Brown Bear
Management Report
of survey-inventory activities
1 July 2004–30 June 2006

Patricia Harper, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation

Larry Lewis, ADF&G

Funded through
Federal Aid in Wildlife Restoration
Grants W-33-3 and W-33-4
2007

STATE OF ALASKA

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DEPARTMENT OF FISH AND GAME
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DIVISION OF WILDLIFE CONSERVATION
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Please note that population and harvest data in this report are estimates and may be refined at a later date.

Cover Photo: This brown bear got into garbage in a Sterling neighborhood. Improper storage of things that attract bears, like garbage, bird feeders, and dog food, creates serious bear conservation and public safety issues. The Division of Wildlife Conservation is working with communities around the state to address this problem. Photo by Larry Lewis.

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If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2007. Brown Bear management report of survey-inventory activities 1 July 2004–30 June 2006. P. Harper, editor. Juneau, Alaska.

BROWN BEAR MANAGEMENT REPORT

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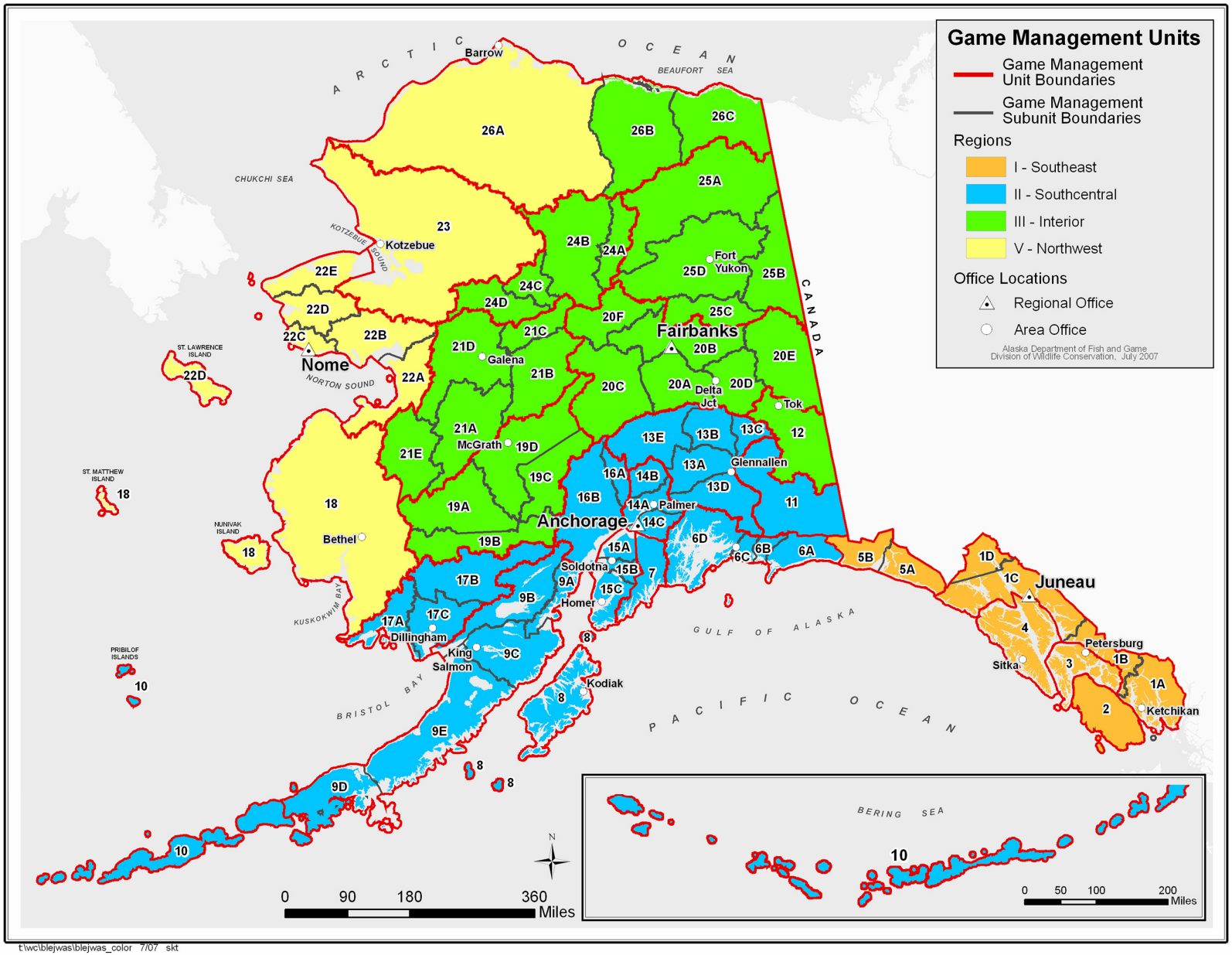

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WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
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BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 1 (18,500 mi^2)

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. 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), only recently has brown bear research 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.

During this reporting period approximately 45% of the unit's annual brown bear hunter harvest came from the Haines area of Unit 1D, located in the northern part of the region. The remainder of the hunter harvest was 24% in Unit 1A (Ketchikan area), 12% in Unit 1B (Petersburg area), and 20% in Unit 1C (Douglas area). 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 four regulatory years 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. Registration brown bear permits became mandatory in RY 1989. Currently, registration permits are issued for fall (RB062) and spring (RB072) hunting seasons in Unit 1A, 1B, and 1C. In Unit 1D, registration permits RB050 and RB051 are issued for fall and spring hunting seasons, respectively. From the permit report we obtain 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, Montana, 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. Current research in the Unuk River area of Unit 1A and Bradfield Canal in Unit 1B are intended to provide brown bear population information in these areas utilizing DNA mark-recapture techniques. With additional mainland research we hope to be able to more accurately estimate populations throughout the region.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
1 bear every 4 regulatory years	15 Sep–31 Dec
by registration permit only	15 Mar–31 May

After several years of increasing harvest in Unit 1, the Alaska Department of Fish and Game (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). This alleviated the concerns in southern Southeast, but in Unit 1D where most lands are under state jurisdiction, this moratorium did not apply. An unexpected consequence of the moratorium on federal lands was an increase in guiding activity on state lands in Unit 1D due to the lack of restrictions on commercial activity. ADF&G staff then met with Department of Natural Resources personnel to try and establish limits on commercial operators, but was unsuccessful in doing so. Responding to growing concerns for the sustainability of the increasing harvest of brown bears in Unit 1D (mostly by guided nonresidents) ADF&G biologists submitted proposals to the Board of Game (BOG) recommending a more conservative management strategy. During its fall 2002 meeting, the board voted to change the Unit 1D nonresident brown bear registration permit hunt (with an unlimited number of permits) to a limited drawing permit hunt. This was in response to an increasing nonresident harvest and was implemented to cap the harvest near the current level. After one season of managing the nonresident brown bear hunt by drawing permit, the Upper Lynn Canal Advisory Committee submitted a proposal to the BOG to repeal the drawing hunt and replace it with a registration permit hunt. This proposal was in response to the difficulty local guides had in scheduling brown bear hunts under a drawing permit system. Unlike a registration permit hunt where permits are available in an unlimited supply throughout the season, drawing permits are awarded through a random lottery. The lottery is held in the spring of each year making it difficult for permit winners and guides to schedule a hunt in the three months between permit awards and the brown bear hunting season. Beginning in fall 2005 the Unit 1D resident and nonresident brown bear hunts (RB050 & RB051) were administered by a registration permit. A separate table (Table 5) describes the Unit 1D permit allocation, effort and harvest during the period in which Unit 1D brown bear hunts were managed by both drawing and registration permits.

Hunter Harvest. Subunit 1D continued to account for the highest proportion of the Unit 1 harvest during this report period (2004–2005), 32% and 55%, respectively. During 2004 the proportion of bears killed by subunit (1A, 1B, 1C, and 1D) was 27%, 14%, 27%, and 32% and during 2005 was 21%, 10%, 14%, and 55% respectively. The Unit 1 ten-year mean harvest percentage by subunit (1A–1D) was 20%, 18%, 15%, and 46%, respectively (Table 1).

The Unit 1A 2004 harvest of 6 bears was much lower than the record 13 bears taken in 2003. The 2005 harvest of 6 bears remained unchanged from the previous year; both 2004 and 2005 harvests were similar to the 10-year mean harvest of 7 bears.

The Unit 1B 2004 and 2005 harvests of 4 and 3 bears respectively is typical of the unit's low brown bear harvest. The brown bear harvest was below the 10-year mean harvest of 6 bears during each year of the reporting period. Although brown bears are believed to occur throughout Unit 1B, population densities vary greatly across the subunit. The overwhelming majority of the brown bear harvest in the subunit is concentrated in and around the Bradfield Canal area. Harvest records indicate that since 1960 just 3 brown bears have been harvested on that portion of the Unit 1B mainland located north of the Stikine River drainage.

