dump and one near Barbara Lake; and 2 females died from capture attempts. In 1986 total

mortality was 196 bears (105 males, 87 females, 4 unknown sex).

The mean ages of bears killed by sport hunters in 1986 were within the range of those recorded during the previous 17 years. Males had a mean age of 7.1 years (n = 91), and females had a mean age of 8.4 years (n = 71).

All bear hunting in Unit 8 was by permit; 573 permittees, which included 450 Alaskan residents and 123 nonresidents, hunted in 1986. Hunter success was 29%. Resident hunters were 16% successful, and nonresident hunters were 76% successful. Drawing-permit hunts had 234 participants, including 129 residents and 105 nonresidents. Hunter success was 34% for residents, 83% for nonresidents, and 56% for both groups combined.

The registration hunt held on northeastern Kodiak and Afognak Islands had 339 participants, including 321 residents and 18 nonresident hunters. Hunter success was 9% for residents, 33% for nonresidents, and 11% for both groups.

Management Summary and Recommendations

The sport harvest of 169 bears in 1986 was the third highest kill in the past 10 years, but it was lower than the 187 bears killed in 1985. The 60% female kill in the fall was disproportionately high, compared with the 26-year mean of 43%. The total kill of 72 females was the fourth highest one on record, but it was below the peak of 89 females killed in 1966.

Although harvest by sport hunters declined, confirmed nonsport kills increased from 24 (1985) to 25 bears in 1986. Total recorded mortality declined from 211 bears in 1985 to 196 bears in 1986.

Hunting pressure declined in the registration hunt from 489 hunters in 1985 to 339 hunters in 1986. A smaller decline from 246 hunters to 234 hunters occurred in the drawing hunt. The current economic decline in Alaska may explain the reduced hunting pressure in 1986.

Since 1977 hunting pressure has steadily increased in the registration hunt on Afognak and northeastern Kodiak Islands. Only 84 hunters participated in the registration hunt in regulatory year 1977-78, compared with a peak of 455 hunters in regulatory year 1985-86. Part of this increase has occurred because hunters who were mainly seeking deer and elk also obtained bear permits, hoping to obtain a bear if they had an opportunity. Although harvest has not increased at the same rate as the increase in the number of hunters, relatively high

harvests of females have occurred on Afognak Island. In 1986, 12 of 22 kills (55%) were females. At least one female and her cub were shot on Afognak, a recurring problem resulting from opportunistic, unselective hunting. I recommend that hunting on Afognak Island in 1987 be regulated by the issuance of drawing permits rather than by registration permits.

The Sharatin Bay, eastern Kizhuyak Bay, and Saltery Creek-Wild Creek drainages of Ugak Bay support most of the harvest in the registration hunt on northeastern Kodiak Island. Those drainages are without roads, permanent habitations, or other developments; and they encompass brown bear habitat of comparable quality to that found in more remote parts of Kodiak Island. This area has traditionally been managed to maintain relatively low brown bear densities because of the close proximity to cattle ranches in the Chiniak Bay and eastern Ugak Bay drainages. In the past 5 years, movements of radio-collared bears have documented that bears as far away as Terror Bay seasonally use the eastern Kizhuyak Bay drainage (Smith and Van Daele 1986). I recommend that the eastern Kizhuyak Bay, Sharatin Bay, and the Saltery Creek-Hidden Basin Creek drainages of Ugak Bay also be included in the drawing-permit hunt. The inclusion of Afognak and the additional drainages on northeastern Kodiak Island in the drawing hunt is consistent with proposed management plans emphasizing aesthetics and trophy-bear management in Unit 8.

Literature Cited

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

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9

GEOGRAPHICAL DESCRIPTION: Alaska Peninsula

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

In seven of 9 years (1962-1970), the Black Lake study area was surveyed. The highest single count from each of these years averaged 103 bears (range 67-123); an average of 38 bears per hour were counted. The Black Lake area was surveyed again in 1974 and 1976; the best survey from each year averaged 105 bears (41 bears per hour). In 1982-86, aerial surveys in this area were conducted using the same procedures (Table 1). The best single count from each of the past 5 years averaged 182 bears (60 bears per hour). When we combined all 17 surveys conducted since 1982, an average of 161 bears (54 bears per hour) was observed; this is approximately 50% higher than the best surveys from all previous years. These surveys were not designed to measure population density and may not reflect trends outside the study area; however, the noted increase in bears observed, bears per hour, harvest statistics, and other observations suggest a large, stable bear population in Unit 9.

Population Composition

Seven hundred and four bears, including 138 (20%) females with young, 260 (37%) cubs and yearlings, and 306 (43%) single bears, were observed during 4 replicate surveys of the Black Lake study area in August 1986 (Table 1). Cubs-of-the-year represented only 13% of the sample, the poorest production ever recorded in the Black Lake area. Spring was delayed in 1986 on the Alaska Peninsula by some very harsh weather in May. This condition may have contributed to higher-than-average cub mortality. Bears not associated with family groups made up 43% of the sample, the highest percentage ever recorded at Black Lake. Females that lost their cub-of-the-year litters would have contributed to the high percentage of bears classified as singles in 1986. Bear

populations in protected areas (e.g., Katmai National Park and McNeil River State Game Sanctuary) have much higher percentages of single bears than hunted populations, and it has been postulated that the percentage of single bears may provide a rough indication of harvest intensity. For example in 1970-86, 57% of 3,065 bears that were classified from "unhunted" populations on the Alaska Peninsula were single bears. The percentage of single bears in hunted areas on the Alaskan Peninsula has fluctuated between 15% and 56%. The earliest bear-composition surveys conducted during a period of very light hunting pressure (1958-61) reflected a high percentage of single bears (approximately 45%). During the mid-1960's when hunting pressure increased and harvests more than doubled, the proportion of single bears in composition surveys dropped to an average of 25%. In the Meshik to Port Moller area (Subunit 9E), where hunting was particularly intense, single bears averaged 16% of the sample in 1967 and 1968. After hunting restrictions were invoked, the percentage of single bears increased to 38% at Black Lake.

Following record harvests in 1972 and 1973, it was apparent that an overharvest had occurred, and the spring 1974 hunting season was closed by emergency order in most of Subunit 9E. Black Lake stream surveys in 1974 and 1976 showed an average of 21% single bears. Since resumption of Black Lake stream surveys in 1982, it has become apparent that the population has recovered. Of 2,749 bears classified since 1982, 35% were singles.

Mortality

Hunters killed 190 brown bears in Unit 9 in 1986; all were taken during spring. This represents a slight decrease from the harvests of the past 4 years (Table 2). Poor weather during the first half of the May season caused some bears to emerge from dens late, and inclement weather hampered hunters, thereby reducing the success rate.

Sixty-eight percent of the harvest was male, slightly below the average of 70% for the past 5 spring seasons. The mean age of males at 8.4 years was a full year older than the historic average; the average age of females (7.0 years) was the same as the historic mean. Nine bears were reported killed in nonsport circumstances; another six were confirmed as dead but not salvaged. Unconfirmed reports were received for approximately 10 other bears that had been killed near Lake Iliamna. In 1986 an extremely weak salmon escapement in the Kvichak drainage and a poor berry crop may have contributed to more nuisance-bear problems in Subunit 9B. An estimate of the unreported harvest in Unit 9 is 35 bears.

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; the 3 bears taken in June near the road system were potentially nuisance bears. At least 4 other bears were known to have been killed (although none were properly reported) within 3 miles of Naknek under defense-of-life-or-property circumstances. This registration hunt has been conducted for the past 11 years, and it has been partially successful in reducing the threat of problem bears. The hunt has remained moderately popular; 16 spring and 20 fall permits were issued; most of these (64%) went to local residents.

The registration-permit hunt in the Cold Bay area was also designed to minimize bear-human conflicts. In 1983, however, the Izembek National Wildlife Refuge staff expressed concern that the number of local bears was too low; they believed that nuisance bears were no longer common. Consequently, the Board of Game authorized this registration hunt to be held only when it was determined that problem bears were present. The hunt has not been held since spring 1984. In December 1986, a male bear was killed in a defense-of-property incident after it had been attracted to domestic-animal food stored outside a house. This bear had not been a problem earlier in the fall.

