

**Brown Bear
Management Report**
of survey-inventory activities
1 July 2002–30 June 2004

**Cathy Brown, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation**



Karla Hart, ADF&G

**Funded through
Federal Aid in Wildlife Restoration
Grants W-33-1 and W-33-2
December 2005**

STATE OF ALASKA

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DEPARTMENT OF FISH AND GAME

McKie Campbell, Commissioner

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ADF&G, Wildlife Conservation
P.O. Box 25526
Juneau, AK 99802-5526
(907) 465-4176

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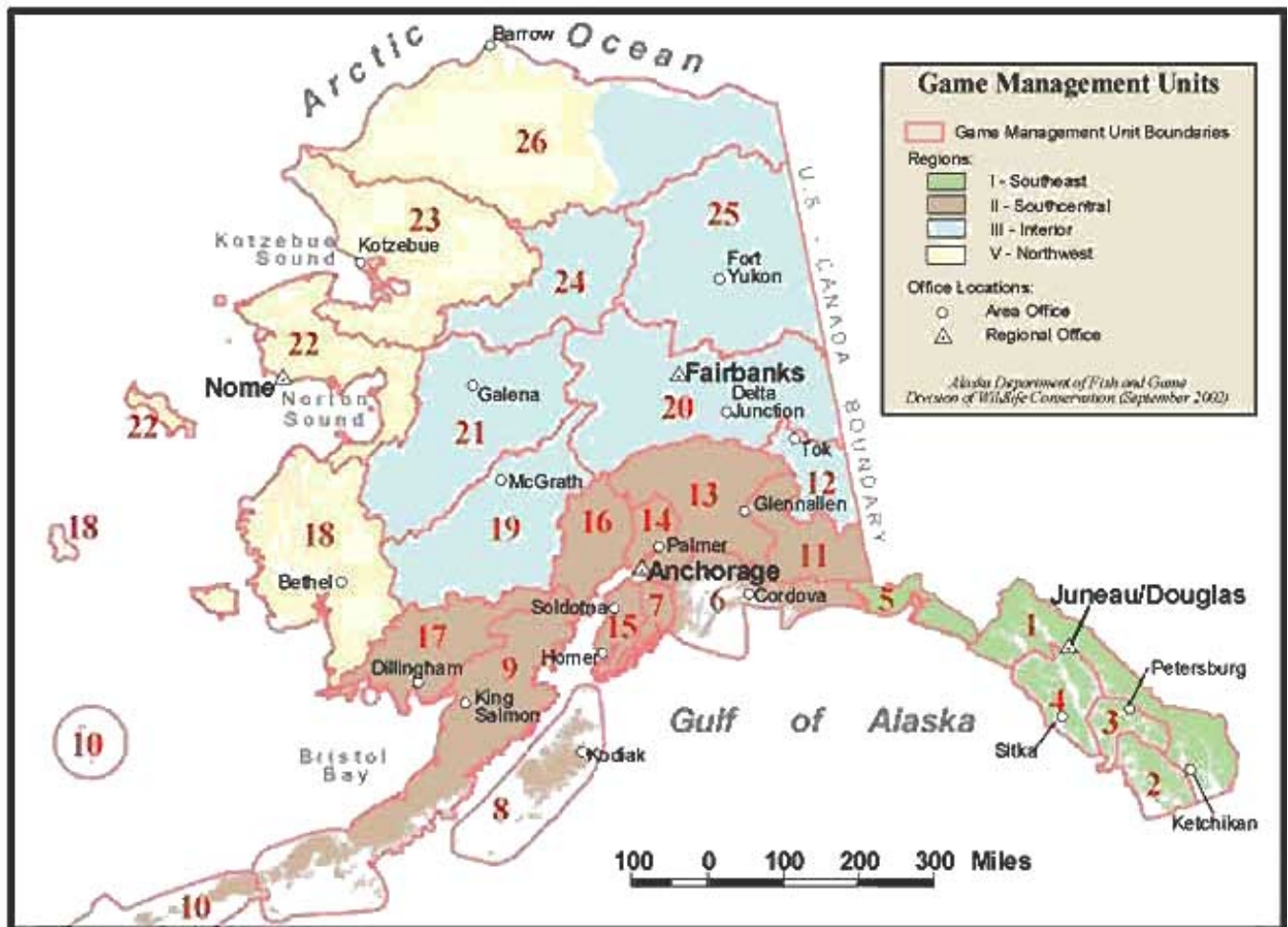
BROWN BEAR MANAGEMENT REPORT

TABLE OF CONTENTS

From: 1 July 2002

To: 30 June 2004

Unit Map	i
Unit 1 – Southeast Alaska, Dixon Entrance to Cape Fairweather	1
Unit 4 – Admiralty, Baranof, Chichagof, and adjacent islands	20
Unit 5 – Cape Fairweather to Icy Bay, eastern Gulf of Alaska Coast.....	38
Unit 6 – Prince William Sound	47
Units 7 and 15 – Kenai Peninsula	63
Unit 8 – Kodiak and adjacent islands.....	74
Unit 9 – Alaska Peninsula	102
Unit 10 – Unimak Island.....	113
Unit 11 – Wrangell Mountains.....	117
Unit 12 – Upper Tanana and White River drainages	124
Unit 13 – Nelchina Basin	137
Unit 14 – Upper Cook Inlet	148
Unit 16 – West side of Cook Inlet.....	157
Unit 17 – Northern Bristol Bay	169
Unit 18 – Yukon–Kuskokwim Delta	181
Unit 19, 21A, and 21E – Drainages of the Kuskokwim, Yukon, and Nowitna and Innoko Rivers.....	190
Unit 20A, 20B, 20C, 20F, and 25C – Central and Lower Tanana Valley, Middle Yukon drainages.....	203
Subunit 20D – Central Tanana Valley near Delta Junction	219
Subunit 20E – Fortymile, Charley, and Ladue River drainages	230
Unit 21B, 21C, 21D and 24– Middle Yukon River, including lower Koyukuk River, lower Nowitna River, and Melozitna River drainages.....	240
Unit 22 – Seward Peninsula and Nulato Hills.....	251
Unit 23 – Kotzebue Sound and Western Brooks Range	263
Subunits 25A, 25B, 25D, 26B, and 26C – Eastern North Slope, Brooks Range, and Upper Yukon River drainages	284
Subunit 26A – Western North Slope.....	310



BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 1 (18,500 mi²)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland from Dixon Entrance to Cape Fairweather, and those islands east of Clarence Strait from Dixon Entrance to Caamano Point, and all islands in Stephens Passage and Lynn Canal north of Taku Inlet.

BACKGROUND

Southeast Alaska brown bears inhabit the islands north of Frederick Sound and the coastal mainland. Until recently they were known to coexist with black bears only on mainland portions of the Alexander Archipelago. During recent years there have been scattered reports of brown bears in Units 1A, 1D, and 3. Although extensive brown bear research has been carried out on Admiralty and Chichagof Islands in Unit 4 (Schoen and Beier 1989; Titus and Beier 1993), no brown bear research has been undertaken on the region's mainland. Most of the information we use to assess and manage mainland brown bear populations has come from hunters' anecdotal information, staff observations, registration permit hunt reports, and mandatory sealing data.

Brown bear sealing requirements have been in effect in Alaska since 1961. Hunters have been required to obtain registration permits before hunting brown bears in Unit 1 since 1989 (McCarthy 1991; Larsen 1993). Hunters were previously only required to obtain a license and metal-locking tag prior to hunting.

Generally about half of the unit's annual brown bear harvest comes from Unit 1D (Haines area), located in the northern part of the region. Units 1A (Ketchikan area), 1B (Petersburg area), and 1C (Douglas area) each account for 5–40% of the annual harvest. Nonresident hunters are required to hunt brown bears with a registered guide or a relative within the second degree of kindred. Because of brown bears' trophy status and because hunters must wait 4 seasons between successful hunts, hunters (especially residents) often do not select small or poorly furred bears, but wait to harvest a large bear. This partly accounts for the relatively low success rates noted for resident hunters in Southeast Alaska.

The Tongass National Forest (Tongass) encompasses most Unit 1 brown bear habitat, excluding intertidal and Unit 1D state lands, municipal lands, and Alaska Native corporation

lands, and is managed under a multiple use concept by the U.S. Forest Service (USFS). The Misty Fiords National Monument within the Tongass on the southern Unit 1 mainland contains large tracts of good bear habitat.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males of no less than 6.5 years, and a male to female harvest ratio of at least 3:2.
- Maintain a spring harvest of at least 60% males.
- Reduce the number of bears killed because of garbage and human food conditioning.

METHODS

Unit 1 brown bear hunters are required to obtain registration permits prior to hunting. From the permit report we obtain useful information about hunting effort, dates afield, and unsuccessful hunt and/or kill locations. We also collect brown bear harvest data through a mandatory-sealing program. During sealing we record the sex of harvested bears, along with the hunt date and kill location. We also measure bear skulls and extract a premolar tooth. At the end of each season, we send all extracted premolars to Matson's Laboratory (Bozeman, Mont., USA) for age determination.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Quantitative population data are not available for Unit 1 brown bears. Based on hunters' anecdotal reports, department staff observations, pilot observations, and sealing records, we believe the population remained stable during this report period.

MORTALITY

Harvest

Season and Bag Limit

1 bear every 4 regulatory years
by registration permit only

Resident and Nonresident Hunters

15 Sep–31 Dec
15 Mar–31 May

After several years of increasing harvest in Unit 1, ADF&G requested the USFS follow the brown bear moratorium model in Unit 4 and restrict the growing guide activity in southern Southeast Alaska. Starting in spring 2001, the moratorium limited the number of guides permitted to operate and the number of hunts each guide could conduct each year on federal lands in Unit 1 (Porter 2003). Unit 1D is the only area in Southeast with substantial amounts of state land. Consequently, recent changes made by the USFS to stabilize guide-use permits on federal land have not had any affect Unit 1D guide use patterns. Responding to growing

concerns for the sustainability of the increasing harvest (mostly by guided nonresidents) ADF&G biologists submitted proposals to the Board of Game (BOG) recommending a more conservative harvest. During the fall 2002 meeting, the board voted to change the Unit 1D nonresident brown bear registration permit hunt to a drawing permit hunt. This was in response to an increasing nonresident harvest and was implemented to cap the harvest near the current level. After implementation of the drawing hunt for one season, the majority of hunters and guides using Unit 1D addressed the board and asked that the season return to a registration hunt. Currently the Unit 1D regulation is back to general registration.

Hunter Harvest. Unit 1D continued to account for the highest proportion of the Unit 1 harvest during the previous report period (2000–01), 47 and 43%, respectively. During 2002 the proportion of bears killed by subunit (1A, 1B, 1C, and 1D) was 13%, 30%, 9%, and 48% and during 2003 was 36%, 11%, 19%, and 33% respectively. The Unit 1 ten-year mean harvest percentage by subunit (1A–1D) was 20%, 22%, 13%, and 46%, respectively (Table 1).

Unit 1A 2003 harvest of 13 bears was the second highest on record and well above the long-term average of 5 bears. This 2003 harvest was scattered across most of Unit 1A and was shared by resident and nonresident hunters. Bears were harvested in areas during that season where very few records had shown harvest historically. One bear was taken on Revilla Island near Ketchikan and was only the second brown bear ever harvested from that area during the past 20 years.

During the past 15 years, the average number of bears harvested has remained evenly split between spring and fall ($\bar{x} = 15$ for both spring and fall), with spring harvests skewed toward males. We suspect this is partly because it is illegal to harvest females accompanied by cubs. As sows with second-year cubs separate at the end of spring, such sows become legal and the proportion of females in the harvest increases substantially during fall. During the past 10 years the fall harvest of female bears has composed just under half of the total ($\bar{x} = 47\%$). The spring harvest of female bears during the past 10 years has consistently been lower ($\bar{x} = 18\%$) (Table 2). We continued to meet our management objective of a 3:2 male to female harvest ratio.

The mean male skull size during 2002 ($\bar{x} = 22.1$, $n = 15$) and 2003 ($\bar{x} = 21.3$, $n = 26$) was similar to the long-term average ($\bar{x} = 22.1$). The average female skull sizes during 2002 ($\bar{x} = 20.9$, $n = 7$) and 2003 ($\bar{x} = 20.7$, $n = 9$) were also similar to the long-term average (20.3 inches) (Table 3).

The 2002 mean age of harvested male bears (7.3, $n = 10$, range 2–18) was similar to the long-term average (7.6 years) and meets our management objective of at least 6.5 years. The mean age of male bears during the subsequent 2003 season also met our objective (7.0, $n = 20$, range 3–20). The 2002 mean female age was 3.1 years ($n = 3$ range 2–22) and was below the long-term average of 7.2 years. The 2003 female average ages were higher (7.1, $n = 9$, range 3–18) (Table 3). One female harvested during the 2002 season was 22 years old and one male from the 2003 season was 20 years old; both were taken in Unit 1A.

Permit Hunts. Registration permits have been required for Unit 1 brown bear hunters since fall 1989. During the 2002 and 2003 seasons, 324 and 322 registration permits were issued,

respectively. Consistent with the long-term average, about 56% of those permittees who registered actually hunted, and 19% of those hunting were successful. Hunter success during 2002 and 2003 (18%) was slightly lower than the 10-year average (19 %) (Table 5). Compliance with permit conditions has been fair during recent seasons, although it has required postseason effort reminding delinquent hunters to submit required hunt reports. A new regulation passed by the BOG in the 2003 meeting made nonreporting a misdemeanor offense, and consequently some hunters will be cited for not sending in their hunt report card.

Hunter Success and Residency. Of the 325 hunters afield in 2002, 14% were successful, and during 2003 a total of 322 hunters went afield with 21% success. The 2002 success rate was lower than normal, while the 2003 success was similar to the 10-year average (20%, range 15–41%). Registration permits issued for spring 2002 were the second highest since 1990. Even though there were more hunters who actually went afield during fall 2002, they were less successful than during past spring seasons. Sixty-one percent of hunters that registered for the 2003 spring hunt actually went hunting, and 78% of those were unsuccessful. The 15% success rate for fall 2002 was the lowest success for Unit 1 since 1995 (Table 4). The 2003 spring harvest was 68% of the total take from Unit 1 and well above the 10-year average of 55% (Table 7).

During 2002 and 2003, nonresidents harvested 17 and 21 bears respectively from Unit 1 (Table 6). The increasing trend in guided hunters has been a concern for several years (Porter 1999). During the past 15 years, there has been a declining trend in residents' success. One explanation is that resident hunters are more selective when choosing a bear, and consequently may pass over smaller, or poorly furred bears due to the 1 bear every 4 years regulation. Local residents on average harvest 12 (range 2–17) bears per year. However, during the 2001 and 2002 seasons, locals only took 2 bears per year, which is the lowest annual local harvests on record. The following season the local resident harvest jumped back up to 13 bears (Table 6).

Successful hunters spent 5.4 to harvest a bear during 2002 and 3.7 days in 2003, compared to the 10-year average of 4.3 days (range 2.9–6.6 days). All Unit 1 successful hunters combined spent 118 total days hunting bear during the 2002 season and 129 total days during the 2003 season.

Harvest Chronology. The greatest numbers of bears are available to hunters late in the spring season because most have left their dens and are seeking food. During this period most available food, primarily grasses and sedges, is found near saltwater, where bears often concentrate. This makes a large portion of the bear population available during a short period for hunters using boats or glassing along shorelines. During most of the past 15 seasons, the Unit 1 brown bear harvest has been somewhat evenly split between fall and spring seasons. The 2003 season was much higher, with 68% of the harvest occurring during spring. This was the highest Unit 1 spring brown bear percentage of harvest since 1986 (Table 7).

The majority of brown bears harvested from the unit have historically been taken during May ($\bar{x}$ = 13, range 4–22), with September the second highest harvest period ($\bar{x}$ = 8, range 2–17). Together these months account for the majority of Unit 1 brown bears. During the 2002

season, May accounted for 22 of 33 bears harvested and is the second highest May season on record (Table 8).

Transport Methods. Most Unit 1 brown bear hunters continue to use boats to access remote, mostly roadless hunting areas. During the past 10 years, boat use has accounted for an average of 70% of the reported transport methods. Highway vehicles (16%), aircraft (7%), and off-road vehicles (ORVs) (5%), are used much less frequently (Table 9). The only Unit 1 area with highway access is near Haines in Unit 1D.

Other Mortality

To estimate the total human-caused mortality we added the reported harvest, defense of life or property (DLP) kills, known and estimated unreported/illegal/accidental kills, and research-related kills (Table 2). Unreported harvests or illegal kills are reported separately. Unreported kills are estimated at 10–20% of the reported harvest, although this is considered a conservative estimate (McCarthy 1991) (Table 2). In 2002, 5 bears were reported as nonhunter kills, including 4 males and 1 female. One male was killed illegally with the wrong permit near Haines, 2 were killed DLP, and 1 was dispatched by Alaska State Troopers after being wounded. During 2003, a pair of sibling cubs were struck and killed by a vehicle near Haines. When these other sources of dead bears are added to the legal Unit 1 harvest, the total human-caused mortality was 28 bears in 2002 and 38 bears in 2003. An open landfill was recently closed near Haines, while other communities, such as Hyder, still have open pits allowing bears access to human garbage. Until the issue of landfills is addressed in these remaining communities, garbage will continue to be a problem and bring bears in direct conflict with humans. The community of Hyder recently missed a chance to obtain funding for a new garbage incinerator through some federal funding earmarked for improving similar situations. Hyder has a high population of brown bears and the town relies on the well-established bear viewing site for revenue, yet the community continues to attract bears to the open landfill near town.

Not all bears killed are reported or sealed, and some DLP mortalities occur during the hunting season and are tagged and sealed as hunter-killed bears. This can provide an artificially low estimate of the number of bears killed under DLP provisions. We are increasing education to provide better public awareness and to reduce nonhunting mortality.

HABITAT

Assessment

As noted above, most of Unit 1 has healthy brown bear habitats, primarily under USFS jurisdiction. Within Unit 1A there is a highway-accessible area closed to bear hunting to enhance viewing opportunities, at the Hyder Salmon River Closed Area. Timber harvest, mineral exploration, and other human developments pose the most serious threats to brown bear habitat in Unit 1. Bear/human interactions and conflicts resulting from increased access and development continue to be areas of concern. DLP mortalities are an ever-present possibility where bears become attracted and accustomed to garbage dumps created by new logging and mining camps, or around villages and towns with open landfills.

A new ADF&G brown bear research project along the mainland is aimed at documenting some basic demographics. To date there have been no studies to document patterns of mainland bears. Currently there are global positioning system (GPS) radio collars on bears along the Unuk River and several streams along the Bradfield Canal. Once these collars are retrieved in fall of 2005 and the data analyzed, we will know a great deal more about seasonal movements and habitat use patterns of brown bears on the Unit 1 mainland.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 1 registration permit hunt initiated in 1989 continues to provide useful information about brown bear hunting effort and success. Hunters continue to use boats as the primary mode of transportation since this allows them access into much of the unit's roadless areas. Due to the existing high number of female bears in the fall harvests, it is essential that any future management actions avoid placing additional pressure on females. ADF&G will continue to work with the USFS to attempt to spread the nonresident harvest around all of Unit 1 by carefully selecting commercial use patterns. Federal use permits are issued for both consumptive and nonconsumptive uses.

The recent trend in DLP bear mortality shows a reduction from previous years and met our objective of reducing the number of bears killed because of human food conditioning. Much of the solution for reducing bear/human conflicts depends on the willingness of the public, municipalities, and timber and mining industries to adopt and adhere to responsible garbage management practices.

Based on harvest data, staff observations, and reports by the public, we could not determine any change in the Unit 1 brown bear population during this report period. Other than the 2004 regulatory changes in Unit 1D, we see no reason to modify the season or bag limit at this time.

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PREPARED BY:

Boyd Porter
Wildlife Biologist III

SUBMITTED BY:

Dale Rabe
Management Coordinator

Please cite any information taken from this section, and reference as:

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Table 1 Unit 1 brown bear harvest, by subunit, 1985–2003^a

Regulatory year	Unit 1A		Unit 1B		Unit 1C		Unit 1D		Total harvest
	harvest	% of total	harvest	% of total	harvest	% of total	harvest	% of total	
1985	1	(4)	7	(30)	6	(26)	9	(39)	23
1986	2	(13)	2	(13)	5	(33)	6	(40)	15
1987	8	(24)	4	(12)	3	(9)	18	(55)	33
1988	4	(25)	2	(12)	3	(19)	7	(44)	16
1989	4	(20)	4	(20)	1	(5)	11	(55)	20
1990	5	(19)	5	(18)	4	(15)	13	(48)	27
1991	4	(15)	6	(24)	4	(15)	12	(46)	26
1992	7	(19)	8	(21)	4	(11)	18	(49)	37
1993	4	(17)	3	(12)	6	(25)	11	(46)	24
1994	8	(28)	5	(17)	3	(10)	13	(45)	29
1995	3	(15)	8	(40)	1	(5)	8	(40)	20
1996	4	(13)	4	(13)	7	(22)	16	(52)	31
1997	5	(14)	4	(12)	5	(14)	21	(60)	35
1998	6	(17)	7	(20)	4	(11)	18	(52)	35
1999	13	(33)	6	(15)	6	(15)	15	(37)	40
2000	4	(12)	9	(27)	5	(15)	16	(47)	34
2001	5	(18)	9	(32)	2	(7)	12	(43)	28
2002	3	(13)	7	(30)	2	(9)	11	(48)	23
2003	13	(36)	4	(11)	7	(19)	12	(33)	36
$\bar{x}$	5	(18)	5	(20)	4	(15)	13	(47)	28

^a Does not include DLP kills, research mortalities, illegal harvests, or other human-caused accidental mortalities.

Table 2 Unit 1 brown bear mortality, by season, 1985–2003

Regulatory year	Reported							Estimated kill				
	Hunter kill				Nonhunting kill ^a			Unreported illegal ^b	Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.		M (%)	F (%)	Unk.	Total
Fall 1985	(30)	(70)	1	11	3	0	0	1	(46)	(54)	2	15
Spring 1986	(82)	(18)	1	12	1	0	0	1	(83)	(17)	2	14
Total	(57)	(43)	2	23	4	0	0	2	(64)	(36)	4	29
Fall 1986	(40)	(60)	0	10	0	0	0	1	(40)	(60)	1	11
Spring 1987	(80)	(20)	0	5	0	0	0	1	(80)	(20)	1	6
Total	(53)	(47)	0	15	0	0	0	2	(53)	(47)	2	17
Fall 1987	(73)	(27)	2	17	0	0	0	2	(73)	(27)	4	19
Spring 1988	(53)	(47)	1	16	1	0	0	1	(56)	(44)	2	18
Total	(63)	(37)	3	33	1	0	0	3	(67)	(33)	6	37
Fall 1988	(60)	(40)	0	5	1	1	0	1	(67)	(33)	1	8
Spring 1989	(82)	(18)	0	11	0	0	0	1	(82)	(18)	1	12
Total	(75)	(25)	0	16	1	1	0	2	(72)	(28)	2	20
Fall 1989 ^c	(67)	(33)	1	10	0	0	0	1	(67)	(33)	2	11
Spring 1990	(80)	(20)	0	10	0	1	0	1	(73)	(27)	1	12
Total	(74)	(26)	1	20	0	1	0	2	(70)	(30)	3	23
Fall 1990	(72)	(28)	0	18	1	1	2	2	(75)	(25)	2	24
Spring 1991	(100)	(0)	0	9	0	0	0	1	(100)	(0)	1	10
Total	(81)	(19)	0	27	1	1	2	3	(79)	(21)	3	34
Fall 1991	(50)	(50)	0	12	1	1	0	1	(50)	(50)	0	15
Spring 1992	(78)	(22)	0	14	0	0	0	1	(78)	(22)	0	15
Total	(65)	(35)	0	26	1	1	0	2	(64)	(36)	0	30
Fall 1992	(52)	(48)	0	25	0	0	0	3 ^d	(52)	(48)	0	28
Spring 1993	(91)	(09)	0	12	4	0	0	1	(94)	(06)	0	17
Total	(64)	(36)	0	37	4	0	0	4	(62)	(38)	0	45
Fall 1993	(75)	(25)	0	12	1	0	0	1	(77)	(25)	0	14
Spring 1994	(75)	(25)	0	12	0	0	0	2 ^e	(75)	(25)	0	13
Total	(75)	(25)	0	24	1	0	0	2	(76)	(24)	0	27

Table 2 continued

Regulatory year	Reported							Estimated kill				
	Hunter kill				Nonhunting kill ^a			Unreported illegal ^b	Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.		M (%)	F (%)	Unk.	Total
Fall 1994	(42)	(58)	0	12	0	1	0	2 ^f	(40)	(60)	0	15
Spring 1995	(76)	(24)	0	17	0	0	0	2	(74)	(26)	0	19
Total	(62)	(38)	0	29	0	1	0	4	(59)	(41)	0	34
Fall 1995	(75)	(25)	0	8	0	2	0	2 ^g	(58)	(42)	0	12
Spring 1996	(83)	(17)	0	12	0	0	0	2 ^h	(86)	(14)	0	14
Total	(80)	(20)	0	20	0	2	0	4	(69)	(31)	0	26
Fall 1996	(54)	(46)	0	13	0	0	0	0	(54)	(46)	0	13
Spring 1997	(78)	(22)	0	18	0	0	0	1 ⁱ	(78)	(22)	0	19
Total	(68)	(32)	0	31	0	0	0	1	(69)	(31)	0	32
Fall 1997	(63)	(37)	0	16	1	1	0	2 ^j	(65)	(35)	0	20
Spring 1998	(84)	(16)	0	19	0	0	0	0	(84)	(16)	0	19
Total	(74)	(26)	0	35	1	1	0	2	(74)	(26)	0	39
Fall 1998	(23)	(77)	0	13	1	2	0	0	(25)	(75)	0	16
Spring 1999	(86)	(14)	0	22	2	0	0	0	(92)	(8)	0	24
Total	(63)	(37)	0	35	3	2	0	0	(65)	(35)	0	40
Fall 1999	(80)	(20)	0	20	2	2	0	0	(75)	(25)	0	24
Spring 2000	(35)	(65)	0	20	2	0	0	0	(41)	(59)	0	22
Total	(58)	(42)	0	40	2	1	0	0	(58)	(42)	0	46
Fall 2000	(42)	(58)	0	19	3 ^k	2 ^l	0	0	(46)	(54)	0	24
Spring 2001	(71)	(29)	0	17	1 ^m	0	0	0	(72)	(28)	0	18
Total	(57)	(43)	0	36	4	2	0	0	(57)	(43)	0	42
Fall 2001	(41)	(59)	0	17	0	1	0	0	(39)	(61)	0	18
Spring 2002	(82)	(18)	0	11	0	0	0	0	(82)	(18)	0	11
Total	(61)	(39)	0	28 ⁿ	0	1	0	0	(60)	(40)	0	29
Fall 2002	(60)	(40)	0	10	0	0	0	0	(60)	(40)	0	10
Spring 2003	(69)	(31)	0	13	4	1	0	0	(76)	(24)	0	18
Total	(65)	(35)	0	23	4	1	0	0	(70)	(30)	0	28

Table 2 continued

Regulatory year	Reported							Estimated kill				
	Hunter kill				Nonhunting kill ^a			Unreported illegal ^b	Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.		M (%)	F (%)	Unk.	Total
Fall 2003	(64)	(36)	0	11	1	1 ^o	0	0	(62)	(38)	0	13
Spring 2004	(80)	(20)	0	25	0	0	0	0	(80)	(20)	0	25
Total	(75)	(25)	0	36	1	1	0	0	(74)	(26)	0	38

^a Includes DLP kills, research mortalities, and other known human/caused accidental mortalities.

^b Estimated to be 10% of reported kill (McCarthy 1991).

^c First season registration permits required.

^d One female was illegally killed and left along Fish Creek in Hyder.

^e Includes 1 male illegally killed at a black bear bait station in Unit 1D and 1 female killed in Unit 1C by a hunter who failed to obtain a registration permit.

^f One male, 1 female killed by hunters who failed to obtain registration permits.

^g One male, 1 female taken illegally.

^h Two males taken by hunters who failed to obtain registration permits.

ⁱ One male taken by a hunter who failed to obtain registration permit.

^j One male and 1 female taken by hunters who failed to obtain registration permits.

^k One male killed illegally; 3-year old male involved in fatal mauling, killed DLP at Hyder; 1 male killed illegally without permit.

^l One female DLP, 1 killed by hunter who did not obtain registration permit.

^m One male yearling killed by ADFG as nuisance at Lutak subdivision

ⁿ One shot on wrong permit, 2 killed DLP, 1 probable wounded later dispatched by State Troopers.

^o One male and 1 female cub of year (from litter of 4) struck and killed by vehicle.

Table 3 Unit 1 age and skull size of harvested brown bears, 1985–2003

Regulatory year	Mean skull size ^a				Mean age ^b			
	Male	Nr	Female	Nr	Male	Nr	Female	Nr
1985	22.3	12	20.5	8	9.1	11	6.5	8
1986	23.2	7	20.7	7	9.4	7	10.2	7
1987	21.4	18	20.6	11	5.5	17	7.7	7
1988	22.7	12	19.4	4	8.4	11	5.2	3
1989	21.2	14	20.6	5	6.7	13	7.4	5
1990	21.5	22	18.7	5	7.9	20	5.2	5
1991	21.6	13	20.4	8	7.4	14	7.9	6
1992	21.9	24	20.0	13	7.4	24	7.4	14 ^c
1993	21.9	16	20.3	6	6.4	16	3.4	5
1994	22.9	18	20.5	11 ^c	7.9	13	7.3	12 ^c
1995	21.7	18 ^d	21.4	4	6.6	12	16.0	3
1996	22.7	22	19.9	10	8.5	22	6.6	10
1997	22.8	27	20.8	10	7.3	24	7.8	14
1998	22.8	24	19.7	13	7.9	24	5.4	10 ^e
1999	21.7	26	19.4	16	8.2	17	6.4	14
2000	21.7	21	20.8	16	6.1	20 ^f	6.2	9
2001	22.6	15	20.1	13	9.8	10	9.4	10
2002	22.1	15	20.9	7	7.3	10	3.1	3
2003	21.3	26	20.7	9	7.0	20	7.1	9
$\bar{x}$	22.1	18	20.3	9	7.6	16	7.2	7

^a Skull size equals length plus zygomatic width.

^b Determined through analyses of extracted premolar teeth.

^c Includes 1 female taken illegally by a hunter who failed to obtain a registration permit.

^d Includes 2 males taken illegally in Unit 1C by hunters who failed to obtain registration permits.

^e Includes 2 females and 1 male DLP.

^f Includes 1 male DLP.

Table 4 Unit 1 brown bear registration permit hunt data, 1989–2003

Season/ hunt nr	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear harvest			
						Males (%)	Females (%)	Unknown	Total
(Fall)									
278F	1989 ^a	44	(0)	(95)	(5)	(50)	(50)	0	2
278F	1990	67	(0)	(73)	(27)	(72)	(28)	0	18
272F	1991	182	(47)	(88)	(13)	(50)	(50)	0	12
272F	1992	149	(46)	(69)	(31)	(56)	(44)	0	25
272F	1993	146	(53)	(83)	(17)	(75)	(25)	0	12
272F	1994	135	(58)	(79)	(21)	(42)	(58)	0	12
272F	1995 ^b	164	(55)	(88)	(12)	(67)	(33)	0	9
272F	1996 ^b	147	(54)	(81)	(19)	(54)	(46)	0	13
272F	1997	175	(52)	(81)	(19)	(63)	(37)	0	16
272F	1998 ^d	148	(53)	(81)	(19)	(23)	(77)	0	13
272F	1999	176	(56)	(74)	(26)	(35)	(65)	0	20
272F	2000	158	(56)	(68)	(32)	(50)	(50)	0	22
272F	2001	159	(54)	(75)	(25)	(47)	(53)	0	18
272F	2002	144	(39)	(85)	(15)	(69)	(31)	0	13
272F	2003	164	(68)	(80)	(20)	(64)	(36)	0	11
(Spring)									
278S	1990	60	(0)	(88)	(12)	(71)	(29)	0	7
278S	1991	59	(0)	(85)	(15)	(100)	(0)	0	9
272S	1992	142	(49)	(81)	(19)	(79)	(21)	0	14
272S	1993	131	(43)	(85)	(15)	(91)	(9)	0	11
272S	1994	133	(50)	(82)	(18)	(75)	(25)	0	12
272S	1995 ^c	156	(43)	(81)	(19)	(76)	(24)	0	17
272S	1996	139	(44)	(85)	(15)	(83)	(17)	0	12
272S	1997	144	(40)	(79)	(21)	(78)	(22)	0	18
272S	1998	152	(46)	(77)	(23)	(84)	(16)	0	19
272S	1999	155	(50)	(71)	(29)	(86)	(14)	0	22
272S	2000 ^d	167	(44)	(79)	(21)	(80)	(20)	0	20
272S	2001	186	(43)	(84)	(16)	(67)	(33)	0	17

Table 4 continued

Season/ hunt nr	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear Males (%)	harvest Females (%)	Unknown	Total
272S	2002	180	(46)	(89)	(11)	(82)	(18)	0	11
272S	2003	158	(44)	(73)	(27)	(79)	(21)	0	24

^a First season permits required for Unit 1 brown bear hunt.

^b Three hunters did not return permits.

^c Two hunters did not return permits.

^d One hunter did not return permit.

Table 5 Unit 1 fall and spring registration permit hunts combined, by regulatory year (1989–2003)

Spring/fall	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear harvest			
						Males (%)	Females (%)	Unknown	Total
	1989	104	(0)	(91)	(9)	(67)	(33)	0	9
	1990	126	(0)	(79)	(21)	(81)	(19)	0	27
	1991	324	(48)	(84)	(16)	(65)	(35)	0	26
	1992	280	(44)	(71)	(29)	(64)	(36)	0	36
	1993	279	(51)	(83)	(17)	(75)	(25)	0	24
	1994	291	(49)	(80)	(20)	(62)	(38)	0	29
	1995	303	(50)	(87)	(13)	(80)	(20)	0	20
	1996	291	(47)	(78)	(22)	(68)	(32)	0	31
	1997	327	(49)	(78)	(22)	(74)	(26)	0	35
	1998	303	(51)	(78)	(22)	(63)	(37)	0	35
	1999	343	(50)	(77)	(23)	(58)	(42)	0	40
	2000	344	(49)	(80)	(20)	(59)	(42)	0	34
	2001	339	(48)	(83)	(17)	(61)	(39)	0	28
	2002	325	(50)	(86)	(14)	(65)	(35)	0	23
	2003	322	(62)	(70)	(30)	(72)	(28)	0	36
	$\bar{x}$	286	(43)	(81)	(19)	(68)	(32)	0	28

Table 6 Unit 1 successful brown bear hunters, by residency, 1985–2003^a

Regulatory year	Local resident ^b (%)	Nonlocal resident (%)	Nonresident (%)	Unknown	Total successful hunters
1985	(61)	(26)	(13)	0	23
1986	(60)	(27)	(13)	0	15
1987	(58)	(27)	(12)	3	33
1988	(56)	(19)	(25)	0	16
1989 ^c	(45)	(25)	(30)	0	20
1990	(63)	(7)	(26)	1	27
1991	(65)	(4)	(23)	2	26
1992	(47)	(8)	(45)	1	37
1993	(54)	(21)	(25)	0	24
1994	(38)	(21)	(41)	0	29
1995	(30)	(15)	(55)	0	20
1996	(29)	(16)	(55)	0	31
1997	(26)	(23)	(31)	0	35
1998	(37)	(23)	(40)	0	35
1999	(25)	(12)	(63)	0	40
2000	(34)	(9)	(57)	0	34
2001	(7)	(4)	(69)	6	28
2002	(9)	(14)	(77)	0	23
2003	(37)	(3)	(60)	0	36
$\bar{x}$	(41)	(16)	(40)	0	28

^a Does not include illegal kills.

^b Local residents are those hunters who reside in Unit 1.

^c Before 1989/90 all harvest data were obtained solely from sealing records.

Table 7 Unit 1 brown bear harvest, by season, 1985–2003^a

Regulatory year	Fall		Spring	
	Harvest	Percent of total	Harvest	Percent of total
1985	12	(52)	11	(48)
1986	5	(33)	10	(67)
1987	16	(48)	17	(52)
1988	11	(69)	5	(31)
1989	10	(50)	10	(50)
1990	18	(67)	9	(33)
1991	12	(46)	14	(54)
1992	25	(68)	12	(32)
1993	12	(50)	12	(50)
1994	12	(41)	17	(59)
1995	8	(40)	12	(60)
1996	13	(42)	18	(58)
1997	16	(46)	19	(54)
1998	13	(37)	22	(63)
1999	20	(50)	20	(50)
2000	19	(56)	17	(50)
2001	17	(61)	11	(39)
2002	13	(57)	10	(43)
2003	11	(32)	24	(68)
$\bar{x}$	14	(51)	14	(49)

^a Does not include illegal kills.

Table 8 Unit 1 brown bear harvest, by month, 1985–2003^a

Regulatory year	Harvest periods							Total
	September	October	November	March	April	May	June	
1985	6	4	1	0	0	12	0	23
1986	6	2	2	0	1	4	0	15
1987	9	4	4	0	0	15	1	33
1988	2	2	1	0	0	10	1	16
1989	2	7	1	0	0	10	0	20
1990	9	8	1	0	1	8	0	27
1991	8	2	2	1	0	13	0	26
1992	14	10	1	0	3	9	0	37
1993	6	5	1	0	1	11	0	24
1994	8	3	1	0	1	16	0	29
1995	3	4	1	0	0	12	0	20
1996	10	3	0	0	3	15	0	31
1997	7	9	0	0	1	18	0	35
1998	7	6	0	0	0	22	0	35
1999	15	5	0	0	0	20	0	40
2000	17	3	0	0	2	13	0	35
2001	7	9	1	0	1	10	0	28
2002	8	2	0	0	0	13	0	23
2003	8	3	2	0	0	23	0	36
$\bar{x}$	8	5	1	0	1	13	0	28

^a Does not include illegal kills.

Table 9 Unit 1 successful brown bear hunter transport methods, 1985–2003^a

Regulatory year	Percent of harvest						Nr.
	Airplane	Boat	Walk	ORV	Highway vehicle	Other/ unknown	
1985	(4)	(61)	(4)	(9)	(13)	(9)	23
1986	(7)	(53)	(0)	(13)	(27)	(0)	15
1987	(12)	(52)	(9)	(12)	(6)	(9)	33
1988	(6)	(63)	(6)	(6)	(13)	(6)	16
1989	(10)	(70)	(5)	(5)	(5)	(5)	20
1990	(15)	(52)	(7)	(15)	(4)	(7)	27
1991	(8)	(62)	(0)	(8)	(3)	(19)	26
1992	(17)	(50)	(0)	(3)	(30)	(0)	37
1993	(0)	(71)	(4)	(0)	(25)	(0)	24
1994	(3)	(76)	(7)	(0)	(14)	(0)	29
1995	(0)	(70)	(5)	(0)	(25)	(0)	20
1996	(3)	(71)	(3)	(3)	(20)	(0)	31
1997	(3)	(66)	(0)	(0)	(31)	(0)	35
1998	(0)	(83)	(3)	(0)	(14)	(0)	35
1999	(8)	(72)	(0)	(0)	(20)	(0)	40
2000	(3)	(77)	(0)	(0)	(17)	(0)	35
2001	(15)	(68)	(0)	(3)	(11)	(3)	28
2002	(0)	(77)	(0)	(0)	(23)	(0)	23
2003	(0)	(86)	(0)	(0)	(14)	(0)	36
$\bar{x}$	(6)	(67)	(3)	(4)	(13)	(3)	28

^a Does not include illegal or DLP kills.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5820 mi²)

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

BACKGROUND

Brown bears inhabit all major islands in Game Management Unit 4 (Admiralty, Baranof, Chichagof, Kruzof, Yakobi, and Catherine Islands). The population has been isolated from mainland brown/grizzly bear populations for over 40,000 years and is genetically distinct from other bears (Heaton et al. 1996; Talbot and Shields 1996).

Management of Unit 4 brown bears has had a colorful and controversial past. In the early part of the 20th century, there were advocates for both complete elimination of and for more reasonable conservation of brown bears. Market hunting for hides and calls for the elimination of bears were gradually overcome by support for greater protection for the valuable bear resource, and the Alaska Department of Fish and Game (ADF&G) developed more restrictive harvest regulations (ADF&G 1998).

The Tongass National Forest encompasses most Unit 4 bear habitat and is managed under a multiple use concept by the U.S. Forest Service (USFS). On both federal and private lands commercial logging has resulted in extensive long-term habitat alteration. Wilderness designations on Admiralty, south Baranof, and west Chichagof Islands, however, contain large areas that should continue to provide bears with pristine environments. Elsewhere in the unit, habitat alteration by logging will affect brown bear density and distribution.

Unit 4 includes the most important brown bear hunting area in Southeast Alaska. Unit 4 has an estimated 70% of Southeast's brown bears (Miller 1993a) and has produced 69% of the region's harvest in recent years (ADF&G 2003). Federal assumption of subsistence management under the terms of the Alaska National Interest Lands Conservation Act (ANILCA) included authority for brown bears on federal lands. This dual authority with the state has confused the public and may deny state wildlife managers the use of options available on nonfederal land.

Increasing numbers of brown bear guides and hunters, as well as increased tourism in Unit 4 during recent years, has led to user conflicts. In July 1998, the ADF&G published "Unit 4 Brown Bears – Past, Present, and Future: A Status Report and Issues Paper." The Unit 4 Brown Bear Management Team was created by the Board of Game (BOG) in January 1999 with 15 members nominated by organizations representing consumptive and nonconsumptive

user groups. The team's purpose was to review issues of bear management and any human activities in Unit 4 that affect brown bears. The team agreed to several elements of a comprehensive management strategy, and a report was published (ADF&G 2000).

Three areas in Unit 4 are closed to bear hunting to enhance viewing opportunities: Seymour Canal Closed Area on eastern Admiralty Island, which encompasses the Stan Price State Wildlife Sanctuary; Salt Lake Closed Area at the northeast end of Mitchell Bay on southwest Admiralty Island; and the Port Althorp Closed Area on northern Chichagof Island.

During 2001–2003, 48 brown bears were captured and outfitted with GPS and VHF radio transmitter collars to evaluate use of riparian and beach zones on Northeast Chichagof Island. The work continued into 2004 to collect the collars and analyze the data (Flynn et al. 2004).

In 2002, two streams were selected on northeast Chichagof Island for hair snare collection. Snare sites were about 10–25 m from the stream, and the hair snares were set along established bear trails. In 2003, the number of hair snares deployed on a stream was doubled. Snares were placed at the same sites as 2002, and an additional snare was placed in between the original sites. Bear hair was collected from single-catch hair traps placed systematically along each study stream every 7- to 10-day period for 6–8 weeks. Using the genetic data from the hair samples to identify individual bears, estimates will be generated for the number of bears at each study stream using open population mark-recapture models (Flynn et al. 2004).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain an average age of harvested males of at least 6.5 years.
- Maintain a male-to-female harvest ratio of at least 3:2.
- Minimize the number of bears killed in defense of life or property (DLP).
- Maintain the annual human-caused mortality of all brown bears at no more than 4% of each island's population estimate (Admiralty, Baranof, Northeast Chichagof, and the rest of Chichagof), averaged over a 3-year period.
- Maintain the annual human-caused mortality of females at no more than 1.5% of each island's population estimate, averaged over a 3-year period.

METHODS

Registration permits for Unit 4 brown bear hunting were issued to the public at ADF&G offices. One license vendor in Hoonah is permitted, under strict guidelines, to issue registration permits for brown bear hunting in Unit 4. This exception was made to help accommodate hunters in the communities of Hoonah, Elfin Cove, and Pelican. Successful bear hunters were required to present skulls and hides to a representative of the Division of Wildlife Conservation (DWC) or the Alaska Bureau of Wildlife Enforcement (ABWE) for sealing. Bear sealers measured skulls, extracted premolars, confirmed sex, and recorded data

on the date and location of kill, hunter residency, hunt length, guide services used (if any), and primary transportation. A commercial laboratory determined ages through cementum annuli analyses in premolars. All permittees were required to submit a report within 10 days after taking a bear. Unsuccessful permittees or those who did not hunt are required to submit a report following the close of the season.

Data recorded on sealing forms and registration permit reports were entered into a computer database. Delinquent permittees were sent up to 2 reminder letters, the second by certified mail, to improve reporting compliance. ABWE cited permittees who failed to report.

Area and regional personnel attempted to reduce DLP incidents through education and cooperation with community authorities, other agencies, and nongovernmental organizations.

In an effort to update current population estimates and evaluate brown bear use of riparian and beach zones, 48 bears were captured through helicopter darting or foot-snaring techniques and outfitted with telemetry devices during 2001–2003 (Flynn et al. 2004). These bears were considered the marked sample in a capture-mark-resight (CMR) population estimation effort. This was done in conjunction with hair-snare collection work to provide genetic markers of individual bears. Nine remaining GPS collars from female bears were recovered from den sites on Northeast Chichagof Island during May and June 2004 (R. Flynn, personal communication).

In 2002, two streams were selected on Northeast Chichagof Island for hair snare collection. A 5-km stretch of each stream was selected for study, and hair snares were placed at 100-m intervals along the banks of the stream, alternating sides, for a total of 50 sites per stream. Snare sites were about 10–25 m from the stream, and the hair snares were set along established bear trails. In 2003, we doubled the number of hair snares deployed on a stream. Snares were placed at the same sites as 2002, and an additional snare was placed in between the original sites. Bear hair was collected from single-catch hair traps placed systematically along each study stream every 7–10 day period for 6–8 weeks. Upon the end of the season, the hair samples were sent to a commercial genetics laboratory for analysis. Using the genetic data to identify individual bears, estimates will be generated for the number of bears at each study stream using open population mark-recapture models (Flynn et al. 2004).

Personnel from DWC and USFS contacted visitors at Pack Creek in the Stan Price State Wildlife Sanctuary. The program was staffed from late June through August to interpret bear behavior and management, promote public safety, prevent DLP loss of habituated bears, and explain regulations associated with the cooperative management area.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Unit 4 brown bear populations are stable or slightly increasing. Analysis of historical harvest data indicates that bear numbers probably declined during the mid 1970s but have since recovered (Faro 1997; Whitman 1999). Harvest levels from some areas of the unit continue to warrant close scrutiny. Expansion of logging roads, particularly on Northeast Chichagof Island, has increased the vulnerability of bears to hunters. High harvest occurs because

logging roads allow hunters greater efficiency in accessing salmon streams, bays, and estuaries (Young 1989, 1990; Titus and Beier 1992). Illegal guiding activity over the past 3 years has also increased harvest to higher than what has been recommended by the Brown Bear Management Team. The final decision for the USFS's Shoreline Assessment Environmental Impact Statement is expected from the agency and will undoubtedly affect the number and distribution of guides within the Unit 4. A reallocation of some hunts to existing or new guides through a prospectus offering may also occur. Although data analysis is preliminary, it appears that the estimated bear population on northeast Chichagof Island has increased significantly between 1991 and 2004. Current estimates, based on the recently completed CMR effort, place the estimated bear density as high as 1.7 bears/mi² (R. Flynn, personal communication).

Population Size

Titus and Beier (1993) reported bear densities on Admiralty and Northeast Chichagof Islands study areas. These studies provide the basis for population estimates for major areas of the unit and are also used as a baseline for estimating bear densities in other parts of the region. The current population estimate for the entire unit is 4155 bears; Chichagof and adjacent islands, 1550; Baranof and adjacent islands, 1045; and Admiralty Island, 1560. Although it is anticipated these numbers will be recalculated in the future using updated information gathered in July 2002–September 2004 from Northeast Chichagof Island, that had not been accomplished at the time this report was written. For management purposes, the lower 95% confidence limit is used as a conservative population level, and we have attempted to maintain harvests at 4% or less of that population.

Population Composition

Unitwide population composition data are limited. The number of bears captured during ADF&G research programs has been small, and we believe capture bias has resulted in a sample not representative of the sexes and age classes of bears in the population. Age and sex data from hunter harvest are biased by hunter selectivity, the vulnerability of young bears, regulations protecting females with offspring, and misidentification of harvested bears by sealers.

In Unit 4 the 2002–03 harvest by hunters was 85% males ($n = 124$) and 15% females ($n = 22$). The 2003–04 harvest was 84% males ($n = 147$) and 16% females ($n = 28$). Table 1 displays sex information for the last 5 regulatory years.

Distribution and Movements

Researchers continued to monitor radiocollared bears on the Northeast Chichagof Controlled Use Area (NECCUA) (Rod Flynn and LaVern Beier, ADF&G, personal communication).

MORTALITY

Harvest

<u>Season and Bag Limit</u>	<u>Resident and Nonresident Hunters</u>
Chichagof Island south and west of a line which follows the crest of the island from Rock Point	15 Sep–31 Dec 15 Mar–31 May

(58° N. lat., 136°21' W. long.) to Rodgers Point (57°35' N. lat., 135°33' W. long.), including Yakobi and other adjacent islands; Baranof Island south and west of a line which follows the crest of the island from Nismeni Point (57°34' N. lat., 135°25' W. long.), to the entrance of Gut Bay (56°44' N. lat., 134°38' W. long.), including the drainages into Gut Bay and including Kruzof and other adjacent islands.

One bear every 4 regulatory years by registration permit only

Unit 4, that portion in the Northeast Chichagof Controlled Use Area north of the Spasski Trail and the Gartina Highway.	15 Sep–30 Sep 15 Mar–20 May
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One bear every 4 regulatory years by registration permit only

Unit 4, remainder of the Northeast Chichagof Controlled Use Area.	15 Mar–20 May
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One bear every 4 regulatory years by registration permit only

Remainder of Unit 4:	15 Sep–31 Dec 15 Mar–20 May
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One bear every 4 regulatory years by registration permit only

Board of Game Actions and Emergency Orders. At the November 2004 meeting, a review of all closed areas to bear hunting within the unit was conducted. Unit 4 has 7 closed areas: Sitka area road system (1960), Seymour Canal closed area (1934), Salt Lake Bay closed area (1984), Mitchell Bay closed area (1991), Port Althorp closed area (1984), Bear Cove closed area (2003), and the Northeast Chichagof Controlled Use Area (1989). The board's review concluded that the Seymour Canal and Mitchell Bay areas would be reopened for discussion during the next Southeast board cycle, fall 2006. Members of the board reiterated their endorsement of the findings of the Unit 4 Brown Bear Management Team, supporting the USFS in its attempts to decrease hunter crowding issues and limit the number of guides (thus, nonresident harvest) in Unit 4.

Hunter Harvest and Other Mortality

Regulatory Year (RY) 2002 (regulatory year begins 1 July 2002 and ends 30 June 2003): Hunters took 41 brown bears in fall 2002 and harvested 105 in spring 2003. The total for the

year was 146 bears. An additional 17 bears are known to have died, bringing the year's total to 163 bears.

RY 2003: Hunters took 44 bears in fall 2003 and 131 in spring 2004. Hunting accounted for 175 bears, and 27 additional bears were reported killed in other situations; the combined mortality for the year was 202 bears. This is a 19% increase from the previous regulatory year and the greatest number of bears ever reported killed in the unit. Data concerning brown bear harvests for the past 5 years are presented in Tables 1 and 2.

Trends in skull measurements and mean ages of harvested bears closely match those found in the long-term data, indicating stable trends. Ages and skull sizes for Baranof and Chichagof Islands are comparable to Admiralty data, also indicating a stable trend.

Hunter Residency and Success. Spring Unit 4 permit hunts are administered by 2 registration permits. The outside drainages are covered under permit RB088, while the inside drainages are covered under permit RB089. All fall Unit 4 permit hunts are administered under a single registration permit (RB077). Hunting pressure in each area is determined from the permit hunt reports at the end of the season. Table 4 summarizes the data for each area with distinct season dates.

Local residents of Unit 4 take a small percentage of the total annual harvest (Table 3), and that number appears to be fairly stable. Most bears were taken by nonresidents or Alaska hunters from outside Southeast. In 2002–03 nonlocal Alaska hunters and nonresidents harvested 90% of the bears. In 2003–04 nonresidents and nonlocal Alaskans again took 90% of the bears with a slight percentage increase in the nonlocal residents and a small decline in the nonresident percentage.

Spring and fall hunting effort is presented in Table 4. In fall 2002, 86 Alaska residents hunted a total of 405 days, while 37 nonresidents spent 209 days afield. In fall 2003, 97 residents hunted 442 days and 43 nonresidents hunted 208 days. Spring seasons produced a larger harvest (Table 1) and have the greater hunting pressure (Table 4). In spring 2003, 148 residents hunted 618 days and 108 nonresidents hunted 700 days. In spring 2004, 158 residents hunted 663 days and 113 nonresidents hunted 592 days. Fall seasons produced one bear for every 14.9 hunt days, and spring seasons produced one bear for every 11 days.

Harvest Chronology. Most fall harvest occurs during the first 2 weeks of the season (Table 5). The greatest hunting pressure occurs early because weather is generally more favorable, and many bears have not yet left salmon streams. Adverse weather and dispersal from the streams makes it increasingly difficult to locate bears late in the fall season. The fall harvest is characteristically composed of a high percentage of female bears (Table 1).

The percentage of male bears killed during spring is higher than in the fall, but the actual number of females killed in spring versus fall is frequently greater (Table 1). The greatest numbers of bears are available to hunters late in the spring season because nearly all bears have left their dens and are seeking food. Most spring bears are killed in May (Table 5). In springs exhibiting late green-up, bears concentrate and feed on grass/sedge flats near salt

water. Harvests in such years are higher than in warmer springs that provide bears with more dispersed feeding opportunities.

Transport Methods. Unit 4 bear hunters used boats as the most common form of transportation (Table 6). In 2002–03, 96% of successful hunters used boats. In 2003–04, successful hunters used boats 95% of the time. Aircraft are the second most important means of hunter transport but were used by only 3% of successful hunters in the 2002–03 season and 5% in the 2003–04 seasons.

Other Mortality

To reduce DLP mortality, we worked with local communities, agencies associated with public safety, and nongovernmental organizations. Most nonhunting mortality results from bears entering areas developed for human use. Such situations are most effectively addressed by eliminating improper garbage disposal or food storage. Most DLP incidents involve bears that have been previously habituated to humans. In Sitka, a collaborative group of private citizens and agencies continues efforts as a working committee to reduce the incidence of improper garbage disposal and storage through greater awareness and education. The majority of increases in DLP incidents this reporting period can be attributed to the landfills of small communities on Admiralty and Chichagof Islands, as well as fish hatcheries in remote locations on Baranof Island.

In 2002–03, 17 nonhunting mortalities were reported (Table 1); 27 occurred in 2003–04. Generally, increasing bear densities lead to more bears in and around human population centers or remote work sites, and increases in bears taken under DLP provisions often result. In recent years, known illegal kills of bears often represent 15–29% of nonhunting mortality.

Bear Viewing. Public interest in viewing bears continues at the Stan Price State Wildlife Sanctuary. The permit system was initiated in 1989 and revised in 1992. This system, along with close USFS and department on-site monitoring, effectively limits guided and unguided use and provides a consistent and benign human presence to the bears. During summer 2002, 1400 visitor-days (both guided and unguided) were recorded at Pack Creek. In summer 2004 the number of visitors was 1514. Many tour operators now take visitors to other Unit 4 locales (such as Kalinin Bay on Kruzof Island and Lake Eva on northeast Baranof Island). During spring 2004, the Icy Strait-Pt. Sophia development began operations offering cruise ship passengers a bear viewing tour from an elevated platform built parallel to Spasski Creek. A proposal to house and display bears was initiated in Sitka in 2002 and entered a department project analysis phase in 2003. The project continued with a demonstration phase using surrogate domestic animals in 2004, but a department decision to place bears in the facility has not been made. Quantifying these growing uses has been difficult and has generated a wide range of general public comments, both for and against.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives for harvested male brown bear ages were met in both years. Mean ages of harvested bears from all subpopulations exceed the 6.5-year minimum objective. The

male-to-female harvest ratio was 3:0.35 in 2002–03 and 3:0.57 in 2003–04, surpassing the management objective of 3:2.

The objective of reducing DLP mortality is difficult to measure. DWC continued to work with communities, USFS and the Alaska Department of Environmental Conservation to address landfill problems in logging camps and communities that contribute to such losses.

For harvest purposes, Admiralty Island, Baranof/Kruzof Islands, Northeast Chichagof, and the remainder of Chichagof/Yakobi Islands are managed as 4 subpopulations. These areas are large enough to encompass viable bear populations, and water barriers largely restrict dispersal of subadults between the areas. Hunting pressure on brown bears requires the use of all available population information for management decisions. None of these subpopulations are currently experiencing excessive human-induced mortality; mortality levels (Table 2) are below the conservative guideline of 4% of the population. Additionally, updated population density figures indicate a significantly higher bear population than previously estimated, so future harvest data will appear to indicate that a smaller percentage of the population is being harvested. Attempts to micromanage Unit 4 bears by smaller areas could redirect hunting pressure and create a “domino effect” of management problems. Future seasons may require some regulatory change in specific areas that receive high hunter effort to maintain biological or aesthetic standards. More information on Unit 4 brown bear movements is necessary before attempting to manage on a finer scale.

Expansion of the Northeast Chichagof Controlled Use Area (NECCUA) in 1994 to north of Port Frederick due to extensive logging road construction appears to have prevented excessive harvest in that area. Chichagof Island has experienced the greatest long-term habitat alteration from logging in Unit 4 areas; thus, bear habitat here is the least secure. Continued research on the island’s bear population is necessary to provide managers with population information.

The combined annual mortality from harvest and DLP kills in the unit is close to the biological guideline of 4% of the estimated population (Table 2). Increases in harvest may make it necessary to recommend regulatory changes to dampen the trend of increasing bear kills. Because of the USFS moratorium on licensing additional guides and enforcement action against illegal guiding activities, harvests by nonresidents are expected to stabilize.

Funding for the Pack Creek bear-viewing program with traditional “hunting-generated funds” has become increasingly controversial. We need to develop a secure source of funding to maintain this popular nonhunting activity. Currently about 50% of the funds needed to operate the Admiralty Island site come from visitor fees, and the balance from the state general fund.

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PREPARED BY:

Philip W. Mooney
Wildlife Biologist III

SUBMITTED BY:

Dale Rabe
Wildlife Biologist IV

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Table 1 Unit 4 brown bear harvest, regulatory years 1999–2003

Regulatory year	<u>Hunter kill</u>					<u>Nonhunting kill^a</u>				Total Reported
	M	F	(%F)	Unk	Total	M	F	Unk	Total	
1999										
Fall 99	27	21	(44)	0	48	3	2	0	5	53
Spring 00	99	19	(16)	0	118	3	0	0	3	121
Total	126	40	(24)	0	166	6	2	0	8	174
2000										
Fall 00	31	18	(37)	0	49	3	2	2	7	56
Spring 01	88	20	(19)	0	108	1	2	0	3	111
Total	119	38	(24)	0	157	4	4	2	10	167
2001										
Fall 01	32	8	(20)	0	40	4	3	2	9	49
Spring 02	75	16	(18)	0	91	5	0	0	5	96
Total	107	24	(18)	0	131	9	3	2	14	145
2002										
Fall 02	28	13	(32)	0	41	3	6	2	11	52
Spring 03	96	9	(9)	0	105	4	1	1	6	111
Total	124	22	(15)	0	146	7	7	3	17	163
2003										
Fall 03	28	16	(36)	0	44	10	3	3	16	60
Spring 04	119	12	(9)	0	131	6	2	3	11	142
Total	147	28	(16)	0	175	16	5	6	27	202

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality. Does not include bears that were found dead.

Table 2 Unit 4 brown bear hunting pressure^a and mortality^b by major geographic areas, regulatory years 1999–2003

Hunt area	Regulatory year	Nr hunters	M	(%) ^c	F	(%) ^c	Unknown	(%) ^d	Total harvest	Percent estimated population ^e
Northeast Chichagof Island ^f										
	1999–00	29	9	(82)	2	(18)	0		11	3.1
	2000–01	28	8	(80)	2	(20)	0		10	2.8
	2001–02	36	4	(57)	3	(43)	0		7	2.0
	2002–03	28	9	(90)	1	(10)	0		10	2.8
	2003–04	36	11	(85)	2	(15)	0		13	3.7
Remainder of Chichagof Island										
	1999–00	113	42	(81)	10	(19)	0		52	4.3
	2000–01	118	30	(67)	15	(33)	0		45	3.8
	2001–02	139	34	(76)	11	(24)	0		45	3.8
	2002–03	136	49	(89)	6	(11)	0		55	4.5
	2003–04	126	50	(83)	10	(17)	0		60	5.0
Baranof and Kruzof Islands										
	1999–00	116	31	(67)	15	(33)	0		46	4.4
	2000–01	97	30	(88)	4	(12)	0		34	3.3
	2001–02	91	25	(89)	3	(11)	0		28	3.3
	2002–03	79	21	(75)	7	(25)	0		28	2.7
	2003–04	76	29	(88)	4	(12)	0		33	3.2
Baranof and Chichagof Islands ^g										
	1999–00	2								
	2000–01	2								
	2001–02	2								
	2002–03	3								
	2003–04	1								
Admiralty Island										
	1999–00	152	44	(77)	13	(23)	0		57	3.7
	2000–01	162	51	(75)	17	(25)	0		68	4.4
	2001–02	153	44	(86)	7	(14)	0		51	3.3
	2002–03	144	45	(85)	8	(15)	0		53	3.4
	2003–04	163	57	(83)	12	(17)	0		69	4.4

Table 2 continued

Hunt area	Regulatory year	Nr hunters	M	(%) ^c	F	(%) ^c	Unknown	(%) ^d	Total harvest	Percent estimated population ^e
Unit 4 Totals										
	1999–00	412	126	(76)	40	(24)	0		166	4.0
	2000–01	407	119	(76)	38	(24)	0		157	3.8
	2001–02	420	107	(82)	24	(18)	0		131	3.2
	2002–03	390	124	(85)	22	(15)	0		146	3.5
	2003–04	402	147	(84)	28	(16)	0		175	4.2

^a Registration permit data.^b Bear sealing data.^c Percentage based on known sex bears.^d Percentage based on total bears.^e Estimated populations: NE Chichagof Island, 354 bears; remainder of Chichagof Island, 1196; Baranof and Kruzof Islands, 1045 bears; Admiralty Island, 1560 bears; all Unit 4, 4155 bears.^f X35 only.^g Unsuccessful hunters who indicated both Baranof and Chichagof Islands as hunt locations.

Table 3 Unit 4 brown bear successful hunter residency, regulatory years 1999–2003

Regulatory year	Local resident ^a	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1999–00	16	(10)	33	(20)	117	(70)	166
2000–01	21	(13)	25	(16)	111	(71)	157
2001–02	22	(17)	24	(18)	85	(65)	131
2002–03	15	(10)	31	(21)	100	(69)	146
2003–04	18	(10)	42	(24)	115	(66)	175

^a Resident of Unit 4.

Table 4 Unit 4 hunting effort by island, by residency, regulatory years 1999–2003

Island	Season	Nr resident hunters	Nr nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	Nr days hunted	Nr bears killed	Effort (Days per bear)
Admiralty									
	Fall 1999	24	18	42	118	129	247	12	21
	Spring 2000	60	50	110	250	289	539	45	12
	Fall 2000	38	20	58	164	110	274	16	17
	Spring 2001	53	51	104	228	274	502	52	10
	Fall 2001	31	12	43	166	83	249	12	21
	Spring 2002	64	46	110	223	301	524	39	13
	Fall 2002	33	15	48	143	81	224	14	16
	Spring 2003	50	46	96	194	304	498	39	13
	Fall 2003	34	17	51	151	70	221	14	16
	Spring 2004	62	51	113	283	259	542	55	10
Baranof									
	Fall 1999	33	22	55	163	123	286	22	13
	Spring 2000	36	25	61	92	154	246	24	10
	Fall 2000	28	15	43	64	84	148	12	12
	Spring 2001	29	25	54	108	115	223	22	10
	Fall 2001	29	7	36	90	26	116	10	12
	Spring 2002	36	19	55	135	154	289	18	16
	Fall 2002	23	10	33	116	54	170	12	14
	Spring 2003	29	20	49	101	118	219	16	14
	Fall 2003	20	8	28	66	43	109	9	12
	Spring 2004	33	19	52	116	94	210	23	9

Table 4 continued

Island	Season	Nr resident hunters	Nr nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	Nr days hunted	Nr bears killed	Effort (Days per bear)
Chichagof									
	Fall 1999	24	14	38	143	87	230	14	16
	Spring 2000	61	38	99	226	237	463	49	9
	Fall 2000	27	17	44	124	140	264	21	13
	Spring 2001	52	42	94	199	292	491	34	14
	Fall 2001	29	12	41	162	63	225	18	13
	Spring 2002	62	44	106	282	349	631	34	19
	Fall 2002	30	12	42	146	74	220	15	15
	Spring 2003	69	40	109	323	258	581	50	12
	Fall 2003	42	18	60	218	95	313	21	15
	Spring 2004	62	43	105	263	239	502	53	9
Admiralty, Baranof, and Chichagof Islands, unspecified									
	Spring 2002	1	0	1	8	0	8		
	Spring 2004	1	0	1	1	0	1		
Baranof and Chichagof									
	Fall 1999	0	0	0	0	0	0		
	Spring 2000	2	0	2	2	0	2		
	Fall 2000	1	0	1	7	0	7		
	Spring 2001	1	0	1	2	0	2		
	Fall 2001	0	0	0	0	0	0		
	Spring 2002	2	0	2	10	0	10		
	Fall 2002	0	0	0	0	0	0		
	Spring 2003	0	2	2	0	20	20		

Table 4 continued

Island	Season	Nr resident hunters	Nr nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	Nr days hunted	Nr bears killed	Effort (Days per bear)
	Fall 2003	1	0	1	7	0	7		
	Spring 2004	0	0	0					
Unit 4 Totals									
	Fall 1999	81	54	135	424	339	763	48	16
	Spring 2000	159	113	272	570	680	1250	118	11
	Fall 2000	94	52	146	359	334	693	49	14
	Spring 2001	135	118	253	537	681	1218	108	11
	Fall 2001	89	31	120	418	172	590	40	15
	Spring 2002	165	109	273	658	804	1444	91	16
	Fall 2002	86	37	123	405	209	614	41	15
	Spring 2003	148	108	256	618	700	1318	105	13
	Fall 2003	97	43	140	442	208	650	44	15
	Spring 2004	158	113	271	663	592	1255	131	10

Table 5 Unit 4 brown bear harvest chronology, regulatory years 1999–2003^a

Regulatory year	Fall harvest periods										
	9/11– 9/20	9/21– 9/30	10/1– 10/10	10/11– 10/20	10/21– 10/31	11/1– 11/10	11/11– 11/20	11/21– 11/31	12/1– 12/10	12/11– 12/20	12/21– 12/31
1999–00	16	19	10	1	1	0	1	0	0	0	0
2000–01	22	18	5	0	2	1	0	0	1	0	0
2001–02	10	18	7	2	0	0	2	1	0	0	0
2002–03	19	9	7	1	0	5	0	0	0	0	0
2003–04	24	12	2	2	1	2	1	0	0	0	0

Spring harvest periods							Total
	4/1– 4/10	4/11– 4/20	4/21– 4/30	5/1– 5/10	5/11– 5/20	5/21– 5/31	
1999–00	0	0	8	45	53	12	166
2000–01	0	0	2	37	55	14	157
2001–02	0	1	6	17	48	19	131
2002–03	0	0	7	36	50	12	146
2003–04	1	0	10	45	61	14	175

^a Includes all hunts.

Table 6 Unit 4 brown bear harvest by transport method, 1999–2000 through 2003–04^a

Regulatory year	Airplane	Boat	Walked	Off- road vehicle	Highway vehicle	Unknown
1999–00	6	153	3	3	1	0
2000–01	12	136	2	0	7	0
2001–02	6	123	0	0	7	0
2002–03	4	140	0	2	0	0
2003–04	8	166	1	0	0	0

^aSealing certificate data and registration permit data often differ. Sealing certificate data were used.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002
To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi²)
GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, Eastern Gulf Coast.

BACKGROUND

Brown bears probably first occurred on the Yakutat and Malaspina Forelands following glacial retreat 300 to 500 years ago. Like many other wildlife species, brown bears gained access to the Pacific Ocean's eastern gulf coast by moving from the Alaska/Canada Interior via the Alsek/Tatshenshini corridor.

Since 1961, when brown bears were first sealed in Alaska, 1000 sport-killed bears have been sealed from Unit 5 (835 from 5A and 165 from 5B). Sixty-six percent of these bears were males, and 65% of the 1000 bears were taken by nonresident hunters. An additional 68 bears have been killed in situations other than legal hunts during the same time period. This mortality resulted from vehicle collisions, the dispatching of nuisance animals, defense of life and property (DLP) situations, and bears found dead from unknown causes. Under federal subsistence regulations, bears do not have to be sealed if they are not removed from Unit 5.

A 1988 Superior Court decision that deregulated the big game guide industry resulted in an increase in big game guiding activity in Southeast Alaska. From 1980 through 1988, an average of 22 guided nonresidents per year hunted brown bear in Unit 5. Since then, the number has climbed to an average of 26 per year.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Maintain a male-to-female harvest ratio of at least 3:2 and an average age of harvested males of at least 6.5 years.

METHODS

Alaska Department and Fish and Game (ADF&G) and Alaska Bureau of Wildlife Enforcement staff gathered data about harvested bears during sealing. State game regulations require brown bear hides and skulls to be sealed within 30 days of harvest. Skulls are measured and a premolar tooth is extracted for age determination. Additional information is collected from hunters, such as harvest date and location, transportation method, guide

information, and number of days of hunting effort. Hunters also provide anecdotal information from their observations in the field.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population information is not available for Unit 5 brown bears. Data gathered from sealing certificates, incidental observations, and hunter interviews indicate no notable changes in the population. However, the 2 highest kills on record occurred in 1991 and 1992, when 41 and 42 brown bears were harvested, respectively. Since that time the annual harvest has ranged from 27 to 38 bears. Although the average male age and skull size decreased slightly during the years of higher harvest, age and skull size of harvested bears have returned to or now exceed long-term averages.

MORTALITY

Harvest

Season and Bag Limit

1 bear every 4
regulatory years

Resident and Nonresident Hunters

1 Sep–31 May

Board of Game Actions and Emergency Orders. There were no Board of Game actions or emergency orders associated with Unit 5 brown bears during this report period.

Hunter Harvest. Unit 5 brown bear harvests have stabilized after decreasing from all-time highs in the early 1990s. Bear harvests from 1961 until the early 1990s had constantly increased. The average kill from 1971 to 1980 was 21 bears, with a range of 13–28. The 1981–90 mean harvest was 30, ranging from 23 to 33 bears. Since 1990, the annual average harvest has been about 33 bears, with a mean annual harvest during the current report period of 26 bears. The mean male age increased between the 1970s (5.8 years) and the 1980s (7.0 years), but dropped to a mean of 6.3 years for 1990 through 1999.

During regulatory year (RY) 2002, 15 males and 6 females were reported taken (Table 1). Males composed 71% of the harvest, which is almost identical to the mean of 70% in the 1989–2001 harvests, and above our management objectives of 60%. Average male skull size of 24.6 inches was substantially higher than the previous report period, and higher than the previous 10-year average of 22.9 inches. The average male age (9.3 years) was significantly higher than the previous report period mean of 6.7 years; however, that figure may be skewed because only 6 of the 15 males harvested during RY 2002 were aged.

In 2003, Unit 5 hunters killed 28 male and 3 female brown bears (Table 1). Males composed 90% of the harvest, substantially higher than the previous 10-year mean of 70%. Mean male skull size was 22.8 inches, almost 2 inches shorter than the previous year, but only slightly lower than the 1989–1999 mean of 22.9 inches.

