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ANNUAL REPORT OF SURVEY-INVENTORY ACTIVITIES

PART V. BROWN/GRIZZLY BEAR

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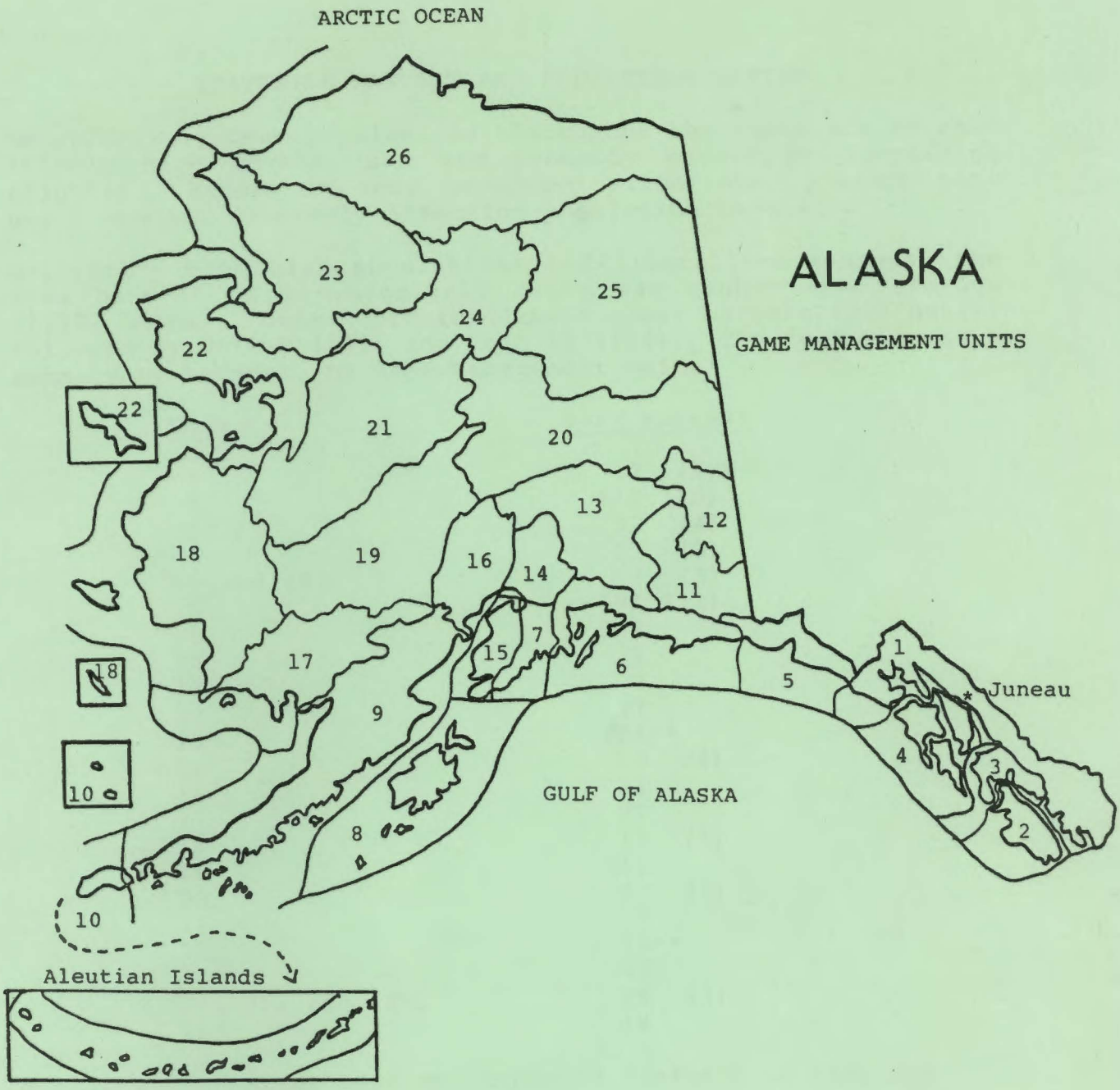
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STATEWIDE HARVEST AND POPULATION STATUS

Brown/Grizzly bear populations throughout the state are at relatively high levels, and are probably stable or increasing slightly. Except in very localized situations, present harvests are not adversely affecting population levels.

Reflecting both high populations and liberalized seasons, the 1984 harvest of brown/grizzly bears was higher than average (1,132 bears). Unit 9 provided the highest harvest (228 bears) followed by Unit 8 (191) and Unit 13 (124). The following is a summary of harvest, by Game Management Unit:

Unit	1984 Harvest
1	17 (1)*
4	111 (10)
5	32 (4)
6	35 (3)
7 and 15	7 (3)
8	191 (11)
9	228
10	1
11	9
12	37
13	124**
14	10 (4)
16	33
17	27
18	11 (2)
19	19
20	72 (2)
21	4
22	54**
23	46
24, 25, 26B, 26C	45 (2)
26A	19

* Figures in parentheses are reported "defense of life and property" kills.

** Highest kill on record.

Robert A. Hinman
Deputy Director

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 1

GEOGRAPHICAL DESCRIPTION: Southeast Mainland

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

No data were collected.

Population Composition

No data were collected.

Mortality

Based on brown bear sealing documents, the 1984 harvest in Unit 1 was 17 bears (12 males, 3 females, and 2 of unknown sex). In addition, 1 male bear was taken in defense of life or property in Subunit 1D on 8 August 1984. Resident hunters accounted for 12 bears and nonresidents took 5.

Six bears (3 males, 1 female and 2 of unknown sex) were taken during the spring season, all in May. Eleven bears (9 males and 2 females) were taken during the fall season: September, 5 bears; October, 5 bears; and November, 1 bear.

The mean skull size of males taken in 1984 was 22.3 inches ($\underline{n}$ = 12) and the mean cementum age was 8.4 years ($\underline{n}$ = 12). The previous 23-year average male skull size and cementum age were 22.2 inches and 7.5 years, respectively.

Management Summary and Recommendations

The 1984 sport harvest of 17 bears was slightly higher than the previous 23-year average annual harvest of 15.8 animals and 7 below the 1983 reported harvest. Harvest levels have fluctuated periodically since 1961, mainly due to surges in resident hunter take, either in 1 Subunit or a combination of the 4 Subunits.

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

No changes in season or bag limit are recommended.

PREPARED BY:

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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 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

No data available.

Population Composition

No data available.

Mortality

The sport harvest in 1984 was 111 bears. The kill of 111 was the 2nd highest on record for the Unit and the ages for both sexes were below the 15-year average. Sport harvest statistics for 1961-84 are shown in Table 1. Ten bears were reported taken in defense of life or property.

Management Summary and Recommendations

The 1984 sport harvest of 111 is on the high side of the harvest objectives established by the Alaska Board of Game and the Division of Game's long-term management plan endorsed by the Board. The nonsport kill continues to be excessive, but no means are known to reduce that kill. Age of bears in the harvest will have to be monitored closely in the future. If the ages continue to decline, additional sport hunting restrictions may be necessary.

No changes in season or bag limit are recommended.

PREPARED BY:

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Steve Peterson
Acting Management Coordinator

Table 1. Brown bear sport harvest, calendar years 1961-84, Game Management Unit 4.

Calendar year	Total kill	% Kill in spring	% Males	Nonresident kill (%)	Male skull size		Mean age			
					Mean	n	Male	n	Female	n
1961	39	72	79	62	24.7	12	--	--	--	--
1962	44	73	67	66	23.9	8	--	--	--	--
1963	26	69	73	58	22.4	9	--	--	--	--
1964	55	73	69	44	23.7	13	--	--	--	--
1965	68	63	66	52	23.5	11	--	--	--	--
1966	76	65	68	67	22.4	24	--	--	--	--
1967	69	61	68	48	23.0	20	--	--	--	--
1968	50	74	78	32	22.2	30	--	--	--	--
1969	65	66	75	55	22.7	46	6.5	32	5.6	9
1970	72	79	72	51	22.0	50	7.1	37	7.9	5
1971	79	78	71	52	22.5	47	7.5	47	8.0	19
1972	77	66	75	53	22.5	56	8.4	54	6.0	17
1973	99	72	68	40	21.6	64	7.2	63	7.9	31
1974	86	73	75	50	22.1	54	7.1	58	7.3	21
1975	105	72	70	57	22.3	69	7.5	68	6.0	28
1976	142	79	65	61	22.4	90	9.1	89	8.2	49
1977	67	84	71	55	21.6	43	6.8	44	8.0	17
1978	67	73	75	54	21.6	49	7.2	47	7.3	16
1979	51	69	68	71	21.1	31	6.3	29	6.0	13
1980	65	60	67	55	22.1	39	7.2	42	7.9	21
1981	62	65	68	61	21.3	40	6.3	42	7.8	20
1982	51	55	71	49	21.5	33	6.2	35	5.3	15
1983	80	57	78	49	21.7	60	6.6	62	8.4	15
1984	111	68	67	47	21.7	73	6.5	72	6.2	27
Totals or Means	1,706	70	71	54	22.1	971	7.2	821	7.2	323

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 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

In 1984, bear sightings were common at the Yakutat landfill, near residences in town, and along the lower Situk River. A number of bear/human conflicts occurred. While the number of bear problems increased noticeably compared with 1983, many of the bears encountered were 2-year-olds and older, indicating that bear numbers had not drastically increased from the previous year. No increase in bear sightings was documented in field locations, and the brown bear population of Game Management Unit 5 is considered stable.

As in 1983, systematic scat surveys were conducted along the Harlequin Lake Road between 24 April and 7 August, 1984 (Table 1). Unlike 1983, observed scats were removed from the road surface during each survey, thus counts were not corrected for scats classified as "old." Scat removal and standardized transect lengths are believed to account for the lower, and more consistent, counts obtained in the current year. In 1983 counts ranged from 1.0 to 7.0 scats/mile, while in 1984 0.1 to 1.9 scats/mile were recorded. No moose hair was found in bear scats prior to 29 May, which coincides with moose parturition; on that date 19%, and on 13 June 13%, of observed scats contained moose hair. Heaviest bear usage of the study area apparently occurred in the period ending 2 July, when 58 scats were found in the 29.8 mile distance.

Population Composition

No data available.

Mortality

Four brown bears were killed under "defense of life or property" provisions during the report period. Three of these

were taken by employees of Fish and Game, and Fish and Wildlife Protection, after it was determined the animals were posing threats to the public. Two of the 4 bears were killed close to residences in Yakutat, and the other 2 were killed along the Situk River. Two additional bear carcasses were found, with either claws or skulls removed; one of these was in the Situk River drainage and the other on Cannon Beach.

During the spring season 13 bears (9 male, 3 female, and 1 of unknown sex) were taken by 9 nonresident and 4 resident hunters (Table 2). The fall harvest of 19 bears (13 males and 6 females) was taken by 12 nonresident and 7 resident hunters.