The 1986 sport harvest of 190 bears was the lowest one for a spring season since 1978; however, reduced hunter success was attributed to very poor weather conditions. The combined spring 1986 and record fall 1985 harvest totaled 418 bears, which approximates the average for the previous 2 regulatory years in which the hunting seasons have been open (1981-82 and 1983-84). Harvest statistics from 1985 and 1986, general observations on brown bear abundance, and the Black Lake stream surveys indicate a healthy bear population; however, cub production may have been low in 1986. No regulatory changes are recommended.

A cooperative, interagency study has been proposed to evaluate brown bear population density and composition near Black Lake. This study is planned for 3 years beginning in June 1988. Census results and other data will be compared with data collected in the early 1970's, and these data will also be compared with a similar study planned for a protected brown bear population in Katmai National Park. These studies will provide a better data base to help manage bears in Unit 9.

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Table 1. Brown bear composition from Black Lake trend counts, 1982-86.

Year	Percent females w/young	Percent cubs	Percent yrlgs	Percent singles	Total sample	Best single survey		Number of replicate counts
						No. of bears	Bears/hour	
1982	19	25	16	40	282	148	53.8	2
1983	22	27	19	32	631	173	55.8	4
1984	24	20	26	30	533	171	64.0	4
1985	22	18	28	32	599	215	67.9	3
1986	20	13	24	43	704	202	61.6	4

Table 2. Annual brown bear sport harvest statistics in Unit 9, 1982-86.

Year	Males	Females	Total	Percent by nonresidents	Mean age	
					Males	Females
1982	134	75	211	76	6.5	7.5
1983	119	78	199	70	5.6	8.0
1984	160	64	228	64	7.3	7.5
1985	125	95	228	73	6.2	8.6
1986	128	61	190	67	8.4	7.0

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 10

GEOGRAPHICAL DESCRIPTION: Unimak Island

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Mortality

Five bears were killed on Unimak Island in 1986, including 2 females during the spring season and 3 males during the fall season.

Management Summary and Recommendations

In the fall of 1985 and spring of 1986, a limited (first-come, first-served basis) registration-permit hunt was conducted on Unimak Island. During that fall, 5 of 6 hunters were successful. Therefore, in the spring of 1986, only 2 registration permits were initially issued. Both permittees were successful, and no further permits were issued. The registration procedure was not well received by the public; it also created administrative problems for the U. S. Fish and Wildlife Service in Cold Bay.

In the fall of 1986, the procedure for obtaining hunting permits was changed back to the drawing method. Eight permits were issued; 5 permittees reported hunting, and 3 bears were taken. I recommend that the drawing-permit hunt be maintained and that 7 permits be issued in the spring and 8 in the fall.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

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. No population trend is readily evident.

Mortality

Nine brown bears, all males, were reported killed during 1986; three were taken during the spring season and six during the fall season. The mean age for all bears was 9.0 years, well above the 18-year-mean age of 7.2 years for all males harvested. The mean skull size was 22.9 inches, greater than the 25-year mean of 21.7 inches for all males harvested. Nonresident hunters took six (67%) of the 9 bears.

Management Summary and Recommendations

Brown bear harvests averaged 16 (8-27) bears per year from 1961 to 1978. Since 1979 harvests have averaged only 7 (5-9) bears per year. The decline in the number of bears harvested has resulted from the inclusion of Unit 11 in Wrangell-St. Elias National Park/Preserve. Under current Federal regulations, sport hunting is allowed only on park lands designated as a preserve, substantially reducing the area in Unit 11 available for sport hunting. I believe the current low annual harvests have had little impact on brown bear numbers 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 extension of the

season is not expected to result in a substantial increase in harvest.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12

GEOGRAPHICAL DESCRIPTION: Upper Tanana and White River drainages

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Grizzly bears are relatively abundant and well distributed throughout Unit 12. No current trend in the bear population is evident. Bear density is estimated to be approximately 1 bear/20 mi^2, based upon recent and ongoing studies to the north and west of Unit 12, respectively. The population in the unit is believed to be 430-570 bears.

Mortality

Hunters reported taking 21 grizzly bears in Unit 12 during 1986. The mean annual harvest has been 22 bears since 1981, when current seasons and bag limits were established. Females (11) composed 52% of the harvest. Only 4 bears (19%) were taken during the spring season and 17 bears (81%) were taken during the fall season. Residents took 13 bears (62%), while guided nonresident hunters took 8 bears. The harvest was well distributed throughout the mountainous portions of Unit 12.

The mean age of females in the harvest was 4.1 years, and only 2 females were older than 5 years of age. The mean age of males was 8.6 years, and six of 10 males were older than 5 years.

Management Summary and Recommendations

The management objective of providing maximum opportunity to participate in grizzly bear hunting is being met in Unit 12. Liberalizations of grizzly bear hunting regulations since 1980 have resulted in a 22% increase in annual harvests; the increased take is attributable to increased harvests by resident hunters. The current grizzly bear harvest rate (less than 5%) is believed to be sustainable. Moose and caribou

populations in Unit 12 are currently depressed, and grizzly bears are known to prey on ungulates.

It is recommended that the resident tag-fee waiver and the bag limit of 1 bear/year be continued. Additionally, a 20-day extension of the spring season is recommended in the northern and western portions of the unit. These measures should limit the growth of grizzly bear populations and provide relief for depressed moose and caribou populations.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13

GEOGRAPHICAL DESCRIPTION: Nelchina Basin

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

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 mi² (Miller et al., in press). This density estimate was slightly higher than the 1 bear/16 mi² reported previously (Miller and Ballard 1982).

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

Population Composition

Cubs-of-the-year and yearlings compose approximately 40% of the brown bear population in Unit 13; litter sizes averaged 2.1 cubs-of-the-year, 1.7 yearlings, and 1.7 2-year-olds (Miller 1987).

Mortality

Hunters reported taking 140 grizzly bears during 1986. This was a slight decline (4%) from the previous year's take of 146 bears but a 32% increase over the 6-year (1980-85) average annual harvest of 106 bears. Seventy-three (53%) of these bears were males, 65 (47%) were females, and two were of unknown sex. The spring harvest was 45 bears, including 28 (62%) males and 17 (38%) females; the fall harvest was 95 bears, including 45 (48%) males, 48 (52%) females, and two of unspecified sex. Nonresident hunters killed 27 (19%) bears.

The mean age for all bears killed during the spring season was 6.6 years; during the fall season, the average age was 6.7 years. The average age for males in the harvest was 6.2 years, approximating the 18-year average of 6.0 years; the

average female age of 7.1 years was similar to the 18-year average of 7.0 years. The mean skull size for all males taken was 21.6 inches, higher than the 18-year average of 21.2 inches; the mean skull size for females was 19.7 inches, identical to the 18-year average for all females harvested.

Natural mortality in Unit 13 among cubs-of-the-year and yearlings belonging to radio-collared females appears to be high. Miller (1987) observed 38% and 22% losses, respectively, for cubs-of-the-year and yearlings accompanying radio-collared females. No brown bears were reported killed in defense of life or property in Unit 13 during 1986.

Management Summary and Recommendations

The grizzly bear harvest in Unit 13 increased after hunting regulations were liberalized in 1980. The recent harvest of 140 grizzlies is the second highest on record. Annual changes in population characteristics are primarily monitored by comparing differences in composition of the harvest. These data indicate that slightly more females than males were taken during the 1986 fall season. Fall hunters in GMU 13 are primarily opportunistic, taking bears in proportion to their presence in the population. A decline in the percentage of males taken in the fall harvests suggests fewer males are present. Current harvest data do not indicate that the increased harvest has resulted in a decline in mean age or size of bears taken in 1986. One major concern with utilizing harvest data to determine population trends, however, is our inability to detect bears illegally taken in other units and sealed for Unit 13. Unit 13 has a bag limit of 1 bear per year; some other units allow only 1 bear every 4 years. The number of bears taken in other units and sealed for Unit 13 is unknown. If a significant number of "bootlegged" bears are included in the harvest data for Unit 13, it could make harvest-data analysis potentially ineffective as a management tool for evaluating population trends.

Harvest rates for marked bears in a portion of Unit 13 suggest that the current take of grizzlies in that area may exceed sustained yield. Miller (1987) estimated harvest rates of from 7% to 14% for radio-collared grizzlies in the upper Susitna River, while an 8-10% harvest rate is considered to be within sustained-yield limits. The area where marked bears are located is a popular hunting area, and harvest rates at this location may not apply to other areas within the unit.