Guided nonresident hunters account for the majority of the brown bears harvested annually in Unit 1B, with Alaska residents accounting on average for only 1.2 bears annually between 1994 and 2005. As a result of the USFS moratorium on Unit 1 brown bear guides, there is currently only one active brown bear guide operating in the subunit. This guide is currently authorized to conduct a maximum of 7 brown bear hunts annually in the subunit, and his clients are responsible for the majority of the brown bears harvested annually.

Anecdotal evidence and unconfirmed reports indicate that at least some illegal brown bear harvest is occurring in the subunit. Many locals believe that by reducing brown and black bear numbers they are aiding moose and deer populations. Although the extent to which this illegal harvest is occurring is not known, it is thought to be most prevalent along the Stikine River drainage, where moose hunting is very popular with local hunters.

The Unit 1C brown bear harvest was also similar to the 10-year mean harvest of 5 bears, with 6 and 5 bears taken during 2004 and 2005 respectively. However, the distribution of the harvest changed considerably from previous report periods, with four bears taken during RY 2004 off the Juneau road system near Echo Cove. A fifth bear was taken up Eagle River, which is the only brown bear ever recorded as harvested in that drainage. This harvest distribution reflects a pattern we are seeing of an increase in brown bear activity along the Juneau road system. The other traditional areas of harvest in Unit 1C include St. James Bay, Berners Bay, Tracy/Endicott Arm, and Port Houghton. While Unit 1C provides some opportunity to hunt and harvest brown bears, most serious bear hunters travel to nearby Unit 4, where the brown bear density is much higher.

The Unit 1D brown bear harvests during 2004 and 2005 were 7 and 16 bears, respectively. The 2004 harvest of just 7 bears is uncharacteristically low for the unit. The low harvest is most likely in response to the limitations on harvest inherent to drawing permit hunts. Regulatory year 2004 represented the last year a drawing permit was used to manage nonresident brown bear hunting in Unit 1D. The 2005 harvest of 16 bears is nearer to the 10-year mean harvest of 14 bears. It is important to note that the Guideline Harvest Level (GHL) for brown bears in Unit 1D is 16 bears annually; including 2005, five of the previous 10 years have reached or exceeded the GHL. Unit 1D managers will continue to watch the harvest level in Unit 1D to ensure future sustainability. Specifically, the harvest sex ratio and age structure will be monitored closely.

During this reporting period the spring harvest accounted for 74% of the bears taken; 26% of bears were harvested in the fall. Over the past 10 years, the average number of bears harvested has remained nearly evenly split between spring and fall (42% and 58%, respectively), 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, females represented 36% of fall-harvested bears, but only 15% of the spring-harvested bears (Table 2). We continued to meet our management objectives of a 3:2 male to female harvest ratio and 60% male harvest component in spring hunting seasons. In addition, extensive educational products (videos, brochures, etc.) are provided to hunters in order to assist hunters in determining the sex of bears in the field, and therefore selecting males over females.

The mean male skull sizes during 2004 ($\bar{x}$= 22.9, n= 21) and 2005 ($\bar{x}$=22.3, n=23) were similar to the long-term average ($\bar{x}$ = 22.3). The average female skull sizes during 2004 ($\bar{x}$= 20.9, n= 3) and 2005 ($\bar{x}$= 21.4, n= 8) were also similar to the long-term average of 20.5 inches (Table 3).

The 2004 mean age of harvested male bears (8.3, n= 19) was higher than the long-term average of 7.7 years and meets our management objective of at least 6.5 years of age. The mean age of male bears during the subsequent 2005 season did not meet our objective (6.2, n=6). However, at the time of this writing, only those ages for fall 2005 were available for regulatory year 2005. We anticipate an increase in the mean age of bears harvested when the spring 2006 data becomes available. The 2004 mean female age was 7.3 years (n=3) and was above the long-term average of 6.5 years of age. The 2005 female mean ages that are currently available are lower than the long-term average (6.0, n=4; Table 3) but are anticipated to increase once the spring 2006 ages are available. The oldest bear harvested during the reporting period was a 20-year-old male taken in Unit 1A by a guided nonresident hunter. The oldest female bear (15 years) was also taken by a guided nonresident hunter in Unit 1B.

Permit Hunts. Registration permits have been required for Unit 1 brown bear hunters since fall 1989. During the 2004 and 2005 regulatory years, 319 and 294 registration permits were issued respectively (Tables 4 & 5). In addition, 19 drawing permit were awarded in both 2003 and 2004 to nonresident Unit 1D brown bear hunters. Consistent with the long-term average, about 55% of those permittees who registered actually hunted. For the Unit 1D nonresident drawing hunting permits, 74% and 63% of permittees hunted in 2003 and 2004 respectively. Compliance with permit conditions has improved during the reporting period. A regulation passed by the BOG in 2003 made nonreporting a misdemeanor offense. In addition, nonreporting hunters lose their opportunity to participate in any permit (registration, drawing, tier II) hunt for all species, statewide, during the following regulatory year. The combination of a possible citation and losing permit hunt privileges appears to be providing the impetus to hunters to report their hunting information in a timely and accurate manner.

Hunter Success and Residency. Of the 173 hunters afield in 2004, 13% were successful, and during 2005 a total of 130 hunters went afield with 22% success (Tables 4 and 5). The 2004 success rate was lower than normal, while the 2005 success was similar to the 10-year average (21%, range 13–37%). The number of permits (registration and drawing) issued for 2004 (338) was slightly higher than the 10-year average of 329 permits, while the number of registration permits issued in 2005 (294) was slightly lower than the 10-year average (Tables 4 & 5). In spring 2005, 86% of the regulatory year 2004 total Unit 1 brown bear harvest was taken; this harvest is the highest recorded seasonal harvest percentage since registration permits were first instituted in 1989.

During 2004 and 2005, nonresidents harvested 14 and 17 bears, respectively, from Unit 1. The success rate for nonresidents was 64% and 59%, respectively (Table 6). The nonresident hunter harvest was at or below the 10-year average (19962005) of 17 bears. Resident hunter success is generally lower than nonresident success. During the report period resident hunter success for all resident hunters was 36% and 41%, respectively; resident hunters took 8 and 12 bears, respectively. The level of resident hunter success did not significantly change since the last reporting period (40% and 41%) and is similar to the 10-year average resident hunter success of

40%. Unit 1 residents harvest an average of 9 (range 3–17) bears per year. One explanation for the historical lower resident hunter success is that resident hunters are more selective when choosing a bear, and consequently may pass over smaller or poorly furred bears because of the regulatory requirement that successful hunters must wait 4 years after taking a bear to hunt brown bears again.

Successful hunters spent 3.9 days to harvest a bear during 2004 and 4.1 days in 2005, compared to the 10-year average of 4.4 days (range 1–13 days). All Unit 1 successful hunters combined spent 90 total days hunting bear during the 2004 season and 124 total days during the 2005 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. The 10-year harvest trend indicates spring and fall harvests are nearly equal (43% and 57%, respectively). However the last three seasons show a significant shift towards a higher spring harvest (Table 7). In 2004, 86% of the harvest was taken in the spring season, and in 2005, a slightly lower harvest percentage of 66%.

The majority of brown bears harvested from the unit have historically been taken during May ($\bar{x}$ = 17, range 10-23), with September the second highest harvest period ($\bar{x}$ = 9, range 3–17). Together these months account for the majority of Unit 1 brown bears. During the reporting period, May accounted for 36 of 39 bears harvested in the spring season (Table 8).

Transport Methods. Most Unit 1 brown bear hunters continue to use boats to access remote, mostly roadless, hunting areas. Boats are consistently the mode of transportation used by bear hunters throughout the region. During the past 10 years, boat use has accounted for an average of 75% of the reported transport methods. Highway vehicles (18%), aircraft (3%), off-road vehicles (≤1%), and walking (≤1%) are used much less frequently (Table 9). The only Unit 1 area with major highway access is near Haines in Unit 1D.