Male bears taken in the spring averaged 6.7 years old (range 2.4-12.4) while females averaged 3.7 years of age (range 2.4-4.4). Male bears harvested in the fall ranged from 2.8 to 22.8 years of age while females ranged from 3.8 to 8.8 years old. Males and females in the fall harvest averaged 8.2 and 6.0 years old, respectively.

Skull sizes for bears taken in the spring averaged 22.7 and 19.1 inches, respectively, for males and females; fall averages were 22.9 and 20.2 inches for males and females, respectively. Five bears taken in 1984 came from Subunit 5B, and 27 were taken from Subunit 5A.

Management Summary and Recommendations

The historic harvest of brown bears from Game Management Unit 5 is presented in Table 2. The 1984 harvest of 32 bears was 14% higher than the average for the previous 5 years (1979-83). Nevertheless, the mean age of male bears taken in 1984 was higher than the mean for the prior 5 years (7.6 years compared with 6.1 years). Of 31 known-sex bears taken in 1984, only 9 (29%) were females, reflecting selection by hunters for larger animals. During the period 1979-83, female bears composed an average of 37% of the harvested animals. Based on these harvest parameters (percent females, mean age of harvested males) it appears that the Unit 5 brown bear population is not presently being exploited excessively. The high number of bear/human interactions occurring during 1984 constituted a major problem. Lax personal garbage disposal, sloppy operation of the city landfill, and behavior by fishermen which resulted in bear/human interactions probably accounted for most incidents during the report period. Efforts will be made to encourage the city to resolve garbage problems and public education will continue to discourage such dangerous interactions with bears.

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, 1984.

Date	No. transect miles	No. Scats	No. Scats/mile	Survey location
24 April	11.1	3	0.3	Paved road to Old Situk R.
8 May	29.8	3	0.1	Paved road to Dangerous R.
14 May	29.8	4	0.1	Paved road to Dangerous R.
29 May	29.8	31[a]	1.0	Paved road to Dangerous R.
5 June	29.8	30[b]	1.0	Paved road to Dangerous R.
13 June	29.8	23[c]	0.8	Paved road to Dangerous R.
2 July	29.8	58[d]	1.9	Paved road to Dangerous R.
7 August	29.8	31[e]	1.0	Paved road to Dangerous R.

[a] Six scats contained moose hair.

[b] Three scats contained moose hair.

[c] No scats contained moose hair.

[d] One scat contained moose hair.

[e] No scats contained moose hair.

Table 2. Historical brown bear harvest, Game Management Unit 5, 1961-84.

Year	Harvest				Mean age		
	Male	Female	Unknown	Total	Male	Female	All
1961	6	2	1	9	--	--	--
1962	4	2	1	7	--	--	--
1963	4	0	1	5	--	--	--
1964	4	8	0	12	--	--	--
1965	12	4	0	16	--	--	--
1966	11	9	2	22	--	--	--
1967	8	8	0	16	--	--	--
1968	12	5	0	17	--	--	--
1969	9	10	0	19	7.2	5.6	6.1
1970	4	3	0	7	8.4	3.6	6.5
1971	12	8	1	21	5.4	3.4	4.6
1972	12	9	0	21	4.6	4.6	4.6
1973	15	8	0	23	8.4	9.0	8.6
1974	8	5	0	13	4.2	7.0	5.5
1975	10	5	0	15	3.6	4.6	3.9
1976	12	4	0	16	6.9	7.1	7.0
1977	10	4	0	14	8.2	3.0	6.7
1978	17	6	0	23	7.1	7.2	7.1
1979	14	8	0	22	6.3	7.4	6.7
1980	16	6	1	23	5.1	3.7	4.7
1981	20	8	1	29	5.5	6.0	5.6
1982	18	13	0	31	7.6	6.8	7.2
1983	22	11	1	34	5.9	7.4	6.4
1984	22	9	1	32	7.6	5.0	6.8
Mean	12	6	1	19	6.4	5.7	6.1

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 6

GEOGRAPHICAL DESCRIPTION: Prince William Sound and North Gulf Coast

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

No data were available.

Population Composition

No data were available.

Mortality

The Unit 6 brown bear sport harvest was 35 bears: 23 males, 9 females, and 3 sex unknown. Twenty bears were killed during the spring season and 15 during the fall season. Three additional bears were killed in defense of life or property. Nonresident hunters took 16 bears, or 46% of the harvest.

Males averaged 23.4 inches in skull size and 6.9 years of age. Females averaged 21.6 inches in skull size and 8.7 years of age.

Distribution of the Unit 6 bear harvest was as follows: Montague Island, 3; Hinchinbrook Island, 3; Valdez-Cordova, 8; West Copper River Delta, 5; and east of Copper River, 16.

Management Summary and Recommendations

The reported kill of 35 brown bears was 3 bears below the 1983 harvest, but 4 bears above average. The spring and fall harvests were about average in size of kill, sex composition, and mean age. Percent of harvest by nonresidents was near average. Distribution and magnitude of the harvest, by Subunits, was normal. Basically, all data collected on brown bear taken in 1984 fell within normal annual fluctuations.

Opening the entire Unit on September 1 had no affect upon the total harvest. A few hunters merely hunted earlier. I recommend the current Unit 6 brown bear season and bag limit be retained.

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SUBMITTED BY:

Leland P. Glenn
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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 7 and 15

GEOGRAPHICAL DESCRIPTION: Kenai Peninsula

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

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

Mortality

The reported sport harvest was 7 brown bears, and included 2 males, 4 females, and 1 bear of unspecified sex. Mean age of males and females was 4.8 years and 4.2 years, respectively. All bears were killed by resident hunters. An additional 2 males and 1 female brown bear were reported taken in defense of life or property (DLP). A historical account of DLP-killed brown bears on the Kenai Peninsula was documented in last year's report (Holdermann 1983).

Management Summary and Recommendations

During 1984, the Board of Game synchronized the opening of the fall season in Unit 7 with that of Unit 15 (September 1), and extended the closing date in both Units from October 10 to October 15. This change had no appreciable effect on the fall 1984 brown bear kill. During the past 10 years the average fall harvest in Units 7 and 15 was 6.2 bears, compared with 7 bears in 1984.

The Interagency Brown Bear Study Team, consisting of members from the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and U.S. Forest Service, has reported on existing information pertaining to the population status of brown bears on the Kenai Peninsula (Bevins et al. 1984). The team engaged in the following activities in 1984: (1) established a file of brown bear literature pertinent to the Kenai

Peninsula; (2) developed a step-down plan that helps establish brown bear research and management priorities; (3) interviewed wildlife biologists and local residents concerning past and present brown bear population status; (4) conducted ground and aerial surveys to identify important brown bear use areas; (5) monitored human use and human/bear encounters along the Russian River/Resurrection River trail system; and (6) tested the feasibility of capturing brown bears in the Kenai Peninsula for future radiotelemetry studies. The continued efforts of the IBBST will greatly facilitate state and federal efforts to maintain an adequate land base to support brown bear populations on the Kenai Peninsula.

No changes in the season or bag limit are recommended.

Literature Cited

Bevins, J. S., C. C. Schwartz, E. E. Bangs, and K. J. Nelson. 1984. Kenai Peninsula Brown Bear Studies: Report of the Interagency Brown Bear Study Team. U.S. Forest Service. 103pp.

Holdermann. D. A. 1983. Units 7 and 15 brown/grizzly bear survey-inventory progress report. Pages 14-15 in R. A. Hinman, ed. Annual report of survey-inventory activities. Part I. Black Bears and Brown Bears. Vol. XV. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-19-2 and W-22-1. Job 17.0 and 4.0. Juneau. 57pp.

PREPARED BY:

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SUBMITTED BY:

Leland P. Glenn
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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 8

GEOGRAPHICAL DESCRIPTION: Kodiak and Adjacent Islands

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

The brown bear population appears to be stable on Kodiak and adjacent islands. The sex and age composition of the 1984 harvest was within the range of data recorded for the previous 23 years. Although the harvest of 191 bears was well above average, the relatively high mean age of males and the high ratio of males to females in the harvest indicate that the 1984 harvest was within sustainable limits.

Population Composition

Brown bear composition surveys were flown during July and August on selected salmon streams on southwestern Kodiak Island, by personnel from the U. S. Fish and Wildlife Service. A total of 367 bears was classified as follows: single bears, 186 (51%); maternal females, 56 (15%); yearling or older young, 69 (19%); cubs-of-the-year, 56 (15%). The percentages of single bears and maternal females were similar to those found since 1978.

Mortality

Hunters killed 191 bears in 1984, the highest sport harvest since 1966 when 200 bears were killed. Composition of the harvest was 134 males (70%) and 57 females (30%). A total of 138 bears (102 males and 36 females) was killed during the spring season, and 53 bears (32 males and 21 females) were killed during the fall season. The spring kill was the highest bear harvest since 1967 when 140 bears were killed. The fall kill was above the average harvest of 43 bears for the previous 24 years. Distribution of the 1984 kill, by harvest Subunit, is shown in Table 1.

Brown bear hunters reported wounding 6 bears (1.2 wounded bears/100 hunters) during the spring and fall seasons.

Eighteen mortalities were recorded from sources other than sport hunting. Eleven bears (5 males, 4 females and 2 of unknown sex) were reported killed in defense of life or property. Eight of the 11 bears killed in defense of life or property were killed by deer hunters. Additional unconfirmed reports of bears wounded by hikers and salmon set-net fishermen were also received. The total recorded mortality from all sources was 209 bears, including 142 males (69%), 65 females (31%), and 2 bears of unknown sex.

The mean age of 131 males in the sport harvest was 7.9 years. The oldest male was 23.8 years of age. Ninety-six of 131 males (73%) were over 5 years of age. The mean age of 57 females in the sport harvest was 8.1 years, well above the 7.2-year mean age of females killed in the 1969-84 period. The mean age of female mortalities from all sources was 8.7 years ($\underline{n}$ = 63). Thirty-five of 57 females (61%) were over 5 years of age. The oldest female killed was 24.4 years old.

A total of 520 permittees reported hunting in 1984, a slight increase from 501 permittees who reported hunting in 1983. There were 401 Alaska residents and 119 nonresidents who hunted. Overall hunter success was 36%. Resident hunters were 22% successful and nonresident hunters reported 81% success.

A total of 243 hunters, including 139 residents and 104 nonresidents, reported hunting in permit areas on Kodiak Island (Hunt Area Nos. 201 through 226). A total of 277 hunters, including 262 residents and 15 nonresidents, reported hunting on northeastern Kodiak Island and on Afognak Island (Registration Hunt No. 250).

Management Summary and Recommendations

The 191-bear sport kill was the 2nd highest annual kill in 24 years. Excellent weather during the spring season contributed to both higher success and more hunters afield. Although harvest levels exceeded the desired kill size in all 5 harvest Subunits, the sex composition of the kill heavily favored males by a 7:3 ratio. Also, the actual take of 57 females was similar to the average female kill (51) since 1961, but well below the peak kill of 89 females killed in 1966. The 7.9-year mean age of males was at the upper range of mean ages recorded since 1969.