Because a substantial increase in the number of bears killed in Unit 13 may have occurred in recent years, the bear population should be carefully monitored. A census will be completed in 1987; its goal will be to derive a brown bear

population estimate for the upper Susitna River. To determine if any changes in bear numbers have occurred in this area, this population estimate will then be compared with the estimate obtained in 1979. Until additional information on population trends in Unit 13 is obtained, no changes in seasons or bag limits are recommended.

Literature Cited

Miller, S. D., and W. B. Ballard. 1982. Density and biomass estimates for an interior Alaskan brown bear population. Can. Field Nat. 96(4):448-454.

Miller, S. D. 1987. Big game studies. Vol. VI. Black bear and brown bear. Final Rep. Susitna Hydroelectric Proj. Alaska Dep. Fish and Game. Juneau. 322pp.

Miller, S. D., W. B. Ballard, and E. F. Becker. In press. Density and structure of black and brown-grizzly bear populations in Alaska estimated using modified capture-recapture techniques. In Proc. Int. Conf. Bear Res. and Manage., Williamsburg, Va.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 14

GEOGRAPHICAL DESCRIPTION: Upper Cook Inlet

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Mortality

Ten brown bears, including 6 males and 4 females, were reported killed in Unit 14. One bear was taken from Subunit 14A, seven from Subunit 14B, and two from Subunit 14C. All 10 bears were killed in the fall season by hunters with bear tags. No bears were killed in defense of life or property.

Management Summary and Recommendations

Brown bear harvests in Unit 14 have remained relatively low since statehood. Between 1961 and 1971, the mean annual harvest was 10 bears; from 1972 through 1986, it was 6 bears. There is little interest in brown bear hunting in Subunits 14A and 14C because bear densities are low. Subunit 14B has moderate bear densities, but access is limited and vegetation is often dense. Most brown bear hunting occurs in conjunction with moose hunting or other outdoor activities.

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 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Brown bears are present throughout Unit 16; the highest densities are in the Alaska Range and the southwestern portion of the unit. While numbers do not approach those of the Alaska Peninsula, observations by the Department's staff and the public indicate that brown bears remain abundant.

Mortality

The total reported harvest for the year was 74 bears: 73 sport harvest bears and 1 defense-of-life-or-property kill. The spring harvest was 29 bears (25 males, 4 females), and the fall harvest was 44 bears (24 males, 15 females, and 5 sex unknown). Both the spring and fall harvests were below the record harvest levels in 1985 (spring, 34 bears; fall, 58 bears).

The ages of male bears taken in both seasons remained relatively high; older bears were most common in the spring. The mean ages for males in the spring and fall were 9.1 years (n = 25) and 6.8 years (n = 24), respectively. The mean skull size of males remained at 23.6 inches, while the mean female skull size declined 0.5 inch: from 20.3 inches in 1985 to 19.8 inches in 1986.

Management Summary and Recommendations

The highest recorded harvests of brown bears have occurred in Unit 16 during the past 2 years. These increases resulted from the combined effects of a longer spring season and an increased public awareness of bear hunting in this area. Most of the increased spring harvest occurred prior to May 10, which is the traditional opening date of past seasons. The increased fall harvest, however, was primarily due to

increased hunting pressure, rather than an extension of the hunting season. Only 2 bears were taken after 31 October when the season normally closed.

Data are lacking on the size of the brown bear population in Unit 16, and the impact of recent harvests cannot be accurately determined. The decrease in harvest from 92 bears in 1985 to 73 bears in 1986 may indicate that some areas now have fewer bears; this may be a result of environmental factors that annually affect the availability of bears (e.g., weather or berry crops). Historically, even during conservative hunting seasons, the harvests have varied from 19 to 41 bears; these harvest variables have been attributed to changing environmental conditions. The high percentage of males, the relatively high mean age and large skull sizes of the males, and the limited amount of reproductive-age females (6 bears) in 1986 suggest that current levels are not excessive. However, because these longer seasons have been in place only a short time, trends in harvest data may not accurately reflect trends in population status. Harvest data will have to be carefully monitored for several years to provide a reliable pattern. If harvest data or observations of bears suggest the population is being adversely impacted, conservative seasons may need to be reinstated.

No changes in seasons or bag limits are recommended.

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BROWN BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 17

GEOGRAPHICAL DESCRIPTION: Northern Bristol Bay

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

No data were available to evaluate the trend or population status of brown bears in Unit 17. General observations indicate moderately high densities of brown bears throughout most of Unit 17. Local residents have reported increasing densities during the past 5 years in Subunit 17C. Most sport hunting occurs in Subunit 17B, and Shepherd (1981) expressed concern that high levels of hunting pressure in this area were leading toward an increased percentage of young bears in the population. This concern has been supported since 1977 by a trend of a higher proportion of bears less than 5 years old in the annual harvest.

Mortality

Fifty-one bears were reported taken in Unit 17 during 1986; 26 were males, and 25 were females. Four, 45, and 2 bears were taken in Subunits 17A, 17B, and 17C, respectively. This is the second-highest reported kill, and it is exceeded only by the 1985 harvest of 57 bears. The mean for annual harvest since 1977 is 32.9 bears (Table 1).

Most bears (84%) were reported taken during the fall season when 20 males and 23 females were killed. Thirty-one bears (61%) were taken by nonresidents; this is significantly below the unit average of 72%. Two bears were taken in defense of life or property.

The annual harvest of brown bears reported in Unit 17 was low prior to 1970. Since then and especially in recent years, the trend has been towards an increasing percentage of females in the harvest (Figure 1). Coupled with this trend has been an increasing percentage of bears in the harvest that have been less than 5 years old.

Management Summary and Recommendations

Since 1984 hunting-season dates and bag limits have changed almost annually in most areas of Unit 17, making it difficult to evaluate the regulatory effects on harvest. Prior to 1984, the hunting-season dates were 10-25 May and 7-21 October; the bag limit was 1 bear every 4 regulatory years. Present seasons and bag limits vary between subunits. Except for the spring subsistence season in Subunits 17A and 17C, the hunting-season dates are 10-25 May and 10 September-10 October. Most of the increased harvest during the past 2 years is due to the earlier fall season. Caribou-hunting season is open throughout the fall bear season, and moose season is open during the first 6 to 11 days of the bear season, depending on the area. Multiple-species hunts are extremely attractive for the guiding, air-taxiing, and outfitting industries; and hunting in Subunit 17B has increased substantially because of these commercial operations.

The trend for an increasing percentage of females and for bears less than 5 years old in the harvest may be indicative of a declining population in Subunit 17B, which is approximately 7,500 mi^2. Assuming a density of 1 bear per 15 mi^2 (Taylor 1986) and using 5% as the optimal harvest level, Subunit 17B would contain approximately 500 bears and be capable of supporting an annual harvest of 25 animals. Harvest levels in Subunit 17B of 51 and 45 bears in 1985 and 1986, respectively, were probably excessive. If this harvest level occurs again in 1987, hunting seasons in September should be reduced.

Literature Cited

Shepherd, P. E. K. 1981. Unit 19 brown bear survey-inventory progress report. Pages 81-82 in R. A. Hinman, ed. Annual report of survey-inventory activities. Part I. Black Bears and Brown Bears. Volume XII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-19-1 and W-19-2. Job 17.0, 4.0, and 22.0. Juneau. 96 pp.

Taylor, K. P. 1986. Unit 17 brown bear survey-inventory progress report. Pages 32-33 in R. A. Hinman, ed. Annual report of survey-inventory activities. Part V. Brown/Grizzly Bear. Volume XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22 -4 and W-22-5. Job 4.0. Juneau. 70 pp.