Other Mortality

To estimate the total human-caused mortality we review the reported harvest, defense of life or property (DLP) kills, known and estimated unreported/illegal/accidental kills, and research-related kills. Unreported kills are estimated at 10–20% of the reported harvest, although this is considered a conservative estimate (McCarthy 1991 and Porter 2005). In 2004, 5 bears were reported as nonhunter kills, including 4 males and 1 bear of unknown sex. Two bears were found dead in the field; one of these, a male, is believed to have been shot and discarded and 2 were killed DLP. In addition, one male bear was taken by a hunter in the Haines area without a registration permit. In 2005, only one male bear was reported as an illegal harvest; the Juneau area hunter mistakenly identified the bear as a black bear. Nonhunting brown bear mortalities are incorporated into the overall management of the Unit 1 brown bear population and can impact the number of bears available to hunters. When these other sources of bear mortality were added to the legal Unit 1 harvest, the total human-caused mortality was 26 bears in 2004 and 30 bears in 2005.

During the last reporting period an open landfill had recently been closed near Haines, while other communities, such as Hyder, still have open landfills 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.

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 areas of Unit 1 have healthy brown bear habitats, which are primarily under USFS jurisdiction. Within Unit 1A there is a highway-accessible area near Hyder, Alaska that is closed to bear hunting to enhance viewing opportunities, at the Salmon River Closed Area. A similar bear viewing situation exists in Haines at Chilkoot State Park. The park area is within the Lutak Road Closed area where the harvest of big game is prohibited. 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 issues of concern. DLP mortalities are possible 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 basic demographics, seasonal movements, habitat selection and transboundary movement of bears (Flynn et al. 2006). Seventeen brown bears (8 males, 9 females) have been collared along the Unuk River and 10 brown bears (4 males, 6 females) have been collared in the Bradfield Canal area. Global Positioning System (GPS) collars provide researchers with spatial and temporal movement data for brown bears in these areas. Home range information for individual bears is determined through analysis of collar locations. In addition, bear movement distances were calculated via capture, hair-snare and telemetry data. Preliminary data indicate extensive transboundary movement along the Unuk River corridor. DNA samples collected from captured bears were matched to DNA samples collected from hair-snare operations in British Columbia, Canada. Mainland brown bear research continues in the Unuk River and Bradfield Canal area with 6 GPS collars currently deployed on bears in each these areas. Future research is planned in the Berners Bay area of Unit 1C for summer 2006.

CONCLUSIONS AND RECOMMENDATIONS

Unit 1 brown bears will continue to draw both resident and nonresident hunters to the field. The current registration permit hunt, initiated in 1989, continues to provide useful information about brown bear hunting effort and success. The short duration of the Unit 1D drawing permit hunt proved to be very difficult for guides to plan and execute hunts for nonresidents. The drawing permit did serve the intent of the program by reducing both the number of nonresident hunters and bears taken in Unit 1D. Recently enacted penalties for not reporting on permit hunt activities is providing a more complete dataset to be used in managing brown bears. 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 and other land managers to distribute the nonresident harvest throughout Unit 1.

While the trend in nonhunting mortality (DLP and illegal harvest) continues to decline and met our objective of reducing the number of bears killed because of human food conditioning during the reporting period, we believe the number of bears taken in nonhunting situations can be further reduced. Education is the key to reducing food condition related mortalities as well as DLP and illegal harvests. By providing more information about bears, people are less likely to find themselves in a situation that requires killing a brown bear. 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 detect any change in the Unit 1 brown bear population during this report period. Subsequent reports will include population information for those areas where active mainland brown bear population research is occurring. At this time the available data indicate little change in the parameters used to manage the Unit 1 brown bear population and changes to the Unit 1 brown bear hunting seasons or bag limit are not necessary.

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

SCOTT, R. 2007. Unit 1 brown bear management report. Pages 1–19 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 1 brown bear harvest, by subunit, 1996–2005[a]

Regulatory	Unit 1A		Unit 1B		Unit 1C		Unit 1D		Total
year	harvest	% of total	harvest	% of total	harvest	% of total	harvest	% of total	harvest
1996	4	(13)	4	(13)	7	(23)	16	(52)	31
1997	5	(14)	4	(11)	5	(14)	21	(60)	35
1998	6	(17)	7	(20)	4	(11)	18	(51)	35
1999	13	(33)	6	(15)	6	(15)	15	(38)	40
2000	4	(12)	9	(26)	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
2004	6	(27)	3	(14)	6	(27)	7	(32)	22
2005	6	(21)	3	(10)	4	(14)	16	(55)	29
$\bar{x}$	7	(20)	6	(18)	5	(15)	14	(46)	32

[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, 1996–2006

Regulatory year	Reported										
	Hunter kill				Nonhunting kill[a]			Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.	M (%)	F (%)	Unk.	Total
Fall 1996	(54)	(46)	0	13	0	0	0	(54)	(46)	0	13
Spring 1997	(78)	(22)	0	18	0	0	0	(78)	(22)	0	18
Total	(68)	(32)	0	31	0	0	0	(69)	(31)	0	31
Fall 1997	(63)	(37)	0	16	1	1	0	(65)	(35)	0	18
Spring 1998	(84)	(16)	0	19	0	0	0	(84)	(16)	0	19
Total	(74)	(26)	0	35	1	1	0	(74)	(26)	0	37
Fall 1998	(23)	(77)	0	13	1	2	0	(25)	(75)	0	16
Spring 1999	(86)	(14)	0	22	2	0	0	(92)	(8)	0	24
Total	(63)	(37)	0	35	3	2	0	(65)	(35)	0	40
Fall 1999	(80)	(20)	0	20	2	2	0	(75)	(25)	0	24
Spring 2000	(35)	(65)	0	20	2	0	0	(41)	(59)	0	22
Total	(58)	(42)	0	40	2	1	0	(58)	(42)	0	43
Fall 2000	(42)	(58)	0	19	3	2	0	(46)	(54)	0	24
Spring 2001	(71)	(29)	0	17	1	0	0	(72)	(28)	0	18
Total	(57)	(43)	0	36	4	2	0	(57)	(43)	0	42
Fall 2001	(41)	(59)	0	17	0	1	0	(39)	(61)	0	18
Spring 2002	(82)	(18)	0	11	0	0	0	(82)	(18)	0	11
Total	(61)	(39)	0	28	0	1	0	(60)	(40)	0	29
Fall 2002	(60)	(40)	0	10	0	0	0	(60)	(40)	0	10
Spring 2003	(69)	(31)	0	13	4	1	0	(76)	(24)	0	18
Total	(65)	(35)	0	23	4	1	0	(70)	(30)	0	28
Fall 2003	(64)	(36)	0	11	1	1	0	(62)	(38)	0	13
Spring 2004	(80)	(20)	0	25	0	0	0	(80)	(20)	0	25
Total	(75)	(25)	0	36	1	1	0	(74)	(26)	0	38

TABLE 2 continued

Regulatory year	Reported										
	Hunter kill				Nonhunting kill[a]			Total estimated kill			
	M (%)	F (%)	Unk.	Total	M	F	Unk.	M (%)	F (%)	Unk.	Total
Fall 2004	(75)	(25)	0	4	2	0	1	(71)	(14)	1	7
Spring 2005	(94)	(6)	0	18	1	0	0	(95)	(5)	0	19
Total	(91)	(9)	0	22	3	0	1	(88)	(8)	1	26
Fall 2005	(67)	(33)	0	9	0	0	0	(67)	(33)	0	9
Spring 2006	(80)	(20)	0	20	1	0	0	(81)	(19)	0	21
Total	(76)	(24)	0	29	1	0	0	(77)	(23)	0	30

[a] Includes DLP and illegal harvests, research mortalities, and other known human/caused accidental mortalities.

TABLE 3 Unit 1 age and skull size of harvested brown bears, 1996–2005

Regulatory year	Mean skull size[a] Male	Nr	Female	Nr	Mean age[b] Male	Nr	Female	Nr
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[c]
1999	21.7	26	19.4	16	8.2	17	6.4	14
2000	21.7	21	20.8	16	6.1	20[c]	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
2004	22.9	21	20.9	3	8.3	19	7.3	3
2005[d]	22.3	23	21.4	8	6.2	6	6.0	4
$\bar{x}$	22.3	22	20.5	11	7.7	17	6.5	8

[a] Skull size equals length plus zygomatic width.
[b] Determined through successful analyses of extracted premolar teeth. Some samples are not viable for aging.
[c] Includes 1 male DLP.
[d] Spring season ages only.