Hunter Residency and Success. From 1991 through 2001 nonresidents accounted for an average of 70% of the Unit 5 brown bear harvest (Table 3). The percentage increased slightly during the first year of this report period to 76%, then increased to 84% in 2003.

Harvest Chronology. From 1989 through 2001 the average proportion of brown bears taken in the spring was 44% with a range of 31–60% (Table 2). This value ranged from 38% in RY 2002 to 54% in RY 2003.

Transport Methods. Transportation types used in successful 2002 brown bear hunts included boats (41%), off-road vehicles (ORVs) (32%) aircraft (18%), and highway vehicles (9%). In 2003, boats were used by 29% of successful brown bear hunters, while the use of aircraft increased to 29%, ORVs increased to 39%, and highway vehicles declined to 0%. The use of aircraft as bear hunters' transportation mode is likely overreported because of hunters' confusion when completing hunting permits. Many hunters fly into camps via small aircraft, then use all-terrain vehicles (ATVs) or boats while hunting, yet record aircraft as their transportation while hunting. This confusion in recording transportation has been confirmed with guided hunters where we know the hunting methods that were employed.

Other Mortality

This category refers to DLP kills, illegal kills, road kills, and nuisance bears. The Yakutat landfill has been the main area of concern for these types of mortalities for decades. The landfill attracts dozens of brown bears during the course of a year, and some of these are eventually killed. In 2000 only one bear was killed in a nonhunting situation. This bear was killed along the Situk River after it threatened a fisherman. Although this incident occurred away from the landfill, anecdotal evidence suggests this bear was a frequent visitor to the area (Bob Johnson, personal communication). In 2001, 2 adult male bears died in nonhunting situations. One was found dead from gunshot wounds, and ADF&G personnel dispatched another due to public safety concerns. During this report period these nonhunting mortalities increased substantially, with 6 being reported in 2002 and 12 in 2003. Several of these bears were killed in residential areas near the dump after a limited dump food supply produced expected movement of bears into adjacent neighborhoods. What was unexpected, though, were the number of bears killed in defense of life or property. Five of these animals were killed by a single person during a one-month period.

Douglas Area ADF&G staff continue to work with the community of Yakutat and the Alaska Department of Environmental Conservation (DEC) to remedy landfill problems and curtail brown bear attractants. Over the past year there have been several meetings in Yakutat regarding this issue. Fish waste is no longer being deposited at the landfill, and garbage is being burned immediately after dumping, thereby eliminating many foraging opportunities for bears. We have begun working with the U.S. Forest Service (USFS) to distribute educational materials to Yakutat fish camp permit holders to reduce the illegal killing of bears. One of our goals is to minimize bear attractants at fish camps, thereby easing the concern of fish camp operators and preventing the unnecessary death of bears.

HABITAT

Assessment and Enhancement

We did not conduct any habitat assessment studies or enhancement projects during this report period. The USFS is revising the Situk River Management Plan, which may affect brown bear hunting and commercial tourism on the river.

CONCLUSIONS AND RECOMMENDATIONS

We were able to exceed our 2 management objectives for brown bears in Unit 5 during both years of the report period. The age objective of 6.5 years was surpassed during 2002 and 2003 with mean ages of male bears being 9.3 and 8.0 respectively. Male bears made up 71% of the harvest in 2002 and 90% in 2003, surpassing our 3:2 male to female harvest objective. Action taken by the Board of Game in fall 2000 implementing a registration permit will allow us to assess hunter effort and success. After a few more years, this data should provide us with valuable harvest-per-unit-effort data.

Although the hunter harvest of brown bears is within the harvest levels we are comfortable with, the recent rash of illegal kills and DLPs is reason for concern. If these types of kills continue at the present rate, it may be necessary to limit the legal take of bears to offset this mortality. Conversations with the USFS regarding commercial guiding operations and potential for limiting hunting permits have been initiated.

Many Yakutat residents view brown bears near town as pests. The Yakutat dump has been an attractant to bears for decades, and although it continues to be a problem, it is much better than in the past. We will continue to emphasize to local residents the importance of properly managing garbage and work with DEC to eliminate this fatal attractant.

PREPARED BY:

Neil Barten
Wildlife Biologist III

APPROVED BY:

Dale Rabe
Management Coordinator

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Table 1 Unit 5 brown bear harvest, age, skull sizes, and effort, RY 1989 through 2003

Regulatory year	<u>Harvest</u>				<u>Mean age</u>			<u>Mean skull size</u>		<u>Avg days/kill</u>	
	M	F	Unk	Total	M	F	Total	M	F	M	F
1989	18	10	1	29	6.6	4.0	5.7	22.8	20.0	3.6	3.6
1990	25	8	2	35	7.9	4.3	6.9	23.2	20.3	5.0	4.0
1991	33	8	0	41	5.3	4.9	5.3	22.4	20.3	5.4	4.3
1992	28	12	0	40	5.0	5.6	5.2	22.2	20.3	4.3	3.8
1993	19	11	0	30	6.7	6.7	6.7	21.3	21.2	3.2	5.6
1994	22	6	0	28	5.5	4.2	5.2	23.0	20.6	4.6	5.7
1995	24	7	0	31	6.7	8.4	7.1	23.5	22.5	4.2	4.0
1996	23	14	1	38	5.4	3.8	4.8	23.1	20.8	4.7	5.6
1997	18	9	0	27	6.1	7.0	6.4	23.4	20.6	4.3	4.3
1998	28	7	0	35	6.2	3.4	5.6	23.5	21.6	4.4	3.0
1999	23	8	0	31	8.4	7.0	8.1	23.5	20.9	5.3	4.4
2000	25	8	0	33	6.9	6.3	6.8	23.9	20.5	4.6	6.1
2001	18	12	1	31	6.5	6.0	6.3	22.5	19.9	3.5	3.3
2002	15	6	0	21	9.3	5.0	8.7	24.6	21.9	4.3	3.5
2003	28	3	0	31	8.0	16.0	8.9	22.8	20.7	4.2	6.0
Means											
2002–03	21.5	4.5	0	26.0	8.7	10.5	8.8	23.7	21.3	4.2	4.8
2000–01	21.5	10.0	.5	32.0	6.7	6.2	6.6	23.2	20.2	4.1	4.7
1989–99	23.7	9.1	0.4	33.2	6.3	5.4	6.1	22.9	20.8	4.5	4.4

Table 2 Unit 5 brown bear harvest chronology, RY 1989 through 2003

Regulatory Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
1989	0	0	10	3	1	0	0	0	0	5	10	0	29
1990	0	0	15	2	1	0	0	0	0	3	14	0	35
1991	0	0	21	2	0	0	0	0	0	2	16	0	41
1992	0	0	21	5	0	0	0	0	0	3	11	0	40
1993	0	0	7	3	1	1	0	0	0	7	11	0	30
1994	0	0	9	2	0	0	1	0	0	6	10	0	28
1995	0	0	12	1	0	0	0	2	0	7	9	0	31
1996	0	0	21	6	0	0	0	0	0	4	8	0	39
1997	0	0	11	7	0	0	0	0	0	4	5	0	27
1998	0	0	10	10	1	0	0	0	0	4	10	0	35
1999	0	0	10	6	2	0	0	0	0	1	12	0	31
2000	0	0	17	3	0	0	0	0	0	3	10	0	33
2001	0	0	16	1	1	0	0	0	0	3	10	0	31
2002	0	0	9	3	0	1	0	0	0	2	5	0	21
2003	0	0	11	2	1	0	0	0	0	3	14	0	31

Table 3 Unit 5 successful brown bear hunter residency, RY 1991 through 2003

Regulatory year	Local resident	(%)	Nonlocal resident	(%)	Nonresident	(%)
1991						
Fall 1991	3	(13)	3	(13)	17	(74)
Spring 1992	2	(11)	0	(0)	16	(89)
Total	5	(12)	3	(7)	33	(80)
1992						
Fall 1992	2	(8)	4	(15)	20	(77)
Spring 1993	1	(7)	4	(29)	9	(64)
Total	3	(8)	8	(20)	29	(73)
1993						
Fall 1993	1	(8)	3	(25)	8	(67)
Spring 1994	0	(0)	5	(28)	13	(72)
Total	1	(3)	8	(27)	21	(70)
1994						
Fall 1994	1	(9)	1	(9)	9	(82)
Spring 1995	2	(12)	0	(0)	15	(88)
Total	3	(11)	1	(4)	24	(86)
1995						
Fall 1995	1	(8)	0	(0)	12	(92)
Spring 1996	2	(11)	3	(17)	13	(72)
Total	3	(10)	3	(10)	25	(81)
1996						
Fall 1996	1	(4)	6	(23)	19	(73)
Spring 1997	1	(8)	2	(17)	9	(75)
Total	2	(5)	8	(21)	28	(74)
1997						
Fall 1997	1	(6)	4	(22)	13	(72)
Spring 1998	0	(0)	0	(0)	9	(100)
Total	1	(4)	4	(15)	22	(81)
1998						
Fall 1998	2	(10)	5	(24)	14	(66)
Spring 1999	0	(0)	2	(14)	12	(86)
Total	2	(6)	7	(20)	26	(74)
1999						
Fall 1999	2	(11)	1	(6)	15	(83)
Spring 2000	0	(0)	1	(8)	12	(92)
Total	2	(6)	2	(6)	27	(88)
2000						
Fall 2000	3	(15)	3	(15)	14	(70)
Spring 2001	0	(0)	0	(0)	13	(100)
Total	3	(9)	3	(9)	27	(82)

Table 3 continued

Regulatory year	Local resident	(%)	Nonlocal resident	(%)	Nonresident	(%)
2001						
Fall 2001	3	(18)	5	(29)	9	(53)
Spring 2002	5	(36)	0	(0)	9	(64)
Total	8	(26)	5	(16)	18	(58)
2002						
Fall 2002	1	(7)	1	(7)	11	(86)
Spring 2003	0	(0)	3	(38)	5	(62)
Total	1	(5)	4	(19)	16	(76)
2003						
Fall 2003	2	(14)	1	(7)	11	(79)
Spring 2004	0	(0)	2	(12)	15	(88)
Total	2	(6)	3	(10)	26	(84)

Table 4 Unit 5 transport modes used by successful brown bear hunters, RY 1991 through 2003

Regulatory year	Plane	(%)	Boat	(%)	ORV/4 wheeler	(%)	Highway vehicle	(%)	Foot	(%)	Other	(%)
1991	22	(54)	9	(22)	4	(10)	0	(0)	2	(5)	4	(10)
1992	22	(55)	10	(25)	0	(0)	4	(10)	3	(8)	1	(3)
1993	19	(63)	7	(23)	0	(0)	0	(0)	4	(13)	0	(0)
1994	16	(57)	6	(21)	0	(0)	1	(4)	4	(14)	1	(4)
1995	23	(74)	4	(13)	0	(0)	2	(6)	1	(3)	1	(3)
1996	30	(79)	7	(18)	0	(0)	1	(3)	0	(0)	0	(0)
1997	17	(63)	7	(26)	1	(4)	2	(7)	0	(0)	0	(0)
1998	25	(72)	4	(11)	1	(3)	4	(11)	1	(3)	0	(0)
1999	11	(35)	11	(35)	6	(20)	3	(10)	0	(0)	0	(0)
2000	5	(15)	18	(55)	7	(21)	3	(9)	0	(0)	0	(0)
2001	12	(39)	14	(45)	3	(10)	2	(6)	0	(0)	0	(0)
2002	4	(18)	9	(41)	7	(32)	2	(9)	0	(0)	0	(0)
2003	9	(29)	9	(29)	12	(39)	0	(0)	1	(3)	0	(0)

Table 5 Unit 5 brown bear mortality by type, RY 1999 through 2003

Regulatory Year	DLP	Unknown/ Natural	Vehicle Collision	Unclaimed kill	Other	Hunter Kill	Total Mortality
1999	2	0	1	3		31	37
2000	1	0	0	0		33	34
2001	3	0	0	1		31	35
2002	5	0	1	0	1	21	28
2003	9	2	1	0		33	45

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 6 (10,140 mi²)

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Brown bears inhabit most of Unit 6, with the exception of the islands and mainland of western Unit 6D and Middleton Island in the Gulf of Alaska. Brown bears are common on the mainland east of Columbia Glacier to Icy Bay and on Hinchinbrook, Montague, Hawkins, and Kayak Islands. Distribution in Unit 6D appears unchanged from that observed by Heller (1910). Brown bear numbers increased during the mid to late 1990s in Unit 6. The bear population on Montague Island recovered from excessive harvest that occurred during the 1970s and early 1980s. The fall hunting season on Montague was closed in 1989 and the spring season closed in 1994. The Board of Game reopened the Montague bear season in response to an increasing population and many complaints of aggressive bears in popular deer hunting areas.

Harvest is monitored by mandatory sealing that began in 1961. Total annual harvest increased substantially in the late 1980s and continued at a high level through 1992–1993. Average annual kill during regulatory years 1961–1962 through 1986–1987 was 32 bears (range = 14–63). During 1987–1988 through 1991–1992, the average yearly harvest was 50 bears (range = 40–60). Most of the increased harvest was in Unit 6D, probably resulting in a population decline. Because of seasonal restrictions established to reduce harvest, the average harvest in Unit 6 declined to 35 bears (range = 22–49) from 1992–1993 through 1997–1998.

The Board of Game changed the bag limit for brown bears in Units 6A, 6B, and 6C from 1 bear every 4 years to 1 bear a year beginning in 1997 for resident hunters and in 2001 for all hunters. This was in response to low moose calf survival in Unit 6B and increasing bear numbers in these units.

Logging threatens brown bear abundance and distribution in Unit 6A. Extensive clearcutting of old-growth timber on private and state land occurred between Icy Bay and Cape Yakataga, and is in progress in the Yakataga and Duktoth river drainages. Old-growth stands are important habitat for coastal bears (Schoen 1990; Schoen and Beier 1990; Schoen et al. 1986). Logging also provides access roads, increases human activity, and stimulates developments that increase bear-human interactions and lead to increased brown bear mortality (McLellan and Shackleton 1988; Smith and VanDaele 1989). The proposed Carbon Mountain logging road would increase human access to remote backcountry in Units 6A and 6B. The Exxon Valdez Oil Spill (EVOS) Trustee

Council has recently acquired or protected most lands scheduled for timber harvest in Unit 6D, thus removing the threat of continued, large-scale habitat loss in Prince William Sound (PWS).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Maintain a brown bear population capable of sustaining a minimum annual harvest of 35 bears to include a minimum of 60% males, with a minimum average skull size of 23 inches.

METHODS

Griese (1991) established baseline estimates of brown bear numbers and density in Unit 6. Bear habitat was defined as nonglaciated land below 3000 ft elevation, quantified by harvest areas (major drainages or other gross geographical characteristics), and summed for each unit. Griese (1991) estimated bear density and numbers within harvest areas using den and track surveys and local knowledge. Densities were extrapolated to entire harvest areas. In recent years track and den surveys were conducted on Hinchinbrook and Montague Islands only. Surveys were timed with the peak emergence of brown bears from dens, which varied annually with snow conditions. An unknown proportion of bears wander the alpine regions of the islands for several days after emergence from dens, leaving easily observable tracks in the snow. Tracks, dens, and bears above 1000 feet elevation were tallied and linear density estimated as $[(\text{tracks}/2) + \text{dens} + \text{bears}] / \text{miles searched}$. I also calculated observations per hour as an additional index for comparison.

The annual allowable harvest of bears on Hinchinbrook and Montague Islands was estimated as 5.7% of the total population. For females older than 2 years it was estimated as 2.5% of the population (Miller 1988, 1990). Harvest of all populations was monitored through bear sealing.

I estimated the total harvest by summing reported harvest and estimated illegal kill. The reported harvest included all bears that were sealed after being taken by hunters or killed for other reasons, such as defense of life or property (DLP). Information collected included sex, age, and skull size of the bear, date and location of kill, hunter residency, number of days hunted, and method of transportation. Unsuccessful hunters were not required to report. I estimated the illegal kill based on previous years' estimates (Nowlin 1998) and anecdotal information.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Based on spring track and den surveys, Hinchinbrook Island in Unit 6D had a stable population of about 105 bears, while Montague Island had an increasing population of about 86 bears (Table 1). The number of tracks varied widely among survey years, which probably reflected the age and distribution of snow coverage more than the bear population. After hunting was closed on the island, Montague bears were managed under the assumption that they were sensitive to overharvest because the population was small and relatively isolated from the mainland. Inbreeding in small, isolated populations probably reduced genetic variability and may increase the danger of extinction (Mills and Smouse 1994; Randi et al. 1994). However, genetic isolation is not complete on Montague. During the 1980s and 1990s, 6–8 nuisance brown bears were

transported from Valdez and Cordova and released on Montague Island. In addition, empirical and anecdotal evidence suggests that bears occasionally swim between Hinchinbrook and Montague Islands, a distance of at least 7 miles in open seas and strong tidal currents.

Density estimates for Unit 6 compared favorably to Miller's (1993) estimates from elsewhere in southern coastal Alaska. Hinchinbrook Island was within a high-density range (>175 bears/1000 km²) that included Kodiak Island, much of the Alaska Peninsula, and parts of Southeast Alaska. Montague Island had a midrange density (40–175 bears/1000 km²), consistent with contiguous coastal habitat to the southeast and with the northern Alaska Peninsula.

MORTALITY

Harvest

Season and Bag Limit. The hunting season for all hunters in Units 6A–C was 1 September–31 May. The Unit 6D season, except Montague Island, was 15 October–25 May for all hunters. Bag limit was 1 bear every regulatory year in Units 6A–C, and 1 bear every 4 regulatory years for Unit 6D. Bear hunting was open on Montague Island 15 October–30 November to residents only by registration permit with a harvest quota of 4 bears. Taking cubs (bears ≤ 2 years old) or a female accompanied by cubs was prohibited.

Board of Game Actions and Emergency Orders. I closed the season on Montague Island by emergency order after 3 bears were harvested in 2002, anticipating that a fourth bear had been killed but not yet reported.

Hunter Harvest. Reported kill during 2002–2003 and 2003–2004 for Unit 6 was 43 and 56, respectively (Table 2). Most of the harvest occurred in Units 6A (27 and 26 bears per year), and 6D (9 and 17 bears per year). Although the number of bears reported in the harvest for Montague Island was only 7, the number of complaints from deer hunters decreased substantially, and the U.S. Forest Service reported that cabins routinely ransacked by bears were undamaged. There was one DLP bear killed on Montague during 2002–2003.

During the reporting period females were 49% and 32% of the reported kill (Table 2). The high proportion of females taken during 2002–2003 was unusual. Fewer bears were taken overall, but females were more vulnerable to harvest in Units 6B–D. Mean skull sizes among males were 25 and 24 inches, similar to mean skull sizes from the past 5 years. (Table 3, Figure 1). Average skull size for males has been on an increasing trend during the last 10 years (Figure 1). Female skull size remained unchanged at 21 inches. Average age of males and females was relatively stable during the reporting period and the last 10 years (Figure 2, Table 3).

Hunter Residency. Nonresidents harvested the majority of brown bears in Unit 6 during 2002–2003 (63%) and 2003–2004 (57%) (Table 4). Nonresident harvest was most prevalent in Unit 6A. Nonlocal residents killed the majority of bears in Unit 6D during the combined reporting period.

Harvest Chronology. Peak brown bear harvests occurred during September and May during the reporting period (Table 5). Seasonal chronology varied by year and unit, with most bears taken in the fall in Unit 6A, a near even split in Units 6B and 6C, and spring in 6D.

Transport Methods. Airplanes were the most important method of transportation overall in Unit 6 (Table 6). In Unit 6C, highway vehicles and boats predominated because of road and boat launch access. In Unit 6D, boats and aircraft were important because of the sheltered waters of PWS. These patterns were typical of the past 5 years (Table 6).

Other Mortality

There were 7 bears killed as DLP or by highway vehicle during 2002–2003 and none reported the next year (Table 2). Estimated illegal kill totaled 7 and 10 bears, respectively. This was similar to the last reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

As clearcut logging continues in Unit 6A, brown bear habitat quality will decline, access will improve, and nonhunting mortality may increase. The Alaska Mental Health Trust removed timber that had been retained by previous operators as buffers and wildlife habitat in eastern Unit 6A. The University of Alaska logging operation moved into the Yakataga and Duktoth River watersheds north of Cape Yakataga. Neither state agency is required to protect brown bear habitat.

CONCLUSIONS AND RECOMMENDATIONS

We achieved our management objectives for brown bears in Unit 6. We maintained a population capable of sustaining a harvest of 35 bears and had a minimum of 60% males in the kill (combined reporting years) with an average skull size of at least 23 inches.

Brown bear numbers were stable during the reporting period except for Montague Island, where they were probably increasing. Brown bear den and track surveys should continue on Montague and Hinchinbrook Islands. I will attempt to refine track and den surveys by weighting the index with: 1) age of snow, 2) percent coverage snow, and 3) relative age of tracks. For example, the number of tracks in snow older than 1 week may be more indicative if divided by 3 rather than 2.

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PREPARED BY:

David W. Crowley
Wildlife Biologist III

SUBMITTED BY:

Gino Del Frate
Management Coordinator

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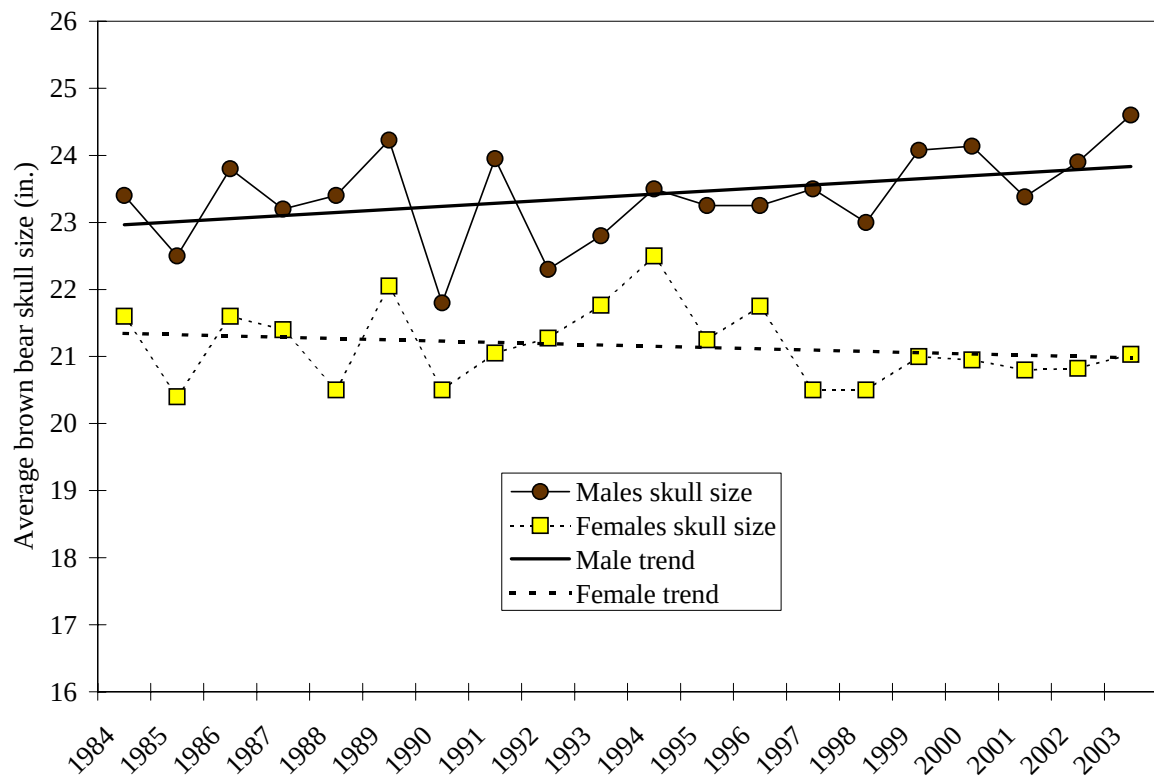


Figure 1 Average skull size of brown bears harvested in Unit 6.

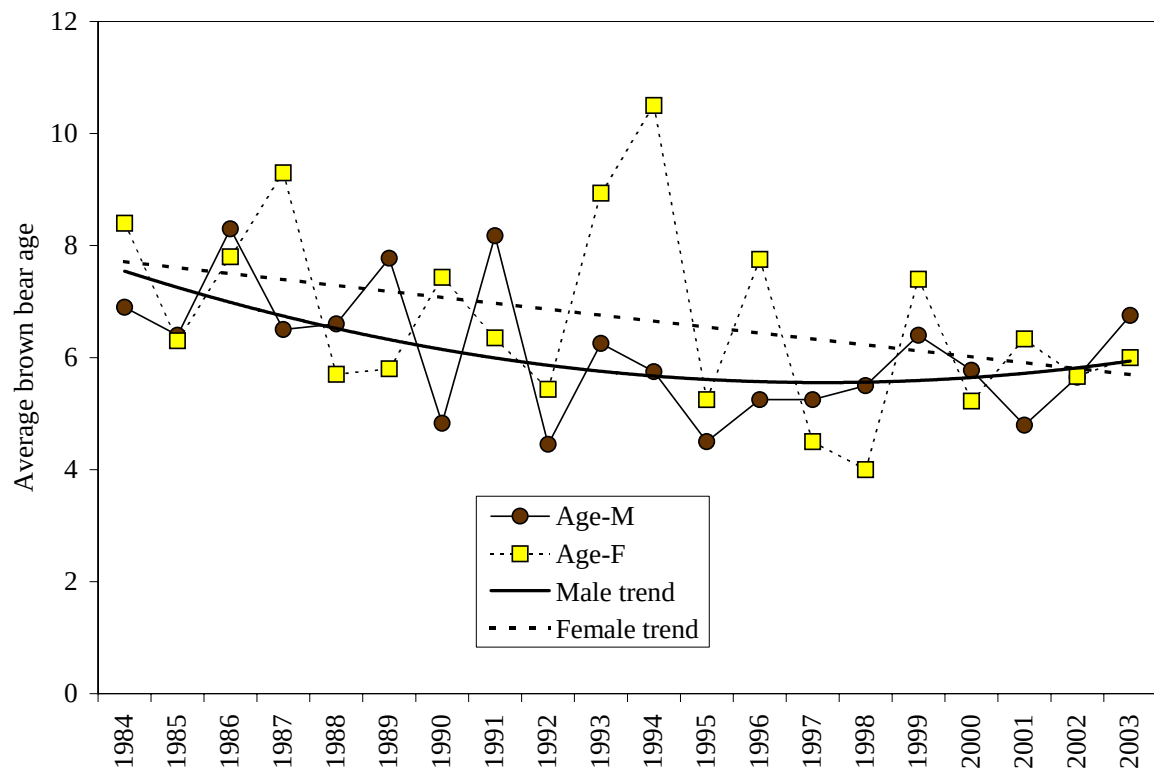


Figure 2 Average age of brown bears harvested in Unit 6.

Table 1 Brown bear population estimates and harvest quotas based on indices of linear density and previous year's harvest in Unit 6D.

Area	Regulatory year	Observations			Miles searched	Linear density index		Estimated population ^a	Harvest quota		Reported harvest	
		tracks	dens	bears		$[(t/2)+d+b]/m$	Obs/hr		Total bears	Females age >2	Total bears	Females age >2
Hinchinbrook Island	1990–1991	34	8	0	100	0.25	38.1	105	6	3	12	5
	1993–1994	26	9	0	100	0.22	7.9	90	5	2	5	0
	2003–2004	124	9	0	148	0.48	25.2	105	6	3	6	1
Montague Island	1989–1990	10	4	0	165	0.05	8.8	41	2	1	1	1
	2000–2001	58	3	0	210	0.15	18.2	69	4	2	0	0
	2001–2002	80	3	0	210	0.21	22.5	73	4	2	4	0
	2002–2003	134	1	0	210	0.32	26.6	84	5	2	3	0
	2003–2004	74	7	0	163	0.27	31.4	86	5	2	0	0

^aMidpoint of range estimate (+/- 30%)

Table 2 Unit 6 brown bear harvest, 1999–2003

Unit	Regulatory year	Reported								Estimated						
		Hunter kill					Nonhunting			illegal kill	Total estimated kill					
		M	F	(%)	Unk	Total	M	F	Unk.		M	(%)	F	(%)	Unk	Total
6A	1999–2000															
	Fall 99	12	4	(25)	0	16	1	0	0	1	13	(76)	4	(24)	1	18
	Spring 00	2	2	(50)	0	4	0	0	0	1	2	(50)	2	(50)	1	5
	Total	14	6	(30)	0	20	1	0	0	2	15	(71)	6	(29)	2	23
	2000–2001															
	Fall 00	9	7	(44)	0	16	0	0	0	2	9	(56)	7	(44)	2	18
	Spring 01	2	2	(50)	0	4	0	0	0	1	2	(50)	2	(50)	1	5
	Total	11	9	(45)	0	20	0	0	0	3	11	(55)	9	(45)	3	23
	2001–2002															
	Fall 01	5	2	(29)	0	7	0	1	0	2	5	(63)	3	(38)	2	10
	Spring 02	2	0	(0)	0	2	0	0	0	1	2	(100)	0	(0)	1	3
	Total	7	2	(22)	0	9	0	1	0	3	7	(70)	3	(30)	3	13
	2002–2003															
	Fall 02	9	7	(44)	0	16	2	0	0	2	11	(61)	7	(39)	2	20
	Spring 03	9	2	(18)	0	11	0	0	0	1	9	(82)	2	(18)	1	12
	Total	18	9	(33)	0	27	2	0	0	3	20	(69)	9	(31)	3	32
	2003–2004															
	Fall 03	7	11	(61)	0	18	0	0	0	2	7	(39)	11	(61)	2	20
	Spring 04	7	1	(13)	0	8	0	0	0	1	7	(88)	1	(13)	1	9
	Total	14	12	(46)	0	26	0	0	0	3	14	(54)	12	(46)	3	29

Table 2 Continued

Unit	Regulatory year	Reported								Estimated illegal kill	Estimated					
		Hunter kill					Nonhunting				Total estimated kill					
		M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
6B	1999–2000															
	Fall 99	0	1	(100)	0	1	0	0	0	1	0	(0)	1	(100)	1	2
	Spring 00	2	0	(0)	0	2	0	0	0	1	2	(100)	0	(0)	1	3
	Total	2	1	(33)	0	3	0	0	0	2	2	(67)	1	(33)	2	5
	2000–2001															
	Fall 00	1	1	(50)	0	2	0	0	0	1	1	(50)	1	(50)	1	3
	Spring 01	4	0	(0)	0	4	0	0	0	0	4	(100)	0	(0)	0	4
	Total	5	1	(17)	0	6	0	0	0	1	5	(83)	1	(17)	1	7
	2001–2002															
	Fall 01	1	3	(75)	0	4	0	0	0	1	1	(25)	3	(75)	1	5
	Spring 02	3	1	(25)	0	4	0	0	0	0	3	(75)	1	(25)	0	4
	Total	4	4	(50)	0	8	0	0	0	1	4	(50)	4	(50)	1	9
	2002–2003															
	Fall 02	0	1	(100)	0	1	1	0	0	1	1	(50)	1	(50)	1	3
	Spring 03	0	1	(100)	0	1	0	0	0	0	0	(0)	1	(100)	0	1
	Total	0	2	(100)	0	2	1	0	0	1	1	(33)	2	(67)	1	4
	2003–2004															
	Fall 03	3	0	(0)	0	3	0	0	0	2	3	(100)	0	(0)	2	5
	Spring 04	4	0	(0)	0	4	0	0	0	1	4	(100)	0	(0)	1	5
	Total	7	0	(0)	0	7	0	0	0	3	7	(100)	0	(0)	3	10

Table 2 Continued

Unit	Regulatory year	Reported								Estimated illegal kill	Estimated					
		Hunter kill					Nonhunting				Total estimated kill					
		M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
6C	1999–2000															
	Fall 99	2	1	(30)	0	3	0	0	0	1	2	(67)	1	(33)	1	4
	Spring 00	3	0	(0)	0	3	0	0	0	1	3	(100)	0	(0)	1	4
	Total	5	1	(17)	0	6	0	0	0	2	5	(83)	1	(17)	2	8
	2000–2001															
	Fall 00	0	1	(100)	0	1	0	0	0	1	0	(0)	1	(100)	1	2
	Spring 01	2	1	(33)	0	3	0	0	0	0	2	(67)	1	(33)	0	3
	Total	2	2	(50)	0	4	0	0	0	1	2	(50)	2	(50)	1	5
	2001–2002															
	Fall 01	2	0	(0)	0	2	0	0	0	1	2	(100)	0	(0)	1	3
	Spring 02	2	0	(0)	0	2	0	0	0	0	2	(100)	0	(0)	0	2
	Total	4	0	(0)	0	4	0	0	0	1	4	(100)	0	(0)	1	5
	2002–2003															
	Fall 02	0	3	(100)	0	3	0	0	0	1	0	(0)	3	(100)	1	4
	Spring 03	1	1	(50)	0	2	0	0	0	0	1	(50)	1	(50)	0	2
	Total	1	4	(80)	0	5	0	0	0	1	1	(20)	4	(80)	1	6
	2003–2004															
	Fall 03	2	1	(33)	0	3	0	0	0	1	2	(67)	1	(33)	1	4
	Spring 04	2	1	(33)	0	3	0	0	0	0	2	(67)	1	(33)	0	3
	Total	4	2	(33)	0	6	0	0	0	1	4	(67)	2	(33)	1	7

Table 2 Continued

Unit	Regulatory year	Reported								Estimated						
		Hunter kill					Nonhunting			illegal kill	Total estimated kill					
		M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
6D	1999–2000															
	Fall 99	2	3	(60)	0	5	1	0	0	4	3	(50)	3	(50)	4	10
	Spring 00	8	4	(33)	0	12	0	0	0	0	8	(67)	4	(33)	0	12
	Total	10	7	(41)	0	17	1	0	0	4	11	(61)	7	(39)	4	22
	2000–2001															
	Fall 00	4	2	(33)	0	6	3	0	0	2	7	(78)	2	(22)	2	11
	Spring 01	9	1	(10)	1	11	0	0	0	0	9	(90)	1	(10)	1	11
	Total	13	3	(19)	1	17	3	0	0	2	16	(84)	3	(16)	3	22
	2001–2002															
	Fall 01	7	4	(36)	0	11	1	0	0	2	8	(67)	4	(33)	2	14
	Spring 02	11	0	(0)	0	11	0	0	0	0	11	(100)	0	(0)	0	11
	Total	18	4	(18)	0	22	1	0	0	2	19	(83)	4	(17)	2	25
	2002–2003															
	Fall 02	1	4	(80)	0	5	1	2	0	2	2	(25)	6	(75)	2	10
	Spring 03	2	2	(50)	0	4	1	0	0	0	3	(60)	2	(40)	0	5
	Total	3	6	(67)	0	9	2	2	0	2	5	(38)	8	(62)	2	15
	2003–2004															
	Fall 03	4	1	(20)	0	5	0	0	0	2	4	(80)	1	(20)	2	7
	Spring 04	9	3	(25)	0	12	0	0	0	1	9	(75)	3	(25)	1	13
	Total	13	4	(24)	0	17	0	0	0	3	13	(76)	4	(24)	3	20

Table 2 Continued

		Regulatory year	Reported							Estimated							
			Hunter kill				Nonhunting			illegal kill	Total estimated kill						
Unit			M	F	(%)	Unk.	Total	M	F		Unk.	M	(%)	F	(%)	Unk.	Total
Unit 6	1999–2000																
Total	Fall 99	16	9	(36)	0	25	2	0	0	7	18	(67)	9	(33)	7	34	
	Spring 00	15	6	(29)	0	21	0	0	0	3	15	(71)	6	(29)	3	24	
	Total	31	15	(33)	0	46	2	0	0	10	33	(69)	15	(31)	10	58	
	2000–2001																
	Fall 00	14	11	(44)	0	25	3	0	0	6	17	(61)	11	(39)	6	34	
	Spring 01	17	4	(19)	1	22	0	0	0	1	17	(81)	4	(19)	2	23	
	Total	31	15	(33)	1	47	3	0	0	7	34	(69)	15	(31)	8	57	
	2001–2002																
	Fall 01	15	9	(38)	0	24	1	1	0	6	16	(62)	10	(38)	6	32	
	Spring 02	18	1	(5)	0	19	0	0	0	1	18	(95)	1	(5)	1	20	
	Total	33	10	(23)	0	43	1	1	0	7	34	(76)	11	(24)	7	52	
	2002–2003																
	Fall 02	10	15	(60)	0	25	4	2	0	6	14	(45)	17	(55)	6	37	
	Spring 03	12	6	(33)	0	18	1	0	0	1	13	(68)	6	(32)	1	20	
	Total	22	21	(49)	0	43	5	2	0	7	27	(54)	23	(46)	7	57	
	2003–2004																
	Fall 03	16	13	(45)	0	29	0	0	0	7	16	(55)	13	(45)	7	36	
	Spring 04	22	5	(19)	0	27	0	0	0	3	22	(81)	5	(19)	3	30	
	Total	38	18	(32)	0	56	0	0	0	10	38	(68)	18	(32)	10	66	

Table 3 Unit 6 brown bear mean skull size and age, 1999–2003

Unit	Year	Males				Females			
		Skull size	<i>n</i>	Age	<i>n</i>	Skull size	<i>n</i>	Age	<i>n</i>
6A	1999–2000	23	14	6	14	21	6	4	6
	2000–2001	23	11	6	11	22	8	6	9
	2001–2002	24	7	4	7	20	3	7	3
	2002–2003	25	20	7	20	21	9	5	9
	2003–2004	26	13	8	13	21	10	7	10
6B	1999–2000	28	2	10	2	20	1	3	1
	2000–2001	24	4	5	5	20	1	3	1
	2001–2002	24	4	5	4	22	3	7	3
	2002–2003	19	1	3	1	19	2	3	2
	2003–2004	24	7	6	7		0		0
6C	1999–2000	22	5	3	5	22	1	16	1
	2000–2001	25	2	6	2	21	2	3	2
	2001–2002	23	3	4	3		0	0	0
	2002–2003	25	1	8	1	22	4	6	4
	2003–2004	24	4	6	4	21	2	4	2
6D	1999–2000	24	11	6	8	21	6	6	7
	2000–2001	24	18	6	16	21	3	9	3
	2001–2002	23	19	6	19	20	4	5	4
	2002–2003	21	5	5	5	22	8	8	8
	2003–2004	24	13	7	13	21	4	3	4
Unit 6	1999–2000	24	32	6	29	21	14	7	15
Total	2000–2001	24	35	6	34	21	14	5	15
	2001–2002	23	33	5	33	21	10	6	10
	2002–2003	24	27	6	27	21	23	6	23
	2003–2004	25	37	7	37	21	16	6	16

Table 4 Unit 6 brown bear successful hunter residency, 1999–2003

Unit	Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Residency unknown	(%)	Total Successful hunters
6A	1999–2000	3	(15)	3	(15)	14	(70)	0	(0)	20
	2000–2001	2	(10)	5	(25)	13	(65)	0	(0)	20
	2001–2002	1	(11)	2	(22)	6	(67)	0	(0)	9
	2002–2003	3	(11)	0	(0)	24	(89)	0	(0)	27
	2003–2004	3	(12)	5	(19)	18	(69)	0	(0)	26
6B	1999–2000	1	(33)	0	(0)	2	(67)	0	(0)	3
	2000–2001	3	(50)	1	(17)	2	(33)	0	(0)	6
	2001–2002	3	(38)	0	(0)	5	(63)	0	(0)	8
	2002–2003	1	(50)	0	(0)	1	(50)	0	(0)	2
	2003–2004	2	(29)	2	(29)	3	(43)	0	(0)	7
6C	1999–2000	5	(83)	1	(17)	0	(0)	0	(0)	6
	2000–2001	3	(75)	1	(25)	0	(0)	0	(0)	4
	2001–2002	2	(50)	1	(25)	1	(25)	0	(0)	4
	2002–2003	4	(80)	1	(20)	0	(0)	0	(0)	5
	2003–2004	1	(17)	2	(33)	3	(50)	0	(0)	6
6D	1999–2000	2	(12)	5	(29)	10	(59)	0	(0)	17
	2000–2001	2	(12)	4	(24)	11	(65)	0	(0)	17
	2001–2002	0	(0)	13	(59)	9	(41)	0	(0)	22
	2002–2003	0	(0)	7	(78)	2	(22)	0	(0)	9
	2003–2004	1	(6)	8	(47)	8	(47)	0	(0)	17
Unit 6	1999–2000	11	(24)	9	(20)	26	(57)	0	(0)	46
Total	2000–2001	10	(21)	11	(23)	26	(55)	0	(0)	47
	2001–2002	6	(14)	16	(37)	21	(49)	0	(0)	43
	2002–2003	8	(19)	8	(19)	27	(63)	0	(0)	43
	2003–2004	7	(13)	17	(30)	32	(57)	0	(0)	56

Table 5 Unit 6 brown bear harvest chronology by percent, 1999–2003

Unit	Regulatory year	Harvest periods										n
		September		October		November		April		May		
		1–15	16–30	1–15	16–31	1–15	16–30	1–15	16–30	1–15	16–31	
6A	1999–2000	(25)	(25)	(30)	(0)	(0)	(0)	(0)	(10)	(5)	(5)	20
	2000–2001	(40)	(25)	(5)	(10)	(0)	(0)	(0)	(10)	(5)	(5)	20
	2001–2002	(56)	(11)	(0)	(11)	(0)	(0)	(0)	(0)	(22)	(0)	9
	2002–2003	(30)	(15)	(15)	(0)	(0)	(0)	(0)	(7)	(26)	(7)	27
	2003–2004	(35)	(8)	(27)	(0)	(0)	(0)	(0)	(0)	(8)	(23)	26
6B	1999–2000	(0)	(33)	(0)	(0)	(0)	(0)	(0)	(67)	(0)	(0)	3
	2000–2001	(33)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(33)	(33)	6
	2001–2002	(13)	(0)	(25)	(13)	(0)	(0)	(0)	(13)	(25)	(13)	8
	2002–2003	(0)	(50)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(50)	2
	2003–2004	(29)	(14)	(0)	(0)	(0)	(0)	(0)	(14)	(14)	(29)	7
6C	1999–2000	(17)	(0)	(17)	(17)	(0)	(0)	(33)	(17)	(0)	(0)	6
	2000–2001	(25)	(0)	(0)	(0)	(0)	(0)	(0)	(50)	(25)	(0)	4
	2001–2002	(0)	(0)	(50)	(0)	(0)	(0)	(0)	(0)	(0)	(50)	4
	2002–2003	(60)	(0)	(0)	(0)	(0)	(0)	(0)	(20)	(20)	(0)	5
	2003–2004	(17)	(33)	(0)	(0)	(0)	(0)	(0)	(0)	(33)	(17)	6
6D	1999–2000	(0)	(0)	(0)	(24)	(6)	(0)	(0)	(0)	(29)	(41)	17
	2000–2001	(0)	(0)	(6)	(29)	(0)	(0)	(6)	(6)	(6)	(47)	17
	2001–2002	(0)	(0)	(0)	(41)	(9)	(0)	(0)	(0)	(14)	(36)	22
	2002–2003	(0)	(0)	(0)	(44)	(11)	(0)	(0)	(0)	(33)	(11)	9
	2003–2004	(0)	(0)	(6)	(24)	(0)	(0)	(0)	(6)	(29)	(35)	17
Unit 6 Total	1999–2000	(13)	(13)	(15)	(11)	(2)	(0)	(4)	(11)	(13)	(17)	46
	2000–2001	(23)	(11)	(4)	(15)	(0)	(0)	(2)	(11)	(11)	(23)	47
	2001–2002	(14)	(2)	(9)	(26)	(5)	(0)	(0)	(2)	(16)	(26)	43
	2002–2003	(26)	(12)	(9)	(9)	(2)	(0)	(0)	(7)	(26)	(9)	43
	2003–2004	(21)	(9)	(14)	(7)	(0)	(0)	(0)	(4)	(18)	(27)	56

Table 6 Unit 6 brown bear harvest percent by transport method, 1999–2003

Unit	Regulatory year	Percent of harvest							Unknown	<i>n</i>
		Airplane	Boat	Airboat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle		
6A	1999–2000	90	0	0	0	0	0	0	10	20
	2000–2001	80	0	0	15	0	0	5	0	20
	2001–2002	67	0	0	22	0	0	0	11	9
	2002–2003	96	0	0	0	0	0	0	4	27
	2003–2004	73	12	0	8	0	0	4	4	26
6B	1999–2000	67	0	0	0	0	0	33	0	3
	2000–2001	50	0	0	0	0	0	50	0	6
	2001–2002	38	13	0	0	13	0	13	25	8
	2002–2003	0	50	0	0	0	0	50	0	2
	2003–2004	43	14	0	0	0	0	29	14	7
6C	1999–2000	0	17	0	17	17	0	50	0	6
	2000–2001	0	0	0	50	0	0	50	0	4
	2001–2002	25	0	0	0	0	0	75	0	4
	2002–2003	0	20	0	0	0	0	60	20	5
	2003–2004	17	17	0	33	0	0	17	17	6
6D	1999–2000	71	24	0	0	6	0	0	0	17
	2000–2001	41	53	0	0	0	0	0	6	17
	2001–2002	36	59	0	5	0	0	0	0	22
	2002–2003	33	67	0	0	0	0	0	0	9
	2003–2004	35	65	0	0	0	0	0	0	17
Total	1999–2000	70	11	0	2	4	0	9	4	46
	2000–2001	55	19	0	11	0	0	13	2	47
	2001–2002	42	33	0	7	2	0	9	7	43
	2002–2003	67	19	0	0	0	0	9	5	43
	2003–2004	52	29	0	7	0	0	7	5	56

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNITS: 7 (3520 mi²) and 15 (4876 mi²)

GEOGRAPHIC DESCRIPTION: Kenai Peninsula

BACKGROUND

Brown bears are found throughout the remote lowland forests and intermountain valleys of the Kenai Peninsula, excluding coastal portions of Unit 7 and the eastern side of Kachemak Bay. Historical brown bear range remains occupied except in developed areas. Field observations and data analyses indicate brown bear densities are highest in the forested lowlands and subalpine areas west of the Kenai Mountains.

Seventy-one percent of the Kenai Peninsula is federal land. The U.S. Forest Service (USFS) (Chugach National Forest, 2000 mi²) and the National Park Service (NPS) (Kenai Fjords National Park, 885 mi²) are the principal landowners in Unit 7. In Unit 15 the U.S. Fish and Wildlife Service (FWS) (Kenai National Wildlife Refuge) is the primary landowner responsible for management of 3062 mi². Ownership of the remaining 29% of the Kenai varies among municipal, state, Native corporation, and private lands.

Brown bears were first given game status in 1902 (Miller 1990) with liberal seasons and bag limits. For example, in 1937–38 the season was 1 September–20 June, with a bag limit of 2 bears for coastal areas in Southcentral and all of southeastern Alaska. The rest of the state did not have a closed season and there was no bag limit. At the time of statehood, the bag limit was 1 brown bear on the Kenai. The bag limit was further reduced in 1967 from 1 bear per year to 1 every 4 years. Cubs and sows with cubs were protected in the early 1970s. The season dates have ranged from 20 to 45 days. In 1978 a 10-day spring season was opened for Unit 15 and extended to a 15-day season in 1980.

More restrictive regulations were needed beginning in 1989 with a reduction of the fall season by 14 days. This change was to reduce the incidental take of brown bears by moose hunters. During the spring 1994 Board of Game meeting, the board shortened and moved the fall season to 1–25 October in response to continued high harvests. The board again addressed the bear season in 1997 and authorized the Department of Fish and Game (ADF&G) to operate the hunts as registration permit hunts. The season dates were changed to 15–31 October. The fall seasons from 1995 to 1998 and the spring of 1999 were closed by emergency order because additional harvests would have exceeded management objectives. Because of these closures, we determined that only one season would be allowable on the Kenai to stay within management objectives, and

the Board of Game authorized a fall-only registration hunt with a bag limit of 1 bear every 4 years and season dates of 15–31 October.

In 1984 representatives of ADF&G, FWS, and USFS formed an Interagency Brown Bear Study Team (IBBST) to discuss brown bear management and research needs on the Kenai Peninsula and to coordinate joint studies. The NPS joined this effort in 1990. This group has coordinated many projects that have increased our understanding of brown bear ecology. The IBBST coordinated a baseline inventory (Bevins et al. 1984, Risdahl et al. 1986) of salmon streams and known high-use brown bear areas and performed detailed ground and habitat surveys (Schloeder et al. 1987, Jacobs et al. 1988).

A cumulative effects model was developed to identify brown bear habitat on the Kenai at risk from human activities (Suring et al. 1998). In 1995 ADF&G initiated a research project in cooperation with the other members of the IBBST to evaluate the cumulative effects model, assess brown bear habitat, estimate survival of bears, and ultimately model the brown bear population on the Kenai (Schwartz and Arthur 1996, Schwartz et al. 1999).

More recently the IBBST has focused research on the dietary requirements of Kenai Peninsula brown bears (Jacoby et al. 1999, Hilderbrand et al. 1999a), the importance of marine nitrogen in the ecosystem (Hilderbrand et al. 1999b), and the physiological effects of diet on reproduction (Hilderbrand et al. 2000).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

New management objective were generated during this report period and are outlined below.

- Maintain a healthy brown bear population.
- Minimize negative brown bear/human interactions.
- Do not exceed 20 human-caused brown bear mortalities (including a maximum of 8 females older than 1 year) calculated as the average annual mortality based on the most recent 3 years.

METHODS

Cost-effective survey techniques to determine brown bear population size over large forested areas have not been developed and tested. We derived a population estimate for the Kenai by combining results from a habitat-based model and a density estimate using expert interpretation (Del Frate 1993). By comparing estimates of bear density to other parts of Alaska, we could approximate brown bear density on the Kenai. Miller (personal communication) suggested the density of brown bears on the Kenai was probably lower than the 27.1 bears per 1000 km² (7.0 bears per 100 mi²) he reported for his middle Susitna Study Area (1987). Consequently, we estimated the bear density on the Kenai to be 20 bears per 1000 km² (5.2 bears per 100 mi²), and we calculated the suitable habitat to be 13,848 km² (5347 mi²). We derived a brown bear

population estimate for Units 7 and 15 by multiplying the suitable habitat by the density estimate.

The Kenai Peninsula Brown Bear Conservation Strategy (Alaska Department of Fish and Game 2000) and A Conservation Assessment of the Kenai Peninsula Brown Bear (Interagency Brown Bear Study Team 2001) are used to provide guidelines for management activities. In addition to these documents, all reported brown bear mortalities are recorded and entered into the state bear-sealing database. Individuals who kill a bear in defense of life and property (DLP) are also required to complete a DLP report that is reviewed by area staff and a representative from the Alaska Bureau of Wildlife Enforcement.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Assuming that the brown bear density was 20 bears per 1000 km² (5.2 bears per 100 mi²), and the suitable habitat was 13,848 km² (5347 mi²), the estimated brown bear population for Units 7 and 15 would be 277 (range = 250–300). It is important to emphasize this estimate is not based on census data from the Kenai Peninsula and is probably a conservative estimate when you consider brown bear densities in other coastal regions of the state. We believe the population is stable or may be slowly increasing.

Distribution and Movements

Brown bears inhabit most of the Kenai Peninsula with the exception of coastal areas of Kenai Fjords National Park (KFNPN) and the southern portions of the peninsula (Schloeder et al. 1987, Jacobs et al. 1988). Recently, members of the public and park personnel have observed brown bears in KFNPN (Nuka Bay). Occasionally, individual bears have been observed on the eastern side of Kachemak Bay. It is unknown whether this is a result of dispersing bears or range expansion of the population.

MORTALITY

Harvest

Season and Bag Limit. The bag limit for Units 7 and 15 is 1 bear every 4 regulatory years with season dates of 15–31 October. Hunting for brown bears on the Kenai Peninsula is administered through a registration permit and occurs only when the number of other human-caused brown bear mortalities is below the maximum number identified in the management objectives.

Board of Game Action and Emergency Orders. During the March 2003 Board of Game meeting the allowable annual human-caused mortality for brown bears was increased from 14 (of which no more than 6 could be female units) to 20 (of which no more than 8 can be females older than 1 year). (For an explanation of “units,” see Selinger 2003.)

At the request of the Brown Bear Stakeholder Group, ADF&G submitted a proposal to eliminate the use of fish or fish parts for black bear bait. The Board of Game passed the proposal at the March 2001 meeting, and it became effective during the spring of 2002.

Hunter Harvest. No permits were issued to hunt bears during 2002 and 2003. Eighteen bears (7 males and 11 females) died from human-caused mortalities not related to the sport harvest during regulatory year 2002–03 (Table 1). Seventeen bears (5 males, 9 females, and 3 unknown) died from human-caused mortalities not related to the sport harvest during regulatory year 2003–04 (Table 1).

Transport Methods. Since 2000 successful brown bear hunters used boats (75%, n=6), horses (13%, n=1), and highway vehicles (13%, n=1) as their primary method of transportation to the field (Table 4).

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

On 27 November 1998, Kenai Peninsula brown bears were listed as a Population of Special Concern under the Alaska's list of Species of Special Concern. The listing was based on the potential for decline in the future because of human encroachment into brown bear habitat.

The Kenai Peninsula Brown Bear Conservation Strategy (Alaska Department of Fish and Game Division of Wildlife Conservation 2000) and A Conservation Assessment of the Kenai Peninsula Brown Bear (Interagency Brown Bear Study Team 2001) are documents frequently used as references for developing management strategies.

Beginning in 2002, area staff initiated a new program to more effectively summarize the nonhunting human-caused mortalities of brown bears on the Kenai Peninsula. Since there is only a fall hunting season, it was decided to track mortalities based on the calendar year. Consequently, beginning with the next Brown Bear Management Report for Units 7 and 15, all data regarding brown bears will be summarized by calendar year rather than regulatory year for consistency. The following is a summary for the human-caused mortalities not related to sport hunting based on the calendar year.

During 2002 there were 15 brown bears (7 males, 8 females) killed. Six (5 males, 1 female) were killed by collisions with automobiles, 5 females were killed by members of the public at private residences, 1 female was killed by an angler, 1 female was killed by a moose hunter, 1 male was killed by a hiker, and 1 male was killed by agency staff for public safety reasons.

During 2003 there were 18 brown bears (3 males, 12 females, 3 unknown) killed. Six (4 females, 2 males) were killed by members of the public at private residences. Five females were killed by hikers. One had 3 cubs of the year presumed unable to survive on their own. One lactating female was killed. The number of her offspring was unknown, but their age was believed to be older than 1 year, so there is a chance they could have survived and they were not counted as mortalities. A female with 3 cubs of the year was killed by a fisherman. The cubs were caught by ADF&G staff and euthanized by a veterinarian. Three females were killed by hunters pursuing other game (1 black bear hunter, 1 moose hunter, and 1 small game hunter).

During 2004 there were 11 brown bears (6 males, 4 females, 1 unknown) killed outside the brown bear hunting season. Four males were killed by members of the public at private residences, 3 (1 male, 2 females) were killed by automobiles, 2 (1 male, 1 female) were killed by hunters pursuing other game (1 black bear hunter, 1 moose hunter), 1 male was killed by Kenai

National Wildlife Refuge Staff (this animal had severe wounds from an unknown source), and 1 female was killed by a seismic exploration crew.

Reducing the nonhunting human-caused mortalities for brown bears continues to be a high priority for area staff. Also, the department is working with the federal agencies to design and fund studies to obtain data to assess the overall health of the Kenai Peninsula brown bear population.

CONCLUSIONS AND RECOMMENDATIONS

In 2003 we decided to change from regulatory year (July 1–June 30) management to calendar year management. We chose this strategy because there is a fall-only hunting season and it made tracking DLPs and other nonhunting human-caused mortalities (which determine whether we will have a hunting season) more efficient.

The long-term health of brown bears on the Kenai Peninsula depends on maintaining quality bear habitat and minimizing the mortality of female bears. Logging and development pose potential threats to Kenai brown bears. Roads into previously inaccessible areas (McLellan and Shackleton 1988) to support salvaging timber killed by spruce bark beetles may make some bears more vulnerable. Commercial, recreational, and residential developments will continue to reduce the quantity and quality of brown bear habitat, restrict travel corridors, and increase the exposure of bears to human-generated attractants (garbage, livestock/pet feed, chicken pens, etc.), which put bears and people in close proximity and usually lead to negative bear/human interactions and DLPs.

We need to continue to monitor sport and nonsport bear mortality by season, location, and cause to identify tangential management issues that may affect long-term survival. Potential issues have been identified, such as bear/human conflicts, bear/livestock interactions, competition between bears and sport fishermen, big game seasons that overlap with brown bear seasons, brown bears taken near black bear bait stations, and private and borough dumpster problems. Solving many of these management concerns will require innovative approaches.

The department continues to provide educational material to the public in an effort to reduce negative bear/human interactions. In addition, department employees are working with local communities to improve waste management practices to make populated areas less attractive to brown bears. Local ordinances or codes are needed. However, without a commitment by local and state enforcement agencies, new regulations stand little chance for success.

During this report period the IBBST has been through significant personnel and structural changes. Hopefully, after a brief period of inactivity, the IBBST will begin to function more efficiently and allow the different agencies to work cooperatively to investigate important aspects of brown bear population dynamics on the Kenai Peninsula.

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PREPARED BY:

Jeff Selinger
Wildlife Biologist

SUBMITTED BY:

Gino Del Frate
Management Coordinator

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Table 1 Units 7 and 15 brown bear harvest, 1999–2003

Regulatory year	Reported							Total estimated kill						
	Hunter Kill				Nonhunting kill ^a			M (%)		F (%)		Unk (%)		Total
	M	F	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	(%)	Total
1999														
Fall 99	5	5	0	10	4	3 ^b	0	9	(53)	8	(47)	0	(0)	17
Spring 00	0	0	0	0	0	0	0	0	(0)	0	(0)	0	(0)	0
Total	5	5	0	10	4	3	0	9	(53)	8	(47)	0	(0)	17
2000														
Fall 00	5	1	0	6	1	2	0	6	(67)	3	(33)	0	(0)	9
Spring 01	0	0	0	0	2	2	0	2	(50)	2	(50)	0	(0)	4
Total	5	1	0	6	3	4	0	8	(62)	5	(38)	0	(0)	13
2001														
Fall 01	0	2	0	2	6	5	0	6	(46)	7	(54)	0	(0)	13
Spring 02	0	0	0	0	2	1	0	2	(67)	1	(33)	0	(0)	3
Total	0	2	0	2	8	6	0	8	(50)	8	(50)	0	(0)	16
2002														
Fall 02	0	0	0	0	5	7	0	5	(42)	7	(58)	0	(0)	12
Spring 03	0	0	0	0	2	4	0	2	(33)	4	(67)	0	(0)	6
Total	0	0	0	0	7	11	0	7	(39)	11	(61)	0	(0)	18
2003														
Fall 03	0	0	0	0	1	8	3	1	(8)	8	(67)	3	(25)	12
Spring 04	0	0	0	0	4	1	0	4	(80)	1	(20)	0	(0)	5
Total	0	0	0	0	5	9	3	5	(29)	9	(53)	3	(18)	17

^a Includes DLP kills, research mortalities, and other known human-caused mortality.

^b One research bear was found dead but never reported.

Table 2 Unit 7 and 15 brown bear successful hunter residency, 1999–2003

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters ^b <i>n</i>
1999–00 ^c	8	(80)	1	(10)	1	(10)	10
2000–01 ^c	4	(67)	2	(33)	0	(0)	6
2001–02 ^c	1	(50)	1	(50)	0	(0)	2
2002–03 ^c	No hunt held						
2003–04 ^c	No hunt held						

^a Local resident means residents of Units 7 or 15.

^b Does not include nonsport harvest.

^c Closed by emergency order.

Table 3 Units 7 and 15 brown bear harvest chronology percent by month, 1999–2003

Regulatory year	Harvest periods			<i>n</i> ^a
	September	October	May	
1999–00 ^b	0	100	0	10
2000–01 ^b	0	100	0	6
2001–02 ^b	0	100	0	2
2002–03 ^b	No hunt held			
2003–04 ^b	No hunt held			

^a Does not include nonsport harvest.

^b Closed by emergency order.

Table 4 Units 7 and 15 brown bear harvest percent by transport method, 1999–2003

Regulatory year	Percent of Harvest									<i>n</i> ^a
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk.	
1999–2000 ^b	0	10	40	10	0	10	30	0	0	10
2000–01 ^b	0	17	83	0	0	0	0	0	0	6
2001–02 ^b	0	0	50	0	0	0	50	0	0	2
2002–03 ^b	No hunt held									
2003–04 ^b	No hunt held									

^a Does not include nonsport harvest.

^b Closed by emergency order.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 8 (5097 mi²)

GEOGRAPHIC DESCRIPTION: Kodiak and adjacent islands

BACKGROUND

Kodiak's geologic character is not conducive to preserving fossil evidence, so there is no way to confirm how long bears have been on the archipelago. Kodiak bears, however, have been isolated from other bear populations since the last ice age (about 12,000 years ago) and during that time have developed into a unique subspecies (*Ursus arctos middendorffi*). Early human occupants of the archipelago looked to the sea for their sustenance. At the time, people occasionally hunted bears, using their meat for food, hides for clothing and bedding, and teeth for adornment. Traditional stories often revolved around the similarity between bears and humans, and around the mystical nature of bears because of their proximity to the spirit world.

Russian entrepreneurs came to the area in the late 1700s to capitalize on the abundant fur resources. Bear hides were considered a "minor fur" and sold for about the same price as river otter pelts (\$10 each). The number of bears harvested increased substantially when sea otter populations declined. After the United States acquired Alaska in 1867, bear harvests on Kodiak increased, peaking at as many as 250 bears per year. Commercial fishing activities increased in the late 1880s, and canneries proliferated throughout the archipelago. Bears were viewed as competitors for the salmon resource and were routinely shot when seen on streams or coasts. At the same time, sportsmen and scientists had recognized the Kodiak bear as the largest in the world, and they voiced concerns about overharvesting the population.

Professional interest in guided Kodiak bear hunts and a concern for unregulated resource use in frontier lands such as Alaska prompted the territorial government's newly established Alaska Game Commission to abolish commercial bear hunting (selling the hides) on the archipelago in 1925. The new regulations seemed to restore bear populations on the Kodiak islands. By the 1930s, ranchers on northeast Kodiak reported an increase in bear problems and demanded action. The Game Commission sent a biologist and a team of predator hunters to eliminate problem bears on the ranches in 1939. Seven bears were killed; however, in their final report the agents discouraged further bear-control efforts (Sarber 1939).

To address the dilemma of conserving bears while protecting cattle and residents, President Franklin D. Roosevelt created the Kodiak National Wildlife Refuge by executive order in 1941. The refuge withdrew 1,957,000 acres from unreserved public domain to preserve the natural feeding and breeding range of the brown bear and other wildlife.

During the 1940s, the sockeye escapement on the Karluk River dwindled, and bears were cited as a leading cause of the decline. Fishermen called for bear control, and sportsmen across the nation lobbied against it. Studies revealed that bears killed a large number of salmon, but the vast majority (98%) were fish that had already spawned, and the impact of bears on future salmon runs was minimal. After considering these diverse opinions and the results of the studies, the Alaska Game Commission again opted to forego any bear control or hunting-season liberalization. It did, however, pass a new regulation in 1957 that protected maternal female bears statewide. The next year that protection was extended to also include dependent cubs.

Alaska achieved statehood in 1959 and assumed responsibility for managing the state's wildlife. The Game Commission's successor, the Alaska Board of Game, reduced bear-hunting seasons on Afognak and Raspberry Islands and on the Kodiak National Wildlife Refuge. The board also implemented a hide-sealing requirement, established a tag fee for nonresident bear hunters, and stationed a game biologist in Kodiak. At the same time, the board liberalized bear seasons on nonrefuge lands on Kodiak and initiated another investigation into bear-cattle problems on northeast Kodiak.

During the 1960s, state biologists worked with ranchers along the Kodiak road system to examine and reduce the predation problem. Biologists reported that cattle and bears are not compatible on the same ranges (Eide 1964). Potential solutions included poisons, fences to isolate cattle ranges, and reduction of land disposals in areas with bears. Again, sportsmen did not hesitate to voice their support for Kodiak bears. In spite of public pressure, the state continued its involvement in dispatching problem bears and attempted to capture and move some bears. From 1966 through 1969, the state authorized the use of dogs to hunt brown bears on northeast Kodiak.

In late 1970, the state issued a policy curtailing bear-control programs. Ranchers suffering losses could continue to take bears in defense of life or property (DLP), but could not shoot bears from airplanes or poison them. Sport hunting was to be the primary means of reducing bear numbers, and hunting regulations were liberalized.

Same-day airborne hunting was prohibited in 1967. In that same year, hunters were required to bring the skulls of harvested bears out of the field, and in 1968 skull sealing was required. Population studies around Karluk Lake suggested the local harvest was excessive, so the drainage was closed to fall bear hunting by emergency regulation in 1967 and by regulation in 1968. In an additional effort to better distribute bear harvests on the refuge, a permit-quota system was established in 1968. In 1969, the bag limit for brown bears was reduced to 1 bear per 4 years, and for most of the archipelago the winter hunting season was eliminated.

In 1971 the Alaska Native Claims Settlement Act (ANCSA) resolved many long-standing land issues with aboriginal Alaskans statewide. The impacts were felt strongly on the archipelago as large areas of the coastline; the Karluk River drainage; Sitkalidak, Spruce and Whale Islands; and most of the forested areas of Afognak and Raspberry Islands were conveyed to the Native corporations. Federal management of the national forest lands on Afognak was threatened, and the Kodiak National Wildlife Refuge lost control of 310,000 acres of prime bear habitat (more than 17 % of refuge lands).

In 1975 the state created 19 exclusive guiding areas on the archipelago. The state also began distributing most of the bear hunting permits on Kodiak Island by lottery. Twenty-six hunt areas were established, Alaska residents were allocated at least 60 percent of the permits, and all harvested bears had to be inspected by a state biologist in Kodiak.

In 1975 the U.S. Forest Service began building a logging road between Kazakof (Danger) Bay and Discoverer Bay, and timber harvesting began in 1977. Under ANCSA's provisions, the Native Corporations took over management of their recently acquired lands in 1978. Passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980 added the northwest portion of Afognak Island to the refuge, but it also curtailed the Forest Service's management on the island. In subsequent years, the rate of timber harvest was greatly accelerated over original projections.

In 1979 work began on an environmental impact statement for the Terror Lake hydroelectric project. The project was to include an earthen dam on Terror Lake in the refuge and a 6 mile-long tunnel through a mountain ridge to a penstock and powerhouse in the Kizhuyak River drainage. The project was the first significant invasion of inland bear habitat on Kodiak Island. To address the opposition encountered from the public and agencies, a mitigation settlement was negotiated in 1981 that included brown bear research and establishment of the Kodiak Brown Bear Trust. The hydroelectric project was completed in 1985.

Human alteration of bear habitat on Kodiak and Afognak Islands spurred renewed interest and funding for bear research on the archipelago, resulting in a surge of baseline and applied bear research on Kodiak through the 1980s and 1990s. Extensive use of radiotelemetry on bears revealed denning, feeding, movement, mortality rates, and reproductive history patterns (Barnes 1986, 1990; Barnes and Smith 1995; Smith and Van Daele 1988, 1990; Van Daele et al. 1990). A density estimation technique developed by Miller et al. (1987) was applied to 2 study areas on Kodiak Island in 1987, and the brown bear population in Unit 8 was estimated (Barnes et al. 1988). Barnes (1993) monitored movements of brown bears in relation to deer hunting activity on western Kodiak Island, recommending additional effort to document unreported killing of bears and improved educational programs for deer hunters.

Bears were not directly harmed by the *Exxon Valdez* oil spill in 1989, although cleanup crews displaced some from traditional feeding and traveling areas. No one was injured by a bear, and no bears were killed. To mitigate the adverse impacts of the spill, Exxon reached a settlement with the state and federal governments. Paradoxically, the impacts of the oil spill and the subsequent cleanup and settlement proved to be beneficial to bears on Kodiak. Bear-safety training exposed thousands of workers to factual information about bears, and money from the settlement fund was used for funding land acquisitions. By the close of the 20th century, more than 80% of the refuge lands lost as a result of ANCSA were reinstated into the refuge, either through direct purchase or by means of conservation easements. Lands were also purchased on Afognak and Shuyak Islands and transferred into state ownership. The Brown Bear Trust coordinated a coalition of sportsmen and other wildlife conservation groups from around the nation to lobby for use of settlement funds to acquire Kodiak lands. The groups also directly contributed funding to protect small parcels of important bear habitat around the islands.

Except for the changes in issuing permits to nonresidents, only minor changes in bear hunting regulations have occurred since 1976. Afognak and part of northeastern Kodiak Island were changed from an unlimited permit hunt to a limited permit hunt in 1987–88. State hunting regulations allowed for a subsistence bear hunt in 1986–87, with hunters required to salvage all bear meat for human consumption. The state subsistence bear hunt was rescinded the next year. In the spring of 1997 a federal hunting regulation reinstated a subsistence season. Under federal regulation up to 10 permits were available to residents of Kodiak Island villages. Permits were valid only on federal lands, and seasons were 1–15 December and 1 April–15 May. All meat from bears harvested under this regulation was to be salvaged for human consumption.

Although hunting continued to be the most popular human use of bears on Kodiak in the early 1990s, the area was experiencing an expansion of bear viewing and photography. To address this public demand, the refuge administered a bear-viewing program in 1990. The program was canceled after 1994 because of a legal challenge to the procedures used in awarding the bear-viewing concession. Biologists studied bear-human interactions at the viewing areas and concluded that bears could tolerate viewing programs as long as the human activities were predictable and restricted to specific areas.

In 2001 a citizens advisory committee was established to work closely with the Alaska Department of Fish and Game (ADF&G), with the cooperation of the Kodiak National Wildlife Refuge (NWR), to develop a management plan addressing the wide variety of issues that affect bears, including hunting, habitat, and viewing. The resulting Kodiak Archipelago Bear Conservation and Management Plan (ADF&G 2002) was crafted over a several month period by a group of representatives from 12 diverse user groups. After hearing from a variety of experts from agencies and receiving extensive public input, the group developed more than 270 recommendations for Kodiak bear management and conservation. Most impressively, in spite of the diversity of viewpoints expressed by members of the group, all of the recommendations were by consensus.

The underlying themes of the recommendations were continued conservation of the bear population at its current level, increased education programs to teach people how to live with bears on Kodiak, and protection of bear habitat with allowances for continued human use of the archipelago. Although the group was advisory in nature, government management agencies expressed a commitment to work to implement all of the regulations that were feasible and within their legal jurisdictions. How this maturing relationship between bears and people will evolve remains to be seen, but the future looks bright for the continuing existence of the bears of the Kodiak Islands (Van Daele 2003).

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1. Maintain a stable brown bear population that will sustain an annual harvest of 150 bears composed of at least 60% males.
2. Maintain diversity in the sex and age composition of the brown bear population, with adult bears of all ages represented in the population and in the harvest.

3. Limit human-caused mortality of female brown bears to a level consistent with maintaining maximum productivity.

METHODS

We collected harvest data from mandatory hunter reports and the sealing program. During sealing, hunters were required to bring the hide and skull of each bear harvested in Unit 8 to the ADF&G office in Kodiak for inspection. We determined bear ages from cementum annuli of premolar teeth removed from each bear. Mandatory hunting reports provided information on hunting effort and success. We monitored hunting activity in the field with periodic patrols by boat and aircraft.