Conventional interpretation of sex ratios and ages of bears killed within the last decade indicates that although young bears predominate in the population, large older males are present in low but stable numbers. The kill of females has remained relatively low compared with that of the mid-1960's when females composed nearly 50% of the harvest.

"Defense of life or property" kills by deer hunters accounted for 8 bear mortalities, 5 of which were maternal females. Greater effort should be made to educate deer hunters about avoiding situations which may lead to bear/human conflicts. That effort may reduce this source of mortality.

The change in fall hunting season opening dates from 25 October to 8 November on Afognak and adjacent islands (Subunit 1) resulted in a predicted decline in harvest, from 13 bears in 1983 to 8 bears in 1984. Although the total sport kill of 22 bears for Subunit 1 was little changed from the previous year's kill of 23 bears, males composed 73% of the take compared with only 43% of the take in 1983.

The relatively high kill which occurred in 1984, and the fact that the desired harvest levels were exceeded, should be considered with caution but not necessarily with alarm. Any evidence of a declining trend in mean age of males in the harvest or an increasing trend in the absolute number of females killed, should be considered as a warning of possible excessive harvest. Sex and age ratios as well as the absolute number of bears killed should be weighed in considering the advisability of increasing or restricting the annual harvest. No changes in seasons, bag limits or permit hunt provisions are recommended.

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Table 1. Distribution of the Unit 8 brown bear sport harvest, 1984.

Subunit No. and location	Males	Males	Females	Females	Kill	Harvest
1 - Afognak, Raspberry, Shuyak Island	16	73%	6	27%	22	20
2 - NE Kodiak Island	19	73%	7	27%	26	15
3 - SE Kodiak Island	26	67%	13	33%	39	20
4 - SW Kodiak Island	46	68%	22	32%	68	60
5 - NW Kodiak Island	27	75%	9	25%	36	30
Totals	134	70%	57	30%	191	145

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 9

GEOGRAPHICAL DESCRIPTION: Alaska Peninsula

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

The only quantitative data to indicate trends in bear population composition and abundance are from aerial surveys conducted along salmon streams where bears congregate to feed. There are several unquantified biases and problems with these surveys, but we can compare standardized surveys in specific areas as indicators of population status. The Black Lake study area was surveyed during 8 years from 1962-69. The highest single survey from each of these years averaged 103 bears (range 67 to 123) with an average of 38 bears counted per hour (Table 1). In 1982, 1983, and 1984, surveys in this area were again flown using the same procedures. The best single count from each of the past 3 years was 148 (51 bears per hour), 173 (56 bears per hour) and 171 (64 bears per hour) for 1982, 1983, and 1984, respectively. Combining all 10 surveys conducted from 1982-84, an average of 145 bears was seen, about 40% higher than the best surveys conducted during the 1960's. Although these bear surveys were not designed to measure population density, the noted increase in sample sizes and bears per hour, along with harvest statistics and other observations, suggest a large, stable or slightly-increasing population.

Population Composition

Five hundred and thirty-three bears were seen during 4 replicate surveys of the Black Lake study area in August 1984 (Table 1). The percentages of single bears, females with offspring, and total young were similar to 1983, but relatively more "yearlings" and fewer cubs-of-the-year were seen in 1984.

The high yearling cohort seen in 1984 reflects the very strong cub production/survival rate in 1983. Litter size has averaged 2.1 for cubs-of-the-year since 1982.

Mortality

Hunters killed 228 brown bears in 1984; all but 3 were taken during the spring season (Table 2). This was the largest harvest since 1973; however, characteristics of the harvest, including percent males (72%), mean ages (males, 7.4 years; females, 7.2 years), and number of mature males (60 bears 8 years of age or older), suggest that the harvest was not excessive. Appendix A presents data collected from questionnaires sent to bear hunters who killed a bear during the 1983-84 regulatory year.

Management Summary and Recommendations

The registration permit hunt in the Naknek drainage was designed to minimize bear-human conflicts in the most heavily settled portion of Unit 9. In 1984, only 4 bears were taken under this hunt, 1 male in the spring and 1 male and 2 females in the fall. The 3 bears killed in the fall were taken by guided nonresident hunters. A local resident took the spring bear in a potential "defense of life or property" situation. In addition to these bears, 2 other bears were wounded, 1 in a "defense of life" situation and 1 by an illegal hunter. The registration hunt has been conducted for the past 9 years and has proven partially successful in reducing the threat of nuisance bears. The bear population in the Naknek drainage appears to be healthy and well-distributed.

The registration permit hunt in the Cold Bay area serves a similar management objective in that community. However, in 1983 the Izembek National Wildlife Refuge staff expressed concern that the number of local bears was too low, and observed that nuisance bears were no longer common. Consequently, the Board of Game authorized that this registration hunt be conducted only when the refuge staff determined that problem bears were present. The spring 1984 hunt was conducted as usual. Seven permits were issued and 1 male bear was taken late in June. Due to the absence of problem bears during the summer, no fall hunt was held.

That portion of Unit 9 north of the Naknek drainage (area 9-01) traditionally has been lightly hunted; however, the spring 1984 harvest was twice as high as the average for the previous 4 spring harvests and 85% above the average fall harvest since 1975. This increased harvest was attributable to more resident hunters. Harvest statistics (Table 3) do not suggest excessive pressure, but future harvests should be monitored closely.

Harvests in the other 3 areas of Unit 9 were slightly above the mean for the past 4 seasons; however, only 15% of the Unit 9 spring harvest was adult females and the average age of males

was 7.4 years, the highest mean age since 1976. The results of composition surveys in the Black Lake study area and from harvest statistics support extending the fall 1985 season from 7-21 October to 1-21 October. No change in the spring season is recommended.

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Survey-Inventory Coordinator

Table 1. Results of brown bear composition surveys from Black/Chignik Lakes, Alaska, trend count area, 1958-83.

Month/ year	Females w/young		Cubs and yearlings		Singles		Total sample	Best survey		Number of replicate counts
	n	%	n	%	n	%		No. of bears	Bears/hr	
8/58	--	--	--	--	--	--	--	76	--	--
8/59	--	--	--	--	--	--	--	73	--	--
1962	439	26	888	52	391	23	1,718	118	--	27 counts
8/65	65	28	135	57	36	15	236	123	49.2	2 counts
8/66	24	22	51	47	33	31	108	108	43.2	1 count
8/67	42	27	86	55	27	17	157	82	30.4	2 counts
8/68	30	23	73	57	25	19	129	67	20.9	3 counts
8/69	148	22	341	51	174	26	663	122	44.4	6 counts
fall/70	70	22	137	43	114	36	321	126	4.0	3 counts
8/74	39	23	89	52	44	26	172	95	43.0	2 counts
8/82	53	19	116	41	113	40	282	148	53.8	2 counts
8/83	139	22	293	46	199	32	631	173	55.8	4 counts
8/84	127	24	246	46	160	30	533	171	64.0	4 counts

Table 2. Alaska Peninsula brown bear sport harvest showing the number of bears killed by year, season, mean age, and percentage of males in the harvest, 1970-84.

	Yearly harvest			Fall harvest			Spring harvest		
					Mean age			Mean age	
Year	M	F	Total[a]	% Males	M	F	% Males	M	F
1970	103	50	158	59	5.6	7.2	78	8.2	6.6
1971	122	63	195	59	5.7	5.5	83	8.6	4.8
1972	154	119	279	53	6.2	7.8	69	8.4	9.3
1973	138	98	242	50	5.6	7.3	70	6.4	5.7
1974	75	66	141	53	5.5	7.5	--	--	--
1975	120	96	224	52	5.6	7.0	64	6.9	7.2
1976	108	41	154	--	--	--	72	7.6	6.6
1977	108	77	189	58	4.5	7.0	--	--	--
1978	133	47	183	--	--	--	74	7.0	6.7
1979	109	55	167	66	5.1	6.0	--	--	--
1980	139	62	203	--	--	--	69	7.1	7.0
1981	106	84	192	55	5.7	5.6	--	--	--
1982	134	75	211	--	--	--	65	6.6	7.6
1983	119	78	199	61	5.6	8.0	--	--	--
1984	160	64	228	--	--	--	72	7.4	7.2

[a] Includes bears of unknown sex.

Table 3. Spring harvest of Alaska Peninsula brown bear, showing the number killed, by management Subunit and year, corresponding mean ages, percentage of males in the harvest, and percentage taken by nonresident hunters, 1976-84.

Year/ Subunit[a]	Total kill	% Nonres. kill	% Males	Mean age (yr) Male	(n)	Female	(n)	% ≤ 5 years of age Male	Female
Subunit 9-01									
1976	18	33	47	10.5	(08)	6.3	(08)	87	62
1977	25	60	76	7.1	(18)	7.9	(06)	44	83
1980	26	58	72	7.4	(17)	8.2	(06)	59	83
1982	26	85	52	8.1	(13)	6.4	(12)	69	67
1984	48	44	79	8.2	(37)	7.2	(10)	73	60
Mean	29	56	65	8.3		7.2		66	71
Subunit 9-02									
1976	40	58	82	7.7	(31)	5.5	(07)	65	57
1978	61	62	75	7.6	(44)	7.3	(15)	61	73
1980	64	78	62	7.5	(40)	7.6	(22)	58	62
1982	62	81	58	6.0	(36)	9.3	(26)	47	77
1984	64	63	67	6.9	(41)	6.6	(21)	63	52
Mean	58	68	69	7.1		7.3		59	64
Subunit 9-03									
1976	30	67	77	7.4	(23)	5.7	(07)	70	43
1978	49	82	67	7.0	(36)	8.3	(11)	69	64
1980	36	81	77	7.3	(24)	5.7	(12)	71	50
1982	41	71	71	7.1	(28)	6.7	(12)	82	50
1984	46	67	67	7.1	(30)	6.4	(15)	80	53
Mean	40	74	72	7.2		6.6		74	52
Subunit 9-04									
1976	60	58	71	6.8	(35)	7.6	(15)	57	53
1978	42	67	68	6.1	(28)	4.4	(12)	50	42
1980	75	72	72	6.5	(53)	6.8	(21)	60	33
1982	75	77	70	6.3	(52)	6.8	(22)	56	55
1984	67	78	76	7.3	(50)	8.7	(16)	66	56
Mean	64	70	71	6.6		6.9		58	48

[a] Subunit designations for management purposes only.

APPENDIX A. Unit 9 Questionnaire Results, 1984.

Questionnaires were mailed to all successful bear hunters who hunted brown bear in Unit 9 during fall 1983 (n = 200) and spring 1984 (n = 223) seasons. Eighty-six percent of the fall questionnaires and 80% of the spring questionnaires were returned. Most hunters, 72% in the fall and 65% in the spring, were nonresidents.