TABLE 4 Unit 1A,B,C brown bear registration permit hunt data, 1996-2005

Season/ hunt nr	Regulatory year	Permits issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bear harvest			
						Males (%)	Females (%)	Unknown	Total
(Fall)									
RB062	1996[a]	147	(54)	(81)	(19)	(54)	(46)	0	13
RB062	1997	175	(52)	(81)	(19)	(63)	(37)	0	16
RB062	1998[b]	148	(53)	(81)	(19)	(23)	(77)	0	13
RB062	1999	176	(56)	(74)	(26)	(35)	(65)	0	20
RB062	2000	158	(56)	(68)	(32)	(50)	(50)	0	22
RB062	2001	159	(54)	(75)	(25)	(47)	(53)	0	18
RB062	2002	144	(39)	(85)	(15)	(69)	(31)	0	13
RB062	2003	164	(68)	(80)	(20)	(64)	(36)	0	11
RB062	2004[b]	105	(63)	(92)	(8)	(67)	(33)	0	3
RB062	2005[b]	93	(75)	(87)	(13)	(100)	(0)	0	3
(Spring)									
RB072	1996	139	(44)	(85)	(15)	(83)	(17)	0	12
RB072	1997	144	(40)	(79)	(21)	(78)	(22)	0	18
RB072	1998	152	(46)	(77)	(23)	(84)	(16)	0	19
RB072	1999	155	(50)	(71)	(29)	(86)	(14)	0	22
RB072	2000[b]	167	(44)	(79)	(21)	(80)	(20)	0	20
RB072	2001	186	(43)	(84)	(16)	(67)	(33)	0	17
RB072	2002	180	(46)	(89)	(11)	(82)	(18)	0	11
RB072	2003	158	(44)	(73)	(27)	(79)	(21)	0	24
RB072	2004[c]	129	(39)	(83)	(17)	(92)	(8)	0	13
RB072	2005	111	(50)	(82)	(18)	(90)	(10)	0	10

[a] Three outstanding permits.
[b] One outstanding permit.
[c] Two outstanding permits.

TABLE 5 Unit 1D fall and spring registration and drawing hunt permits by regulatory year, 2003–2005

Spring/fall Hunt Nr	Regulatory year	Permits issued	Nr Hunted	Nr Did Not Hunt	Percent successful hunters	Bear harvest			
						Males	Females	Unknown	Total [a]
(Fall)									
DB052	2003	6	4	2	(0)	0	0	0	0
DB052	2004	11	5	6	(20)	1	0	0	1
RB050	2003	54[b]	33	21	(9)	2	1	0	3
RB050	2004	57[b]	26	28	(0)	0	0	0	0
RB050	2005	49	24	25	(25)	3	3	0	6
(Spring)									
DB053	2003	13	10	3	(80)	5	3	0	8
DB053	2004	8	7	1	(71)	4	0	1	5
RB051	2003	34	21	13	(5)	1	0	0	1
RB051	2004	28[c]	17	10	(0)	0	0	0	0
RB051	2005	41	27	14	(37)	7	3	0	10
	$\bar{x}$	30.1	17.4	12.3	(25)	2.3	1.4	0	3.4

[a] Hunter harvest only.
[b] Three outstanding permits.
[c] One outstanding permit.

TABLE 6 Unit 1 successful brown bear hunters, by residency, 1996–2005[a]

Regulatory year	Local resident[b] (%)	Nonlocal resident (%)	Nonresident (%)	Unknown (%)	Total successful hunters
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)	(21)	28
2002	(9)	(14)	(77)	0	23
2003	(37)	(3)	(60)	0	36
2004	(36)	0	(64)	0	22
2005	(34)	(7)	(59)	0	29
$\bar{x}$	(28)	(11)	(56)	N/A	31.3

[a] Does not include DLP or illegal kills.

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

TABLE 7 Unit 1 brown bear harvest, by season, 1996–2005[a]

Regulatory year	Fall		Spring	
	Harvest	Percent of total	Harvest	Percent of total
1996	13	(42)	18	(58)
1997	16	(46)	19	(54)
1998	13	(37)	22	(63)
1999	20	(50)	20	(50)
2000	19	(53)	17	(47)
2001	17	(61)	11	(39)
2002	13	(57)	10	(43)
2003	11	(31)	24	(69)
2004	3	(14)	19	(86)
2005	10	(34)	19	(66)
$\bar{x}$	13.6	(43)	17.9	(57)

[a] Does not include illegal kills.

TABLE 8 Unit 1 brown bear harvest, by month, 1996–2005[a]

Regulatory year	Harvest periods							
	September	October	November	March	April	May	June	Total
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
2004	3	1	0	0	1	17	0	22
2005	5	4	1	0	0	19	0	29
$\bar{x}$	9	5	1	0	1	17	0	31.5

[a] Does not include illegal kills.

TABLE 9 Unit 1 successful brown bear hunter transport methods, 1996-2005[a]

Regulatory year	Percent of Hunters						Nr.
	Airplane	Boat	Walk	ORV	Highway vehicle	Other/ unknown	
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
2004	(0)	(78)	(0)	(9)	(9)	(0)	22
2005	(0)	(72)	(0)	(7)	(13)	(7)	29
$\bar{x}$	(3)	(75)	(1)	(2)	(17)	(1)	31.4

[a] Does not include illegal or DLP kills.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: Unit 4 (5820 mi^2)

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 more than 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 1993*a*) 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. Recent regulations adopted by the Federal Subsistence Board allowing the sale of brown bear parts, including claws, skulls, teeth, and bones, are prohibited by state law. 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, 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). A status report on implementation of and progress with the recommendations proposed by the team was presented to the Board of Game at its November 2006 meeting.

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 Global Positioning System (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).

Beginning in 2002, staff placed hair snares along selected bear trails near the beach fringe at Swan Cove, Pack Creek, and Windfall Harbor from June to early September. Strategies for deploying hair snares differed slightly from the Chichagof Island effort since the intent was to look at individual bears using multiple drainages within the Seymour Canal Closed Area. In an effort to obtain more samples at Pack Creek, staff replaced the trap sites with scratching posts and fixed wire sites for 2005 and 2006. Using the genetic data from the hair samples to identify individual bears, estimates will be generated for the number of bears within the total sample found in multiple drainages (C. Rice, personal communication).

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 to the field. 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 were 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 one reminder letter; if hunters still did not comply they were added to the Failure to Report (FTR) list and their names were given to ABWE for citation.

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. Hair snare collection efforts were begun in the Seymour Canal area in 2002 by the Pack Creek staff. Strategies for deploying hair snares differed slightly from the Chichagof Island effort since the intent was to look at individual bears using multiple drainages within the Seymour Canal Closed Area. Bear hair was collected from single-catch hair traps placed along known bear trails within the beach fringe stream every 7–10 days from June through early September. Snare sites were modified slightly in 2003–2006 to take advantage of adjacent trails exhibiting a greater degree of traffic. In an effort to obtain more samples at Pack Creek, staff replaced the trap sites with scratching posts and fixed wire sites for 2005 and 2006. Using the genetic data from the hair samples to identify individual bears, estimates will be generated for the number of bears within the total sample that are found in multiple drainages. The posts and fixed wire sites were checked daily and allowed staff to observe some individuals leaving hair at these sites as well; providing a link for a few genetic samples to known individual bears from Pack Creek (C. Rice, personal communication).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Unit 4 brown bear populations are stable or slightly increasing. Analysis of historical harvest data indicate 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 during 1999–2003 contributed to increased harvest above guidelines recommended by the Brown Bear Management Team. Combined federal and state enforcement effort during that period is believed to be part of the reason harvest declined in 2004–05. The Record of Decision for the USFS's Shoreline Outfitter/Guide Assessment Environmental Impact Statement was released in December 2004. The original 1998 proposed action made specific recreation carrying capacity allocations for big game guided hunting, primarily for brown bear hunting. Considering public comment and additional analysis, this focus was determined to be too narrow. The proposed action was expanded to include all commercial recreation providers in the overall commercial recreation allocations. Big game guided hunting operations are now included within the overall commercial recreation allocations in the alternatives. Specific allocations to individual guiding businesses will occur through the Special Uses administration process (USDA-FS 2004). This process will undoubtedly affect the number and distribution of

guides within 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 the bear population on northeast Chichagof Island increased significantly between 1991 and 2004. Current estimates, based on the recently completed CMR effort, place estimated bear density as high as 1.7 bears/mi^2 (R. Flynn, personal communication).

Population Size

Titus and Beier (1993) reported bear densities on Admiralty and northeast Chichagof island 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. It is anticipated some island numbers will be recalculated in the future using updated information gathered in July 2002–September 2004 from northeast Chichagof Island. 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. The three-year mean annual human-caused mortality guideline is 166 bears for the unit (Admiralty Island–62 bears, Baranof/adjacent islands–42 bears, and Chichagof /adjacent islands–62 bears).

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 sex 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, and regulations protecting females with offspring.