Brown bear population estimates were developed for 9 study areas with the “intensive aerial survey technique” detailed in Barnes and Smith (1997a). Data from these surveys were extrapolated to develop a unitwide bear density and population estimate. We also cooperated with Kodiak NWR staff to conduct aerial brown bear composition surveys along selected streams of southern Kodiak Island.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Recent estimates of the Unit 8 brown bear population are comparable with rough estimates made in the 1950s, although a slightly increasing trend in hunting mortality and in nonsport mortality occurred through the 1980s. The bear population has increased in northeast Kodiak Island since the early 1970s because of more restrictive seasons and fewer bears killed to protect livestock. Since 1976 permits have closely regulated hunting in most of the unit, and the brown bear population is stable to increasing in local areas.

Population Size

We have worked closely with staff from Kodiak NWR to conduct 16 intensive aerial brown bear surveys from 1987 to 2003 (Table 1). These surveys were in 9 separate areas on Kodiak Island, and 5 areas have been surveyed more than once. Data from these surveys were extrapolated to estimate the total bear population on the archipelago (Barnes and Smith 1997a, Barnes and Smith 1998). The estimated population size was 2980 bears, 2085 of which were independent (>3 years old). There were an estimated 330 bears on the islands north of Kodiak, 208 bears on northeast Kodiak, 665 on southeast Kodiak, 1088 on southwest Kodiak, and 689 on northwest Kodiak. The average density on Kodiak Island was 265 bears/1000 km² (0.7 bears/mi²), and for the northern islands it was 142 bears/1000 km² (0.4 bears/mi²). We have not conducted aerial surveys on northeastern Kodiak, Afognak or the other northern islands where dense Sitka spruce (*Picea sitchensis*) forest makes it difficult to observe bears, so the population estimates for those areas are tentative.

During this reporting period, the Karluk Lake drainage was surveyed. The results of the 2003 survey indicated a statistically significant population increase ($p = 0.05$) since the last survey in the same area. The data reflected an increase from 400 independent bears/1000 km² in 1994 to 496 independent bears/1000 km² in 2003. Supplemental information from hunters, hunt records,

and stream surveys corroborate the conclusion that the bear population in the Karluk Lake drainage is healthy and productive. In 2004 we attempted to replicate a survey of the Terror Lake area, but weather and early vegetative development curtailed our efforts.

Aerial surveys along salmon streams in southwestern Kodiak Island by FWS indicated little change in composition of the brown bear population (Table 2). These data reveal considerable interannual variation, which is often correlated with berry and salmon abundance and timing. Analysis by 5-year periods dampens these variations and indicates a stable population during the past decade. Single bears composed 43.4% of the bears classified from 1993 to 1997, and 42.0% from 1998 to 2002. Cubs of the year composed 13.4% of the bears classified during both of the 5-year periods.

Distribution and Movements

There have been several investigations of brown bear movements and population dynamics on Kodiak Island. Most involved radiotelemetry and lasted at least 3 years. The Karluk Lake area was investigated from 1954 to 1962 (Troyer and Hensel 1967), the Terror Lake area from 1982 to 1987 (Smith and Van Daele 1990), southwest Kodiak from 1983 to 1987 (Barnes 1990), the Aliulik Peninsula from 1992 to 1996 (Barnes and Smith 1997b), and the Spiridon Peninsula from 1991 to 1997 (Barnes, in prep). The denning characteristics of bears in the Terror Lake and the southwest Kodiak areas were described and compared in 1990 (Van Daele et al. 1990). We are currently working on a compendium of these and other research results to develop a more concise picture of bear ecology on the Kodiak archipelago.

MORTALITY

Harvest

Since statehood, the reported sport harvests of bears in Unit 8 have ranged from 77 (1968–69) to 206 (1965–66) per regulatory year (Table 3). In recent years regulations have been more consistent and designed to better distribute the hunting pressure. From 1980–81 to 1989–90 the average annual harvest was 165.4 bears (range = 124–202, and from 1990–91 to 1999–2000 the average was 160.0 bears (range = 149–177). Assuming a stable bear population of 2890 bears (2085 independent bears), we estimate sport hunters are harvesting 5.5% of the bear population annually (7.8% of the independent bears).

Season and Bag Limit. The season for residents and nonresidents in that portion of Kodiak Island east of a line from the mouth of Saltery Creek to Crag Point, and including Spruce Island, was 15 October–30 November and 1 April–15 May. The bag limit was 1 bear every 4 regulatory years by registration permit only. In the remainder of Unit 8, the season dates and bag limit were the same, but by drawing permit only. Drawing and registration permits were available for nonresidents guided by a registered, master, or Class A assistant guide.

The Federal Subsistence Board authorized an additional hunt on federal lands for subsistence hunters. Under this regulation up to 10 federal permits are issued to residents of remote Kodiak Island villages to harvest 1 bear per year for human consumption.

Board of Game Actions and Emergency Orders. During its spring 2003 meeting, no proposals to alter Kodiak bear hunting regulations came before the Board of Game. In spring 2005, a

coalition of registered big game guides proposed a change to the nonresident permitting process for Unit 8 bear hunts. The proposal made 4 specific recommendations: 1) Require a signed guide-client agreement at time of application for a permit; 2) Guides must be registered in Unit 8 and certified in the hunting area at the time they sign the guide-client agreement; 3) Guides only allowed to sign as many guide-client agreements for a particular hunt area as there are nonresident permits available for that area; and 4) Successful permit winners must purchase their brown bear tag in order to secure their permit. The board passed the first 3 recommendations and deferred action on the fourth. There was also a proposal to count a wounded bear that was not recovered as a bear that was killed, thereby prohibiting the hunter from harvesting another bear in Unit 8 for 4 years. That proposal did not pass.

No emergency orders were issued during this reporting period.

Hunter Harvest. Hunters harvested 142 bears in regulatory year 2002–03 and 165 bears in 2003–04, a rate somewhat lower than the previous 5-year mean of 168.0 bears (Table 3). There were 49 bears killed in fall 2002 and 54 killed in fall 2003. The mean annual fall harvest for the previous 5 years was 55.2 bears. During the spring of 2003, 93 bears were killed, and in the spring of 2004, 111 bears were killed. The mean annual harvest for the previous 5-year period was 112.8 bears. These totals do not include bears killed under federal subsistence regulations: 3 bears (2 males and 1 female) in 2002–03 and 4 bears (2 of each) in 2003–04.

Males predominated in the harvest, composing 72.5% of the sport harvest in 2002–03 and 75.1% in 2003–04, a rate above the previous 5-year average of 74.8%. Although the current management objective of 60% males was met both years, Miller (1990a) cautioned that using sex and age ratios to set allowable harvest objectives is more likely to result in overexploitation than using total adult females for setting guideline harvests. Sport hunters harvested 39 females in 2002–03 and 41 females in 2003–04, comparable to the annual mean of 42.2 females harvested during the preceding 5 years. Including other human-caused deaths of females, 43 females were killed in 2002–03 and 46 females were killed in 2003–04, compared to the previous 5-year mean of 48.2 females.

Mean total skull sizes of male bears harvested was 25.8 inches in 2002–03, and 24.9 inches in 2003–04 differing only slightly from the mean skull size of 24.8 inches for the previous 5 years. Skull measurements from harvested females averaged 22.0 inches in 2002–03 and 21.8 inches in 2003–04. The average female skull size during the previous 5 years was 21.8 inches (Table 4). The mean age of males harvested in 2002–03 was 9.4 years; and the mean age in 2003–04 was 7.8 years. The average age of male bears harvested during the previous 5 years was 7.3 years. Female ages averaged 7.3 years in 2002–03, and 7.8 years in 2003–04. From 1980–81 to 2003–04 there was a significant increase in the mean skull sizes for males ($r^2=0.25$; $p=0.006$), but no significant ($p>0.05$) trends for females ($r^2=0.01$), or in the mean ages of males ($r^2=0.10$) or females ($r^2=0.11$) harvested.

A sex/skull restriction for guided nonresident hunters in permit hunts DB 108–116 to 138–146 became effective in the spring 1995 season. Guided hunters in those areas must harvest male bears or females with skulls that are at least 15 inches long or 9 inches wide. Failure to meet these minimum requirements results in loss of a permit during the next season. Since inception

of the regulation, guided nonresident harvest has declined from a mean of 27.8 bears (1988–89 to 1993–94) to 23.6 bears (1995–96 to 2003–04). Guided nonresident success has not changed significantly from 66.3% (1988–89 to 1993–94) to 65.7% (1995–96 to 2003–04). The regulation was effective in reducing harvest of female bears by guided nonresidents. Prior to the restrictions, the average guided nonresident harvest in areas with the sex/skull minimums was 7.5 females/year (1988–89 to 1993–94), after restrictions this average fell to 2.7 females/year (1995–96 to 2003–04). Since 1995, 16 permits have been lost because of undersized females being taken.

Permit Hunts. There are 29 drawing hunt areas in Unit 8 for brown bears, with a total of 472 permits obtainable annually. Each year 319 drawing permits are available to Alaska residents (107 in fall, 212 in spring), and 153 permits are available for nonresidents (53 in fall, 100 in spring). Nonresidents hunting with resident relatives are allocated permits from the resident quota. Nonresident, guided permits may be reduced if hunters fail to adhere to the sex/skull minimums in southwest Kodiak hunt areas. In 2002–03, successful applicants picked up 326 drawing permits; in 2003–04, 315 permits were claimed (Table 5). Annual harvest in the drawing permit areas was 137 in 2002–03 and 149 in 2003–04. The average annual harvest during the previous 5 years was 155.8.

The northeastern portion of Kodiak Island is managed as a registration area for bear hunters (RB 230/260). The seasons mirror those in the drawing hunt areas, but there are no limits on the number of permits available. In 2002–03 we issued 160 registration permits, and in 2003–04 we issued 235 (Table 6). This was a decrease over the mean number of registration permits issued in the previous 5 years (241.8). The number of hunters afield in the registration hunt was 100 in 2002–03 and 157 in 2003–04, also lower than the mean of the previous 5 years (159.2). Annual harvest in the registration permit area was 5 in 2002–03 and 16 in 2003–04. The average annual harvest during the previous 5 years was 11.8.

Hunter Residency and Success. Hunter success in the drawing permit hunts was 43% in 2002–03 and 49% in 2003–04 (Table 5), comparable to the mean for the previous 5 years (47.8%). In the registration hunts, hunter success was 5% in 2002–03 and 10% in 2003–04, comparable to the mean for the previous 5 years (7.6%) (Table 6).

Although more than two-thirds of the drawing permits and the vast majority of registration permits are issued to Alaska residents, nonresidents usually harvest more bears in Unit 8 than do residents. In 2002–03, residents harvested 57 bears and nonresidents took 85 (Table 7). In 2003–04, residents harvested 81 bears and nonresidents took 84 bears. The mean harvest for the previous 5 years was 79.2 for residents and 88.4 for nonresidents.

Harvest Chronology. The first third of the fall season (25 October–6 November) and the last third of the spring season (8–15 May) were typically the most productive times for bear hunters (Table 8). In 2002–03, 80% of the harvest occurred during the first third of the fall season, and in 2001–02, 83% of the harvest occurred in the first third. During the previous 5 years, the mean annual percentage of the harvest in the first third of the fall season was 75.8%. In 2002–03, 55% of the harvest occurred during the last third of the spring season, and in 2003–04, 60% of the harvest occurred in the last third. The mean annual percentage of the harvest in the last third of the fall season during the previous 5 years was 55.0%.

Transport Methods. Bear hunters in Unit 8 most commonly use aircraft and boats. The proportion of hunters reporting each method varies each year, with aircraft the most common transportation method (Table 9). This annual variation may be more a function of what hunters report rather than actual changes in transportation modes. Most hunters fly into hunt areas and then use a skiff or inflatable raft in the area, and hunters are inconsistent in the way they choose to report these overlapping modes of transportation.

Other Mortality

DLP kills, illegal kills, subsistence harvests, and other nonsport human-caused mortality resulted in the deaths of 20 bears in 2002–03 and 27 in 2003–04 (Table 3). This was higher than the mean annual nonsport harvest of 18.8 bears/year during the previous 5 years.

Reported DLP kill data is most appropriately analyzed on a calendar year basis, rather than regulatory year (Table 10). During 2004 we saw a spike in the number of bears killed by deer and elk hunters (8), considerably higher than during the previous 5-year period (1.4 bears). This increase was coincident with a lower than normal production of elderberries archipelago-wide.

HABITAT

Assessment

Kodiak's inland habitat is contiguous and intact. Coastal areas have much greater human activity, but the activity is generally restricted to isolated areas and small numbers of people, and roads are few and far between. Salmon management for sustained yield is a high priority on the archipelago, and bear predation is factored into escapement rates. The only large-scale disruption of inland habitat, the Terror Lake hydroelectric project, was completed with minimal direct or indirect adverse impact to bears or their habitat due to a conscious effort to work with and around the bears.

Afognak Island has experienced considerable habitat alteration in the past 25 years due to commercial logging. Although there have been no objective studies, we suspect that these activities have not had major adverse impacts on the bear population because of continued healthy salmon runs, good berry and grass production, little direct persecution, and limited general access to logging roads.

There are approximately 3 million acres of brown bear habitat on Kodiak, Afognak, and adjacent islands in Unit 8. Nearly half that acreage is contained within the Kodiak NWR. More than 300,000 acres of the original 1.9 million acres of refuge land, mostly prime coastal and riparian brown bear habitat, was transferred to Native corporations through ANCSA. By 2000, more than 80 percent of the refuge lands that had been lost as a result of ANCSA were reinstated into the refuge, either through direct purchase or by means of conservation easements. Lands also were purchased on Afognak and Shuyak Islands and transferred into state ownership. Current developments affecting brown bears include ongoing commercial timber harvest on Afognak Island, proposed development of the Midway Creek hydroelectric project near the village of Old Harbor, expanding rural settlement, commercial fishing, and increasing recreational activities in remote areas, including hunting, sport fishing, and wildlife viewing.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

In 2002 we completed the Kodiak Archipelago Bear Conservation and Management Plan (ADF&G 2002). The plan was developed by a Citizen's Advisory Committee consisting of stakeholders from 12 diverse user groups, along with cooperation from an Interagency Planning Group that provided government support and perspective. ADF&G funded the project and provided logistical support with assistance from U.S. Fish and Wildlife Service (FWS). The final plan included more than 270 recommendations (all by consensus), and we are incorporating several into our management program.

One of the most evident products of the bear management plan was the creation and operation of the Kodiak Unified Bear Subcommittee (KUBS), a standing subcommittee of the Kodiak Fish and Game Advisory Committee. This group includes members from various stakeholder groups, as well as ADF&G and Kodiak NWR staff. It met twice a month during this reporting period to share information and address bear-related issues in the area. It has produced and distributed a brochure on bear-viewing etiquette, is working on a bear-viewing guide certification program and is looking into ways to deal with bear viewing conflicts on the archipelago.

Our program to reduce adverse bear-human interactions in Kodiak city and local villages progressed well in the past several years. An electric fence around the Kodiak landfill has eliminated bear use of the site, and bear resistant dumpsters and public education efforts have drastically reduced bear-human encounters in the vicinity of Kodiak city. We also maintain close coordination with the U.S. Coast Guard military police, Kodiak Police Department, Alaska State Troopers, Alaska State Parks, Kodiak Island Borough, Kodiak NWR, and Kodiak Sanitation to assure effective and consistent responses to bears sighted near the city.

In villages we have continued and expanded education and enforcement efforts to reduce bear problems. Funding from the Kodiak Island Borough, Exxon Valdez settlement funds, ADF&G, and the village of Larsen Bay was used to enclose the Larsen Bay landfill with an electric fence, install a burn box, and provide bear-resistant dumpsters. This project was initiated in 2004 and was to have its first season of operation in 2005. We also worked closely with residents in other villages to develop similar projects. Port Lions plans to have its village and landfill "bear resistant" by spring 2006. Overall, cooperation in these efforts has been excellent.

The incidence of illegal or unreported DLP kills is unknown; however, bears that have been shot but not reported are found occasionally. Cases in which deer hunters, hikers, sport fishers, commercial fishers, photographers, and remote area residents killed or wounded bears without reporting have been documented often enough to warrant continued effort to improve our estimates of unreported kills.

Our primary research project is currently a joint effort by the department, Kodiak NWR, the University of Idaho, and the Kodiak Brown Bear Trust to consolidate and analyze more than 20 years of movement, productivity, survival, and harvest data for bears on Kodiak Island. We will use these data to evaluate our management program and harvest strategies on the island.

CONCLUSIONS AND RECOMMENDATIONS

Bear harvests have been relatively consistent over the past 20 years; most variations are attributable to weather and hunter participation. In every regulatory year from 1996–97 to 2003–04, the percent males in the harvest exceeded 70%. The management objective of males composing at least 60% of the harvest has been achieved for the past 17 consecutive years and in 36 of 44 years since statehood. The current estimated annual harvest rate of 5.5% of the total bear population is close to the suggested approximate maximum 5.7% exploitation rate from Miller's (1990b) population simulation studies on brown bears in Southcentral Alaska. These data indicate the brown bear population in Unit 8 is healthy, productive, and relatively stable, and the current rate of harvest is sustainable as long as habitat is protected and the number of adult females killed remains low.

The minimum skull size requirement in permit hunts DB108/116–138/146 resulted in a 16% decline in total harvest of bears in the area by guided nonresident hunters, virtually no change in their success rate, and a 64% decline in the harvest of females by nonresidents in that area during the first 10 years of implementation. The substantial decline in female harvest suggests nonresident hunters and their guides have become highly selective because of the risk of losing a permit if a bear fails to meet minimum requirements. Overall, there are few complaints about the system, and the system appears to be a viable alternative to reductions in the number of permits.

Intensive aerial surveys and composition counts along streams in southern Kodiak Island indicated that bear populations on Kodiak Island have remained stable to increasing during the past 20 years. The Kodiak NWR has included these jointly conducted surveys in its annual management budget, and we plan to continue to cooperate with refuge biologists with these surveys each year. We will also work to train new personnel and periodically review the methods to refine data collection and analysis methods and population estimates. This will be especially important in the next couple of years as personnel change in both agencies. The current methods are predicated on having experienced observers and survey pilots, and disruption of that continuity could violate critical assumptions and thereby impact accuracy of the data.

Development of the Kodiak Archipelago Bear Management Plan was a successful endeavor that reiterated the importance of this bear population to a wide variety of people. The group took the best available biological information, along with extensive public testimony, and deliberated to develop mutually acceptable recommendations. The common ground that unified these diverse members of the Citizen's Advisory Committee was their desire to maintain a healthy population of bears on the archipelago, even if it meant alteration of some human behaviors. The group also recognized the importance of tracking and assisting with implementation of the recommendations.

Since finalization of the plan, the department has initiated implementation of several of the recommendations. Public education projects to develop bear information kiosks on the state ferry Tustumena and at the Kodiak airport terminal are underway. The department also is working with bear viewing guides, FWS, and National Park Service to develop a bear-viewing guide certification program. This program would be based on the "Best Practices for Viewing Bears" produced in a cooperative effort between the department, NPS, and the guides during the winter of 2002–03. The Kodiak NWR has addressed many bear-related issues in its planning efforts.

Refuge managers began to revise their Comprehensive Conservation Plan (USFWS 1987) for the refuge in 2001, and hope to have it completed by late 2005.

The success of public participation in bear management on the Kodiak islands has gained a worldwide reputation since the inception of the bear management plan. In 2001 the Japanese government sent a contingent of biologists and civic leaders from Hokkaido to Kodiak to learn about our program. They have since adopted several of the things they learned, and there have been substantial improvements in the number of problems and injuries bears have caused. In August 2002, a delegation of Russian bear biologists spent a week in Southcentral Alaska, including Kodiak, gathering information they could use to improve their bear management and public education programs. In March 2004, Russian and Japanese government representatives invited the Kodiak area wildlife biologist to give the keynote address to a conference in Yakutsk, Russia. They see better human–bear relations as the only way to protect the brown bear populations in their areas, and in their minds, Kodiak was the best example of a place where bears and people have learned to coexist and bear hunting is sustainable.

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PREPARED BY:

Lawrence J. Van Daele
Wildlife Biologist III

SUBMITTED BY:

Gino Del Frate
Management Coordinator

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Table 1 Estimated density and observation rates of independent bears^a in intensive aerial survey areas, Unit 8, 1987–2003

Survey Area	Year	Replicate surveys	Survey rate (min/km ²)	Observed independent bears/hr	Observed independent bears/1000km ²	Sightability	Est. density ind.bears/ 1000 km ²	Size of survey area (km ²)	Size of survey area (mi ²)
Terror Lake	1987	3	1.5	3.1	75	0.33	234	355	137
Terror Lake	1997	4	1.7	3.4	92	0.33	276	355	137
Southwest Kodiak	1987	4	1.5	3.5	88	0.41	218	632	244
Sturgeon River	1987	4	1.6	4.3	120	0.41	293	264	102
Sturgeon River	1992–93	4	1.8	2.6	77	0.41	190	264	102
Sturgeon River	1998	4	1.9	3.0	94	0.41	227	264	102
Aliulik Peninsula	1992–93	8	1.6	4.0	108	0.53	216	350	135
Aliulik Peninsula ^b	2001	5	1.6	3.0	81	0.53	152	350	135
Aliulik Peninsula	2002	5	1.4	4.1	92	0.53	173	350	135
Olga Lakes	1992–93	5	1.2	1.8	33	0.41	80	262	101
Karluk Lake	1994	4	2.1	5.4	180	0.45	400	267	103
Karluk Lake	2003	4	2.3	5.8	223	0.45	496	267	103
Spiridon Lake	1995	4	1.9	1.2	38	0.33	118	287	111
Spiridon Lake	2000	4	1.8	1.5	44	0.33	134	287	111
Shearwater Peninsula	1996	3	2.2	2.6	92	0.37	248	274	106
Kiliuda Bay	1996	4	2.5	2.4	101	0.37	270	159	61

^a Does not include cubs still with mother

^b Because of concerns about the accuracy of this survey, it was replicated in 2002.

Table 2 Unit 8 aerial stream counts of brown bears^a, 1985–2002

Regulatory year	Complete surveys	<i>Single bears</i>		<i>Maternal bears</i>		<i>Yearlings & cubs</i>		<i>Cubs of the year</i>		Bears	
		Number	%	Number	%	Number	%	Number	%	per survey	Total
1985	10	434	54	110	14	189	24	67	8	80.0	800
1986	10	445	55	115	14	191	24	54	7	80.5	805
1987	8	205	53	58	15	92	24	31	8	48.3	386
1988	4	117	51	39	17	50	22	23	10	57.3	229
1989	9	406	46	148	17	284	32	54	6	99.1	892
1990	8	460	44	177	17	273	26	126	12	129.5	1036
1991	9	529	52	156	15	210	21	129	13	113.8	1024
1992	5	226	44	92	18	103	20	92	18	102.6	513
1993	6	244	47	88	17	119	23	67	13	86.5	519
1994	5	238	47	85	17	110	22	65	13	100.4	502
1995	4	230	46	86	17	136	27	49	10	125.3	501
1996	3	122	39	62	20	86	27	45	14	105	315
1997	7	195	37	112	21	128	24	92	17	75.3	527
1998	19	818	46	317	18	364	21	273	15	93.3	1772
1999	14	477	35	300	22	372	27	214	16	97.4	1363
2000	5	182	57	50	16	78	24	13	4	64.4	322
2001	8	164	42	75	19	65	17	88	22	49.0	392
2002	4 ^b	129	30	101	23	162	37	44	10	109.0	436

^a From Kodiak NWR files; standardized low-level surveys along selected streams on southwestern Kodiak Island.

^b Five of 6 standard monitoring sites were surveyed on 4 dates.

Table 3 Reported brown bear kill data for the Kodiak archipelago by regulatory year and season, 1960–61 through 2003–04

Regulatory	Fall harvest				Spring harvest				Total sport harvest				Reported nonsport				Total reported bear kill ^a				
year	M ^b	F ^c	UNK ^d	Total ^e	M	F	UNK	Total	M	%M ^f	F	UNK	Total	M	F	UNK	Total	M	F	UNK	Total
1960–61				0	72	25	0	97	72	74%	25	0	97	2	1	0	3	74	26	0	100
1961–62	19	17	0	36	55	23	0	78	74	65%	40	0	114	0	0	0	0	74	40	0	114
1962–63	17	16	0	33	50	37	4	91	67	54%	53	4	124	4	4	0	8	71	57	4	132
1963–64	21	9	0	30	69	45	1	115	90	62%	54	1	145	10	7	0	17	100	61	1	162
1964–65	23	6	0	29	67	67	3	137	90	54%	73	3	166	9	13	0	22	99	86	3	188
1965–66	40	26	0	66	77	62	1	140	117	57%	88	1	206	14	11	0	25	131	99	1	231
1966–67	40	22	1	63	45	31	1	77	85	61%	53	2	140	6	4	0	10	91	57	2	150
1967–68	30	16	0	46	50	27	0	77	80	65%	43	0	123	3	3	0	6	83	46	0	129
1968–69	16	12	0	28	32	16	1	49	48	62%	28	1	77	3	1	0	4	51	29	1	81
1969–70	11	9	1	21	36	21	6	63	47	56%	30	7	84	2	0	0	2	49	30	7	86
10-year mean	24.1	14.8	0.2	39.1	55.3	35.4	1.7	92.4	77.0	60%	48.7	1.9	127.6	5.3	4.4	0	9.7	82.3	53.1	1.9	137.3
1970–71	28	12	1	41	47	17	2	66	75	70%	29	3	107	5	8	0	13	80	37	3	120
1971–72	27	21	2	50	62	31	0	93	89	62%	52	2	143	1	2	1	4	90	54	3	147
1972–73	33	33	0	66	66	47	1	114	99	55%	80	1	180	0	1	1	2	99	81	2	182
1973–74	24	38	0	62	52	35	0	87	76	51%	73	0	149	2	1	1	4	78	74	1	153
1974–75	29	23	0	52	48	25	3	76	77	60%	48	3	128	1	5	0	6	78	53	3	134
1975–76	18	14	0	32	61	29	0	90	79	65%	43	0	122	2	6	0	8	81	49	0	130
1976–77	25	16	0	41	55	34	0	89	80	62%	50	0	130	1	0	0	1	81	50	0	131
1977–78	22	12	0	34	65	38	0	103	87	64%	50	0	137	1	3	1	5	88	53	1	142
1978–79	22	13	0	35	49	39	1	89	71	57%	52	1	124	6	2	2	10	77	54	3	134
1979–80	18	18	0	36	77	34	1	112	95	64%	52	1	148	1	3	4	8	96	55	5	156
10-year mean	24.6	20.0	0.3	44.9	58.2	32.9	0.8	91.9	82.8	61%	52.9	1.1	136.8	2.0	3.1	1.0	6.1	84.8	56.0	2.1	142.9

Table 3 continued

Regulatory year	Fall harvest				Spring harvest				Total sport harvest				Reported nonsport				Total reported bear kill ^a				
	M ^b	F ^c	UNK ^d	TOT ^e	M	F	UNK	Total	M	%M ^f	F	UNK	Total	M	F	UNK	Total	M	F	UNK	Total
1980–81	24	14	0	38	61	25	0	86	85	69%	39	0	124	3	6	3	12	88	45	3	136
1981–82	21	16	0	37	65	34	0	99	86	63%	50	0	136	4	3	3	10	90	53	3	146
1982–83	36	26	2	64	102	36	0	138	138	68%	62	2	202	6	8	2	16	144	70	4	218
1983–84	31	26	0	57	102	36	0	138	133	68%	62	0	195	5	7	0	12	138	69	0	207
1984–85	33	21	0	54	71	30	0	101	104	67%	51	0	155	9	13	0	22	113	64	0	177
1985–86	52	32	2	86	70	34	0	104	122	64%	66	2	190	6	13	5	24	128	79	7	214
1986–87	26	39	0	65	71	30	0	101	96	58%	69	0	165	7	8	2	17	103	77	2	182
1987–88	25	25	0	50	80	40	1	121	104	61%	65	1	170	7	5	4	16	111	70	5	186
1988–89	30	23	1	54	73	39	0	112	103	62%	62	1	166	2	15	5	22	105	77	6	188
1989–90	25	20	0	45	74	32	0	106	99	66%	52	0	151	2	11	1	14	101	63	1	165
10-year mean	30.3	24.2	0.5	55.0	76.9	33.6	0.1	110.6	107.0	65%	57.8	0.6	165.4	5.1	8.9	2.5	16.5	112.1	66.7	3.1	181.9
1990–91	30	21	0	51	69	29	0	98	99	66%	50	0	149	6	7	3	16	105	57	3	165
1991–92	25	16	1	42	72	40	2	114	97	62%	56	3	156	6	6	4	16	103	62	7	172
1992–93	39	23	1	63	74	39	1	114	113	64%	62	2	177	5	7	6	18	118	69	8	195
1993–94	35	19	0	54	78	30	1	109	113	69%	49	1	163	2	6	8	16	115	55	9	179
1994–95	42	15	0	57	65	33	0	98	107	69%	48	0	155	10	14	3	27	117	62	3	182
1995–96	29	20	0	49	67	36	0	103	96	63%	56	0	152	2	2	1	5	98	58	1	157
1996–97	33	15	0	48	92	22	0	114	125	77%	37	0	162	5	7	8	20	130	44	8	182
1997–98	36	17	0	53	85	28	1	114	121	72%	45	1	167	7	3	6	16	128	48	7	183
1998–99	39	15	0	54	74	21	0	95	113	76%	36	0	149	7	13	5	25	120	49	5	174
1999–2000	44	16	0	60	83	27	0	110	127	75%	43	0	170	12	7	4	23	139	50	4	193
10-year mean	35.2	17.7	0.2	53.1	75.9	30.5	0.5	106.9	111.1	69%	48.2	0.7	160.0	6.2	7.2	4.8	18.2	117.3	55.4	5.5	178.2

Table 3 continued

Regulatory year	Fall harvest				Spring harvest				Total sport harvest				Reported nonsport				Total reported bear kill ^a				
	M ^b	F ^c	UNK ^d	TOT ^e	M	F	UNK	Total	M	%M ^f	F	UNK	Total	M	F	UNK	Total	M	F	UNK	Total
2000–01	34	15	0	49	87	34	0	121	121	71%	49	0	170	5	2	5	12	126	51	5	182
2001–02	47	13	0	60	99	25	0	124	146	79%	38	0	184	3	5	10	18	149	43	10	202
2002–03	33	16	0	49	70	23	0	93	103	73%	39	0	142	5	4	11	20	108	43	11	162
2003–04	39	15	0	54	85	26	0	111	124	75%	41	0	165	9	5	13	27	133	46	13	192
4 year mean	38.3	14.8	0.0	53.0	85.3	27.0	0.0	112.3	123.5	75%	41.8	0.0	165.3	5.5	4.0	9.8	19.3	129.0	45.8	9.8	184.5

^a reported kill data derived from sealing records (1960–61 to 1989–90) and annual harvest reports (1990–91 to present).

^b males

^c females

^d unknown or unreported sex

^e total

^f percent males in harvest (males/total)

Table 4 Total skull size, age, and sex of brown bears killed by sport hunters in Unit 8, 1982–83 through 2003–04

Regulatory year	Males				Females			
	Mean skull size	<i>n</i>	Mean age	<i>n</i>	Mean skull size	<i>n</i>	Mean age	<i>n</i>
1982–83	24.4	89	7.2	98	22.1	55	8.6	59
1983–84	24.6	128	7.4	130	21.6	60	7.9	62
1984–85	24.7	99	7.3	102	22.0	45	7.8	51
1985–86	24.5	116	7.4	120	21.9	57	7.2	64
1986–87	24.8	93	7.6	96	21.9	60	8.5	64
1987–88	24.6	100	6.7	104	21.8	63	6.6	65
1988–89	25.5	98	9.1	103	21.6	53	7.4	61
1989–90	25.4	96	9.0	97	21.6	48	8.7	52
1990–91	25.3	97	8.6	95	21.7	43	8.0	50
1991–92	25.0	91	8.4	96	21.7	52	8.0	56
1992–93	25.1	106	8.2	112	21.9	56	7.8	61
1993–94	24.4	109	6.8	113	21.8	45	7.2	48
1994–95	25.0	103	7.8	107	21.8	46	6.8	48
1995–96	25.2	94	7.5	95	21.8	50	7.4	55
1996–97	24.7	120	7.5	125	21.7	34	7.9	37
1997–98	24.7	117	6.8	120	21.9	44	6.5	44
1998–99	24.9	112	6.9	113	21.8	36	5.6	35
1999–2000	24.7	122	7.7	125	22.4	40	8.8	41
2000–01	25.2	117	8.1	120	21.1	49	5.2	49
2001–02	24.7	141	7.2	145	21.9	37	7.0	38
2002–03	25.8	100	9.4	103	22.0	37	7.3	39
2003–04	24.9	120	7.8	124	21.8	40	7.8	40

Table 5 Unit 8 brown bear harvest data for drawing permit hunts DB 101–159 and 201–259, 1994–95 through 2003–04

	Regulatory year	Permits issued	Permits returned	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total ^a harvest
Fall hunts	1994–95	118	116	2	48	39	82	15	28	0	54
(DB101-129)	1995–96	113	113	2	40	29	65	16	35	0	45
(DB201-229)	1996–97	120	119	5	39	32	73	12	27	0	44
	1997–98	131	128	2	50	33	67	16	33	0	49
	1998–99	128	126	2	39	32	68	15	32	0	47
	1999–2000	126	126	6	44	37	71	15	29	0	52
	2000–01	114	113	1	41	32	70	14	30	0	46
	2001–02	113	113	0	46	39	76	12	24	0	51
	2002–03	113	112	4	44	32	68	15	32	0	47
	2003–04	121	120	6	41	33	72	13	28	0	46
Spring hunts	1994–95	215	213	2	45	63	66	32	34	0	95
(DB131-159)	1995–96	225	223	3	45	63	64	35	36	0	98
(DB231-259)	1996–97	219	216	2	50	85	80	21	20	0	106
	1997–98	235	218	1	50	83	76	26	24	1	110
	1998–99	214	211	3	44	70	77	21	23	0	91
	1999–2000	216	214	0	48	77	76	24	24	0	101
	2000–01	225	218	2	54	87	75	29	25	0	116
	2001–02	221	220	1	54	94	80	23	20	0	117
	2002–03	213	210	3	44	68	76	22	24	0	90
	2003–04	194	194	2	54	80	78	23	22	0	103

Table 5 Continued

	Regulatory year	Permits issued	Permits returned	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total ^a harvest
Combined	1994–95	333	329	2	54	102	69	47	31	0	149
Fall and	1995–96	338	336	3	46	92	64	51	36	0	143
Spring Hunts	1996–97	339	335	7	45	117	78	33	22	0	150
(DB101-159)	1997–98	366	346	3	50	116	74	42	26	1	158
(DB201-259)	1998–99	342	337	5	42	102	74	36	26	0	138
	1999–2000	342	340	3	46	114	75	39	25	0	153
	2000–01	339	331	3	50	119	73	43	27	0	162
	2001–02	334	333	1	51	133	79	35	21	0	168
	2002–03	326	322	3	43	100	73	37	27	0	137
	2003–04	315	314	4	49	113	76	36	24	0	149

^a Harvest figures may differ from those in other tables because of differences in classification of illegal kills and unresolved discrepancies in hunter reports.

Table 6 Unit 8 brown bear harvest data for registration permit^a hunt numbers RB 230 and RB 260, 1994/95–2003/04

	Regulatory year	Permits issued ^a	Permits returned	Hunters afield	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total harvest
Fall Hunts (RB230)	1994–95	69	65	52	20	4	2	100	0	0	0	3
	1995–96	71	68	37	48	11	0	0	4	100	0	4
	1996–97	84	83	47	43	9	2	50	2	50	0	4
	1997–98	114	98	71	24	4	3	100	0	0	0	3
	1998–99	157	145	99	32	7	7	100	--	--	0	7
	1999–2000	176	175	110	33	7	7	88	1	12	0	8
	2000–01	162	146	99	32	3	2	67	1	33	0	3
	2001–02	126	124	92	26	10	8	89	1	11	0	9
	2002–03	85	77	54	30	4	1	50	1	50	0	2
	2003–04	118	118	81	31	10	5	63	3	38	0	8
Spring Hunts (RB260)	1994–95	75	68	45	40	7	2	67	1	33	0	3
	1995–96	85	83	58	32	9	4	75	1	25	0	5
	1996–97	82	78	53	32	15	7	88	1	12	0	8
	1997–98	94	55	34	38	12	2	50	2	50	0	4
	1998–99	107	92	72	22	6	4	100	0	--	0	4
	1999–2000 ^b	103	96	79	18	11	7	78	2	22	0	9
	2000–01	104	92	70	24	7	0	---	5	100	0	5
	2001–02	106	94	70	26	10	5	71	2	29	0	7
	2002–03	75	67	46	31	7	2	67	1	33	0	3
	2003–04	117	108	76	30	11	5	63	3	37	0	8

Table 6 Continued

	Regulatory year	Permits issued ^a	Permits returned	Hunters afield	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total harvest
Combined	1994–95	144	133	97	27	6	5	83	1	17	0	6
Fall and	1995–96	156	151	95	39	9	4	44	5	56	0	9
Spring	1996–97	166	161	100	38	12	9	75	3	25	0	12
Hunts	1997–98	208	153	105	31	8	5	71	2	29	0	7
(RB230	1998–99	264	237	171	28	6	11	100	0	--	0	11
& RB260)	1999–2000 ^b	279	271	189	27	9	14	82	3	18	0	17
	2000–01	226	238	169	29	5	2	25	6	75	0	8
	2001–02	232	218	162	26	10	13	81	3	19	0	16
	2002–03	160	144	100	31	5	3	60	2	40	0	5
	2003–04	235	226	157	31	10	10	63	6	37	0	16

^a No limit on the number of permits issued.

^b Includes 1 female bear illegally killed by a sport hunter.

Table 7 Residency of successful brown bear hunters^a in Unit 8, 1994–95 through 2003–04

Regulatory year	Local residents ^b	(%)	Nonlocal residents	(%)	Nonresidents ^c	(%)	Total successful hunters
1994–95	10	6	58	37	87	56	155
1995–96	20	13	61	40	71	47	152
1996–97	10	6	63	39	89	55	162
1997–98	12	7	71	43	83	50	166
1998–99	11	7	57	38	81	54	149
1999–2000	16	9	62	37	91	54	169
2000–01	15	9	65	38	90	53	170
2001–02	21	11	66	36	97	53	184
2002–03	6	4	51	36	85	60	142
2003–04	19	12	62	38	84	50	165

^a Permits required for all hunters; does not include sport hunters who killed bear without a permit, so may differ from other tables.

^b Includes residents of Game Management Unit 8.

^c Includes the following successful nonresidents guided by next-of-kin: 1994–95, 1; 1995–96, 3; 1996–97, 1; 1997–98, 3; 1998–99, 1; 1999–2000, 2; 2000–01, 2; 2001–02, 6; 2002–03, 4; and 2003–04, 1.

Table 8 Chronology of the brown bear harvest by season and period in Unit 8, 1994–95 through 2003–04

Regulatory year	Fall Season								Spring Season								Regulatory Year Total ^a
	25 Oct–		7 Nov–		19 Nov–		Fall Total	1 Apr–		16 Apr–		1 May–		Spring Total			
	6 Nov		18 Nov		25 Nov			15 Apr		30 Apr		15 May					
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>			
1994–95	38	67	11	19	8	14	57	2	2	40	41	56	57	98	155		
1995–96	34	69	13	26	2	4	49	1	1	40	39	62	60	103	152		
1996–97	39	81	8	17	1	2	48	6	5	47	41	61	54	114	162		
1997–98	41	77	8	15	4	8	53	3	3	59	52	52	46	114	167		
1998–99	43	80	9	17	2	3	54	4	4	34	36	57	60	95	149		
1999–2000	43	73	10	17	6	10	59	6	5	41	37	63	57	110	169		
2000–01	35	71	12	24	2	4	49	4	3	55	45	62	51	121	170		
2001–02	47	78	10	17	3	5	60	4	3	44	35	76	61	124	184		
2002–03	39	80	6	12	4	8	49	2	2	40	43	51	55	93	142		
2003–04	45	83	9	17	0	0	54	4	4	40	36	67	60	111	165		

^a Totals may differ from those in other tables because of different classifications of illegal sport harvest.

Table 9 Unit 8 brown bear harvest percent by transport method, 1994–95 through 2003–04

Regulatory Year	Percent of Harvest								<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snow machine	ORV	Highway vehicle	Unknown	
1994–95	57	0	38	1	0	0	3	0	155
1995–96	70	1	23	3	0	1	2	0	152
1996–97	48	0	46	0	0	<1	5	0	162
1997–98	70	0	27	0	0	<1	2	0	167
1998–99	73	0	20	3	0	<1	3	0	149
1999–2000	69	0	22	2	0	0	5	2	170
2000–01	76	0	20	2	0	0	2	0	170
2001–02	72	0	20	4	0	0	4	0	184
2002–03	73	0	23	2	0	0	1	1	142
2003–04	66	0	25	2	0	0	7	<1	165

Table 10 Unit 8 brown bears reported DLP harvest, 1994–2004

Regulatory Year	Sex of bear				Location		Cause ^a	
	Males	Females	Unknown	Total	Kodiak road system	Remote	Hunting Related	Other
1994	7	10	0	17	0	17	8	9
1995	1	0	0	1	0	1	0	1
1996	4	4	1	9	0	9	5	4
1997	2	3	2	7	2	5	1	6
1998	6	7	0	13	0	13	5	8
1999	10	7	2	19	8	11	3	13
2000	6	3	1	10	0	10	1	9
2001	1	3	0	4	0	4	0	4
2002	2	1	0	3	1	2	1	2
2003	1	1	0	2	1	1	2	0
2004	4	5	1	10	3	7	8	2

^a Data included in previous columns

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 9 (33,638 mi²)

GEOGRAPHIC DESCRIPTION: Alaska Peninsula

BACKGROUND

The Alaska Peninsula is a premier area for large brown bears, and the Board of Game has placed a high priority on maintaining the quality of this hunt. Because of reasonably easy aircraft access and the high quality of bear trophies in the unit, an active guiding industry developed during the 1960s. As hunting pressure increased, several studies on brown bear ecology were initiated. During the late 1960s and early 1970s, Alaska Department of Fish and Game (ADF&G) engaged in research at McNeil River State Game Sanctuary to investigate reproductive biology and survival rates of brown bears (Glenn et al. 1976). A succession of graduate students from Utah State University studied bear behavior at McNeil River during the early 1970s. Sellers and Aumiller (1994) analyzed population data collected at McNeil River.

An intensive study was conducted during the early 1970s near Black Lake in the central portion of Unit 9E. Three hundred and forty-four bears were captured and marked during 1970–75 to acquire information on reproductive performance, movements, and harvest rates. More recently, efforts have been directed at further analyzing the data from this study to better understand the population dynamics of an exploited bear population. In 1988 an interagency study was initiated at Black Lake to assess the current status of the bear population (Sellers and Miller 1991, Sellers 1994, Miller et al. 1997) and to make comparisons with conditions in the early 1970s. The 1989 *Exxon Valdez* oil spill (EVOS) led to another research project to assess damage to the brown bear population along the coast of Katmai National Park. This study continued under National Park Service (NPS) funding with the primary objective of measuring population parameters of an unhunted brown bear population (Sellers et al. 1999).

High harvests that coincided with poor salmon escapements in most drainages in 1972 and 1973 indicated that hunting seasons needed to be reduced. Harvest statistics and the high percentage of marked bears killed in the Black Lake area also supported a reduction in hunting. Emergency closures were declared for all of Unit 9 in the spring of 1974 and for the central portion of the Alaska Peninsula in the spring of 1975. At the spring 1975 Board of Game meeting, the present system of alternating seasons (open in the fall of odd-numbered years and the spring of even-numbered years) was adopted to keep harvests within the quota

of 150 bears per year for the area south of the Naknek River. This system reduced harvests substantially from 1976 to 1981 and allowed the bear population to recover.

In 1984 the board abandoned the harvest quota (150 bears) for the area south of the Naknek River and endorsed more flexible objectives (Sellers and McNay 1984): (1) maintain maximum opportunity to hunt bears and avoid a drawing permit system; (2) continue both spring and fall hunts, maintain a desirable sex ratio in the bear population, and allow hunters to select either season; (3) maintain hunting seasons long enough so that severe weather would be unlikely to eliminate the entire season; and (4) handle chronic bear threats to villages through better sanitation, public education, and, only as a last resort when other measures prove ineffective, through special permit hunts.

In the fall of 1988, the Alaska Supreme Court ruled the exclusive guide area system unconstitutional. This allowed the number of registered guides operating in Unit 9 to increase; however, federal land management agencies limited the number of commercial-use licenses to new guides on federal lands. Therefore, most new guide operations used either state or private lands. With approximately 75% of the Unit 9 harvest coming from guided hunts, stability in the guide industry is a key part of the management program.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

To maintain a high bear density with a sex and age structure that will sustain a harvest composed of 60% males, with 50 males 8 years or older taken during the combined fall/spring season.

METHODS

Historically, brown bear managers have relied heavily on interpretation of harvest statistics (i.e., total harvest, sex ratio, age composition) to monitor bear populations, often using various computer models (Tait 1983, Harris 1984) to aid in evaluating harvest data. However, models based on harvest data have inherent problems (Miller and Miller 1990). Recently a new model using the Lotka equation has been developed by W. Testa (ADF&G, Anchorage) to estimate the sustainable harvest of females based on estimates of survival and reproductive rates.

Despite the potential utility of models, supplementary means of detecting changes in heavily exploited bear populations are needed. Aerial surveys of bears concentrated along salmon streams have been used periodically since 1958, primarily to detect major changes in population composition. Erickson and Siniff (1963) identified limitations of these surveys, recommending procedures to standardize the technique. Subsequently, ADF&G has conducted surveys near Black Lake, and U.S. Fish and Wildlife Service (FWS) has conducted surveys in the Izembek and Unimak areas.

In May 1999 and 2000, an experimental line-transect/double count technique, first tried on Kodiak Island (Becker and Quang, in prep.) was used in the northern portion of Unit 9B. A

cooperative project with the Lake Clark National Park estimated brown and black bear densities; this project also provided limited information on population composition. This technique was used to estimate brown bear densities for all of Unit 9A, Unit 9D, and Unimak Island.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

The brown bear population in Unit 9 was depressed during the mid 1970s because of high harvests, low salmon escapements, and severe winters. With the reduced harvests during the late 1970s, bear densities have increased. From 1985 to 1990, the average annual count of independent bears at Black Lake was 102 (range = 86–109); from 1991 to 1996 the average annual count was 121 (range = 101–144) (Sellers 1994). Poor weather in 1997 and 1998 hampered completion of adequate repetitions of these surveys, but one completed survey in 1998 included 158 independent bears. Counts during 1999–2002 averaged 145 independent bears. These data indicate a reasonably stable population during the last 5 years in which surveys were conducted (Table 1).

Population Size

Brown bear densities vary within Unit 9; densities are lower in western Unit 9B and the Bristol Bay coastal plain. Results from the 1989 CMR (Capture/Mark/Resight) population estimate at Black Lake showed a density of 1 bear/2.08 mi² in a 469 mi² study area. Within the study area, density varied among count units from 1 bear/1 mi² to 1 bear/7 mi², depending on habitat type (Sellers and Miller 1992). Results were extrapolated by UCUs (uniform coding units) to arrive at estimates of 296, 879, 429, 3,176, and 900 bears for 9A, 9B, 9C, 9E, and 9D, respectively (Sellers and Miller 1991). These estimates do not include national park lands or McNeil River State Game Sanctuary. Thus, in the portion of Unit 9 open to brown bear hunting, the total population was estimated at 5679 bears in 1991, with an overall density of 1 bear/4.13 mi² (93 bears/1000 km²) (Sellers and Miller 1991). Although these were subjective extrapolations, surveys flown in 1993 within Katmai National Preserve at the same intensity as the CMR flights produced estimated densities similar to the one made for this area in 1991 (Sellers et al. 1999). A more objective test of the extrapolated density estimate for northern Unit 9B is available from line transect surveys flown in 1999 and 2000 (Becker and Sellers in prep.). The extrapolated estimate for this area was 1 bear /7.7 mi² versus an estimate of 1 bear/10 mi² from the line transects. An additional comparison is available from Unit 9D where the extrapolated population estimate was 900–1000 bears. Transect surveys in 2002 estimated a population of 1462.

Assuming that the bear population has grown since 1991, as suggested by stream surveys and opinions of various residents and guides, it is likely that the bear population now is more than 6000. The McNeil River State Game Sanctuary and national parks within Unit 9 are thought to contain an additional 2000–2500 brown bears.

Population Composition

Evidence from the Black Lake study and analysis of harvest data show a change in the population composition since the early 1970s believed to be correlated to differences in harvest rates. The Black Lake capture samples during the early 1970s showed an adult (i.e., ≥ 5 years old) sex ratio of 21 adult males:100 adult females. The 1988–89 capture sample showed a significantly higher ratio of 39 males:100 females ($t = 1.62$, $df = 194$, $P = 0.052$). The average age of adult males increased from a mean of 7.19 years in the early 1970s to 9.92 years in 1988 (Mann-Whitney, $T = 87.5$, $P = 0.080$) (Sellers 1994). The average age of adult females also increased from a mean of 9.57 years during the early 1970s to 12.21 years for 1988 (Mann-Whitney, $T = 1345$, $P = 0.003$).

Classification of bears during replicate stream surveys at Black Lake also showed changes in population composition believed to reflect significant changes in harvest rates beginning in the mid 1960s. This analysis was based on the percentage of “single” bears (i.e., not in family groups) in the population. Hunting regulations protected family groups of cubs and yearlings, so hunting tended to reduce the proportion of single bears in the population (Sellers and McNay 1984). During 1958–61, when harvests were extremely low, a mean of 46% (range = 37–55%) of 1365 brown bears classified during summer surveys were single bears. This was higher ($t = 6.81$, $P = 0.002$) than the mean of 21% single bears (range = 17–26%) of 2078 bears classified from 1967 to 1976 when the population was affected by excessive harvests. Restrictive regulations, beginning in 1974, led to reduced harvests, and the population began recovering during the late 1970s and early 1980s. During 1982–2002, a mean of 37% of 14,123 bears classified during stream surveys were single, significantly higher than during 1967–76 ($P = < 0.001$).

The circumstances of excessive harvests in the early 1970s and subsequent population recovery at Black Lake are thought to apply to Unit 9 in general.

During 1999 and 2000, 272 brown bears in 167 different groups were classified on the line transects in northern 9B. Sixty (22%) were classified as adult males by virtue of their obvious large size. Of all bears seen, 57% were in family groups and 43% were independent bears. Families of cubs made up 10% of all bears seen, and the average litter size was 1.7. Families with yearlings made up 22.4%, and the average litter size was 1.65. Families with young ≥ 2 years old made up 24%, and the average litter size was 2. Litter sizes of both cubs and yearlings were smaller in 1999 (1.5 and 1.4, respectively) than in 2000 (2 and 1.7, respectively). The high percentage of single bears probably reflects both low harvest pressure and the effect of 2 consecutive poor salmon runs in 1997 and 1998 that may have reduced productivity. The cohorts most likely affected by the scarcity of salmon were cubs and yearlings in 1999. The average litter size for cub and yearlings was 1.5 ($n = 10$) and 1.4 ($n = 12$). In contrast, the average litter size of offspring judged to be older than yearlings was 2.56 ($n = 9$).

In 2002 during transect surveys in Unit 9D, a sample of 633 bears was composed of 52% single bears and 16.6% adult males. The average litter size was 1.9.

MORTALITY

Harvest

Season and Bag Limit. The hunting season in Unit 9C, Naknek River drainage, was 1 September–31 October and 1 May–30 June. The bag limit was 1 bear every 4 regulatory years by registration permit only.

The open season for 9B was 20 September–21 October in odd-numbered years and 10–25 May in even-numbered years. The season for the remainder of Unit 9, including the registration permit hunt in the Cold Bay road system, was 1–21 October in odd-numbered years and 10–25 May in even-numbered years. The bag limit was 1 bear every 4 regulatory years.

Board of Game Action and Emergency Orders. In March 1999 the Board of Game reviewed the status of brown bears in Unit 9 and deliberated over a large number of public proposals to liberalize the seasons. Based on evidence that the population was growing, the board extended the fall season as described above. The board has made no changes since 1999.

The Cold Bay registration hunt in Unit 9D is closed routinely by emergency order after the quota is reached. The fall 2003 season closed 3 October, and the spring 2004 season closed 21 May.

Hunter Harvest. During the 2002 regulatory year (RY), only the Naknek registration hunt was open; hunters took 8 bears in the fall and 7 in the spring. (RY begins 1 Jul and ends 30 Jun; e.g., RY02 = 1 Jul 2002 through 30 Jun 2003). The reported harvest for RY 2003 was 626 bears, including 430 males (69%) and 196 females (Table 2). During the 2002 and 2003 regulatory years, 9 bears were reported as nonsport kills, but because nonhunting and illegal kills, including defense of life or property (DLP) kills, are rarely reported, I estimate the nonsport mortality at more than 50 bears.

The mean annual harvest of trophy-sized males, ≥ 8 years old, was 51 (range = 41–58) during the period of population recovery during 1975–82. The mean increased to 73 (range = 61–80) during 1983–88 and jumped to 123 during 1989–98. Since 1999, a mean of 168 males ≥ 8 years old have been taken. Not only has the number of mature males in the harvest increased, but the proportion of the harvest composed of mature males has also increased for these 3 time periods. It was 14.3% during 1975–82; 16.9% during 1983–88; and 23.1% during 1989–98. Since 1999, 25% of the total harvest has been composed of males ≥ 8 years old .

Permit Hunts. The registration permit hunt in the Naknek drainage was designed to minimize bear-human conflicts in the most heavily settled portion of Unit 9. Participation in fall hunts was higher than in spring hunts because some moose and caribou hunters obtained a permit “just in case” they encountered a bear. During 1995–99, an average of 11 bears was killed per regulatory year. Since 2000 the average increased to 14 bears per regulatory year. About half the bears taken in this permit hunt since 1987 were either confirmed or suspected of having been in conflict with humans.

The registration permit hunt in the Cold Bay area was also designed to minimize bear-human conflicts. In 1983, the Izembek National Wildlife Refuge staff expressed concern that the number of local brown bears was too low; they believed problem bears were not common. Consequently, the Board of Game only authorized this hunt when it was determined that problem bears were present. The hunt was not conducted from 1984 until fall 1989. During this period, the bear population appeared to have increased, and the FWS and the department agreed it was impractical to have a season by emergency announcement in response to nuisance bear complaints. Thus, the registration permit hunt was changed to coincide with the normal unitwide season, with a seasonal quota of 2 bears or a regulatory year quota of 4 bears. During the fall 2003 season 2 bears were harvested by 3 October, and 2 bears were killed by 21 May during the spring 2004 hunt. Emergency orders were issued to close both seasons on the day that the seasonal quota was reached.

The Chignik Brown Bear Management Area was established in 1994 and was modeled after the Western Alaska Brown Bear Management Area to provide an opportunity for traditional subsistence hunting. Past village household surveys resulted in customary and traditional findings for the villages of Chignik Lake, Perryville, and Ivanof Bay. This hunt overlaps a federal subsistence permit hunt, which complicates issuing permits and collecting results. Since 1996, participation and compliance with the state permit hunt have been virtually nonexistent. The ADF&G Subsistence Division estimated a harvest of 6 bears from these villages in 1996, yet the only permittee was unsuccessful. No permits were issued during this reporting period and no harvest estimates are available.

Unit 9B was included in the Western Alaska Brown Bear Management Area in 1997. Only 1 bear has been reported during the past 3 regulatory years (2001, 2002, and 2003).

Hunter Residency. During RY 2003–04 general seasons, nonresidents took 77% of the harvest (Table 3).

Harvest Chronology. Prior to 1985, the fall season began 7 October. When the opening date was moved to 1 October, the pattern of harvest also shifted, and 47% of the fall harvest occurred during the first 6 days of October during 1985–89. The opening date for the general season in 9C, 9D, and 9E was moved back to 7 October in 1991, but again advanced to 1 October for the 1999 season. In addition, 9B was opened on 20 September in 1999. During the fall 1999, 2001, and 2003 seasons, 61%, 75% and 85% of the kill in Unit 9B occurred during September. For all of Unit 9 in 2003, 60% of the kill occurred prior to 7 October.

Transportation Methods. During 2003–04, 80% of the successful hunters in the general hunts used aircraft, with boats being the next most common method of transportation (Table 5).

Other Mortality

Nonhunting and illegal kills, including DLP kills, are rarely reported. Unsubstantiated reports from villages, remote lodges, canneries, and commercial fishermen suggest that many other unreported bears are killed or wounded, and I estimate the total unreported kill at 50–100 bears per year.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Bear-human conflicts continue to be the most serious and intractable problem in Unit 9, as in many other parts of the state. Given the pervasive nature of this problem, it will take a concerted effort to make headway. The other continuing issue involves perceived conflicts between bear viewing and hunting.

CONCLUSIONS AND RECOMMENDATIONS

Brown bear populations do not lend themselves to convenient methods of monitoring trends in density or composition. Harvest statistics are useful, but a manager cannot expect to gain a confident appraisal of population status solely from sex and age composition of the harvest. Stream surveys on the Alaska Peninsula should be continued. The Black Lake surveys indicated a relatively stable and high population. Harvests increased significantly during the 1980s, and the population appears to have stopped growing. I estimate more than 6000 bears inhabit the portion of Unit 9 open to bear hunting. With the dramatic increase in harvest recorded since the 1999–2000 regulatory year and an estimated unreported illegal/DLP kill of 50 bears per year, the annual rate of human-caused mortality now is estimated at 6%. In recent years, the Board of Game has been asked to drastically increase the brown bear harvest, especially in Units 9C and 9E, to benefit moose and caribou survival. This is not a new sentiment among local residents, but it has taken on added weight with the decline of the Northern Alaska Peninsula caribou herd (NAPCH). A caribou calf mortality study in 1998 did identify brown bears as one of the major predators of young calves; however, a more significant portion of the annual mortality of calves occurred overwinter, when bears were not active. Research at Black Lake showed that a relatively small percentage of radiocollared bears made any use of the NAPCH's primary calving grounds during spring. Thus, an indiscriminant reduction of the brown bear population in 9C and 9E would realize little reduction in caribou mortality. Throughout Unit 9, brown bear predation on moose calves apparently remains high, but the moose population has remained stable. I do not recommend targeting brown bears in any portion of Unit 9 for reduction to benefit caribou or moose populations.

Given what appear to be reasonable estimates derived from line transect surveys in several parts of the state, I recommend this technique be used in cooperative projects with federal agencies to estimate bear populations in other units on the Alaska Peninsula.

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PREPARED BY:

Lem Butler
Wildlife Biologist

SUBMITTED BY:

Gino Del Frate
Management Coordinator

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Table 1 Black Lake aerial stream counts of brown bears, 1990–2002

Regulatory year	Number of surveys attempted	<u>Single bears</u>		<u>Maternal bears</u>		<u>Offspring > 1year old</u>		<u>Cubs of the year</u>		Total
		Number	%	Number	%	Number	%	Number	%	
1990	5	332	36	194	21	232	25	170	18	928
1991	4	357	49	128	17	143	19	106	14	734
1992	3	219	35	126	20	134	22	138	22	617
1993	0									
1994	4	296	36	167	20	206	25	147	18	816
1995	4	370	38	205	21	211	22	182	19	968
1996	4	277	42	131	20	175	26	78	12	661
1997	3	139	40	69	20	48	14	90	26	346
1998	3	172	33	114	22	115	22	121	23	522
1999	4	411	37	236	21	281	25	175	16	1103
2000	4	350	36	205	21	223	23	203	21	987
2001	4	351	38	177	19	224	25	176	19	928
2002	4	356	32	234	21	317	29	193	18	1100

Table 2 Unit 9 brown bear harvest, RY 1999–2004

Regulatory Year	Hunter kill						Non-hunting kill ^a			Total reported kill					
	M	(%)	F	(%)	Unk	Total	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
1999–2000															
Fall 99	224	(60)	148	(40)	1	373	11	4	4	235	(61)	152	(39)	5	392
Spring 00	227	(76)	71	(24)	1	299	--	--	--	227	(76)	71	(24)	1	299
Total	451	(67)	219	(33)	2	672	11	4	4	462	(67)	223	(33)	6	691
2000–01															
Fall 00	6	(75)	2	(25)	0	8	4	1	0	10	(77)	3	(23)	0	13
Spring 01	6	(86)	1	(14)	0	7	1	0	0	7	(87)	1	(13)	0	8
Total	12	(80)	3	(20)	0	15	5	1	0	17	(81)	4	(19)	0	21
2001–02															
Fall 01	211	(62)	131	(38)	0	342	5	2	0	216	(62)	133	(38)	0	349
Spring 02	252	(78)	73	(22)	0	325	0	3	1	252	(77)	76	(23)	1	329
Total	463	(69)	204	(31)	0	667	5	5	1	468	(69)	209	(31)	1	678
2002–03															
Fall 02	5	(63)	3	(37)	0	8	2	0	2	7	(58)	3	(25)	2	12
Spring 03	6	(86)	1	(14)	0	7	0	0	0	6	(86)	1	(14)	0	7
Total	11	(73)	4	(27)	0	15	2	0	2	13	(68)	4	(21)	3	19
2003–04															
Fall 03	196	(63)	115	(37)	0	311	1	1	2	197	(63)	116	(37)	2	315
Spring 04	234	(74)	81	(26)	0	315	1	0	0	235	(74)	81	(26)	0	316
Total	430	(69)	196	(31)	0	626	2	1	2	432	(67)	197	(33)	2	631

^a Includes DLP kills, research mortalities, and other known human-caused, accidental mortality.

Table 3 Unit 9 brown bear successful hunter residency, RY 1999–2004

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters ^b
1999–00	17	(2)	142	(21)	530	(77)	691
2000–01	3	(14)	1	(5)	9	(43)	21
2001–02	20	(3)	111	(16)	542	(79)	683
2002–03	7	(47)	3	(20)	5	(33)	15
2003–04	19	(3)	126	(20)	481	(77)	626

^a Local resident means resident of Unit 9.^b Includes unknown residency.

Table 4 Unit 9 brown bear harvest chronology percent by month, RY 1999–2004

Regulatory Year	Harvest periods											
	July/August		September		< 7 October		≥7 October		May		June	
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)
1990–00	1	(9)	9	(64)	24	(166)	22	(150)	43	(298)	0	(0)
2000–01	19	(4)	33	(7)	5	(1)	0	(0)	19	(4)	14	(3)
2001–02	0	(0)	8	(58)	23	(154)	20	(135)	47	(323)	1	(6)
2002–03	0	(0)	53	(8)	0	(0)	0	(0)	13	(2)	33	(5)
2003–04	0	(0)	7	(42)	24	(145)	17	(105)	51	(306)	1	(3)

Table 5 Unit 9 brown bear harvest percent by transport method, RY 1999–2004

Regulatory year	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unk.	n
1999–00	80	0	14	1	0	0	0	4	691
2000–01	5	0	20	33	0	0	10	32	21
2001–02	76	0	16	3	0	0	1	3	683
2002–03	7	0	33	20	0	0	33	7	15
2003–04	80	0	16	2	0	1	1	1	623

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 10 (1536mi²)

GEOGRAPHIC DESCRIPTION: Unimak Island

BACKGROUND

Unimak Island is the only area in Unit 10 occupied by brown bears. The island is classified as a wilderness area and is managed by the Izembek National Wildlife Refuge (INWR). Brown bear hunting on Unimak Island was administered by the U.S. Fish and Wildlife Service (FWS) from 1949 to 1979 and by the Alaska Department of Fish and Game after 1979. Fifteen drawing permits are issued each year: 7 for the spring hunt and 8 for the fall hunt.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

Provide opportunities to hunt large brown bears under aesthetically pleasing conditions. The number of hunters is limited, and harvests are maintained below maximum sustained yield.

MANAGEMENT OBJECTIVE

Maintain a high bear density with a sex and age structure that will sustain a harvest of at least 60% males.

METHODS

The FWS periodically conducts aerial bear surveys on Unimak Island in late summer. Interpretation of harvest data to reflect population status is not possible with the very low number of bears killed annually. In spring 2002 we used a new line-transect-double-count technique to estimate the number and sex/age composition of bears on Unimak Island.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

The Unimak Island brown bear population appears to be maintained by natural limiting factors at a relatively stable level.

Population Size and Composition

Based on extrapolation from the capture-mark-resight population estimate done in 1989 at Black Lake, an estimated 250 brown bears were on Unimak Island. Results of the 2002

line transect survey estimated 293, with 90% confidence intervals of 218–384. This equates to a density estimate of 1 bear:3.8 mi². During these surveys, we classified 315 bears consisting of 21% adult males and 64% single bears. Average litter size for cubs was 1.8.

MORTALITY

Harvest

Season and Bag Limit. The seasons for residents and nonresidents were 1 October–31 December and 10–25 May. The bag limit was 1 brown bear every 4 regulatory years by drawing permit only; 15 permits were issued annually.

Board of Game Action and Emergency Orders. None

Hunter Harvest. During 1981–96, annual harvests from Unimak Island averaged 5.9 bears (range = 3–9). During the 1997–2002 regulatory years, the average annual harvest was 11.4 bears. Part of the increase was due to 2 special governor’s permits that were auctioned off by Safari Club International and Foundation for North American Wild Sheep. These extra permittees were successful in fall 1997 and spring 2000. The Rocky Mountain Elk Foundation auctioned another governor’s permit for the 2000–01 regulatory year, but the purchaser was unable to use his permit. Hunters harvested 10 bears during the 2002 and the 2003 regulatory years (70% and 100% males, respectively; 20 bears total. See Table 1.)

Hunter Residency and Success. Nonresidents accounted for 8% of the harvest during 1981–96 and 52% during 1997–2001. Approximately 38% of permittees did not hunt on Unimak Island between 1981 and 1996, and of those who actually hunted, 63% were successful. Since 1999, 88% of permittees hunted, and their success rate increased to 85%.

Harvest Chronology. Total harvests have been evenly split between the spring and fall seasons.

Transport Methods. Since 1995 all successful hunters used aircraft to access Unimak Island.

CONCLUSIONS AND RECOMMENDATIONS

The brown bear population on Unimak Island appears stable, and the drawing permit hunt meets management objectives. Although harvests have increased in recent years, no changes are recommended in the permit hunt at this time.

PREPARED BY:

Lem Butler

Wildlife Biologist

SUBMITTED BY:

Gino Del Frate

Management Coordinator

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Alaska Department of Fish and Game. Juneau, Alaska.

Table 1 Unit 10 brown bear harvest data by permit hunt, RY 1999–2003

Hunt Number	Regulatory year	Permits issued	Permit reports returned	Percent did not hunt ^b	Percent successful hunters	Harvest				
						Male	(%)	Female	(%)	Total
DB375 (Fall)	1999–00	8	8	25	100	6	(100)	0	(0)	6
	2000–01	9 ^a	9	33	100	3	(50)	3	(50)	6
	2001–02	8	8	12	71	4	(80)	1	(20)	5
	2002–03	8	8	12	57	1	(25)	3	(75)	4
	2003–04	8	8	12	100	7	(100)	0	(0)	7
DB376 (Spring)	1999–00	8 ^a	8	12	100	6	(86)	1	(14)	7
	2000–01	7	7	14	83	4	(80)	1	(20)	5
	2001–02	7	5	28	60	3	(100)	0	(0)	3
	2002–03	7	7	0	85	6	(100)	0	(0)	6
	2003–04	7	5	28	60	3	(100)	0	(0)	3
DB375 & DB376 Combined	1999–00	16	16	19	100	12	(92)	1	(8)	13
	2000–01	16	16	25	92	7	(64)	4	(36)	11
	2001–02	15	15	20	58	7	(88)	1	(22)	8
	2002–03	15	15	29	71	7	(70)	3	(30)	10
	2003–04	15	14	17	83	10	(100)	0	(0)	10

^a Includes one governor's permit.^b Includes hunters that did not report.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi²)

GEOGRAPHIC DESCRIPTION: Wrangell Mountains

BACKGROUND

Brown bears were numerous in Unit 11 prior to 1948–1953, when federal poisoning programs directed at controlling wolves incidentally reduced bear numbers. Following cessation of wolf control, bear numbers increased, and by the mid 1970s bears again were abundant.

Brown bear harvests averaged 16 (range = 8–27) per year throughout the 1960s and 1970s, but declined substantially after 1978, when much of Unit 11 was included in Wrangell-Saint Elias National Park and Preserve. For 20 years between 1979 and 1999, hunting pressure was low, and harvests averaged only 6 bears (range = 2–12) per year. Brown bear harvests have been increasing since 1999, when the first federal subsistence season was implemented in the hard park.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

To maintain a brown bear population that will sustain an annual harvest of 25 bears composed of at least 50% males.

METHODS

We monitored the brown bear harvest by sealing skulls and hides of harvested bears. We measured skulls of sealed bears and determined the sex of the bears. A premolar tooth was extracted for aging, and information on date and location of the harvest, days afield and mode of transportation was collected from successful hunters.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

No surveys or censuses have been conducted in Unit 11; therefore, population data are not available. Frequent observations of bears by ADF&G staff and the public suggest a relatively abundant and well-distributed population of brown bears in Unit 11. No population trends were evident over this reporting period.

Distribution and Movements

Based on incidental observations and harvest locations, brown bears inhabit most of Unit 11 except high-elevation glaciers. There has not been a bear movement study conducted in Unit 11, but we suspect the movement patterns are similar to those in Unit 13. After den emergence, most bears, except females with cubs of the year, move into riparian areas to feed on sprouting plants and overwintered berries. They also scavenge carcasses of ungulates that died during winter. Females with cubs of the year tend to stay at higher elevations to avoid contact with other bears. Throughout the summer, brown bears in Unit 11 feed in various habitats, including the many salmon streams in the unit. In late summer, bears generally move into subalpine habitats to feed on ripening blueberries. Bears feed on salmon in many streams throughout Unit 11, but especially in the lower Chitina River Valley during late summer and fall.

MORTALITY

Harvest

Seasons and Bag Limits. The bear seasons in Unit 11 were 1 September–31 October and 25 April 25–31 May in 2000–01, and 10 August–15 June since 2001–02. The bag limit was 1 bear every 4 regulatory years until June 2003–04, when it became 1 bear every regulatory year. The resident tag fee requirement was dropped starting with the 2003–04 season.

Board of Game Actions and Emergency Orders. The Board of Game has determined there was not subsistence use of brown bears in Unit 11. The National Park Service (NPS) adopted this board subsistence determination and closed all brown bear hunting in those portions of Unit 11 designated “park” (as opposed to “preserve”) until 1999, when a federal subsistence season for brown bears was established. The Board of Game extended the season dates during the March 2001 meeting. During the March 2003 meeting, the board again liberalized brown bear hunting by changing the bag limit and dropping the \$25 resident tag fee.

Hunter Harvest. Fifteen brown bears were reported killed during the 2003–04 season, and 11 during 2002–03 (Table 1). Males composed 73% of the 2003–04 harvest and 64% of the 2002–03 harvest. The 2003–04 harvest is the highest reported since before the creation of Wrangell St. Elias National Park in 1978–79, when 17 bears were reported killed. The mean age for males was 12 years in 2002–03. Mean ages of bears taken in Unit 11 fluctuate yearly because of the small sample size, but do indicate large, older bears are common, and hunters can hunt for large trophies.