Fall hunters reported seeing an average of 10 bears, and spring hunters an average of 8 bears each during their hunts. Most hunters (76% fall, 54% spring) reported seeing at least 1 family group. The difference in family group sightings between fall and spring was probably related to a tendency for females with cubs-of-the-year to remain in or around dens longer in the spring. Average litter size reported by hunters sighting family groups was similar for both hunts, 1.96 in the fall and 1.91 in the spring.

Fifty-eight percent of all respondents passed up 1 or more legal bears before killing a bear. However, guided hunters took the 1st legal bear more often during the fall (47%) than during the spring (34%), possibly because many fall hunters are also interested in pursuing other game, or fishing. For both seasons, most hunters (63%) reported overestimating the bear's size. There was no reported difference between guided and nonguided hunters in their ability to estimate bear size before shooting.

Guided hunters ranked bear size first among factors affecting their decision to kill a given bear. The guide's recommendation and the bear's coat condition were secondary. Nonguided hunters clearly ranked coat condition first, and size second, in influencing their decision to kill a bear. However, both guided and nonguided hunters reported "the opportunity to take a large bear" was the primary reason for hunting on the Alaska Peninsula. Among 9 factors listed as important in making a satisfying hunt, "the quality of bear taken" ranked first, while, "just taking a bear" ranked seventh. Most hunters (90%) were satisfied with their bear. Small size was the most common reason given for a hunter's dissatisfaction; only 6 (2%) hunters were dissatisfied because of poor coat condition, 2 in the fall, 4 in the spring.

Both male and female mean skull sizes of bears taken by guided hunters in the spring season were significantly larger than those taken by nonguided hunters ($P < 0.01$). Guided hunters in spring were also more likely to take a male than nonguided hunters ($P < 0.025$). However, there was no apparent correlation ($P < 0.05$) between skull sizes and hunter effort, measured both as "days hunted" and as "number of bears passed up."

On the spring hunt questionnaire, hunters were asked to itemize costs of their bear hunt. The average cost for nonguided hunters was $2,016; for guided hunters the figure was $10,870. Total cost for successful hunters was estimated at $1.74 million, and for all hunters, $2.0 million for the 1984 spring season.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 10

GEOGRAPHICAL DESCRIPTION: Unimak Island

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

No data were collected.

Mortality

Only 1 brown bear, a female, was killed by a hunter during 1984. No other bear mortality was reported.

Management Summary and Recommendations

Brown bear hunting on Unimak Island is limited by State permits and federal wilderness regulations limiting aircraft access to beaches and existing runways.

During the spring season, a group of 2 hunters spent 3 days hunting, without success. In the fall, a hunter took a female bear on the 6th day of hunting. One nonresident also hunted on the island but decided to hunt elsewhere after seeing only 2 small bears.

Although hunting effort and harvest declined in 1984, no changes in regulations or management objectives were recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 11

GEOGRAPHICAL DESCRIPTION: Wrangell Mountains

PERIOD COVERED: 1 January 1984-31 December 1984.

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Standardized surveys of brown bears have not been conducted in Unit 11. Observations by Department staff and reports by the public indicate that grizzlies are abundant. No population trends were evident.

Mortality

Nine grizzly bears: 3 males, 3 females, and 3 sex unknown were reported killed. This harvest was 1 more than last year's total and was approximately the same as the previous 3-year average (1981-83) of 8.7 bears. The mean age of the bears killed was 9.5 years, up from last year's mean age of 8.3 years and the 16-year average of 7.5 years of age. The mean skull size for males was 23.0 inches and for females was 19.3 inches. Nonresident hunters took 4 of the 9 bears.

Management Summary and Recommendations

Since 1979, grizzly bear harvests have remained low in Unit 11, the result of reduced hunting pressure associated with restrictive federal regulations which limit hunting activity in Wrangell-St. Elias National Park/Preserve. Recent harvest levels are about half the 16-bear average for the 18-year period prior to 1979.

No changes in seasons or bag limits are recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 12

GEOGRAPHICAL DESCRIPTION: Upper Tanana and White Rivers

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

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

No standardized surveys of bears have been conducted in Unit 12. However, based on an ongoing study in the Alaska Range to the west of Unit 12, the bear density is likely 5.0-6.7 bears/100 mi^2, resulting in an estimated population of 430-570 bears.

Mortality

Hunters reported taking 37 grizzly bears during this reporting period, an increase of 118% over the 24-year average annual harvest of 17 bears. Even so, the harvest during 1984 was only 6-9% of the estimated population. This compares to a 2-3% harvest the previous year. Most of the increased harvest in 1984 is attributable to unseasonably early bear movements to subalpine areas during the spring, which increased availability of bears to hunters.

Of the 37 bears reported taken, 21 (57%) were males, 15 (41%) were females, and 1 (3%) was of unknown sex. Of the 37 bears, 13 (35%) were taken in the spring season, 23 (62%) were taken in fall, and 1 male was taken in winter. Males outnumbered females 2 to 1 in the spring harvest (8 males, 4 females, 1 unknown sex), but the sex ratio of bears taken in the fall was about even (12 males, 11 females).

Mean skull size for males was 20.0 inches and mean age was 6.3 years; these averages do not differ significantly from the averages in 1983 or the 24-year averages. Mean skull size for females was 19.1 inches and mean age was 9.1 years. Again,

there were no meaningful differences compared with 1983 averages of 18.9 inches and 8.6 years for females, or with the 24-year averages of 19.2 inches and 7.5 years. Thus, at this time, harvest data do not indicate that hunter-caused mortality has resulted in an overharvest of the Unit 12 grizzly bear population.

Nonresident hunters took 43% of the harvest compared with their historical average of 55%. Following passage of the Alaska Lands Act, there has been increased resident hunting pressure directed at Dall sheep in Unit 12. The taking of bears during sheep hunts is probably the reason for the increased grizzly harvest by residents in recent years. Residents are no longer required to have a brown/grizzly bear tag and the bag limit is now 1 bear per year. These factors may also contribute to increased incidental harvest by resident hunters.

The harvest of bears was well-distributed throughout the mountainous portions of Unit 12; however, bear hunts in the upper Chisana and White River drainages resulted in most of the Unit 12 take. The Little Tok and Tetlin River drainages contributed only 1 bear, presumably due to the controlled access into the Native-owned Tetlin River drainage and a greatly reduced moose hunting season in the Little Tok River drainage this past fall.

Management Summary and Recommendations

Grizzly bears are believed to be stable and relatively abundant in Unit 12, with an estimated 430-570 bears in the population. The harvest of 37 bears during this reporting period probably reflected an abnormally high availability of bears during spring and fall 1984. Annual harvest data have not shown any trends which would threaten the bear population in Unit 12. In fact, to complement ungulate management efforts in Unit 12, larger grizzly harvests would be desirable at this time.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 13

GEOGRAPHICAL DESCRIPTION: Nelchina Basin

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Miller and Ballard (1982) estimated grizzly bear density in a portion of Unit 13 to vary from 1 bear/16 mi^2 to 1 bear/24 mi^2. Continued frequent observations of grizzly bears throughout much of Unit 13 suggest little change in their relative abundance over the past year.

Population Composition

Miller (1984) found a mean litter size of 2.1 cubs-of-the-year for 19 litters, and 1.6 yearlings for 22 litters. He found grizzly bear mean ages of 7.7 years for males greater than 3 years of age and 7.9 years for females greater than 3 years of age.

Mortality

The harvest in 1984 was 124 bears, up slightly from last year's harvest of 117. Sixty-nine (58%) bears were males, 49 (42%) were females and 6 were of unknown sex. The spring harvest was 47 bears and the fall harvest 77. Nonresident hunters killed 34 (27%) bears.

The mean age of all bears in the harvest was 6.8 years, similar to the 6.7 years reported for 1983, up from the 1980-83 average of 6.0 and the 16-year average of 6.4 years. The average age of all males in the harvest was 6.2 years, the same as reported for 1983, up from the 1980-83 average of 5.2 years and the 16-year average of 6.0 years. The mean age of all females was 7.6 years, up from 7.2 years in 1983, the 7.3-year average for 1980-83, and the 16-year average of 7.0 years.

Mean skull size was 21.4 inches for males compared with the 1980-83 average of 20.7 inches and the 16-year average of 21.1

inches; mean skull size was 19.6 inches for females, nearly the same as the 1980-83 average of 19.6 inches and the 16-year average of 19.7 inches.

Management Summary and Recommendation

Although the reported kill of 124 grizzlies during 1984 was the highest ever recorded for Unit 13, harvest data analysis shows little if any reason for concern. Mean age and skull size for both males and females support the contention that the grizzly bear population is capable of withstanding current levels of harvest.

Concern over property damage by bears, plus public awareness of bear predation on moose calves, continues to influence public attitude toward more liberal regulations governing the hunting of grizzlies in Unit 13.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 14

GEOGRAPHICAL DESCRIPTION: Upper Cook Inlet

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25

Population Status and Trend

No data were available.

Population Composition

No data were available.

Mortality

One brown bear of unknown sex was killed by a hunter during the spring season and 9 bears (4 males, 4 females and 1 sex unknown) were killed during the fall season. In addition, 4 bears (1 male and 3 females) were killed in defense of life or property.

Management Summary and Recommendations

There appears to be little interest in brown bear hunting in this Unit. All brown bears killed by sport hunters were taken during the moose hunting season and are believed to have been harvested incidental to moose hunts. Unit 14 has never experienced a large brown bear harvest. Between 1961 and 1971 the average annual harvest was 10 brown bears. From 1972 through 1983 the average annual harvest was 5 bears. Since 1961, 41 brown bears have been reported killed in defense of life or property.

Due to the low average annual harvest, mean ages and mean skull sizes are of limited value in estimating trends in population status. The annual kill of brown bears is low; therefore, we believe the harvest has little impact on population composition.

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 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Observations of bears by Department staff and the public have indicated an abundant population of brown bears in Unit 16.

Population Composition

No data were available.

Mortality

Thirty-three brown bears were reported killed by sport hunters during the 1984 season. Three males were taken during the spring season and 30 bears (21 males, 6 females, and 3 sex unknown), were taken during the fall season. The mean age of males killed during the spring was 8.4 years and for males killed during the fall, 6.0 years. The mean age of females was 6.5 years.

Management Summary and Recommendations

The mean age of bears in the harvest continues to fluctuate from year to year. These fluctuations are probably due to the small sample size and show no trend in age composition. The number of brown bears killed each year is considered low and is probably not causing a significant impact on the population.

No changes in season or bag limits are recommended.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 17

GEOGRAPHICAL DESCRIPTION: Northern Bristol Bay

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

The status of brown bears in Subunit 17A is unknown. Brown bear density in Subunit 17B where hunting pressure is greatest has been reported to be increasing slowly. General observations, the incidence of bear/human conflicts, and reported observations by moose hunters indicate the population density in Subunit 17C is high.

Population Composition

No data were available.