In Unit 4 the 2004–05 harvest by hunters was 83% males (n = 116) and 17% females (n = 24). The 2005–06 harvest was 77% males (n = 92) and 23% 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

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

Season and Bag Limit	Resident and Nonresident Hunters
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. One bear every 4 regulatory years by registration permit only	15 Sep–30 Sep 15 Mar–20 May
Unit 4, remainder of the Northeast Chichagof Controlled Use Area. One bear every 4 regulatory years by registration permit only	15 Mar–20 May
Remainder of Unit 4: One bear every 4 regulatory years by registration permit only	15 Sep–31 Dec 15 Mar–20 May

Board of Game Actions and Emergency Orders: At its November 2004 meeting, the board reviewed all areas closed to bear hunting within the unit. 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, in fall 2006. Members of the Board reiterated their endorsement of the findings of the Unit 4 Brown Bear Management Team (BBMT), supporting the USFS in its attempts to decrease hunter crowding issues and limit the number of guides (thus, nonresident harvest) in Unit 4.

The November 2006 Board of Game meeting in Wrangell was preceded by an opportunity for public testimony at Juneau in October. The bulk of the testimony was related to the closed areas of Mitchell Bay and Seymour Canal and was strongly opposed to any change in the status quo of those areas. Later, in Wrangell, the board heard a report on the status of implementing recommendations of the Unit 4 BBMT since the completion of the report in 2000. Following that, the board heard testimony regarding the closed areas at Seymour Canal and Mitchell Bay

and unanimously supported no change to those areas while reiterating their support of the recommendations of the Unit 4 BBMT. In a subsequent unanimous vote, the Board placed a 10-year moratorium on hearing regulations associated with changes to the Seymour Canal Closed Area.

In May 2006, the Federal Subsistence Board refused the State of Alaska's request to limit sales of bear parts, including claws, skulls, teeth, and bones from bears taken under federal subsistence regulations. Under state law, the purchase of claws, teeth, skulls, and bones is prohibited. The state also argued that the federal regulations authorize sales of extremely valuable bear parts without implementing a tracking system. In August 2006, the state filed a Request for Reconsideration which was denied in February 2007.

Hunter Harvest and Other Mortality

Regulatory Year (RY) 2004 (regulatory years begin 1 July and end 30 June, e.g., RY 2004 began 1 July 2004 and ended 30 June 2005): Hunters took 35 brown bears in fall 2004 and harvested 105 in spring 2005. The total for the year was 140 bears. An additional 18 bears are known to have died, bringing the year's total to 158 bears. The three-year mean annual human-caused mortality guideline of 166 bears was exceeded when the previous two years were combined. This resulted in a three-year mean of 174 bears.

RY 2005: Hunters took 40 bears in fall 2005 and 80 in spring 2006. Hunting accounted for 120 bears, and 11 additional bears were reported killed in other situations; the combined mortality for the year was 131 bears. This is a 17% decrease from the previous regulatory year and a 35% decrease from RY 2003, when we had the greatest number of bears ever reported killed in the unit. The 3-year mean annual human-caused mortality dropped to 163, below the guideline harvest of 166. 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 Island data, also indicating a stable trend.

Hunter Residency and Success

Spring Unit 4 permit hunts are administered by two 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), averaging about 12% over the last seven years. Most bears were taken by nonresidents or Alaska hunters from outside Southeast. In 2004–05 nonlocal Alaska hunters and nonresidents harvested 91% of the bears. In 2005–06 nonresidents and non-local Alaskans took 87% of the bears with a slight percentage decrease in the nonlocal residents and no change in the nonresident percentage.

Spring and fall hunting effort is presented in Table 4 and the following discussion is in the context of regulatory years. In fall 2004, 81 Alaska residents hunted a total of 320 days, while 44 nonresidents spent 200 days afield. In fall 2005, 83 residents hunted 253 days and 61 nonresidents hunted 244 days. Spring seasons produced a larger harvest (Table 1) and exhibit greater hunting pressure (Table 4). In spring 2005, 175 residents hunted 567 days and 189 nonresidents hunted 670 days. In spring 2006, 144 residents hunted 443 days and 156 nonresidents hunted 722 days. Over the last 5 years, fall seasons produced one bear for every 14.4 hunt days, and spring seasons produced one bear for every 13 days.

Harvest Chronology. Most fall harvest occurs during the first 20 days 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, declining daylight period and dispersal from the streams make 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). An increasing trend of high female harvest in the fall remains a management concern and may require changes in the fall season to maintain the guideline harvest.

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). When green-up occurs late in the spring, bears concentrate and feed on grass/sedge flats near salt water. Harvests in such years are higher than in years where an earlier, warm spring occurs that provides bears with more dispersed feeding opportunities.

Transport Methods. Unit 4 bear hunters overwhelmingly used boats as the most common form of transportation (Table 6). In 2004–05, 97% of successful hunters used boats. In 2005–06, successful hunters used boats 98% of the time. Aircraft are the second most important means of hunter transport but were used by only 9% of successful hunters in 2004–05 and by 8% of successful hunters in the 2005–06 seasons. The overlap in percentages is due to hunters reporting using more than one transport method.

Other Mortality

To reduce DLP mortality we worked with local communities, agencies associated with public safety, and nongovernmental organizations. A significant amount of 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.

Deer and mountain goat hunting have also led to DLP confrontations between hunters and bears in the unit. Educational materials related to bear behavior, field etiquette and safety, and bear

"awareness" are available through the area and regional offices. Regional staff have assisted in educational programs directed at school children using college student volunteers to present programs. In the fall of 2005, a juvenile brown bear was captured and fitted with a GPS/VHF radiotelemetry collar in Sitka as part of a department and high school class effort. The project was intended to allow students to discover firsthand how a bear travels through and around the neighborhoods in the community. These types of projects, along with others, help to provide a sense of ownership in the welfare of bears around communities where food conditioning puts them at risk.

In 2004–05, 18 nonhunting mortalities were reported (Table 1) and 11 occurred in 2005–06. Generally, increasing bear densities lead to more bears in and around human population centers or remote work sites, and often increase the numbers of bears taken under DLP provisions. In recent years, known illegal kills of bears often represent 15–29% of nonhunting mortality and have represented 24% of all known nonhunting mortality over the last 45 years.

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. Together with the USFS, the area is managed as the Pack Creek Cooperative Management Area (PCCMA) and encompasses an area from Swan Cove to Windfall Harbor. During summer 2002, 1215 visitors (both guided and unguided) were recorded at PCCMA. In summer 2004 the number of visitors was 1277 and dropped slightly to 1235 visitors in 2005. Some tour operators now take visitors to other Unit 4 locales (such as Kalinin Bay on Kruzof Island and Lake Eva on northeast Baranof Island), but the PCCMA area remains the premier spot for bear viewing within the unit. During spring 2004, the Icy Strait-Pt. Sophia development (Hoonah) 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. A final department decision to place bears in the facility has not been made. Quantifying 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 3:0.31 in 2004–05 and 3:0.37 in 2005–06, surpassing the management objective of 3:2. However, the 3-year mean annual human-caused mortality guideline was exceeded in 2004–2005 because of the high overall mortality of the previous year, caused in part by a large number of DLP and illegal kills.

The objective of reducing DLP mortality is difficult to measure. The division continued to work with communities, the 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. A few areas are currently experiencing excessive human-induced mortality; mortality levels (Table 2) near or at the conservative guideline of 4% of the population. Preliminary population density figures appear to indicate a significantly higher bear population than previously estimated. If so, future harvest data will appear to indicate 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.

It appears that expansion of the Northeast Chichagof Controlled Use Area in 1994 successfully prevented excessive harvest in that area following extensive logging road construction.. Chichagof Island has experienced the greatest long-term habitat alteration from logging in Unit 4; thus, bear habitat there is most at risk. 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 exceeded the biological guideline of 4% of the estimated population in 2004–05 and was close to exceeding it in 2005–06 (Table 2). Increases in DLP and illegal kills may make it necessary to recommend regulatory changes to dampen the trend of increasing bear kills, especially where there is an increasing trend in female harvest. Because of the USFS moratorium on licensing additional guides and enforcement action against illegal guiding activities, harvests by nonresidents are expected to stabilize. Reinstatement of the state Big Game Commercial Services Board should provide better oversight of guides and transporters. It is unknown at this time what effect the sale of bear parts will play in human-caused bear mortality in the next few years.

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.

ACKNOWLEDGMENTS

DWC staff contributed significantly to the Unit 4 brown bear management program. The following deserve specific mention: Rod Flynn, LaVern Beier, Tom Paul, Kristen Romanof, Anne Post, Chad Rice, and Kim Titus. Additional support came from the Department of Public Safety, Alaska Bureau of Wildlife Enforcement, especially from Sergeant Steven Hall, and Troopers Shaun Kuzakin, Andy Savland, and Todd Machacek.