Hunter Residency and Success. Nonresident hunters took 5 bears in 2003–04 and 4 during the 2002–03 season (Table 2). The annual harvest by nonresidents declined between 1961 and 1978 from an average of 11 (range = 2–18) bears per year to an average of 2 (range = 0–3) between 1978 and 1999. Local residents harvested 6 bears during the 2003–04 season. Between 1990 and 2003 local residents only averaged slightly more than 1 bear (range = 0–3) a year. Successful bear hunters averaged 3.3 days hunting during the 2003–04 season and 2.3 days in 2002–03. Between 1979 and 1999, hunter effort data show a mean of 4.9 days to take a bear in Unit 11, and no trends are evident.

Harvest Chronology. In 2003–04, 80% of brown bear harvest occurred during the fall (Table 3). Since initiating sealing records in 1961, more than 80% of the harvest has occurred during the fall, presumably because combination hunts for more than one species were possible. This is especially true now that the bear season opens on 10 August as does the sheep season. In 2001–02, 44% of the bears were taken during August. Spring harvests were higher in the 1970s when more guides were active in Unit 11.

Transport Methods. For successful brown bear hunters in GMU 11, aircraft is the most important method of transportation (Table 4). Use of ground transportation in Unit 11 is very restricted; the only access points are along the Nabesna or Chitina-McCarthy roads, and some of the most popular trails have been closed by the NPS due to negative environmental impacts.

Other Mortality

The only reported defense of life or property (DLP) killings during the last 5 years were one male per year in both 2000 and 2001. Although much of the unit is remote with few cabins, most problem bears are killed near homesites and cabins along the Nabesna and McCarthy roads. More bears are probably killed each year than are reported because of the work involved with salvaging and preserving the hides and skulls of bears taken DLP. Compliance with reporting requirements on DLP bears would be higher if individuals were not required to salvage the hide and skull. Because most summer hides are worthless, DLP requirements could be changed so that during June, July, and August, only skulls and claws need to be surrendered. This would undoubtedly increase reporting compliance, but might also increase DLP kills, as the requirement to salvage the hide may often be a deterrent to killing bears.

HABITAT

Assessment

There are few cabins or homesites in this remote unit. Future settlement will be limited because much of the land is now included in Wrangell-St. Elias National Park or belongs to Ahtna Corp. Private inholdings and NPS facilities are the only sources of development, especially along the McCarthy Road and at McCarthy. The number of people living and visiting McCarthy has increased appreciably in recent years, and as a result, bear problems will become more frequent and could result in more DLP-killed bears. However, the NPS has identified this as a problem area and has a program to minimize bear problems. Overall, Unit 11 is considered good brown bear habitat because of the variety of vegetation types, large tracts of undeveloped land, and numerous salmon streams throughout the unit.

CONCLUSIONS AND RECOMMENDATIONS

Brown bear harvests increased the last 4 years, averaging 11 bears per year. This is well above the 2.7 average bear harvest observed from 1991 to 1999. Even though the current harvest is up appreciably, harvest levels are still below the 16 bear per year average reported between 1961 and 1978.

The decline in bear harvest after 1978 was a direct result of establishing the Wrangell St. Elias National Monument, then the Park and Preserve in 1980. NPS regulations prohibit sport

hunting and aircraft access for subsistence hunting over approximately 60% of Unit 11 designated as park. The increase in bear harvests the last 2 years is thought to be a result of an increased interest in hunting bears. The opportunity to hunt caribou, moose, and sheep has decreased dramatically in recent years because the population of these species has declined. Individuals seeking hunting opportunities with a reasonable chance of success are turning to alternative species such as bears, for which seasons are long and participation not limited by a permit system. Also, increasing the season length to overlap with the sheep season has resulted in an increase in harvest by hunters seeking combination hunts. Dropping the tag fee for residents also contributed to the take because bears can now be taken incidentally when seen on combination hunts, even if the hunter didn't plan on taking a bear.

Brown bears are considered abundant in Unit 11. Frequent sightings of sows with cubs suggest good productivity. Studies in Unit 13, which is adjacent to Unit 11, suggest these units have good productivity rates for an interior grizzly bear population. Given the low harvest and large amount of habitat inaccessible to hunters because of both topography and NPS regulations, current harvest rates are not influencing brown bear population trends. Because hunting has little impact on brown bear numbers in this unit, no changes in bag limits or season dates are recommended.

PREPARED BY:

Robert W. Tobey
Wildlife Biologist III

SUBMITTED BY:

Gino Del Frate
Management Coordinator

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Table 1 Unit 11 brown bear harvest, 1999–2000 to 2003–04

Regulatory Year	Hunter kill						Nonhunting kill ^a			Total Kill			
	M	(%)	F	(%)	Unk.	Total	M	F	Unk.	M	F	Unk.	Total
1999–2000													
Fall 99	3	(75)	1	(25)	0	4	0	0	0	3	1	0	4
Spring 00	0	(0)	1	(100)	0	1	0	0	0	0	1	0	1
Total	3	(60)	2	(40)	0	5	0	0	0	3	2	0	5
2000–01													
Fall 00	8	(73)	3	(27)	0	11	1	0	0	9	3	0	12
Spring 01	0	(0)	0	(0)	0	0	0	0	0	0	0	0	0
Total	8	(73)	3	(27)	0	11	1	0	0	9	3	0	12
2001–02													
Fall 01	5	(56)	4	(44)	0	9	0	0	0	5	4	0	9
Spring 02	0	(0)	0	(0)	0	0	1	0	0	1	0	0	1
Total	6	(56)	4	(44)	0	9	1	0	0	6	4	0	10
2002–03													
Fall 02	6	(60)	4	(40)	0	10	0	0	0	6	4	0	10
Spring 03	1	(100)	0	(0)	0	1	0	0	0	1	0	0	1
Total	7	(64)	4	(36)	0	11	0	0	0	7	4	0	11
2003–04													
Fall 03	9	(75)	3	(25)	0	12	0	0	0	9	3	0	12
Spring 04	2	(67)	1	(33)	0	3	0	0	0	2	1	0	3
Total	11	(73)	4	(27)	0	15	0	0	0	11	4	0	15

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 11 brown bear successful hunter residency, 1999–2000 to 2003–04

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters
1999–2000	1	(20)	2	(40)	2	(40)	5
2000–01	2	(18)	4	(36)	5	(46)	11
2001–02	1	(11)	5	(56)	3	(33)	9
2002–03	3	(27)	4	(36)	4	(36)	11
2003–04	6	(40)	4	(27)	5	(33)	15

^a Local resident means residents of Unit 11 and Unit 13 residents of federally designated subsistence communities.

Table 3 Unit 11 brown bear harvest chronology percent by time period, 1999–2000 to 2003–04

Regulatory year	Harvest percent							n
	August	September	October	November	April	May	June	
1999–2000	--	60	20	--	--	20	--	5
2000–01	--	91	9	--	--	--	--	11
2001–02	44	56	--	--	--	--	--	9
2002–03	36	46	9	--	--	--	9	11
2003–04	13	47	13	7	--	--	20	15

Table 4 Unit 11 brown bear harvest percent by transport method, 1999–2000 to 2003–04

Regulatory year	Percent of harvest									n
	Airplane	Horse	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unk.	
1999–2000	40	20	0	20	0	0	20	0	0	5
2000–01	73	0	9	9	0	0	9	0	0	11
2001–02	56	0	0	0	0	0	33	0	11	9
2002–03	36	0	9	9	0	0	9	36	0	11
2003–04	60	0	33	0	0	0	7	0	0	15

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 12 (9978 mi²)

GEOGRAPHIC DESCRIPTION: Upper Tanana and White River drainages, including the northern Alaska Range east of the Robertson River and the Mentasta, Nutzotin, and northern Wrangell Mountains

BACKGROUND

Grizzly bears are distributed throughout most of Unit 12. The areas not commonly used by bears (approximately 2500 mi²) are dominated by high mountains (>7000 ft) devoid of vegetation or covered by large ice fields. Little is known about historical population trends; harvest data indicate that most of the unit probably supported densities of grizzly bears that were not limited by harvest. In portions of the unit that were mined extensively or had human settlements, the bear population was regulated at lower levels.

Since 1900, grizzly bears have been sought by hunters and periodically by miners in southeastern Unit 12. Bear hunting regulations became more restrictive from statehood through the early 1980s as guiding activity increased. During the 1970s the Unit 12 moose population declined substantially, and grizzly bears were found to be an important predator on moose calves. Unit 12 grizzly bear hunting regulations were liberalized in 1981 to reduce the bear population and elevate moose calf survival. A Southcentral Alaska study (Ballard and Miller 1990) indicated that when a grizzly bear population was reduced by at least 60%, moose calf survival increased significantly. Harvest was not expected to reduce the grizzly bear population at that level, but because the sustainable harvest of grizzly bears is low (5–8%), some population reduction was expected, along with increased moose calf survival.

During the mid 1980s, bear harvests increased by 29% in Unit 12. Most of the increase was due to greater harvest by Alaska residents, apparently in response to more liberal seasons and bag limits. Concurrently, survival of moose calves to 5 months of age improved in western Unit 12 where bear harvest was high, and the moose population throughout Unit 12 slowly increased. However, moose calf survival also improved in portions of Unit 12 where little bear harvest occurred. During the early 1990s, moose calf survival declined or remained stable. Management objectives called for elevated grizzly bear harvests until moose numbers approached stated objectives or until harvest was too high to ensure the viability of the bear population. During the 1990s it appeared that reducing the grizzly bear population by harvest did not have the desired effect on moose calf survival. Also, further analysis of the southcentral moose population data found no evidence that grizzly bear population reduction contributed to the moose population increase (Miller and Ballard 1992). In response,

management objectives were changed to offer the greatest hunting opportunity while ensuring protection of the Unit 12 grizzly bear population.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Provide maximum opportunity to hunt grizzly bears in Unit 12.

MANAGEMENT OBJECTIVE

- Manage harvests so 3-year mean harvest does not exceed 28 bears and includes at least 55% males in the harvest.

METHODS

All grizzly bears taken in Unit 12 must be sealed before being transported from the unit. During the sealing process we take skull measurements, determine the sex of each bear, extract a premolar tooth, and collect information on harvest date, specific harvest location, and time spent afield by the hunter. Premolar teeth were sent to Matson's Laboratory (Milltown, Montana, USA) to determine age. Harvest data were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY02 = 1 Jul 2002 through 30 Jun 2003).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

The Unit 12 grizzly bear population trend appears stable, with the autumn 2000 population at 350–425 bears (46.6–56.7 bears of all ages/1000 mi² of useable habitat; 18.0–21.9 bears of all ages/1000 km²) (Gardner 2003). The population estimate was based on 1) extrapolations from density estimate surveys conducted in similar habitats in Interior and Southcentral Alaska (Reynolds and Boudreau 1992; Miller et al. 1997), 2) harvest distribution, and 3) sex and age composition of the harvest. The population trend estimate was based on 1) harvest statistics (total harvest, sex ratio, average skull size, and age of harvested bears) and 2) informal public surveys. During RY00, harvest exceeded the estimated sustainable yield of 28 bears; however, during RY01–RY03, mean annual harvest decreased to only 12 bears. The effect of harvest was primarily in local areas, as about 90% of the harvest occurred in the Tok River drainage and between the Nabesna River and the Alaska–Yukon border within the Wrangell Mountains. In the remainder of the unit, harvest level was light and likely had no effect on population trend. Therefore, grizzly bear population in the entire unit probably remained stable relative to the 2000 estimate but reduced compared to the early 1970s. Bear numbers in the Tok, Nabesna, Chisana, and White River drainages probably declined locally during RY02–RY03 due to harvest. Comments received from long-term guides and hunters in the area support this assessment.

Based on harvest data, Gardner (2003) found that Unit 12 grizzly bear numbers have fluctuated since the 1970s, but declined overall. Grizzly bears were reduced in portions of Unit 12 due to high harvest between RY73 and RY82. During that period, annual harvests

averaged 20.1 bears/year (range = 10–29), and were primarily in the northern Wrangell Mountains, Mentasta Mountains, and the Tok River drainages. Due to topography, much of Unit 12 is difficult to access and hunt. Consequently, harvest by residents was concentrated in the few accessible areas. Guides also hunted primarily in these areas but stayed separate from resident hunters by using areas where landownership restricted access or by using the areas later in the fall.

Between RY83 and RY87, estimates of grizzly bear numbers in accessible areas continued to decline due to increased harvest ($\bar{x}$ = 24 bears/year, range = 19–30). During RY88–RY99, harvest declined to 15.7 bears/year (range = 8–24). Harvest distribution remained relatively constant. Average skull size of harvested males did not change during RY72–RY82 (20.8 inches) or RY88–RY99 (20.8 inches). However, average skull size of males (19.6 inches) was smaller during RY83–RY87. The primary difference between these periods was that from RY84 to RY87 no grizzly bear tag fee was required. During RY00–RY03, a grizzly bear tag fee was required and mean annual male skull size was 19.9 inches (range = 19.3–22.0).

Based on kill density (number of harvested bears/10,000 mi²), bear numbers were reduced in the accessible areas of Unit 12 between RY73 and RY86. The estimated kill density within selected portions of the unit was high and ranged from 10.6 bears/10,000 mi² (4.1 bears/10,000 km²) in the northern Wrangell and Mentasta Mountains to 9.3 bears/10,000 mi² (3.6 bears/10,000 km²) in the Tok River drainages. In Unit 20A the bear population declined by 28% during a period when the kill density was 4.8 bears/10,000 mi² (2.2/10,000 km²; Reynolds, ADF&G, unpublished data). Since RY87, harvest has declined in the accessible areas as well as the remainder of Unit 12 (5875 mi²), and the average kill density declined to 0.2 bears/10,000 mi² (0.4 bears/10,000 km²).

MORTALITY

Harvest

Season and Bag Limit. The season for grizzly bears in Unit 12 for both residents and nonresidents was 1 September–30 June. A bear taken in this unit did not count against the bag limit of 1 bear every 4 years in other units; however, no person could take more than 1 bear statewide per regulatory year. During the report period a \$25 resident tag fee was required to hunt grizzly bears in Unit 12.

Alaska Board of Game Actions and Emergency Orders. In March 2002 the Alaska Board of Game lengthened the season for grizzly bears in Unit 12 to include the month of June as part of an effort to provide hunting opportunity and consistency in regulations in Interior Alaska. In a similar action during 2004, the board changed the season opening to 10 August, so beginning in RY04 the season opens on 10 August and closes on 30 June. An additional action in 2004 allowed the sale of handicrafts made from the skin of brown bears. The tag fee requirement was waived in southeastern Unit 20D annually during the board's spring 1995 through spring 2002 meetings, which could have affected the grizzly bear numbers in adjacent northwestern Unit 12. However, based on harvest distribution in Unit 20D, this regulatory change probably had little effect on Unit 12 grizzly bears (Stephen DuBois, ADF&G wildlife biologist, personal communication).

The Board of Game designated the Unit 12 moose population as important for high levels of human consumptive use under the intensive management law. This designation requires the board to consider intensive management if regulatory action to significantly reduce harvest becomes necessary because the population is depleted or has reduced productivity. This decision may affect the Unit 12 grizzly bear population if further grizzly bear population reduction is deemed appropriate to benefit moose.

Hunter Harvest. Based on the estimated grizzly bear population size and research in Unit 20A (Reynolds, ADF&G, personal communication), the sustainable harvest in Unit 12 was 28 bears, of which 6 could be adult females >5 years old. Following the record high harvest of 37 bears (14 females) during RY00, harvest has moderated. Subsequently, harvest declined to 19 in RY01 (6 females), 11 in RY02 (8 females), and 6 in RY03 (2 females). Average age of females harvested during RY01–RY03 was 8.1 years and an average of 3 were >5 years of age. The RY01–RY03 average harvest was 12.0 bears. The percent males harvested during RY01 was 68%, during RY 02 was 27%, and during RY 03 was 67%. The 3-year average was 56%, which met the harvest objective.

Changes in grizzly bear hunting regulations may have affected bear population trend. The Alaska Board of Game enacted regulations designed to reduce grizzly bear numbers in Unit 12 by increasing the harvest bag limit to 1 bear/year in RY82 and eliminating the resident tag fee in spring 1984 (RY83). The increased bag limit resulted in little change in harvest, as less than 2% of the harvest during RY82–RY02 was by repeat hunters. However, in spring 1984, residents harvested 11 bears compared to the RY78–RY82 average spring harvest of 1.2 bears. Residents took 13 bears in autumn 1984 (RY84) compared to the previous 5-year average of 9.2 bears in autumn. While the resident tag fee exemption was in effect during spring 1984 through spring 1988, autumn and spring harvests by residents ranged from 7 to 13 ($\bar{x}$ = 10) and 3 to 11 ($\bar{x}$ = 5.5), respectively. After the tag fee was reinstated, the average harvest by residents during RY87–RY91 was 7.4 (3–12) (Gardner 2003).

The resident tag fee was eliminated to encourage more resident hunters to harvest grizzly bears incidental to moose, sheep, and caribou hunts (Gardner 2003). Harvest data trends indicate residents responded to the regulatory change, especially during the first year, and grizzly bear harvest was higher when the resident tag fee was waived. However, there was no significant difference between the number of bears harvested during the 3.5 years with no tag fee (treatment) compared to the 5 years pre-treatment (tag fee required) ($P \leq 0.38$) and the 5 years post-treatment (tag fee required) ($P \leq 0.12$). Spring grizzly harvest by residents was higher during the treatment years compared to pre-treatment ($P \leq 0.08$) and post-treatment ($P \leq 0.09$), indicating that a combination of an aggressive public awareness campaign and no tag fee brought hunters to Unit 12 for the sole purpose of hunting grizzly bears. The quick response by hunters to the resident tag fee waiver indicates the hunting public was well informed and supportive of the increased opportunity to hunt grizzlies in Unit 12.

Based on nonresident harvest, the higher harvests during the treatment years (spring RY83–RY87) appears to have resulted in a decline in the grizzly bear population in that portion of Unit 12 that received the greatest hunting pressure (Tok, Nabesna, Chisana, and White River

drainages). Nonresidents harvested 10 bears/year during RY78–RY82 (pre-treatment). During post-treatment years (RY87–RY91), nonresidents took significantly fewer bears (5.1 bears/year; $P \leq 0.001$). The same number of guides booked about the same number of nonresident bear hunters in the area. Nonresidents also took a lower percentage of the harvested bears following the treatment years, declining from 54.5% of the harvest to 37.7%. Residents tend to hunt earlier in September than guided nonresidents and may have taken most of the vulnerable bears before most nonresidents were afield. Average annual harvest during RY87–RY91 (post-treatment) was also significantly lower compared to average annual harvests during pre-treatment RY78–RY82 ($P \leq 0.009$).

If further reduction of bear numbers through increased harvest is desired in Unit 12, the tag fee should be eliminated and accompanied by an intensive public awareness campaign. However, unless the hunt is managed differently than in the past, harvest will be localized in areas where bears are most vulnerable, not necessarily where the population reduction is desired. Also, based on results from other areas with liberal grizzly bear harvest regulations, hunter demand may be satisfied and harvest could stabilize or decline within a few years with little to no increases in moose calf survival (Gardner 1999). As the number of areas where resident tag fees are waived and bag limits are liberalized grows, it may become less likely that grizzly bear hunters will be drawn to Unit 12.

Based on recent harvest in Units 12 and 20E, greater grizzly bear hunting opportunity can be maintained without reducing the population by implementing a 1 bear/year bag limit and by offering a June season.

Hunter Residency and Success. Historically, nonresidents took most of the grizzly bears harvested in Unit 12; before RY83 they took 63% of the harvest. During RY83–RY91, residents took 66% of the bear harvest. Harvest by residents increased as a result of regulation changes that allowed 1 bear/year and, periodically, no tag fee. In spring 1991 the bag limit reverted to 1 bear/4 years and resident harvest began to decline (Table 1). Since RY92, nonresidents have taken 60.3% of the harvest, even though more liberal regulations favoring residents were reenacted. During RY02 and RY03, nonresidents took 64% and 67% of the harvest. Based on discussions with local and nonlocal residents (Gardner 2003), their interest in hunting for grizzly bears in Unit 12 was relatively low because 1) they had already harvested a grizzly bear or 2) they were not interested in taking a bear while hunting moose or sheep. Some hunters stated they would take a grizzly bear if the tag fee were eliminated.

Both residents and nonresidents hunt the area where most grizzly bear harvest occurs in Unit 12, but are usually separated temporally and by land use restrictions. Only the western portion (Tok River drainage) is heavily hunted for moose.

Harvest Chronology. During RY99–RY03, 70% of the harvested grizzly bears were taken during September (Table 2). Historically, most bears were harvested during September, when most resident moose and caribou hunters and guided hunters were afield. Since RY94 there has been more interest in spring bear hunting in Unit 12 by guided nonresident hunters in the Nabesna and Chisana River drainages and by resident hunters along the Chisana and Tanana Rivers.

Transport Methods. During RY02 and RY03 most successful grizzly bear hunters used airplanes to access the area (Table 3). Historical patterns show that horses were also frequently used. During RY89–RY99, hunters using 3- or 4-wheelers as their primary transportation harvested only 12 bears, but during RY00–RY03, an average of 20% of successful hunters used this method. Few trails in Unit 12 give bear hunters who use 3- or 4-wheelers an advantage. Most 4-wheeler use occurred in the Alaska Range, west of the Tok Cutoff, where access is easier. Almost exclusively, the use of horses was by guided nonresident hunters within the Nabesna, Chisana, and White River drainages.

Other Mortality

Intraspecific mortality inflicted by adult male bears is probably the greatest source of nonhunting bear mortality in Unit 12. No grizzly bears were recorded taken in defense of life or property incidents during RY02–RY03 (Table 4).

HABITAT

Assessment

Unit 12 offers moderate-quality grizzly bear habitat with the exception of 2500 mi² of unvegetated mountaintops and ice fields. Bear habitat is relatively undisturbed, except near a few small communities, the Alaska Highway, and the Tok Cutoff. Like most other areas in Interior Alaska, streams in Unit 12 do not contain reliable seasonal salmon runs accessible to bears.

Enhancement

Maintaining a near-natural fire regime through provisions of the *Alaska Interagency Fire Management Plan: Fortymile Area* was the primary action taken in Unit 12 to restore habitat diversity and productivity for all species. Other habitat enhancement methods are being considered for areas managed for full fire suppression. A cooperative ADF&G–Alaska Department of Natural Resources logging project is being planned for the Tok River valley. If implemented, clearcuts of 20–80 acres will be treated to enhance regeneration of deciduous shrubs to mimic natural succession. About 1000 acres will be logged and treated during a 5- to 10-year period. Wildfires in Unit 12 burned 434 mi² in 1990 and 434 mi² in 2004. Bears and their prey species are expected to benefit from both natural fires and habitat enhancement efforts.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

The objective of liberalizing grizzly bear harvest regulations in Unit 12 in RY82 was to temporarily reduce the bear population to benefit moose calf survival. Moose calf survival increased in the mid 1980s in the one area monitored (Tok River drainage) that received high bear harvest. However, calf survival also increased in areas that received little bear harvest in adjacent Unit 20E. After monitoring this management technique for 15 years in Unit 20E and 13 years in Unit 12, Gardner (2003) maintained that reductions in the grizzly bear populations solely by hunter harvest in portions of these units was not effective at increasing moose calf survival.

Liberal grizzly bear regulations in Units 12 and 20E indicate we can offer increased hunter opportunity by increasing the bag limit to 1 bear/year and extending the season through June

without affecting bear population trends. Adding an August season and waiving the resident tag fee requirement can result in higher bear harvests.

Based on the current estimates, 28 grizzly bears, including a maximum of 6 adult females, can be harvested annually in Unit 12 without a population decline, assuming harvest is evenly distributed in the unit. During the past 21 years, the annual female quota has been exceeded twice, and the overall harvest quota 4 times. However, harvest has not been evenly distributed and has caused localized population declines and probable changes to the sex and age composition (Gardner, ADF&G unpublished data).

CONCLUSIONS AND RECOMMENDATIONS

Grizzly bears continue to be well distributed throughout Unit 12 (Gardner 2003). The 2002 population was near the 2000 estimate of 350–425 bears (46.6–57.7 bears of all ages/1000 mi²; 18.0–21.9 bears of all ages/1000 km²), and the population trend was estimated to be stable to slightly declining. Harvest regulations were liberal and allowed for maximum hunting opportunity. During the 1980s, due to uneven harvest distribution, bear numbers declined, and population sex and age composition changed in the northern Wrangell and Mentasta Mountains, in the Tok River drainages, and near permanent communities. High levels of harvest immediately prior to the report period probably caused the population to decline slightly. Grizzly bears are a valued trophy animal, and the combination of resident and nonresident hunting has proven to be adequate to maintain the grizzly population at a level lower than the habitat can support.

The objectives were met to limit the 3-year mean harvest to 28 or fewer bears with at least 55% males in the harvest. While the female harvest during RY98, RY99, and RY01 was higher than desired, it moderated during RY02–RY03. The greatest female harvest occurred in autumn 2000, and all were taken in areas that historically receive the greatest harvest. Seven of the female bears were taken by guided nonresidents. Similarly, RY02 harvest data shows that 8 females were harvested, 4 of which were taken in a high-harvest area. In addition, most of the Unit 12 grizzly bear harvest was in a fairly concentrated area. While a lower harvest rate of females occurred subsequently, a more thorough analysis of harvest trends is still needed in the Tok, Nabesna, Chisana, and White River drainages.

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PREPARED BY:

Harry V. Reynolds, III
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

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Table 1 Unit 12 grizzly bear successful hunter residency, regulatory years 1989–1990 through 2003–2004

Regulatory year	Unit resident	(%)	Other residents	(%)	Nonresident	(%)	Total successful hunters
1989–1990	6	(46)	3	(23)	4	(31)	13
1990–1991	2	(12)	7	(44)	7	(44)	16
1991–1992	0	(0)	3	(33)	6	(67)	9
1992–1993	7	(29)	6	(25)	11	(46)	24
1993–1994	1	(6)	6	(38)	9	(56)	16
1994–1995	2	(14)	1	(7)	11	(79)	14
1995–1996	0	(0)	1	(13)	7	(87)	8
1996–1997	5	(24)	4	(19)	12	(57)	21
1997–1998	4	(31)	1	(7)	8	(62)	13
1998–1999	1	(6)	5	(31)	10	(63)	16
1999–2000	3	(19)	5	(31)	8	(50)	16
2000–2001	4	(12)	10	(29)	20	(59)	34
2001–2002	8	(42)	1	(5)	10	(53)	19
2002–2003	3	(27)	1	(9)	7	(64)	11
2003–2004	0	(0)	2	(33)	4	(67)	6

Table 2 Unit 12 grizzly bear harvest chronology by month, regulatory years 1989–1990 through 2003–2004

Regulatory year	Harvest chronology by month										<i>n</i> ^a
	Sep (%)	Oct (%)	Nov (%)	Apr (%)	May (%)	Jun (%)					
1989–1990	10 (83)	0 (0)	0 (0)	0 (0)	2 (17)	0 (0)					12
1990–1991	11 (69)	0 (0)	0 (0)	1 (6)	4 (25)	0 (0)					16
1991–1992	7 (78)	0 (0)	0 (0)	1 (11)	1 (11)	0 (0)					9
1992–1993	14 (58)	2 (8)	2 (8)	0 (0)	6 (25)	0 (0)					24
1993–1994	14 (82)	1 (6)	0 (0)	1 (6)	1 (6)	0 (0)					17
1994–1995	11 (73)	0 (0)	0 (0)	1 (7)	3 (20)	0 (0)					15
1995–1996	6 (75)	0 (0)	0 (0)	0 (0)	2 (25)	0 (0)					8
1996–1997	16 (76)	0 (0)	0 (0)	0 (0)	4 (19)	0 (0)					21
1997–1998	8 (73)	0 (0)	0 (0)	0 (0)	3 (27)	0 (0)					11
1998–1999	9 (56)	1 (6)	0 (0)	0 (0)	6 (38)	0 (0)					16
1999–2000	10 (63)	1 (6)	0 (0)	0 (0)	5 (31)	0 (0)					16
2000–2001	24 (71)	1 (3)	0 (0)	0 (0)	9 (26)	0 (0)					34
2001–2002	14 (78)	0 (0)	0 (0)	0 (0)	4 (22)	0 (0)					18 ^b
2002–2003	6 (55)	2 (18)	0 (0)	0 (0)	3 (27)	0 (0)					11
2003–2004	5 (83)	0 (0)	0 (0)	0 (0)	0 (0)	1 (17)					6

^a Includes unknowns.

^b Excludes 1 bear taken in defense of life or property during July.

Table 3 Unit 12 grizzly bear harvest by transport method, regulatory years 1989–1990 through 2003–2004

Regulatory year	Harvest by transport method										<i>n</i>
	Airplane (%)	Horse (%)	Boat (%)	3- or 4-wheeler (%)	Snowmachine (%)	ORV (%)	Highway vehicle (%)	Walking (%)	Unk (%)		
1989–1990	4 (33)	2 (17)	1 (8)	0 (0)	1 (8)	4 (33)	0 (0)	0 (0)	0 (0)	12	
1990–1991	6 (38)	4 (25)	0 (0)	0 (0)	0 (0)	2 (13)	2 (13)	1 (6)	1 (6)	16	
1991–1992	6 (67)	2 (22)	0 (0)	0 (0)	1 (11)	0 (0)	0 (0)	0 (0)	0 (0)	9	
1992–1993	7 (29)	10 (42)	0 (0)	1 (4)	2 (8)	0 (0)	2 (8)	0 (0)	2 (8)	24	
1993–1994	2 (12)	7 (41)	0 (0)	2 (12)	0 (0)	0 (0)	2 (12)	3 (18)	1 (6)	17	
1994–1995	4 (27)	7 (47)	0 (0)	1 (7)	0 (0)	0 (0)	2 (13)	0 (0)	1 (7)	15	
1995–1996	1 (13)	7 (86)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8	
1996–1997	4 (19)	10 (48)	1 (5)	4 (19)	0 (0)	1 (5)	1 (5)	0 (0)	0 (0)	21	
1997–1998	2 (18)	8 (73)	1 (9)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11	
1998–1999	6 (38)	5 (31)	0 (0)	1 (6)	0 (0)	2 (13)	2 (13)	0 (0)	0 (0)	16	
1999–2000	5 (31)	8 (50)	0 (0)	3 (19)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16	
2000–2001	9 (26)	14 (41)	1 (3)	5 (15)	0 (0)	0 (0)	5 (15)	0 (0)	0 (0)	34	
2001–2002	4 (21)	5 (26)	0 (0)	6 (32)	0 (0)	0 (0)	0 (0)	3 (16)	1 (5)	19	
2002–2003	3 (27)	4 (36)	0 (0)	1 (9)	0 (0)	1 (9)	2 (18)	0 (0)	0 (0)	11	
2003–2004 ^a	4 (67)	0 (0)	0 (0)	2 (33)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6	

^a Preliminary harvest.

Table 4 Unit 12 grizzly bear mortality, regulatory years 1989–1990 through 2003–2004

Regulatory year	Reported							Estimated kill		Total estimated kill					
	Hunter kill				Nonhunting kill ^a					M	(%)	F	(%)	Unk	Total
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal						
1989–1990															
Autumn 1989	5	6	0	11	0	0	0	0	0	5	(45)	6	(55)	0	11
Spring 1990	2	0	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Total	7	6	0	13	0	0	0	0	0	7	(54)	6	(46)	0	13
1990–1991															
Autumn 1990	7	4	0	11	0	0	0	0	0	7	(64)	4	(36)	0	11
Spring 1991	2	3	0	5	0	0	0	0	0	2	(40)	3	(60)	0	5
Total	9	7	0	16	0	0	0	0	0	9	(56)	7	(44)	0	16
1991–1992															
Autumn 1991	3	4	0	7	1	0	0	0	0	4	(50)	4	(50)	0	8
Spring 1992	2	0	0	2	1	0	0	0	0	3	(100)	0	(0)	0	3
Total	5	4	0	9	2	0	0	0	0	7	(64)	4	(36)	0	11
1992–1993															
Autumn 1992	11	7	0	18	0	0	0	0	0	11	(61)	7	(39)	0	18
Spring 1993	4	2	0	6	0	0	0	0	0	4	(67)	2	(33)	0	6
Total	15	9	0	24	0	0	0	0	0	15	(63)	9	(37)	0	24
1993–1994															
Autumn 1993	8	7	0	15	1	0	0	0	0	9	(56)	7	(44)	0	16
Spring 1994	2	0	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Total	10	7	0	17	1	0	0	0	0	11	(61)	7	(39)	0	18
1994–1995															
Autumn 1994	5	6	0	11	1	0	0	0	0	6	(50)	6	(50)	0	12
Spring 1995	2	1	0	3	1	0	0	0	0	3	(75)	1	(25)	0	4
Total	7	7	0	14	2	0	0	0	0	9	(56)	7	(44)	0	16
1995–1996															
Autumn 1995	4	2	0	6	0	0	0	0	0	4	(67)	2	(33)	0	6
Spring 1996	2	0	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Total	6	2	0	8	0	0	0	0	0	6	(75)	2	(25)	0	8
1996–1997															
Autumn 1996	9	8	0	17	0	0	0	0	0	9	(53)	8	(47)	0	17
Spring 1997	3	1	0	4	0	0	0	0	0	3	(75)	1	(25)	0	4
Total	12	9	0	21	0	0	0	0	0	12	(57)	9	(43)	0	21

Table 4 continued

Table 7 continued

Regulatory year	Reported							Estimated kill		Total estimated kill					
	Hunter kill				Nonhunting kill ^a					M	(%)	F	(%)	Unk	Total
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M	(%)	F	(%)	Unk	Total
<i>1997–1998</i>															
Autumn 1997	7	1	0	8	1	0	0	0	0	8	(89)	1	(11)	0	9
Spring 1998	3	0	0	3	0	1	0	0	0	3	(75)	1	(25)	0	4
Total	10	1	0	11	1	1	0	0	0	11	(85)	2	(15)	0	13
<i>1998–1999</i>															
Autumn 1998	6	4	0	10	0	1	0	0	0	6	(55)	5	(45)	0	11
Spring 1999	2	4	0	6	0	0	0	0	0	2	(33)	4	(67)	0	6
Total	8	8	0	16	0	1	0	0	0	8	(47)	9	(53)	0	17
<i>1999–2000</i>															
Autumn 1999	3	8	0	11	0	0	0	0	0	3	(27)	8	(73)	0	11
Spring 2000	4	1	0	5	0	0	0	0	0	4	(80)	1	(20)	0	5
Total	7	9	0	16	0	0	0	0	0	7	(44)	9	(56)	0	16
<i>2000–2001</i>															
Autumn 2000	15	10	0	25	2	1	0	0	0	17	(61)	11	(39)	0	28
Spring 2001	6	3	0	9	0	0	0	0	0	6	(67)	3	(33)	0	9
Total	21	13	0	34	2	1	0	0	0	23	(62)	14	(38)	0	37
<i>2001–2002</i>															
Autumn 2001	6	6	0	12	3	0	0	0	0	9	(60)	6	(40)	0	15
Spring 2002	4	0	0	4	0	0	0	0	0	4	(100)	0	(0)	0	4
Total	10	6	0	16	3	0	0	0	0	13	(68)	6	(32)	0	19
<i>2002–2003</i>															
Autumn 2002	1	7	0	8	0	0	0	0	0	1	(12)	7	(88)	0	8
Spring 2003	2	1	0	3	0	0	0	0	0	2	(67)	1	(33)	0	3
Total	3	8	0	11	0	0	0	0	0	3	(27)	8	(73)	0	11
<i>2003–2004</i>															
Autumn 2003	3	2	0	5	0	0	0	0	0	3	(60)	2	(40)	0	5
Spring 2004	1	0	0	1	0	0	0	0	0	1	(100)	0	(0)	0	1
Total	4	2	0	6	0	0	0	0	0	4	(67)	2	(33)	0	6

^a Includes defense of life or property kills, research mortalities, and other known human-caused accidental mortality.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 13 (23,368 mi²)

GEOGRAPHIC DESCRIPTION: Nelchina Basin

BACKGROUND

The brown bear harvest in Unit 13 increased substantially over the last 40 years. The average annual harvests for the decades of the 1960s, 1970s, 1980s and 1990s were 39, 59, 105, and 113, respectively. Interest in brown bear hunting and yearly harvests by recreational hunters increased over the years as seasons were lengthened and bag limits increased. Liberalization of brown bear hunting regulations started in 1980 with the initiation of a spring season. The bag limit was increased to one bear a year between 1983 and 1988 and again starting in 1995. Brown bear harvests have been the highest in those years when the bag limit has been one bear per year.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

To maintain a minimum unit population of 350 brown bears.

METHODS

Department representatives sealed skulls and hides of harvested bears. Skulls were measured, sex was determined, and a premolar tooth was extracted for aging. Sealing agents collected information on date and location of harvest and time spent afield by successful hunters.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Brown bear density estimates are available for 2 study areas in Subunit 13E and 1 study area in western 13A. The 1979 estimate of 10.5 independent bears/1000 km² on the upper Susitna River (13E) was higher than the 1987 estimate of 6.36 independent bears/1000 km² (Ballard et al. 1982; Miller 1988, 1995). Miller (1995) concluded that because of differences in survey methods, it could not be statistically demonstrated that a decline in bear numbers occurred, though the 1987 point estimate was lower. Density estimates for the Su-Hydro Study Area (13E) in 1985 and 1995 were 18.75 and 23.31 independent bears/1000 km² (27.1 and 40.8 all bears) respectively (Miller 1995). These results were derived using similar census techniques, and were indicative of increasing brown bear numbers in eastern 13E. A 1998 density estimate from the

13A West Nelchina study area was 21.3 independent bears/1000 km² (28.8 all bears) (Testa, ADF&G memorandum July 1998). The similar estimates between the 13E and 13A study areas indicate similar densities between these 2 areas. These densities are among the highest estimates for brown bears in interior and northern Alaska (Testa et al. 1998). In 2000, 2001, and 2003 line transect surveys were completed in a portion of 13E. In 2003 and 2004 line transect surveys were partially completed in 13A and 13B. Preliminary density estimates are 32.2 and 16.3 respectively for all bears/1000 km² (Becker, personal communication).

Population Size

Four separate population estimates were calculated for Unit 13 in the past 20 years. During the late 1970s an estimate of 1500 brown bears was calculated based solely on field observations, hunter reports, and harvests. Extrapolations from density estimates in the Upper Susitna River and Su-Hydro areas from 1979, 1985, and 1987 (Ballard et al. 1982; Miller 1987, 1988) yielded a recalculated population estimate of 1228 brown bears, of which 823 were ≥ 2 years of age (Miller 1990). Three years later, based solely on a model of sustainable harvest rates, Miller re-estimated only 640–1120 bears in Unit 13 (Miller 1993). In 1995, a second bear research project in the Su-Hydro Study Area was completed, resulting in an updated Unit 13 population estimate of 1450 brown bears (Miller, personal communication). The most recent population estimate based on preliminary line transect densities found between 2000 and 2004 in subunits 13A, B, and E was about 1300 bears.

Population Composition

Miller (1993) reported that between 1980 and 1988, on average, brown bear sows were accompanied by 2.1 cubs of the year, 1.9 yearlings, or 1.8 two-year-olds. The estimated reproductive interval was 4.1 years, and the observed age at first reproduction was 5.6 years (range = 4–9). The average litter sizes in 1998 in the Nelchina Study Area were 2.3 cubs of the year or 1.8 yearlings (Testa et al. 1998). These parameters are typical of reproductive potential for an Interior Alaska population.

Miller (1995) presented the sex ratios of brown bears in the Su-Hydro Study Area during 2 different censuses 10 years apart. He estimated 82.4 males/100 females in 1985, compared to only 27.8 males/100 females in 1995. He did not find a change between censuses in the mean age of brown bears in the study area. Testa et al. (1998) reported 48 males/100 females observed during the 1998 Nelchina Study Area census in western 13A.

MORTALITY

Harvest

The 2000–2001 hunting season dates were 10 August–15 June in Unit 13, except that portion of 13E west of the Alaska Railroad, where the season opened 10 September and closed 31 May, and Denali State Park, where the season was 1 September–31 March. The season dates in 2001–02 and 2002–03 were 10 August–15 June unitwide. Since 2002, there has been no closed season in GMU 13, except that portion of 13 within Denali State Park where the season remained 10 August–15 June. The bag limit is 1 bear every 4 years in that portion of 13E within Denali State Park. The bag limit for the remainder of the unit is 1 bear every year. The resident \$25 tag fee requirement in GMU 13 has been waived every year since 1995 by the Board of Game.

Board of Game Actions and Emergency Orders. The Board of Game designated GMU 13 an intensive management area as directed under Senate Bill 77 during the 1995 meeting. Board findings (during intensive management discussions) were that brown bears were important predators of moose calves, that brown bears were abundant in Unit 13, and that brown bear numbers should be reduced to increase moose calf survival. In order to increase interest in hunting bears, the board has been liberalizing seasons ever since.

Hunter Harvest. The reported 2003–04 sport harvest of brown bears was 119, down 28% from the record harvest of 166 taken in 1999–2000 (Table 1). The average annual take was 136 bears/year (range = 116–166) during the last 5 years. This figure is 9% higher than the 125 bears a year average (range = 97–138) reported during the 5-year period from 1982 to 1987. The average annual harvest during the 8-year period of 1987–95, following a reduction in the bag limit and a somewhat reduced hunting season, was 85 bears a year (range = 66–111). The lowest harvest reported in recent years was 66 bears taken in 1993–94.

The 2003–04 brown bear harvest broken down by subunit was: 13A - 18 bears, 13B - 20, 13C - 6, 13D - 23, and 13E - 52 bears. In all subunits the reported harvests were well above harvest levels reported before 1995, when brown bear regulations were liberalized. More bears have been reported from 13E over the years than any other unit.

The 2003–04 brown bear harvest was 59 (50%) males and 59 (50%) females (Table 1). The mean skull size was 21.3 inches for males and 19.8 inches for females. The mean age was 5.5 years for males and 6.3 years for females. In most years, the mean age of males taken in the fall was lower than males taken in the spring. There is a less definite trend in female ages; however, females taken during the fall tend to be older, larger bears compared to females taken in spring.

Interpretation of size and age data in the harvest is difficult (Miller 1993) and can lead to false conclusions. With this in mind, the guarded conclusion reached after looking at Unit 13 data is that a high proportion of the yearly take includes young males, indicating recruitment and/or emigration into the population. Males compose 61% of the bears harvested up through the first 5-year age classes. Given a 50:50 sex ratio at birth, this suggests emigration of young males from lighter or unhunted portions of the unit or adjacent areas (Kontio et al. 1998). There are, however, some old bears taken every year. Because older males are the first to emerge from dens, they are more often taken during spring, and hunters can select for older bears by hunting early in April. Young males tend to be killed in the fall incidentally by hunters pursuing other big game species. We speculate that more older females are taken in the fall because cubs that accompanied them during spring may not be with them later in the year, making more females legal during the fall.

Hunter Residency and Success. Nonresident hunters took 21 (18%) bears in 2003–04 (Table 2). The number of bears taken by nonresidents increased slightly between 1998 and 2002, averaging 43 bears a year compared to 33 a year prior to 1998. The nonresident harvest dropped the last 2 years, presumably because combination moose-bear hunts are no longer possible due to moose hunting in Unit 13 being closed to nonresidents in 2002. Local residents took 10 (8%) bears in 2003–04. The number of bears taken by locals shows considerable yearly variation. The nonlocal Alaska resident harvest increased appreciably in 1995–96, when hunting regulations were liberalized. Nonlocal Alaska resident bear harvests over the last 5 years have averaged 86 bears

and are the highest reported since the mid 1980s, when similar liberal seasons and bag limits were in effect. Bear tags were purchased by only 7–13% of successful resident hunters since eliminating the tag fee in 1995. Successful hunters averaged 4.2 days in the field in 2003–04 and 4.3 days in 2002–03. In Unit 13, hunters have averaged 4.2 days hunting to take a bear during the last 15 years. Hunting effort varies between years, but no trend is evident.

Harvest Chronology. For the 2003–04 regulatory year, hunters harvested 63% during the fall and 37% in the spring (Table 3). Throughout the current reporting period, the fall season has been the most important for bear harvests. Spring harvests have fluctuated between years (Table 1). This variation may in part be related to snow conditions. Because hunters rely on snowmachines during spring, an increase in the April harvest (Table 3), such as in spring 2000, may be partly due to excellent spring snow conditions and better access. Alternatively, a particularly late breakup would interfere with ORV access later in May.

Males composed 47% ($n = 35$) of the fall harvest in 2003. This was the first time in 7 years that males have not predominated in the fall kill (Table 1). It was previously presumed that when harvests were high, the percent of males taken in the fall harvest declined. This conclusion was drawn from harvest data collected from 1983 to 1987 with the one bear/year bag limit when harvests were high and males averaged only 45% of the fall take. However, during the last 10 years with high harvests, males have averaged 53% of the fall take.

The percent males in the spring 2004 harvest was 55% ($n = 24$). The percent males taken during the spring has fluctuated between a low of 49% in 1996 and a high of 81% in 1998. Since 1980, when spring seasons started, males have averaged 68% of the harvest, and no trends are evident.

Transport Methods. The most important method of transportation for brown bear hunters in Unit 13 during 2002–04 was 4-wheelers (Table 4). Aircraft and highway vehicles are consistently important, while snowmachine use is highly variable and dependent on snow conditions during the spring season. Snowmachine use has generally been increasing since 1989 when design changes improved agility and reliability, permitting hunters to travel into areas formerly considered too rough or remote. The importance of 4-wheelers as a transportation method for all hunting in GMU 13 has increased the last 10 years. Unit 13 has many far-reaching trail systems that are ideally suited to 4-wheeler transportation during fall hunting seasons. Caribou and moose hunters report that 4-wheelers have also become the most important method of transportation for them. Because many bears are taken on combination hunts in the fall, it is little wonder that 4-wheelers have increased in importance.

Hunter Attitudes. We sent hunter questionnaires to 235 successful bear hunters who took a bear in Unit 13 between 1995 and 1997. Hunter response was 54% ($n = 128$). Brown bears were the primary species hunted by 33% of those responding ($n = 40$ out of 120), the remainder being incidental take. Incidental harvests are those in which hunters seek different species but also take a bear. Hunters seeking moose and caribou reported taking 85% of the incidental take.

The 10 August opening was important to bear hunters; 60% reported this extension allowed them added hunting opportunity. Successful hunters reported the regulation that most influenced their decision to hunt or take a bear was the bag limit of one bear per year. Forty-nine percent felt they would not have taken a bear without this liberalization. The impact of this liberal bag limit

becomes apparent when 42% of the hunters reported they may hunt brown bears in another unit next year. This is quite high and shows that having the opportunity to hunt bears in another unit is important. The bag limit change was not as important for Unit 13-only hunters; 36% felt they would probably take another bear in Unit 13. However, 72% of Unit 13-only hunters said they would take another Unit 13 bear if it was a significantly larger bear or a better trophy. The bag limit change was important here in allowing additional hunting opportunity for a better trophy.

Other Mortality

There were 11 brown bears (8 males) reported killed in defense of life or property (DLP) during 1999–2004. Only one bear a year was reported in both 2002–03 and 2003–04. The 5-year average of 2.2 bears/year was below the 2.9 bears/year average since 1961. The reported DLP harvest has always been considered a minimum estimate because some bears are shot and not reported, especially at remote cabins, home sites and mining claims. The state requirement to salvage and surrender the hides of DLP bears often deters individuals from reporting DLP bears. Bears may also not be reported because individuals fear they may be cited if Alaska Bureau of Wildlife Enforcement does not deem their DLP claim as valid. Also, a year-round season means a problem bear can be taken with a hunting license and the hunter keeps the bear.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Intolerance of brown bears in proximity to people and dwellings is becoming more of a problem in Unit 13. Because of increased recreational use and development, bear encounters have become more numerous. Consequently, the Glennallen office has received more complaints of problem bears and requests to tranquilize and relocate bears. Publications, including news articles, about bear problems or conflicts encourage and maintain the public's fear of bears. The frequent "scare" articles in the media are hard to overcome and perpetuate the bear–human conflict problem. In dealing with bear–human conflicts at remote sites, I recommend the department maintain its policy of not relocating problem bears.

CONCLUSIONS AND RECOMMENDATIONS

A major problem pertaining to brown bear management is the difficulty in obtaining population data. Because of their low density and secretive behavior, observing and counting bears is both difficult and expensive. This is especially true of Interior grizzly populations that do not congregate on salmon streams and are wary of motorized vehicles. Because of this, population data are available for only limited portions of Unit 13. The most recent unitwide bear estimates of 1450 and 1300 bears were both based on extrapolations of estimated densities. Problems with this are obvious, particularly given the differences in study areas and techniques. To further complicate the issue, bear numbers are not consistent throughout the unit, especially considering harvest pressure is concentrated in easily accessible high country.

Data from the 2 different census areas prior to 1998 suggested that bear numbers were stable or increasing even with heavy hunting pressure and increasing harvests since 1994. The only detectable consequence of high human harvest was a change in the sex ratio, with males less numerous than females in the heavily hunted areas of Unit 13. The mean age of captured bears did not decline, however, indicating that hunters were not selecting for just older males, but

taking them as they occurred in the population. It does not appear that harvest rates until 1998 were high enough to reduce the brown bear population in Unit 13.

Recent preliminary line transect census data indicate a decline in bear densities since capture recapture estimates were done in both 13E and 13A. If this decline is real, it would suggest the liberal seasons and bag limit changes since 1995 have started to be effective in reducing the Unit 13 population.

Unit 13 is an intensive management area where the primary management objective is to provide high harvests of moose for human use. In a 1979 study where a large number of bears were translocated out of the Upper Susitna study area, the result was increased calf recruitment. Data showed that bears killed more than 50% of the moose calves. The approach adopted by the Board of Game has been to reduce brown bear numbers in Unit 13 by liberalizing the take.

Brown bear harvests were high in GMU 13 between 1982 and 1987 and since 1995 because of liberal seasons and bag limits and lack of tag requirement. The brown bear harvest peaked in 1999–2000 with a record 166 bears taken. The 2000–03 harvest is down, averaging 128 bears a year. A decline in hunter effort in GMU 13 may be partially responsible for the decline in harvest. GMU 13 has had a 40–50% decline in the number of moose and caribou hunters since the mid 1990s, which has resulted in a lower incidental fall kill. Weather also influences harvest rates as unfavorable travel conditions limit hunter access and overall kill rates. Overall bear hunter effort is not known because effort data is not collected from unsuccessful bear hunters.

The high harvests reported during periods of liberalized regulations exceed predicted sustainable harvest guidelines for brown bears in GMU 13. Miller (1988, 1993) calculated sustainable harvest rates of 5.7% for all bears or 8% for bears ≥ 2.0 year, which would give a maximum unitwide sustainable harvest of only 83, given a population of 1450 bears, and only 74 for a 1300-bear population. As of 1998, census data have been unable to detect a population decline. Sex ratios in the harvest approach 50:50 every 5 or 6 years, but the 5-year average of 59% males indicates, overall, a stable population. Monitoring of harvest data has shown no indication of a population decline.

Whether continued harvests at the current level can reduce bear numbers enough to appreciably reduce brown bear predation on moose calves is unknown. Current regulations that protect the reproductive portion of the population (sows with cubs, and cubs) may protect enough sows to maintain recruitment, thus preventing a population reduction. An adult sow is only legal every third or fourth year. Another reason high harvests of brown bears may not have the same impact on bear numbers as models predict is that the Unit 13 brown bear population is not closed, and the extent and effects of migration are unknown. Brown bears are fully or partially protected in both Denali and Wrangell-St. Elias National Parks. These large parks are adjacent to Unit 13 and probably provide significant immigration. When looking at 2-year olds in the harvest, it is evident that young males are more abundant than young females. This also suggests immigration from young dispersers as males are known to disperse over longer distances than females.

I recommend maintaining the current season, bag limit, and tag fee waiver as a management experiment to determine if hunter harvests can reduce the brown bear population in Unit 13. We would be a lot further along in our management objective and knowledge of harvest rates on

Interior brown bears if we had maintained the liberal regulations we had between 1983 and 1988. Becoming more restrictive without any detectable change in the bear population was a mistake we should not repeat. To monitor population changes, I recommend a periodic capture-recapture census in previously established census areas in 13A and 13E. If a demonstrable decline occurs in the bear population, moose calf survival in the area should be reevaluated.

To further increase hunting effort in GMU 13, I recommend changing the guide requirement to allow nonresidents to hunt in GMU 13 without requiring a guide. Unit 13 grizzlies are classified as coastal brown bears by Boone & Crocket, even though historic records show skull sizes are consistent with other Interior grizzly populations. An attempt to reclassify Unit 13 bears in Boone & Crocket as grizzlies was unsuccessful. Opening GMU 13 to nonresidents without requiring a guide will provide a new source of hunters looking for an inexpensive opportunity to take a small brown bear, even if it won't make the record book.

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Prepared by

Robert W. Tobey
Wildlife Biologist III

Submitted by

Gino Del Frate
Management Coordinator

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Table 1 Unit 13 brown bear harvest, 1999–2000 to 2003–2004

Regulatory Year	Hunter kill						Nonhunting kill ^a			Total Kill			
	M	(%)	F	(%)	Unk.	Total	M	F	Unk.	M	F	Unk.	Total
1999–2000													
Fall 99	48	(52)	44	(48)	0	92	3	1	0	51	45	0	96
Spring 00	52	(70)	22	(30)	0	74	0	1	0	52	23	0	75
Total	100	(60)	66	(40)	0	166	3	2	0	103	68	0	171
2000–01													
Fall 00	51	(53)	45	(47)	0	96	2	0	0	53	45	0	98
Spring 01	37	(70)	16	(30)	0	53	0	0	0	37	16	0	53
Total	88	(59)	61	(41)	0	149	2	0	0	90	61	0	151
2001–02													
Fall 01	45	(53)	40	(47)	2	87	1	2	0	46	42	2	90
Spring 02	23	(77)	7	(23)	0	30	0	0	0	23	7	0	30
Total	68	(59)	47	(41)	2	117	1	2	0	69	49	2	120
2002–03													
Fall 02	55	(61)	35	(39)	0	90	1	0	0	56	35	0	91
Spring 03	32	(74)	11	(26)	0	43	0	0	0	32	11	0	43
Total	87	(65)	46	(35)	0	133	1	0	0	88	46	0	134
2003–04													
Fall 03	35	(47)	39	(53)	0	74	0	0	0	35	39	0	74
Spring 04	24	(55)	20	(45)	1	45	1	0	0	25	20	1	46
Total	59	(50)	59	(50)	1	119	1	0	0	60	59	1	120

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 13 brown bear successful hunter residency, 1999–2000 to 2003–2004

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters ^b
1999–00	21	(13)	100	(60)	45	(27)	166
2000–01	14	(9)	92	(62)	43	(29)	149
2001–02	10	(9)	63	(54)	44	(37)	117
2002–03	8	(6)	92	(69)	33	(25)	133
2003–04	10	(8)	88	(74)	21	(18)	119

^a Local resident means resident of GMU 13.^b Includes unknown residency.

Table 3 Unit 13 brown bear harvest chronology percent by time period, 1999–2000 to 2003–2004

Regulatory year	Harvest periods																		n
	July		August		September		October		November		March		April		May		June		
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	
1999–00	0	(0)	15	(25)	33	(55)	7	(11)	1	(1)	0	(0)	28	(46)	13	(21)	4	(7)	166
2000–01	0	(0)	17	(26)	41	(61)	5	(8)	1	(1)	0	(0)	15	(22)	15	(23)	5	(8)	149
2001–02	0	(0)	25	(29)	45	(53)	3	(4)	1	(1)	0	(0)	11	(13)	8	(9)	7	(8)	117
2002–03	0	(0)	14	(18)	46	(61)	8	(11)	0	(0)	0	(0)	14	(18)	10	(13)	8	(11)	132
2003–04	3	(3)	17	(20)	40	(48)	3	(3)	0	(0)	0	(0)	12	(14)	13	(16)	13	(15)	119

Table 4 Unit 13 brown bear harvest percent by transport method, 1999–2000 to 2003–04

Regulatory year	Airplane	Horse	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk.	<u>n</u>
1999–00	25	6	6	16	29	3	13	2	1	166
2000–01	25	1	7	19	16	5	18	7	1	148
2001–02	29	3	11	28	4	6	10	7	1	116
2002–03	26	2	13	28	8	8	9	5	2	133
2003–04	17	2	15	28	10	6	16	6	1	119

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 14 (6625 mi²)

GEOGRAPHIC DESCRIPTION: Upper Cook Inlet

BACKGROUND

Brown bear populations in Unit 14 have been influenced by increased development, urbanization, agricultural settlement, and other human activities. During the late 1980s, Grauvogel (1990) estimated brown bear numbers at 169–262. Harkness (1993) later refined this population estimate to 185–239 brown bears. Del Frate (2003) reported that public reports and human–bear encounters indicated that bears were more common than they had been 10–15 years earlier.

In Unit 14, Grauvogel (1990) estimated the annual sustainable harvest at 8–19 bears, and Harkness (1993) calculated it to be 8.2–12.6 bears. Griesse (1995) applied a more conservative annual allowable harvest (AAH) of 10 total bears and/or 3 independent females. This resulted in a harvest objective of 6–10 bears, including no more than 3 females >2 years old. Griesse (1998) suggested that future population objectives should reflect the permanent loss of bear habitat in Unit 14. He also indicated that human-use objectives should reflect allowance of higher harvest to bring the bear population to within a societal carrying capacity. The Board of Game supported this and allowed for a higher human-use objective of 10–15 bears (Griesse 1999).

A high incidence of human–bear interactions occurs in Unit 14. Since 1985, 1–8 bears annually have been killed unrelated to hunting. In 1995 two humans were fatally mauled by brown bears in Chugach State Park in Unit 14C. Efforts have been made to develop educational programs directed at area residents and visitors to reduce the potential for conflicts, although bear complaints in Unit 14C continue to be problematic.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Unit 14A goals have been to provide the maximum opportunity to participate in hunting brown bears and, secondarily, to provide for optimum harvests of brown bears. In Unit 14B the goal has been to provide the maximum opportunity to participate in hunting brown bears. In Unit 14C the goals have been to provide an opportunity to view, photograph, and enjoy brown bears, and, secondarily, to provide an opportunity to hunt brown bears under aesthetically pleasing conditions.

MANAGEMENT OBJECTIVES

To maintain a brown bear population that is largely unaffected by human harvest.

Human-Use Objectives

To allow optimum opportunity to hunt brown bears with an annual allowable harvest (AAH) of 10–15 bears, including no more than 5 females greater than 2 years of age.

METHODS

Department staff or authorized sealers interviewed hunters when they presented bears for sealing of skulls and hides. Skulls were measured, sex of bears determined, a premolar tooth was extracted for age determination, and information on date and location of kill and hunter effort were collected from successful hunters. All harvest information was entered into the statewide database and made available to staff for analysis. Harvest data were compared to previous years.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

There is currently no practical way to census brown bears in a forested environment, such as in most of Unit 14. Previous biologists have attempted to estimate the GMU 14 brown bear population based on the information available (see Background section). However, recent public reports and human–bear encounters indicated that bears were more common than 15 years ago.

MORTALITY

Harvest

Season and Bag Limit. For regulatory years 1997 and 1998, Unit 14B hunting season for brown bears was 15 September through 25 May. In Units 14A and 14C the season was 15 September through 10 October and 1–25 May. During 1999 the season for all of Unit 14 changed to 15 September through 25 May. Within Subunit 14C brown bear hunting was not allowed in Chugach State Park and several special management areas. The season was extended in Unit 14B to 1 September–31 May in 2001. Currently the season in Unit 14A, 14B, and the remaining portions of 14C is 1 September–31 May.

The bag limit for brown bears was 1 bear every 4 regulatory years. Harvesting cubs and sows accompanied by cubs was prohibited. Residents were required to get a \$25 tag for brown bear hunting.

Board of Game Actions and Emergency Orders. During spring 2001 the Board of Game increased the season length in Unit 14B. In an attempt to streamline regulations the department proposed and the board approved a longer season for the remainder of Unit 14 except Chugach State Park in 2003.

Hunter Harvest. During the past 5 years hunters harvested an average of 17.4 bears (range 14–21) (Table 1). This 5-year average is greater than the 9.2 average for the previous 5-year period (range 5–12). The female component of the brown bear harvest ranged from 19 to 53%, with an average of 36.8%. The average yearly total of known female bears >2 years of age that were

killed in the 5-year period 1997–2001 was 7.6 (including defense of life or property [DLP] and other non-hunting mortality).

Hunter Residency. Nonresidents harvested an average of 3.6 bears between 1999 and 2003 (Table 2). All remaining bears were harvested by residents of GMU 14 during this period, except one taken in 2002 and another in 2003 by nonlocal residents.

Harvest Chronology. Harvest chronology in Unit 14 has typically peaked during September and secondarily in May (Table 3). In 2002, 84% of the bears were harvested during the fall. One bear was actually taken in November. During the 2003 season, approximately half of the harvest occurred in May; the balance occurred during September and October (Table 3).

Transport Methods. Successful bear hunters preferred using all-terrain vehicles (ATVs) and/or off-road vehicles (ORVs) during this report period (Table 4). Hunters that report taking bears using foot transportation are likely hunting near their residences. Some of this may be occurring due to the proximity of hunting opportunity near home for some local residents, as well as less tolerance for bears near developed areas.

Other Mortality

Defense of life or property is the primary causes of nonhunting mortality. There were 2 nonhunting mortalities in 2002 and 7 in 2003. Four bears were killed in vehicle collisions, and the rest of the bears were killed DLP. All of the bears were killed in Unit 14C. No bears were killed by trains during the reporting period. We estimated an additional 2 bears per year killed and not reported (Table 1).

CONCLUSIONS AND RECOMMENDATIONS

The total human use objective of 10–15 bears has been exceeded during the last 3 years, and the average number of independent females harvested exceeded the objective in 3 of the last 5 years. These trends indicate harvest objectives are likely to be exceeded in the future.

At the March 1999 Board of Game meeting, we recommended that the brown bear human-use objective be increased to current harvest levels, which appeared to be sustainable. By all indicators, such as frequency of bear sign observed by biologists, reports from the public, incidence of nuisance bears, and an increased harvest level, the brown bear subpopulation in the unit seems to be stable or increasing. We suggest that a harvest objective of 10–15 bears (AAH of 15) with a maximum of 5 independent females is reasonable but may need to be modified if current trends continue.

We also recommend that the harvest be monitored closely, checking age of bears harvested, and the ratio of females in the harvest in order to determine the need for adjustments to the harvest objective. There has been an increase in the spring harvest since the season was extended to 31 May in 14A and portions of 14C. It is possible that the increase in harvest may be attributed to more interest in hunting brown bears in Units 14A and 14B due to recent season extensions.

Management goals for observation and photography of brown bears in the unit are being met. Brown bears in and around Anchorage and the Matanuska-Susitna valleys are seen almost daily

during the summer months, creating a tremendous number of calls from concerned citizens. Efforts to inform Alaskans and visitors how to act around bears and how to minimize undesirable interactions (Griese 1999) should be the basis for information and education programs intended to reduce bear mortality and the possibility of property damage and attacks by brown bears. We should continue to strive for strong educational programs in Anchorage and the Mat-Su to address issues such as garbage placement, bird feeders, and human–bear encounters.

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PREPARED BY:

Tony P. Kavalok
Wildlife Biologist III

SUBMITTED BY:

Gino G. Del Frate
Management Coordinator

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Table 1 Unit 14 brown bear harvest, 1994–2003

Regulatory year	Reported					Nonhunting kill ^a			Estimated unreported kill	Total estimated kill					Total
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	
1994															
Fall 94	0	1	(100)	0	1	3	0	1	1	3	(75)	1	(25)	2	6
Spring 95	2	2	(50)	0	4	0	0	1	1	2	(50)	2	(50)	2	6
Total	2	3	(60)	0	5	3	0	2	2	5	(63)	3	(38)	4	12
1995															
Fall 95	4	5	(56)	0	9	2	0	1	1	6	(55)	5	(45)	2	13
Spring 96	1	1	(50)	0	2	0	1	0	1	1	(33)	2	(67)	1	4
Total	5	6	(55)	0	11	2	1	1	2	7	(50)	7	(50)	3	17
1996															
Fall 96	2	3	(60)	0	5	1	0	0	1	3	(50)	3	(50)	1	7
Spring 97	4	0	(0)	0	4	5	1	0	1	9	(90)	1	(10)	1	11
Total	6	3	(30)	0	9	6	1	0	2	12	(75)	4	(25)	2	18
1997															
Fall 97	7	2	(22)	0	9	3	1	1	1	10	(77)	3	(23)	2	15
Spring 98	2	1	(33)	0	3	0	0	0	1	2	(67)	1	(33)	1	4
Total	9	3	(25)	0	12	3	1	1	2	12	(75)	4	(25)	3	19
1998															
Fall 98	6	3	(33)	0	9	3	0	0	1	9	(75)	3	(25)	1	13
Spring 99	0	0	(-)	0	0	0	1	0	1	0	(0)	1	(100)	1	2
Total	6	3	(33)	0	9	3	1	0	2	9	(69)	4	(31)	2	15
1999															
Fall 99	5	4	(44)	0	9	2	1	0	1	7	(58)	5	(42)	1	13
Spring 00	5	1	(17)	0	6	1	0	1	1	6	(86)	1	(14)	2	9
Total	10	5	(33)	0	15	3	1	1	2	13	(68)	6	(32)	3	22

Table 1 continued

Regulatory year	Reported								Estimated unreported kill	Total estimated kill					
	Hunter kill				Nonhunting kill ^a					M	(%)	F	(%)	Unk.	Total
	M	F	(%)	Unk.	Total	M	F	Unk.							
2000															
Fall 2000	8	4	(33)	0	12	2	1	0	1	10	(67)	5	(33)	1	16
Spring 2001	2	0	(0)	0	2	3	1	1	1	5	(83)	1	(17)	2	8
Total	10	4	(29)	0	14	5	2	1	2	15	(71)	6	(29)	3	24
2001															
Fall 2001	8	5	(38)	0	13	2	0	0	1	10	(67)	5	(33)	1	16
Spring 2002	1	5	(83)	0	6	0	0	0	1	1	(17)	5	(83)	1	7
Total	9	10	(53)	0	19	2	0	0	2	11	(52)	10	(48)	2	23
2002															
Fall 2002	6	9	(60)	0	15	0	0	1	1	6	(40)	9	(60)	2	17
Spring 2003	3	0	(0)	0	3	1	0	0	1	4	(100)	0	(0)	1	5
Total	9	9	(50)	0	18	1	0	1	2	10	(53)	9	(47)	3	22
2003															
Fall 2003	8	3	(27)	0	11	1	2	1	1	9	(75)	5	(25)	2	16
Spring 2004	9	1	(10)	0	10	1	2	0	1	10	(77)	3	(23)	1	14
Total	17	4	(19)	0	21	2	4	1	2	19	(76)	8	(24)	3	30

^a Includes DLP kills, illegal kills, other known human-caused accidental mortality.

Table 2 Unit 14 brown bear successful hunter residency, 1994–2003

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1994	5	(100)	0	(0)	0	(0)	5
1995	10	(91)	1	(9)	0	(0)	11
1996	7	(78)	0	(0)	2	(22)	9
1997	9	(75)	1	(8)	2	(17)	12
1998	8	(89)	0	(0)	1	(11)	9
1999	11	(73)	0	(0)	4	(27)	15
2000	10	(71)	0	(0)	4	(29)	14
2001	13	(68)	0	(0)	6	(32)	19
2002	16	(89)	1	(6)	1	(6)	18
2003	17	(81)	1	(5)	3	(14)	21

^aUnit 14 residents

Table 3 Unit 14 brown bear harvest chronology percent by month, 1994–2003

Regulatory year	Harvest periods							<i>n</i>
	August	September	October	November	March	April	May	
1993	0	40	0	0	0	0	60	5
1994	0	20	0	0	0	0	80	5
1995	0	64	18	0	0	0	18	11
1996	0	44	11	0	0	--	11	9
1997	0	67	8	0	0	8	17	12
1998	11	56	33	0	0	0	0	9
1999	0	47	13	0	0	20	20	15
2000	0	36	50	0	0	0	14	14
2001	0	58	11	0	0	21	11	19
2002	0	72	6	6	0	0	16	18
2003	0	42	10	0	0	0	48	21

Table 4 Unit 14 brown bear harvest percent by transport method, 1994–2003

Regulatory year	Percent of harvest							<i>n</i>
	Airplane	Horse	Boat	ATV/ORV	Snowmachine	Highway vehicle	Foot	
1994	0	0	40	20	0	20	20	5
1995	9	0	27	0	0	36	27	11
1996	22	0	0	33	0	33	11	9
1997	17	0	0	33	0	33	17	12
1998	11	0	11	44	0	22	11	9
1999	13	0	0	27	20	40	0	15
2000	29	0	21	14	7	7	21	14
2001	16	0	11	26	21	11	16	19
2002	11	0	11	50	0	17	11	18
2003	14	0	19	38	0	14	14	21

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 16 (12,255 mi²)

GEOGRAPHIC DESCRIPTION: West side of Cook Inlet

BACKGROUND

Griese (1993) estimated the brown bear population in Unit 16 at 586–1156. Estimated brown bear densities ranged from no bears on Kalgin Island to a presumed unit-high in the coastal and foothill areas of Redoubt Bay and Trading Bay. More recently, Del Frate (2003) reported the number of brown bears in Unit 16 was similar. With limited data available, biologists have tracked harvest data to estimate population trends, but more recently had also relied on reports by long-time residents to refine trend estimates (Griese 1998). Efforts to develop a statistically rigorous estimate of bear density over a large portion of the unit are ongoing.

Hunter harvest increased substantially in 1984 following a lengthening of seasons in Unit 16 to allow hunting during den emergence in March and April. Females generally emerge after the males, and their emergence tends to coincide with “rotting” snow conditions and reduced access by hunters. Prior to the liberalization, 1961–1983, harvest ranged from 17 to 46 bears annually. Harvest during 1984 reached 66 bears and peaked at 91 in 2003. During the last 5 years, the harvest averaged 81 bears.

Griese (1993) first estimated an annual sustainable harvest of 55 bears, including no more than 18 females older than 2 years. Harvest annually exceeded this level during 1984–1992. Brown bear numbers, at least sows and young, appeared to increase during the 1990s (Del Frate 2003). Also, Griese (1999) reported long-time residents seeing more bears than during the previous 10–20 years. In 1994, the Board of Game directed the department to allow the brown bear population in Unit 16 to decline. The board determined moose was the priority species in Unit 16, and a high population of brown bears conflicted with moose population productivity. Griese (1995) modified the brown bear population objective to reflect that priority. It was modified again in 1998, producing the current management goals and objectives intended to reduce the bear population. Because harvest levels were not reaching objectives, and the ratio of bears to moose appeared to be growing, the Board of Game adopted a 10 August opening date in 1999.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

To allow the number of breeding females in the population to decrease by providing optimal opportunity to hunt brown bears.

POPULATION OBJECTIVES

To reach desirable predator/prey ratios by allowing the brown bear population to decline.

HUMAN-USE OBJECTIVES

To allow human use to reach a 3-year average harvest of 28 females older than 2 years.

METHODS

Biologists monitored brown bear harvests by collecting data gathered during the sealing of skulls and hides of harvested brown bears. Department personnel or designated sealers measured skulls, determined sex of bears, extracted a premolar for age determination, and recorded date and location of kill, hunter effort, and transportation method. All harvest information was entered into the statewide harvest database and made available to staff for analysis. Similar data was collected from bears sealed as taken in defense of life or property (DLP).