Mortality

Twenty-seven brown bears were reported killed during 1984. Two bears were taken during the spring season and 25 were taken during the fall season. Of these bears, 12 were males, 14 were females and 1 was of unknown sex. Nonresident hunters took 67% of the reported harvest. One bear was reported killed in Subunit 17A and the remaining 24 were reported taken from Subunit 17B. Two additional bears were killed in defense of life or property. Both of these bears were reported taken from Subunit 17C in the Dillingham area.

Management Summary and Recommendations

Although no data exist to estimate bear populations in Unit 17, observations of bears by local residents, and incidental observations by biologists during game surveys indicate the bear population in most areas of the Unit was high. Harvest levels in Subunits 17A and 17C have been extremely low. However, the number of bears killed by local residents of Subunit 17A and 17C, excluding the Dillingham area, are rarely reported.

Season dates in Unit 17 were liberalized by the Board of Game during this reporting period to allow an increased bear harvest. This liberalization had little effect on the number of bears killed.

A research proposal to estimate bear densities in a portion of Subunit 17A within the Togiak National Wildlife Refuge was drafted and submitted to refuge staff for funding consideration. If funded, this project would be a 4-year cooperative bear research study between the Togiak Wildlife Refuge staff and the Department of Fish and Game.

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BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 18

GEOGRAPHICAL DESCRIPTION: Yukon-Kuskokwim Delta

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Alaska Hunting Regulations No. 24 and 25.

Population Status and Trend

Observations by Department personnel, reports from the public, and current harvest data indicate that Unit 18 grizzly bear populations are moderate in density and stable in number. The highest densities are found in the Kilbuck Mountains southeast of Bethel and in the Andreafsky and Ilivit Mountains north of the Yukon River. Although the vast lowland of the delta lying between the Yukon and Kuskokwim Rivers contains very few bears, occasional sightings are made in the Askinuk Hills east of Cape Romanzof and in the Kusilvak area south of Mountain Village.

We suspect that grizzly bear densities are greater in the Kilbuck Mountains than elsewhere in the Unit, although conclusive data are lacking. The Kilbuck Mountains population shares some similarities with Unit 17 populations to the east in terms of habitat, salmon availability, and climate. As a result, bear density is probably high in the Kilbuck Mountains (similar to that of Unit 17).

Growth curves can be used to compare Unit 18 with other populations. In an intensively studied brown bear population on the Alaska Peninsula (Unit 9) Glenn (1980) found that skull measurements, particularly zygomatic width, are the best morphometric indicator of growth rate. Curvilinear correlations of zygomatic width plotted against age were calculated for both male and female bears harvested by hunters in Unit 18 from 1970 to 1984, and were compared with similar correlations from a sample of Unit 9 bears (Glenn 1980, Figs. 1 and 2). Analyses were done separately for male and female, spring and fall bears. Results of the Unit 18 spring female analysis were not used because of small sample size and a low correlation coefficient. Both male and female bears harvested from Unit 18 appear to exhibit slower growth rates than Unit 9 bears, and presumably would have growth and reproductive rates more similar to interior and northwest Alaska populations. The

difference is especially noticeable for female bears (brown bear populations inhabiting the Alaska Peninsula are well known for their fast growth rates and high population densities). Of interest are the smaller correlation coefficients observed for the Unit 18 sample.

Several factors accounting for the additional variability are plausible. Whereas the Unit 9 sample is large and was collected from a small study area during a 5-year period, the Unit 18 sample is significantly smaller and was collected from widely scattered areas over a 15-year period. If the number of skull measurements can be increased sufficiently to allow analysis by geographic area within Unit 18, and the variability of the correlations can be reduced, comparisons outlined above may have merit.

Mortality

According to sealing records, 11 bears were harvested by hunters and 2 were taken in defense of life or property in Unit 18 during 1984. Four bears were harvested during the spring hunting season and 7 were taken during the fall season. Nonresident hunters took 100% of the reported spring harvest and 80% of the fall harvest (Table 1). One bear was reportedly taken from the Andreafsky Mountains, and 10 were taken from the Kilbuck Mountains. The percentage of males in the harvest (77%) was higher than the long-term average of 63% but well within the range of values observed in adjacent Game Management Units. The Unit 18 harvest increased markedly after guiding began in 1979 but has not exceeded the high of 24 bears taken during 1981. Since 1979, hunters have taken an average of 15 bears per year. If we assume 5% of the population can be safely harvested each year, Unit 18 should produce an annual harvestable surplus of 15-35 bears.

Superficially, it appears that current harvests are sustainable. An important unknown, however, is the number of unreported bears killed by subsistence hunters and in defense of life or property. Subsistence hunters take bears opportunistically and normally do not report such kills due to the intricacies of bear hunting regulations and reporting requirements. We believe the problem is most prevalent among the Kuskokwim River villages, because residents of Yukon River villages do not normally hunt grizzly bears for subsistence. Individuals who take bears in defense of life or property often do not report the kill either because of the inconvenience involved or because they are unaware of reporting requirements. These incidents usually occur at remote fish camps, and most individuals are unwilling to take on the inconvenience of reporting the bear attack or depredation. We believe, however, that the number of bears killed in defense of life or property

is low. Fish camps and villages are normally in marginal bear habitat and are rarely near salmon-spawning areas. During August 1984, Department personnel spent approximately 1 week on the Yukon River interviewing residents of fish camps. Although some individuals reported having trouble with bears, the problem appeared to be relatively minor overall.

Mean ages of the annual harvest, when analyzed in relation to sex and season, do not appear to have changed significantly since 1979 (Tables 2 and 3). The mean age of males harvested in spring is significantly greater than the mean age of males harvested in fall ($P < 0.001$, $t = 5.74$), but the same is not true of females. Similar patterns are commonly observed in other areas of Alaska. Larger and older bears tend to emerge earlier in spring and thus are more vulnerable to hunters. Normally, two-year-old bears are still with the sow in spring but are likely to be on their own in fall. Hunters who harvest bears in fall are usually after other game such as moose or caribou, are not as selective, and take bears opportunistically. Spring bear hunters are usually more selective because they are only hunting bears. If overharvest were consistently occurring, we would expect a decline in mean age over time, particularly among spring males which tend to be older than other groups and are frequently taken from smaller cohorts. Our limited age data do not suggest such a decline. However, because samples are very small in some categories, conclusions are tentative.

Management Summary and Recommendations

Grizzly bears remain abundant in the northern and eastern portions of Unit 18. Although actual harvests are not known with certainty, we believe safe harvest limits have not been exceeded during this reporting period. As in the past, most of the harvest came from the Kilbuck Mountains east of Bethel.

Unreported taking of bears in defense of life or property and for subsistence must be addressed. Department personnel should continue information and education efforts emphasizing the need for rural compliance with reporting responsibilities. The program of fish camp and village visits, radio and TV spots, newsletters, and school visits should continue.

The suspected difference in density between the Kilbuck and Andreafsky populations needs to be better documented. Aerial stream surveys and track counts by boat during salmon runs are possible methods of documenting this difference.

Although the Unit 18 harvest is currently low, future increases are likely, especially if guides increase the size of their operations. Unit 18 is largely open terrain in which bears are

extremely vulnerable to hunters using aircraft. Given the likelihood of future harvest increases and the paucity of population data, additional studies are recommended.

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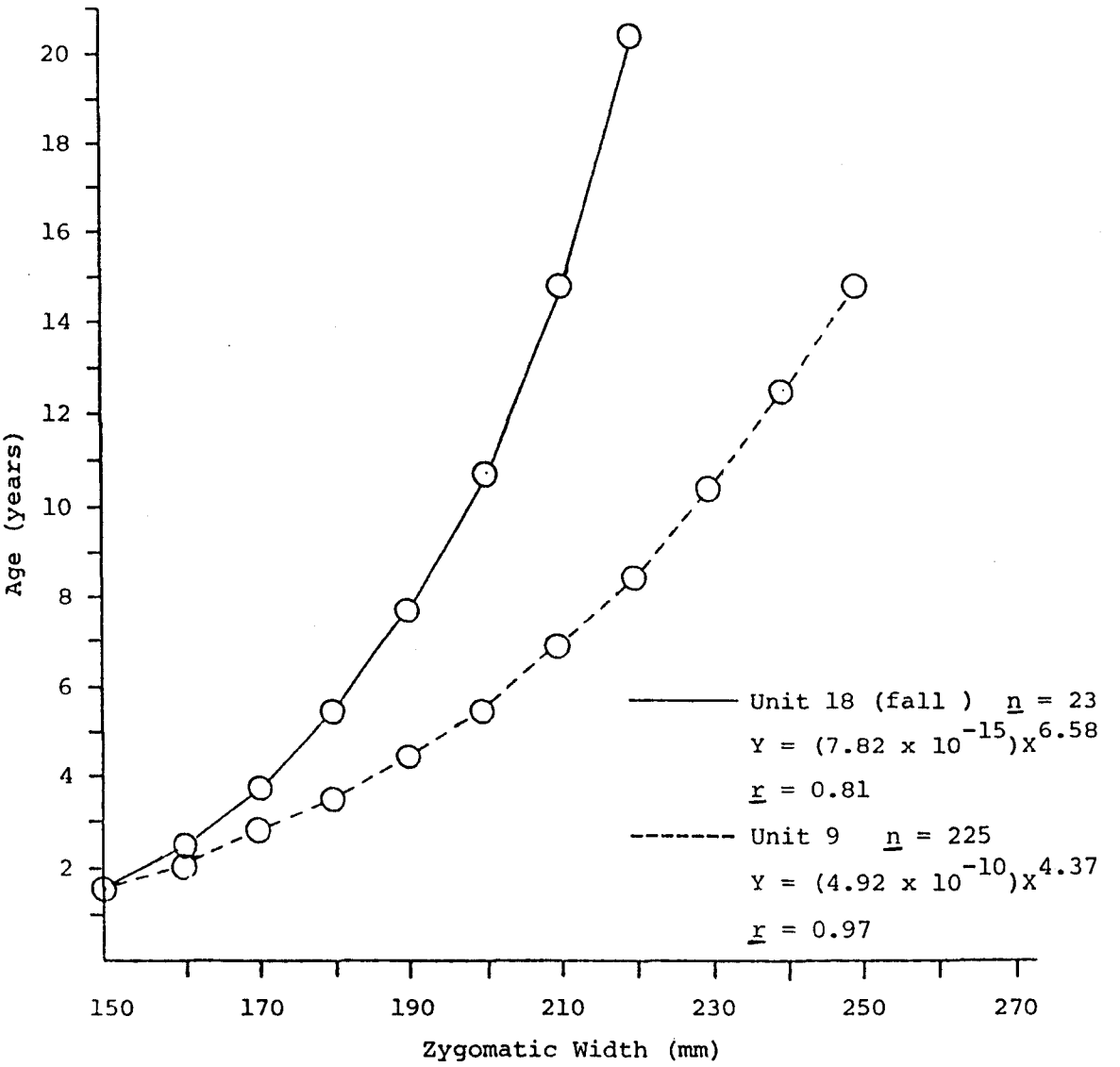

Figure 1. Relationship of age and zygomatic width for female grizzly bears from Units 18 and 9. Unit 9 data from Glenn (1980).