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

MOONEY, P.W. 2007. Unit 4 brown bear management report. Pages 20–39 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 4 brown bear harvest, regulatory years 2001–05

	Hunter kill					Nonhunting kill[a]				
Regulatory year	M	F	(%F)	Unk	Total	M	F	Unk	Total	Total Reported
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	1	9	140
Total	147	28	(16)	0	175	16	5	4	25	200
2004										
Fall 04	25	10	(29)	0	35	3	5	7	15	50
Spring 05	91	14	(13)	0	105	3	0	0	3	108
Total	116	24	(17)	0	140	6	5	7	18	158
2005										
Fall 05	21	19	(48)	0	40	3	2	2	7	47
Spring 06	71	9	(11)	0	80	0	2	2	4	84
Total	92	28	(23)	0	120	3	4	4	11	131

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

TABLE 2 Unit 4 brown bear hunting pressure[a] and mortality[b] by major geographic areas, regulatory years 2001–2005

Hunt area	Regulatory Year	# hunters	M	(%)[c]	F	(%)[c]	Unknown	(%)[d]	Total harvest	Percent estimated population[e]
Northeast Chichagof Island[f]										
	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
	2004-05	32	6	(75)	2	(25)	0		8	2.3
	2005-06	32	6	(67)	3	(33)	0		9	2.5
Remainder of Chichagof Island										
	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
	2004-05	180	35	(83)	7	(17)	0		42	3.5
	2005-06	160	34	(81)	8	(19)	0		42	3.5
Baranof and Kruzof Islands										
	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	28	(88)	4	(12)	0		32	3.0
	2004-05	142	28	(82)	6	(18)	0		34	3.3
	2005-06	112	10	(83)	2	(17)	0		12	1.1
Admiralty Island										
	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
	2004-05	165	48	(83)	10	(17)	0		58	3.7
	2005-06	150	30	(73)	11	(27)	0		41	2.6

TABLE 2 continued

Hunt area	Regulatory year	# hunters	M	(%)[c]	F	(%)[c]	Unknown	(%)[d]	Total harvest	Percent estimated population[e]
Unit 4 Totals										
	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
	2004-05	521	116	(83)	24	(17)	0		140	3.7
	2005-06	454	92	(77)	28	(23)	0		120	2.8

[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.

TABLE 3 Unit 4 brown bear successful hunter residency, regulatory years 2001–2005

Regulatory year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
2001–02	22	(17)	24	(18)	85	(65)	131
2002–03	15	(10)	31	(21)	100	(68)	146
2003–04	18	(10)	42	(24)	115	(66)	175
2004-05	13	(09)	24	(17)	103	(74)	140
2005-06	15	(13)	16	(13)	89	(74)	120

[a] Resident of Unit 4.

TABLE 4 Unit 4 hunting effort by island, by residency, regulatory years 2001–2005

Island	Season	# resident hunters	# nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	# days hunted	# bears killed	Effort (Days per bear)
Admiralty									
	Fall 01	31	12	43	166	83	249	12	21
	Spring 02	64	46	110	223	301	524	39	13
	Fall 02	33	15	48	143	81	224	14	16
	Spring 03	50	46	96	194	304	498	39	13
	Fall 03	34	17	51	151	70	221	14	16
	Spring 04	62	51	113	283	259	542	55	10
	Fall 04	29	13	42	146	47	193	10	19
	Spring 05	68	54	122	224	240	464	48	10
	Fall 05	22	14	36	65	73	138	12	12
	Spring 06	61	48	109	205	267	472	29	16
Baranof									
	Fall 01	29	7	36	90	26	116	10	12
	Spring 02	36	19	55	135	154	289	18	16
	Fall 02	23	10	33	116	54	170	12	14
	Spring 03	29	20	49	101	118	219	16	14
	Fall 03	20	8	28	66	43	109	9	12
	Spring 04	33	19	52	116	94	210	23	9
	Fall 04	22	7	29	79	92	171	12	14
	Spring 05	46	41	87	146	140	286	22	13
	Fall 05	22	15	37	72	60	132	13	10
	Spring 06	26	19	45	106	95	201	15	13

TABLE 4 continued

Island	Season	# resident hunters	# nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	# days hunted	# bears killed	Effort (Days per bear)
Chichagof									
	Fall 01	29	12	41	162	63	225	18	13
	Spring 02	62	44	106	282	349	631	34	19
	Fall 02	30	12	42	146	74	220	15	15
	Spring 03	69	40	109	323	258	581	50	12
	Fall 03	42	18	60	218	95	313	21	15
	Spring 04	62	43	105	263	239	502	53	9
	Fall 04	30	24	54	95	61	156	13	12
	Spring 05	61	94	155	197	290	487	38	13
	Fall 05	39	32	71	116	111	227	15	15
	Spring 06	57	88	145	132	360	492	36	14

TABLE 4 continued

Island	Season	# resident hunters	# nonresident hunters	Total hunters	Days hunted by residents	Days hunted by nonresidents	# days hunted	# bears killed	Effort (Days per bear)
Unit 4 Totals									
	Fall 01	89	31	120	418	172	590	40	15
	Spring02	165	109	274	658	804	1462	91	16
	Fall 02	86	37	123	405	209	614	41	15
	Spring 03	148	108	256	618	700	1318	105	13
	Fall 03	97	43	140	442	208	650	44	15
	Spring 04	158	113	271	663	592	1255	131	10
	Fall 04	81	44	125	320	200	520	35	15
	Spring 05	175	189	364	567	670	1237	108*	11
	Fall 05	83	61	144	253	244	497	40	12
	Spring06	144	156	300	443	722	1165	80	15

*3 bears were later deemed illegal

TABLE 5 Unit 4 brown bear harvest chronology, regulatory years 2001–2005[a]

Regulatory year	Fall harvest periods											Tot
	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	
2001–02	10	18	7	2	0	0	2	1	0	0	0	40
2002–03	19	9	7	1	0	5	0	0	0	0	0	41
2003–04	24	12	2	2	1	2	1	0	0	0	0	44
2004-05	18	5	5	3	2	1	0	0	1	0	0	35
2005-06	18	11	7	0	2	0	1	0	1	0	0	40

	Spring harvest periods							RY 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	Total	
2001–02	0	1	6	17	48	19	91	131
2002–03	0	0	7	36	50	12	105	146
2003–04	1	0	10	45	61	14	131	175
2004-05	1	1	24	26	38	15	105	140
2005-06	0	0	2	20	32	26	80	120

[a] Includes all hunts.

TABLE 6 Unit 4 brown bear harvest by transport method, 2001–2002 through 2005–06[a]

Regulatory year	Airplane	Boat	Walked	Off-road vehicle	Highway vehicle	Unknown
2001–02	6	123	0	0	7	0
2002–03	4	140	0	2	1	0
2003–04	8	166	1	0	0	0
2004-05	12	136	3	2	0	0
2005-06	9	117	2	5	1	1

[a]Sealing certificate data and registration permit data often differ. Sealing certificate data were used where possible.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

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.

Unit 5 is composed of two game management subunits, 5A and 5B, that are separated by Yakutat Bay. Although they are geographically similar and adjacent to one another, they face vastly different pressure from bear hunters. Unit 5A is fairly accessible with 40–50 miles of gravel roads plus many all-terrain-vehicle (ATV) trails. There are numerous airstrips that provide access for small aircraft, and many of these have rental cabins associated with them that hunters use as base camps. Finally, there are several navigable rivers that can be accessed via the road system that provide hunters with additional access. Unit 5B has just a few miles of gravel logging roads near Icy Bay, and has a limited ATV trail system in this same area. There are only a couple of airstrips and just a single rental cabin for hunters to use as a base. The subunits also vary in that most of the lands in 5A are within the Tongass National Forest or Glacier Bay National Preserve and are open to hunting. In contrast, much of Unit 5B is off limits to hunting because much of it is designated national park land. Additionally, the subunit has areas owned by Native Corporations which are open to hunting only with a permit from a corporation.

Since 1961, when brown bears were first sealed in Alaska, just over 1000 sport-killed bears have been sealed from Unit 5. During this same time period, nonhunter harvest mortality (vehicle collisions, the dispatching of nuisance animals, defense of life and property (DLP) situations, and bears found dead from unknown causes) have accounted for 71 bears. Approximately 85% of the hunter harvested bears were from Unit 5A, and 15% from Unit 5B. Although hunters from around Alaska hunt bears in Unit 5, the majority of the harvest is by guided nonresident hunters, who harvest approximately 70% of the bears annually. 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. This increase is due in part to a 1988 Superior Court

decision that deregulated the big game guide industry and resulted in an increase in big game guiding activity across Southeast Alaska.