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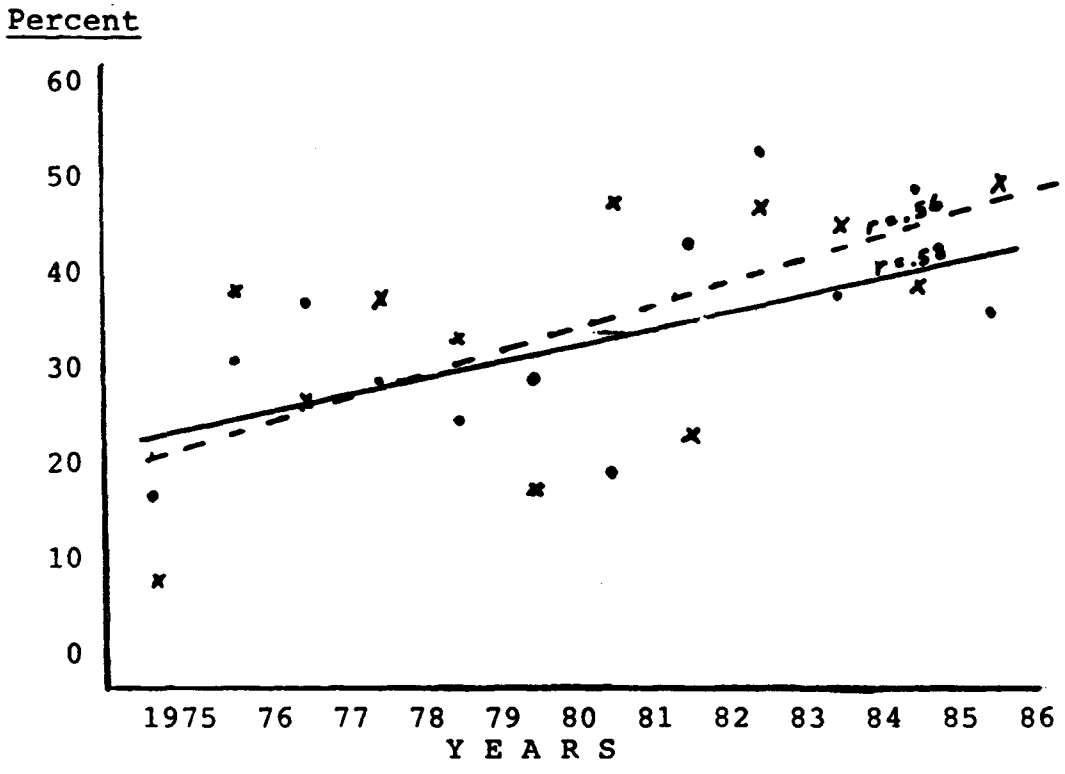
Table 1. Reported brown bear harvest in Unit 17, 1977-86.

Year	Season	Males	Females	Total season harvest[a]	Total annual harvest
1977	Spring	19	7	26	
	Fall	9	7	16	42
1978	Spring	10	4	14	
	Fall	5	6	11	25
1979	Spring	22	8	31	
	Fall	9	5	15	46
1980	Spring	11	4	15	
	Fall	8	2	10	25
1981	Spring	14	5	19	
	Fall	5	3	8	27
1982	Spring	1	0	1	
	Fall	6	2	8	9
1983	Spring	4	2	6	
	Fall	7	7	14	20
1984	Spring	1	1	2	
	Fall	11	13	25	27
1985	Spring	12	2	15	
	Fall	19	19	42	57
1986	Spring	6	2	8	
	Fall	20	23	43	51
$\bar{x}$					32.9

[a] Unknown sex included in total season harvest.



x = percent of bears less than 5 years old
--------- = trend in percent of bears less than 5 years old
● = percent of females
--------- = trend in percent of females

Fig. 1. Trends in percentage of females and of bears less than 5-years-old in the annual harvest, Unit 17, 1975-86.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 18

GEOGRAPHICAL DESCRIPTION: Yukon-Kuskokwim Delta

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Observations reported by agency personnel and the public indicate that brown/grizzly bear populations in Unit 18 remain moderate in density and locally abundant, particularly in the eastern and northern portions of the unit. Densities are highest in the Kilbuck Mountains east of Bethel and in the Ilivit and Andreafsky Mountains north of the Yukon River. Very few bears inhabit the vast lowland of the Yukon-Kuskokwim Delta, although they are occasionally sighted in the Askinuk and Kuzilvak area near the Black River.

Unit 18 contains approximately 11,000 mi^2 of grizzly bear habitat. Research studies conducted in other parts of Alaska with similar habitat types indicate that bear densities in Unit 18 probably lie between 1 bear/16 mi^2 and 1 bear/35 mi^2 (Machida 1985). Using these density estimates, I believe that Unit 18 contains approximately 300-700 bears. However, the validity of using densities from research studies conducted in distant parts of the state is questionable, and the above population extrapolations should be regarded as tentative.

Mortality

Sealing-certificate data indicate that 4 bears were harvested by hunters and one was taken in defense of life or property during 1986. All 4 bears harvested by hunters were taken during the fall season. The 1986 reported harvest level is substantially lower than normal. The reported harvest in Unit 18 has averaged 15 bears annually since 1979, and the highest harvest reported in 1982 is 24 bears (Table 1). Hunting conditions during the spring 1986 season were unusually poor, particularly for hunters using snowmachines. Snow was scarce during spring, and access to most areas in Unit 18 by snowmachine was nonexistent. The amount of use of

Unit 18 by registered guides using aircraft was also minimal and restricted to only the fall season.

The amount of unreported bears taken in Unit 18 is substantial, exceeding the reported harvest in some years. Many local hunters, particularly those dwelling in the Kuskokwim drainage, occasionally take bears in the Kilbucks for subsistence use. The $25 resident-tag fee and sealing requirements effectively discourage most of these individuals from reporting their harvest. Staff estimate that normally 15 or more bears are harvested annually from the Kilbuck Mountains by local hunters. The 1986 unreported harvest was undoubtedly lower than normal because hunting conditions were poor; however, it probably exceeded the reported harvest.

Grauvogel (1984) and Reynolds and Hechtel (1983) have suggested that maximum harvest guidelines for bear populations on the Seward Peninsula, Interior Alaska, and the North Slope range from 2-10% of the population size. The lower end of the allowable harvest range would apply to populations characterized by low productivity, such as those occurring on the North Slope. More southerly populations are generally characterized by higher productivity and presumably could sustain higher levels of harvest. Because populations in Unit 18 are probably fairly productive compared with other, more northerly populations, I believe that the maximum allowable harvest probably equals or exceeds 5% of the population size. If the actual number of bears in Unit 18 is near the upper end of the population estimate (range of 300-700 bears), harvest levels during average years represent less than 5% of the population and are probably within sustained-yield limits. However, if the number of bears is actually near the low end of the range, overharvests are probably occurring in some areas. The possibility of overharvesting is greatest in the Kilbucks where reported harvest levels are usually the highest.

Management Summary and Recommendations

Grizzly bears remain abundant in Unit 18, particularly in the northern and eastern portions of the unit. Highest densities are found in the Andreafsky and Ilivit Mountains north of the Yukon River and in the Kilbuck Mountains east of Bethel.

The unreported harvest of bears by residents of Unit 18 remains a serious management concern. The situation is especially serious in the Kilbuck Mountains, where the highest amount of reported and unreported harvests occur. Many local residents do not report their harvests because they consider the existing procedures for reporting defense-of-life-or-property and hunter kills to be overly complex. A regulatory

and harvest-monitoring system addressing local-use patterns needs to be designed and implemented.

Better information regarding population size and productivity is also needed. Because overharvests may be occurring in some drainages, good population information is necessary for the effective management of bears in Unit 18. Current management relies heavily on the sex and age composition of the reported harvest of bears in a unit; however, because the reported harvest in Unit 18 is usually low and frequently accounts for less than half of the actual harvest, these data are not sufficient to provide conclusive population estimates. Research addressing the density and productivity of bears in the Kilbuck Mountains is recommended.

Literature Cited

Grauvogel, C. A. 1984. Unit 22 brown/grizzly bear survey-inventory progress report. Pages 52-59 in B. Townsend, ed. Annual report of survey-inventory activities. Part V. Brown/grizzly Bears. Vol. XVI. Alaska Dep. Fish and Game Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-4. Job 4.0. Juneau. 69pp.

Machida, S. 1985. Unit 18 brown/grizzly bear survey-inventory progress report. Pages 34-38 in B. Townsend, ed. Annual report of survey-inventory activities. Part V. Brown/grizzly Bears. Vol. XVII. Alaska Dep. Fish and Game Fed. Aid. in Wildl. Rest. Prog. Rep. Proj. W-22-4 and W-22-5. Job 4.0. Juneau. 70pp.

Reynolds, H., and J. L. Hechtel. 1983. Population structure, reproductive biology, and movement patterns of grizzly bears in the northcentral Alaska Range. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-1. Job 4.16R. Juneau. 27pp.

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Table 1. Reported brown/grizzly bear harvest in Unit 18, 1979-86.