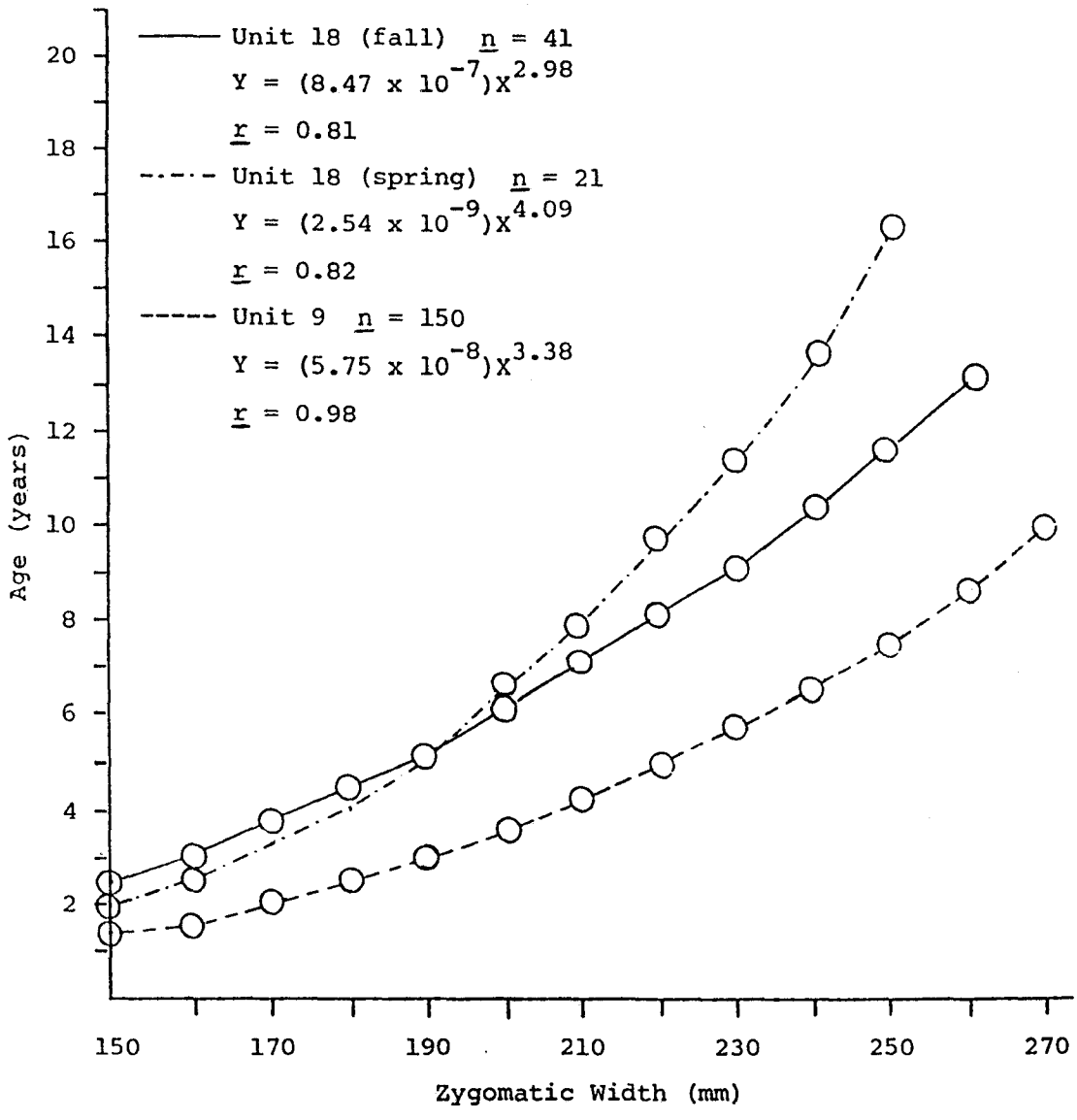

Figure 2. Relationship of age and zygomatic width for male grizzly bears in Units 18 and 9. Unit 9 data from Glenn (1980).

Table 1. Unit 18 total reported harvest and nonresident hunter harvest of grizzly bears, 1977-84.

Year	Season	Total harvest	Nonresident harvest	
			Number	%
1979	Spring	6	3	50
	Fall	6	5	83
1980	Spring	5	5	100
	Fall	9	8	89
1981	Spring	6	5	83
	Fall	18	16	89
1982	Spring	5	4	80
	Fall	9	9	100
1983	Spring	5	5	100
	Fall	11	7	164
1984	Spring	6	6	100
	Fall	5	4	80
Totals	Spring	33	28	85
	Fall	58	49	84

Table 2. Mean age (in years) of male bears harvested in Unit 18 during spring and fall, 1979-84.

	Spring			Fall		
Year	n	$\bar{x}$	SE	n	$\bar{x}$	SE
1979-80	6	11.7	2.0	7	6.2	1.3
1981-82	7	11.5	1.2	14	4.9	0.9
1983-84	8	12.8	2.7	13	5.7	1.4
Totals	21	12.0	1.2	34	5.6	0.7

Table 3. Mean age (in years) of female bears harvested in Unit 18 during spring and fall, 1979-84.

	Spring			Fall		
Year	n	$\bar{x}$	SE	n	$\bar{x}$	SE
1979-80	4	5.9	1.3	4	5.1	1.7
1981-82	4	11.4	4.4	13	10.1	1.6
1983-84	3	10.1	3.2	4	9.8	4.1
Totals	11	9.0	1.9	21	9.5	1.3

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 19

GEOGRAPHICAL DESCRIPTION: Middle and Upper Kuskokwim River

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Observations indicate that grizzly bear populations are similar to those of last year.

Mortality

Nineteen bears (9 males, 7 females, 3 unknown sex) were taken in Unit 19 during 1984. This harvest was low, only 1 bear more than the lowest recorded for the Unit since 1970 and less than one-half of the annual average of 46 bears killed during the last 14 years. Thirteen of the 19 bears were taken by nonresident hunters. No bears were reported taken in Subunit 19A during 1984. There were 11 applicants for the 9 spring season permits issued for Subunit 19B, but none of the permittees hunted. The permit requirement to hunt bears in Subunit 19B was eliminated, beginning in fall 1984. During the 3 years this permit system was in effect, 27 permits were available for spring seasons, but interest was low. Only 6 permits were issued, and no permittees actually hunted. During fall seasons interest was somewhat higher. Forty-eight permits were available, 44 permits were issued, 15 permittees hunted, and only 8 bears were taken. Nonresidents were much more likely to hunt if they received a permit than residents; 13 of 26 nonresident permittees hunted compared with 2 of 18 resident permittees. All successful hunters were nonresidents. In Subunit 19B, 6 bears were taken during the 1984 fall season. This was the 4th consecutive fall season in which harvests were low. In comparison, during 1972-80, an average of 22 bears was taken each fall. Eleven bears were reported taken in Subunit 19C; an additional bear was reported taken but the hide and skull were stolen before they were sealed. The take of 11 bears was half the annual average for the previous 13 years. The harvest of 2 bears in Subunit 19D was similar to harvest in previous years.

Management Summary and Recommendations

The permit requirement during 1981-84, and increased effectiveness of enforcement efforts, curtailed some guiding activities. As a result, hunting effort and harvests in Subunit 19B appear to have been reduced, which should allow the bear population to recover from the heavy harvests that occurred during the 1970's. Population parameters and harvests should be monitored closely because permits are no longer required for hunting in Subunit 19B. Only 2 residents hunted during the past 3 years in Subunit 19B. Apparently the permit system effectively reduced hunting by residents, but guided nonresident hunters were more likely to participate in permit hunts.

Harvest by guided hunters dropped considerably in 1984. The mean size and age of bears taken in 1984 increased slightly over the previous averages, indicating that declines in size and age of bears taken in 1983 may not have reflected the population trend.

PREPARED BY:

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SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 20

GEOGRAPHICAL DESCRIPTION: Central Tanana-Middle Yukon Valley

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Data regarding the population status of grizzly bears in most portions of Unit 20 are lacking, but casual observations and other indicators suggest the population is moderate in size and stable in most areas. Bear density in the Alaska Range portion of Subunit 20A is approximately 6 bears/100 mi^2.

Mortality

Bear sealing data indicate 72 bears were harvested by hunters in Unit 20 during 1984 (Table 1). An additional 2 bears were taken in defense of life or property. The mean harvest since 1961 is 35 bears. Subunits 20A and 20B showed sizable harvest increases, while all other Subunits except 20F experienced smaller harvests than during 1983. The harvest increased in the fall season, while spring harvests actually declined from 1983 levels, suggesting at least part of the increase was incidental take by moose and caribou hunters.

Efforts to increase the bear harvest in Subunit 20A were successful. The bear take there increased from 9 in 1983 to 22 in 1984. Although the Subunit 20E harvest declined slightly, harvest levels are still well above average. Here, too, the harvest increase appears to be incidental to moose and caribou hunting.

The mean age of male bears was 5.6 years, a decline from the 15-year average of 7.3 years, and the youngest average age ever recorded for Unit 20. The mean age for all harvested bears was 6.7 years, slightly less than the 15-year mean of 7.2 years. Male bears in the harvest were an average of 2.4 years younger than females. Males composed 54% of the harvest, a 9% decline from the previous year. Two nonsport kills occurred in Subunit 20A.

Management Summary and Recommendations

Increased opportunistic take by moose and caribou hunters appears responsible for the larger bear harvest in Unit 20. Bear harvests increased during the fall season and declined in spring. Subunits 20A and 20B both experienced harvest increases over 1983 levels. The take in Subunit 20B is the largest recorded there in recent years; the Subunit 20A harvest is only about 70% of the 1981 take of 31 bears. Harvests in Subunit 20A will probably increase during the next several years.

The harvest of 15 bears in the upper Middle Fork Fortymile River-Mosquito Flats area was a slight increase over the 1983 take, although the harvest in Subunit 20E as a whole was down slightly in 1984. The present management goal is to reduce bear numbers in this important moose calving area where past wolf control efforts have been concentrated.

Where grizzly bears have been implicated as important moose calf predators in certain areas, management strategies may require temporary reductions in bear numbers to enhance ungulate survival and population recovery. Future management will require balancing bear and ungulate populations to attain management goals for both bears and ungulates.

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SUBMITTED BY:

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Table 1. Unit 20 grizzly bear harvest, 1984.