During May 2000 ADF&G research staff, with cooperative funding from Denali National Park, began investigating the application of a method to survey bears using aerial transect surveys in northeastern Unit 16 and eastern Unit 13 (Quang and Becker 1999). This project continued through the current reporting period and has provided some insight into the density of bears in the area during the surveys and provided a limited opportunity to refine population estimates.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Staff observations during the past 20 years and comments from unit residents and others who regularly visit the unit indicate a growing brown bear population during the last several years. Results for the “Quang and Becker survey” suggested that the density of brown bears in northern 16B was in the range of 26.7 bears per 1000 km². The southern end was likely similar in bear density to Unit 9A, which has about 150 bears per 1000 km² (Earl Becker, ADF&G, personal communication).

Population Size

Based on the data from the Quang and Becker surveys, it is likely the brown bear population in Unit 16 is similar to the number reported by Griesse in 1993, although it may have increased slightly despite high harvests reported in recent years.

MORTALITY

Harvest

The average annual reported brown bear harvest for 2001–2003 in Unit 16 was 82.7 bears. This included 25.3 females older than 2 years, which was within the management objectives. Nonhunting mortality and estimates of unreported kills from wounding loss and poaching accounted for 8 bears annually (Tables 1 and 2). The average age of female bears for this report period was 7.4 years ($n = 46$). This was up from 6.2 reported for the previous period.

Season and Bag Limit. In Unit 16 the hunting season was 1 September–31 May. In Unit 16A, the bag limit was 1 bear every 4 regulatory years. During 2003, the season in Unit 16B was changed to 10 August–31 May with a bag limit of 1 bear every regulatory year and resident tag fee. Cubs and females accompanied by cubs were not legal to take.

Board of Game Actions and Emergency Orders. In 2003 the Board of Game removed the “one in four” restriction and further lengthened the season to 31 May for all of GMU 16. In response to a public proposal to close a large portion of 16B (Redoubt Bay Critical Habitat Area) to brown bear hunting, the board delayed the opening of the season with one mile of the mouth of Wolverine Creek. The justification for this amendment was to allow bears tolerant of people to disperse.

Effective 1 July 2005, the bag limit in Unit 16B will increase to 2 bears per year and 1 bear every year in Unit 16A. These changes by the board were in response to public concerns about the continued decline of moose and increased reports of large numbers of bears in the unit.

Hunter Harvest. With the exception of 1997, hunter harvest has increased from the low harvest in 1993 to a record high of 91 bears in 2003. Harvest dipped during 2002 as a result of poor weather and poor snow conditions during spring. During the last 5 years, the harvest averaged 80.8 bears (Tables 1 and 2).

Hunter Residency and Success. Nonresident harvest was similar to the previous reporting period and was up slightly from historic trends. Nonresidents claimed 64 and 46% of the harvest in 2002 and 2003 respectively (Table 3). For the past 10 years, unit resident hunters took 0–6% of the harvest.

Harvest Chronology. In the past, more bears have been taken during the fall than spring (Table 4). In 2003, 46 bears were harvested in the spring while 45 were taken during the fall. Most bears taken in the fall are incidental to moose hunting, but with the reduction in moose hunting opportunities, fall brown bear harvests have dropped over the last 5 years. Most fall bears are taken in September, and most spring bears are taken in April.

Transport Methods. Successful brown bear hunters reported using airplanes for transportation more often than all other methods combined (Table 5). During 2002 and 2003 respectively, 71% and 66% of successful hunters used aircraft. Snowmobiles have become more popular in recent years; however, only 12% or less of successful hunters reported using this method in 2003.

Other Mortality

During the report period, 3 nonhunting kills (2 females) were reported in 2002 and none in 2003 (Tables 1 and 2). Consequently, we estimated that approximately 8 bears annually might not be reported.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Griese (1998) highlighted dangerous interactions between humans and bears caused by sport fishing at Wolverine Creek. ADF&G worked to educate users and commercial operators specifically and to develop a multidivisional management strategy to promote safer conditions for anglers and bear viewers (Griese 1999). In addition, the department assisted in the formation of a public advisory group charged with drafting voluntary guidelines for users. This has been in effect since the summer of 2003 with success in addressing some of the issues. Monitoring and evaluation of this program is ongoing.

CONCLUSIONS AND RECOMMENDATIONS

We believe management objectives are being met. The harvest objective was below the desired 3-year average of 28 females older than 2 years, but at the same time the harvest was at record levels. By liberalizing the spring season and eliminating the resident tag fee in Unit 16B, the Board of Game has increased the likelihood of additional harvests to reach the desired objectives.

Bear viewing and hunting are continuing to become more popular in the unit. At the same time, interest remains in increasing the harvest because of low moose numbers and the desire by the public to reduce predators in Unit 16. These factors likely will have a continuing affect on management direction and programs for the foreseeable future. The department must continue to closely monitor harvest, particularly age and sex of bears, in order to identify and hopefully avoid any serious declines in the population.

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PREPARED BY

Tony Kavalok
Wildlife Biologist II

SUBMITTED BY

Gino Del Frate
Management Coordinator

Please cite any information taken from this section, and reference as:

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Table 1 Unit 16A human-caused brown bear mortality, RY 1994–2003

Regulatory year	Reported					Nonhunting kill ^a			Estimated unreported kill	Total estimated kill					
	M	F	Hunter kill (%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
1994															
Fall 94	3	1	(25)	0	4	0	0	0		3	(75)	1	(25)	0	4
Spring 95	1	2	(67)	0	3	0	0	0		1	(33)	2	(67)	0	3
Total	4	3	(43)	0	7	0	0	0	1	4	(57)	3	(43)	1	8
1995															
Fall 95	1	1	(50)	0	2	0	1	0		1	(33)	2	(67)	0	3
Spring 96	2	2	(50)	0	4	1	0	0		3	(60)	2	(40)	0	5
Total	3	3	(50)	0	6	1	1	0	1	4	(50)	4	(50)	1	9
1996															
Fall 96	1	1	(50)	0	2	0	0	0		1	(50)	1	(50)	0	2
Spring 97	2	0	(0)	0	2	0	0	0		2	(100)	0	(0)	0	2
Total	3	1	(25)	0	4	0	0	0	1	3	(75)	1	(25)	1	5
1997															
Fall 97	2	2	(50)	0	4	0	1	0		2	(40)	3	(60)	0	5
Spring 98	1	0	(0)	0	1	1	0	0		2	(100)	0	(0)	0	2
Total	3	2	(40)	0	5	1	1	0	1	4	(57)	3	(43)	1	8
1998															
Fall 98	0	1	(100)	0	1	0	0	0		0	(0)	1	(100)	0	1
Spring 99	0	1	(100)	0	1	0	0	0		0	(0)	1	(100)	0	1
Total	0	2	(100)	0	2	0	0	0	2	0	(0)	2	(100)	2	4
1999															
Fall 99	9	2	(18)	0	11	0	0	0		9	(82)	2	(18)	0	11
Spring 00	4	0	(0)	0	4	0	1	0		4	(80)	1	(20)	0	5
Total	13	2	(13)	0	15	0	1	0	2	13	(81)	3	(19)	2	18
2000															
Fall 2000	6	3	(33)	0	9	0	0	0		6	(67)	3	(33)	0	9
Spring 01	4	0	(0)	0	4	0	0	0		4	(100)	0	(0)	0	4
Total	10	3	(30)	0	13	0	0	0	2	10	(67)	3	(23)	2	15

Table 1 continued

Regulatory year	Reported					Nonhunting kill ^a			Estimated unreported kill	Total estimated kill					
	Hunter kill		Unk.	Total	Nonhunting kill		Unk.	M		(%)	F	(%)	Unk.	Total	
	M	F			(%)	M									F
2001															
Fall 2001	5	2	(29)	0	7	0	0	0		5	(71)	2	(29)	0	7
Spring 02	1	0	(0)	0	1	0	0	0		1	(100)	0	(0)	0	1
Total	6	2	(25)	0	8	0	0	0	2	6	(75)	2	(25)	2	10
2002															
Fall 2002	3	1	(25)	0	4	0	0	0		3	(75)	1	(25)	0	4
Spring 03	1	0	(0)	0	1	1	0	0		2	(100)	0	(0)	0	2
Total	4	1	(20)	0	5	1	0	0	1	5	(83)	1	(17)	1	7
2003															
Fall 2003	3	3	(50)	0	6	0	0	0		3	(50)	3	(50)	0	6
Spring 04	4	0	(0)	0	4	0	0	0		4	(100)	0	(0)	0	4
Total	7	3	(30)	0	10	0	0	0	2	7	(70)	3	(30)	2	12

^a Includes DLP kills, illegal kills, other known human-caused accidental mortality.

Table 2 Unit 16B human-caused brown bear mortality, RY 1994–2003

Regulatory year	Reported					Nonhunting kill ^a			Estimated unreported kill	Total estimated kill					
	M	F	Hunter kill (%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
1994															
Fall 94	15	8	(35)	0	23	0	0	0		15	(65)	8	(35)	0	23
Spring 95	19	1	(5)	0	20	0	0	0		19	(95)	1	(5)	0	20
Total	34	9	(21)	0	43	0	0	0	6	34	(79)	9	(21)	6	49
1995															
Fall 95	12	19	(61)	0	31	3	1	2		15	(43)	20	(57)	2	37
Spring 96	14	1	(7)	0	15	0	0	0		14	(93)	1	(7)	0	15
Total	26	20	(43)	0	46	3	1	2	5	29	(58)	21	(42)	7	57
1996															
Fall 96	13	16	(55)	0	29	2	0	0		15	(48)	16	(52)	0	31
Spring 97	28	3	(10)	0	31	1	0	1		29	(88)	3	(9)	1	33
Total	41	19	(32)	0	60	3	0	1	6	44	(70)	19	(30)	7	70
1997															
Fall 97	13	15	(54)	0	28	0	1	0		13	(45)	16	(55)	0	29
Spring 98 ^b	5	1	(17)	0	6	0	0	0		5	(83)	1	(17)	0	6
Total	18	16	(47)	0	34	0	1	0	3	18	(51)	17	(49)	3	38
1998															
Fall 98	29	21	(42)	0	50	0	3	0		29	(55)	24	(45)	0	53
Spring 99	10	2	(17)	0	12	0	0	0		10	(83)	2	(17)	0	12
Total	39	23	(35)	0	62	0	3	0	6	39	(60)	26	(40)	6	71
1999															
Fall 99	39	19	(40)	0	48	1	3	0		30	(58)	22	(42)	0	52
Spring 00	13	1	(7)	0	14	0	1	0		14	(87)	2	(13)	0	15
Total	41	20	(33)	0	61	1	4	0	6	43	(64)	24	(36)	6	73
2000															
Fall 2000	17	22	(56)	0	39	1	5	0		18	(45)	27	(60)	0	45
Spring 01	25	3	(11)	0	28	0	0	0		25	(89)	3	(11)	0	28
Total	42	25	(37)	0	67	1	5	0	6	43	(59)	30	(41)	6	79

Table 2 continued

Regulatory year	Reported					Nonhunting kill ^a			Estimated unreported kill	Total estimated kill					
	Hunter kill		Unk.	Total	Unk.			Unk.		Total					
	M	F			(%)	M	F				(%)				
2001															
Fall 2001	22	24	(52)	0	46	0	0	0		22	(48)	24	(52)	0	46
Spring 02	32	2	(6)	0	34	0	0	0		32	(94)	2	(6)	0	34
Total	54	26	(33)	0	80	0	0	0	6	54	(67)	26	(33)	6	86
2002															
Fall 2002	21	19	(48)	0	40	0	2	0		21	(50)	21	(50)	0	42
Spring 03	21	3	(13)	0	24	0	0	0		21	(87)	3	(13)	0	24
Total	42	22	(34)	0	64	0	2	0	5	42	(64)	24	(36)	5	71
2003															
Fall 2003	22	17	(44)	0	39	0	0	0		22	(56)	17	(44)	0	39
Spring 04	38	4	(10)	0	42	0	0	0		38	(90)	4	(10)	0	42
Total	60	21	(26)	0	81	0	0	0	6	60	(74)	21	(26)	6	87

^a Includes DLP kills, illegal kills, other known human-caused accidental mortality.

^b Includes one bear killed where subunit could not be determined.

Table 3 Unit 16 brown bear successful hunter residency, RY 1994–2003

Regulatory year	Local ^a resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total ^b successful hunters
1994	2	(4)	18	(36)	29	(58)	50
1995	2	(4)	24	(46)	25	(48)	52
1996	2	(3)	24	(38)	37	(58)	64
1997	1	(3)	17	(44)	21	(54)	39
1998	0	(0)	33	(52)	31	(48)	64
1999	5	(6)	39	(51)	32	(42)	77
2000	3	(4)	27	(34)	50	(63)	80
2001	4	(5)	38	(43)	46	(52)	88
2002	1	(1)	24	(35)	44	(64)	69
2003	6	(7)	43	(47)	42	(46)	91

^a Unit 16 residents

^b Includes unknown residency

Table 4 Unit 16 brown bear harvest chronology percent by month, RY 1994–2003

Regulatory year	Harvest periods							<i>n</i>
	August	September	October	November	March	April	May	
1994	0	50	4	0	4	32	10	50
1995	0	46	15	2	0	27	10	52
1996	0	42	6	0	6	39	6	64
1997	0	62	21	0	3	13	3	39
1998	0	69	9	2	2	16	3	64
1999	16	56	4	1	0	19	4	77
2000	20	39	1	0	1	33	6	80
2001	23	28	8	1	0	33	7	88
2002	15	41	9	0	0	29	7	69
2003	10	32	7	1	0	37	13	91

Table 5 Unit 16 brown bear harvest percent by transport method, RY 1994–2003

Regulatory year	Percent of harvest							Other/ Unknown	<i>n</i>
	Airplane	Horse	Boat	ATV/ORV	Snowmachine	Highway vehicle	Foot		
1994	66	12	2	4	8	8	0	0	50
1995	71	4	6	4	2	4	8	2	52
1996	73	6	9	2	3	6	0	0	64
1997	67	5	15	10	0	3	0	0	39
1998	83	3	8	4	2	0	0	2	64
1999	53	10	9	7	9	4	5	1	77
2000	76	4	5	5	6	1	3	0	80
2001	66	0	9	7	10	2	6	0	88
2002	71	1	10	6	4	1	6	0	69
2003	66	2	8	9	12	1	2	0	91

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 17 A, B, and C (18,800 mi²)

GEOGRAPHIC DESCRIPTION: Northern Bristol Bay

BACKGROUND

Brown bears are common throughout the northern Bristol Bay area and are seasonally abundant along salmon spawning areas in the Nushagak, Mulchatna, Togiak, and Kulukak River drainages, as well as throughout the Wood River/Tikchik Lakes. Bears also are observed occasionally near aggregations of the Mulchatna caribou herd.

Bears in Unit 17 are neither as abundant nor usually as large as those found along the Alaska Peninsula, so historically there hasn't been as much hunting pressure on this bear population. Along with increased interest in hunting bears elsewhere in the state, bear hunting in Unit 17 has increased since the mid 1990s. Prior to 1970, few bears were reported as harvested from the unit. When the Board of Game established alternate year seasons in Unit 9 in 1973, the number of bears reported killed in Unit 17 increased. Between 1970 and 1997, annual reported harvests rarely exceeded 50 bears per year. Since 1997, annual reported bear harvests have increased substantially. From 1972–73 to 1980–81, the harvest was generally balanced between the spring and fall seasons. Between 1982 and 1997 there were higher harvests during fall seasons than during the spring. Beginning with the increased spring hunting season length during the 1998 regulatory year, spring harvests exceeded fall harvests for several years. However, during recent years, fall harvests have increased to almost twice the numbers previously taken.

One reason for the increase in the fall harvest through the mid 1990s was increased hunting pressure on the rapidly growing Mulchatna caribou herd (Van Daele 1997; Woolington 2003). Reported moose hunting activity and harvests also increased dramatically during this same period (Woolington 2002). With more hunters in the field hunting caribou and moose, more bears were killed either incidentally or during "combination" hunts. Increased spring harvest, however, demonstrates the rising interest in hunting brown bears in Unit 17. Present bear harvest numbers probably reflect the popularity of bear hunting, as well as the ability for guided hunters to participate in multispecies hunts.

Reported harvests are only a part of the brown bears killed in the unit. All villages in the area have open landfills that attract bears during the spring, summer, and fall. Residential garbage, dog food, and fish-drying racks also bring bears close to humans. Many local residents have a low tolerance for bears near villages and fish sites, and they occasionally kill bears in these areas. Although reporting rates seem to have improved in recent years, most nonhunting

mortalities are reported either indirectly or not at all. Because of unreported kills, any conclusions based solely on harvest data should be viewed with caution.

POPULATION OBJECTIVE

Maintain a brown bear population that will sustain an annual harvest of 50 bears composed of at least 50% males.

METHODS

Each brown bear legally harvested or killed in defense of life or property (DLP) in the unit is sealed, the skull is measured, sex determined, and a premolar tooth extracted and aged. We record data on hunter residency, number of days hunted, transportation used, and date and location of kill at the time of sealing. When possible, we investigate circumstances surrounding DLP and illegal kills. We collect subjective population data during caribou and moose surveys. Reports from agency field workers, local residents, and hunters are also used to estimate bear population trends.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

No objective data on the status of the bear population in Unit 17 is available. The brown bear population is probably stable to increasing unitwide. Bears living along the Nushagak River in Unit 17B, the Mulchatna River drainage, and in the mountains surrounding the Wood River/Tikchik Lakes experience the greatest hunting pressure.

Population Size

No population size or density estimates have been made for the brown bear population in Unit 17. Densities are probably lower than those observed along the Alaska Peninsula, but greater than that of interior areas to the north.

Distribution and Movements

We know little about the distribution and movements of brown bears in this unit. Bears concentrate along salmon spawning streams throughout the summer and fall. Individual bears and family groups are commonly observed near calving aggregations of caribou in late May. We have seen den sites in the mountains throughout the unit.

MORTALITY

Harvest

Season and Bag Limit

Units 17A & 17C	10 Sep–15 May	1 bear per regulatory year
Unit 17B, that portion of the Mulchatna River drainage upstream from, and including, the Chilchitna River drainage	10 Sep–25 May	1 bear per regulatory year

Unit 17B	20 Sep–25 May	1 bear per regulatory year
Units 17A, B, and C Residents only, by registration permit	1 Sep–31 May 31	1 bear per regulatory year

Board of Game Actions and Emergency Orders. During its spring 2003 meeting, the Board of Game changed the bag limit to one brown bear every regulatory year, and changed the opening date for that portion of Unit 17B in the Mulchatna River drainage upstream of and including the Chilchitna River to 10 September. During its spring 2004 meeting, the board eliminated reference to the Western Alaska Brown Bear Management Area and changed the subsistence registration brown bear hunt to game management unit based. No emergency orders were issued during this reporting period.

Human-Induced Mortality. During the 2002–03 hunting seasons, 97 hunters reported killing brown bears in Unit 17, including 56 males (58%) and 41 females (42%) (Table 1). During the 2003–04 hunting seasons, 100 hunters reported killing brown bears in Unit 17, including 53 males (53%) and 47 females (47%) (Table 1). These reported harvests were higher than the mean annual reported harvest of the previous 5 years (84 bears).

The average skull size of bears presented for sealing in 2002–03 was 23.0 inches ($n = 55$, range 16.1 in.– 27.0 in.) for males and 20.9 inches ($n = 41$, range 16.8 in.– 24.1 in.) for females. The average skull size of bears presented for sealing in 2003–04 was 23.3 inches ($n = 51$, range 18.2 in.–27.3 in.) for males and 20.7 inches ($n = 45$, range 17.3 in.–23.5 in.) for females. In 2002–03, four bears (3 males, 1 female) were reported killed in Unit 17A; 77 (41 males, 36 females) were reported killed in Unit 17B; and 16 (12 males and 4 females) were reported from Unit 17C. In 2003–04, 10 bears (5 each males, females) were reported killed in Unit 17A, 60 (29 males and 31 females) were reported killed in Unit 17B, and 30 (19 males and 11 females) were reported from Unit 17C. In the past 5 years, 7.6% of the bears reported killed in the unit have been taken in Unit 17A, 64.4% in 17B, and 28% in 17C (Table 2).

Hunter Residency and Success. Nonresidents account for most of the brown bear harvest in Unit 17. During the 2002–03 seasons, nonresidents took 83.5% of the bears reported killed in the unit. During the 2003–04 seasons, nonresidents took 76% of the bears reported killed in the unit (Table 3).

Harvest Chronology. Seventy bears were reported killed during the fall 2002 hunting season, and 27 bears were reported killed during the spring 2003 season. Sixty-eight bears were reported killed during the fall 2003 hunting season, and 32 bears were reported killed during the spring 2004 season (Tables 1 and 4). Prior to 1998, fall was consistently when most bears were reported killed in Unit 17. When the spring season was lengthened, spring harvests increased and for several years exceeded that reported taken in the fall (Table 4). For the past several years, numbers reported taken in the fall exceed the spring harvest, but then the fall harvest is also almost twice that from previous years. It is likely that the ability for nonresident guided hunters to take bears while on combination hunts for other species (moose and caribou) has contributed to the increased number of bears taken during the fall.

Transport Methods. Most successful bear hunters in Unit 17 used aircraft for access. Boats and snowmachines were the only other consistently used method of access (Table 5).

Other Mortality

Five brown bears were reported killed in defense of life or property in Unit 17 during the 2002–03 regulatory year. One bear was reported killed illegally in Unit 17 during 2002–03; however, based on previous years, other illegal kills likely occurred. Four brown bears were reported killed in defense of life or property in Unit 17 during the 2003–04 regulatory year, with no known illegal kills.

HABITAT

Assessment

Brown bear habitat in Unit 17 is virtually unaltered and in excellent condition. Salmon stocks are carefully managed, and escapements are adequate for the needs of the current bear population. Abundant ungulates in the unit have also provided a steady food supply for bears. Human settlements are small relative to urban areas, but village populations are growing. With resultant increase in land uses by local residents, areas used by both humans and bears are increasing. Increased localized food sources around these settlements (human food and garbage) may enhance the areas as bear habitat; however, bears using areas frequented by humans run the risk of being shot. Proposed development of the Pebble/Copper gold mine in the Mulchatna drainage has the possibility of affecting bear habitat. But the degree to which the exploration and possible development might affect denning and use of the area by bears is currently unknown.

NONREGULATORY PROBLEMS/NEEDS

A joint ADF&G/U.S. Fish and Wildlife Service (FWS) research project started in 1992 ended in spring 2003. The objectives of this project were to estimate bear densities, collect baseline population data, and delineate habitat-use patterns for brown bears in portions of the Togiak and Yukon Delta National Wildlife Refuges (in northwestern Unit 17A and southern Unit 18). Bears radiocollared in 1993, 1994, 1997, and 2000 were tracked at least twice per month. At the end of the project, all active radio collars were removed.

To reduce nuisance bear complaints and illegal kills, a public education effort was continued in the unit. Radio announcements and public meetings have been used to inform rural residents about bear behavior and to disseminate advice on how to deal with bear problems. The department has worked with city and village government representatives and the Dillingham city police to enforce existing regulations when bear problems are caused by improper food or garbage storage. Demonstration projects to publicize the use of electric fences to protect property from bears were set up in the Dillingham area and have been very effective.

We should continue efforts to encourage local residents to report all bears killed and to educate them on bear behavior and ways to minimize problems with bears. We should also emphasize nonlethal methods of dealing with “nuisance” bears. Concurrent with these efforts, we should work with local village governments and the Alaska Department of Environmental Conservation to improve landfills so they are less attractive to bears.

The Dillingham dump was consistently used by an unknown number of individual bears for more than 2 decades. The open landfill formerly used was closed and covered during this reporting period. The new landfill was moved to a different location and uses the “closed cell” concept. Garbage and waste material dropped off by the public at a transfer site is now incinerated before being hauled to a disposal site, which is covered with soil at the end of each day. In addition, the transfer and disposal sites are enclosed by chain link as well as electric fences. The former dump site attracted large numbers of bears to the surrounding residential areas. The design and operation of the new landfill has significantly reduced the number of bears and bear problems in the immediate Dillingham area.

RESULTS AND CONCLUSIONS

Despite harvests during the reporting period of almost twice the historical average, we are meeting our population objective of maintaining a brown bear population that will support a harvest of 50 bears per year. Subjective evidence indicates the population is large enough to support such a harvest. The population objective of at least 50% males in the reported harvest has been met in most years, though the sex ratio for all bears killed (reported plus unreported) in the unit is unknown.

It is unknown if the unequal distribution of harvest in the unit is due to bear distribution or hunter effort. The bear population in the Wood/Tikchik Lakes, the upper Nushagak River and Mulchatna drainage should be monitored to watch for signs of excessive harvest. Efforts to better distribute hunting pressure to other areas of the unit should continue.

Changing the intolerant attitude of many local residents toward bears is a significant challenge. We have instituted a multifaceted approach, including education, enforcement, and implementation of nonlethal methods to minimize antagonistic bear-human encounters. It is difficult to objectively measure the success of these efforts, but in recent years there probably has been improvement.

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PREPARED BY

James D. Woolington
Wildlife Biologist III

SUBMITTED BY

Gino Del Frate
Management Coordinator

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Table 1 Unit 17 brown bear harvest, 1994–95 through 2003–04

Regulatory year	Hunter Kill				Nonhunting Kill				Total reported kill			
	Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1994												
Fall 1994	18	19	0	37	4	2	1	7	22	21	1	44
Spring 1995	6	0	0	6	0	0	0	0	6	0	0	6
Total	24	19	0	43	4	2	1	7	28	21	1	50
1995												
Fall 1995	14	17	0	31	2	5	0	7	16	22	0	38
Spring 1996	13	2	0	15	0	0	0	0	13	2	0	15
Total	27	19	0	46	2	5	0	7	29	24	0	53
1996												
Fall 1996	19	10	1	30	3	0	2	5	22	10	3	35
Spring 1997	12	5	0	17	1	0	0	1	13	5	0	18
Total	31	15	1	47	4	0	2	6	35	15	3	53
1997												
Fall 1997	20	17	0	37	8	4	0	12	28	21	0	49
Spring 1998	22	7	0	29	8	0	1	1	22	7	1	30
Total	42	24	0	66	8	4	1	13	50	28	1	79
1998												
Fall 1998	20	16	0	36	2	2	1	5	22	18	1	41
Spring 1999	36	6	0	42	2	0	0	2	38	8	0	46
Total	56	22	0	78	4	2	1	7	60	26	1	87

Table 1 Continued

Regulatory year	Hunter Kill				Nonhunting Kill				Total reported kill			
	Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1999												
Fall 1999	23	15	0	38	0	0	1	1	23	15	1	39
Spring 2000	35	9	0	44	0	0	0	0	35	9	0	44
Total	58	24	0	82	0	0	1	1	58	24	1	83
2000												
Fall 2000	33	27	1	61	4	2	4	10	37	29	5	71
Spring 2001	36	7	0	43	0	0	0	0	36	7	0	43
Total	69	34	1	104	4	2	4	10	73	36	5	114
2001												
Fall 2001	21	25	1	47	0	2	5	7	21	27	6	54
Spring 2002	41	4	1	46	0	0	0	0	41	4	1	46
Total	62	29	2	93	0	2	5	7	62	31	7	100
2002												
Fall 2002	35	35	0	70	4	0	2	6	39	35	2	76
Spring 2003	21	6	0	27	0	0	0	0	21	6	0	27
Total	56	41	0	97	4	0	2	6	60	41	2	103
2003												
Fall 2003	26	42	0	68	1	2	1	4	27	44	1	72
Spring 2004	27	5	0	32	0	0	0	0	27	5	0	32
Total	53	47	0	100	1	2	1	4	54	49	1	104

Table 2 Unit 17 brown bear harvest by subunit, 1991–92 through 2003–04

Regulatory year	Unit															
	17(A)				17(B)				17(C)				Unit 17 total			
	M	F	Unk	Total	M	F	Unk	Total	M	F	Unk	Total	M	F	Unk	Total
1991–92	2	2	0	4	18	12	2	32	6	3	0	9	26	17	2	45
1992–93	1	3	0	4	21	7	0	28	13	4	0	17	35	14	0	49
1993–94	1	2	0	3	16	6	0	22	4	4	0	8	21	12	0	33
1994–95	0	3	0	3	17	13	0	30	7	3	0	10	24	19	0	43
1995–96	1	3	0	4	18	13	0	31	8	3	0	11	27	19	0	46
1996–97	3	0	0	3	18	9	1	28	11	6	0	17	31	15	1	47
1997–98	3	0	0	3	28	18	0	46	11	6	0	17	42	24	0	66
1998–99	4	0	0	4	36	19	0	55	16	3	0	19	56	22	0	78
1999–00	7	3	0	10	34	16	0	50	17	5	0	22	58	24	0	82
2000–01	6	1	0	7	44	26	1	71	19	7	0	26	69	34	1	104
2001–02	3	2	0	5	31	17	0	48	28	10	2	40	62	29	2	93
2002–03	3	1	0	4	41	36	0	77	12	4	0	16	56	41	0	97
2003–04	5	5	0	10	29	31	0	60	19	11	0	30	53	47	0	100

Table 3 Unit 17 brown bear successful hunter residency, 1991–92 through 2003–04

Regulatory Year	Local ^a resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters ^b
1991–92	5 (11.1)	2 (4.4)	38 (84.4)	45
1992–93	8 (16.3)	4 (8.1)	35 (71.4)	49
1993–94	2 (6.0)	2 (6.0)	28 (84.8)	33
1994–95	4 (9.3)	2 (4.7)	37 (86.0)	43
1995–96	2 (4.4)	11 (23.9)	33 (71.7)	46
1996–97	4 (8.5)	4 (8.5)	39 (83.0)	47
1997–98	1 (1.5)	9 (13.6)	56 (84.9)	66
1998–99	5 (6.4)	3 (3.9)	70 (89.7)	78
1999–00	9 (11.0)	11 (13.4)	62 (75.6)	82
2000–01	1 (1.0)	13 (12.5)	90 (86.5)	104
2001–02	6 (6.5)	16 (17.2)	71 (76.3)	93
2002–03	2 (2.1)	14 (14.4)	81 (83.5)	97
2003–04	7 (7.0)	17 (17.0)	76 (76.0)	100

^a Residents of Game Management Unit 17.

^b Total may be higher than the sum of the columns because of hunters of unknown residency.

Table 4 Unit 17 brown bear harvest chronology percent by season, 1991–92 through 2003–04

Regulatory Year	Fall Season			Spring Season				Total
	1–15 Sep	16–30 Sep	1–15 Oct	1–15 Apr	16–30 Apr	1–15 May	16–30 May	
1991–92 ^a	6.7%	53.3%	11.1%	----	----	11.1%	15.6%	45
1992–93 ^a	12.2%	46.9%	6.1%	----	----	20.4%	14.3%	49
1993–94 ^{a, b}	9.1%	48.5%	24.2%	----	----	6.1%	12.1%	33
1994–95 ^{a, b}	11.6%	58.1%	16.3%	----	----	4.7%	9.3%	43
1995–96 ^{a, b}	10.9%	45.6%	10.9%	----	----	15.2%	17.4%	46
1996–97 ^{a, b}	6.4%	34.0%	23.4%	----	----	17.0%	19.2%	47
1997–98 ^c	7.6%	30.3%	18.2%	----	22.7%	13.6%	7.6%	66
1998–99 ^c	1.3%	25.6%	18.0%	----	26.9%	19.2%	9.0%	78
1999–00 ^c	3.7%	30.5%	12.2%	4.9%	20.7%	23.2%	4.9%	82
2000–01	4.8%	44.3%	9.6%	1.9%	18.3%	14.4%	6.7%	104
2001–02 ^d	6.5%	35.5%	7.5%	6.5%	26.9%	10.8%	4.3%	93 ^e
2002–03 ^d	5.2%	52.6%	14.4%	1.0%	9.3%	12.4%	5.2%	97
2003–04 ^f	11.0%	48.0%	8.0%	4.0%	16.0%	11.0%	----	100 ^g

^a Season dates: Spring - Unit 17 10 May–25 May
Fall - Units 17A & C 10 Sep–10 Oct
Unit 17B 20 Sep–10 Oct

^b Season dates for 1993–94 through 1996–97 are the same as 1990–91 through 1992–93 with the following addition:

Western Alaska Brown Bear Management Area(including 17A and that portion of 17B that drains into Nuyakuk and Tikchik Lakes), 1 Sep–31 May

^c Season dates: Spring - Unit 17 15 Apr–25 May
Fall - Units 17(A)&(C) 10 Sep–10 Oct
Unit 17(B) 20 Sep–10 Oct

Western Alaska Brown Bear Management Area (including Unit 17) 1 Sep–31 May

^d Season dates: Units 17(A)&(C) 10 Sep–25 May
Unit 17(B) 20 Sep–25 May

^e Includes one bear taken 20 Oct 2001, and one bear taken 29 Mar 2002

^f Season dates: Units 17(A)&(C) 10 Sep–25 May
Unit 17(B) Mulchatna drainage,
upstream of and including the
Chilikadrotna River 10 Sep–25 May
Unit 17 (B), remainder 20 Sep–25 May

^g Includes one bear taken 16 Nov 2003 and one bear taken 27 Mar 2004

Table 5 Unit 17 brown bear harvest percent by transport method, 1991–92 through 2003–04

Regulatory Year	Percent of harvest									Total
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1991–92	80.0	---	15.5	---	---	---	---	---	4.4	45
1992–93	83.6	---	14.2	---	---	---	---	2.0	---	49
1993–94	81.8	---	15.1	---	---	---	---	3.0	---	33
1994–95	83.7	---	16.3	---	---	---	---	---	---	43
1995–96	91.3	---	6.5	---	---	---	2.2	---	---	46
1996–97	78.7	---	17.0	---	---	---	2.1	---	2.1	47
1997–98	74.2	---	18.2	---	6.1	---	---	1.5	---	66
1998–99	73.1	---	7.7	1.3	18.0	---	---	---	---	78
1999–00	58.5	---	17.1	2.4	20.7	---	---	---	1.2	82
2000–01	77.9	---	7.7	---	10.6	---	---	3.8	---	104
2001–02	61.3	---	11.8	1.1	25.8	---	---	---	---	93
2002–03	92.8	---	7.2	---	---	---	---	---	---	97
2003–04	73.0	---	16.0	---	9.0	---	---	2.0	---	100

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 18 (42,000 mi²)

GEOGRAPHIC DESCRIPTION: Yukon-Kuskokwim Delta

BACKGROUND

Brown/grizzly bears exist at moderate density and the population is stable in Unit 18. Highest densities are in the Kilbuck Mountains southeast of Bethel and in the Andreafsky Mountains/Nulato Hills north of the Yukon River. Typically, few bears are reported harvested.

Traditionally, bears were important as food animals for the Yup'ik Eskimo people of Unit 18, and some of their customs surrounding bear hunting were inconsistent with the general hunting regulations. A brown bear working group made up of representatives of Unit 18 villages was established as a vehicle for local input on brown bear issues. After consultation with this group, the Western Alaska Brown Bear Management Area (WABBMA) was established, and regulations were modified to more closely match local cultural needs and to improve harvest reporting. In the WABBMA a registration permit hunt is administered for subsistence hunters, who pursue bears primarily for the meat.

Future administration of the subsistence brown bear hunt will be on a game management unit basis rather than through the WABBMA, and the working group is no longer active. However, a good working relationship with the local public was established and is an important part of bear management in Unit 18.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Maintain a viable brown bear population in Unit 18.
- Obtain brown bear population and harvest information.
- Minimize adverse interactions between bears and the public.
- Maintain productive working relationships with local residents and other agencies.

MANAGEMENT OBJECTIVES

- Monitor harvests through the sealing program, WABBMA registration permit reports, and contacts with the public.

- Obtain brown bear population information within the Togiak National Wildlife Refuge (TNWR) portion of Unit 18 by cooperating with TNWR staff in a census effort.
- In cooperation with the Yukon Delta National Wildlife Refuge (YDNWR), remove the radio collars deployed to obtain a brown bear population estimate in the Kilbuck Mountains.
- Provide educational material through the media and informal channels to improve compliance with brown bear hunting regulations and harvest reporting requirements.
- Inform the public of methods to minimize bear–human conflicts by reducing the attractiveness of fish camps, dumps, and other attractive nuisances.
- Communicate and cooperate with the Association of Village Council Presidents (AVCP), subsistence brown bear hunters, local village councils, Alaska Fish and Game Advisory Committees (AC), Federal Subsistence Regional Advisory Council (RAC), and FWS to regulate subsistence bear hunting.

METHODS

During May 2003 and May 2004, we participated with TNWR staff in a brown bear density estimation effort within the TNWR and adjacent areas using an aerial survey technique that does not require radio collars. With results of this population estimate pending, we removed the radio collars deployed during a previous study in the spring of 2003.

During the 2002–2003 and the 2003–2004 regulatory years, we sent letters requesting harvest and effort information to registered hunters in the WABBMA and monitored the general hunt harvest through our standard sealing requirements. Several local residents shot bears in defense of life and property (DLP), and we assisted them through the administrative process.

In an effort to minimize bear–human conflicts at fish camps, we installed an electric fence around a volunteer’s fish camp near St. Marys as a demonstration project and provided articles and information regarding bear–human conflicts to the public and media. We also contacted village leaders, local media, village natural resource personnel, hunters, and law enforcement personnel and relayed reports of illegal activities to the Alaska Department of Public Safety, Bureau of Wildlife Enforcement (ABWE).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We participated in a density estimation survey in the TNWR and adjacent areas with TNWR staff. The results of this survey are not yet available, but experience during a recent brown bear study provides a basis for us to estimate that the Unit 18 brown bear population is stable and includes approximately 335 bears in the Kilbuck Mountains and 200 bears in the Andreafsky Mountains and along the Yukon River. Few bears exist elsewhere in Unit 18.

Population Composition

There were no activities to determine brown bear population composition in Unit 18, but sex composition of the general hunt harvest is available in Table 1. During this reporting period, 62% of the bears taken were males, compared to 64% of all the bears taken since 1994.

Distribution and Movements

Drainages that include salmon streams in Unit 18, such as the Kisaralik and Kwethluk Rivers in the Kilbuck Mountains and the Andreafsky River north of St. Marys, support greater brown bear densities than elsewhere in the unit. Lowland habitats along the forested riparian corridors of the Yukon River and tributaries of the Kuskokwim River support moderate densities of brown bears. Other lowland habitats, including the vast treeless lowland of the Yukon–Kuskokwim Delta (Y–K Delta), contain very few bears.

MORTALITY

Harvest

Season and Bag Limit

<u>Unit and Bag Limits</u>	Resident Open Season (Subsistence and <u>General Hunts</u>)	Nonresident <u>Open Season</u>
<i>Unit 18–General Hunt</i>		
Unit 18, that portion north of the south bank of the Kashunuk River, including sloughs, from its mouth to the Yukon River and north of the south bank of the Yukon River		
Resident and Nonresident Hunters: 1 bear every 4 regulatory years	1 Sep–31 May (General hunt only)	1 Sep–31 May (General hunt only)
Remainder of Unit 18		
Resident and Nonresident Hunters: 1 bear every 4 regulatory years	10 Sep–10 Oct 10 Apr–25 May (General hunt only)	10 Sep–10 Oct 10 May–25 May (General hunt only)
<i>Unit 18–Subsistence Hunt</i>		
Resident Hunters: 1 bear per regulatory year by registration permit in the	1 Sep–31 May (Subsistence hunt only)	

WABBMA for subsistence purposes

Nonresident Hunters:

No open season
(Subsistence hunt only)

Board of Game Actions and Emergency Orders. During the fall 2001 Board of Game meeting, the general brown bear resident and nonresident season in that portion of Unit 18, north of the south bank of the Kashunuk River, including its sloughs from its mouth to the Yukon River, and north of the south bank of the Yukon River, including its sloughs was extended to 1 September–31 May. In the remainder of Unit 18 the season remained 10 September–10 October and 1 May–25 May. The resident and nonresident bag limit was 1 bear every 4 regulatory years. This season and bag limit was in effect throughout this reporting period.

During the subsequent Board of Game meeting in fall 2003, the resident and nonresident general brown bear season was changed to 1 September–31 May unitwide, and the bag limit was raised to 1 bear per regulatory year. These changes took effect in July 2004.

The Board of Game also reauthorized the brown bear tag fee exemption associated with the WABBMA registration permit.

Human-Induced Harvest. During the 2002–2003 regulatory year, the Unit 18 reported harvest was 16 bears (2 subsistence and 14 general season), and during 2003–2004 the reported harvest was 17 bears (2 subsistence and 15 general season). Nearly all of the total reported harvest occurs in the area south of the Kuskokwim River; only 3 of 76 bears harvested since 1994 were taken north of the Yukon River. Additional harvest statistics for the general hunt are shown in Table 1.

DLP losses are reported infrequently. By their nature, DLP instances are unplanned; people involved in DLP kills are unprepared for dealing with a dead bear; and they generally have poor knowledge of proper procedures. We made some progress with DLP reporting, but we probably don't hear about many of the bears killed under DLP circumstances. We processed 3 DLP bears during each regulatory year of this reporting period. Four of the reported DLP bears were taken along the Yukon River, while 2 of the bears killed during 2003–2004 were taken near Quinhagak.

Permit Hunts. The WABBMA registration permit is available to hunters who take bears primarily for the meat. This permit was designed to make bear hunting regulations more suitable for local residents who include bear meat as part of their subsistence fare. Under this permit, hunters must salvage the meat for human consumption, the bag limit is one bear per regulatory year, the season is generally longer, the hide and skull need not be salvaged, hunters must report their hunting activity after receiving a prompt by mail, and the sealing requirement is eliminated unless the hide is removed from the management area. If a hide is presented for sealing under this last provision, the trophy value is destroyed by removing the skin of the head and the front claws, and these parts are retained by the department. Harvest statistics for the subsistence hunt are shown in Table 2.

In some cases, hunters get the WABBMA registration permit so they can shoot a bear causing problems in camp during hunts for other big game. They often don't want to shoot a bear, but if they have to, they also don't care to relinquish it to the state as required by DLP regulations. Provided the meat is salvaged, the WABBMA registration permit offers them a way to do that without paying the \$25 tag fee required under the general hunt regulations. In portions of the WABBMA, this is an accepted practice.

Hunter Residency and Success. During the 2002–2003 regulatory year, 10 of 14 brown bears harvested under general hunting regulations were taken by nonresidents. During the general hunt in 2003–2004, 13 residents and 2 nonresidents harvested bears. Because nonresidents aren't eligible to hunt under the WABBMA permit, all of the bears taken under this permit were taken by residents (Table 2).

General hunt regulations require hunters to report by having their bear sealed. However, this reporting mechanism does not measure the number of unsuccessful hunters, so success rates are unavailable for this group of hunters.

Success rates are available for those hunters using the WABBMA permits (Table 2). In 2002–2003, 9% of hunters who reported were successful. In 2003–2004, 6% of them were successful.

Harvest Chronology. Prior to the arrival of caribou in Unit 18 in the mid 1990s, most of the bears taken in Unit 18 were killed in the spring. This pattern was variable and depended on snow conditions to allow travel by snowmachine, which provides greater access. More recently, the fall harvest has exceeded the spring harvest and is attributed to caribou hunters opportunistically taking bears. Additional harvest chronology data are found in Table 1.

Transport Methods. In 2002–2003, 11 successful hunters used airplanes to access their hunting areas, while 3 used boats. In 2003–2004, 14 successful hunters used airplanes, and 1 used a highway vehicle in the St. Marys area.

The hunters who use WABBMA permits typically use snowmachines. Since the subsistence season is open from 1 September through 31 May, and spring hunting is preferred by subsistence hunters, snowmachines are more practical.

Other Mortality

No other mortality was documented during this reporting period.

HABITAT

Assessment

Unit 18 contains approximately 14,000 km² of fair to excellent brown bear habitat in the Kilbuck and Andreafsky Mountains. Additional lowland riparian habitats surrounded by tundra support moderate densities of brown bears along the Yukon River and tributaries of the Kuskokwim. Most brown bear habitat in Unit 18 is protected by the YDNWR and the TNWR, and land status is not expected to change.

Enhancement

Bear habitat is largely intact in Unit 18 and protected by the YDNWR and the TNWR. No enhancement is necessary or anticipated.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

The WABBMA working group was a useful platform for public involvement in bear issues in Unit 18 but was disbanded due to budget considerations. Public input will still be necessary and will be accomplished through the ACs and the RAC.

CONCLUSIONS AND RECOMMENDATIONS

A density estimate in partnership with the TNWR will be useful for estimating brown bear populations in Unit 18, and the technique being used offers an alternative to the use of radio collars, which were opposed locally and led to the creation of the WABBMA working group. The radio collars that were part of the previous study have been removed, and the public input duties of the working group have been returned to the ACs and the RAC.

The WABBMA registration permit hunt remains a valuable tool to document subsistence use of brown bears, but administration of this permit hunt has been cumbersome as the WABBMA has grown to include 4 game management units with 4 area offices supervised from 3 different regional offices. In future years, administration of this hunt will take place on a game management unit basis, but hunting opportunity will remain the same.

As the Mulchatna caribou herd (MCH) continues to use Unit 18, we expect resident hunters to use the Kilbuck Mountains in greater numbers than a decade ago, and with that, we expect greater opportunistic bear harvest. However, access to the Kilbuck Mountains is generally by aircraft and is restricted to lakes and a few landing strips. Hunting pressure around these access points will be high, but there are large areas throughout Unit 18 that provide refuge for bears, and no ill effects of increased hunting pressure are anticipated.

Nonresident brown bear hunters are required to hire a guide or be accompanied by a resident who is within the second degree of kindred. The YDNWR has issued permits to 2 bear hunting guides to operate within the refuge and the TNWR has issued a permit to 1 guide to operate within the portion of the TNWR within Unit 18. Only 1 of these 3 guides is active in Unit 18, but each is permitted to take up to 5 bears per calendar year, and there are no plans by either refuge to change that number. Because of this cap on the number of guides, we expect nonresident brown bear harvest to remain low.

Progress was made toward improving DLP reporting, especially along the Yukon River, where we established an electric fence around a fish camp as a demonstration project, which not only provided evidence of the efficacy of this technique, but also offered a focus for education efforts regarding DLP issues. We should continue these efforts.

PREPARED BY:

Roger Seavoy
Wildlife Biologist III

SUBMITTED BY:

Peter J. Bente
Management Coordinator

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Table 1 Unit 18 general hunting season brown bear harvest

Regulatory year	Total harvest	<u>Southeast of the Kuskokwim</u>								<u>North of the Yukon</u>							
		Fall harvest				Spring harvest				Fall harvest				Spring harvest			
		Before 20-Sep		After 20-Sep		Before 15-May		After 15-May		Before 20-Sep		After 20-Sep		Before 15-May		After 15-May	
		♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀
1994–1995	3	0				1	1	1									
1995–1996	4			1	1			1	1								
1996–1997	5	1				2	1	1									
1997–1998	4			2	1			1									
1998–1999	13	2	2	1		5	1			1			1				
1999–2000	5	1			1	1		2									
2000–2001	5		1			3	1										
2001–2002	8	2	1		2			2	1								
2002–2003	14	1	2	4	3	1		3									
2003–2004	15	4	2	4	3		1			1							
Totals	76	11	8	12	11	13	6	11	1	2			1				

Table 2 Western Alaska Brown Bear Management Area (WABBMA) brown bear harvest, hunter effort and success, 1996–2004.

Regulatory year	Permits issued	Permits returned	Number hunting	Bears harvested in WABBMA	Bears harvested in Unit 18
1996–1997	57	28	12	0	0
1997–1998	54	16	6	0	0
1998–1999	95	42	21	4	1
1999–2000	85	63	27	8	2
2000–2001	26	20	9	1	1
2001–2002	69	56	19	3	1
2002–2003	63	58	22	5	2
2003–2004	63	52	17	3	2

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNITS: 19, 21A, and 21E (59,756 mi²)

GEOGRAPHIC DESCRIPTION: All drainages of the Kuskokwim River upstream from the village of Lower Kalskag; Yukon River drainage from Paimiut upstream to, but not including, the Blackburn Creek drainage; the entire Innoko River drainage; and the Nowitna River drainage upstream from the confluence of the Little Mud and Nowitna Rivers.

BACKGROUND

Although grizzly bears are distributed throughout Units 19, 21A, and 21E, bear densities and hunter interest varies among subunits. At higher elevations within the Alaska Range and associated foothills (Units 19B and 19C), there is moderate harvest pressure, mainly from nonresident, guided hunters. Harvest pressure is generally light in other portions of the area.

Estimated population densities were based on extrapolations from research in other areas. Harvests have generally fluctuated with season lengths and probably do not provide a good indication of population status or trend. During the 1960s when mandatory sealing requirements began, harvest was light, averaging about 15 bears annually. During the 1970s, harvest increased dramatically, but seasons were shortened severely, and as a result, harvest declined by the early 1980s. Throughout the 1980s, harvests remained relatively low, with a slowly increasing trend through the early 2000s.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

That portion of Units 19D and 19A and Units 21A and 21E

- Provide the greatest sustained opportunity to hunt grizzly bears.

Units 19C and 19B upstream from the Aniak River drainage

- Provide the opportunity to take large grizzly bears.
- Provide the opportunity to hunt grizzly bears under aesthetically pleasing conditions.

Western portion of Units 19, 21A within the Western Alaska Brown Bear Management Area, and 21E

- Provide for subsistence uses of grizzly bears.

MANAGEMENT OBJECTIVE

- Manage grizzly bear populations to sustain a mean annual harvest of no more than 70 bears with a minimum of 50% males in the harvest.

MANAGEMENT ACTIVITIES

- Allow an increased legal harvest of grizzly bears in and around villages, fish camps, and other human habitations during open seasons to reduce human–bear conflicts during closed seasons.
- Increase reporting of harvest.

METHODS

Data from sealing certificates provided hunter residency and hunting methods, bear demographics, sex ratio of the harvest, and timing and location of harvest. Similar harvest data were compiled from registration permits for bears taken under Western Alaska Brown Bear Management Area regulations. Harvest data were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY03 = 1 Jul 2003 through 30 Jun 2004).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size and Composition

Population surveys or density estimates have not been conducted in these units. However, I estimated the population based on known bear densities (Miller et al. 1997) in similar habitats in other game management units in Interior Alaska. The habitat in Unit 19A is of moderate quality, which should support a density of 20 bears/1000 mi², or 200 bears. Unit 19B contains about 7500 mi² of good quality bear habitat, with an estimated density of 75 bears/1000 mi² or 560 bears. Unit 19C has about 5200 mi² of good quality habitat (50 bears/1000 mi² = 260 bears) and about 1500 mi² of moderate-quality habitat (20 bears/1000 mi² = 30 bears). Unit 19D generally contains poor quality habitat (15 bears/1000 mi² = 190 bears). Using these figures, my estimate was 1000–1250 bears for Unit 19. Pegau (1987) estimated a total of 900 bears for the same area.

I used the same approach to estimate population size in Units 21A and 21E. The higher elevation areas are moderately good bear habitat, and low elevation areas contain poor habitat. I estimated density at 25 bears/1000 mi² in moderate quality bear habitat and 10 bears/1000 mi² in poor habitat. In Unit 21A there are about 4500 mi² of moderately good habitat (25 bears/1000 mi² = 113 bears) and about 11,500 mi² of poor habitat (15 bears/1000 mi² = 175 bears). The total population estimate for Unit 21A was therefore 285–

335 bears. Unit 21E consists of about 1000 mi² of moderately good habitat (25 bears/1000 mi² = 25 bears) and about 7000 mi² of poor habitat (15 bears/1000 mi² = 105 bears). The total population estimate for Unit 21E was 100–200 bears.

My estimate for the entire 60,352-mi² area was 1685–1960 bears, based on extrapolated densities of 15–75 bears/1000 mi². The population was probably stable or slowly increasing during the past 10 years, based on field observations, nuisance reports, hunter harvest, and sightings.

MORTALITY

Harvest

Season and Bag Limit

Units and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
<u><i>RY01–RY03</i></u>		
Units 19A and 19B within the Western Brown Bear Management Area.		
One bear every regulatory year by registration permit.	1 Sep–31 May (Subsistence hunt only)	No open season
One bear every 4 regulatory years.	1 Sep–31 May	1 Sep–31 May
Unit 19A outside the Western Brown Bear Management Area.		
One bear every 4 regulatory years.	1 Sep–31 May	1 Sep–31 May
Unit 19B outside the Western Brown Bear Management Area.		
One bear every 4 regulatory years.	1 Sep–25 May	1 Sep–25 May
Units 19C and 19D.		
One bear every 4 regulatory years.	1 Sep–31 May	1 Sep–31 May
Units 21A and 21E.		
One bear every 4 regulatory years.	1 Sep–31 May	1 Sep–31 May

RY04

Units 19A and 19B within the Western Brown Bear Management Area.		
One bear every regulatory year by registration permit.	10 Aug–30 Jun (Subsistence hunt only)	No open season
One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun

Units and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 19A outside the Western Brown Bear Management Area. One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun
Unit 19B outside the Western Brown Bear Management Area. One bear every regulatory year.	1 Sep–31 May	1 Sep–31 May
Units 19C and 19D. One bear every regulatory year.	1 Sep–31 May	1 Sep–31 May
Unit 19D. One bear every regulatory year.	10 Aug–30 Jun Tag fee exemption	10 Aug–30 Jun
Units 21A and 21E. One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun

Alaska Board of Game Actions and Emergency Orders. The Alaska Board of Game passed a proposal at its March 2004 meeting to lengthen the hunting seasons in Units 19A, 19D, 21A, and 21E by 21 days in the fall and 30 days in the spring. This resulted in the season beginning on 10 August instead of 1 September and ending on 30 June instead of 31 May. The board reauthorized the resident tag fee exemption for Unit 19D at its spring 2003 and 2004 meetings. Resident tag fee exemptions must be reauthorized each year by the board. The seasons in Units 19B and 19C were not changed due to concerns that substantial grizzly bear harvest already occurred in those units.

Hunter Harvest. Grizzly bear harvest was highly variable among units (Table 1). During RY93–RY98, harvest trend for most of the area was stable. The Unit 19A average harvest during RY93–RY98 was 7.3 bears/year. During RY99–RY03 the harvest remained stable at 9.0 bears/year, slightly higher than during RY93–RY98. Unit 19B harvest remained stable during RY93–RY98 at 26.1 bears/year and increased during RY99–RY03 to an average of 51 bears/year. In Unit 19C during RY93–RY98, the average harvest was 19.3 bears/year and decreased during RY99–RY03 to 11.6 bears/year. Unit 19D annual harvest was low but increased slightly; during RY93–RY98 harvest averaged 2.0 bears/year compared to the RY99–RY03 mean harvest of 4.0 bears/year. Unit 21A and 21E harvests have remained low since RY93, with Unit 21A averaging 1.4 bears/year. Unit 21E annual harvest increased from 4.3 bears/year in RY93–RY98 to 6.4 bears/year during RY99–RY03. The unreported harvest of bears taken at fish camps was probably ≤ 10 bears/year throughout the area.

The 5-year mean annual harvest (RY98–RY03) in the entire area was 88.4 grizzly bears, an increase of more than 27 bears/year compared to RY93–RY98. The conservative estimate of sustainable harvest was 83–99 bears (6% of 1375–1650 bears; Reynolds 1997). The 5-year average annual harvests during RY98–RY03 were slightly more than the lower limit of this estimated conservative sustainable level (83 bears) based on the current population estimates.

The proportion of males in the reported harvest ranged between 56–69% during RY99–RY03 (Table 2). The mean percentage of males in the harvest during RY99–RY03 was 63%. During RY03 the percent males in the harvest was 56%, the lowest percentage of males measured since RY96.

Generally, the preponderance of males in the harvest reflects a healthy population, given low-to-moderate hunting pressures. However, many Unit 19, 21A, and 21E grizzly bears are harvested on multispecies hunts, and hunters are not necessarily attempting to take a record-class animal. Therefore, hunters may not avoid taking females (except those with cubs or yearlings). Unless grizzly bear hunting effort becomes more intensive, our management objective to harvest >50% males should afford the protection needed to sustain the population, even if harvest levels exceed the guideline of 6% annual harvest of the estimated population.

Hunter Residency and Success. During the past 5 years, nonresidents harvested 370 of the 442 bears harvested in this area (84%; Table 3). This indicates a relatively high use of the area by grizzly bear guides and their nonresident clients. No information is available on success rates (i.e., number of successful versus unsuccessful hunters) for grizzly bear hunters in the unit. However, between RY99 and RY03, the mean number of days hunted annually by successful hunters fluctuated between 4.0 and 5.2 days. This range is slightly lower than RY93–RY01 average days hunted of 4.4–6.0 days.

Harvest Chronology. Most harvest occurred during the fall hunting season (Table 4). The fall harvest was greater primarily due to guided hunts for multiple species. Guided hunters opportunistically killed bears while hunting ungulates. Spring grizzly bear hunting increased in this area from an average of 13.5 bears during April and May RY93–RY98 to 16.8 bears during April and May RY99–RY03.

Transport Methods. During the past 5 years, 83–91% of successful hunters used airplanes as their primary access method (Table 5). The proportion of successful hunters who used aircraft has not changed substantially since sealing began.

CONCLUSIONS AND RECOMMENDATIONS

Grizzly bear harvests during RY02–RY03 were stable in Units 19A, 19C, 19D, 21A, and 21E. Harvest increased in Unit 19B from an average of 26.1 bears/year during RY93–RY98 to 51 bears/years during RY99–RY03. During RY03 the reported harvest in Unit 19B was 64 bears, the highest ever recorded. This substantial increase was during the fall season only, and may have been influenced by 1) increased interest in harvesting more grizzly bears by guides to alleviate recent declines in the moose populations, 2) local area guides may have booked more fall bear hunters in order to continue to make a living despite declining moose numbers,

and 3) bear populations have likely increased over the last 10 years, and a larger percentage of guided hunters harvested bears. The percent males harvested in Unit 19B decreased from an average of 56–64% during RY98–RY02 to 51% in RY03. This may have been due to increased harvest combined with decreased discrimination by guides and their hunters in harvesting male versus female bears. Decreased percentage of male bears in the harvest in Unit 19B, combined with increased take, indicates the need for close monitoring of the harvest.

Sex ratios of harvested bears continue to favor males in all subunits, including Unit 19B. Harvest reporting by locals still appears to be low in remote areas. Additional increases in season length in areas where most local hunters travel might help improve harvest reporting. However, anecdotal information indicates that the recent tag fee exemption in Unit 19D had little effect on improving the reporting rate in that unit.

We did not meet our management objective to sustain a mean annual harvest of no more than 70 bears but met our objective of a minimum of 50% males. Taking into account the revised extrapolated population estimates for grizzly bears in this report, objectives will be changed for the next reporting period to manage grizzly bear populations to 1) sustain a mean annual harvest of no more than 100 bears and 2) maintain a minimum of 50% males in the harvest. If the harvest in Unit 19B continues to increase, the goal of providing opportunity to harvest large bears may need to be reconsidered based on a thorough analysis of skull size trends. No changes in seasons and bag limits are recommended at this time. However, changes may be necessary in the future if we are to continue to meet this management goal in Unit 19B.

During RY03, changes in regulations allowed more opportunity to legally harvest grizzly bears in and around villages, fish camps, and other human habitations during hunting seasons and reduce human–bear conflicts during closed seasons. The hunting season was lengthened to include the month of June and 21 days in August and will likely increase legal take. However, the requirement to purchase a grizzly bear tag and hunting license so early in the year remained a barrier to legal harvest.

Increased reporting of grizzly bear harvest did not occur during RY02–RY03. It is unlikely harvest reporting will increase unless the department initiates an education program in local schools.

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PREPARED BY:

Toby A. Boudreau
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

Please cite any information taken from this section, and reference as:

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Table 1 Units 19, 21A, and 21E grizzly bear harvest by season, regulatory years 1990–1991 through 2003–2004

Regulatory year/ Season	Unit 19 subunits					Unit 21 subunits		
	A	B	C	D	Unk	A	E	Total
1990–1991								
Fall 1990	2	7	10	6	0	1	1	27
Spring 1991	0	8	4	1	0	1	2	16
Total	2	15	14	7	0	2	3	43
1991–1992								
Fall 1991	2	14	8	1	0	0	0	25
Spring 1992	2	4	1	1	0	0	5	13
Total	4	18	9	2	0	0	5	38
1992–1993								
Fall 1992	10	22	14	3	0	2	1	52
Spring 1993	1	6	1	1	0	0	4	13
Total	11	28	15	4	0	2	5	65
1993–1994								
Fall 1993	3	21	13	1	0	0	0	38
Spring 1994	1	4	1	0	0	0	4	10
Total	4	25	14	1	0	0	4	48
1994–1995								
Fall 1994	6	22	14	1	0	1	0	44
Spring 1995	2	4	2	1	0	2	4	15
Total	8	26	16	2	0	3	4	59
1995–1996								
Fall 1995	7	27	14	1	0	0	0	49
Spring 1996	0	3	4	1	0	0	2	10
Total	7	30	18	2	0	0	2	59
1996–1997								
Fall 1996	8	6	13	2	0	2	1	32
Spring 1997	1	7	6	0	0	0	2	16
Total	9	13	19	2	0	2	3	48
1997–1998								
Fall 1997	9	23	22	0	0	2	2	58
Spring 1998	1	4	3	0	0	0	8	16
Total	10	27	25	0	0	2	10	74
1998–1999								
Fall 1998	6	27	21	5	1	1	0	61
Spring 1999	0	9	3	0	0	0	3	15
Total	6	36	24	5	1	1	3	76

Table 1 continued

Regulatory year/ Season	Unit 19 subunits					Unit 21 subunits		
	A	B	C	D	Unk	A	E	Total
<i>1999–2000</i>								
Fall 1999	11	33	21	5	0	0	2	72
Spring 2000	2	6	2	0	0	0	10	20
Total	13	39	23	5	0	0	12	92
<i>2000–2001</i>								
Fall 2000	13	33	14	6	1	2	0	69
Spring 2001	0	10	6	1	0	1	8	26
Total	13	43	20	7	1	3	8	95
<i>2001–2002</i>								
Fall 2001	5	48	12	4	0	4	1	74
Spring 2002	3	10	1	1	0	0	5	20
Total	8	58	13	5	0	4	6	94
<i>2002–2003</i>								
Fall 2002	6	49	12	1	0	0	1	69
Spring 2003	2	3	4	0	0	0	3	12
Total	8	52	16	1	0	0	4	81
<i>2003–2004</i>								
Fall 2003	2	57	6	2	0	0	2	69
Spring 2004	1	7	3	0	0	0	0	11
Total	3	64	9	2	0	0	2	80
Fall totals	90	389	194	38	2	15	11	739
Fall % of harvest	85%	82%	83%	84%	100%	79%	15%	78%
Fall average	6.4	27.8	13.9	2.7	0.2	1.1	0.7	52.8
Spring totals	16	85	41	7	0	4	60	213
Spring % of harvest	15%	18%	17%	16%	0%	21%	85%	22%
Spring average	1.1	6.1	2.9	0.5	0.0	0.3	4.3	15.2
Grand total	106	474	235	45	2	19	71	952
Annual average	7.6	33.9	16.8	3.2	0.2	1.4	5	68

Table 2 Units 19, 21A, and 21E grizzly bear harvest by type of kill, regulatory years 1993–1994 through 2003–2004

Regulatory year	Hunter kill				Nonhunting kill				Total reported kill				
	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	(%)	Total
<i>1993–1994</i>													
Fall 1993	20	18	0	38	0	0	0	0	20	(53)	18	(47)	38
Spring 1994	9	1	0	10	0	0	0	0	9	(90)	1	(10)	10
Total	29	19	0	48	0	0	0	0	29	(60)	19	(40)	48
<i>1994–1995</i>													
Fall 1994	24	19	1	44	0	0	0	0	24	(56)	19	(44)	44
Spring 1995	12	3	0	15	0	0	0	0	12	(80)	3	(20)	15
Total	36	22	1	59	0	0	0	0	36	(62)	22	(38)	59
<i>1995–1996</i>													
Fall 1995	29	18	1	48	0	0	1	1	29	(62)	18	(38)	49
Spring 1996	6	4	0	10	0	0	0	0	6	(60)	4	(40)	10
Total	35	22	1	58	0	0	1	1	35	(61)	22	(39)	59
<i>1996–1997</i>													
Fall 1996	18	14	0	32	0	0	0	0	18	(56)	14	(44)	32
Spring 1997	7	9	0	16	0	0	0	0	7	(44)	9	(56)	16
Total	25	23	0	48	0	0	0	0	25	(52)	23	(48)	48
<i>1997–1998</i>													
Fall 1997	36	22	0	58	0	0	0	0	36	(62)	22	(38)	58
Spring 1998	14	2	0	16	0	0	0	0	14	(88)	2	(12)	16
Total	50	24	0	74	0	0	0	0	50	(68)	24	(32)	74
<i>1998–1999</i>													
Fall 1998	39	22	0	61	0	0	0	0	39	(64)	22	(36)	61
Spring 1999	12	3	0	15	0	0	0	0	12	(80)	3	(20)	15
Total	51	25	0	76	0	0	0	0	51	(67)	25	(33)	76
<i>1999–2000</i>													
Fall 1999	38	31	0	69	2	1	0	3	40	(56)	32	(44)	72
Spring 2000	16	4	0	20	0	0	0	0	16	(80)	4	(20)	20
Total	54	35	0	89	2	1	0	3	56	(61)	36	(39)	92

Table 2 continued

Regulatory year	Hunter kill				Nonhunting kill				Total reported kill				
	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	(%)	Total
<i>2000–2001</i>													
Fall 2000	44	25	0	69	0	0	0	0	44	(64)	25	(36)	69
Spring 2001	22	4	0	26	0	0	0	0	22	(85)	4	(15)	26
Total	66	29	0	95	0	0	0	0	66	(69)	29	(31)	95
<i>2001–2002</i>													
Fall 2001	41	29	1	71	2	1	0	3	43	(59)	30	(41)	74
Spring 2002	18	2	0	20	0	0	0	0	18	(90)	2	(10)	20
Total	59	31	1	91	2	1	0	3	61	(66)	32	(34)	94
<i>2002–2003</i>													
Fall 2002	41	27	0	68	1	0	0	1	42	(61)	27	(39)	69
Spring 2003	9	2	0	11	0	1	0	1	9	(75)	3	(25)	12
Total	50	29	0	79	1	1	0	2	51	(63)	30	(37)	81
<i>2003–2004</i>													
Fall 2003	35	33	0	68	0	1	0	1	35	(51)	34	(49)	69
Spring 2004	9	1	0	10	0	0	0	0	9	(90)	1	(10)	10
Total	44	34	0	78	0	1	0	1	44	(56)	35	(44)	79
<i>1993–1994 through 2003–2004 Totals:</i>													
Fall total	365	258	3	626	5	3	1	9	370	(58)	261	(41)	635
Spring total	134	35	0	169	0	1	0	1	134	(79)	36	(21)	170
Grand total	499	293	3	795	5	4	1	10	504	(63)	297	(39)	805

Table 3 Units 19, 21A, and 21E grizzly bear successful hunter residency and effort, regulatory years 1993–1994 through 2003–2004

Regulatory year	Resident (%)	Nonresident (%)	Unk	Mean effort for successful hunters (days)	Total successful hunters
1993–1994	8 (17)	40 (83)	0	4.5	48
1994–1995	17 (29)	41 (71)	1	5.4	59
1995–1996	9 (16)	48 (84)	2	6.0	59
1996–1997	5 (10)	43 (90)	0	6.0	48
1997–1998	10 (14)	64 (86)	0	4.4	74
1998–1999	15 (20)	61 (80)	0	5.0	76
1999–2000	20 (22)	71 (78)	1	4.9	92
2000–2001	13 (14)	82 (86)	0	4.9	95
2001–2002	18 (19)	76 (81)	0	5.2	94
2002–2003	7 (9)	72 (89)	2	4.0	81
2003–2004	10 (13)	69 (86)	1	5.2	80
Totals	132	667	7		806
Averages	12.0	60.6	0.6	5.0	73.2

Table 4 Units 19, 21A, and 21E grizzly bear harvest chronology by month, regulatory years 1993–1994 through 2003–2004

Regulatory year	Month of harvest (%)					n
	Sep	Oct	Apr	May	Other ^a	
1993–1994	35 (73)	3 (6)	6 (13)	4 (8)	0 (0)	48
1994–1995	40 (68)	4 (7)	7 (12)	7 (12)	1 (1)	59
1995–1996	48 (82)	0 (0)	6 (10)	4 (7)	1 (1)	59
1996–1997	30 (63)	2 (4)	3 (6)	13 (27)	0 (0)	48
1997–1998	56 (75)	2 (3)	11 (15)	5 (7)	0 (0)	74
1998–1999	51 (67)	10 (13)	7 (9)	8 (11)	0 (0)	76
1999–2000	67 (73)	4 (4)	15 (16)	5 (6)	1 (1)	92
2000–2001	60 (63)	7 (7)	16 (17)	10 (10)	2 (2)	95
2001–2002	66 (70)	5 (5)	13 (14)	6 (6)	4 (4)	94
2002–2003	66 (81)	4 (5)	4 (5)	5 (6)	2 (3)	81
2003–2004	68 (86)	1 (1)	6 (8)	5 (5)	0 (0)	80
Totals	587	42	94	72	11	806
Averages	53.4	3.8	8.5	6.5	1.0	73.2

^a Other = Jan, Mar, Jul, Aug, Nov, and Dec. Table includes defense of life or property kills.

Table 5 Units 19, 21A, and 21E grizzly bear harvest by transport method, regulatory years 1993–1994 through 2003–2004

Regulatory year	Harvest by transport method (%)									<i>n</i>
	Airplane	Dog Team /Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk	
1993–1994	39 (82)	2 (4)	1 (2)	0 (0)	3 (6)	1 (2)	0 (0)	2 (4)	0 (0)	48
1994–1995	52 (88)	2 (3)	0 (0)	0 (0)	3 (5)	0 (0)	1 (2)	1 (2)	0 (0)	59
1995–1996	57 (96)	0 (0)	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (2)	59
1996–1997	45 (94)	0 (0)	2 (4)	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	48
1997–1998	54 (73)	0 (0)	4 (6)	6 (8)	8 (11)	0 (0)	0 (0)	1 (1)	1 (1)	74
1998–1999	66 (88)	1 (1)	3 (4)	2 (3)	1 (1)	1 (1)	0 (0)	1 (1)	1 (1)	76
1999–2000	76 (83)	0 (0)	2 (2)	2 (2)	10 (11)	0 (0)	0 (0)	1 (1)	1 (1)	92
2000–2001	84 (88)	0 (0)	3 (3)	3 (3)	2 (2)	1 (1)	2 (2)	0 (0)	0 (0)	95
2001–2002	78 (83)	1 (1)	5 (5)	3 (3)	2 (2)	0 (0)	0 (0)	3 (3)	2 (2)	94
2002–2003	74 (91)	0 (0)	2 (2)	3 (4)	0 (0)	0 (0)	0 (0)	2 (2)	0 (0)	81
2003–2004	68 (85)	0 (0)	2 (2)	4 (5)	3 (4)	0 (0)	0 (0)	1 (1)	2 (3)	80
Totals	693	6	25	24	32	3	3	12	8	806
Averages	63	0.5	2.3	2.2	2.9	0.3	0.3	1.1	0.7	73.2

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNITS: 20A, 20B, 20C, 20F, and 25C (39,228 mi²)

GEOGRAPHIC DESCRIPTION: Central and Lower Tanana Valley, and Middle Yukon River drainages

BACKGROUND

Grizzly bears are found throughout this area, with higher densities in the mountainous portions of Units 20A and 20C. We initiated a long-term grizzly bear research project in Unit 20A in 1981 to 1) gather baseline data on population status and reproductive biology (1981–1985; Reynolds and Hechtel 1986); 2) study the effects of high exploitation rates on grizzly bear population dynamics (1986–1991; Reynolds and Boudreau 1992, Reynolds 1993); and 3) measure recovery (Reynolds 1999). During the second phase of the project, the grizzly bear population was deliberately subjected to high harvest levels ($\geq 11\%$ of the population versus $\leq 6\%$ before 1981). As a result, Reynolds (1993) documented a 20% decline in the bears (≥ 2 -years old) in this area since 1981. The final phase of the study examined population recovery (Reynolds 1999). Accordingly, the Alaska Board of Game reduced season length to increase recruitment and survival of female bears.