Under federal subsistence regulations, bears do not have to be sealed if they are not removed from Unit 5.

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 highest annual mortality on record occurred in 2003 when 45 brown bears were killed, 11 of these in defense of life and property (DLP). There was concern that this high mortality might develop into a pattern, but during this report period the total brown bear mortality returned to pre-2003 levels, with 35 and 34 bears being killed during regulatory years (RY) 2004 and 2005 respectively (A regulatory year runs from 1 July through 30 June; e.g. RY 2004 ran from 1 July 2004–30 June 2005). Although the average male age and skull size decreased slightly from the previous report period, they are comparable to the long-term averages.

MORTALITY

Harvest

Season and Bag Limit	Resident and Nonresident Hunters
1 bear every 4 regulatory years	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 at 30-35 bears per year since the early 1990s, when for two consecutive years forty or more bears were taken. 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 annual harvest was 30, with a range of 23–33 bears. Since 1990, the annual average harvest has been about 33 bears, with a mean annual harvest during the current report period of 33 bears. The mean male age increased from the 1970s (5.8 years) to the 1980s (7.0 years), but dropped to a mean of 6.3 years for 1990 through 1999. Since then the mean age of males increased to 6.7 years for 2000-01 and 8.2 years for 2002-03, it was 7.2 years during this report period.

During regulatory year 2004, 24 males and 9 females were reported taken (Table 1). Males composed 73% of the harvest, which is above the mean of 70% in the 1989–2003 harvests, and above our management objectives of 60%. Average male skull size of 22.8 inches was a full inch smaller than the previous report period, and 0.6 inch less than the 1996-2003 mean of 23.4 inches. The average male age (6.1 years) was significantly lower than the previous report period mean of 8.2, and slightly below the management objective of 6.5 years.

In RY 2005, Unit 5 hunters killed 25 male and 8 female brown bears (Table 1). Males composed 76% of the harvest, which again was above our management objective of 60%. Mean male skull size was 24.0 inches, and the mean age was 8.4 years. Both above the long term averages, and both significantly higher than the previous year. Overall, for the report period, the both the mean age of 7.2 years, and the mean skull size of 23.4 inches were close to or at the long term averages.

Hunter Residency and Success. During both years of this report period, nonresident hunters accounted for 85% of the brown bear harvest. This is not only higher than the 1996-2003 mean of 77%, but is comparable to highest years we have documented.

Harvest Chronology. During the report period the harvest chronology varied between years. In RY 2004, 61% of the bears were taken in spring which is substantially higher than the 45% spring harvest during RY 2005 (Table 2). This compares with a mean value of 42% during 1996 through 2003, with a range of 32% to 55%,

Transport Methods. Transportation types used in successful brown bear hunts during this report period included boats (36%), off-road vehicles (ORVs) (42%) aircraft (17%), highway vehicles (3%), and walking (2%).

Other Mortality

This category refers to DLP kills, illegal kills, road kills, and nuisance bear kills. During 2004 only a single bear was killed in a DLP situation, and another was found dead. In 2005 we again had only a single DLP, and that accounted for the only nonhunt-killed bear.

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 once food conditioned and near the community, many of these animals eventually are killed in nonhunting situations. Douglas Area ADF&G staff continues 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 easily exceed one of our management objectives (male to female ratio of at least 3:2) during both years of the report period, with a mean of 75% male harvest. However, we were only able to attain the other objective (mean age of at least 6.5 years for male bears) during 2005, when the mean age was 8.4 years, well above our objective. This rebound from the 2004 mean of 6.1 years puts us well above our management objective for the report period. The high percentage of male bears in the hunter harvest gives us a fair bit of comfort that the productivity of this population is not being compromised. .

Current hunter harvest in Unit 5 seems to be sustainable based on skull size and age indices. These indices help us anticipate the harvest year to year, as does the limit the USFS places on nonresident hunts in the Tongass National Forest. The real concern then is not hunter harvest; but the killing of bears in nonhunting situations. The killing of bears in DLP situations is unpredictable and is substantial some years. Also, bears coming into Yakutat for the landfill as well as trash in residential areas end up being killed year after year. Convincing the general populace in Yakutat that brown bears are a valuable wildlife resource and not just pests has not been an easy thing to do. Efforts are being made by department staff to work with the community of Yakutat to address the access to trash by bears at both the landfill and at people's homes. These efforts, should they be successful, will lead to a much lower take of bears in nonhunt situations. We will continue to emphasize to local residents the importance of properly managing garbage and work with DEC to eliminate this fatal attractant.

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BARTEN, N. 2007. Unit 5 brown bear. Pages 40–48 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 5 brown bear harvest, age, skull sizes, and effort, RY 1996 through RY 2005

Regulatory	Harvest				Mean age			Mean skull size		Avg days/kill	
year	M	F	Unk	Total	M	F	Total	M .	F	M	F
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
2004	24	9	0	33	6.1	8.9	6.8	22.8	22.0	5.3	5.3
2005	25	8	0	33	8.4	5.3	7.2	24.0	21.9	5.0	4.0
Means											
2004–05	24.5	8.5	0	33	7.3	7.2	7.3	23.4	22.0	5.1	4.7
2002–03	21.5	4.5	0	26.0	8.5	8.7	8.6	23.4	21.5	4.2	4.3
1996–05	22.8	8.4	.2	31.3	7.1	6.2	6.9	23.4	21.0	4.6	4.5

TABLE 2 Unit 5 brown bear harvest chronology, RY 1996 through RY 2005

Regulatory Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar.	Apr	May	Jun	Total	
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	
2004	0	0	12	1	0	0	0	0	0	6	14	0	33	
2005	0	0	11	6	1	0	0	0	0	5	10	0	33	

TABLE 3 Unit 5 successful brown bear hunter residency, RY 1996 through RY 2005

Regulatory year	Local resident	(%)	Nonlocal resident	(%)	Nonresident	(%)
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)
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)
2004						
Fall 2004	0	(0)	5	(38)	8	(62)
Spring 2005	0	(0)	0	(0)	20	(100)
Total	0	(0)	5	(15)	28	(85)
2005						
Fall 2005	2	(11)	2	(11)	14	(78)
Spring 2006	0	(0)	1	(7)	14	(93)
Total	2	(6)	3	(9)	28	(85)

TABLE 4 Unit 5 transport modes used by successful brown bear hunters, RY 1996 through 2005

Regulatory year	Plane	(%)	Boat	(%)	ORV/4 wheeler	(%)	Highway vehicle	(%)	Foot	(%)	Other	(%)
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)
2004	4	(12)	12	(37)	15	(45)	2	(6)	0	(0)	0	(0)
2005	7	(21)	12	(37)	13	(39)	0	(0)	1	(3)	0	(0)

TABLE 5 Unit 5 brown bear mortality by type, RY 1996 through 2005

Regulatory Year	DLP	Unknown/ Natural	Vehicle Collision	Illegal kill	Other	Hunter Kill	Total Mortality
1996	0	0	0	0	0	38	38
1997	0	0	0	0	0	27	27
1998	0	0	1	0	0	35	36
1999	2	0	1	3	0	31	37
2000	1	0	0	0	0	33	34
2001	3	0	0	1	0	31	35
2002	5	0	1	0	1	21	28
2003	11	2	1	0	0	31	45
2004	1	0	0	1	0	33	35
2005	1	0	0	0	0	33	34
Mean 2004-05	1.0	0	0	0.5	0	33	34.5
Mean 1996-03	2.8	0.3	0.5	0.5	0.1	30.9	35.0

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 6 (10,140 mi^2)

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 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 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, which may have caused a population decline. Seasonal restrictions were established to reduce harvest, which resulted in an average harvest of 35 bears (range = 22–49) from 1992–1993 through 2002–2003.

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 activity probably reduced 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 continued north 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 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 and 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-ft elevation were tallied and linear density estimated as [(tracks/2)+dens+bears]/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 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 and model assumptions, Hinchinbrook Island in Unit 6D had a stable population of about 110 bears, while Montague Island had a slightly increasing population of about 90 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, Montague Island 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 reduces 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 km^2) that included Kodiak Island, much of the Alaska Peninsula, and parts of Southeast Alaska. Montague Island had a midrange density (40–175 bears/1000 km^2), 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 5 bears. Taking cubs (bears ≤ 2 years old) or a female accompanied by cubs were prohibited.

Board of Game Actions and Emergency Orders. The board repealed the in-unit sealing requirement and increased the reporting period from 7 to 30 days for Units 6A, B and C beginning in 2005.