Subunit	Fall harvest			Spring harvest			Total
		Sex			Sex		
	Number	M	F	Number	M	F	
20A	18	9	9	4	1	3	22
20B	11	5	6	5	3	2	16
20C	4	4	0	1	1	0	5
20D	5	2	3	2	2	0	7
20E	17	7	10	3	3	0	20
20F	2	1	1	0	0	0	2
Total	57	28	29	15	10	5	72

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 21

GEOGRAPHICAL DESCRIPTION: Middle Yukon (Tanana to Paimiut)

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

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

Mortality

Hunting pressure on bears in Unit 21 continues to be low despite the recent take of bears large enough to qualify for inclusion in Boone and Crockett records. Four bears were harvested in 1984 (1 in spring and 3 in fall). The bear taken in spring was killed by a nonresident hunter. Of 3 bears taken in fall, 2 were shot by moose hunters and 1 was taken at the Anaconda mine in the Kaiyuh Mountains, where it had been stealing dog food and creating a nuisance. This nuisance bear was 20.8 years old; its canines were worn down to the gum line, and it was thin and in poor condition. According to hunter reports it had been following a larger bear, scavenging its kills. Ten bears were reported killed at fish camps along the Yukon River during summer 1984. None were reported taken in defense of life or property.

Management Summary and Recommendations

Annual harvest continues to have an insignificant impact on the bear population in Unit 21. A larger harvest could easily be sustained, but hunter interest is low and the $25 tag fee may discourage hunting and incidental take by some local residents. Bears are numerous enough to cause problems at fish camps and trapping cabins. The seasons have been liberalized for 1985 and the effect will be monitored.

PREPARED BY:

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SUBMITTED BY:

Jerry D. McGowan
Survey-Inventory Coordinator

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 22

GEOGRAPHICAL DESCRIPTION: Seward Peninsula

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Miners and reindeer herders were probably responsible for reducing the Seward Peninsula grizzly bear population to low numbers during the early 1900's. Following the decline of the reindeer industry in the 1920's and 1930's, grizzly bears slowly began to increase, and the population may have rebounded to pre-1900 levels by the 1960's. From 1970 to 1978 the annual harvest of grizzly bears in Unit 22 was relatively low, ranging from 1 to 14 with a mean of 5.6. Harvests during this period probably had little impact on population status. Liberalized hunting seasons established in 1979 increased guiding activity, and the annual harvest more than tripled to at least 50 bears, of which 76% were taken by nonresidents. Because of concern over possible overharvest in some areas, a nonresident drawing permit system was implemented. The system succeeded in reducing the annual harvest to 31 or fewer bears during 1980-83. Recent harvests have reduced grizzly bear numbers in portions of some Subunits, but bears appear to be relatively numerous throughout most of Unit 22 .

Population Composition

No studies to determine composition, abundance, or density of bears in Unit 22 have been conducted. To arrive at a population estimate, I used data from research conducted in Units 26, 20A, and 13 and made the following assumptions for Unit 22. Bear density on very good habitat is 1 bear/16 mi^2. Good habitat, found primarily in Subunit 22A, probably occurs in less than 1/5 of Unit 22. In most cases a high bear density for Unit 22 would be 1 bear/20 mi^2. A medium density would be 1 bear/40 mi^2, and a low density would be 1 bear/80-100 mi^2. Subjectively assigning the appropriate density (high, medium, or low) to each of the 5 Subunits in Unit 22 results in a Unitwide population estimate of 300-1,100 bears. I believe the actual number of bears is 500-800.

Mortality

The reported harvest in 1984 was at least 54 bears, nearly double the previous year's kill (Table 1). This increase was due to a combination of 3 factors: 1) lengthening of the spring hunting season by 10 days, 2) elimination of the $25 resident tag fee, and 3) increased guiding effort in Subunit 22A. The harvest was distributed almost equally between spring and fall hunting seasons with 29 (54%) and 25 (46%) bears taken, respectively. The sex of the recorded harvest was 39 males (72%) and 15 females (28%). Alaska residents killed 32 bears (59%) and nonresidents killed 22 bears (41%). The percentage of bears harvested by nonresidents declined from 76% in 1979 to a low of 20% in 1982, but began increasing again in 1983 and 1984. This increase occurred despite a substantial numerical increase in the resident harvest during 1980-84 (Table 1).

Some residents consider grizzly bears nuisances because they disrupt camps, destroy property, and are thought to be a serious threat to human safety. Some bears were probably shot and not salvaged, and the incidents not reported. Based on reports received by the staff, and other comments from the public, I estimate that 10-30 unreported bears were killed in 1984.

The highest reported harvest occurred in Subunits 22A, B, and C, but bears were killed in all 5 Subunits and in most major drainages in Unit 22 (Table 2). Mean age of harvested males was 8.4 years, mean age of females was 5.3 years, and mean age of both sexes combined was 7.5 years. Bears 5 years old or younger composed 52% of the harvest; bears 6-10 years old, 24%; bears 11-15 years old, 9%; and bears 16 or older, 15%. The oldest bear in the sample was 23 years old.

Management Summary and Recommendations

Nonresidents were first required to obtain drawing permits in fall 1980. Permits were required because the bear harvest increased from 14 in 1978 to 50 in 1979, and 76% of the 1979 harvest was taken by nonresidents. Permits were eliminated in Subunit 22A beginning in fall 1982 because of a relatively high bear density and a low harvest. However, permit requirements were retained in all other Subunits with a total of 20 permits available per year. These regulatory changes have remained in effect until the present (Table 3).

Drawing permits have been undersubscribed until recently; however, all available permits were issued in fall 1984 (Table 4). In 1984 the Board of Game authorized all undersubscribed permits to be issued on a first-come, first-served basis.

Because guiding activity has increased, I anticipate that most, if not all, permits will be issued in the future.

The resident tag fee ($25) was first eliminated in spring 1984. In part, this regulatory change was intended to increase compliance with the sealing requirement. Sufficient time has not elapsed to allow a full evaluation of the effect of the change. However, the preliminary indication is that the regulation promoted an increase in the resident harvest in large communities such as Nome, where compliance with sealing requirements has always been relatively good. The regulation has not yet had an apparent effect in other rural villages. Resident harvest increased from 20 bears in 1983 to 32 in 1984. Of the 32 successful residents in 1984, 8 resided outside Unit 22, 1 was from Unalakleet, and 23 were from Nome or Teller (Teller is on the road system to Nome). No bears were sealed from any other village.

Liberalization of regulations and some increase in guiding effort resulted in a harvest of 54 grizzly bears in 1984; this is the largest harvest on record for this Unit. Based on bear research work throughout the state, I have assumed that a safe sustainable annual harvest is 5% and that a maximum is 10%. Based on the minimum-to-maximum population estimate of 300-1,100 bears, a safe sustainable harvest is 15-55 bears and the upper limit is 30-100 bears. Estimated 1984 harvest was 64-84 bears, including estimated unreported kill.

Because population and harvest estimates are not precise and because bear density is not uniform in Unit 22, it is not possible to accurately determine the impact of the current harvest on the population. However, I believe that overharvest may be occurring in some areas and that harvest is well within sustainable limits in other areas. Increases in the 1984 harvest occurred primarily in Subunits 22A and 22C. In both Subunits, the 1984 harvests of 19 and 15 bears, respectively, were twice the recent 5-year mean annual harvest of 8 bears. The highest bear density in Unit 22 occurs in Subunit 22A. Despite a substantial increase, harvest is still probably below sustained yield.

Hunters frequently see bears, and local residents complain of many problem bears. Moose density is very low in Subunit 22A and appears to be declining, perhaps in part because of bear predation. Given these conditions, higher harvests in Subunit 22A appear to be warranted.

Subunit 22C receives heavy hunting pressure because of good road access from Nome. Harvest has undoubtedly exceeded sustained yield, and I believe that bears have been significantly reduced in recent years. If our management objective is

to maintain a reproductively viable bear population, then hunting restrictions should be imposed. However, because bear predation on reindeer is a recurring problem and because bears may threaten human safety, many people prefer to keep bear numbers low in the Nome area.

Because Subunit 22C is small (1,800 mi^2), I believe some bears immigrate from adjacent Subunits, and/or home ranges of bears in adjacent Subunits extend into Subunit 22C. Continued overharvest in Subunit 22C will probably not extirpate bears, provided that populations in adjacent Subunits 22B and D, are not greatly depressed. Mean annual harvests in Subunits 22B, D, and E were probably below sustained yield during 1979-84, but the Subunit 22B harvest is increasing and may be approaching sustained yield (Table 5).

I make the following recommendations:

1. Elimination of the nonresident permit in Subunit 22A has resulted in an increased nonresident harvest, and it appears that this trend will continue. However, bear density is high in this Subunit, and higher harvests are currently acceptable.

2. Because harvest is escalating, the nonresident drawing permit should be retained in Subunits 22B, C, D, and E. If the permit is eliminated, some other regulation should be substituted to ensure that nonresident take does not become excessive.

3. The resident bear tag should not be reinstated until we have had at least 1 additional year to evaluate the effect of its elimination. In the meantime, the staff must continue to work to improve compliance with reporting regulations.

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SUBMITTED BY:

David A. Anderson
Survey-Inventory Coordinator

Table 1. Unit 22 resident and nonresident grizzly bear harvests, hunting season dates, and permit requirements, 1976-84.

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

[a] S = spring; F = fall.

Table 2. Unit 22 grizzly bear harvest by Subunit and drainage, 1984.

22A		22B		22C		22D		22E	
Drainage	Harvest	Drainage	Harvest	Drainage	Harvest	Drainage	Harvest	Drainage	Harvest
Pikmiktalik	3	Koyuk	5	Sinuk	4	Kougarok	2	Serpentine	2
Nunakagok	2	Fish	5	Flambeau/ Eldorado	3	Pilgrim	1	--	--
Nunavulnuk	1	Niukluk	3	Penny	2	Pt. Clarence	1	--	--
Golsovia	5	Tubutulik	1	Solomon	2	--	--	--	--
Akoolik	1	--	--	Bonanza	1	--	--	--	--
Unalakleet	3	--	--	Cripple	1	--	--	--	--
Ungalik	3	--	--	Tisuk	1	--	--	--	--
Shaktoolik	1	--	--	Snake	1	--	--	--	--
Totals	19	--	14	--	15	--	4	--	2

Table 3. Unit 22 grizzly bear season dates and permit requirements, 1976-84.

Year	Resident season		Nonresident season		Nonresident permit requirement
	Spring	Fall	Spring	Fall	
1976	5/10-5/25	9/01-10/31	5/10-5/25	9/01-10/31	Not required
1977	Same	Same	Same	Same	Not required
1978	Same	Same	Same	Same	Not required
1979	4/25-5/25	Same	4/25-5/25	Same	Not required
1980	Same	Same	Same	Same	Spring-not required, 14 fall
1981	Same	Same	Same	Same	20 permits
1982	Same	Same	Same	Same	20 permits, not required for 22A in fall
1983	Same	Same	Same	Same	20 permits, not required for 22A
1984	4/15-5/25	Same	4/15-5/25	Same	20 permits, not required for 22A

Table 4. Availability of, and application for, Unit 22 nonresident grizzly bear drawing permits, 1980-84.