State regulations prevent grizzly bear harvest within the Denali National Park portions of Unit 20C, resulting in low harvests in that unit. The eastern half of Unit 20B supports a moderate density of grizzly bears, and harvests are higher than in western Unit 20B. Grizzly bears inhabit the remainder of the area at lower densities, resulting in low harvests.

Ballard et al. (1981) and Gasaway et al. (1992) identified grizzly bears as significant predators of moose in Units 13 and 20E, respectively. However, Gasaway et al. (1983) determined that grizzly bears played little role in the dynamics of moose within the Tanana Flats portion of Unit 20A, and Miller and Ballard (1992) did not detect changes in moose calf survival during periods when bear numbers were reduced in Unit 13. In Unit 20A, Valkenburg (1997) identified grizzly bears as important predators of Delta caribou herd neonates. Although grizzly bears may influence moose population dynamics in parts of this management area at different times, Keech (1999) found low mortality rates of moose calves as a result of grizzly bear predation.

During the 1980s, McNay (1990) noted increasing numbers of hunters and increased interest in hunting grizzly bears. He analyzed harvest and population data from this management area to develop specific management and harvest objectives, which he based on a sustainable harvest rate of 8% of the population ≥ 2 years of age (Miller 1990).

In the early 1990s, Eagan (1995) estimated grizzly bear numbers in the management area at unit, subunit, and subarea (e.g., Unit 20A mountains, Unit 20A Tanana Flats) scales using a stratified approach based on topography, habitat, and accessibility to humans. These estimates provided more precise measures of harvest rates across the management area, and subsequently, improved evaluation of harvest-based management objectives.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Units 20A, 20B, 20C, 20F, and 25C

- Maintain healthy grizzly populations and the ecosystems upon which they depend.
- Provide people with an opportunity to hunt, view, and photograph grizzly bears.
- Avoid human–grizzly bear interactions that threaten human life and property.

Additionally in Unit 20A

- Provide for scientific and educational use of grizzly bears.

Additionally in Unit 20C

- Maintain a grizzly bear population within Denali National Park that is largely unaffected by human activity and is not subjected to hunting within the park.

MANAGEMENT OBJECTIVES

Unit 20A Mountains

- Manage human-caused grizzly bear mortality to provide a stable population with a 3-year mean annual human-caused mortality $\leq 8\%$ of the bears ≥ 2 years old.

Eastern half of Unit 20B

- Manage human-caused grizzly bear mortality to provide a stable population with a 3-year mean annual human-caused mortality of up to 6 bears ≥ 2 years old.

Unit 20C within the original boundaries of Denali National Park

- Maintain a closed season on grizzly bear hunting.

Unit 20A Tanana Flats, western half of Unit 20B, Unit 20C outside Denali National Park, and all of Units 20F and 25C

- Manage human-caused mortality in the combined area to provide stable grizzly bear populations with a 3-year mean annual human-caused mortality of no more than 26 grizzly bears ≥ 2 years old.
- Manage the 3-year mean annual human-caused grizzly bear (≥ 2 years of age) mortality from individual areas with the following harvest objectives: no more than 3 bears from Unit 20A Tanana Flats, 3 from the western half of Unit 20B, 7 from Unit 20C, 7 from Unit 20F, and 6 from Unit 25C.

Units 20A, 20B, 20C, 20F, and 25C

- Manage for a 3-year mean annual human-caused mortality of at least 55% males.

METHODS

HARVEST

We used data from grizzly bear sealing certificates to obtain date and location of kill, sex, skull size, hunter residency, transportation method, commercial services used and kill type—hunter harvest, illegal kill, research mortality, defense of life or property (DLP), etc. We coded location of kill according to Uniform Coding Units (UCU). During sealing we collected premolars to determine age. ADF&G/Wildlife Conservation staff in Fairbanks sealed most of the grizzly bears harvested in this area.

We analyzed grizzly bear harvest data by both regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY03 = 1 Jul 2003 through 30 Jun 2004), and calendar year. Many of our harvest objectives are age-specific. Analysis by regulatory year creates difficulties because a cohort passes through 2 age classes within a single regulatory year. Therefore, we analyzed data relevant to age-specific objectives by calendar year to avoid confusion regarding age class. We based all other analyses on regulatory years.

POPULATION SIZE AND DENSITY

In June 1993, Reynolds and Egan (Egan 1995) categorized UCUs in Units 20A, 20B, 20C, 20F, and 25C into 4 grizzly bear density strata: low, medium, high, and super. The low-density stratum consisted of areas with significant human development, poorly drained soils (or permafrost) and black spruce. The medium-density stratum included upland forest and tundra habitats at elevations generally between 500 and 1500 ft. The high-density stratum consisted of upland foothills and mountainous areas similar to areas of known density in Units 20A, 20E, and 13E. The super-density stratum included habitat similar to the high-density areas, but where no harvest was permitted.

The total area within each stratum excluded glaciers and land above 6000 ft. Approximately 500 mi² (1300 km²) were excluded from the high-density stratum, and 386 mi² (1000 km²) were excluded from the super-density stratum. Population size was estimated using extrapolations from strata densities of low, 3–8 bears/1000 mi² (1–3 bears/1000 km²); medium, 13–26 bears/1000 mi² (5–10 bears/1000 km²); high, 36–44 bears/1000 mi² (14–17 bears/1000 km²); and super, 52–78 bears/1000 mi² (20–30 bears/1000 km²).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Unit 20A. Egan (1995) classified the mountainous portion of Unit 20A as high density based on results from research in the central foothills (Reynolds 1993). High harvest rates intentionally resulted in reduced bear numbers in this portion of Unit 20A during phase 2 of the research. Phase 3 monitored recovery of the population. We expected the number of

female adult bears to meet prereDUCTION levels by 1998. However, numbers were still estimated to be slightly low by spring 2000. Based on predicted trends and anecdotal information, we suspect the grizzly bear population recovered to prereDUCTION levels by 2002.

The Tanana Flats in Unit 20A provide relatively poor grizzly bear habitat, resulting in low densities. Some grizzly bears on the Tanana Flats probably disperse from higher density areas or make temporary forays onto the flats. Eagan (1995) estimated that the flats provide habitat for 20 grizzly bears, or 6.5 bears/1000 mi² (2.5 bears/1000 km²).

Unit 20B. Eagan (1995) classified most of Unit 20B as low density because of the moderate habitat, high density of people, and good human access. Better habitat in the Sawtooth Mountains in the western portion was classified as low-density stratum because of good access and human activity. The upper Chena and Salcha Rivers rated medium density because the area was better habitat and relatively inaccessible.

Unit 20C. Eagan (1995) classified the mountainous portion of Unit 20C into the super-density stratum (52–78 bears/1000 mi² [20–30 grizzly bears/1000 km²]). Although Dean (1987) estimated 88 bears/1000 mi² (34 bears/1000 km²) for a portion of this area in 1983, he surveyed the area along the Denali Park Road that includes the best habitat. Eagan (1995) assumed lower densities for the remainder of the mountainous portions of Unit 20C, based on densities Reynolds (1993) documented in Unit 20A in 1981.

Eagan (1995) classified a small portion of northwestern Unit 20C as medium-density because of higher habitat quality than in the Unit 20C Tanana Flats, and the area also abuts some higher quality grizzly bear habitat in the upper Kuskokwim drainage. Eagan (1995) felt the remainder of Unit 20C was low-density but indicated potential for slightly higher densities than other low-density areas because the Unit 20C Tanana Flats have streams where salmon are available and hunting pressure is relatively low.

Unit 20F. Although very little information exists, the Tozitna River drainage/Ray Mountains portion of Unit 20F probably contains relatively good grizzly bear habitat and warranted medium-density classification. Eagan (1995) classified the remainder of Unit 20F as low density due to relatively poor grizzly bear habitat.

Unit 25C. Eagan (1995) classified the mountainous portion of Unit 25C as medium density. This is an extension of the medium density area of eastern Unit 20B and also includes the White Mountains. Although good habitat abounds, Eagan (1995) noted that roads and trails through the area provide good human access. Hunters take grizzly bears incidental to their pursuit of caribou and moose.

All Subunits. Extrapolating from the stratification above, Eagan (1995) estimated that 446–782 grizzly bears (all ages) inhabit the area. Using the midpoint of the population estimate (614 bears), the combined density for the area is about 16.1 bears/1000 mi² (6.2 grizzly bears/1000 km²).

Population Composition

Reynolds (1993) summarized composition data for his study area in Unit 20A. In 1992, there were more females than males present in adult age classes and approximately equal numbers of males and females in the subadult age classes. Because the sex ratio of grizzly bears at birth typically approximates 50:50; because hunters generally prefer to shoot the larger, adult males; and because females with cubs <2 years of age are legally protected, we suspect the 1992 composition data is currently applicable.

Distribution and Movements

Reynolds (1997) described movement and dispersal trends for the Unit 20A study area. Females exhibited high fidelity to home ranges and little emigration or immigration (Reynolds 1993).

MORTALITY

Harvest

Season and Bag Limit. From RY90 through RY93, the season for grizzly bears was 1 September–31 May with a bag limit of 1 bear every 4 regulatory years (1 bear/4 years). Cubs (<2 years of age) and females accompanied by cubs were illegal to harvest. Commensurate with research objectives, the board shortened the Unit 20A season by 9 days in RY94 to 10 September–31 May. In RY02 the board liberalized the season by 5 days (5 Sep–31 May) based on evidence that the population had recovered to prereduction levels. All other areas covered in this report retained the 1 September opening. Beginning RY04 the board liberalized the bag limit from 1 bear/4 years to 1 bear/year in all subunits. These seasons and bag limits applied to both resident and nonresident hunters.

Harvest by Hunters. Harvests in Units 20A, 20B, 20C, 20F, and 25C combined were similar to the 5-year mean of 29 bears in RY02 ($n = 30$), but were noticeably lower in RY03 ($n = 20$; Tables 1a–e). Other human-caused mortality (DLP kills, illegal kills, etc.) resulted in 3 bear deaths in RY02–RY03, lower than the 8 nonhunting-related bear deaths during the previous reporting period.

Harvest Zones

Unit 20A Mountains — We estimate the 3-year (2001–2003) mean annual human-caused mortality (9.3 bears) was approximately 7–8% of bears ≥ 2 years old, assuming Eagan's (1995) population estimates and Reynolds' (1993) population structure (Table 2). This met our objective to provide a stable population with a 3-year mean annual human-caused mortality $\leq 8\%$ of the bears ≥ 2 years old.

Eastern half of Unit 20B — The 3-year (2001–2003) mean annual human-caused mortality of 4.7 bears ≥ 2 years of age met our objective of a mean of not more than 6 bears ≥ 2 years of age (Table 2).

Unit 20A Tanana Flats, western half of Unit 20B, Unit 20C outside Denali National Park, and all of Units 20F and 25C — The 3-year (2001–2003) mean annual human-caused

mortality of 13.7 bears ≥ 2 years of age was well below our objective of 26 bears ≥ 2 years of age (Table 2).

We also met our objectives of a 3-year (2001–2003) mean annual human–caused mortality of bears ≥ 2 years of age for the Unit 20A Tanana Flats with a harvest of 1.3 bears, western Unit 20B with 2.7 bears, Unit 20C with 5 bears, Unit 20F with 1.7 bears, and Unit 25C with 2.3 bears.

Percent Males in Harvest by Unit. The objective to have a 3-year (RY01–RY03) mean proportion of $\geq 55\%$ males in the harvest was met in Unit 20B (59%); in all other units (20A = 46%, 20C = 40%, 20F = 50% and 25C = 33%) that objective was not met (Tables 1a-e).

Hunter Residency and Success. As in previous years, Alaska residents harvested the majority (71%) of the grizzly bears during the last 3 regulatory years (Table 3).

Harvest Chronology. Hunters harvested bears primarily during the month of September (Table 4), most likely because moose and caribou hunters take many bears incidentally during that period.

Transport Methods. The methods of transportation used by successful grizzly bear hunters have not changed substantially in recent years. On average, successful hunters used airplanes most often to access hunt areas, followed closely by ATVs (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

We met our objective to provide a stable population with a 3-year mean, annual, human-caused mortality $\leq 8\%$ of the bears ≥ 2 years old in all subareas. However, with liberalized seasons, areas with high harvest density, such as those areas surrounding Fairbanks, may be subject to localized overharvest. We met our objective to manage for a 3-year mean, annual, human-caused mortality of at least 55% males only in Unit 20B; in all other units the proportion of males in the harvest was below the objective. If this trend persists, we recommend stepping up the “Take a closer look” program to educate hunters about how harvest of females may affect the population.

We must continue to closely monitor harvests, particularly in harvest zones with small harvest quotas, and to encourage the harvest of males and discourage the take of females. We will continue to address this issue through education (e.g., Public Information Service and bear hunting seminars).

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PREPARED BY:

Donald D. Young, Jr
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

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Table 1a Unit 20A grizzly bear harvest, regulatory years 1999–2000 through 2003–2004

Regulatory year	Reported											
	Hunter kill ^a				Nonhunting kill ^b			Total estimated kill ^c				
	M	F	Unk	Total	M	F	Unk	M	F	Unk	Total	% Males
1999–2000												
Fall 1999	10	4	0	14	0	1	0	10	5	0	15	
Spring 2000	1	0	0	1	2	0	0	3	0	0	3	
Total	11	4	0	15	2	1	0	13	5	0	18	72
2000–2001												
Fall 2000	7	4	0	11	0	0	0	7	4	0	11	
Spring 2001	0	0	0	0	0	0	0	0	0	0	0	
Total	7	4	0	11	0	0	0	7	4	0	11	64
2001–2002												
Fall 2001	5	6	1	12	1	1	0	6	7	1	14	
Spring 2002	0	0	0	0	0	0	0	0	0	0	0	
Total	5	6	1	12	1	1	0	6	7	1	14	46
2002–2003												
Fall 2002	5	5	0	10	0	0	0	5	5	0	10	
Spring 2003	0	0	0	0	0	0	0	0	0	0	0	
Total	5	5	0	10	0	0	0	5	5	0	10	50
2003–2004												
Fall 2003	6	5	0	11	0	0	0	6	5	0	11	
Spring 2004	0	2	0	2	0	0	0	0	2	0	2	
Total	6	7	0	13	0	0	0	6	7	0	13	46

^a Includes illegal kills.^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality. These data not included in tables of chronology, transport, etc.^c Percentage includes only bears of known sex.

Table 1b Unit 20B grizzly bear harvest, regulatory years 1999–2000 through 2003–2004

Regulatory year	Reported											
	Hunter kill ^a				Nonhunting kill ^b			Total estimated kill ^c				
	M	F	Unk	Total	M	F	Unk	M	F	Unk	Total	% Males
<i>1999–2000</i>												
Fall 1999	2	3	0	5	0	0	0	2	3	0	5	
Spring 2000	1	1	0	2	0	0	0	1	1	0	2	
Total	3	4	0	7	0	0	0	3	4	0	7	43
<i>2000–2001</i>												
Fall 2000	11	3	0	14	0	0	0	11	3	0	14	
Spring 2001	0	0	0	0	1	1	0	1	1	0	2	
Total	11	3	0	14	1	1	0	12	4	0	16	75
<i>2001–2002</i>												
Fall 2001	1	2	0	3	0	0	0	1	2	0	3	
Spring 2002	3	0	0	3	2	0	0	5	0	0	5	
Total	4	2	0	6	2	0	0	6	2	0	8	75
<i>2002–2003</i>												
Fall 2002	5	3	0	8	1	0	0	6	3	0	9	
Spring 2003	0	1	0	1	0	0	0	0	1	0	1	
Total	5	4	0	9	1	0	0	6	4	0	10	60
<i>2003–2004</i>												
Fall 2003	1	0	0	1	0	1	0	1	1	0	2	
Spring 2004	0	1	0	1	0	1	0	0	2	0	2	
Total	1	1	0	2	0	2	0	1	3	0	4	25

^a Includes illegal kills.^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality. These data not included in tables of chronology, transport, etc.^c Percentage includes only bears of known sex.

Table 1c Unit 20C grizzly bear harvest, regulatory years 1999–2000 through 2003–2004

Regulatory year	Reported												% Males
	Hunter kill ^a				Nonhunting kill ^b			Total estimated kill ^c					
	M	F	Unk	Total	M	F	Unk	M	F	Unk	Total		
<i>1999–2000</i>													
Fall 1999	2	4	0	6	1	1	0	3	5	0	8		
Spring 2000	0	0	0	0	0	0	0	0	0	0	0		
Total	2	4	0	6	1	1	0	3	5	0	8	38	
<i>2000–2001</i>													
Fall 2000	4	4	0	8	2	0	0	6	4	0	10		
Spring 2001	0	0	0	0	0	0	0	0	0	0	0		
Total	4	4	0	8	2	0	0	6	4	0	10	60	
<i>2001–2002</i>													
Fall 2001	0	4	0	4	0	0	0	0	4	0	4		
Spring 2002	3	0	0	3	0	0	0	3	0	0	3		
Total	3	4	0	7	0	0	0	3	4	0	7	43	
<i>2002–2003</i>													
Fall 2002	1	5	0	6	0	0	0	1	5	0	6		
Spring 2003	0	0	0	0	0	0	0	0	0	0	0		
Total	1	5	0	6	0	0	0	1	5	0	6	17	
<i>2003–2004</i>													
Fall 2003	2	0	0	2	0	0	0	2	0	0	2		
Spring 2004	0	0	0	0	0	0	0	0	0	0	0		
Total	2	0	0	2	0	0	0	2	0	0	2	100	

^a Includes illegal kills.^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality. These data not included in tables of chronology, transport, etc.^c Percentage includes only bears of known sex.

Table 1d Unit 20F grizzly bear harvest, regulatory years 1999–2000 through 2003–2004

Regulatory year	Reported											
	Hunter kill ^a				Nonhunting kill ^b			Total estimated kill ^c				
	M	F	Unk	Total	M	F	Unk	M	F	Unk	Total	% Males
<i>1999–2000</i>												
Fall 1999	0	1	0	1	0	0	0	0	1	0	1	
Spring 2000	0	0	0	0	0	0	0	0	0	0	0	
Total	0	1	0	1	0	0	0	0	1	0	1	0
<i>2000–2001</i>												
Fall 2000	0	0	0	0	0	0	0	0	0	0	0	
Spring 2001	1	1	0	2	0	0	0	1	1	0	2	
Total	1	1	0	2	0	0	0	1	1	0	2	50
<i>2001–2002</i>												
Fall 2001	0	0	0	0	0	0	0	0	0	0	0	
Spring 2002	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0
<i>2002–2003</i>												
Fall 2002	1	0	0	1	0	0	0	1	0	0	1	
Spring 2003	0	1	0	1	0	0	0	0	1	0	1	
Total	1	1	0	2	0	0	0	1	1	0	2	50
<i>2003–2004</i>												
Fall 2003	0	1	0	1	0	0	0	0	1	0	1	
Spring 2004	1	0	0	1	0	0	0	1	0	0	1	
Total	1	1	0	2	0	0	0	1	1	0	2	50

^a Includes illegal kills.^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality. These data not included in tables of chronology, transport, etc.^c Percentage includes only bears of known sex.

Table 1e Unit 25C grizzly bear harvest, regulatory years 1999–2000 through 2003–2004

Regulatory year	Reported											
	Hunter kill ^a				Nonhunting kill ^b			Total estimated kill ^c				
	M	F	Unk	Total	M	F	Unk	M	F	Unk	Total	% Males
<i>1999–2000</i>												
Fall 1999	0	0	0	0	0	0	0	0	0	0	0	
Spring 2000	1	0	0	1	0	0	0	1	0	0	1	
Total	1	0	0	1	0	0	0	1	0	0	1	100
<i>2000–2001</i>												
Fall 2000	2	1	0	3	0	0	0	2	1	0	3	
Spring 2001	0	0	0	0	0	0	0	0	0	0	0	
Total	2	1	0	3	0	0	0	2	1	0	3	67
<i>2001–2002</i>												
Fall 2001	3	2	0	5	0	0	0	3	2	0	5	
Spring 2002	0	0	0	0	0	0	0	0	0	0	0	
Total	3	2	0	5	0	0	0	3	2	0	5	60
<i>2002–2003</i>												
Fall 2002	0	3	0	3	0	0	0	0	3	0	3	
Spring 2003	0	0	0	0	0	0	0	0	0	0	0	
Total	0	3	0	3	0	0	0	0	3	0	3	0
<i>2003–2004</i>												
Fall 2003	0	0	0	0	0	0	0	0	0	0	0	
Spring 2004	0	1	0	1	0	0	0	0	1	0	1	
Total	0	1	0	1	0	0	0	0	1	0	1	0

^a Includes illegal kills.^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality. These data not included in tables of chronology, transport, etc.^c Percentage includes only bears of known sex.

Table 2 Units 20A, 20B, 20C, 20F, and 25C grizzly bear harvest in 3 zones, calendar years 1999 through 2003

Harvest zone	Area (mi ²)	Calendar year	Bears killed		3-year Mean harvest		Harvest density ^c
			All ages ^a	≥2 years ^b	All ages	≥2 years ^b	
Unit 20A mountains	3081 ^d	1999	17 (1)	17	13.0	12.7	5.5
		2000	12 (2)	11	12.7	12.0	3.6
		2001	12 (2)	11	13.7	13.0	3.6
		2002	9 (1)	8	11.0	10.0	2.6
		2003	9 (0)	9	10.0	9.3	2.9
Eastern half of Unit 20B	4929	1999	4 (0)	4	5.0	4.3	0.8
		2000	10 (0)	9	7.3	7.0	1.8
		2001	4 (1)	4	6.0	5.7	0.8
		2002	8 (1)	8	7.3	7.0	1.6
		2003	2 (0)	2	4.7	4.7	0.4
Unit 20A Flats, western half of Unit 20B, Unit 20C outside Denali National Park, Units 20F and 25C	26,278 ^e	1999	13 (2)	12	13.0	12.7	0.5
		2000	22 (3)	18	16.3	14.7	0.7
		2001	14 (1)	14	16.3	14.6	0.5
		2002	21 (2)	20	19.0	17.3	0.8
		2003	7 (1)	7	14.0	13.7	0.3

^a Numbers in parentheses indicate how many of these bears were killed by other than hunter harvest (i.e., DLP, illegal kills, research activities).

^b Assuming all bears of unknown age were ≥2 years old.

^c Bears ≥2 years old harvested per 1000 m².

^d Excludes about 500 m² (1300 km²) of nonbear habitat in glaciers and above 6000 ft (1850 m).

^e Excludes 4450 m² (11,500 km²) that is closed to hunting in Denali National Park.

Table 3 Unit 20A, 20B, 20C, 20F, and 25C grizzly bear successful hunter residency^a, regulatory years 1999–2000 through 2003–2004

Regulatory year	Resident (%)	Nonresident (%)	Unknown (%)	<i>n</i>
1999–2000	20 (67)	9 (30)	1 (3)	30
2000–2001	29 (78)	8 (22)	0 (0)	37
2001–2002	21 (70)	9 (30)	0 (0)	30
2002–2003	22 (73)	8 (27)	0 (0)	30
2003–2004	13 (68)	6 (32)	0 (0)	19

^a Excludes DLP, research mortality, or other human-caused accidental or illegal mortality bears.

Table 4 Units 20A, 20B, 20C, 20F, and 25C grizzly bear harvest chronology percent by month/day, regulatory years 1999–2000 through 2003–2004

Regulatory year	Harvest chronology percent by month/day ^a								<i>n</i>
	Sep		Oct–Nov	Total	Apr	May		Total	
	1–15	16–30				1–15	16–31		
1999–2000	40	43	3	87	0	3	10	13	30
2000–2001	51	35	8	95	0	3	3	5	37
2001–2002	43	27	10	80	7	0	13	20	30
2002–2003	60	27	7	93	0	7	0	7	30
2003–2004	68	11	0	79	11	0	11	21	19

^a Excludes DLP, research mortality, or other human-caused accidental or illegal mortality.

Table 5 Units 20A, 20B, 20C, 20F, and 25C grizzly bear harvest percent by transport method, regulatory years 1999–2000 through 2003–2004

Regulatory year	Harvest percent by transport method ^a								<i>n</i>
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	Other ORV	Highway vehicle	Other/Unk	
1999–2000	30	10	10	27	0	10	3	10	30
2000–2001	24	5	11	27	0	0	24	8	37
2001–2002	33	10	3	33	0	3	10	7	30
2002–2003	27	7	23	27	0	7	3	7	30
2003–2004	53	5	5	21	0	0	16	0	19

^a Does not include DLP, research mortality, or other human-caused accidental or illegal mortality.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 20D (5637 mi²)

GEOGRAPHIC DESCRIPTION: Central Tanana Valley near Delta Junction

BACKGROUND

Brown bears are distributed throughout Unit 20D; however, the Tanana River separates brown bear habitat into 2 distinct types within the unit. Unit 20D south of the Tanana River is adjacent and similar to habitat described by Reynolds (1990) for the foothills and mountains of the northcentral Alaska Range. Brown bear habitat in Unit 20D north of the Tanana River is adjacent and similar to habitat described in Unit 20E by Gasaway et al. (1990) for the hills north of the Tanana River. Hunter access to southern Unit 20D is excellent, while hunter access is more difficult in northern Unit 20D.

Until regulatory year (RY) 1991 (RY begins 1 Jul and ends 30 Jun; e.g., RY02 = 1 Jul 2002 through 30 Jun 2003), Unit 20D brown bear hunting regulations consisted of a bag limit of 1 bear every 4 years, a \$25 resident tag fee, and a hunting season from 1 September to 31 May. During RY92–RY94, the regulations were liberalized in northern Unit 20D to 1 bear per year, and the season was lengthened to 10 August–30 June to provide greater opportunity for hunters in this area of low bear harvest. In RY95, regulations were further liberalized to meet intensive management objectives, and the Alaska Board of Game established a Unit 20D harvest objective of 5–15 bears per year. The portion of Unit 20D north of the Tanana River and east of the Gerstle River was liberalized to a bag limit of 1 bear per year with no resident tag fee and a hunting season of 10 August–30 June.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- As directed by the Alaska Board of Game, manage grizzly bears to reduce the effects of predation on ungulate species in portions of Unit 20D.

MANAGEMENT OBJECTIVES

- Manage for an annual mortality of 5–15 bears/year.
- Manage for a 3-year mean, annual, human-caused mortality composed of at least 55% males.

METHODS

Successful hunters were required to have brown bears sealed at ADF&G offices. Data collected from each brown bear included sex, skull length and width, transportation used by the hunter, number of days hunted, date and location of kill, and hunter name and address. A premolar tooth was extracted from each bear skull for use in age determination. Bears that died from nonhunting mortality sources, such as those killed in defense of life or property (DLP), were also sealed. Data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

I calculated brown bear population estimates for Unit 20D in May 1993. The Unit 20D estimate was 181–210 total bears, with 143–176 bears ≥ 2 years old. For the population estimate, I calculated separate estimates for Unit 20D north and south of the Tanana River as described below. I continued to use the 1993 estimates during this reporting period (RY02–RY03).

Southern Unit 20D. The population estimate for southern Unit 20D was 51–58 brown bears ≥ 2 years old and a total of 76–86 bears. This estimate was based on density estimates of 25.4–29.0 bears ≥ 2 years old/1000 mi², plus an additional 14% for cubs and yearlings, developed by Reynolds (1993) for similar habitat in the Alaska Range in Unit 20A.

Anecdotal information for southern Unit 20D from local residents, hunters, and pilots indicates that bears are common in most of the area. Residents commonly report bears near the town of Delta Junction, near the landfill, and in the Delta Agricultural Project. Dall sheep, moose, and caribou hunters commonly report seeing bears in the foothills of the Alaska Range.

Northern Unit 20D. The population estimate for northern Unit 20D was 92–109 brown bears ≥ 2 years old and 105–124 total bears. This estimate was based on the Gasaway et al. (1990) brown bear density estimates for Unit 20E of 26.9–32.1 bears ≥ 2 years old/1000 mi², plus an additional 14% for cubs and yearlings.

Reynolds (ADF&G, personal communication) plans to refine Alaska Range brown bear density estimates upon which we based the population estimate for southern Unit 20D. He also plans to complete a population model that calculates sustainable harvest levels based on harvest of females, rather than the current model that uses total adult harvest as the basis for estimating harvest goals. When this information is available, the Unit 20D population estimate and management objectives should be reviewed and reevaluated.

Population Composition

Brown bear population composition is unknown for Unit 20D. Because cubs or females accompanied by cubs are illegal to harvest, the sex ratio of the harvest was not used to estimate population composition.

Distribution and Movements

Brown bears are distributed throughout Unit 20D; however, no specific information on patterns of brown bear distribution or movements is available.

MORTALITY

Season and Bag Limit. During RY02 those portions of Unit 20D north of the Tanana River or south of the Tanana River and east of the east bank of the Gerstle River had a 10 August–30 June hunting season for residents and nonresidents. The bag limit was 1 bear per year, and no tag fee was required of residents. Hunters who took bears in this area were required to have the bears sealed in Delta Junction or Tok. The hunting season south of the Tanana River and west of the Gerstle River for residents and nonresidents was 1 September–31 May. The bag limit was 1 bear every 4 regulatory years, and a \$25 tag was required of resident hunters.

In RY03 the Alaska Board of Game liberalized the hunting season and bag limit in southwestern Unit 20D so that the entire unit had a uniform season date of 10 August–30 June, a bag limit of 1 bear per year, and no resident tag fee. The in-unit sealing requirement was also eliminated.

Alaska Board of Game Actions and Emergency Orders

RY02 — The Alaska Board of Game considered and approved an annual reauthorization of the brown bear tag fee exemption for those portions of Unit 20D north of the Tanana River and south of the Tanana River and east of the east bank of the Gerstle River.

RY03 — The Alaska Board of Game liberalized the hunting season and bag limit in southwestern Unit 20D so that the entire unit had a uniform season date of 10 August–30 June, a bag limit of 1 bear per year, and no resident tag fee. The in-unit sealing requirement was also eliminated.

Hunter Harvest and Other Mortality

RY02 — Hunters killed 13 bears (Table 1) and met the harvest objective. One of these bears was killed as a nuisance bear. Hunter take consisted of 54% males. Hunters killed 8 bears in Unit 20D south of the Tanana River, west of the Gerstle River, where hunting regulations were most restrictive. Where hunting regulations were least restrictive, hunters killed 4 bears south of the Tanana River, east of the Gerstle River, and 1 north of the Tanana River. Eight bears were killed during fall, and 5 were killed during spring (Table 2).

The total reported mortality of 13 bears was an estimated 6–7% of the unitwide brown bear population and 8–9% of bears ≥ 2 years old.

An estimated 1 bear is killed each year and not reported. Adding this estimated mortality to reported mortality results in estimated total mortality of 14 bears (Table 2).

RY03 — Hunters killed 5 bears (Table 1) and met the harvest objective. Harvest was composed of 80% male bears. Hunters killed 4 bears in southern Unit 20D, with 2 bears taken west of the Gerstle River and 2 taken east of the Gerstle River. One bear was killed north of the Tanana River.

The total reported mortality of 5 bears was an estimated 2–3% of the unitwide brown bear population and 3–4% of the estimated bears ≥ 2 years old.

An estimated 1 bear is killed each year and not reported. Adding this estimated mortality to reported mortality results in estimated total mortality of 6 bears (Table 2).

During RY01–RY03, 29 brown bears were known to have been killed in Unit 20D, including 18 (62%) males. This meets the objective to have a 3-year average of at least 55% males in the harvest.

Hunter Residency and Success. No significant changes occurred in previous patterns of residency of successful hunters during this reporting period. Most brown bears continued to be killed by residents. Of the bears taken in RY02–RY03 by hunters with known residency, Unit 20D residents took 50% of the harvest and nonlocal residents took 50% (Table 3).

Harvest Chronology. No substantive changes occurred in previous patterns of harvest chronology during this reporting period. In Unit 20D most brown bears continued to be harvested during the fall hunting season, with most kills in September (Table 4).

Transport Methods. During RY02–RY03 the most commonly used transportation types for hunting brown bears in Unit 20D were 3- or 4-wheelers and foot travel (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

The harvest objective of 5–15 bears per year was met in RY02–RY03. Hunters took predominantly male bears both years, allowing us to meet the objective to manage for a 3-year mean, annual, human-caused mortality of at least 55% males. The Board of Game reauthorized brown bear tag fee exemptions in portions of Unit 20D as part of an intensive management program to increase numbers of moose and caribou, and then liberalized the season and bag limit in southwestern Unit 20D so that regulations were uniform throughout the unit.

Although bear mortality decreased in RY03, average annual mortality has increased in Unit 20D since the \$25 resident tag fee was eliminated in portions of Unit 20D. However, nuisance bears killed in defense of life or property and other nonhunting mortality continue to be a significant source of mortality.

Based on my population estimates, brown bear mortality may be exceeding sustainable levels in southern Unit 20D. A substantial portion of the brown bear mortality west of the Gerstle River is due to nonhunting mortality that results from people living near brown bears. However, anecdotal observations indicate that bears remain plentiful in the area. This area will likely continue to experience high levels of bear mortality because of the number of human inhabitants and liberal hunting regulations. However, because this area is relatively small and surrounded by areas that have healthy brown bear populations, and because the Alaska Board of Game objective is to reduce predation on ungulates, no reduction in the hunting season dates and bag limits are planned at this time. There is significant demand for human use of moose and caribou in southern Unit 20D, and current population objectives are

to increase the size of these ungulate populations. While there is little evidence that increased bear harvest results in increased ungulate numbers, a localized reduction in the brown bear population may benefit survival of moose and caribou calves.

The Unit 20D brown bear population should be monitored closely to determine long-term effects of liberal hunting regulations and to monitor the population west of the Gerstle River where mortality rates are highest.

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PREPARED BY:

Stephen D. DuBois
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

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Table 1 Unit 20D brown bear mortality^a with differing hunting regulations, regulatory years 1987–1988 through 2003–2004

Regulatory year	Southern Unit 20D								Northern Unit 20D		Total Unit 20D		Total bears M+F
	West of Gerstle River		East of Gerstle River		Unk location		Total						
	M	F	M	F	M	F	M	F	M	F	M	F	
	1 bear/4 yr, 1 Sep–31 May, \$25 tag ^b												
1987–1988	2	0	4	4	1	0	7	4	0	1	7	5	12
1988–1989	1	1	1	1	0	0	2	2	2	0	4	2	6
1989–1990	2	0	0	0	0	0	2	0	2	0	4	0	4
1990–1991	1	2	2	0	0	1	3	3	0	1	3	4	7
1991–1992	<u>2</u>	<u>3</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>4</u>	<u>6</u>
Total kill	8	6	7	6	1	1	16	13	4	2	20	15	35
Kill/Year	Avg 3		Avg 3		Avg 0		Avg 6		Avg 1		Avg 7		
% Male	57		54		50		55		67		57		
	1 bear/4 yr, 1 Sep–31 May, \$25 tag ^b								1 bear/yr, 10 Aug– 30 Jun, no tag fee ^b				
1992–1993	4	1	1	1	0	1	5	3	2	0	7	3	10
1993–1994	2	0	2	1	0	0	4	1	1	1	5	2	7
1994–1995	<u>3</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>3</u>	<u>7</u>
Total kill	9	3	4	3	0	1	13	7	3	1	16	8	24
Kill/Year	Avg 4		Avg 2		Avg 0		Avg 7		Avg 1		Avg 8		
% Male	75		57		0		65		75		67		
	1 bear/4 yr, 1 Sep– 31 May, \$25 tag ^b		1 bear/yr, 10 Aug– 30 Jun, no tag fee ^b						1 bear/yr, 10 Aug– 30 Jun, no tag fee ^b				
1995–1996	4	1	3	1	0	0	7	2	4	3	11	5	16
1996–1997	3	4	1	1	0	0	4	5	1	1	5	6	11
1997–1998	3	3	0	0	0	0	3	3	2	1	5	4	9
1998–1999	10	3	2	0	0	0	12	3	0	1	12	4	16
1999–2000	1	2	2	1	0	0	3	3	4	1	7	4	11
2000–2001	6	3	3	4	0	0	9	7	4	0	13	7	20
2001–2002	4	1	3	2	0	0	7	3	2	0	9	3	12
2002–2003	<u>5</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>7</u>	<u>5</u>	<u>0</u>	<u>1</u>	<u>7</u>	<u>6</u>	<u>13</u>
Total kill	36	20	16	11	0	0	52	31	17	8	69	39	108
Kill/Year	Avg 7		Avg 3		Avg 0		Avg 11		Avg 3		Avg 14		
% Male	64		59		0		63		68		64		

Table 1 continued

Regulatory year	Southern Unit 20D								Northern Unit 20D		Total Unit 20D		Total bears
	West of Gerstle River		East of Gerstle River		Unk location		Total		M	F	M	F	M+F
	M	F	M	F	M	F	M	F					
	1 bear/yr, 10 Aug–30 Jun, no tag fee ^b												
2003–2004	<u>1</u>	<u>1</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>1</u>	<u>5</u>
Total kill	1	1	2	0	0	0	3	1	1	0	4	1	5
Kill/Year	Avg 2		Avg 2		Avg 0		Avg 4		Avg 1		Avg 4		
% Male	50		100		0		75		100		80		

^a Includes nonhunting mortality.^b Hunting regulation.

Table 2 Unit 20D brown bear mortality^a, regulatory years 1992–1993 through 2003–2004

Regulatory year	Reported							Estimated kill		Total reported and estimated kill			
	Hunter kill				Nonhunting kill ^a					M	F	Unk	Total
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal				
1992–1993													
Fall 1992	4	2	0	6	1	0	0	1	0	5	2	1	8
Spring 1993	2	1	0	3	0	0	0	0	0	2	1	0	3
Total	6	3	0	9	1	0	0	1	0	7	3	1	11
1993–1994													
Fall 1993	5	1	0	6	0	0	0	1	0	5	1	1	7
Spring 1994	0	1	0	1	0	0	0	0	0	0	1	0	1
Total	5	2	0	7	0	0	0	1	0	5	2	1	8
1994–1995													
Fall 1994	2	2	0	4	0	0	0	1	0	2	2	1	5
Spring 1995	1	1	0	2	1	0	0	0	0	2	1	0	3
Total	3	3	0	6	1	0	0	0	0	4	3	1	8
1995–1996													
Fall 1995	8	3	0	11	0	0	0	1	0	8	3	1	12
Spring 1996	3	2	0	5	0	0	0	0	0	3	2	0	5
Total	11	5	0	16	0	0	0	1	0	11	5	1	17
1996–1997													
Fall 1996	4	2	0	6	0	3	0	1	0	4	5	1	10
Spring 1997	1	0	0	1	0	1	0	0	0	1	1	0	2
Total	5	2	0	7	0	4	0	1	0	5	6	1	12
1997–1998													
Fall 1997	3	3	0	6	0	0	0	1	0	3	3	1	7
Spring 1998	2	0	0	2	0	1	0	0	0	2	1	0	3
Total	5	3	0	8	0	1	0	1	0	5	4	1	10
1998–1999													
Fall 1998	8	1	0	9	2	2	0	1	0	10	3	1	14
Spring 1999	2	1	0	3	0	0	0	0	0	2	1	0	3
Total	10	2	0	12	2	2	0	1	0	12	4	1	17

Table 2 continued

Regulatory year	Reported				Nonhunting kill ^a			Estimated kill		Total reported and estimated kill				
	Hunter kill				M	F	Unk	Unreported	Illegal	M	F	Unk	Total	
	M	F	Unk	Total										
1999–2000														
Fall 1999	4	2	0	6	0	0	0	1	0	4	2	1	7	
Spring 2000	3	2	0	5	0	0	0	0	0	3	2	0	5	
Total	7	4	0	11	0	0	0	1	0	7	4	1	12	
2000–2001														
Fall 2000	7	5	0	12	1	2	0	1	0	8	7	1	16	
Spring 2001	4	0	0	4	1	0	0	0	0	5	0	0	5	
Total	11	5	0	16	2	2	0	1	0	13	7	1	21	
2001–2002														
Fall 2001	6	3	1	10	1	0	0	1	0	7	3	2	12	
Spring 2002	1	0	0	1	0	0	0	0	0	1	0	0	1	
Total	7	3	1	11	1	0	0	1	0	8	3	2	13	
2002–2003														
Fall 2002	4	4	0	8	0	0	0	1	0	4	4	1	9	
Spring 2003	3	2	0	5	0	0	0	0	0	3	2	0	5	
Total	7	6	0	13	0	0	0	1	0	7	6	1	14	
2003–2004														
Fall 2003	3	0	0	3	0	0	0	1	0	3	0	1	4	
Spring 2004	1	1	0	2	0	0	0	0	0	1	1	0	2	
Total	4	1	0	5	0	0	0	1	0	4	1	1	6	

^a Includes DLP kills, research mortalities, and other known, human-caused accidental mortality.

Table 3 Residency of successful Unit 20D brown bear hunters (includes legal and illegal harvest; excludes DLP kill), regulatory years 1989–1990 through 2003–2004

Regulatory year	Local ^a resident	Nonlocal resident	Nonresident	Unk	Total successful hunters
1989–1990	3	1	0	0	4
1990–1991	4	2	0	1	7
1991–1992	5	0	0	0	5
1992–1993	5	4	0	0	9
1993–1994	3	4	0	0	7
1994–1995	2	4	0	0	6
1995–1996	7	6	1	2	16
1996–1997	5	3	0	0	8
1997–1998	5	2	1	0	8
1998–1999	8	5	0	0	13
1999–2000	9	2	0	0	11
2000–2001	6	9	1	1	17
2001–2002	5	3	2	1	11
2002–2003	8	5	0	0	13
2003–2004	1	4	0	0	5

^a Residents of Unit 20D.

Table 4 Chronology of Unit 20D brown bear harvest and nonhunting mortality by month, regulatory years 1989–1990 through 2003–2004

Regulatory year	Harvest by month								<i>n</i>
	Aug	Sep	Oct	Nov	Apr	May	Jun	Other	
1989–1990	0	2	0	0	0	2	0	0	4
1990–1991	0	5	0	0	0	2	0	0	7
1991–1992	0	1	0	0	0	4	1	0	6
1992–1993	0	4	2	0	0	3	0	1	10
1993–1994	1	4	0	1	0	1	0	0	7
1994–1995	0	4	0	0	0	2	1	0	7
1995–1996	1	9	1	0	0	2	3	0	16
1996–1997	2	5	1	0	0	1	1	1	11
1997–1998	0	5	1	0	0	2	1	0	9
1998–1999	4	7	0	2	0	3	0	0	16
1999–2000	1	3	2	0	0	2	3	0	11
2000–2001	3	9	2	0	0	2	3	1	20
2001–2002	5	4	1	0	0	0	0	2	12
2002–2003	1	7	0	0	0	5	0	0	13
2003–2004	0	3	0	0	0	1	1	0	5

Table 5 Unit 20D percent of brown bear harvest (includes legal and illegal harvest; excludes DLP) by transport method, regulatory years 1989–1990 through 2003–2004

Regulatory year	Percent harvest by transport method										<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Foot	Other	Unk	
1989–1990	0	0	25	0	0	25	25	25	0	0	4
1990–1991	0	14	0	0	0	57	14	14	0	0	7
1991–1992	0	0	0	0	20	20	0	0	60	0	5
1992–1993	11	11	11	22	0	0	33	11	0	0	9
1993–1994	14	0	29	0	0	0	43	14	0	0	7
1994–1995	17	17	0	33	0	0	17	17	0	0	6
1995–1996	25	0	13	25	0	0	31	6	0	0	16
1996–1997	0	0	25	13	0	13	38	0	13	0	8
1997–1998	13	0	13	25	0	13	13	0	25	0	8
1998–1999	0	0	0	54	0	0	8	39	0	0	13
1999–2000	9	0	9	0	0	9	27	46	0	0	11
2000–2001	12	0	12	29	0	6	12	29	0	0	17
2001–2002	27	0	0	27	0	0	9	36	0	0	11
2002–2003	8	8	0	46	0	0	15	23	0	0	13
2003–2004	20	0	0	60	0	0	0	20	0	0	5

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 20E (10,680 mi²)

GEOGRAPHIC DESCRIPTION: Fortymile, Charley, and Ladue River drainages, including the Tanana Uplands and all drainages into the south bank of the Yukon River upstream from and including the Charley River drainage

BACKGROUND

The grizzly bear population in Unit 20E declined to low levels during the 1950s as a result of use of poisons for wolves during an intensive, year-round federal predator control program. After the program ended, bears were lightly exploited throughout the 1960s and 1970s.

During the early 1980s, predation by grizzly bears was identified as a major factor in maintaining the moose population in Unit 20E at low densities (0.2 moose/mi², 0.5 moose/km²; Gasaway et al. 1992). Hunting regulations were liberalized in an attempt to reduce the grizzly bear population to a level that would result in a decline in predation on moose calves. Regulation changes included lengthening the grizzly bear season; increasing the bag limit from 1 bear/4 years to 1 bear/year; and waiving the \$25 resident grizzly bear tag fee during regulatory year (RY) 1984 through RY89 and RY02–RY03 (RY begins 1 Jul and ends 30 Jun; e.g., RY02 = 1 Jul 2002 through 30 Jun 2003). Annual grizzly bear harvest increased from a mean of 3 during RY66–RY81 to a mean of 19 during RY82–RY88 and declined slightly during RY89–RY03 to a mean of 15.

During the mid 1980s, Boertje et al. (1987) estimated the grizzly bear population in a portion of Unit 20E at 31 bears of all ages/1000 mi² (12/1000 km²) as of 1 May annually and 41 bears of all ages/1000 mi² (16/1000 km²) by 1 November annually. Even with liberal regulations beginning in the early 1980s, grizzly bear harvest has remained relatively low. Gardner (2003) indicated that harvest data and population estimates reported by Boertje et al. (1987) showed that there may have been a population decline in Unit 20E during 1982–1988. However, due to the small sample sizes, fluctuating harvest levels during this period and variable harvest distribution, further analysis of the population is warranted.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Provide maximum opportunity to hunt grizzly bears in Unit 20E.

MANAGEMENT OBJECTIVES

- Manage for temporary reductions in the grizzly bear population or for reduction in bear predation where it may be limiting moose population growth (e.g., moose populations are below food-limiting densities with autumn calf:cow ratios <25:100).
- After moose populations increase to desired levels, reduce bear harvests to allow for bear population stabilization or recovery.

When developing grizzly bear and wolf management goals and objectives for Unit 20E, I also considered the management goals and objectives for moose and caribou populations of the area. Coordinating predator and ungulate population and harvest objectives in Unit 20E is necessary because the Alaska Board of Game designated the moose population in most of Unit 20E and the Fortymile caribou herd as important for high levels of human consumptive use. Under the intensive management law, the board must consider intensive management if regulatory action to significantly reduce harvest becomes necessary because a population is depleted or has reduced productivity. Grizzly bears are the primary predator on newborn moose calves in Unit 20E, and this moose population has been kept at low densities by predation (Gasaway et al. 1992). Grizzly bears are also an important predator on newborn caribou calves (Boertje and Gardner 1999).

METHODS

Grizzly bears harvested in Unit 20E must be sealed within the unit or at Tok before being transported out of the area. During the sealing process, we determined the sex of the bear, measured the length and width of the skull, extracted a premolar tooth, and collected information on date and location of harvest and time the hunter spent in the field. Premolar teeth were sent to Matson's Laboratory (Milltown, Montana, USA) for age determination. Harvest data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Gardner (2001) estimated that the Unit 20E grizzly bear population was stable at 475–550 bears (44.3–51.3 bears of all ages/1000 mi², 17.1–19.8 /1000 km²) in autumn 2000. This estimate is based on Unit 20E harvest statistics collected since 1977, but is higher than the estimate of 31 bears of all ages/1000 mi² (12/1000 km²; Boertje et al. 1987) based on telemetry data in the area. In a more intensive study of spring grizzly bear density 110 mi (175 km) to the west in Unit 20A in the central Alaska Range, Reynolds and Boudreau (1992) estimated a spring grizzly bear density of 42.7 bears of all ages/1000 mi² (16.5/1000 km²) in an intensively hunted grizzly bear population. Since there were no substantial weather events or change in harvest during RY00–RY03, I believe the Unit 20E grizzly bear population size likely remained at 475–550 bears.

Reynolds and Boudreau (1992) found that a 6% mortality rate of adult females ≥6 years old resulted in a grizzly bear population decline. In addition, Reynolds (1990) reported that an overall harvest of 11% for 8 years resulted in a population decline of 32%. Human-caused

mortality included hunter kills, illegal kills, and wounding losses. Additionally, natural deaths accounted for about 2% annual mortality.

Grizzly bear hunting regulations in Unit 20E were liberalized in 1982 in an effort to reduce bear numbers and predation on moose calves. However, during RY82–RY01, grizzly bear harvest was less than the level that resulted in an unsustainable 32% decline in the Unit 20A grizzly population (Reynolds and Boudreau 1992). Gardner (2003) estimated a 2% annual decline in the grizzly bear population in portions of Unit 20E because localized harvest levels exceeded sustainable levels. However, Gardner (2003) reported harvest was within sustainable levels in Unit 20E as a whole.

I estimated that during RY02–RY03, annual harvest of adult females in Unit 20E had no effect on population trend because it represented only 3% of the estimated adult female population and 3–5% of the estimated total population; further, it was distributed throughout the unit.

MORTALITY

Harvest

Season and Bag Limit

Unit and Bag Limit	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
RY02–RY03 Unit 20E.		
1 bear every regulatory year.	10 Aug–30 Jun (General hunt only)	10 Aug–30 Jun

A bear taken in Unit 20E did not count against the bag limit of 1 bear every 4 years in other units; however, no person could take more than 1 bear, statewide, per regulatory year. During RY02–RY03 the \$25 resident tag fee was waived for hunting grizzly bears in Unit 20E outside of Yukon–Charley Rivers National Preserve.

Alaska Board of Game Actions and Emergency Orders. The Alaska Board of Game waived the grizzly bear tag fee in Unit 20E outside of Yukon–Charley Rivers National Preserve during RY02–RY03. During its 2004 meetings, the board again maintained the tag fee waiver, increased the bag limit to 2 bears annually, allowed the sale of handicrafts made of the skin of grizzly bears, and approved a predator control program to allow baiting of grizzly bears. Each of these regulatory changes was implemented in an attempt to increase harvest to reduce the grizzly bear population in Unit 20E to meet the first management objective.

Hunter Harvest. Hunters reported killing 14 bears in RY02 and 20 in RY03 (Table 1). The 5-year (RY99–RY03) average harvest was 14 bears. The mean percentage of males harvested

during RY99–RY03 in Unit 20E was 51%. During RY02 and RY03, males represented 57% and 35% of the harvest, respectively.

Hunter Residency and Success. Resident hunters took 93% and 85% of the grizzly bear harvest in RY02 and RY03 (a total of 30 bears taken by residents, 4 taken by nonresidents), compared with the 5-year average of 83% taken by resident hunters (Table 2). Historically, little guided hunting for grizzly bears occurred in Unit 20E. Nonresidents accompanied by second-degree of kindred residents took a few bears while hunting moose or caribou. Since 1995, guided nonresident grizzly bear hunters in remote portions of the unit harvested 1–3 bears/year.

Harvest Chronology. During RY99–RY03, 82% of grizzly bears harvested in Unit 20E were taken during August and September when moose and caribou hunters were afield (Table 3). Few bears were taken in the spring.

Transport Methods. During RY02–RY03, airplanes (24%), highway vehicles/walking (22%), and 4-wheelers (27%) were the modes of transportation used by most successful bear hunters (Table 4). Use of airplanes by successful grizzly bear hunters in Unit 20E has increased as more big game hunters access the more remote areas to hunt.

Other Mortality

No grizzly bears were reported killed in defense of life or property (DLP) in Unit 20E during RY02–RY03. Most nonhunting-caused grizzly bear mortality is likely the result of intraspecific strife and cannibalism (Boertje et al. 1987). Reynolds (1997) estimated natural mortality at 2.5% for females ≥ 2 years of age and 1.9% for females ≥ 6 years of age.

HABITAT

Assessment

All of Unit 20E is suitable grizzly bear habitat. Few human developments exist, except the Taylor Highway and the small communities of Eagle, Boundary, and Chicken. The unit offers a variety of forbs and berries for grizzly bears. However, there are no arctic ground squirrels and few opportunities for salmon, which are known to be important food sources elsewhere. Habitat diversity is improving because implementation of the Alaska Interagency Fire Management Plan during the early 1980s allowed wildfires and prescribed burns to occur on hundreds of thousands of acres. Average home range sizes for adult male and female bears are 1409 km² (544 mi², $s = 695$) and 391 km² (151 mi², $s = 318.3$), respectively (Boertje et al. 1987).

Enhancement

The implementation of the Alaska Interagency Fire Management Plan allowed wildfires to burn in more areas than before 1984. Also, 3 prescribed burns were ignited during 1997–1999, affecting about 95,000 acres of grizzly bear habitat. Revegetation of preferred plant species in burned-over areas is expected to provide better forage for grizzly bears than is available in mature forests of black or white spruce. Similarly, in 2004, about 1700 square

miles of Unit 20E burned and can be expected to provide improvements in usable habitat for grizzly bears in the future.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Research in Unit 20E and other parts of Alaska demonstrated that grizzly bear and wolf predation can be the primary limiting factor in moose and caribou population growth (Gasaway et al. 1992). Altering wolf and bear predation simultaneously was recommended by Gasaway et al. (1992) to achieve maximum potential to increase moose numbers. Grizzly bear harvest regulations were liberalized in Unit 20E in 1981 with the intent of reducing the bear population to benefit moose. Analyses demonstrated that survival of neonatal moose increased substantially after 8 years of increased grizzly bear harvest and an estimated 2% annual decline in the bear population (Gasaway et al. 1992). However, Gardner (2001) concluded that the Unit 20E moose population continued to be limited primarily by grizzly bear predation on calves and that moose numbers would increase if grizzly bear numbers or their predation efficiency on moose calves was reduced.

To reduce the effects of grizzly bear predation on calves, either the number of bears must be reduced to a level at which predation is reduced, or the efficiency of the grizzly bear as a predator of calves must be reduced. Liberal grizzly bear hunting regulations during the past 23 years have proven ineffective at reducing grizzly bear numbers to a low enough level to reduce predation on moose calves. Additional methods outside of normal hunter harvest should be explored to meet management objectives.

CONCLUSIONS AND RECOMMENDATIONS

In autumn 2004, I estimated there were 475–550 grizzly bears in Unit 20E. Harvest data indicates the population has fluctuated little since 1981, despite liberal hunting regulations. Low harvest rates are likely due to 1) the inaccessibility of most of the unit and the dense forest that hinders hunters' ability to harvest bears and discourages hunters from coming to Unit 20E specifically to hunt grizzly bears and 2) unwillingness of moose and caribou hunters to opportunistically harvest bears due to the inconvenience and expense of taking care of the harvested bear hides. Since 1994, harvest has been dispersed across the unit, and any localized impacts to grizzly bear numbers in portions of the unit are unlikely.

Population trend is currently stable. Grizzly bear management in Unit 20E provides maximum bear hunting opportunity, which meets our management goal. High numbers of moose and caribou hunters and liberal seasons and bag limits have been unsuccessful in increasing grizzly bear harvest. Although grizzly bear harvest regulations were liberal, we did not meet our management objective to temporarily reduce the grizzly bear population or to reduce bear predation where it may be limiting moose population growth. Additional incentives or methods and means other than those allowed under current hunting regulations are necessary if bear harvest is to be substantially increased. A grizzly bear predator control program will be implemented in spring 2005 and will be evaluated during the next report period.

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PREPARED BY:

Jeff A. Gross
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

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Table 1 Unit 20E grizzly bear mortality, regulatory years 1999–2000 through autumn 2004

Regulatory year	Reported							Estimated kill		Total estimated kill					Total
	Hunter kill				Nonhunting kill ^a					M (%)	F (%)	Unk			
	M	F	Unk	Total	M	F	Unk								
<i>1999–2000</i>															
Autumn 1999	0	2	0	2	0	0	0	0	0	0 (0)	2 (100)	0	2		
Spring 2000	2	1	0	3	0	0	0	0	0	2 (67)	1 (33)	0	3		
Total	2	3	0	5	0	0	0	0	0	2 (40)	3 (60)	0	5		
<i>2000–2001</i>															
Autumn 2000	10	8	0	18	0	1	0	0	0	10 (53)	9 (47)	0	19		
Spring 2001	0	0	0	0	0	0	0	0	0	0 (0)	0 (0)	0	0		
Total	10	8	0	18	0	1	0	0	0	10 (53)	9 (47)	0	19		
<i>2001–2002</i>															
Autumn 2001	6	3	0	9	0	0	0	0	0	6 (67)	3 (33)	0	9		
Spring 2002	2	0	0	2	0	0	0	0	0	2 (100)	0 (0)	0	2		
Total	8	3	0	11	0	0	0	0	0	8 (73)	3 (27)	0	11		
<i>2002–2003</i>															
Autumn 2002	6	6	0	12	0	0	0	0	0	6 (50)	6 (50)	0	12		
Spring 2003	2	0	0	2	0	0	0	0	0	2 (100)	0 (0)	0	2		
Total	8	6	0	14	0	0	0	0	0	8 (57)	6 (43)	0	14		
<i>2003–2004</i>															
Autumn 2003	5	11	0	16	0	0	0	0	0	5 (31)	11 (69)	0	16		
Spring 2004	2	2	0	4	0	0	0	0	0	2 (50)	2 (50)	0	4		
Total	7	13	0	20	0	0	0	0	0	7 (35)	13 (65)	0	20		
<i>2004–2005</i>															
Autumn 2004 ^b	9	4	0	13	0	0	0	0	0	9 (69)	4 (31)	0	13		

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality.^b Preliminary data.

Table 2 Unit 20E residency of successful grizzly bear hunters, regulatory years 1999–2000 through autumn 2004

Regulatory year	Resident	(%)	Nonresident	(%)	Unknown	(%)	Total successful hunters
1999–2000	3	(60)	2	(40)	0	(0)	5
2000–2001	14	(78)	4	(22)	0	(0)	18
2001–2002	11	(100)	0	(0)	0	(0)	11
2002–2003	13	(93)	1	(7)	0	(0)	14
2003–2004	17	(85)	3	(15)	0	(0)	20
Autumn 2004 ^a	12	(92)	1	(8)	0	(0)	13

^a Preliminary data.

Table 3 Unit 20E chronology of grizzly bear harvest by month, regulatory years 1999–2000 through autumn 2004

Regulatory year	Harvest by month										<i>n</i>
	Aug (%)	Sep (%)	Oct (%)	Nov (%)	Apr (%)	May (%)	Jun (%)				
1999–2000	0 (0)	2 (40)	0 (0)	0 (0)	0 (0)	3 (60)	0 (0)	5			
2000–2001	3 (17)	15 (83)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	18			
2001–2002	2 (18)	7 (64)	0 (0)	0 (0)	1 (9)	0 (0)	1 (9)	11			
2002–2003	3 (21)	9 (64)	0 (0)	0 (0)	1 (7)	1 (7)	0 (0)	14			
2003–2004	7 (35)	8 (40)	1 (5)	0 (0)	1 (5)	2 (10)	1 (5)	20			
Autumn 2004 ^a	4 (31)	9 (69)	0 (0)	0 (0)	n/a	n/a	n/a	13			

^a Preliminary data.

Table 4 Unit 20E grizzly bear percent harvest by transport method, regulatory years 1989–1990 through autumn 2004

Regulatory year	Percent harvest by transport method									<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk	
1999–2000	60	0	0	0	0	0	40	0	0	5
2000–2001	44	0	11	33	0	0	11	0	0	18
2001–2002	55	0	9	36	0	0	0	0	0	11
2002–2003	14	0	7	29	7	14	7	21	0	14
2003–2004	33	0	0	25	25	0	8	8	0	20
Autumn 2004 ^a	46	0	15	31	0	0	8	0	0	13

^a Preliminary data.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNITS: 21B, 21C, 21D, and 24 (46,750 mi²)

GEOGRAPHIC DESCRIPTION: Middle Yukon River, Koyukuk River, lower Nowitna River and Melozitna River drainages

BACKGROUND

This report combines the reports for 2 areas that were previously published separately: Unit 24 and Units 21B, 21C and 21D.

Grizzly bear density is low (10 bears/1000 mi²) to moderate (25 bears/1000 mi²) throughout Units 21B, 21C, and 21D, with highest densities in the mountainous areas. Grizzly bears are found in moderate numbers throughout Unit 24, with the highest densities (33 bears/1000 mi²) in mountainous areas of the Brooks Range in the northern portion of the unit. Previous reports indicated bear populations were stable or slowly increasing (Woolington 1997a), although specific information in the area is limited. Information from studies conducted on the northern slopes of the Brooks Range in Unit 26 (Crook 1972; Reynolds 1976; Reynolds and Hechtel 1984) and in the southwestern Brooks Range in Unit 23 (Ballard et al. 1988) has been used to describe bear populations in Unit 24.

Annual reported harvest in Units 21B, 21C, and 21D was <10 bears per year with an estimated additional human-caused mortality of 10 bears per year that were unreported and probably a result of bear-human conflicts. In Unit 24 the reported harvest since 1961 rarely exceeded 15–20 grizzly bears/year. Unreported kills most likely occurred along the Yukon River during the summer and early fall, when fish camps were in operation and bears were attracted to the sites.

Historically, grizzly bears were an important source of food and hides, but hunting effort by unit residents, with the exception of Anaktuvuk Pass residents, declined considerably during the 1900s. The Northwest Alaska Brown Bear Management Area was created in 1992 and allowed a bag limit of 1 bear every regulatory year under a subsistence registration permit. This permit required salvage of meat for human consumption, but the hide and skull did not need to be sealed unless they were removed from the management area. If the hide was removed from the management area, the Alaska Department of Fish and Game (ADF&G) took the skin of the head and the front claws. The registration regulations and fee exemption for the Northwest Alaska Brown Bear Management Area, which now includes all of Unit 21D and 24, did not improve harvest reporting among local residents. Local hunters (residents of Units 21B, 21C, 21D, and 24) took very few bears, and although the opening of the Dalton

Highway corridor to the public in the 1980s and early 1990s increased the number of potential nonlocal hunters, increased harvest in Unit 24 did not occur.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Protect, maintain, and enhance the grizzly bear population and its habitat in concert with other components of the ecosystem.

MANAGEMENT OBJECTIVE

Unit 21B, 21C, 21D

- Manage a grizzly population that will sustain a 3-year mean annual harvest of at least 25 bears, with at least 50% males in the reported harvest.

Unit 24

- Manage a grizzly population that will sustain a 3-year mean annual reported harvest of at least 20 bears in the northern portion of the unit (north of Allakaket) and at least 15 bears in the southern (remaining) portion of the unit, with at least 50% males in the reported harvest.

METHODS

Harvest was monitored through sealing requirements of general hunts and reporting requirements of the Northwest Alaska Brown Bear Management Area subsistence hunts. Data collected during sealing included sex, location of harvest, skull measurements, and age, if teeth were submitted for aging. Data specific to harvest such as transportation methods, time of harvest, and commercial services used were also recorded. Data collected from bears harvested under subsistence regulations were limited to sex, location of kill, and date of harvest. Bear–human conflicts were addressed through education, legal harvest of problem bears, and changes in regulations. Harvest data were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY02 = 1 July 2002 through 30 June 2003).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Field observations, nuisance reports, and hunter sightings indicated the population was stable or slowly increasing during the past 10 years. We did not conduct surveys in the area; however, we made population estimates based on known bear densities in similar habitats in other Interior Alaska game management units (Reynolds and Hechtel 1984; Reynolds 1989). We estimated 350–400 grizzly bears inhabit Units 21B, 21C, and 21D ($21B \approx 50$, $21C \approx 100$, $21D \approx 200$), assuming 25 bears/1000 mi² in the highest density bear habitat and 10 bears/1000 mi² in the remainder of the reporting area (Woolington 1997b). In Unit 21D the best bear habitat is in the Nulato Hills. Unit 21C in its entirety contained the next best grizzly bear habitat. However, for both areas, density was likely underestimated because the best

habitat in this reporting area included salmon spawning streams that the referenced habitats were lacking (Miller 1993).

In Unit 24, Reynolds (1989) estimated densities of 33 bears/1000 mi² within Gates of the Arctic National Park (7000 mi²), 33/1000 mi² in the Brooks Range outside the park (6500 mi²), and 22–33 bears/1000 mi² in the remainder of Unit 24 to the south (14,500 mi²). He estimated 450 bears in northern Unit 24 (north of Allakaket) and 320–480 in the remainder of the unit (south of Allakaket). Earlier work in similar habitats in Interior and Arctic Alaska provided a basis for these estimates (Reynolds 1976; Reynolds and Hechtel 1984).

MORTALITY

Harvest

Seasons and Bag Limits

Units and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Units 21B and 21C One bear every 4 regulatory years.	1 Sep–31 May	1 Sep–31 May
Unit 21D One bear every regulatory year by registration permit.	1 Sep–15 Jun (Subsistence hunt only)	No open season
One bear every regulatory year.	1 Sep–15 Jun	1 Sep–15 Jun
Unit 24 One bear every regulatory year by registration permit.	1 Sep–15 Jun (Subsistence hunt only)	No open season
One bear every regulatory year.	1 Sep–15 Jun	1 Sep–15 Jun

Note: Cubs (<2 years of age) and sows accompanied by cubs were illegal to harvest.

Alaska Board of Game Actions and Emergency Orders

Units 21B, 21C and 21D — During the spring 1996 Alaska Board of Game meeting, Unit 21D was included within the Northwest Alaska Brown Bear Management Area. This regulation change allowed a bag limit of 1 bear/year under a subsistence registration permit. This regulation also required salvage of meat for human consumption, but the hide and skull did not need to be sealed unless they were removed from the management area, and aircraft could not be used. If the hide was removed from the management area, ADF&G took the skin of the head and the front claws. At the spring 2000 Board of Game meeting, the season was extended to 15 June for both the subsistence and general seasons in Unit 21D. The bag limit was also liberalized to allow for the harvest of 1 bear/year under the general hunt. No changes

to grizzly bear regulations were adopted during the spring 2002 board meeting. At the 2004 meeting, the board adopted a regulation that eliminated the tag fee requirement in Units 21B, 21C and 21D, and then reversed the tag fee exemption for Units 21B and 21C in 2005.

Unit 24 — In 1990 the Board of Game eliminated all drawing permits and made a uniform season throughout Unit 24, which was aligned with seasons in Units 19, 20, and 21. In 1992 the board established the Northwest Alaska Brown Bear Management Area that included portions of Unit 24 west of the Dalton Highway Corridor Management Area (DHCMA). Under this subsistence registration permit, the season remained the same, but the bag limit changed from 1 bear/4 years to 1 bear/year. Also, all meat had to be salvaged, sealing requirements were waived if the hide and skull remained within the management area, there was no resident tag fee, and aircraft could not be used. During the spring 1996 board meeting, the portion of Unit 24 within the DHCMA was included within the Northwest Alaska Brown Bear Management Area. This action allowed Unit 24 residents that resided within the DHCMA to participate in the subsistence hunt and transport bear hides to their residences without sealing. At the spring 2000 meeting, the season was extended to 15 June for both the subsistence and general seasons. The bag limit was also liberalized to allow for the harvest of 1 grizzly bear every year under the general harvest regulation. No changes to grizzly bear regulations were adopted during the spring 2002 Board of Game meeting. However, a limited drawing hunt for moose was adopted in 2002 that will likely reduce the number of bears harvested incidental to moose hunting activities.

Hunter Harvest. Grizzly bear harvest in Units 21B, 21C, and 21D was low ($\bar{x} = 7.3$ bears/year), and no harvest patterns were clear over the last 6 regulatory years (Table 1). More than half the annual harvest was probably unreported. The number of bears taken and not reported was uncertain, but I estimated it was approximately 10 bears per year based on interviews and previously reported values. Most of the bears that were harvested but unreported were likely taken at fish camps. If this estimate was accurate, the combined mean annual harvest for the last 6 regulatory years was approximately 18 bears/year in Units 21B, 21C, and 21D.

The age and sex composition of the reported harvest in Units 21B, 21C, and 21D shows no indication of overexploitation. From RY98 through fall 2003, males made up 80% of the reported harvest, which was an adequate level to maintain recruitment. The percent of males in the harvest was up from 73% reported in 2003 (Stout 2003). For RY02–RY04, the average age of harvested bears was 9.8 years, slightly older than the 34-year average (through RY02) of 8.6 years of age for bears harvested in Units 21B, 21C, 21D and 24. The trend in age of harvested bears has steadily increased.

In Unit 24, the average annual grizzly bear harvest by hunters for RY98 through RY03 was 18.1 bears (Table 2). The reported 3-year average harvest (RY01–RY03) for the northern (north of Allakaket) and southern (remaining) portions of the unit was 14.7 and 2.3 bears, respectively. The number of bears taken by fishermen or trappers and not reported is unknown, but was likely <4 bears annually. The 5-year mean annual reported and estimated unreported harvest (RY98–RY03) for the entire unit was 23.5 bears. Of the reported harvest for that same period, 58% were males and 42% were females, which was a slight change from

the previously reported harvest of 64% males and 36% females. Formerly, the estimated sustainable harvest rate was 5–6% based on data from other areas of Interior Alaska (DuBois 1989), but recent data on bear populations in the Interior suggest harvest rates of up to 10–12% are sustainable. Based on the estimated sustainable harvest rate of 5–6%, a harvest of 51–102 bears can be sustained in this unit.

Among Units 21B, 21C, and 21D, most grizzly bear harvest occurred in Unit 21D (Table 3), where most of the moose hunting also occurred. Unit 21C sustained the second greatest harvest, which was supported by the relatively high density of bears in that area.

Hunter Residency and Success. In Units 21B, 21C, and 21D, nonresident hunters harvested more grizzly bears than local or nonlocal resident hunters (Table 4). Mean annual harvest over the past 4 regulatory years in those units was 1.5 bears for local hunters, 1.25 for nonlocal residents, and 5.25 for nonresidents. From RY94 through fall 2004 the mean annual number of successful hunters was 6.4, which was down only slightly from the previous management report.

Residents of Alaska who did not live in Unit 24 accounted for most of the reported harvest in that unit (Table 5). Most of this harvest was incidental to fall moose hunting. Nonresidents and local residents took relatively few bears, but nonresidents account for an increasingly larger and more consistent proportion of the harvest. Harvest was in the range of 10–15 bears annually until RY00, when hunters reported harvesting 25 bears, the highest harvest since 1973. Harvest in the last 4 years (RY00–RY03) averaged 20.3 bears, an increase from the average harvest of 12.7 bears during RY94–RY99.

Harvest Chronology and Transport Methods. Because harvest was low in Units 21B, 21C, and 21D, a statistically significant pattern demonstrating greater harvest during the spring versus fall was not apparent. Spring bear hunters typically used snowmachines for transportation. Fall bear harvest was often incidental to moose hunting activity, and hunters typically used boats for transportation.

In Unit 24 from RY98 through RY03 most kills occurred during the fall (78%), incidental to hunting other game species. Over the past 4 regulatory years, transportation to the hunt area was via highway vehicle (33%), airplane (20%), boat (18%), horseback/dogteam (14%), or by foot and other methods (15%).