Year	Season	Total harvest	Location	
			Andreafsky	Kilbuck
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
1986	Spring	1	1	0
	Fall	4	1	3
Total	Spring	48	22	26
	Fall	72	7	65

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 19

GEOGRAPHICAL DESCRIPTION: Middle and upper Kuskokwim River

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

No bear surveys were conducted in Unit 19; however, rough population estimates can be made by assuming that the bear densities in similar habitats on the north side of the Alaska Range are typical of Unit 19; i.e., in Subunit 20A, research on grizzly bear densities resulted in an estimate of 6 bears/100 mi^2. Using that figure and my assumption of habitat comparability, Unit 19 may contain up to 900 grizzly bears. Subunits 19A and 19D are poor grizzly bear habitats, and they may support about 200 and 100 bears, respectively. Subunit 19B has good bear habitat that may support an estimated 275-310 bears. Subunit 19C has 4,500 mi^2 of good habitat and 1,500 mi^2 of poor habitat supporting an estimated 310 bears.

Mortality

Twenty-five bears (17 males, 6 females, 2 unknown) were reported taken in Unit 19 during 1986. This number is similar to last year's harvest. Five bears were taken during the spring season and twenty during the fall season. The harvests from the subunits are as follows: 19A, 6; 19B, 11; 19C, 7; and 19D, 1. The average ages of male (9.0 years) and female bears (8.6 years) are above the 1969-85 average age of 7.9 years for both sexes. Nonresidents took 72% of the bears harvested in the unit; this was less than the 26-year average of 81%.

Management Summary and Recommendations

Harvest remains low and is 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 and may even be increasing.

If population estimates are correct and a harvest rate of 5% is sustainable, the annual kills should not exceed 10 bears in 19A, 15 bears in 19B, 15 bears in 19C, and 5 bears in 19D unless lower population levels are desired.

Management goals for Subunits 19A and 19D emphasize production of moose and caribou for local consumption, so brown bear harvest levels above the projected maximums should be encouraged. Management goals for Subunits 19B and 19C emphasize balanced, sustainable harvests for all species; so pending more accurate grizzly bear inventory in Unit 19, projected guidelines for bear harvests should be followed.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20A, B, C, D, and F

GEOGRAPHICAL DESCRIPTION: Tanana Valley-central Alaska Range

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Grizzly bears occur at low densities in Subunits 20B, 20F, and in the low-elevation portions of Subunits 20A, 20C, and 20D. Higher densities of bears occur in the foothills and mountains of Subunits 20A, 20C, and 20D.

In a 1,500-mi² portion of the central Alaska Range, grizzly bear densities appear to have declined in recent years. Reynolds and Hechtel (1987) calculated a minimum population density of 3.4 bears/100 mi² for bears $\geq$ 2 years old in 1981; the 1986 estimate was 2.7 bears/100 mi².

Mortality

Hunters killed 36 bears (18 males and 18 females) in Unit 20 (Subunits 20A, B, C, D, and F) during 1986; an additional 3 bears (1 male, 2 females) were killed in defense of life or property (Table 1). Since 1980 grizzly harvests have ranged from 24 to 52 bears annually; the average annual harvest since 1980 is 41 bears. Traditionally, most bears are taken in the foothills and mountainous portions of Subunit 20A; during 1986 24 bears were taken in 20A.

Since 1981 the fall harvest has averaged 79% of the total annual harvest; however, during 1986 only 59% of the total harvest was taken during fall. Twenty-three and 16 bears were taken during the fall and spring seasons, respectively. The greater kill during fall was related to the opportunistic take of grizzly bears by moose, caribou, or sheep hunters.

Mean skull sizes for bears harvested in this area during 1986 were 20.9 and 19.0 inches for males and females, respectively.

The mean ages of harvested male and female bears were 6.3 and 6.5 years, respectively.

If densities are uniform throughout the Alaska Range portion of Subunit 20A, exploitation rates in the Yanert River drainage (450 mi^2) are probably higher than in the Alaska Range study area. Annual harvests in the Yanert drainage were 7, 4, and 5 bears for 1984 through 1986, respectively. Mean age of bears harvested from 1984 through 1986 was 4.6 years for both males and females. Of the 16 harvested bears, 10 were females; one of them was a 14.8-year-old female. Excluding her age from the calculations, the 15 remaining bears had a mean age of 3.8 years.

Natural mortality rates for young bears under maternal care within the study population in Subunit 20A were 36% for cubs, 12% for yearlings, and 7% for 2-year-olds (Reynolds and Hechtel 1987). Natural mortality was 3% among radio-collared females (n = 28) aged 2 to 25 years. Cannibalism by adult males was suspected as the primary cause of mortality among young bears accompanied by their mothers.

Management Summary and Recommendations

Throughout most of the Tanana Valley-central Alaska Range, grizzly bears occur at low-to-moderate densities and numbers appear stable. However, in the heavily hunted areas of Subunit 20A, bear densities may have declined since 1981.

Exploitation rates were estimated at about 13% in a 1,500-mi^2 study area in the central Alaska Range. Assuming densities are similar in the Yanert drainage, the exploitation rate there is even higher. Because most of the grizzly harvest occurs in conjunction with other big-game hunting seasons during fall, reductions in moose and caribou seasons in the Yanert drainage and western foothills in Subunit 20A will probably reduce bear harvest there.

An ongoing study of grizzly bear population dynamics in the central Alaska Range is monitoring the long-term effects of high exploitation rates. To allow a consistent evaluation of harvest impacts, I recommend that the hunting season for bears remains unchanged.

Literature Cited

Reynolds, H. V., and J. L. Hechtel. 1987. Effects of harvest rates on grizzly bear population dynamics in the northcentral Alaska Range. Alaska Dep. Fish and Game.

Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 4.19. Juneau.

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Table 1. Grizzly bear harvest for Unit 20, 1986.[a]

Subunit	Fall harvest		Spring harvest		Total
	Males	Females	Males	Females	
20A	9	6	5	4	24
20B	1	3	1	0	5
20C	0	2	1	2	5
20D	1	1	1	2	5
20F	0	0	0	0	0
Total	11	12	8	8	39

[a] Includes 2 bears killed in defense of life or property in Subunit 20A (1 male and 1 female, spring) and 1 in Subunit 20D (female, fall).

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20E

GEOGRAPHICAL DESCRIPTION: Fortymile, Charley, and Ladue River drainages

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Data collected during an ongoing moose-grizzly bear predation study in Subunit 20E indicate bear density in the southern portion of the subunit is 1 bear/19 mi^2. If bear density is comparable with other portions of the subunit, approximately 520 grizzly bears inhabit the 10,000-mi^2 area. The population is probably stable, but increased harvests during the past 6 years may be reducing bear numbers locally in accessible, heavily hunted areas.

Mortality

During 1986 hunters reported harvesting 20 grizzly bears: 11 (55%) males and 9 (45%) females. Seven (35%) were harvested during spring; 13 bears (65%) in the fall. All bears except one were harvested by resident hunters. The average ages of male and female bears were 8.4 years and 9.7 years, respectively.

Prior to 1981, when bear hunting regulations were first liberalized, harvests were less than 6 bears per year. During 1981-1985 annual harvests were 10, 23, 24, 22, and 12 bears, respectively. Even though harvests have increased, the reported 1986 harvest probably represents only a 4% rate of harvest, too low to achieve the desired reduction in grizzly bear numbers.

Management Summary and Recommendations

It has been demonstrated in Subunit 20E that grizzly bears are partly responsible for suppressing the desired growth of the moose population. Because the management objective for grizzly bear use in this area is to provide maximum opportunities for hunting them, the applicable regulations have

been gradually liberalized since 1981. While this management objective is currently being met, the harvests remain too low to reduce bear numbers in any but localized, accessible areas.

All liberal bear-hunting regulations should be retained, including the bag limit of 1 bear per year and the resident tag-fee waiver; the season should be lengthened to end on 30 June; and other options should be considered. If hunting liberalizations do not result in a sufficiently high harvest level to cause a reduction in bear predation on moose, alternative methods to do so should be investigated. These could include birth-control substances and the use of bait to change bear predation behavior during the moose-calving season.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 21

GEOGRAPHICAL DESCRIPTION: Middle Yukon River (Tanana to Paimiut)

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

No bear surveys were conducted in Unit 21; however, assuming bear densities in similar habitats in other Interior units were applicable to Unit 21 (1 bear/40 mi^2 in good habitat and 1 bear/100 mi^2 in the rest of the unit), the population is approximately 500 bears. The best bear habitat is found in Subunits 21D and 21E (Nulato Hills) and throughout Subunit 21C. Field observations, nuisance-animal reports, hunter sightings, and pilot observations indicate the bear population has been slowly growing over the past 10 years.