Year	Spring		Fall	
	Available permits	Applicants[a]	Available permits	Applicants[a]
1980	--	--	14	11
1981	6	5	14	15
1982	6	5	14	4
1983	6	4	10	3
1984	10	6	10	10

[a] Ineligible applicants not included.

Table 5. Annual harvests[a] of grizzly bears in Subunits 22A through E, 1979-84.

Year	22A	22B	22C	22D	22E	Unit total
1979	10	8	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
Mean 1979-83	8	11	7	3	1	31

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

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 23

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Hunter reports, field observations, and nuisance complaints suggest a stable or slowly increasing grizzly bear population in Unit 23.

Population Composition

Mean age of the 1984 reported harvest was 8.0 years ($\underline{n}$ = 42), which is identical to the 1961-84 mean ($\underline{n}$ = 397). Mean age of male bears killed in 1984 was 7.7 years ($\underline{n}$ = 28) compared with a mean of 8.1 years ($\underline{n}$ = 283) for 1961-84. Mean skull sizes of male and female bears killed in 1984 were 21.9 inches ($\underline{n}$ = 27) and 19.6 inches ($\underline{n}$ = 13), respectively; mean skull sizes of male and female bears killed during 1961-84 were 22.0 inches ($\underline{n}$ = 354) and 19.5 inches ($\underline{n}$ = 116), respectively. These statistics suggest no changes in population structure.

Mortality

The 1984 reported harvest was 46 bears, including 30 males, 15 females, and 1 of unknown sex. This was the 2nd highest reported harvest since 1961 (highest: 58 in 1979). The high reported harvest is probably more a reflection of an increase in the take rather than an increase in reporting compliance. Eight bears were sealed from Unit 23 villages in 1983, and only 5 bears were recorded in 1984. In any case, the actual harvest was probably in excess of 50 but less than 100.

Reported grizzly harvest from communities other than Kotzebue did not increase and is probably still only a small part of the actual harvest in these areas. Much of the problem is the result of unavailability of bear sealing service in outlying communities; village residents must rely on sporadic visits of game biologists who perform this service. A widespread reluctance to report the taking of bears also contributes to the

problem. Nonreporting cannot be adequately addressed until the bear sealing service is more readily available to village residents.

Nonresident hunters took 28% of the reported harvest, compared with an annual mean of 52% for 1961-84. Since 1981, the proportion of the harvest taken by nonresidents has significantly declined, reaching a low of 20% in 1982.

Management Summary and Recommendations

The Unit 23 grizzly bear population appears to be stable or slowly increasing. Although the 1984 reported harvest of 46 was the 2nd highest on record, there is no clear evidence that sustained yield has been exceeded. However, at least 25 of the 46 bears were taken from the Noatak drainage, primarily from the lower river. These data suggest a potential for local overharvest. Bears in the Kobuk and other major drainages of Unit 23 appear to be lightly hunted. A further increase in reported harvest in 1985 would necessitate greater efforts at interpretation of the relationship between reported and actual harvest.

In deference to the problem of interpreting the meaning of reported harvest, any change in regulations would be inappropriate at this time.

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SUBMITTED BY:

David A. Anderson
Survey-Inventory Coordinator

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

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

GEOGRAPHICAL DESCRIPTION: Brooks Range Drainages

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

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

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

Population Composition

Recent population composition data are available only for the western Brooks Range near the headwaters of the Utukok and Kokolik Rivers. In that area, approximately 40% of the bears > 1 year old are males and 60% are females. The sex ratio of cubs and yearlings is probably equal but may slightly favor females.

Percentages of bears by age classes were as follows: cubs, 13.0%; yearlings, 10.7%; 2-year-olds, 13.7%; 3- and 4-year-olds, 10.7%; and >5 years of age, 51.9%.

Quantified parameters of grizzly bear reproductive capacity for the eastern Brooks Range (1973-75 data) and western Brooks Range (1977-84 data) are as follows (listed as eastern and western Brooks Range, respectively): mean age at production of 1st litter of 10.1 and 8.0 years; mean litter sizes of 1.8 and 2.0 cubs; reproductive intervals of 4.2 and 4.0 years; and mean

reproductive rates of 0.42 and 0.50 cubs/year. In addition, preliminary research results of a population study on the coastal plain of Subunit 26C indicate that numbers and reproductive capacity in that area are high, similar to rates for bears in the western Brooks Range.

Mortality

The permit season which had been in operation since 1977 changed during calendar year 1984. Prior to and including the 1984 spring season, permits were required of both resident and nonresident grizzly bear hunters in the Brooks Range and coastal plain areas of Units 24, 25, and 26. However, beginning in fall 1984, permits were required for resident and nonresident hunters in eastern Subunit 26A, Subunit 26A, and northern Unit 24. Permits were required for nonresidents in Subunits 25A, western 26A, and in 26C.

During 1984, 27 grizzlies were taken in Subunits 26B, 26C, 25A, and northern Unit 24 (including 2 taken in defense of life or property; Table 1). Harvest was similar to or lower than the average harvests for the last 7 years, despite a liberalization of the permit system.

In Gates of the Arctic National Park only local subsistence hunters holding a registration permit may take grizzly bears. The 1984 subsistence harvest in the Park was 1 bear in Subunit 26A and 1 bear in Unit 24. The sport harvest in Unit 24 outside the Park was low.

Management Summary and Recommendations

Grizzly bear harvest in the Brooks Range was lower than, or within levels appropriate for, the populations in the various Subunits. Hunting pressure was generally well-distributed and no areas of overharvest were apparent. No changes in the present permit system are recommended at this time. Harvest in places outside the permit areas in Units 24 and 25 was well within sustainable levels.

PREPARED BY:

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SUBMITTED BY:

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Table 1. Sport hunting harvest of grizzly bears in Units 24-26, 1977-84.

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

[a] These figures include reported harvest only; 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] Not calculated.

BROWN/GRIZZLY BEAR

SURVEY-INVENTORY PROGRESS REPORT

GAME MANAGEMENT UNIT: 26A

GEOGRAPHICAL DESCRIPTION: Western Arctic Slope

PERIOD COVERED: 1 January 1984-31 December 1984

Season and Bag Limit

See Hunting Regulations No. 24 and 25.

Population Status and Trend

Research by Reynolds (1984) has shown that Brooks Range and North Slope grizzly bear density varies from 1 bear/17 mi^2 to 1 bear/300 mi^2, with a mean of 1 bear/100 mi^2. Based on these densities and food availability within the North Slope topographic provinces, the Subunit 26A population is estimated at 645-780 bears.

Permit hunting requirements begun in the 1977-78 regulatory year appear to have favorably affected Brooks Range grizzly populations, including those in Subunit 26A. Populations in Subunit 26A are at least stable and may be at relatively high levels with respect to habitat. At certain times and locations, grizzlies appear to be numerous. Thirteen bears were observed along the coast from Pt. Lay to Cape Lisburn during a walrus carcass survey flown under only fair conditions on 25 August 1984. During 1-9 September, most of the 22 moose-hunting parties contacted on the Colville River had observed grizzlies. Two parties lost moose carcasses to aggressive bears. By the end of this period bears were often seen in the vicinity of known moose kills. A bear originally collared in western Unit 26A was shot in defense of life or property on the Topagoruk River near the head of Admiralty Bay at least 150 air miles northeast of the point of capture.

Population Composition

Recent population composition 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 greater than 1 year old were males and 60% were females. The sex ratio of cubs and yearlings is probably even 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%.

Reproductive capacity of grizzly bears has been described by Reynolds (1984) from the same 1977-83 data collected in the western Brooks Range. Mean age at 1st reproduction was 8.0 years, mean litter size was 2.0 cubs, mean reproductive interval was 4.0 years, and mean productivity was 0.50 cubs/year.

Mortality

Sealing records indicate that recreational hunters killed 19 grizzlies in Subunit 26A. Ten of those bears were from western Subunit 26A, the highest number so far reported for that area (Table 1). An additional 3 bears were known to have been killed for nonrecreational reasons: 2 were killed in defense of life or property. The total known kill in Subunit 26A was 22 grizzlies.

The actual number of bears killed by hunters was certainly higher, perhaps 32-44. Illegal unreported kills by guided nonresident recreational hunters, resident recreational hunters, and residents of Unit 26A were all considered. The largest source of unreported bear kills is almost certainly Unit residents who may have taken 9-12 unreported bears.

No estimate of overall natural mortality among brown/grizzly bears in Unit 26A is available. However, Reynolds and Hechtel (1983) reported mortality rates among offspring accompanied by marked adult females in western Unit 26A during 1977-81. Mortality rates from spring emergence to fall (all years combined) were as follows: cubs, 44%; yearlings, 9%; 2-year-olds, 14%.

Management Summary and Recommendations

The maximum sustainable harvest (4% of the population) appears to have been taken in 1984, given 9-12 unreported illegal bear kills by Unit residents. The suspected high unreported kill by Unit residents is probably due to 2 main causes: 1) complicated bear hunting regulations that may be locally inappropriate, and 2) lack of aggressive enforcement. Insufficient regular contact between Department staff and residents of small North Slope communities also contributes to the problem.

Unit residents' lack of compliance with existing regulations impedes management efforts. Very few local residents shoot bears that are technically legal, for a variety of reasons including having no license, no permit and/or tag in possession, failure to seal within 30 days, and failure to surrender

the hide and skull when a bear is shot in defense of life or property. Because 9-12 bears were probably killed under these circumstances (about 50% of the legal reported harvest), this is a serious problem. Present regulations may not be entirely appropriate for many Inupiaq-speaking North Slope residents. Most of these regulations are predicated on the twin assumptions that grizzlies are rare and that they are highly desirable for recreational hunting. The only other legal way to kill a grizzly is in defense of life or property. North Slope residents do not at this time appear to rely heavily on grizzlies for subsistence. However, when they do shoot a bear it often could be labeled as "occasional taking for utilitarian purposes" rather than strictly in defense of life or property or for recreation. Permit drawing applications, in particular, are inconsistent with this local style of occasional or opportunistic hunting.

To improve reporting and compliance, the most common recommendation is to increase enforcement and education efforts in the Unit. These efforts are desirable and should be pursued with all available resources. However, modification of present regulations should also be considered so that local residents can more reasonably be expected to comply. One possibility is to assign a limited number of permits to each community and then to insist on an accounting for each permit issued. Another option would be to liberalize bear seasons near communities in the Unit but maintain existing seasons in areas where most recreational hunting now occurs.

Bear management efforts in Subunit 26A are also impeded by insufficient biological information. Densities are unknown in the eastern Subunit, and no reliable method is available for assessing density on a regular basis, other than intensive capture and collaring programs. Consequently, population changes are difficult to monitor, and harvests must be regulated conservatively. More biological information is becoming available in western Subunit 26A as a result of H. Reynolds' continuing intensive studies.

Literature Cited

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Table 1. Sport hunting harvest of grizzly bears in Unit 26A, 1977-84.

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

[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.