CONCLUSIONS AND RECOMMENDATIONS

For Units 21B, 21C, and 21D, the management objective to manage for a grizzly population that will sustain a 3-year mean annual harvest of at least 25 bears, with at least 50% males in the reported harvest, was achieved. The 3-year mean annual harvest (reported and unreported) of 18 bears was below the harvest objective of 25 bears, and the population was probably increasing. With the current population estimate of 350–400 bears, a sustainable annual harvest of 21–48 grizzly bears can be supported (10–12% of the population). Because males continued to be harvested at more than twice the rate of females and the average age of harvested bears was relatively high, the population was most likely maintaining a high level of reproductive potential with a gradually maturing age-class structure. Although Miller

(1993) cautioned about using the proportion of males in the harvest to determine the composition of the population, approximately half of the bears were harvested in the fall, so the bias of a greater number of male bears in the spring harvest was diminished. Unless regulations or hunting habits change dramatically, the harvest will have a negligible effect on grizzly populations in these units. A more accurate assessment of the unreported harvest and a better estimate of the population size should be addressed in the next reporting period.

In Unit 24, the management objective of maintaining a population that could sustain the stated level of harvest was achieved. During this reporting period (RY02–RY03), harvest throughout the unit was very low and was not a factor influencing the population, although it increased slightly. Although most of the harvest took place in the northern portion of the unit, the population was capable of sustaining that level of harvest. The southern portion of the unit was underutilized at an average harvest rate of less than 3 bears per year. The objective of maintaining at least 50% male harvest was achieved, with 58% of the harvest being males. The trend of increasing age of harvested bears suggests that the population has not been heavily harvested. Most bears in this unit were harvested in the fall, so the bias of a greater number of male bears in the spring harvest was diminished.

Although some localized overhunting could occur in Unit 24, the grizzly bear population as a whole is probably not susceptible to overharvest because hunting is restricted within Gates of the Arctic National Park, where most brown bear habitat occurs. Much of the remainder of the unit is more heavily forested and difficult to hunt. Also, for most hunters the use of firearms is prohibited within 5 miles of the Dalton Highway.

Education, improved reporting compliance, and federal agency cooperative activities will continue to be given high priority during the next reporting period. Age and sex ratios of harvested animals are the standard for monitoring large predator populations in the absence of intensive population investigations, and that information will continue to be collected.

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PREPARED BY:

Glenn W. Stout
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

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Table 1 Units 21B, 21C, and 21D brown/grizzly bear mortality, regulatory years 1998–1999 through fall 2004

Regulatory year	Reported								Estimated kill		Total estimated kill			
	Hunter kill				Nonhunting kill ^a									
	M	F	Unk	Total	M	F	Unk	Total	Unreported	Illegal	M	F	Unk	Total
1998–1999														
Fall 1998	2	2	0	4	0	0	1	1	5	0	2	2	6	10
Spring 1999	1	0	0	1	0	0	0	0	5	0	1	0	5	6
Total	3	2	0	5	0	0	1	1	10	0	3	2	11	16
1999–2000														
Fall 1999	2	1	0	3	0	0	0	0	5	0	2	1	5	8
Spring 2000	4	0	0	4	0	0	0	0	5	0	4	0	5	9
Total	6	1	0	7	0	0	0	0	10	0	6	1	10	17
2000–2001														
Fall 2000	8	1	0	9	0	0	0	0	5	0	8	1	5	14
Spring 2001	4	0	0	4	0	0	0	0	5	0	4	0	5	9
Total	12	1	0	13	0	0	0	0	10	0	12	1	10	23
2001–2002														
Fall 2001	1	3	0	4	0	0	0	0	5	0	1	3	5	9
Spring 2002	3	2	0	5	0	0	0	0	5	0	3	2	5	10
Total	4	5	0	9	0	0	0	0	10	0	4	5	10	19
2002–2003														
Fall 2002	1	0	0	1	0	0	0	0	5	0	1	0	5	6
Spring 2003	4	0	0	4	0	0	0	0	5	0	4	0	5	9
Total	5	0	0	5	0	0	0	0	10	0	5	0	10	15
2003–2004														
Fall 2003	2	0	0	2	0	0	0	0	5	0	2	0	5	7
Spring 2004	3	0	0	3	0	0	0	0	5	0	3	0	5	8
Total	5	0	0	5	0	0	0	0	10	0	5	0	10	15
2004–2005														
Fall 2004	0	0	0	0	0	1	0	0	5	0	0	1	5	6

^a Includes defense of life or property (DLP) kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 24 brown/grizzly bear mortality, regulatory year 1998–1999 through fall 2004

Regulatory year	Reported								Estimated kill		Total estimated kill			
	Hunter kill				Nonhunting kill ^a									
	M	F	Unk	Total	M	F	Unk	Total	Unreported	Illegal	M	F	Unk	Total
<i>1998–1999</i>														
Fall 1998	8	6	0	14	2	0	0	2	3	2	10	6	5	21
Spring 1999	2	0	0	2	0	0	0	0	0	0	2	0	0	2
Total	10	6	0	16	2	0	0	2	3	2	12	6	5	23
<i>1999–2000</i>														
Fall 1999	6	3	0	9	0	0	0	0	3	2	6	3	5	14
Spring 2000	2	1	0	3	0	0	0	0	0	0	2	1	0	3
Total	8	4	0	12	0	0	0	0	3	2	8	4	5	17
<i>2000–2001</i>														
Fall 2000	14	8	0	22	0	0	0	0	3	2	14	8	5	27
Spring 2001	3	0	0	3	0	0	0	0	0	0	3	0	0	3
Total	17	8	0	25	0	0	0	0	3	2	17	8	5	30
<i>2001–2002</i>														
Fall 2001	5	9	0	14	0	0	0	0	3	2	5	9	5	19
Spring 2002	3	1	0	4	0	0	0	0	0	0	3	1	0	4
Total	8	10	0	18	0	0	0	0	3	2	8	10	5	23
<i>2002–2003</i>														
Fall 2002	6	5	0	11	0	0	0	0	3	2	6	5	5	16
Spring 2003	4	3	0	7	0	0	0	0	0	0	4	3	0	7
Total	10	8	0	18	0	0	0	0	3	2	10	8	5	23
<i>2003–2004</i>														
Fall 2003	9	6	0	15	0	0	0	0	3	2	9	6	5	20
Spring 2004	2	3	0	5	0	0	0	0	0	0	2	3	0	5
Total	11	9	0	20	0	0	0	0	3	2	11	9	5	25
<i>2004–2005</i>														
Fall 2004	5	1	0	6	0	0	0	0	3	2	5	1	5	11

^a Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 3 Units 21B, 21C, and 21D reported brown/grizzly bear harvest by subunit, regulatory years 1994–1995 through fall 2004^a

Regulatory year	Unit			Total
	21B	21C	21D	
1994–1995	0	3	5	8
1995–1996	0	0	4	4
1996–1997	1	2	0	3
1997–1998	1	1	8	10
1998–1999	0	2	4	6
1999–2000	1	0	6	7
2000–2001	1	4	8	13
2001–2002	0	1	8	9
2002–2003	0	0	5	5
2003–2004	0	2	3	5
Fall 2004	0	0	0	0

^a Nonhunting kill not included

Table 4 Unit 21B, 21C, and 21D brown/grizzly bear successful hunter residency, regulatory years 1994–1995 through fall 2004

Regulatory year	Local ^a resident	Nonlocal resident	Nonresident	Total successful hunters
1994–1995	2	3	3	8
1995–1996	2	0	2	4
1996–1997	1	2	0	3
1997–1998	4	1	5	10
1998–1999	2	1	3	6
1999–2000	2	2	3	7
2000–2001	1	3	9	13
2001–2002	3	0	6	9
2002–2003	2	0	3	5
2003–2004	0	2	3	5
Fall 2004 ^b	0	0	0	0

^a Unit 21B, 21C, and 21D residents

^b Preliminary

Table 5 Unit 24 brown/grizzly bear successful hunter residency, regulatory years 1994–1995 through fall 2004

Regulatory year	Local ^a resident	Nonlocal resident	Nonresident	Total successful hunters
1994–1995	1	11	4	16
1995–1996	1	7	1	9
1996–1997	2	7	6	15
1997–1998	0	4	4	8
1998–1999	2	10	4	16
1999–2000	0	9	3	12
2000–2001	2	16	7	25
2001–2002	0	12	6	18
2002–2003	1	10	7	18
2003–2004	0	12	8	20
Fall 2004	1	5	0	6

^a Unit residents.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 22 (25,200 mi²)

GEOGRAPHICAL DESCRIPTION: Seward Peninsula and that portion of the Nulato Hills draining west into Norton Sound

BACKGROUND

We believe that brown bear numbers in Unit 22 declined during the early 1900s after the introduction of the gold mining and reindeer herding industries. The population did not begin to slowly recover until these activities diminished substantially during the 1940s, and federal predator control efforts ended at statehood in 1959 (Grauvogel 1986). Since then, bear numbers have increased in most areas, presumably in response to conservative management policies, higher prey densities, and favorable environmental conditions.

Growth of the Unit 22 bear population has had many effects. There is considerable interest in hunting by residents, principally from the Nome area, and by nonresidents through general season and drawing permit hunts. Predation on moose calves is believed to be depressing moose populations in many parts of the unit. Human–bear encounters in the Nome area and in Unit 22 villages and camps are a serious concern to the public, and many local residents believe that bear densities in Unit 22 are excessive. Since 1997, in response to public demand, brown bear hunting regulations have been incrementally liberalized to increase annual harvest and to attempt to reduce bear numbers in Unit 22 (Persons 2001).

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Maintain a population that sustains a 3-year mean annual reported harvest of at least 50% males.

MANAGEMENT OBJECTIVES

- Assess population trends through field observations and analyses of harvest data.
- Seal bear skins and skulls, determine sex, and extract a tooth for aging from brown bears presented for sealing.

- Monitor the brown bear harvest through field observations, brown bear sealing reports, village harvest surveys, subsistence harvest questionnaires, interviews with successful hunters, and data analysis.
- Improve communication with the public to reduce illegal and unreported harvest and improve understanding of defense of life and property (DLP) situations.
- Provide opportunity for subsistence hunting of brown bears.
- Assist the public in dealing with nuisance bear problems.
- Educate the public about bear behavior and safety to minimize conflicts between bears and humans.
- Provide information to the Board of Game on brown bear management.

METHODS

Various methods were used to assess the bear population and to meet the management objectives in Unit 22. Population status was assessed from observations made during other wildlife surveys and fieldwork. Information was also gathered through general conversation with knowledgeable local residents. Efforts were made to inform residents about DLP regulations. Bears were sealed by Nome staff and approved sealing agents in several Unit 22 villages. Harvest data were summarized from sealing certificates, harvest reports from nonresident drawing permits and subsistence registration permits, village-based big game harvest surveys, and DLP reports. Problems with nuisance bears were addressed through public education and by working with Alaska Bureau of Wildlife Enforcement officers and Village Public Safety Officers to deter or destroy problem bears. An electric fence bear enclosure was maintained as a demonstration project at a camp with a history of bear problems in the vicinity of Nome. A second fence was available for seasonal loan and used by a local Nome resident to deter bears from entering his fish camp.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We believe grizzly bear numbers have increased throughout much of Unit 22, and densities are probably above those previously estimated. A census, completed during the early 1990s, estimated the brown bear population in eastern Unit 22B and Units 22C, 22D and 22E at 458 bears >2 years old (density: 1 bear per 27 mi²). The density estimate varied almost two-fold within the study area with the highest densities (1 bear per 20 mi²) in the western portion of Unit 22B and the lowest densities (1 bear per 39 mi²) in the southern portion of Unit 22E (Miller and Nelson 1993). Over the last decade observations by staff, guides, and residents of Unit 22 indicate brown bear numbers have increased throughout much of the unit in spite of increasingly high harvests. Reports of bear encounters and complaints about nuisance bears were frequent, and the take of DLP bears reached an all-time high of 10 bears during the

2000–2001 regulatory year. Destruction of cabins and raids on subsistence food caches now occur in the westernmost parts of the unit where bears previously were seldom seen (Persons 2001). A 2001 Board of Game action opened Unit 22 bear seasons on 1 August and significantly reduced DLP harvest by allowing problem bears to be harvested under sport hunt regulations.

Population Composition

There were no activities to determine population composition in Unit 22 during the reporting period.

Distribution and Movements

There were no activities to determine distribution and movements in Unit 22 during the reporting period.

MORTALITY

Harvest

Season and Bag Limit

Liberalized bear hunting regulations, adopted by the Board of Game in November 2001, went into effect at the beginning of this reporting period. The changes included: 1) increasing the bag limit from 1 bear every 4 years to 1 bear every year, except in Unit 22C, where the bag limit remains 1 bear every 4 years; 2) opening the brown bear season one month earlier on 1 August; 3) increasing the number of nonresident brown bear drawing permits from 8 to 12 in DB690; and 4) adding Unit 22C to the Northwest Brown Bear Management Area.

2002–2003 and 2003–2004

Regulatory Year

Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 22(A) Residents & nonresidents: One bear every regulatory years	1 Aug–31 May	1 Aug–31 May
Unit 22(B) Resident hunters: One bear every year	1 Aug–31 May	
Nonresident hunters: One bear every regulatory year by drawing permit only. Up to 27 permits may be issued in combination with Unit 22C.		1 Aug–31 May
Unit 22(C) Residents: One bear every 4	1 Aug–31 Oct	

<i>2002–2003 and 2003–2004 Regulatory Year</i>		
Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
regulatory years	10 May–25 May	
Nonresidents: One bear every 4 regulatory years by drawing permit only. Up to 27 permits may be issued in combination with Unit 22B.		1 Aug–31 Oct 10 May–25 May
Unit 22(D)		
Residents: One bear every regulatory year	1 Aug–31 May	
Nonresidents: One bear every regulatory year by drawing permit only. Up to 12 permits may be issued in combination with Unit 22E.		1 Aug–31 May
Unit 22(E)		
Residents: One bear every regulatory year	1 Aug–31 May	
Nonresidents: One bear every regulatory year by drawing permit only. Up to 12 permits may be issued in combination with Unit 22D.		1 Aug–31 May
Units 22(A), 22(B), 22(D), 22(E) – Subsistence Hunt		
Residents: One bear per regulatory year by registration permit in the Northwest Alaska Brown Bear Management Area for subsistence purposes	1 Aug–31 May	
Nonresidents:		No Open Season
22(C) – Subsistence Hunt		
Residents: One bear per regulatory year by registration permit in the	1 Aug–31 Oct 10 May–25 May	

2002–2003 and 2003–2004
Regulatory Year

Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
---------------------	--	----------------------------

Northwest Alaska Brown
Bear Management Area for
subsistence purposes

Nonresidents:

No Open Season

Board of Game Actions and Emergency Orders. In March 2003 and 2004 the Board of Game reauthorized the brown bear resident tag fee exemption in Unit 22.

Human-Induced Harvest. In 2002–2003, 84 bears were taken, and in 2003–2004, 90 bears were taken (Table 1). Hunters harvested a record number of bears (n=65) during the fall portion of the 2003 season, and we believe poor spring traveling conditions were a factor in the reduced harvest during the spring portion of the season. Since 1998 the average annual harvest was 92 bears, which is a 70% increase over the 1990–1997 average annual harvest of 54 bears. Liberal bear regulations, bear abundance, reduced ungulate populations in areas of the unit, and a desire by local residents to reduce bear numbers were contributing factors to the high harvests in recent years.

From 1961 to 2001, annual reported harvest of male bears has consistently exceeded the female harvest, with male bears averaging approximately 65% of the harvest. In 2002–2003 male bears composed 68% of the harvest, and in 2003–2004 males bears composed 60% of the harvest.

Since Unit 22 age records began in 1967, the age of harvested bears has averaged 6.3 years annually. During this reporting period, harvested bears averaged 5.8 years (6.3 in 2002 and 5.1 in 2003). We believe the decline in average age is a result of reduced spring harvest due to snow conditions and not an indication of a change in the age structure of the population.

The fall hunt generally targets bears in more accessible places, where most of the older, larger bears have been eliminated, and results in a lower average age compared to bears harvested in the spring, when travel conditions and snowmachines allow access to remote areas of the unit. Since 1967, the average age of harvested bears from the fall portion of the season is 5.6 years, and bears taken from the spring portion of the season averaged 6.8 years.

Much of the harvest is by local recreational hunters who are not selective and shoot whatever bear presents itself first. Large bears are available for serious trophy hunters; 20 of 172 bears (12%) taken during this reporting period had skull sizes of 24 inches or larger. However, the number of record book bears was fewer than the 2 previous reporting periods when 27 skulls (15% of the harvest) and 39 skulls (21% of the harvest) measured 24 inches or larger.

Resident harvest generally exceeds nonresident harvest in Unit 22. The exceptions are in Unit 22A and Unit 22E, where local residents show little interest in hunting brown bears, so nonresident harvest generally exceeds resident harvest.

Nine bears were reported as DLP kills during the 2-year reporting period. These totals do not represent the actual number of nonhunting kills for the reporting period. Each year, we receive unverified reports of bears being shot and left unattended, or of not being sealed. The accuracy of these reports and the extent of illegal harvest are unknown. Nelson (1993) estimated that an additional 10 to 30 bears were killed annually and not reported in Unit 22.

In 2002–2003, nineteen Unit 22 residents registered for the Northwest Alaska Brown Bear Management Area (NWABBMA) subsistence hunt and in 2003–2004, four people registered. There were no subsistence brown bears harvested in 2002, and 2 bears were harvested in 2003. In Unit 22 brown bears are seldom hunted for food, and most residents register so they may keep the hide and skull if they are forced to kill a bear under DLP circumstances.

Nome staff continued work on a community harvest assessment project with the Subsistence Division and Kawerak Native Corporation in an attempt to better quantify unreported subsistence harvest of big game species, including brown bears, by village residents. During this reporting period the villages of Shaktoolik, St. Michael, Stebbins, and Unalakleet were surveyed. Two bears were reported on harvest surveys from Stebbins, but none of the other communities surveyed reported bear harvest.

Permit Hunts. During the 2002–2003 season, 28 drawing permits were available to nonresident hunters in Units 22B and 22C in combination, and 12 permits were allocated to nonresidents in Units 22D and 22E in combination. During the 2003–2004 season, 27 drawing permits were available to nonresident hunters in Units 22B and 22C in combination, and 12 permits were allocated to nonresidents in Units 22D and 22E in combination. The additional permit in 2002 was a one time “governor’s permit” awarded to a nonresident hunter. A continuous season from 1 September to 31 May, except in Unit 22C, allowed drawing permit holders to hunt during either spring or fall. To increase opportunity for nonresidents, all qualified drawing permit applicants are maintained on alternate lists, and permits are issued to alternates in ranked order if drawing permit winners decline their permits and choose not to hunt. Over-the-counter permits were issued both years when the alternate lists were exhausted.

Hunter Residency and Success. We cannot easily evaluate hunter effort and success for resident hunters under the present harvest reporting system because unsuccessful hunters are not required to report. However, it appears hunter success is normally higher in the spring, particularly when suitable snow conditions exist for snowmachine travel and tracking.

The nonresident success rate was 56% in Units 22B and 22C and 50% in Units 22D and 22E during the reporting period. In Units 22B and 22C, 91% of the available drawing hunt permits were issued to nonresident hunters, and in Units 22D and 22E, 100% of the available permits were issued. It is difficult to evaluate nonresident hunter success in Unit 22A because drawing permits are not required.

Harvest Chronology. In 2002–2003, 53% of the harvest occurred in the spring, and in 2003–2004, spring harvest represented 25% of the total harvest (Table 3) Historically, more bears are taken during the spring season because they are more easily observed and tracked, and bears tend to be more accessible to hunters using snowmachines as transportation; however, we believe the poor spring traveling conditions during the reporting period prevented hunters from using snowmachines to hunt and caused the reduced spring harvest.

Transport Methods. The Nome road system makes it possible for bear hunters to use highway vehicles as the primary transportation for hunting or to use roads as access points for boats, 4-wheelers and snowmachines. In the fall, 4-wheelers, followed by boats and highway vehicles, were used most frequently. Most hunters use snowmachines in the spring (Table 4). Aircraft use in the unit is primarily limited to registered guides moving clients in and out of camps. Other transport methods are used from the camps.

Other Mortality

There were no observations of other mortality during the reporting period.

HABITAT

Assessment

There were no brown bear habitat assessment activities in Unit 22 during the reporting period.

Enhancement

There were no brown bear habitat enhancement activities in Unit 22 during the reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Unit 22 staff temporarily housed 2 bear cubs that were orphaned when a local hunter mistakenly harvested the sow during a legal hunting season in May of 2003. The cubs were approximately 14 weeks old and stayed in Nome for 2 days before being shipped to the Oklahoma City Zoo.

Moose research in Unit 22B indicates that brown bear predation on moose calves reduces calf survival in western Unit 22B (Persons 1998), and research in other parts of Alaska has shown that brown bear predation can be the primary factor in limiting moose population growth. Moose recruitment rates have declined to less than 10% in much of Unit 22 over the last 15 years, during which time bear numbers are believed to have increased. Anecdotal evidence suggests bear predation on adult moose, particularly in the spring, is common.

CONCLUSIONS AND RECOMMENDATIONS

The only bear census conducted in Unit 22 was completed in 1991 and estimated 458 bears >2 years old (density: 1 bear per 27 mi²) in western Unit 22B and Units 22C, 22D and 22E. The density estimate varied almost two-fold within the study area with the highest densities (1 bear per 20 mi²) in the western portion of Unit 22B and the lowest densities (1 bear per 39 mi²) in the southern portion of Unit 22E (Miller and Nelson 1993). Throughout the 1990s,

observations by staff, guides, and residents of Unit 22 and increasing reports of bear encounters and complaints about nuisance bears all indicated bear numbers were increasing unitwide. The take of DLP bears reached a high of 10 bears during the 2000–2001 regulatory year. Destruction of cabins and raids on subsistence food caches were reported in the westernmost parts of the unit, where bears were previously seldom seen. Beginning in 1997, the Board of Game began incremental liberalization of bear hunting regulations, resulting in higher harvests. In the last few years, in the most heavily hunted part of unit (Units 22B west, Unit 22C and the more accessible parts of Unit 22D), staff and public observations, a reduction in complaints about problem bears, and harvest data now suggest that bear numbers may have stabilized or be declining somewhat.

During the 2001–2002 regulatory year, 54% of the harvest was male bears, which is the lowest percentage of males in the harvest since 1992. From 1961 to 2001, reported harvest of male bears has consistently exceeded the female harvest, with male bears averaging approximately 65% of the harvest. During this reporting period, 65% percent of bear harvest was male bears, so it appears the reduction documented during the 2001–2002 regulatory may have been an anomaly in harvest, rather than a change in the sex structure of the population.

Over the last decade we believe Unit 22 brown bear numbers have increased above the density estimated in the bear census and research study reported in 1991. During the same period moose populations and recruitment rates have declined in most parts of the unit, and we attribute current moose declines largely to bear predation on calves. As recommended in the previous progress report, we have maximized opportunity to hunt brown bears (except Unit 22C) in an attempt to reduce bear numbers. Although uncertain, the reduction of brown bear density may have the benefit of reducing bear predation on moose calves. In Unit 22C bears are already heavily harvested, and the Unit 22C moose population is above our management goal.

From 1990 to 2000, Unit 22 brown bear harvest approximately doubled and has since appeared to stabilize after a record high 104 bears were taken during the 2000–2001 regulatory year. During the three regulatory years since 2000–2001, harvest has reduced to 85, 84, and 90 bears, respectively, which yields a 3-year annual average of 86 bears (Figure 1).

We should strive for high harvest rates and reductions in the bear population only as long as necessary to rebuild moose populations that are limited by predation. If high harvests and annual harvests composed of more than 50% female bears fail to result in improved moose recruitment, bear harvest should be reduced before the bear population is reduced to very low levels.

It is important to increase educational efforts aimed at understanding bear behavior, bear safety and minimizing bear–human conflicts and emphasizing the importance of clean camps and not leaving food, dog food, scraps or garbage unattended or accessible to bears. We should continue efforts to improve understanding of hunting and DLP regulations in the villages.

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PREPARED BY:

Tony Gorn
Wildlife Biologist II

SUBMITTED BY:

Peter J. Bente
Management Coordinator

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Table 1 Unit 22 brown bear harvest^a for regulatory years 2002–2003 and 2003–2004

Regulatory year	Reported harvest											
	Hunter kill				Nonhunting kill				Total			
	M	F	Unk.	Total	M	F	Unk.	Total	M	F	Unk.	Total
<u>2002–2003</u>												
Fall 2002	25	12	0	37	1	4	1	6	26	16	1	43
Spring 2003	29	12	0	41	0	0	0	0	29	12	0	41
NWABBMA	0	0	0	0	0	0	0	0	0	0	0	0
Total	54	24	0	78	1	4	1	6	55	28	1	84
<u>2003–2004</u>												
Fall 2003	36	29	0	65	0	3	0	3	36	32	0	68
Spring 2004	17	5	0	22	0	0	0	0	17	5	0	22
NWABBMA	0	0	0	0	0	0	0	0	0	0	0	0
Total	53	34	0	87	0	3	0	3	53	37	0	90

^a Represents the total known harvest, including nonresident permit hunt harvest, DLP, and other human-caused accidental mortality.

Table 2 Proportion of successful brown bear hunter residency in Unit 22 for regulatory years 2000–2004

Regulatory Year	Successful hunters								
	Local Residents ^a		Nonlocal Residents		Nonresidents		Unknown		Total
	(n)	%	(n)	%	(n)	%	(n)	%	(n)
2000–2001	39	41%	10	11%	45	48%	0	0%	94
2001–2002	34	42%	15	19%	32	40%	0	0%	81
2002–2003	36	43%	13	15%	32	38%	3	4%	84
2003–2004	39	43%	16	18%	31	34%	4	4%	90

^a Hunters residing in Unit 22

Table 3 Sex of Unit 22 brown bear harvest^a for regulatory years 2002–2003 and 2003–2004

Regulatory Year	Game management unit																	
	22A			22B			22C			22D			22E			Total		
	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U
<u>2002–2003</u>																		
Fall 2002	10	4	0	7	2	0	4	2	0	3	4	0	1	0	0	25	12	0
Spring 2003	5	4	0	10	5	0	3	1	0	3	1	0	8	1	0	29	12	0
<u>2003–2004</u>																		
Fall 2003	11	4	0	12	13	0	5	5	0	8	7	0	0	0	0	36	29	0
Spring 2004	7	0	0	3	1	0	1	0	0	4	2	0	2	2	0	17	5	0

^a Includes nonresident permit hunts and NWABBMA harvest and nonhunting mortalities.

Table 4 Unit 22 brown bear harvest by transport method for regulatory years 1995–2003

Regulatory Year	Number harvested							Total (<i>n</i>)
	Airplane	Boat	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1995–1996	7	1	29	6	5	0	0	48
1996–1997	9	5	14	15	12	3	0	58
1997–1998	7	6	28	8	10	0	0	59
1998–1999	4	13	42	13	8	3	0	83
1999–2000	7	8	35	25	12	2	0	91
2000–2001	6	10	56	10	10	2	0	94
2001–2002	1	8	42	21	7	2	0	81
2002–2003	5	14	34	13	9	6	3	84
2003–2004	4	20	10	24	18	11	3	90

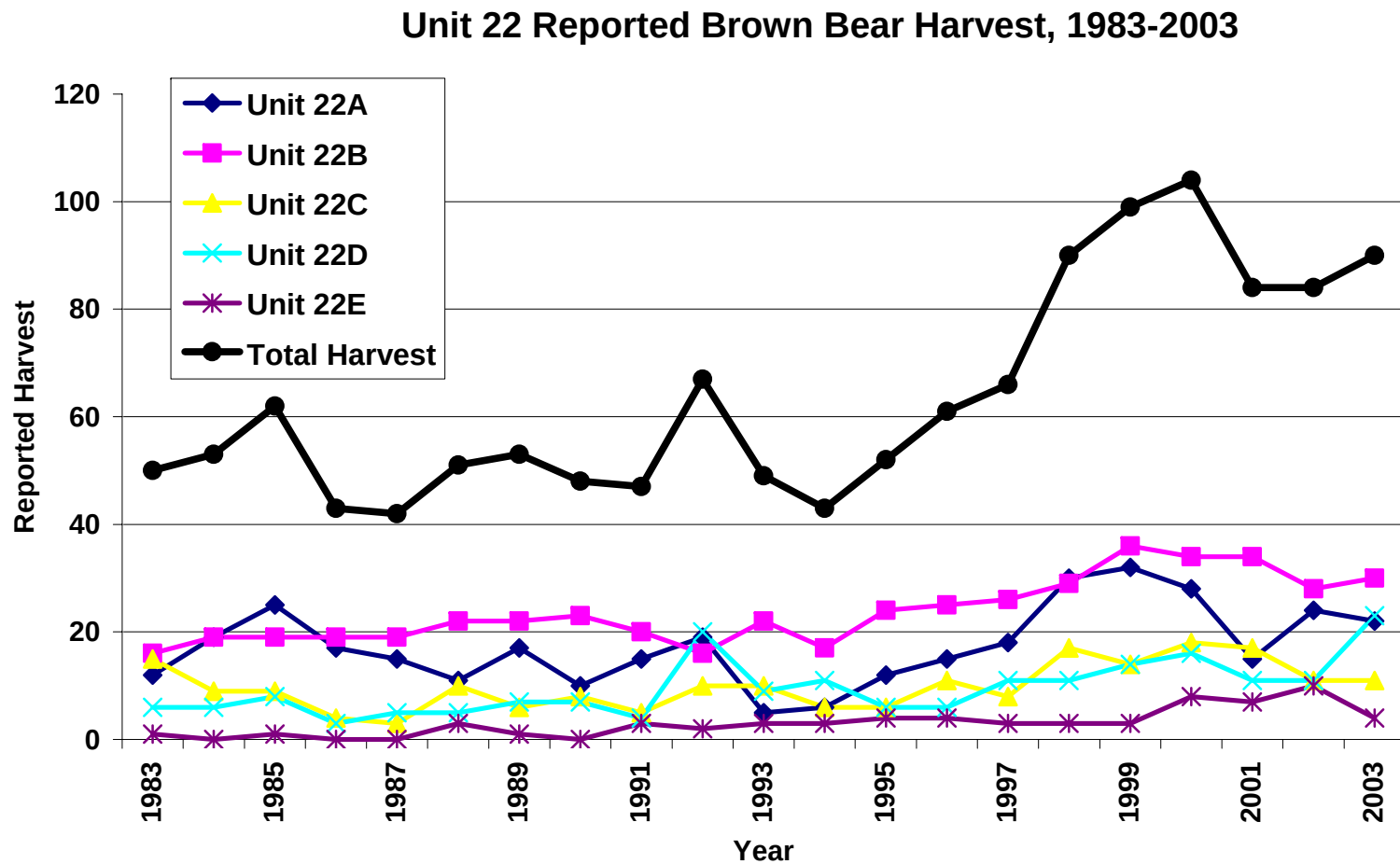


Figure 1 Unit 22 reported brown bear harvest, 1983–2003

BROWN BEAR MANAGEMENT REPORT

From: July 2002

To: June 2004

LOCATION

GAME MANAGEMENT UNIT: 23 (43,000 mi²)

GEOGRAPHICAL DESCRIPTION: Kotzebue Sound and western Brooks Range

BACKGROUND

The department established hunting regulations and sealing requirements for brown bears in Unit 23 in 1961. From that time until the early 1990s, regulations assumed the primary use of brown bears was for trophy hunting. However, Inupiat hunters of inland communities had traditionally harvested brown bears for meat, fat, and hides for countless generations (Loon and Georgette 1989). In response to frustration expressed by local residents over hunting regulations for brown bear and other species, department staff began an extensive regulation review in Unit 23 during 1988. This review provided the basis for establishing the Northwest Alaska Brown Bear Management Area (NWABBMA) subsistence registration hunt in 1992. Since 1992, 3 types of brown bear hunts have existed in Unit 23: 1) two drawing permit hunts (DB 781 – fall; DB 791 – spring) for nonresident hunters; 2) a general season hunt for resident hunters; and 3) a subsistence registration permit hunt for resident hunters. Since the early 1990s, brown bear hunting regulations have been incrementally liberalized in Unit 23 to increase hunting opportunity and reduce predation on declining numbers of moose.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

The management goal for brown bears in Unit 23 is to maintain a minimum density of one adult bear per 25.7 mi² in the Noatak drainage.

MANAGEMENT OBJECTIVES

- Conduct a census in the Noatak drainage during 2006 or 2007. The census should be comparable to the census completed in 1987.
- Continue community-based assessments to collect brown bear harvest information from residents of Unit 23.

METHODS

We obtained harvest information from sealing documents, community harvest assessments, and harvest reports. Compliance with brown bear sealing requirements has historically been low for residents of Unit 23; therefore, this data should be viewed as a minimal estimate of

harvest. In contrast, most nonlocal hunters seal their bears so this data is reasonably accurate. We believe community-based harvest assessments and harvest reports from the registration subsistence hunt are much more accurate than sealing data. Computer access to archived harvest data continued to improve during this reporting period. Harvest summaries reported in previous management reports were updated based on these files. Many brown bears taken under defense of life or property (DLP) regulations are not reported, and many of those that have been reported have still not been entered into the statewide harvest files. As a result, harvest data in future reports will likely differ from that reported here. Kotzebue staff contacted by phone those subsistence registration permit holders who did not respond to the harvest report letter.

The 1987 Red Dog brown bear census provided a benchmark for bear abundance in the northwest portion of Unit 23. Since then, our understanding of brown bear population status has been based on qualitative information from local residents and some long-term commercial operators and opportunistic observations of agency staff.

To determine whether harvests have affected the sex and age structure of bear populations, I plotted the proportion of males in the total Unit 23 harvest through time. I also plotted the size and age of male bears taken by nonlocal hunters throughout the unit, and in the most heavily hunted portion of the unit (Noatak, Wulik and Kivalina drainages), to look for “red flags” that could suggest whether hunting has affected the population sex or age structure. I focused on harvest by nonlocal hunters because they select most strongly for large, male bears. In contrast, many local hunters are nonselective or select small bears for food. I assumed that a decreasing proportion of males or a decrease in the size or age of males taken by nonlocal hunters would indicate harvests have affected the sex or age structure of the population.

The term “nonlocal hunter” in this report refers to resident Alaskans who live outside of Unit 23 as well as nonresident and alien hunters. “Local hunter” refers to anyone residing in Unit 23.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The only brown bear population census conducted in Unit 23 occurred in the vicinity of the Red Dog Mine during 1987. This census estimated a density of one adult bear (2.5+ years) per 25.7 mi² (Ballard et al. 1991). There is no other quantitative data for this unit to indicate population trend.

Residents of Unit 23 report brown bear numbers have increased since at least the 1940s or 1950s. Several developments over the last 50 years have probably contributed to this trend. Moose, caribou, and muskox numbers in this region increased substantially since the 1950s. This has provided a stable prey base for large predators. In addition, the presence of these ungulates substantially reduced the subsistence harvest of brown bears (R. Stoney, personal communication). In recent years the decline of the commercial salmon fishery in Kotzebue Sound has allowed more salmon to reach spawning areas far inland, again increasing food for

bears. State hunting regulations have probably contributed to the increase of brown bears in Unit 23 as well. For example, from statehood until the early 1990s, brown bear hunting regulations mainly provided opportunities for trophy hunting and discouraged subsistence hunting to some extent. Additionally, regulations have historically made it virtually impossible to harvest sows. In contrast, “denning” bears and killing all occupants, including sows with cubs, commonly occurred when bears provided the only reliable source of terrestrial hides, meat, and fat to local users (R. Stoney, personal communication). Finally, the strong selection by recreational hunters for large male bears that occasionally kill cubs and smaller bears may have reduced natural mortality to some degree.

Since the mid 1990s many residents of Unit 23 have complained there are “too many bears” here. They complain that bears damage remote camps, take fish from drying racks, and scare people while berry picking or hunting. Similarly, some nonlocal moose and caribou hunters have lost meat to brown bears each year. Based on my opportunistic observations and reports from the public, bear predation on moose calves has likely depressed moose recruitment in large portions of the Unit since the mid to late 1990s.

MORTALITY

Harvest

Season and Bag Limit

The following regulations were in effect throughout the 2002–2003 and 2003–2004 regulatory years:

<u>Unit and Bag Limits</u>	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 23		
Residents: One bear per regulatory year; a \$25 tag fee is required	1 Aug–31 May (General hunt)	
Nonresidents: One bear every regulatory year by drawing permit (24 permits fall; 24 permits spring)		1 Sep–10 Oct 15 Apr– 25 May
Residents: One bear per regulatory year by registration permit in the NWABBMA	1 Aug-31 May (Subsistence hunt)	

Hunters taking a brown bear under the general season hunt were required to use a big game tag and seal the hide and skull. Salvage of meat was optional under this hunt. The NWABBMA subsistence registration permit hunt has been previously described (Dau 2002).

Game Board Actions and Emergency Orders. There were no emergency orders issued for brown bears during the reporting period. In November 2003 the Board of Game increased the number of nonresident brown bear permits for the fall hunt (DB781) from 24 to 34. The board also eliminated the \$25 resident tag fee at this meeting so that resident hunters would only need a valid hunting license to take a bear under the general hunt within Unit 23. These changes went into effect during the 2004–2005 regulatory year.

Hunter Harvest. Harvest levels in 2002–2003 and 2003–2004 were similar and lower than in any previous year since 1998–1999 (Figure 1). The onset of breakup happened abruptly in April 2004, and as a result of poor conditions for snowmachines and airplanes, almost no bears were taken during spring. As in the past, few bears were taken under the subsistence registration permit hunt during this reporting period (Table 1).

Brown bear harvests have generally increased since the early 1960s, despite substantial annual variability around this trend (Figure 1). Annual variation in harvest levels is primarily attributable to weather and snow conditions, especially during spring, which strongly affect access and success rates. Although establishment of the brown bear subsistence hunt in 1992 may have improved our harvest data to some degree, it likely had little effect on the long-term trend toward increasing harvests because so few bears have been taken under this hunt. We feel the subsistence hunt had no effect on actual harvest levels in Unit 23 because brown bears were taken for subsistence prior to 1992 but were rarely sealed.

Community harvest estimates suggest villages within Unit 23 take relatively few brown bears for subsistence. For example, since 1998–1999, 8 community harvest assessments have been conducted in 6 villages within Unit 23 (Table 2). The maximum number of brown bears reported taken by a community during any individual year was 5 (Table 2). Combining all community harvest assessment data for Unit 23 indicates 0.0043 brown bears were taken on a per capita basis. Extrapolating that to the human population of Unit 23 (6563 people excluding Kivalina and Point Hope, which do not harvest brown bears for food) suggests roughly 32 brown bears were harvested for subsistence annually during this reporting period. It may be inappropriate to apply a harvest rate estimated from outlying villages to the entire community of Kotzebue. Applying the per capita harvest rate (0.0043 brown bears/person) only to outlying villages in Unit 23 (3468 people excluding Kivalina, Point Hope, and Kotzebue) suggests about 15 bears were taken. During 1999–2000 through 2003–2004, residents of Kotzebue reported taking an average 7.4 bears annually. Adding the mean annual bear harvest for Kotzebue (7 bears) to the village per capita harvest estimate (15 bears) yields a total Unit 23 local harvest of 22 bears. Thus, residents of Unit 23 probably took roughly 22–32 brown bears annually during this reporting period.

Illegal harvests may exceed the unreported component of legitimate subsistence harvests in Unit 23. For example, several years ago 8 brown bears were taken illegally for their gall bladders within a period of several days between Kivalina and Cape Thompson (C. Bedingfield, personal communication). Similarly, in the past 2 years I have found 3 bears, 1 of which had a cub that almost certainly died later, shot and left by hunters. My discoveries must represent only a small fraction of all bears shot and abandoned. Additionally, many residents of Unit 23 feel DLP reporting requirements are onerous and, as a result, many bears

taken under these regulations are not reported. The significance of this is that harvest data underrepresents total human-induced mortality of bears. Even so, brown bear numbers remained high during the reporting period.

As in previous years, more brown bears were reported taken in the Noatak drainage during this reporting period than in any other drainage (Figure 2, Table 3). This is partly because guides and residents of Kotzebue have historically focused their efforts in the Noatak River drainage where brown bears are easier to hunt than in the more densely forested Kobuk drainage. Since 1998, brown bear harvests in the Kobuk drainage have been approaching those reported for the Noatak drainage.

There was no trend in the proportion of males in the total Unit 23 harvest (Figure 3). Likewise, there was no trend in skull size for male bears taken by nonlocal hunters throughout the unit (Figure 4). Although there was no clear temporal trend in median age of male bears taken throughout the unit (Figure 5), it appears hunters began taking somewhat younger bears after 1991.

Historically, most trophy hunting for brown bears in Unit 23 has occurred in that portion of the Noatak drainage below the Anisak River and in the Wulik and Kivalina drainages. Telemetry results indicate bears commonly move among these drainages (Ballard et al. 1991). If hunting has substantially affected the sex or age structure of bears anywhere in Unit 23, it should be most apparent in harvests within this area by nonlocal hunters, who most strongly select for large male bears. In this area there was no trend in the proportion of male bears taken, or in the size of male bears harvested for the sample of all bears harvested, or for the subsample of bears harvested only by nonlocal hunters (Figure 6).

Brown bear hunting regulations in Unit 23 have been modified many times since 1962. Since 1992, brown bear regulations have been incrementally liberalized to provide for traditional subsistence hunting practices and to increase opportunity for recreational hunters. These regulatory changes also attempted to slowly reduce bear density to reduce bear-human conflicts and predation on moose. Even so, the long-term trend toward higher harvests (Figure 1) is probably more a function of increasing numbers of commercial operators and nonlocal hunters in Unit 23, especially nonlocal resident hunters (Figure 7), than increasingly liberal brown bear regulations.

Permit Hunts. Participation in the NWABBMA registration hunt may be declining as a result of increasingly liberal general hunting regulations. Subsistence hunters took 4 bears (all males) in 2002–2003 and no bears in 2003–2004 (Table 1).

Nonresident brown bear hunters were limited to 2 drawing permit hunts, DB781 (fall hunt) and DB791 (spring hunt), with 24 permits available in each hunt annually. Nonresidents took 7 bears (1 male and 6 females) in fall 2002, 4 bears (all males) in spring 2003, 4 bears (all males) in fall 2003, and 1 bear (a male) in spring 2004 (Table 1). During 2003–2004, the nonresident harvest was the lowest ever recorded, and the nonlocal resident harvest was near its maximum range (Table 4).

Hunter Residency and Success. Nonlocal resident and nonresident hunters took 79% and 88% of the total reported Unit 23 harvest during 2002–2003 and 2003–2004, respectively (Figure 8, Table 4; this does not include community harvest assessment data). The number of Alaskan hunters who reside outside Unit 23 has increased substantially since the early 1990s. Increasing harvest levels are primarily attributable to higher numbers of nonlocal hunters.

Harvest Chronology. More bears were taken during September than in any other month (Table 5). During 2002–2003, 63% of the harvest occurred during September, and in 2003–2004 this percentage was 71%.

Transport Methods. As in previous years, aircraft were the predominant means of accessing brown bear hunting areas. Boats (during fall) and snowmachines (during spring) were the next most commonly used means of transportation (Table 6). Many guides are now combining use of airplanes and snowmachines to hunt bears. Use of all-terrain vehicles (ATVs) during fall is increasing for hunting all big game in Unit 23 as guides and outfitters base them at remote camps.

Other Mortality

There were no estimates of other mortality for brown bears in Unit 23 during the reporting period.

HABITAT

Assessment

There were no habitat assessment activities in Unit 23 during the reporting period.

Enhancement

There were no habitat enhancement activities in Unit 23 during the reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

During this reporting period, brown bears continued to be viewed as a nuisance or threat to many residents of Unit 23 who encounter them during subsistence activities, e.g., drying fish or picking berries. Many local residents believe brown bears have caused moose numbers to decline in Unit 23 during recent years.

CONCLUSIONS AND RECOMMENDATIONS

- Census a large portion of northwest Unit 23, including the 1987 Red Dog brown bear project study area, in 2006 or 2007 to evaluate the effects of development on bear abundance and determine bear density.
- Continue community-based assessments to monitor harvests of brown bears by residents of Unit 23.
- Brown bear regulations in Unit 23 have been incrementally liberalized since the early 1990s. During this time, brown bear harvest levels have increased; however, this trend began well before recent regulatory changes. Increases in bear harvests have probably been caused more by increasing numbers of commercial operators and nonlocal hunters

throughout Unit 23 than through increased hunting opportunity. Although brown bear harvests have clearly increased in Unit 23 over the last 40 years, harvest data do not suggest this has affected the sex or age structure of the population or the size of bears available to hunters. Heavily hunted portions of the unit may be acting as “population sinks” where bears, especially boars, continually replace those that are harvested through immigration from lightly hunted areas, e.g., the upper Noatak drainage and Brooks Range. Alternatively, harvest data is notoriously insensitive to changes in brown bear population structure. Without census data, human harvests could skew population sex and age structures and not be reflected in harvest data.

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PREPARED BY:

Jim Dau
Wildlife Biologist III

SUBMITTED BY:

Peter J. Bente
Survey-Inventory Coordinator

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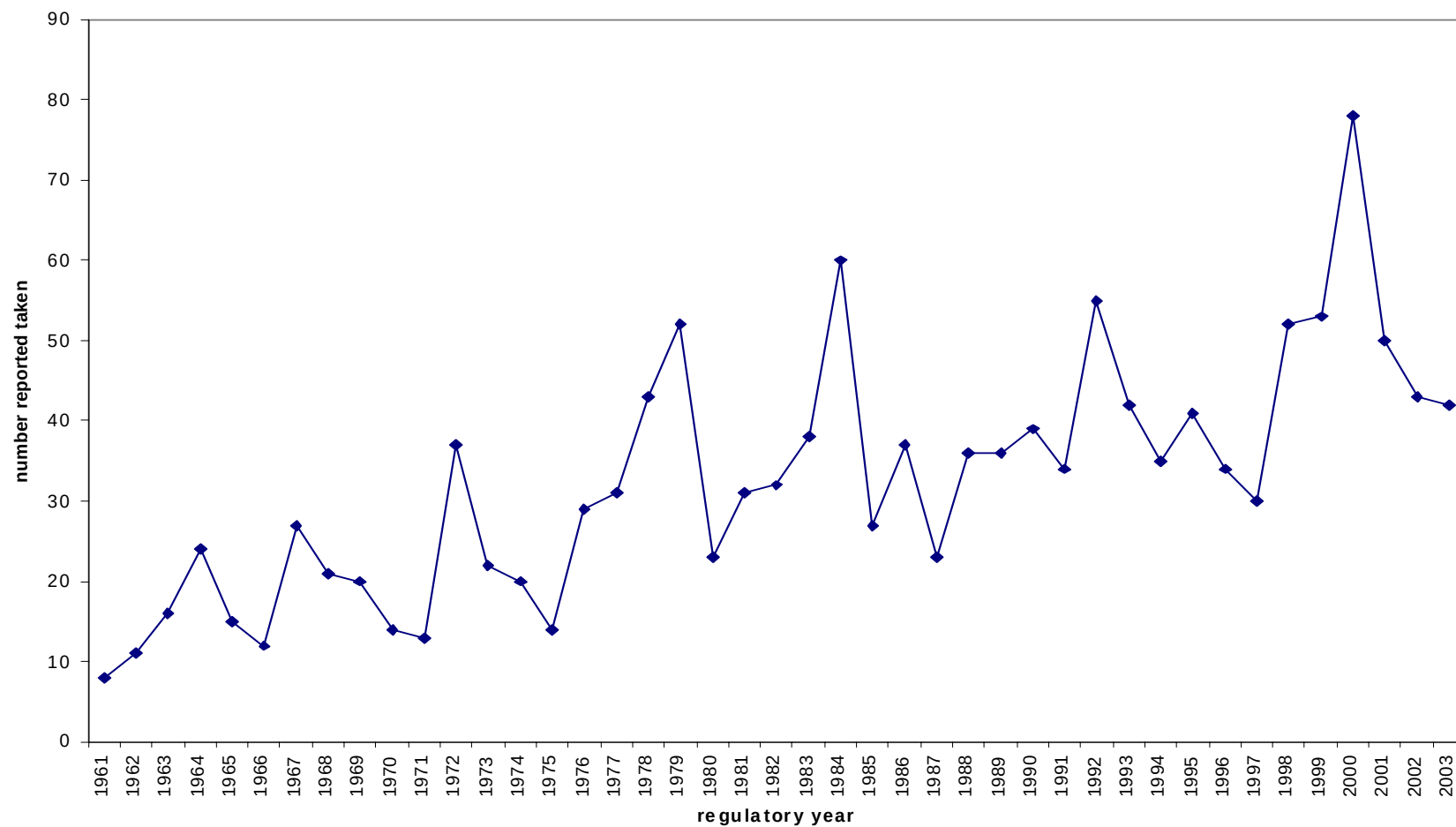


Figure 1 Unit 23 brown bear harvest, 1961–1962 through 2003–2004 (sealing and registration permit data)

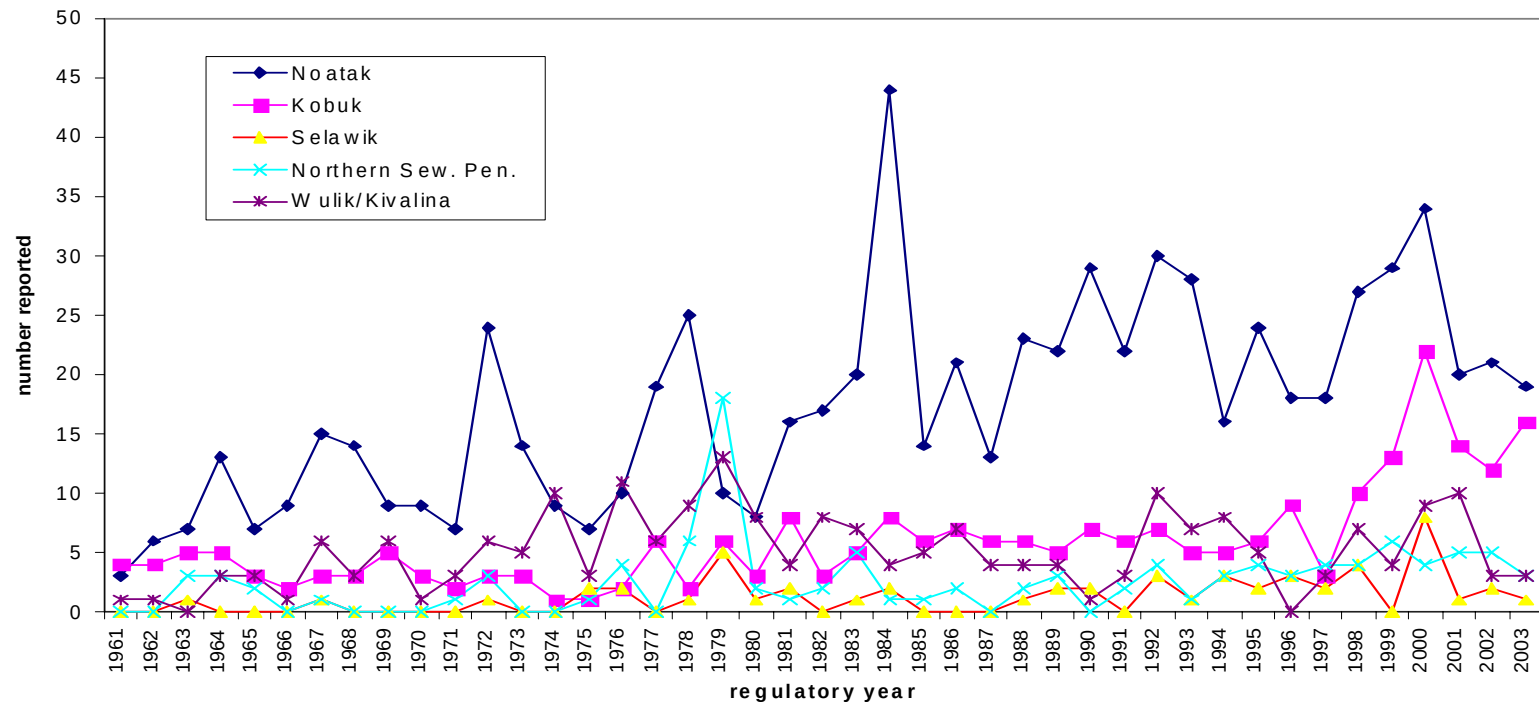


Figure 2 Unit 23 brown bear harvest by drainage, 1961–1962 through 2002–2003 (sealing and registration permit data)

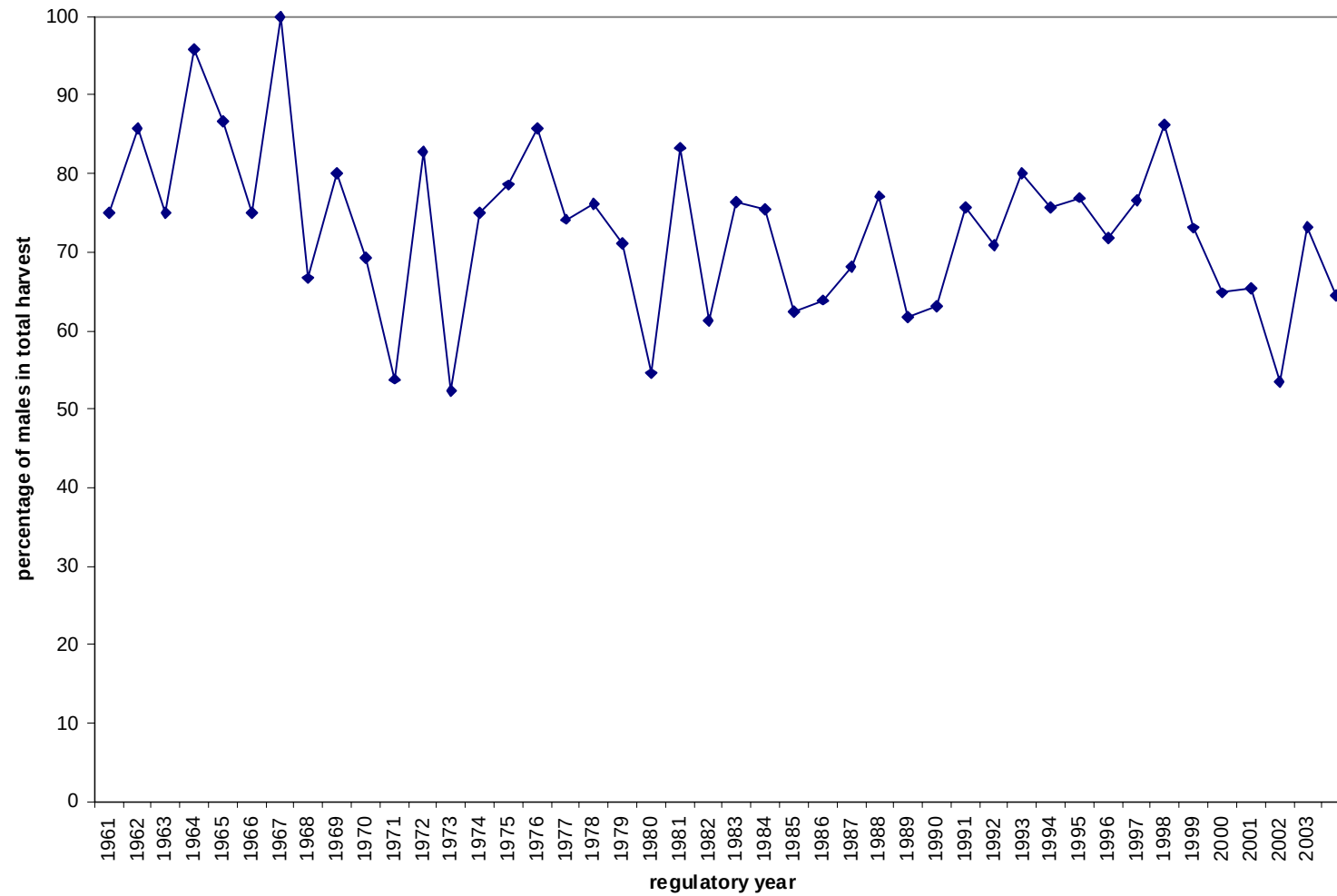


Figure 3 Percentage of males in Unit 23 brown bear harvest, 1961–1962 through 2003–2004 (sealing and registration permit data)

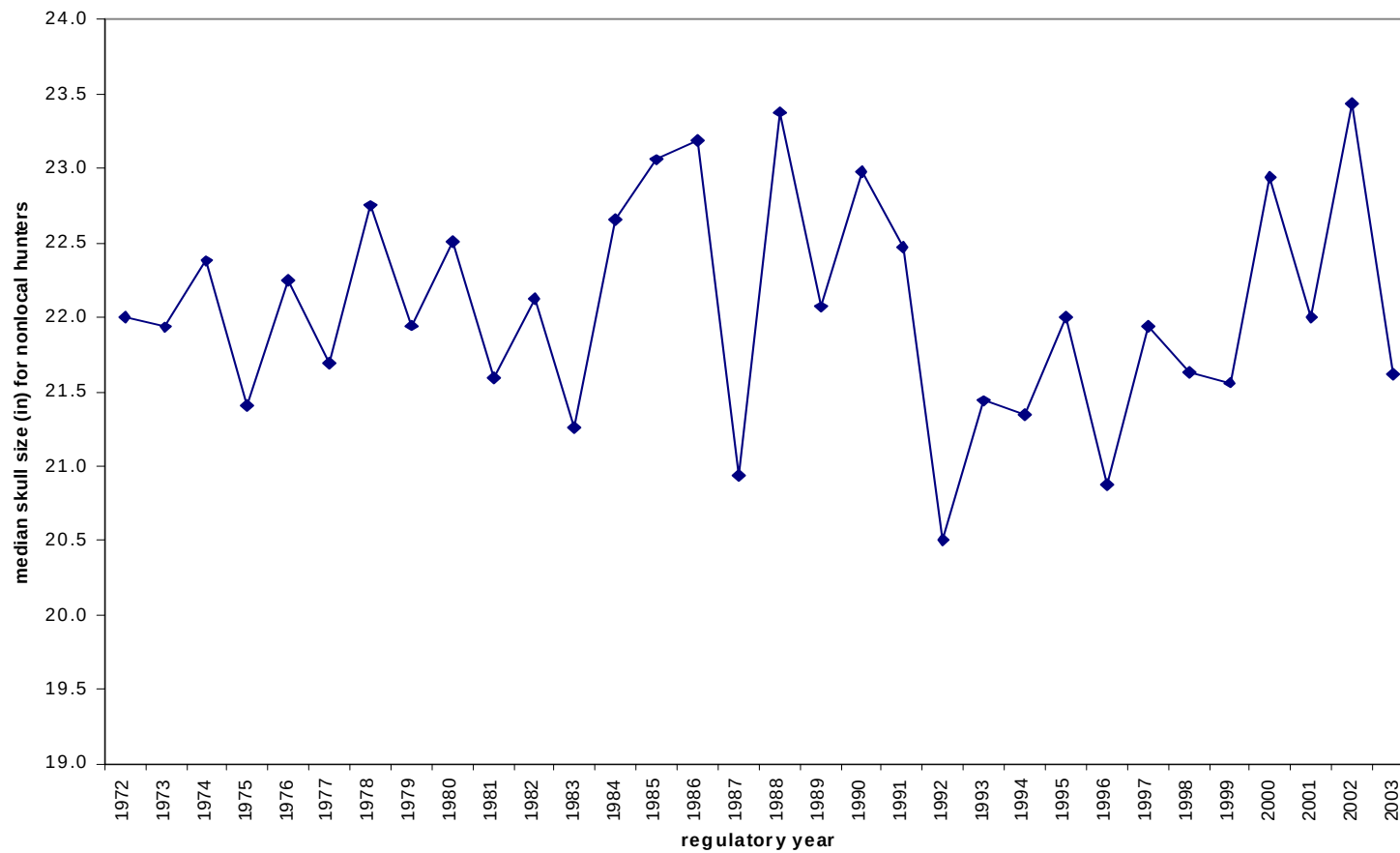


Figure 4 Median skull size of male brown bears taken in Unit 23 by hunters who resided outside the unit, 1972–1973 through 2003–2004 (sealing data)

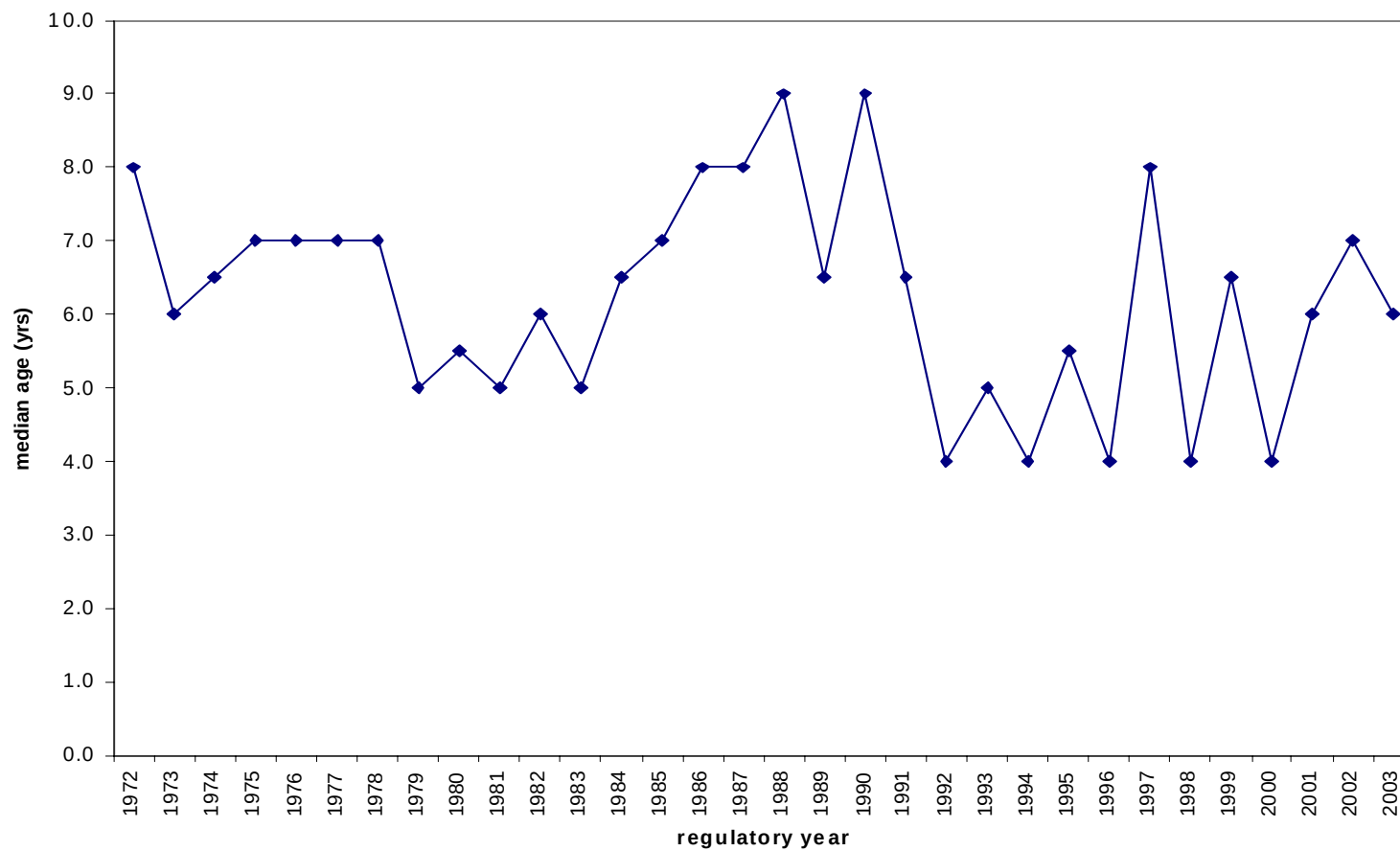


Figure 5 Median age of brown bears harvested in Unit 23, 1972–1973 through 2003–2004 (sealing data)

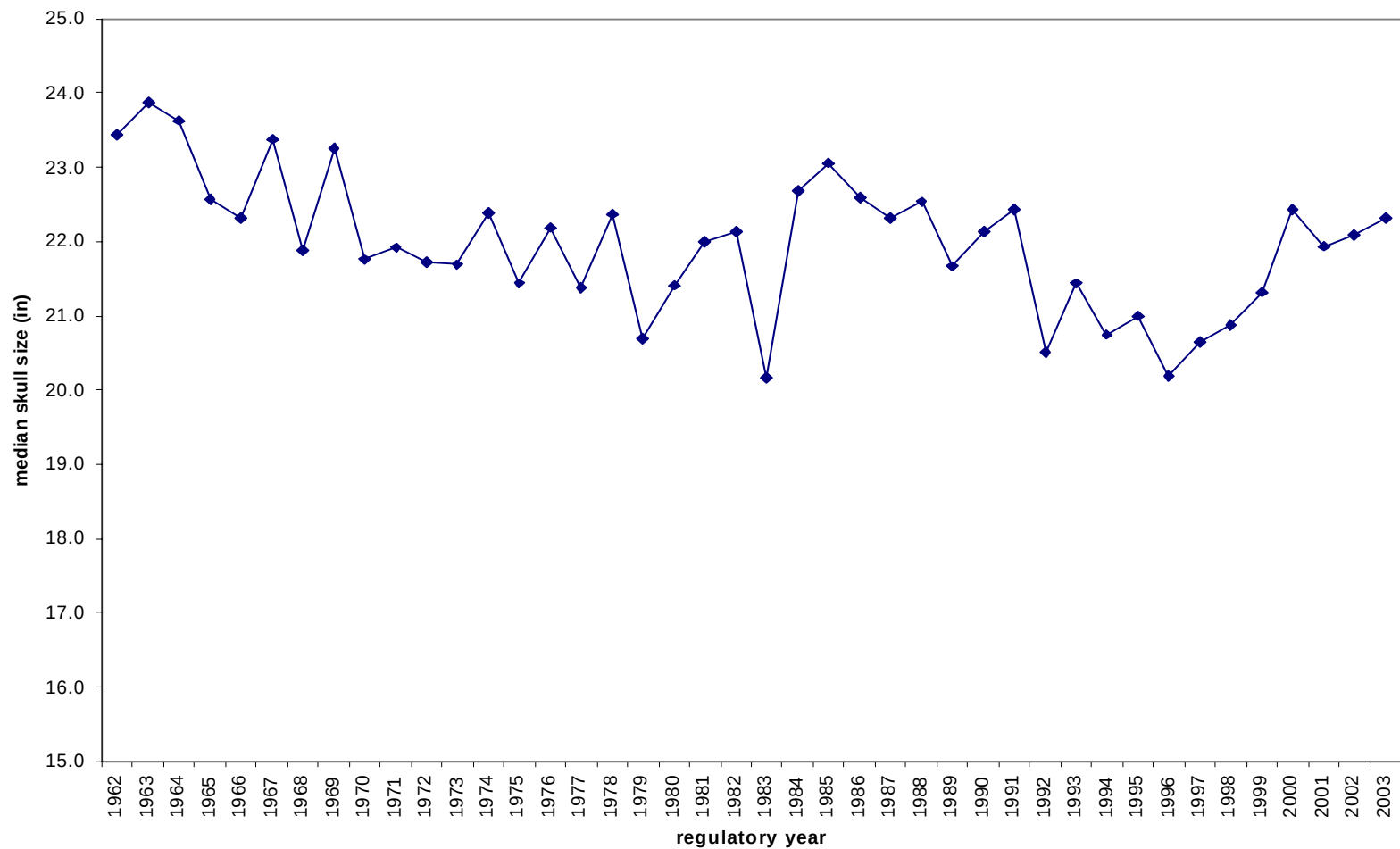


Figure 6 Median skull size of male brown bears taken in that portion of the Noatak drainage below the Anisak R., and in the Wulik and Kivalina drainages, 1962–1963 through 2003–2004 (sealing data)

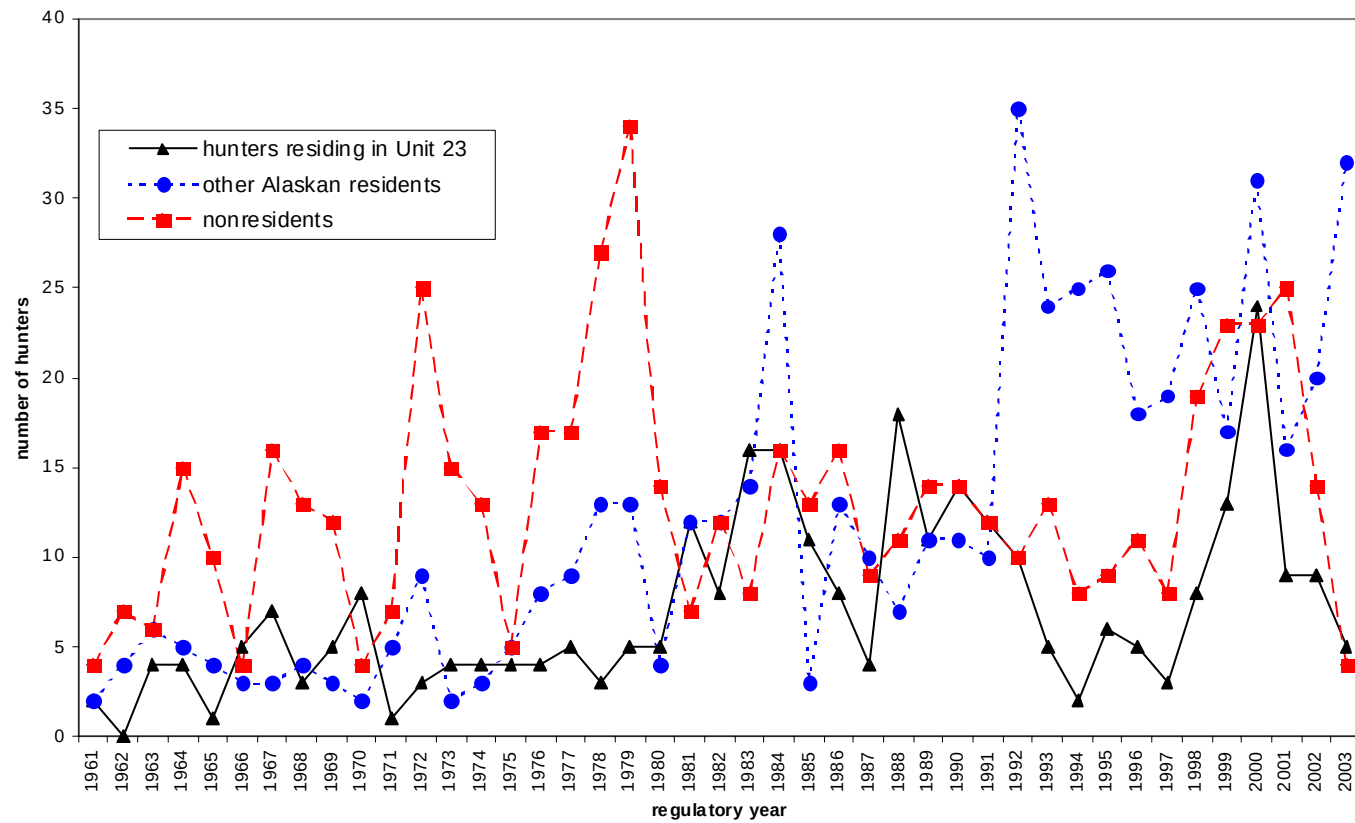


Figure 7 Unit 23 brown bear harvest by hunter residence, 1961–1962 through 2003–2004 (sealing and registration permit data)

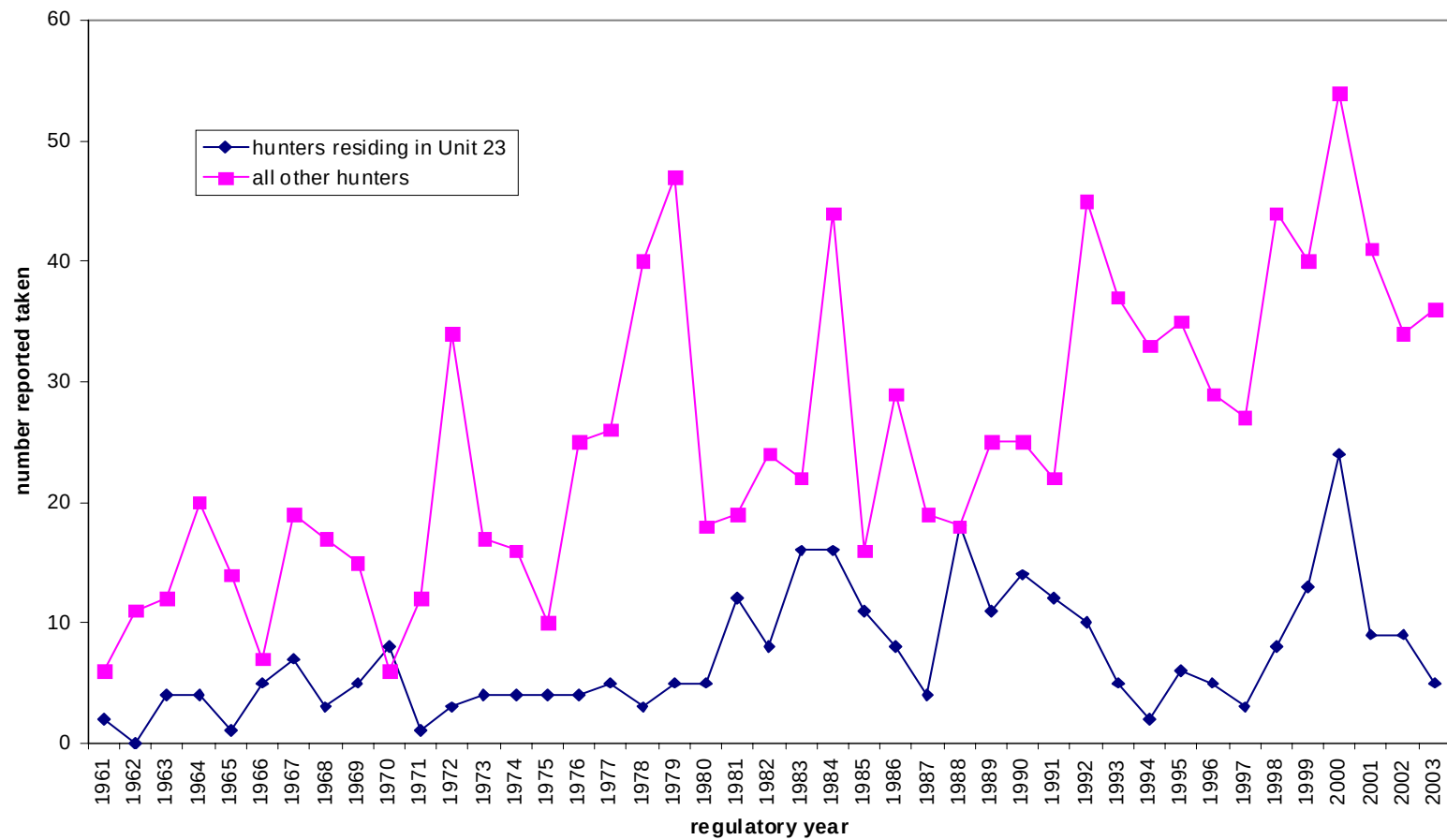


Figure 8 Unit 23 brown bear harvest by hunter residence, 1961–1962 through 2003–2004 (sealing and registration permit data)

Table 1 Reported harvest of brown bears in Unit 23, 1998–1998 through 2003–2004, by hunt type (excludes bears reported with hunt unknown; sealing and registration permit data)

Regulatory year/Hunt type	Male	Female	Unknown	Total
1998–1999				
General hunt	22	4	1	27
Fall nonresident (DB781)	9	2	2	13
Spring nonresident (DB791)	5	0	1	6
NWABBMA (subsistence)	7	0	0	7
Nonhunting harvest	1	0	0	1
Total	44	6	4	54
1999–2000				
General hunt	6	6	0	12
Fall nonresident (DB781)	7	4	0	11
Spring nonresident (DB791)	9	1	0	10
NWABBMA (subsistence)	4	1	0	5
Nonhunting harvest	6	3	7	16
Total	32	15	7	54
2000–2001				
General hunt	28	16	1	45
Fall nonresident (DB781)	2	4	0	6
Spring nonresident (DB791)	11	0	0	11
NWABBMA (subsistence)	6	3	0	9
Nonhunting harvest	0	1	1	2
Total	47	24	2	73
2001–2002				
General hunt	16	7	0	23
Fall nonresident (DB781)	6	5	0	11
Spring nonresident (DB791)	8	4	0	12
NWABBMA (subsistence)	2	1	0	3
Nonhunting harvest	0	0	1	1
Total	32	17	1	50
2002–2003				
General hunt	14	14	0	28
Fall nonresident (DB781)	1	6	0	7
Spring nonresident (DB791)	4	0	0	4
NWABBMA (subsistence)	4	0	0	4
Nonhunting harvest	0	0	0	0
Total	23	20	0	43
2003–2004				
General hunt	24	11	0	35
Fall nonresident (DB781)	4	0	0	4
Spring nonresident (DB791)	1	0	0	1
NWABBMA (subsistence)	0	0	0	0
Nonhunting harvest	1	0	1	2
Total	30	11	1	42

Table 2 Brown bear harvests in Unit 23 based on community harvest assessments

Community	Year	Human Population	Estimated nr of brown bears harvested	Nr of brown bears taken per individual
Ambler	2002–2003	291	1	0.0034
Kiana	1999	398	2	0.0050
Noatak	1999	423	3	0.0071
Noatak	2001–2002	455	1	0.0022
Noorvik	2002	677	5	0.0074
Selawik	1999	767	1	0.0013
Shungnak	1998–1999	255	1	0.0039
Shungnak	2002	248	1	0.0040
Total		3514	15	0.0043

Table 3 Reported Unit 23 brown bear harvest by drainage, 1981–1982 through 2003–2004 (excludes bears with unknown harvest location; sealing and registration permit data)

Regulatory year	Noatak	Kobuk	Selawik	N. Seward Peninsula	Wulik/Kivalina	Total
1981–1982	16	8	2	1	4	31
1982–1983	17	3	0	2	8	30
1983–1984	20	5	1	5	7	38
1984–1985	44	8	2	1	4	59
1985–1986	14	6	0	1	5	27
1986–1987	21	7	0	2	7	37
1987–1988	13	6	0	0	4	23
1988–1989	23	6	1	2	4	36
1989–1990	22	5	2	3	4	36
1990–1991	29	7	2	0	1	39
1991–1992	22	6	0	2	3	33
1992–1993	30	7	3	4	10	54
1993–1994	28	5	1	1	7	42
1994–1995	16	5	3	3	8	35
1995–1996	24	6	2	4	5	41
1996–1997	18	9	3	3	0	33
1997–1998	18	3	2	4	3	30
1998–1999	27	10	4	4	7	52
1999–2000	29	13	0	6	4	52
2000–2001	34	22	8	4	9	78
2001–2002	20	14	1	5	10	50
2002–2003	21	12	2	5	3	43
2003–2004	19	16	1	3	3	42

Table 4 Unit 23 brown bear harvest^a by hunter residency, 1985–1986 through 2003–2004 (sealing and registration permit data; does not include community harvest assessment data)

Regulatory year	Unit 23 resident	Nonlocal resident	Nonresident	Unk.	Total
1985–1986	11	3	11	2	27
1986–1987	8	13	16	0	37
1987–1988	4	10	9	0	23
1988–1989	18	7	10	1	36
1989–1990	11	11	14	0	36
1990–1991	14	11	13	1	39
1991–1992	12	10	12	0	34
1992–1993	10	35	10	0	55
1993–1994	5	24	12	1	42
1994–1995	2	25	8	0	35
1995–1996	6	26	9	0	41
1996–1997	5	18	11	0	34
1997–1998	3	19	8	0	30
1998–1999	8	25	19	0	52
1999–2000	13	17	23	0	53
2000–2001	24	31	18	5	78
2001–2002	9	16	25	0	50
2002–2003	9	20	14	0	43
2003–2004	5	32	4	1	42

^a Includes nonresident permit hunts and excludes nonhunting mortalities.