Mortality

Hunting pressure on bears in the unit is low. Only 6 bears (1 male, 5 females) were reported harvested by sport hunters in Unit 21 during 1986, and 1 bear was harvested in defense of life or property. This is similar to the 10-year average of 7 bears; all bears were taken during the fall season. The harvests from the subunits were as follows: 21A, 1; 21B, 0; 21C, 2; 21D, 1; and 21E, 3. Although the season was liberalized in 1985, there has not been an increase in the reported harvest. Nonresidents accounted for 50% of the bears harvested in the unit, which is similar to the 10-year average (47%).

The areas from which bears are harvested vary widely from year to year with no set pattern. The number of unreported bears that were harvested at fish camps is unknown, but we estimate the amount as equal to the reported harvest.

Management Summary and Recommendations

Based on a sustainable harvest rate of 4-10% elsewhere in Interior Alaska, the estimated annual kill in Unit 21 (2.4%)

is well below sustainable levels. The seasons are currently as liberal as possible, and no further recommendations are necessary at this time.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 22

GEOGRAPHICAL DESCRIPTION: Seward Peninsula

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Activities associated with reindeer herding and gold mining during the early 1900's are believed to have severely impacted the Seward Peninsula's grizzly bear population. By the mid-1940's, intensity of these activities had decreased, and bear numbers began to slowly recover. Although records are scanty, the bear population in Unit 22 was thought to have recovered to pre-1900 levels by the 1960's, and presumably, it has continued to slowly increase through the 1970's. I believe the population size is now at record-high levels. Because bear studies have never been conducted on the Seward Peninsula, information concerning population density, productivity, mortality, and maximum carrying capacity are unavailable. A current research study in Unit 23 will hopefully provide conclusive results applicable to Unit 22.

Using densities derived from research studies conducted in Units 13, 20A, and 26, Grauvogel (1986) estimated the number of bears in Unit 22 at 300-1,100. Because of differences in topography, climate, and other factors, I question whether densities from other parts of Alaska are valid when extrapolated to the Seward Peninsula bear population; however, until better data are available, I will use these figures.

Mortality

The reported harvest in 1986 for Unit 22 was 51 bears (Tables 1 and 2): 35 males (69%), 16 females (31%). Fifteen, 20, 8, 7, and 1 bears were harvested in Subunits A through E, respectively. The spring season accounted for 69% of the harvest because snow conditions and weather were ideal for hunting and there appeared to be an increased interest in bear hunting among Nome residents. Alaska residents killed 29 bears, accounting for 57% of the harvest. Twenty nonresidents

successfully drew permits to hunt bears in Subunits B, C, D, and E; of these, five did not hunt, nine hunted and were successful, and six hunted but were unsuccessful.

Mean age of harvested males is 7.8 years, of females 7.3 years, and of both sexes combined 7.6 years. Bears 5 years and younger composed 58% of the harvest; 6-10 years, 24%; 11-15 years, 4%; 16 years or older, 14%. The oldest bear was a 23-year-old male. As observed in past years, age data indicate younger bears composed the greatest portion of the harvest (Grauvogel 1986).

Three bears were killed in defense of life or property; 1 bear was killed for undetermined reasons, and the carcass was left lying on the bank of the Fox River (Subunit 22B). Addition of these kills to the reported harvest brings the known harvest for the unit to 55 bears. Not all harvested bears are sealed, and many hides and skulls are not surrendered to the State when taken in defense of life or property. I estimate an additional 10 to 30 bears were killed but not reported.

Management Summary and Recommendations

From 1970 to 1987, reported annual harvests of grizzly bears in Unit 22 were relatively low, ranging from one to 14. A liberalization of the season and mild weather during the spring of 1979 caused a substantial increase in the bear harvest. The spring harvest went from 8 bears in 1978 to 40 bears in 1979 (Table 1). Guided hunters, most of whom were nonresidents, accounted for 83% of the 1979 spring harvest. Prompted by the Department's concern that overharvesting was occurring in the unit, the Board of Game implemented a drawing-permit system for nonresidents (Table 3). This action successfully reduced the annual bear harvest to 31 or fewer bears from 1980 to 1983. Additional Board of Game actions in subsequent years eliminated the resident tag-fee requirement, deleted the nonresident-permit requirement for Subunit 22A, and lengthened the spring season throughout the unit. These liberalizations have resulted in an increased hunter effort and a harvest exceeding 50 bears annually.

Harvest reporting in Unit 22 falls into 2 categories: (1) sealing of bears taken during established hunting seasons and (2) reporting of bears killed in defense of life or property. Individuals residing in the communities of Nome and Unalakleet maintain a high level of compliance in both of these categories. In contrast, voluntary compliance with bear-sealing requirements in other rural villages in Unit 22 is very low; it may be less than 30% in some communities. Most bears killed by rural residents in defense of life or property are generally not reported because they consider

bears to be nuisances and do not believe it worth their time or effort to skin the bear and report the incident, especially if they are required to surrender the hide and skull to the State.

Until conventional wildlife management principles are more widely accepted, improved compliance with bear-sealing regulations will most likely not be forthcoming. Some hunters in Unit 22 do not purchase hunting licenses or hunt entirely within the established seasons. Until these larger-scale problems are resolved, lack of compliance with bear-sealing regulations will most likely continue.

Because little is known about the Seward Peninsula's grizzly bear numbers and habits, regulatory changes that may increase the harvest of bears should not be implemented. Population estimates (Grauvogel 1986) indicate that we may be overharvesting bears in Subunit 22C. Assuming these limited data are correct, the spring season in Subunit 22C should be shortened; May 10-May 25 is recommended. Bear research continues to be a priority for Unit 22. If we are to properly manage this species in accordance with our current management plan and effectively address questions pertaining to productivity, densities, and interactions with ungulate populations, better population and productivity information is required.

Literature Cited

Grauvogel, C.A. 1986. Unit 22 brown/grizzly bear survey-inventory progress report. Pages 46-56 in B. Townsend, ed. Annual report of survey-inventory activities. Part V. Brown/Grizzly Bear. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wild. Rest. Prog. Rep. Proj. W-22-4 and W-22-5. Job. 4.0. Juneau. 70pp.

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Table 1. Resident and nonresident grizzly bear harvests in Unit 22 for spring (S) and fall (F), 1976-86.

Year	Resident harvest			Nonresident harvest			Total harvest			Percent harvest by Nonresidents
	S	F	Total	S	F	Total	S	F	Total	
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
1986	21	8	29	14	8	22	35	16	51	43

Table 2. Known annual harvests[a] of grizzly bears in Subunits 22A-E, 1979-86.

Year	22A	22B	22C	22D	22E	Unit totals
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
1986	15	20	8	7	1	51
Mean 1979-86	12	14	9	4	1	39

[a] Does not include illegally taken bears or bears taken in defense of life or property.

Table 3. Number of permits available and issued for nonresident grizzly bear drawing hunts in Unit 22, 1980-86.

Year	Spring			Fall		
	Available permits	Permits issued by drawing	Permits issued first-come first-served	Available permits	Permits issued by drawing	Permits issued first-come first-served
1980	0	0	0	14	11	0
1981	6	5	0	14	14	0
1982	6	5	0	14	4	0
1983	6	4	0	10	3	0
1984	10	6	1	10	10	0
1985	10	8	2	10	10	0
1986	10	10	0	10	10	0

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 23

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Research results and observations reported by the public and Department staff indicate that the grizzly bear population in Unit 23 is stable and healthy. Ballard (1987) reported a minimum estimate of 1 bear/55 mi^2 for a 2,600-mi^2 study area in the Noatak and Wulik River drainages during 1986. In April 1983 grizzly bear surveys conducted in Unit 23 yielded a density estimate of 1 bear/40 mi^2 (Quimby 1984). Studies conducted in the northern Brooks Range suggest that bear density in optimum and lower-quality habitats should be 1 bear/20 mi^2 and 1 bear/80 mi^2, respectively (Reynolds 1982).

Population Composition

For the 1st time since the inception of bear management in northwest Alaska, data provided by ongoing research are available for assessing the composition and productivity of the bear population in Unit 23. Ballard (1987) captured 47 bears during late May and early June 1986 in the Noatak and Wulik River drainages (Table 1 and 2). Cementum ages of the captured bears are not yet available; however, based on tooth wear and eruption patterns, 4 females and 4 males were estimated to be 1.5-3.5 years of age. Of 13 adult females judged to be reproductively mature when captured, six were lactating but not accompanied by young, suggesting high cub mortality. Three female and 2 male 1st-year cubs were captured and marked. An additional 3 cubs were observed but not marked. First-year cubs made up 16% of the observed and handled bears. Observed litter size averaged 2.7 cubs per sow ($\underline{N}$=3).