Table 5 Monthly harvest of brown bears in Unit 23, 1990–1991 through 2003–2004 (excludes bears with unknown date of kill; sealing and registration permit data)

	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
1990–1991	0	0	21	1	0	0	0	0	0	14	3	0	39
1991–1992	0	0	15	1	0	0	0	0	0	12	6	0	34
1992–1993	0	4	36	3	0	0	0	0	1	11	0	0	55
1993–1994	1	0	21	2	0	0	0	0	0	14	3	0	41
1994–1995	1	0	23	1	0	0	0	0	0	6	4	0	35
1995–1996	0	0	26	2	0	1	0	0	0	8	4	0	41
1996–1997	1	0	22	1	0	0	0	0	0	7	2	1	34
1997–1998	1	0	17	1	0	0	0	0	0	9	2	0	30
1998–1999	0	0	32	1	0	0	0	0	2	5	11	0	51
1999–2000	1	3	25	0	0	0	0	0	0	17	6	1	53
2000–2001	0	2	36	1	0	0	0	0	0	22	11	1	73
2001–2002	0	0	30	0	1	0	0	0	0	9	10	0	50
2002–2003	0	0	27	2	0	0	0	0	1	8	5	0	43
2003–2004	0	9	29	1	0	0	0	0	0	2	0	0	41

Table 6 Reported Unit 23 brown bear harvest by transport method, 1985–1986 through 2003–2004 (sealing and registration permit data)

Regulatory year	Airplane	Boat	4-wheeler	Snow-machine	Foot	Other	Unknown	Total
1985–1986	15	1	0	8	0	2	0	26
1986–1987	20	7	0	6	1	3	0	37
1987–1988	17	4	1	0	0	0	0	22
1988–1989	13	3	0	11	0	2	0	29
1989–1990	24	4	0	6	0	1	0	35
1990–1991	24	6	0	8	0	1	0	39
1991–1992	20	2	0	11	0	1	0	34
1992–1993	32	3	5	1	2	2	10	54
1993–1994	24	0	1	10	0	2	5	42
1994–1995	17	8	1	7	2	0	1	35
1995–1996	20 ^a	5 ^b	2	7	1	2	5	41
1996–1997	18	3	0	4	1	3	5	34
1997–1998	15	7	1	4	1	1	2	30
1998–1999	25	10	1	7	3	3	6	52
1999–2000	19	3	0	0	1	0	4	46
2000–2001	41	7	1	20	3	6	0	78
2001–2002	26	10	1	12	0	0	0	49
2002–2003	22	9	0	10	1	0	1	43
2003–2004	28	11	1	1	1	0	0	42

^a One hunter indicated he used a boat in conjunction with an airplane; 2 hunters indicated they used 4-wheelers in conjunction with an airplane.

^b Three hunters used both a boat and 4-wheeler to harvest brown bears.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002

To: 30 June 2004

LOCATION

GAME MANAGEMENT UNITS: 25A, 25B, 25D, 26B, and 26C (73,755 mi²)

GEOGRAPHIC DESCRIPTION: Upper Yukon River drainage and eastern North Slope of the Brooks Range

BACKGROUND

Brown bears are widely distributed in northeastern Alaska. There was a decline in numbers during the 1960s resulting primarily from aircraft-supported hunting associated with guiding. As a result, in regulatory year (RY) 1971, Units 26B and 26C were closed to brown bear hunting. (RY = 1 Jul through 30 Jun, e.g., RY02 = 1 Jul 2002 through 30 Jun 2003.) In subsequent years a variety of regulations were used to limit harvest and increase brown bear numbers. Regulations have been gradually liberalized as populations recovered. A harvest objective of no more than 5% of estimated populations has been used in recent years.

Drawing permits were required for all brown bear hunters in Units 25A, 26B, and 26C beginning in RY77. As bear populations recovered, regulatory changes included applying the permit requirement only to nonresidents and increasing the number of permits issued in some areas. The requirement for a drawing permit for nonresidents only was applied in Units 25A and 26C beginning in RY84, and in Unit 26B beginning in RY87.

The need for the nonresident permit system in Units 25A, 26B, and 26C was reevaluated in 1993. The improved status of bear populations, a low level of harvest relative to a conservative estimate of sustainable harvest, and the cumbersome nature of the permit system prompted the department to propose eliminating the drawing permit system for nonresident hunters in Units 25A and 26C. The Alaska Board of Game adopted this proposal in March 1994, with the understanding that harvests would be closely monitored and that the average annual harvest in each unit during a 2-year period should not exceed the estimated sustainable harvest (Table 1).

Similarly, the permit system for nonresidents in Unit 26B was reevaluated and eliminated by the Board of Game beginning in RY96. The board also established an earlier season opening date of 20 August in Units 26B and 26C. This occurred in response to the closure of the September moose hunting season in most of Unit 26 that took effect in RY96. A decline in brown bear harvest during September was expected to accompany the decline in moose hunting activity during this period. These regulations worked as intended in Units 25A and 26C, but resulted in an unacceptable increase in the harvest in Unit 26B. Following the harvest of 25 bears in Unit 26B during RY96 and 25 during fall 1997, the department closed

the remainder of the RY97 season by emergency order. A department proposal to restore a drawing permit hunt for nonresident hunters and open the season on 1 September rather than 20 August was passed by the board in March 1998. However, in view of the high harvests during the previous 2 years, no permits were issued to nonresidents in RY98, and only 3 bears were reported taken by resident hunters. Up to 3 drawing permits were issued for nonresident hunters in RY99 and RY00, with a 1 September–31 October open season.

The board also liberalized brown bear hunting regulations in Unit 25D, eliminating the tag fee for resident hunters and establishing a bag limit of 1 bear per year beginning in RY98. These regulation changes occurred because harvests in the area were extremely low and less restrictive regulations could provide for additional hunting opportunity. The estimated sustainable annual harvest in Unit 25D was 19 bears, whereas the reported annual harvest was <5 bears.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Protect, maintain, and enhance brown bear populations and habitat in concert with other components of the ecosystem.
- Provide the opportunity to hunt brown bears under aesthetically pleasing conditions in the eastern Brooks Range.
- Provide the greatest sustained opportunity to participate in hunting brown bears in the upper Yukon and Porcupine drainages.
- Provide maximum opportunity to participate in hunting grizzly bears in Unit 25D.

MANAGEMENT OBJECTIVES

- In Unit 25, maintain a brown bear population capable of sustaining mean annual harvests of 30 bears in Unit 25A and 29 bears in Units 25B and 25D, with a minimum of 60% males in the harvest.
- In Units 26B and 26C, maintain a brown bear population capable of sustaining a mean annual hunter harvest of 13 bears in Unit 26B and 19 bears in Unit 26C, with a minimum of 60% males in the harvest.
- Manage for a temporary reduction in grizzly bear numbers and predation on moose in Unit 25D. After moose populations increase to desired levels, reduce bear harvests to allow the bear population to recover.

METHODS

Brown bear population density estimates for Units 25A, 25B, 25D, 26B, and 26C were revised in 1993 based on studies done in portions of these areas (Reynolds 1976; Garner et al. 1984; Reynolds and Hechtel 1984) or in similar habitat elsewhere (Reynolds 1992), taking into consideration observations by area residents and others with long-term experience in the

area. In addition, a new aerial transect density estimating technique was applied in portions of Unit 26B during 1999–2003 (Reynolds et al., in prep). Harvest data are obtained from mandatory sealing documents. Harvest data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Conservative regulations, including a drawing permit system in use from 1977 until recently, fostered a recovery in the number of brown bears in Units 25A, 26B, and 26C. During this reporting period, bear numbers in Unit 25A were likely stable or increasing, and the trend in Units 26B and 26C was likely stable. The long-term population trend in Units 25B and 25D is less well known, but brown bears are common throughout the area and numbers during this period were probably stable or increasing. North Slope residents reported that brown bears were abundant compared to historic levels. Similarly, residents of the Yukon Flats reported that brown bears were scarce during much of this century but were abundant during this reporting period. Numbers have increased in the Yukon Flats area during the last 10–20 years, probably because of a decline in the number of bears harvested by local residents.

Population Size

We estimate there are approximately 1800 brown bears in the eastern Brooks Range and upper Yukon River drainage. We revised population estimates in 1993 and have since used those estimates in our management program (Table 1). The revision was part of a statewide effort to update brown bear population information. We based our estimates on extrapolation from studies in the area or in similar habitat (Reynolds 1976, 1992; Reynolds and Hechtel 1984; Reynolds and Garner 1987), field observations on bear abundance and population trend, and more accurate calculations of land area based on computer digitization of game management units. The density estimate calculated for Unit 26B during 1999–2003, using the new line transect method (Reynolds et al., in prep), confirmed the reliability of our previous estimate for that area. The previous density estimate for the area was 1.7 bears/100 mi², while the 1999–2003 point estimate was 1.8 bears/100 mi².

Current estimates of bear numbers are somewhat higher than estimates made prior to 1993, largely because of increased knowledge of bear densities, and to a lesser extent, because previous calculations of land area were lower than current measurements.

Distribution and Movements

Brown bears are distributed throughout the area. Densities were generally highest in the foothills and mountains of the Brooks Range and lowest on the coastal plain of the North Slope. An artificially high concentration of bears developed near Prudhoe Bay (23 in 1500 mi²; R. Shideler, ADF&G, personal communication) because discarded food was available in dumpsters and in the Prudhoe Bay landfill. We observed movement of some brown bears from the mountains to the Porcupine caribou herd calving area on the coastal plain. Brown bears are also known to concentrate near salmon spawning areas on the lower Sheenjek River in Unit 25A.

MORTALITY

Season and Bag Limits

Units and Bag Limits	Resident Open Season	Nonresident Open Season
Unit 25A		
RESIDENT AND NONRESIDENT HUNTERS: One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun
Unit 25B		
RESIDENT AND NONRESIDENT HUNTERS: One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun
Unit 25D		
RESIDENT AND NONRESIDENT HUNTERS: One bear every regulatory year.	1 Jul–30 Nov; 1 Mar– 30 Jun	1 Sep–30 Nov OR 1 Mar–15 Jun
Unit 26B		
RESIDENT HUNTERS: One bear every regulatory year.	1 Sep–31 May	
NONRESIDENT HUNTERS: One bear every regulatory year by drawing permit only; up to 10 permits will be issued.		1 Sep–20 May
Unit 26C		
RESIDENT AND NONRESIDENT HUNTERS: One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun

Alaska Board of Game Actions and Emergency Orders. In March 2004 the department proposed to simplify and align seasons in Region III to the extent possible. Brown bear harvests were well below sustainable levels in several remote Interior game management units. The Board of Game extended the season in Units 25A, 25B, and 26C to 10 August–30 June, while maintaining existing seasons in Units 25D and 26B.

In March 2002, the board established a drawing permit hunt for brown bears in the Dalton Highway Corridor Management Area (DHCMA) in Unit 26B. Up to 10 permits could be issued, but only 6 were issued in RY02 and RY03. In 2004 the board increased the number of permits that may be issued from 10 to 15 and limited the permit requirement to 1 September–31 December, thus excluding the spring season. This drawing permit regulation was prompted by the increasing number of bow hunters using the corridor and the need to limit opportunistic brown bear hunting in the open terrain in Unit 26B. The number of permits available for nonresident hunters in Unit 26B had been increased to 6 in RY02, with a 1 September–20 May open season. The more liberal season in Unit 25D was proposed at the March 2002 board meeting in connection with the Yukon Flats Cooperative Moose Management Plan, which resulted in a number of 2002 regulation proposals designed to reduce predation on moose.

Hunter Harvest. The total annual harvest during RY89 through RY03 ranged from 21 to 48 (Tables 2–5). Most were taken in Units 25A, 26B, and 26C. Increased bear numbers and a gradual liberalization of regulations resulted in harvests that were higher than during the late 1970s and early 1980s, but were at or below the currently estimated sustainable harvest of 5%. The overall harvest was nearly stable in recent years, except in Unit 26B, where the number of bears taken increased during RY96 and RY97. The harvest in Unit 25A increased in RY02 and RY03, when 23 and 25 bears were taken. The previous high was 20. The reported harvest in Unit 25D continued to be low, despite the more liberal regulations established in RY98, although 9 bears were reported taken in RY02. This is the highest harvest recorded in the area, but still well below the estimated sustainable harvest of 29 bears.

The study of moose calf mortality in Unit 25D (Bertram and Vivion 2002) led to a greater awareness of the importance of bear predation on moose calves in recent years. As a result, the harvest of bears by local residents appears to have increased on the Yukon Flats, as prescribed in the Yukon Flats Cooperative Moose Management Plan. This involves primarily black bear harvest, but some increase in brown bear harvest has probably also occurred.

The proportion of males in the overall harvest was 67% in RY02 and 47% in RY03 (Tables 2–5). The number of female bears taken in Units 25, 26B, and 26C during this reporting period was relatively low, although the proportion of females was higher than average during RY03. Most bears were taken during fall hunts.

Permit Hunts. During the report period, drawing permits were required for nonresident hunters in Unit 26B outside the DHCMA, and for nonresidents and Alaska residents hunting within the DHCMA in Unit 26B. A total of 3 permits were available for nonresident hunters in Unit 26B (DB987 and DB997), and 6 permits (DB990) were available annually to residents and nonresidents for bow hunting in the DHCMA beginning in RY02 (Table 6).

Hunter Residency and Success. During the RY02 and RY03 seasons combined, residents of Alaska accounted for all of the reported harvest in Units 25B, 25D, and Unit 26B. During the same period, residents took only 38% of reported harvest in Unit 25A and 43% in Unit 26C (Tables 7–10). Only a few local residents reported taking bears. These figures probably underrepresent the number taken by local hunters, particularly in Units 25A, 25B, and 25D, where a few additional bears are taken but not sealed.

Transport Methods. Most brown bears were harvested during aircraft-supported hunts, with a few taken by hunters using snowmachines and boats. Highway vehicles provided access for some hunters near the Dalton Highway.

Other Mortality

The number of brown bears taken and not reported is unknown, but there were occasional reports of bears being killed but not sealed, especially near villages in Unit 25. Some of this harvest probably occurred in defense of life or property (DLP). Continued efforts are necessary to encourage local residents to report harvest and seal bears. The relatively large number of DLP mortalities in Unit 26B in RY01 reflects department actions to remove food-conditioned bears in the Prudhoe Bay oilfield area.

Relatively little is known about natural mortality of brown bears in northeastern Alaska. Reynolds and Hechtel (1984) observed natural mortality rates in the western Brooks Range of 47% for cubs, 12% for yearlings, and 13% for 2-year-olds.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives were met, and harvests in Units 25A, 25B, 25D, and 26C were at or below levels specified in management objectives. Existing management objectives are generally suitable for the next period.

Management goals and objectives for ungulate populations have been considered in setting grizzly bear management goals for this area. Moose populations are currently limited by predation, and grizzly bears are an important predator on newborn moose calves (Gasaway et al. 1992; Bertram and Vivion 2002). The Board of Game has determined that the moose population in Unit 25D is important for providing high levels of human consumptive use under the state's intensive management law. The board must consider intensive management if regulatory action to significantly reduce moose harvest becomes necessary because of a decline in numbers or productivity. One of the goals of the Yukon Flats Cooperative Moose Management Plan is to increase moose numbers. The plan identified the need to reduce predation by grizzly bears, black bears, and wolves.

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PREPARED BY:

Robert O. Stephenson
Wildlife Biologist III

SUBMITTED BY:

Doreen I. Parker McNeill
Assistant Management Coordinator

REVIEWED BY:

Harry V. Reynolds, III
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

Please cite any information taken from this section, and reference as:

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Table 1 Units 25A, 25B, 25D, 26B, and 26C brown bear population parameters and estimated sustainable harvest, 1993–2004

Unit	Area (mi ²)	Estimated density/100 mi ²	Estimated population size	Allowable harvest @ 5%
25A	21,280	2.8	596	30
25B and D	26,660	2.2	587	29
25 subtotal	47,940		1164	58
26B	15,500	1.8	269	13
26C	10,272	3.8	391	19
26 subtotal	25,772		653	32
Total	73,712	2.5	1843	92

Table 2 Unit 25A brown bear mortality^{ab}, regulatory years 1989–1990 through 2003–2004

Regulatory year	Reported									Total estimated kill					
	Hunter kill					Nonhunting kill ^c									
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total	
1989–1990															
Fall 1989	6	6	(50)	0	12	1	1	1	7	(50)	7	(50)	1	15	
Spring 1990	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0	
Total	6	6	(50)	0	12	1	1	1	7	(50)	7	(50)	1	15	
1990–1991															
Fall 1990	6	3	(33)	0	9	0	0	0	6	(67)	3	(33)	0	9	
Spring 1991	3	2	(40)	0	5	0	0	0	3	(60)	2	(40)	0	5	
Total	9	5	(36)	0	14	0	0	0	9	(64)	5	(36)	0	14	
1991–1992															
Fall 1991	7	3	(30)	2	12	0	0	0	7	(70)	3	(30)	2	12	
Spring 1992	3	0	(0)	0	3	0	0	0	3	(100)	0	(0)	0	3	
Total	10	3	(30)	2	15	0	0	0	10	(77)	3	(23)	2	15	
1992–1993															
Fall 1992	11	5	(31)	0	16	1	0	0	12	(71)	5	(29)	0	17	
Spring 1993	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0	
Total	11	5	(31)	0	16	1	0	0	12	(71)	5	(29)	0	17	
1993–1994															
Fall 1993	5	3	(38)	0	8	0	0	0	5	(62)	3	(38)	0	8	
Spring 1994	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0	
Total	5	3	(38)	0	8	0	0	0	5	(62)	3	(38)	0	8	
1994–1995															
Fall 1994	9	3	(25)		12	0	0	0	9	(75)	3	(25)	0	12	
Spring 1995	0	1	(100)		1	0	0	0	0	(0)	1	(100)	0	1	
Total	9	4	(31)	0	13	0	0	0	9	(69)	4	(31)	0	13	

Table 2 continued

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>1995–1996</i>														
Fall 1995	10	4	(29)	0	14	0	0	0	10	(71)	4	(29)	0	14
Spring 1996	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	10	4	(29)	0	14	0	0	0	10	(71)	4	(29)	0	14
<i>1996–1997</i>														
Fall 1996	11	9	(45)	0	20	0	0	0	11	(55)	9	(45)	0	20
Spring 1997	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	11	9	(45)	0	20	0	0	0	11	(55)	9	(45)	0	20
<i>1997–1998</i>														
Fall 1997	6	5	(45)	0	11	1	0	0	7	(58)	5	(42)	0	12
Spring 1998	0	2	(100)	0	2	0	0	0	0	(0)	2	(100)	0	2
Total	6	7	(54)	0	13	1	0	0	7	(50)	7	(50)	0	14
<i>1998–1999</i>														
Fall 1998	8	4	(33)	1	13	0	0	0	8	(67)	4	(33)	1	13
Spring 1999	0	0	(0)		0	0	0	0	0	(0)	0	(0)	0	0
Total	8	4	(33)	1	13	0	0	0	8	(67)	4	(33)	1	13
<i>1999–2000</i>														
Fall 1999	11	3	(21)	0	14	0	0	0	11	(79)	3	(21)	0	14
Spring 2000	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	11	3	(21)	0	14	0	0	0	11	(79)	3	(21)	0	14
<i>2000–2001</i>														
Fall 2000	4	3	(43)	0	7	0	0	0	4	(57)	3	(43)	0	7
Spring 2001	0	0	(0)		0	0	0	0	0	(0)	0	(0)	0	0
Total	4	3	(43)	0	7	0	0	0	4	(57)	3	(43)	0	7

Table 2 continued

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F (%)	Unk	Total		M	F	Unk	M (%)	F (%)	Unk	Total		
<i>2001–2002</i>														
Fall 2001	9	2 (18)	0	11		1	1	0	10 (77)	3 (23)	0	13		
Spring 2002	1	0 (0)	0	1		0	0	0	1 (100)	0 (0)	0	1		
Total	10	2 (17)	0	12		1	1	0	11 (79)	3 (21)	0	14		
<i>2002–2003</i>														
Fall 2002	15	7 (32)	0	22		0	0	0	15 (68)	7 (32)	0	22		
Spring 2003	0	1 (100)	0	1		0	0	0	0 (0)	1 (100)	0	1		
Total	15	8 (35)	0	23		0	0	0	15 (65)	8 (35)	0	23		
<i>2003–2004</i>														
Fall 2003	11	13 (54)	1	25		0	0	0	11 (46)	13 (54)	1	25		
Spring 2004	0	0 (0)	0	0		0	0	0	0 (0)	0 (0)	0	0		
Total	11	13 (54)	1	25		0	0	0	11 (45)	13 (54)	1	25		

^a Includes permit harvest.^b No estimate was made of unreported or illegal kills.^c Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 3 Unit 25B and 25D brown bear mortality^{ab}, regulatory years 1989–1990 through 2003–2004

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
1989–1990														
Fall 1989	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
Spring 1990	3	0	(0)	0	3	0	0	0	3	(100)	0	(0)	0	3
Total	4	1	(20)	0	5	0	0	0	4	(80)	1	(20)	0	5
1990–1991														
Fall 1990	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3
Spring 1991	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
Total	2	3	(60)	0	5	0	0	0	2	(40)	3	(60)	0	5
1991–1992														
Fall 1991	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 1992	0	1	(100)	0	1	0	0	0	0	(0)	1	(100)	0	1
Total	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
1992–1993														
Fall 1992	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 1993	2	1	(33)	0	3	0	0	0	2	(66)	1	(33)	0	3
Total	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4
1993–1994														
Fall 1993	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
Spring 1994	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
1994–1995														
Fall 1994	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
Spring 1995	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
Total	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4

Table 3 continued

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
1995–1996														
Fall 1995	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 1996	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
1996–1997														
Fall 1996	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4
Spring 1997	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4
1997–1998														
Fall 1997	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 1998	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
1998–1999														
Fall 1998	0	0	(0)	1	1	0	0	0	0	(0)	0	(0)	1	1
Spring 1999	1	0	(0)	0	0	0	0	0	1	(100)	0	(0)	0	1
Total	1	0	(0)	1	2	0	0	0	1	(100)	0	(0)	1	2
1999–2000														
Fall 1999	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4
Spring 2000	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2
Total	4	2	(33)	0	6	0	0	0	4	(67)	2	(33)	0	6
2000–2001														
Fall 2000	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 2001	0	0	(0)		0	0	0	0	0	(0)	0	(0)	0	0
Total	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1

Table 3 continued

Regulatory year	Reported					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
2001–2002														
Fall 2001	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 2002	0	0	(0)		0	0	0	0	0	(0)	0	(0)	0	0
Total	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
2002–2003														
Fall 2002	6	4	(40)	0	10	0	0	0	6	(60)	4	(40)	0	10
Spring 2003	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	6	4	(40)	0	10	0	0	0	6	(60)	4	(40)	0	10
2003–2004														
Fall 2003	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 2004	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1

^a Includes permit harvest.^b No estimate was made of unreported or illegal kills.^c Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 4 Unit 26B brown bear mortality^{ab}, regulatory years 1989–1990 through 2003–2004

Regulatory year	Reported										Total estimated kill					Total
	Hunter kill					Nonhunting kill ^c										
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk			
1989–1990																
Fall 1989	6	5	(45)	0	11	1	0	0	7	(58)	5	(42)	0	12		
Spring 1990	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4		
Total	9	6	(40)	0	15	1	0	0	10	(63)	6	(37)	0	16		
1990–1991																
Fall 1990	3	5	(62)	0	8	0	0	0	3	(38)	5	(62)	0	8		
Spring 1991	4	0	(0)	0	4	0	0	0	4	(100)	0	(0)	0	4		
Total	7	5	(42)	0	12	0	0	0	7	(58)	5	(42)	0	12		
1991–1992																
Fall 1991	8	5	(38)	0	13	0	0	0	8	(62)	5	(38)	0	13		
Spring 1992	4	0	(0)	0	4	0	0	0	4	(100)	0	(0)	0	4		
Total	12	5	(29)	0	17	0	0	0	12	(71)	5	(29)	0	17		
1992–1993																
Fall 1992	7	4	(36)	0	11	0	1	0	7	(58)	5	(42)	0	12		
Spring 1993	1	1	(50)	1	3	0	0	0	1	(50)	1	(50)	1	3		
Total	8	5	(38)	1	14	0	1	0	8	(53)	6	(40)	1	15		
1993–1994																
Fall 1993	4	5	(56)	1	10	0	1	0	4	(40)	6	(60)	1	11		
Spring 1994	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2		
Total	5	6	(55)	1	12	0	1	0	5	(42)	7	(58)	1	13		
1994–1995																
Fall 1994	6	4	(40)	0	10	0	0	0	6	(60)	4	(40)	0	10		
Spring 1995	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2		
Total	8	4	(33)	0	12	0	0	0	8	(66)	4	(33)	0	12		

Table 4 continued

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
1995–1996														
Fall 1995	7	2	(22)	0	9	0	0	0	7	(78)	2	(22)	0	9
Spring 1996	0	2	(100)	0	2	0	0	0	0	(0)	2	(100)	0	2
Total	7	4	(36)	0	11	0	0	0	7	(64)	4	(36)	0	11
1996–1997														
Fall 1996	15	7	(32)	0	22	1	0	0	16	(70)	7	(30)	0	23
Spring 1997	1	2	(66)	0	3	0	0	0	1	(33)	2	(66)	0	3
Total	16	9	(36)	0	25	1	0	0	17	(65)	9	(35)	0	26
1997–1998														
Fall 1997	17	8	(32)	0	25	0	1	0	17	(65)	9	(35)	0	26
Spring 1998	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	17	8	(32)	0	25	0	1	0	17	(65)	9	(35)	0	26
1998–1999														
Fall 1998	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3
Spring 1999	0	0	(0)	0	0	0	1	0	0	(0)	0	(0)	0	0
Total	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3
1999–2000														
Fall 1999	2	2	(50)	0	4	0	0	0	2	(50)	2	(50)	0	4
Spring 2000	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	2	2	(50)	0	4	0	0	0	2	(50)	2	(50)	0	4
2000–2001														
Fall 2000	6	4	(40)	0	10	0	0	0	6	(60)	4	(40)	0	10
Spring 2001	1	0	(0)		0	0	0	0	1	(100)	0	(0)	0	1
Total	7	4	(36)	0	11	0	0	0	7	(64)	4	(36)	1	11

Table 4 continued

Regulatory year	Reported								Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>2001–2002</i>														
Fall 2001	10	3	(23)	0	13	2	3	1	12	(63)	6	(32)	1	19
Spring 2002	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	11	3	(21)	0	14	2	3	1	13	(68)	6	(32)	1	20
<i>2002–2003</i>														
Fall 2002	4	2	(33)	0	6	0	1	1	4	(57)	3	(43)	1	8
Spring 2003	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	4	2	(33)	0	6	0	1	1	4	(57)	3	(43)	1	8
<i>2003–2004</i>														
Fall 2003	4	2	(33)	0	6	1	0	1	5	(71)	2	(29)	1	8
Spring 2004	0	1	(100)	0	1	0	0	0	0	(0)	1	(100)	0	1
Total	4	3	(43)	0	7	1	0	1	5	(62)	3	(38)	1	9

^a Includes permit harvest.

^b No estimate was made of unreported or illegal kills.

^c Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 5 Unit 26C brown bear mortality^{ab}, regulatory years 1989–1990 through 2003–2004

Regulatory year	Reported										Total estimated kill					Total
	Hunter kill					Nonhunting kill ^c										
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk			
1989–1990																
Fall 1989	1	1	(50)	0	2	1	0	0	2	(67)	1	(33)	0	3		
Spring 1990	0	0	(0)	0	0	0	1	0	0	(0)	1	(100)	0	1		
Total	1	1	(50)	0	2	1	1	0	2	(50)	2	(50)	0	4		
1990–1991																
Fall 1990	3	1	(25)	0	4	0	0	0	3	(75)	1	(25)	0	4		
Spring 1991	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2		
Total	5	1	(17)	0	6	0	0	0	5	(83)	1	(17)	0	6		
1991–1992																
Fall 1991	4	2	(33)	0	6	2	0	2	6	(75)	2	(25)	2	10		
Spring 1992	1	1	(50)	0	2	0	0	0	1	(50)	1	(50)	0	2		
Total	5	3	(38)	0	8	2	0	2	7	(70)	3	(30)	2	12		
1992–1993																
Fall 1992	0	5	(100)	0	5	0	0	0	0	(0)	5	(100)	0	5		
Spring 1993	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1		
Total	1	5	(83)	0	6	0	0	0	1	(17)	5	(83)	0	6		
1993–1994																
Fall 1993	6	0	(0)	0	6	0	0	0	6	(100)	0	(0)	0	6		
Spring 1994	0	1	(100)	0	1	0	0	0	0	(0)	1	(100)	0	1		
Total	6	1	(14)	0	7	0	0	0	6	(86)	1	(14)	0	7		
1994–1995																
Fall 1994	1	2	(67)	0	3	0	0	0	1	(33)	2	(67)	0	3		
Spring 1995	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1		
Total	2	2	(50)	0	4	0	0	0	2	(50)	2	(50)	0	4		

Table 5 continued

Regulatory year	Reported								Total estimated kill					
	Hunter kill					Nonhunting kill ^c								
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
1995–1996														
Fall 1995	4	3	(43)	0	7	0	0	0	4	(57)	3	(43)	0	7
Spring 1996	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	4	3	(43)	0	7	0	0	0	4	(57)	3	(43)	0	7
1996–1997														
Fall 1996	5	3	(38)	0	8	0	0	0	5	(63)	3	(38)	0	8
Spring 1997	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	5	3	(38)	0	8	0	0	0	5	(63)	3	(38)	0	8
1997–1998														
Fall 1997	4	2	(33)	0	6	0	0	0	4	(66)	2	(33)	0	6
Spring 1998	2	0	(0)	0	2	0	0	0	2	(100)	0	(0)	0	2
Total	6	2	(25)	0	8	0	0	0	6	(75)	2	(25)	0	8
1998–1999														
Fall 1998	2	1	(33)	0	3	0	0	0	2	(67)	1	(33)	0	3
Spring 1999	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	2	1	(33)	0	3	0	0	0	2	(67)	1	(33)	0	3
1999–2000														
Fall 1999	6	2	(25)	0	8	0	0	0	6	(75)	2	(25)	0	8
Spring 2000	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	6	2	(25)	0	8	0	0	0	6	(75)	2	(25)	0	8
2000–2001														
Fall 2000	8	5	(38)	0	13	1	0	1	9	(64)	5	(36)	0	14
Spring 2001	0	0	(0)		0	0	0	0	0	(0)	0	(0)	0	0
Total	8	5	(38)	0	13	1	0	1	9	(64)	5	(36)	0	14

Table 5 continued

Regulatory year	Reported													
	Hunter kill					Nonhunting kill ^c			Total estimated kill					
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
<i>2001–2002</i>														
Fall 2001	5	3	(38)	0	8	1	0	0	6	(67)	3	(33)	0	9
Spring 2002	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	5	3	(38)	0	8	1	0	0	6	(67)	3	(33)	0	9
<i>2002–2003</i>														
Fall 2002	4	4	(50)	0	8	0	0	0	4	(50)	4	(50)	0	8
Spring 2003	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	4	4	(50)	0	8	0	0	0	4	(50)	4	(50)	0	8
<i>2003–2004</i>														
Fall 2003	2	4	(66)	0	6	0	0	0	2	(33)	4	(66)	0	6
Spring 2004	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	2	4	(66)	0	6	0	0	0	2	(33)	4	(66)	0	6

^a Includes permit harvest.^b No estimate was made of unreported or illegal kills.^c Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 6 Unit 26B brown bear harvest data by permit hunt, regulatory years 1987–1988 through 2003–2004

Hunt/Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunt	Percent successful hunters	Males	Females	Unk	Total harvest
Fall hunts									
(DB288)	1987–1988	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	1988–1989	n/a	n/a	25	75	1	2	0	3
	1989–1990	n/a	n/a	n/a	n/a	n/a	n/a	4	4
	1990–1991	6	33	0	67	1	2	1	4
	1991–1992	6	33	0	67	4	0	0	4
	1992–1993	6	50	0	50	1	3	0	4
	(DB987) 1993–1994	6	50	17	33	0	2	0	2
	1994–1995	6	50	0	50	3	0	0	3
	1995–1996	6	0	17	83	4	1	0	5
	1996–1997 ^a								
	1997–1998 ^a								
	1998–1999	0	0	0	0	0	0	0	0
	1999–2000	3	100	0	0	0	0	0	0
	2000–2001	2	0	0	100	2	0	0	2
	2001–2002	1	0	0	100	0	1	0	1
	2002–2003	1	100	0	0	0	0	0	0
(DB990-Archery)	2003–2004	0	0	0	0	0	0	0	0
	2002–2003	6	17	83	0	0	0	0	0
	2003–2004 ^b	6	50	0	50	1	1	0	2
Spring hunts									
(DB297)	1987–1988	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	1988–1989	n/a	n/a	n/a	n/a	3	0	0	3
	1989–1990	n/a	n/a	n/a	n/a	0	0	3	3
	1990–1991	4	0	0	100	4	0	0	4
	1991–1992	4	25	0	75	3	0	0	3
	1992–1993	2	0	50	50	0	0	1	1
	(DB997) 1993–1994	0	0	0	0	0	0	0	0
	1994–1995	0	0	0	0	0	0	0	0

Table 6 continued

Hunt/Area	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunt	Percent successful hunters	Males	Females	Unk	Total harvest
	1995–1996	0	0	0	0	0	0	0	0
	1996–1997 ^a								
	1997–1998 ^a								
	1998–1999	0	0	0	0	0	0	0	0
	1999–2000	0	0	0	0	0	0	0	0
	2000–2001	0	0	0	0	0	0	0	0
	2001–2002	1	100	0	0	0	0	0	0
	2002–2003	0	0	0	0	0	0	0	0
	2003–2004	0	0	0	0	0	0	0	0
Totals for all permit hunts	1987–1988	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	1988–1989	n/a	n/a	n/a	n/a	4	2	0	6
	1989–1990	n/a	n/a	n/a	n/a	n/a	n/a	7	7
	1990–1991	10	20	0	80	5	2	1	8
	1991–1992	10	30	0	70	7	0	0	7
	1992–1993	8	38	12	50	1	3	1	4
	1993–1994	6	50	17	33	0	2	0	2
	1994–1995	6	50	0	50	3	0	0	3
	1995–1996	6	0	17	83	4	1	0	5
	1996–1997 ^a								
	1997–1998 ^a								
	1998–1999 ^a	0	0	0	0	0	0	0	0
	1999–2000	3	100	0	0	0	0	0	0
	2000–2001	2							
	2000–2001	2	0	0	100	2	0	0	2
	2001–2002	2	50	0	50	0	1	0	1
	2002–2003	7	29	100	0	0	0	0	0
	2003–2004	6	50	0	50	1	1	0	2

^a The nonresident drawing hunt in Unit 26B was eliminated in regulatory year 1996–1997 and reinstated in regulatory year 1998–1999.

^b Preliminary data.

^c Percentages based on returned reports; 2 hunters did not report.

Table 7 Unit 25A residency of successful brown bear hunters^a, regulatory years 1985–1986 through 2003–2004

Regulatory year	Local ^b resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1985–1986	1 (11)	2 (22)	6 (67)	9
1986–1987	0 (0)	6 (50)	6 (50)	12
1987–1988	0 (0)	3 (23)	10 (77)	13
1988–1989	1 (5)	8 (38)	12 (57)	21
1989–1990	1 (8)	2 (17)	9 (75)	12
1990–1991	2 (14)	6 (43)	6 (43)	14
1991–1992	1 (7)	4 (27)	10 (67)	15
1992–1993	0 (0)	6 (38)	10 (62)	16
1993–1994	0 (0)	4 (50)	4 (50)	8
1994–1995	0 (0)	8 (62)	5 (38)	13
1995–1996	0 (0)	4 (29)	10 (71)	14
1996–1997	0 (0)	2 (10)	18 (90)	20
1997–1998	0 (0)	3 (23)	10 (77)	13
1998–1999	1 (7)	3 (23)	9 (69)	13
1999–2000	0 (0)	4 (29)	10 (71)	14
2000–2001	0 (0)	1 (14)	6 (86)	7
2001–2002	0 (0)	6 (50)	6 (50)	12
2002–2003	1 (4)	11 (48)	11 (48)	23
2003–2004	1 (4)	5 (20)	19 (76)	25

^a Includes permit harvest.

^b Includes only residents of the subunit.

Table 8 Unit 25B and 25D residency of successful brown bear hunters^a, regulatory years 1985–1986 through 2003–2004

Regulatory year	Local ^b resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1985–1986	0 (0)	0 (0)	2 (100)	2
1986–1987	0 (0)	1 (25)	3 (75)	4
1987–1988	0 (0)	2 (40)	3 (60)	5
1988–1989	1 (25)	0 (0)	3 (75)	4
1989–1990	1 (20)	1 (20)	3 (60)	5
1990–1991	1 (20)	3 (60)	1 (20)	5
1991–1992	0 (0)	0 (0)	2 (100)	2
1992–1993	1 (25)	0 (0)	3 (75)	4
1993–1994	0 (0)	2 (100)	0 (0)	2
1994–1995	2 (50)	2 (50)	0 (0)	4
1995–1996	0 (0)	1 (50)	1 (50)	2
1996–1997	1 (33)	0 (0)	2 (67)	3
1997–1998	0 (0)	0 (0)	0 (0)	0
1998–1999	1 (50)	0 (0)	1 (50)	2
1999–2000	4 (80)	0 (0)	1 (20)	5
2000–2001	1 (100)	0 (0)	0 (0)	1
2001–2002	0 (0)	1 (100)	0 (0)	1
2002–2003	7 (70)	3 (30)	0 (0)	10
2003–2004	1 (100)	0 (0)	0 (0)	1

^a Includes permit harvest.

^b Includes only residents of the subunit.

Table 9 Unit 26B residency of successful brown bear hunters^a, regulatory years 1985–1986 through 2003–2004

Regulatory year	Local ^b resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1985–1986	0 (0)	0 (0)	6 (100)	6
1986–1987	0 (0)	2 (40)	3 (60)	5
1987–1988	0 (0)	6 (46)	7 (54)	13
1988–1989	0 (0)	4 (44)	5 (56)	9
1989–1990	0 (0)	7 (47)	8 (53)	15
1990–1991	0 (0)	4 (33)	8 (66)	12
1991–1992	0 (0)	10 (59)	7 (41)	17
1992–1993	0 (0)	9 (64)	4 (29)	13
1993–1994	0 (0)	10 (83)	2 (17)	12
1994–1995	0 (0)	9 (75)	3 (25)	12
1995–1996	0 (0)	6 (55)	5 (45)	11
1996–1997	1 (4)	11 (44)	13 (57)	25
1997–1998	0 (0)	9 (35)	16 (64)	25
1998–1999	0 (0)	3 (100)	0 (0)	3
1999–2000	0 (0)	4 (100)	0 (0)	4
2000–2001	0 (0)	9 (82)	2 (18)	11
2001–2002	0 (0)	13 (93)	1 (7)	14
2002–2003	0 (0)	6 (100)	0 (0)	6
2003–2004	0 (0)	7 (100)	0 (0)	7

^a Includes permit harvest.

^b Includes only residents of the subunit.

Table 10 Unit 26C residency of successful brown bear hunters^a, regulatory years 1985–1986 through 2003–2004

Regulatory year	Local ^b resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1985–1986	0 (0)	4 (67)	2 (33)	6
1986–1987	0 (0)	6 (67)	3 (33)	9
1987–1988	0 (0)	5 (63)	3 (37)	8
1988–1989	0 (0)	3 (50)	3 (50)	6
1989–1990	0 (0)	0 (0)	2 (100)	2
1990–1991	0 (0)	3 (50)	3 (50)	6
1991–1992	0 (0)	4 (50)	4 (50)	8
1992–1993	1 (17)	1 (17)	4 (66)	6
1993–1994	1 (14)	6 (86)	0 (0)	7
1994–1995	0 (0)	2 (50)	2 (50)	4
1995–1996	0 (0)	0 (0)	7 (100)	7
1996–1997	0 (0)	4 (50)	4 (50)	8
1997–1998	2 (25)	0 (0)	6 (75)	8
1998–1999	0 (0)	0 (0)	3 (100)	3
1999–2000	0 (0)	1 (12)	7 (88)	8
2000–2001	0 (0)	5 (38)	8 (62)	13
2001–2002	0 (0)	2 (25)	6 (75)	8
2002–2003	0 (0)	3 (38)	5 (62)	8
2003–2004	0 (0)	3 (50)	3 (50)	6

^a Includes permit harvest.

^b Includes only residents of the subunit.

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2002
To: 30 June 2004

LOCATION

GAME MANAGEMENT UNIT: 26A (56,000 mi²)

GEOGRAPHIC DESCRIPTION: Western North Slope

BACKGROUND

Densities of brown/grizzly bears vary widely in Unit 26A, with densities highest in the foothills of the Brooks Range and lowest in the northern portion of the unit. Bear populations were reduced during the 1960s by hunting, but are currently stable or slowly increasing. Hunters, particularly those from out of state, have continued to show an interest in hunting bears in Unit 26A. Subsistence hunting regulations for the Northwest Alaska Brown Bear Management Area (NWABBMA) allow residents to hunt brown bears primarily for food in Units 21D, 22 except 22C, 23 except Baldwin Peninsula, 24, and 26A.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Maintain the existing brown bear population.

MANAGEMENT OBJECTIVES

- Maintain a grizzly bear population of approximately 800 bears or greater.
- Maintain a harvest success rate of at least 60%.
- Minimize adverse interactions between grizzly bears and the public.

METHODS

There was a radiotelemetry study in the southern portion of Unit 26A for a number of years, with methods previously reported in research progress reports (Reynolds 1984, 1989) and management reports (Trent 1985, 1989; Carroll 1993).

Population densities for broad habitat zones in Unit 26A were estimated using subjective comparisons to areas of the North Slope with known bear densities. The habitat zones include the coastal plain (<800 ft elevation), the foothills (800–2500 ft elevation), and mountains (>2500 ft elevation). Bear densities within these habitat zones are available from studies in the western

Brooks Range (1992), the Arctic National Wildlife Refuge (1982–1990), the Canning River and Ivashak River drainages (1973–1975), and the Prudhoe Bay oilfield area (1990–1993).

We used brown bear sealing certificates to determine seasonal harvests. For sealed bears we summarized the date and location of taking, skull sizes, and sex/age composition of harvested animals. Hunting activity was summarized by residency of hunters and their methods of transportation. For reporting population estimates and harvest summaries, we divided Unit 26A at 159° W longitude into Unit 26A East and Unit 26A West.

The sealing certificate system has not proven to be an effective method to determine local harvest, so we reviewed several community-based harvest assessment studies to get an insight into local harvest. Some of the communities have been studied more than once, so we were able to calculate mean harvests for these villages. In 1992 nearly all the villages were studied, so we determined the total harvest for that year. For the villages of Anaktuvuk Pass and Nuiqsut, which are on the border of Unit 26A, we assumed that half of their bear harvest came from Unit 26A.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The most recent bear density information comes from June 1992 for the Utukok and Kokolik drainages in Unit 26A West. The density was calculated at 29.5 bears/1000 km² with a 95% confidence interval of 28.1–31.5 bears/1000 km² (Reynolds, personal communication).

The current population estimate for bears in Unit 26A is 900–1120 bears (Reynolds 1989). We estimate there are 400 bears in Unit 26A West and 500–720 bears in Unit 26A East (Table 1). This represents a substantial increase from the pre-1987 population estimate of 645–780 bears.

Bear populations in the Brooks Range apparently declined during the 1960s due to guided hunting (Reynolds, personal communication) and have been recovering since permit hunts were instituted during the 1977–78 regulatory year (Trent 1989). Bear densities appear to be at high levels relative to carrying capacity of the habitat.

Population Composition

The most recent population composition and productivity data are available from Reynolds (1984) for the western portion of the unit in the Utukok and Kokolik drainages. The sex ratio for bears older than 1 year was approximately 40 males:60 females; for cubs and yearlings it was approximately 50:50, but may have slightly favored females.

Age composition was as follows: cubs of the year – 13%; yearlings – 10%; 2-year-olds – 14%; 3 and 4-year-olds – 11%; and bears over 5 years – 52%. Mean age at first 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.

Distribution and Movements

We estimate densities for habitat zones in Unit 26A at 0.5–2 bears/1000 km² on the coastal plain, 10–30 bears/1000 km² in the foothills, and 10–20 bears/1000 km² in the mountains. These densities yield an estimated total of 1007 bears, with 81 in the coastal plain, 666 in the foothills, and 260 in the mountains.

MORTALITY

Harvest

Season and Bag Limit

<u>Unit and Bag Limits</u>	Resident Open Season (Subsistence and <u>General Hunts</u>)	Nonresident <u>Open Season</u>
Unit 26A Resident and Nonresident Hunters:		
1 bear every regulatory year.	20 Aug–31 May (General hunt only)	20 Aug–31 May (General hunt only)
Unit 26A Resident Hunters:		
1 bear per regulatory year by registration permit in the Northwest Alaska Brown Bear Management Area for subsistence purposes.	20 Aug–31 May (Subsistence hunt only)	
Nonresident Hunters		No open season

Board of Game Actions and Emergency Orders. During its spring 1996 meeting, the Board of Game eliminated the drawing permit requirements for nonresident brown bear hunters in Unit 26A and lengthened the season to 20 August–31 May. The change was made to simplify the complex permit system. The harvest in Unit 26A had been well below the maximum sustained yield, and the permit hunt was undersubscribed. Our goal will be to keep the harvest at or below an average of 5% of the bear population during any 2-year period. Therefore, the maximum allowable harvest will be 31 bears per year in Unit 26A East and 20 bears in Unit 26A West. If this quota is exceeded during one year, the quota for the next year will be reduced by as much as it was exceeded during the first year. If the average is exceeded, more restrictive regulatory action, including emergency orders, will be considered. The system depends on open lines of communication among ADF&G, guides, and hunters.

During the fall 1999 meeting, the Board of Game increased the bag limit from 1 bear every 4 years to 1 bear every year. This was done to provide more opportunity for hunters because the bear harvest had remained well below the maximum sustained yield level. Originally, the 1 bear

per regulatory year restriction counted against the 1 bear every 4 regulatory years restriction in other units; but during its 2003 meeting, the board changed the regulation so that it does not.

Human-Induced Harvest. Fourteen bears were sealed during 2002–2003. No bears were reported killed in defense of life and property (DLP). Four bears were killed in Unit 26A West and 10 in Unit 26A East (Table 1). Ten bears were males and 4 were females (Table 2).

Sixteen bears were sealed during 2003–2004. Four bears were killed in Unit 26A West and 12 in Unit 26A East (Table 1). Twelve bears were males and 4 were females (Table 2). There were no DLP kills reported.

The sealing certificate system has not proven to be an effective method to determine actual local harvest, so we reviewed several community-based harvest assessment studies to get an indication of local harvest. We determined that the total of the mean number of bears harvested per year was approximately 11–12 bears (Braund et al. 1991, 1993; Brower and Opie 1996, 1997; Fuller and George 1997; Hepa et al. 1997; Pedersen 1989, 1995, 2001). These numbers are reflected in Unreported Kill in Table 2. Fuller and George (1997) obtained information from nearly every village in 1992, which indicated that local residents harvested at least 9–10 bears that year. Sealing certificates indicated a reported local harvest of 3 bears in 1992.

The reported harvest in 2002–2003 (14 bears) and 2003–2004 (16 bears) was similar to recent years (18 in 2000–2001 and 13 in 2001–2002), and was below the average number harvested from 1988 to 1996 (27.6). The harvests reported in 1990–1991 (32 bears) and 1991–1992 (34 bears) remain the highest for Unit 26A (Table 1).

For bears harvested during 2002–2003, the mean skull size for males was 20.8 inches and 18.5 inches for females; the mean age was 6.8 years for males and 10.0 years for females. During 2003–2004 the mean skull size for males was 21.6 inches and 19.3 inches for females; the mean age was 10.4 years for males and 7.8 years for females (Table 3).

Permit Hunts. Drawing permit hunts were discontinued by board action as of the 1996–1997 regulatory year. There were no bears taken under the Northwest Alaska Brown Bear Management Area (NWABBMA) permit hunt.

Hunter Residency and Success. Of the 14 bears sealed in Unit 26A during 2002–2003, 8 were harvested by nonresidents, 6 by nonlocal Alaska residents, and 0 by North Slope residents. During 2003–2004, 9 of 16 bears were harvested by nonresidents, 6 by nonlocal Alaska residents, and 1 by a North Slope resident (Table 4).

Harvest Chronology. During 2002–2003, 6 bears were harvested during August, 6 in September, 1 in April, and 1 in May. During 2003–2004, 7 bears were harvested in August, 6 in September, and 3 in May (Table 5).

Transport Methods. Most bear hunters continued to use aircraft as transportation in Unit 26A. During 2002–2003, 12 hunters used aircraft for transportation, 1 used a snowmachine, and 1 walked. During 2003–2004, 12 hunters used aircraft for transportation, 1 used an all-terrain vehicle (ATV), and 2 walked (Table 6).

Other Mortality

No recent estimate of natural mortality for 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 from 1977 to 1981.

HABITAT

Assessment

Most of the brown bear habitat in Unit 26A remains undisturbed and supports a fairly large and growing population of bears. It would be difficult to evaluate many of the food sources for brown bears in Unit 26A, such as herbivorous forage and ground squirrels. Caribou represent a large food resource available to bears for at least part of the year. The decline in the Colville River moose population in the early 1990s and the current recovery may have affected bear numbers.

Potential hazards to brown bear habitat include oil, gas, and mineral exploration and development. Exploration is currently underway in Unit 26A, including areas within the foothills on the north side of the Brooks Range.

Some areas in Unit 26A, particularly some east/west-oriented ridges, are used much more heavily than the surrounding area by brown bears for at least part of the year (Reynolds, personal communication). An attempt should be made to catalog as many of these areas as possible. These areas should be considered critical habitat for brown bears and given special protection in the future.

Enhancement

There were no habitat enhancement activities in Unit 26A during the reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

There were no activities related to nonregulatory management problems/needs in Unit 26A during the reporting period.

CONCLUSIONS AND RECOMMENDATIONS

Hunters reported 14 bears harvested during 2002–2003 and 16 bears during 2003–2004. This was similar to the number harvested during the past 2 years, but below the average number of bears harvested between 1988 and 1996 (27.6) and well below the allowable sustained yield of approximately 51 bears. Even if unreported harvest is as high as 100% of the reported harvest, the total estimated yearly harvest of 28–32 bears would still be well within safe harvest limits.

Oil, gas, and mineral exploration and development are potential hazards to brown bear habitat. Reynolds has stated that some areas, particularly some east/west-oriented ridges, have very high brown bear densities. We should identify these critical habitat areas and catalog them so they can be given special protection during upcoming exploration and development projects.

A significant management problem in Unit 26A continues to be unreported harvest and noncompliance with bear hunting regulations. To accommodate rural hunting practices, the Board of Game established the NWABBMA with alternate hunting regulations for subsistence users in 1992. The regulations are designed for people who hunt bears for food. The regulations eliminate tags and sealing procedures and allow harvest reports by mail. Hopefully, these regulations will improve harvest reporting and compliance.

Because the sealing certificate system has not proven to be an effective method to determine actual local harvest, ADF&G personnel worked with the North Slope Borough to develop a harvest documentation system that is more acceptable to local residents. Harvest monitors have been hired in some villages and are collecting harvest information for several species.

In order to approximate local harvest, we used data from the North Slope Borough and other community-based harvest assessment studies. We determined that the total of the mean number of bears harvested in Unit 26A villages per year was approximately 11–12 bears. Fuller and George obtained information from most villages in 1992 that indicated local residents harvested approximately 9–10 bears in Unit 26A that year. Sealing certificates indicated a reported local harvest of 3 bears in 1992. While not all harvested bears are reported, the local unreported harvest does not appear to be at a level that creates a biological problem.

In 1996 the Board of Game discontinued the brown bear drawing permit system and lengthened the season in Unit 26A. In addition, the board increased the bag limit from 1 bear every 4 years to 1 bear every year in 1999. It has been surprising that, since 1996, the bear harvest has been less than before the regulations were liberalized. This might be explained by a lack of a concurrent moose season and hunters that would have secondarily harvested bear while hunting moose. Eliminating the drawing permit system has reduced paperwork and time spent administering the hunt and has not led to overharvest. We will continue communicating with the guides and urge them to limit their harvests and to be selective toward males. Because the harvest remains low, we recommend that the season for both the subsistence and the general hunt open on 1 August, so we will be consistent with other units in the region.

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PREPARED BY:

Geoff Carroll
Wildlife Biologist III

SUBMITTED BY:

Peter J. Bente
Survey-Inventory Coordinator

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Table 1 Estimated Population Size and Reported harvest of brown/grizzly bears in Unit 26A, 1988–2004

Unit	Estimated population size	5% harvest rate	Reported harvest											
			1988–1989	1989–1990	1990–1991	1991–1992	1992–1993	1993–1994	1994–1995	1995–1996	1996–1997	1997–1998	1998–1999	1999–2000
26A West	400	20	25	12 ^a	16	13 ^a	16	9 ^a	7	6	8	6	4 ^a	7
26A East	500–720	25–36	6	14	16 ^a	21	13	17	13	17	12	14	6	4
Total	900–1200	45–56	31	26 ^a	32 ^a	34 ^a	29	26 ^a	20	23	20	20	10 ^a	11

^a Includes DLP bears

Unit	Estimated population size	5% harvest rate	Reported Harvest			
			2000–2001	2001–2002	2002–2003	2003–2004
26A West	400	20	6	0	4	4
26A East	500–720	25–36	12	13	10	12
Total	900–1200	45–56	18	13	14	16

^a Includes DLP bears

Table 2 Unit 26A brown bear harvest^a, 1985–2004

Regulatory Year	Hunter harvest						Non- hunting kill ^b	Total	Un- reported est. kill	Total est. kill
	M	(%)	F	(%)	Unk.	Total				
1985–1986										
Fall 1985	3	(43)	4	(57)		7				
Spring 1986	2	(40)	3	(60)		5				
Total	5	(42)	7	(58)		12	2	14	5–7	19–21
1986–1987										
Fall 1986	10	(77)	3	(23)		13				
Spring 1987	6	(86)	1	(14)		7				
Total	16	(80)	4	(20)		20		20	8–11	28–31
1987–1988										
Fall 1987	11	(58)	8	(42)		19				
Spring 1988	2	(67)	1	(33)		3				
Total	13	(59)	9	(41)		22		22	8–12	30–34
1988–1989										
Fall 1988	12	(71)	5	(29)		17				
Spring 1989	11	(79)	3	(21)		14				
Total	23	(74)	8	(26)		31		31	12–17	43–48
1989–1990										
Fall 1989	10	(53)	9	(47)		19				
Spring 1990	7	(100)	0			7				
Total	17	(63)	9	(33)	1	27		27	8–13	34–39
1990–1991										
Fall 1990	15	(75)	5	(25)		20				
Spring 1991	8	(73)	3	(27)		11				
Total	23	(74)	8	(26)		31	1	32	5–12	37–44
1991–1992										
Fall 1991	22	(81)	5	(19)		27				
Spring 1992	6	(100)	0			6				
Total	28	(82)	5	(15)	1	34	0	34	5–10	39–44
1992–1993										
Fall 1992	18	(95)	1	(5)		19				
Spring 1993	8	(80)	2	(20)		10				
Total	26	(90)	3	(10)		29	0	29	6–12	35–41

Table 2 continued

Regulatory Year	Hunter harvest						Non- hunting kill ^b	Total	Un- reported est. kill	Total est. kill
	M	(%)	F	(%)	Unk.	Total				
1993–1994										
Fall 1993	11	(79)	3	(21)		14				
Spring 1994	8	(89)	1	(11)		9				
Total	19	(83)	4	(17)		23	3	26	6–12	32–38
1994–1995										
Fall 1994	9	(75)	3	(25)		12				
Spring 1995	7	(88)	1	(12)		8				
Total	16	(80)	4	(20)		20	0	20	6–12	26–32
1995–1996										
Fall 1995	7	(53)	6	(47)		13				
Spring 1996	6	(60)	3	(30)	1(10)	10				
Total	13	(57)	9	(39)	1(10)	23	2	23	6–12	29–35
1996–1997										
Fall 1996	11	(69)	5	(31)		16	0			
Spring 1997	2	(67)	1	(34)		3	0	3	1	
Total	13	(68)	6	(32)		19	1	20	6–12	06–32
1997–1998										
Fall 1997	11	(69)	5	(31)		16	0			
Spring 1998	2	(50)	2	(50)		4				
Total	13	(65)	7	(35)		20	0	20	6–12	26–32
1998–1999										
Fall 1998	6	(60)	4	(40)		10	0			
Spring 1999	0		0			0	0			
Total	5	(56)	4	(44)		9	1	10	6–12	16–22
1999–2000										
Fall	7	(64)	4	(36)		11				
Spring	0		0			0				
Total	7	(64)	4	(36)		11	0	11	6–12	17–23
2000–2001										
Fall	12	(75)	4	(25)		16				
Spring	2		0			2				
Total	14	(78)	4	(22)		18	0	18	6-12	24-30

Table 2 continued

Regulatory Year	Hunter harvest						Non- hunting kill ^b	Total	Un- reported est. kill	Total est. kill
	M	(%)	F	(%)	Unk.	Total				
2001–2002										
Fall	10	(77)	3	(23)		13				
Spring	0		0			0				
Total	10	(77)	3	(23)		13	0	13	6–12	19–25
2002–2003										
Fall	8	(67)	4	(33)		12	0			
Spring	2	(100)	0			2	0			
Total	10	(71)	4	(29)		14	0	14	6–12	20–26
2003–2004										
Fall	10	(71)	4	(29)		14	0			
Spring	2	(100)	0			2	0			
Total	12	(75)	4	(25)		16	0	16	6–12	22–28

^a Permit hunt harvest included.

^b Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 3 Unit 26A brown bear skull size and age, 1985–2004

Regulatory year	Mean skull size, inches				Mean age, years			
	Male	<i>N</i>	Female	<i>N</i>	Male	<i>n</i>	Female	<i>n</i>
1985–1986	20.6	5	20.2	5	8.8	5	10.3	5
1986–1987	20.9	10	19.2	5	8.2	12	4.6	5
1987–1988	22.5	16	20.0	9	11.1	16	11.9	9
1988–1989	22.0	14	19.9	6	11.2	13	9.2	6
1989–1990	21.5	17	19.7	8	9.8	16	11.7	9
1990–1991	21.1	22	19.5	8	10.1	22	7.8	8
1991–1992	20.0	28	19.9	5	7.9	25	16.6	4
1992–1993	21.2	17	19.0	1	8.3	17	3.0	1
1993–1994	20.9	11	19.0	3	8.0	10	4.3	3
1994–1995	21.4	16	18.8	4	7.7	14	3.5	4
1995–1996	21.2	13	19.1	7	8.1	12	6.1	4
1996–1997	20.9	12	19.5	6	7.8	12	6.0	6
1997–1998	21.4	10	19.3	6	8.5	11	7.6	5
1998–1999	22.1	5	19.4	4	6.0	3	7.3	4
1999–2000	21.7	7	18.4	4	10.0	6	5.5	4
2000–2001	21.9	14	20.8	4	11.0	14	9.0	4
2001–2002	21.0	10	18.7	3	9.4	10	5.3	3
2002–2003	20.8	10	18.5	4	6.8	10	10	4
2003–2004	21.6	12	19.3	4	10.4	12	7.8	4

Table 4 Unit 26A brown bear successful hunter^a residency, 1985–2004

Regulatory year	Local resident ^b	Nonlocal resident	Nonresident	Unknown	Total hunters
1985–1986	2	7	2	1	12
1986–1987	0	8	12		20
1987–1988	1	8	13		22
1988–1989	1	10	20		31
1989–1990	2	12	13		27
1990–1991	1	9	21		31
1991–1992	2	15	16		33
1992–1993	1	8	20		29
1993–1994	1	10	12		23
1994–1995	0	5	15		20
1995–1996	6	4	13		23
1996–1997	2	0	18	0	20
1997–1998	1	1	18	0	20
1998–1999	1	1	8		10
1999–2000	0	3	8		11
2000–2001	3	3	12		18
2001–2002	0	4	9		13
2002–2003	0	6	8	0	14
2003–2004	1	6	9	0	16

^a Hunters in permit hunts are included.

^b Local means North Slope residents.

Table 5 Unit 26A brown bear harvest chronology by time period, 1985–2004

Regulatory year	Aug	Sep	Oct	Nov	Apr	May	June	<i>N</i>
1985–1986		6	1	0	0	5	0	12
1986–1987		13	0	0	0	7	0	20
1987–1988		19	0	0	0	3	0	22
1988–1989		17	0	0	0	14	0	31
1989–1990	1	18	1	0	0	7	0	27
1990–1991	1	18	1	0	1	10	0	31
1991–1992	0	25	2	0	3	3	0	33
1992–1993	0	18	1	0	6	4	0	29
1993–1994	0	13	1	0	4	5	0	23
1994–1995	0	12	0	0	0	8	0	20
1995–1996	0	11	2	0	2	8	0	23
1996–1997	5	11	1	0	1	2	0	20
1997–1998	11	5	0	0	1	3	0	20
1998–1999	6	4	0	0	0	0	0	10
1999–2000	3	8	0	0	0	0	0	11
2000–2001	10	6	0	0	0	2	0	18
2001–2002	7	6	0	0	0	0	0	13
2002–2003	6	6	0	0	1	1	0	14
2003–2004	7	6	0	0	0	3	0	16

Table 6 Unit 26A brown bear harvest^a percent by transport method, 1985–2004.

	Transport method for brown bear harvest														
Regulatory	<u>Airplane</u>		<u>Horse</u>		<u>Boat</u>		<u>Snowmachine</u>		<u>ORV</u>		<u>Walk</u>		<u>Unknown</u>		<u>Total</u>
Year	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>N</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>
1985–1986	7	(50)	2	(14)			3	(22)			1	(7)	1	(7)	14
1986–1987	19	(95)							1	(5)					20
1987–1988	20	(92)					1	(4)	1	(4)					22
1988–1989	27	(87)			3	(10)			1	(3)					31
1989–1990	21	(78)			3	(11)	1	(4)	1	(4)					27
1990–1991	26	(84)							3	(10)			2	(6)	31
1991–1992	30	(91)					2	(6)					1	(3)	33
1992–1993	24	(83)					5	(17)							29
1993–1994	15	(65)			3	(13)	4	(18)			1	(4)			23
1994–1995	15	(75)			1	(5)	3	(15)			1	(5)			20
1995–1996	12	(52)			2	(9)	7	(30)			2	(9)			23
1996–1997	15	(75)					1	(5)	1	(5)	2	(10)	1	(5)	20
1997–1998	17	(85)			1	(5)	2	(10)							20
1998–1999	9	(90)			1	(10)									10
1999–2000	11	(100)													11
2000–2001	15	(83)			1	(6)	1	(6)			1	(5)			18
2001–2002	13	(100)													13
2002–2003	12	(86)					1	(7)			1	(7)			14
2003–2004	12	(75)							1	(6)	2	(13)	1	(6)	16

^a Permit hunt harvest is included.



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge and attitudes for responsible hunting.



Karla Hart, ADF&G