The mean age of the 1986 reported harvest is 8.4 years ($\underline{N}$=32), slightly higher than the 1985 mean of 8.2 years ($\underline{N}$=31) and the 1969-1986 mean of 8.0 years ($\underline{N}$=465). Mean age of male bears killed in 1986 is 10.0 ($\underline{N}$=19), compared with a mean of 8.4

years for males killed in 1985 (N=26) and 8.2 years for males killed between 1969 and 1986 (N=331). The mean age of females killed in 1986 is 6.1 years (N=13), slightly lower than the 1985 mean of 6.9 years (N=5) and the 1969-86 mean of 7.4 years (N=134). Aside from small annual fluctuations, no significant trends in the age structure of the harvest in Unit 23 are apparent at this time.

Mortality

The 1986 reported harvest for Unit 23 is 34 bears: 19 males, 13 females, and 2 of unknown sex. Mean annual reported harvest for the 1961-1986 period is 18.0 males and 6.1 females.

Nonresident hunters accounted for 45% of the reported harvest in 1986. This is the first time in 6 years that over 34% of the reported harvest was taken by nonresidents. Nonresident hunting in Unit 23 has been limited to 25 permits annually for the past 7 years.

Most of the harvest in Unit 23 has come from the Noatak River drainage (Table 3). During 1970-1986, 52% of the reported harvest were from the Noatak drainage, while 14% and 12% of the harvest were reported from the Kobuk and Wulik/Kivalina drainages, respectively (N=522).

We again assessed changes occurring in the harvest level from year to year relative to hunting effort (Table 4). By ranking the years 1969-1986 from highest to lowest in terms of total harvest and from lowest to highest in terms of hunting effort, we derived an overall ranking score for each year by adding the 2 rankings together. For example, in 1986 the hunting effort of 4.2 hunter-days/bear and harvest of 34 bears yielded ranking scores of 11 and 7, respectively; therefore, the overall ranking score is 18. Years characterized by a relatively high harvest accompanied by a low effort per harvested bear would receive a numerically small overall ranking score. Conversely, years characterized by a relatively low harvest and a high hunter effort per harvested bear would receive a numerically large overall ranking score. With overall ranking scores of 9, 1979 and 1983 were recognized as the best years in terms of numbers of bears harvested relative to hunting effort exerted. Lowest in the ranking was 1971, which exhibited a numerically large ranking score of 31. The 1986 ranking score of 18 placed the 1986 harvest at approximately the midpoint of the range. Rankings by year for 1969-1986 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 hunting effort.

Management Summary and Recommendations

The grizzly bear population in Unit 23 appears to be healthy and stable. Although the harvest from the Noatak River drainage continues to exceed the harvest from all other drainages in the unit, we do not believe the harvest is excessive. Preliminary data provided by Ballard (1987) indicate that the minimum bear density in the Noatak and Wulik/Kivalina drainages is 1 bear/55 mi^2. Productivity, as indicated by the percentage of 1st-year cubs, is 16%. A modified capture-recapture technique developed by Miller and Ballard (1982) will be used during May and June 1987 to estimate spring bear density in the study area. No regulatory changes are recommended at this time.

Literature Cited

Ballard, W. B. 1987. Demography of Noatak grizzly bears in relation to human exploitation and mining development. Progress report. Alaska Dep. Fish and Game. Fed. Aid in Wild. Rest. Prog. Rep. Proj. W-22-5 and W-22-6. Job 4.20 R. Juneau. 45pp.

Miller, S., and W. B. Ballard. 1982. Density and biomass estimates for an interior Alaskan brown bear population. Can. Field-Nat. 96(4):448-454.

Quimby, R. 1984. Unit 23 brown/grizzly bear survey-inventory progress report. Pages 52-54 in A. Seward, ed. Annual report of survey-inventory activities. Vol. XV. Brown Bears. Part V. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-2 and W-22-3. Job 4.0. Juneau. 57pp.

Reynolds, H. 1982. Alaska Range grizzly bear studies. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-21-2. Job 4.1R. Juneau. 10pp.

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Table 1. Weight and reproductive and family status of female grizzly bears captured in the southwest Brooks Range (GMU 23), 31 May-30 June 1986 (Ballard 1987).

Bear ID (tattoo)	Weight (lbs)	Number of cubs	Age of cubs	Lact.[a]	Reproductive status[b]	Physical condition[c]
001	235	2	0.5	Y	2	3
002	210	0	---	N	1	2
004	225	2	0.5	Y	2	3
005	022	-	---	-	-	-
006	028	-	---	-	-	3
008	210	0	---	N	3	1
009	248	0	---	Y	1	3
011	013	-	---	-	-	1
013	235	0	---	Y	2	4
014	210	3	0.5	Y	2	4
018	320	0	---	Y	1	4
020	140	0	---	N	1	4
021	250	0	---	Y	-	2
022	215	1	1.5	Y	2	4
025	225	0	---	N	1	3
026	---	0	---	N	2	3
028	260	0	---	Y	2	3
032	138	-	---	N	2	4
033	155	0	---	N	1	4
036	---	2	2.5	Y	1	4
038	185	0	---	N	-	2
039	275	0	---	Y	1	4
041	186	0	---	N	1	4
043	276	0	---	N	1	2
047	---	2	2.5	-	-	5

[a] Lactating: Y = Yes, N = No.

[b] Reproductive status: 1 = in estrus, 2 = not in estrus, 3 = pre-estrus.

[c] Condition: From 1 = good to 5 = bad.

Table 2. Weight and physical condition of male grizzly bears captured in the southwest Brooks Range (GMU 23) 31 May-9 June 1986 (Ballard, 1987).

Bear ID (tatoo)	Weight (lbs)	Physical condition[a]
003	412	2
007	390	1
010	---	-
012	475	1
012	---	-
015	014	2
016	016	2
017	080	3
019	---	3
023	078	4
024	435	2
027	335	3
029	425	2
030	485	2
031	190	3
034	310	4
035	215	3
037	---	3
040	435	2
042	230	3
044	435	2
045	390	3
046	405	4

[a] Condition: 1 = good to 5 = bad.

Table 3. Locations of reported grizzly bear harvests in GMU 23, 1970-1986.

Year	Noatak	Kobuk	Wulik/ Kivalina	Selawik	Chukchi Sea Coast	Northern Seward Peninsula	Unknown	Total
1970	15	7	3	0	3	0	1	29
1971	7	2	3	0	0	1	0	13
1972	23	3	0	0	2	0	0	28
1973	15	3	5	1	5	2	0	31
1974	5	1	3	0	5	0	0	14
1975	6	0	3	1	2	1	0	13
1976	9	2	4	0	2	0	1	18
1977	22	5	1	2	7	4	0	41
1978	24	5	3	1	6	0	0	39
1979	12	3	11	5	2	18	6	57
1980	8	5	7	1	1	4	0	26
1981	10	5	3	1	1	1	1	22
1982	20	6	2	1	3	0	0	32
1983	20	4	6	1	6	3	0	40
1984	32	7	1	0	4	4	0	48
1985	25	6	1	2	2	1	0	37
1986	18	8	6	0	0	1	1	34
Total	271 (52%)	72 (14%)	62 (12%)	16 (3%)	51 (10%)	40 (7%)	10 (2%)	522

Table 4. Reported numbers of bears harvested, hunter effort (hunter-days/bear) exerted each year, and rankings of bear numbers and hunter success each year relative to other years in GMU 23, 1969-1986.

Year	Hunter-days	Total bears killed[a]	Hunter-days/bear[b]	Overall ranking score[c]
1969	30	14 (15)	2.1 (1)	16
1970	72	29 (10)	2.5 (4)	14
1971	64	13 (16)	4.9 (15)	31
1972	105	28 (11)	3.8 (10)	21
1973	89	31 (9)	2.9 (6)	15
1974	42	14 (15)	3.0 (7)	22
1975	31	13 (16)	2.4 (3)	19
1976	41	18 (14)	2.3 (2)	16
1977	124	41 (3)	3.0 (7)	10
1978	170	39 (5)	4.3 (12)	17
1979	197	57 (1)	3.5 (8)	9
1980	95	26 (12)	3.6 (9)	21
1981	95	22 (13)	4.3 (12)	25
1982	79	32 (8)	2.5 (4)	12
1983	111	40 (4)	2.8 (5)	9
1984	229	48 (2)	4.8 (14)	16
1985	165	37 (6)	4.5 (13)	19
1986	143	34 (7)	4.2 (11)	18
Total	1,882	536	3.5	

[a] Numbers in parentheses represent ranking scores for numbers of bears killed during each year relative to all years: 1 = highest, 16 = lowest.

[b] Numbers in parentheses represent ranking scores for hunter effort for each year relative to all years: 1 = lowest, 15 = highest.

[c] Overall ranking score is equal to the ranking score for the number of bears killed plus the ranking score for hunter effort.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

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

GEOGRAPHICAL DESCRIPTION: Brooks Range drainages

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

Research in the Brooks Range indicates that grizzly bear densities vary from 0.3 to 5.9 bears/100 mi^2; the average density for the entire area is 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 grizzly bears.

Reduced harvest brought about by permit requirements may be allowing grizzly populations in Subunit 26B to recover from previous overharvesting. Population trends in Unit 24 and eastern Subunit 26A are either stabilized or growing; the bear populations are 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 analysis of data from research conducted from 1982 to 1985 in Subunit 26C indicates an even sex ratio for grizzly bears older than the yearling-age class.

The age-class composition of the western Brooks Range bear populations is 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, preliminary data from the Arctic National Wildlife Refuge 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%.

Mortality

During 1986 a harvest of 57 bears was reported for Units 24, 25, and 26. This total includes 50 bears taken in areas requiring permits (northern Unit 24, Subunit 25A, and Unit 26). Seven bears were taken in portions of Units 24 and 25 where permits were not required (Table 1). Permits are required in those units or portions of units where the potential for the overharvesting of grizzly bear populations is greatest. The harvest was similar to those of the past 9 years, despite a liberalization of the permit system. The single exception to this pattern occurred in Subunit 26C where the harvest of 8 bears was higher than previous levels but still within estimated sustained yield. No bears were reported killed in defense of life or property. The 1986 subsistence harvest in Gates of the Arctic National Park was 1 bear taken in Subunit 26A.

Management Summary and Recommendations

The grizzly bear harvest in the Brooks Range did not exceed sustainable levels. Hunting pressure was generally well distributed, and no areas of overharvesting were apparent. No changes in the present permit system are recommended at this time. Harvests in places outside permit areas in Units 24 and 25 were well within sustainable levels.

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Table 1. Human-caused mortality of grizzly bears in Units 24-26, 1977-86.

Unit	Estimated population	Mortality[a] 1977-81	1982	1983	1984	1985	1986
Permit areas							
24	165-220	8.0	1	7[b]	5	3[b,c]	7
25A	360-470	8.2	15	16	12	13[d]	12
26A west	315-350	3.8	2	4[b]	9	2	5
26A east	330-430	5.4	11	11	5	8	13
26B	150-240	5.2	4[b]	9[b]	7[b]	4[d]	5
26C	220-320	2.0	4	2	3	6[b]	8
Total	1540-2030	32.6	37	49	41	36	50
Nonpermit areas							
24	-[e]	4.6	3[b]	6	2	3[b]	3
25	-[e]	8.8	4	7	4[b]	4	4
Total		13.4	7	13	6	7	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 MANAGEMENT UNIT: 26A

GEOGRAPHICAL DESCRIPTION: Western Arctic Slope

PERIOD COVERED: 1 January 1986-31 December 1986

Season and Bag Limit

See Hunting Regulations Nos. 26 and 27.

Population Status and Trend

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

Hunting-permit requirements begun in the 1977-78 regulatory year appear to have favorably affected Brooks Range grizzly populations, including those in Subunit 26A. I believe that 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 population 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 exceeding 1 year of age were males and 60% were females. The sex ratio of cubs and yearlings was approximately 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 0.5 cubs/year.

Mortality

Eighteen bears were sealed in 1986; 5 of these were killed west of 159 degrees west longitude; the remainder, east of 159 degrees west longitude (Subunit 26A). Eleven additional bears

were killed by North Slope residents but not sealed: 5 each by Barrow and Nuiqsut hunters and one by a Point Lay hunter. The known hunter-caused mortality was 29 bears for 1986.

I believe the actual number killed by hunters was higher, ranging from 33 to 38 bears. This estimate includes unreported mortalities attributable to guided nonresidents, Alaska residents, and residents of Subunit 26A. Most of the unreported harvest was taken by residents of the subunit. Reasons and causes for not reporting bear harvests have been discussed previously (Trent 1985).

These data suggest that the 1986 harvest in Subunit 26A increased markedly from that in 1985. The reported harvest increased from 10 to 18 sealed bears (80%) (Table 1). In 1985 the estimated harvest was 22-26 bears; in 1984 it was 32-44 bears. The unusually low harvest in 1985 may have been partly attributable to inclement weather that occurred during the 1985 fall season.

Included in the known 1986 harvest are 13 bears killed by hunters from Barrow and Nuiqsut. This additional harvest is relatively high, suggesting that bear densities and/or availability may have increased in these areas. Although most of these bears were not reported or sealed, many may have been killed in defense of life or property.

No recent estimate of natural mortality among grizzly bears in Unit 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

In 1986 the grizzly bear harvest increased over that of 1985; better fall weather and changes in bear distribution or abundance may be partial explanations for this increase. Certain hunting restrictions were also eliminated during 1986: (1) nonresidents were allowed to hunt in the eastern portion of Subunit 26A by permit, and 8 permits were issued; and (2) Alaska residents were allowed to hunt throughout the subunit without the need of permits. If we assume that safe harvest limits should not exceed 4% of the population, the allowable sustained yield is about 26-31 bears. The 1986 estimated harvest of 33-38 bears slightly exceeds this level.

A significant management problem 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: (1) many local residents are either unaware or

unsupportive of grizzly bear hunting regulations and (2) these regulations are not always compatible with the way local people hunt bears. Usually, bears are taken opportunistically as local conditions allow. Most hunters consider seasons, bag limits, and tag requirements to be unwieldy and cumbersome. In order to gain more local participation and effectively gauge the level of harvest, the grizzly bear regulations need to be extensively modified. These modifications should be implemented under a subsistence grizzly bear season for the entire North Slope (Unit 26). Until the point is reached where most of the bears killed are actually reported, the Department must continue to make allowances for a "shadow harvest" of unreported bears that may easily be 50-100% in excess of the number of bears actually sealed.

Literature Cited

Reynolds, H. V. 1984. Units 24-26 brown/grizzly bear survey-inventory progress report. Pages 94-96 in J. A. Barnett, ed. Annual report of survey-inventory activities. Part I. Brown/grizzly bears. Vol. XIV. Alaska Dep. Fish and Game. Fed Aid in Wildl. Rest. Prog. Rep. Proj. W-22-1 and W-22-2. Job 17.0 and 4.0. Juneau. 96pp.

Reynolds, H. V., and J. L. Hechtel. 1983. Reproductive biology, movement, distribution, and habitat utilization of a grizzly bear population. Alaska Dep. Fish and Game. Fed Aid in Wildl. Rest. Prog. Rep. Proj. W-22-1. Job 4.14R. Juneau. 22pp.

Trent, J. N. 1985. Unit 26A brown/grizzly bear survey-inventory progress report. Pages 65-69 in B. Townsend, ed. Annual report of survey-inventory activities. Part V. Brown Bears. Vol. XVI. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-4. Job 4.0. Juneau. 69pp.

Trent, J. N. 1986. Unit 26A brown/grizzly bear survey-inventory progress report. Pages 66-70 in B. Townsend, ed. Annual report of survey-inventory activities. Part V. Brown/grizzly Bears. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-4 and W-22-5. Job 4.0. Juneau. 70pp.

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Table 1. Reported harvest of grizzly bears in Unit 26A, 1978-86.

GMU	Estimated population	Harvest of 4%	Reported harvest[a]									
			1978	1979	1980	1981	1982	1983	1984	1985	1986	Mean
26A W	315-350	13-14	2	1	8	6	2	4[b]	10	3	5	4.6
26A E	330-430	13-17	5	5	5	5	11	11	12[c]	7	13	8.2
Totals	645-780	26-31	7	6	13	11	13	15	22	10	18	12.8

[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.