Hunter Harvest. Reported harvests during 2004–2005 and 2005–2006 for Unit 6 were 68 and 47, respectively (Table 2). In each year, most bears were harvested in Units 6A (18 and 14 bears), or 6D (35 and 19 bears). The reported harvest for Montague Island was five. The Unit 6 harvest for 2004–2005 was a record high.

During the reporting period females made up 21% and 23% of the reported kill in each of the years, respectively (Table 2). Mean skull size among males was 24 inches in both years, similar to mean skull size during the past 5 years. (Table 3). Average skull size for males has been increasing 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 (Table 3).

Hunter Residency. Nonresidents harvested the majority of brown bears in Unit 6 during 2004–2005 (65%) and 2005–2006 (60%) (Table 4). Nonresident harvest was most prevalent in Unit 6A.

Harvest Chronology. Peak brown bear harvests occurred during September–October and May during the reporting period (Table 5).

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 2 bears killed as DLP or by highway vehicle during 2004–2005 and 3 reported the 2005–2006 next year (Table 2). Estimated illegal kill totaled 10 and 9 bears, respectively. This was similar to the last reporting period.

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 (with reporting years combined) 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.

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

CROWLEY, D.W. 2007. Unit 6. Pages 49–63 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

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 [(t/2)+d+b]/m	Obs/hr	Estimated population[a]	Harvest quota		Reported harvest	
		tracks	dens	bears					Total bears	Females age >2	Total bears	Females age >2
Hinchinbrook	1990–1991	34	8	0	100	0.25	38.1	116	5	2	5	0
Island	1993–1994	26	9	0	100	0.22	7.9	106	5	2	6	4
	2003–2004	124	9	0	148	0.48	25	110	6	3	6	1
	2004–2005	64	6	3	100	0.41	43	110	6	3	13	1
	2005–2006	94	12	0	148	0.40	53	103	6	3	5	0
Montague	1989–1990	10	4	0	165	0.05	8.8	41	2	1	1	1
Island	2000–2001	58	3	0	210	0.15	18.2	75	4	2	0	0
	2001–2002	80	3	0	210	0.21	22.5	80	4	2	4	0
	2002–2003	134	1	0	210	0.32	26.6	81	5	2	3	0
	2003–2004	74	7	0	163	0.27	31.4	84	5	2	0	0
	2004–2005	154	2	1	210	0.38	37.5	90	5	2	5	1
	2005–2006	166	2	3	210	0.42	38.3	91	5	2	0	0

[a]Midpoint of range estimate (+/- 30%)

TABLE 2 Unit 6 brown bear harvest, 2000–2005

		Reported								Estimated						
	Regulatory	Hunter kill					Nonhunting			illegal	Total estimated kill					
Unit	year	M	F	(%)	Unk	Total	M	F	Unk.	kill	M	(%)	F	(%)	Unk	Total
6A	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
	2004-2005															
	Fall 04	7	3	(30)	0	10	0	0	0	2	7	(70)	3	(30)	2	12
	Spring 05	6	2	(25)	0	8	0	0	0	1	6	(75)	2	(25)	1	9
	Total	13	5	(28)	0	18	0	0	0	3	13	(72)	5	(28)	3	21
	2005-2006															
	Fall 05	10	1	(9)	0	11	1	1	0	1	11	(85)	2	(15)	1	14
	Spring 06	3	0	(0)	0	3	0	0	0	1	3	(100)	0	(0)	1	4
	Total	13	1	(7)	0	14	1	1	0	2	14	(88)	2	(13)	2	18

TABLE 2 Continued

Unit	Regulatory year	Reported: Hunter kill M	F	(%)	Unk.	Total	Reported: Nonhunting M	F	Unk.	Estimated illegal kill	Total estimated kill M	(%)	F	(%)	Unk.	Total
6B	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
	2004-2005															
	Fall 04	7	1	(13)	0	8	0		1	2	7	(88)	1	(13)	3	11
	Spring 05	3	0	(0)	0	3	0		0	1	3	(100)	0	(0)	1	4
	Total	10	1	(9)	0	11	0		1	3	10	(91)	1	(9)	4	15
	2005-2006															
	Fall 05	4	1	(20)	0	5	0		0	1	4	(80)	1	(20)	1	6
	Spring 06	2	1	(33)	0	3	0		0	0	2	(67)	1	(33)	0	3
	Total	6	2	(25)	0	8	0		0	1	6	(75)	2	(25)	1	9

TABLE 2 Continued

Unit	Regulatory year	Reported								Estimated illegal kill	Total estimated kill					
		Hunter kill					Nonhunting									
		M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
6C	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
	2004-2005															
	Fall 04	1	0	(0)	0	1	0	0	0	1	1	(100)	0	(0)	1	2
	Spring 05	2	1	(33)	0	3	0	0	0	0	2	(67)	1	(33)	0	3
	Total	3	1	(25)	0	4	0	0	0	1	3	(75)	1	(25)	1	5
	2005-2006															
	Fall 05	2	2	(50)	0	4	0	0	0	1	2	(50)	2	(50)	1	5
	Spring 06	2	0	(0)	0	2	0	0	0	0	2	(100)	0	(0)	0	2
	Total	4	2	(33)	0	6	0	0	0	1	4	(67)	2	(33)	1	7

TABLE 2 Continued

Unit	Regulatory year	Reported: Hunter kill M	F	(%)	Unk.	Total	Reported: Nonhunting M	F	Unk.	Estimated illegal kill	Total estimated kill M	(%)	F	(%)	Unk.	Total
6D	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
	2004-2005															
	Fall 04	7	5	(42)	0	12	0	1	0	2	7	(54)	6	(46)	2	15
	Spring 05	21	2	(9)	0	23	0	0	0	1	21	(91)	2	(9)	1	24
	Total	28	7	(20)	0	35	0	1	0	3	28	(78)	8	(22)	3	39
	2005-2006															
	Fall 05	2	0	(0)	0	2	0	0	0	4	2	(100)	0	(0)	4	6
	Spring 06	11	6	(35)	0	17	0	1	0	1	11	(61)	7	(39)	1	19
	Total	13	6	(32)	0	19	0	1	0	5	13	(65)	7	(35)	5	25

TABLE 2 Continued

Unit	Regulatory year	Reported								Estimated illegal kill	Total estimated kill					
		Hunter kill					Nonhunting									
		M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
Unit 6 Total	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
	2004-2005															
	Fall 04	22	9	(29)	0	31	0	1	1	7	22	(69)	10	(31)	8	40
	Spring 05	32	5	(14)	0	37	0	0	0	3	32	(86)	5	(14)	3	40
	Total	54	14	(21)	0	68	0	1	1	10	54	(78)	15	(22)	11	80
	2005-2006															
	Fall 05	18	4	(18)	0	22	1	1	0	7	19	(79)	5	(21)	7	31
	Spring 06	18	7	(28)	0	25	0	1	0	2	18	(69)	8	(31)	2	28
	Total	36	11	(23)	0	47	1	2	0	9	37	(74)	13	(26)	9	59

TABLE 3 Unit 6 brown bear mean skull size and age, 2000–2005

		Males				Females			
Unit	Year	Skull size	*n*	Age	*n*	Skull size	*n*	Age	*n*
6A	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
	2004–2005	25	13	8	12	21	5	3	5
	2005–2006	24	12	4	10	21	2	11	2
6B	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
	2004–2005	24	10	5	9	20	1	5	1
	2005–2006	23	6	5	4	20	3	4	2
6C	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
	2004–2005	25	3	7	3	21	1	3	1
	2005–2006	24	4	2	2	23	2	7	2
6D	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
	2004–2005	24	28	8	27	22	8	7	6
	2005–2006	24	13	5	2	22	8	21	2
Unit 6	2001–2002	23	33	5	33	21	10	6	10
Average	2002–2003	24	27	6	27	21	23	6	23
	2003–2004	25	37	7	37	21	16	6	16
	2004–2005	24	54	7	51	21	15	5	13
	2005–2006	24	35	4	18	21	15	9	7

TABLE 4 Unit 6 brown bear successful hunter residency, 2000–2005

Unit	Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Residency unknown	(%)	Total Successful hunters
6A	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
	2004–2005	1	(6)	0	(0)	17	(94)	0	(0)	18
	2005–2006	1	(7)	2	(14)	11	(79)	0	(0)	14
6B	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
	2004–2005	1	(9)	3	(27)	7	(64)	0	(0)	11
	2005–2006	3	(38)	3	(38)	2	(25)	0	(0)	8
6C	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
	2004–2005	2	(50)	2	(50)	0	(0)	0	(0)	4
	2005–2006	1	(17)	1	(17)	4	(67)	0	(0)	6
6D	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
	2004–2005	1	(3)	14	(40)	20	(57)	0	(0)	35
	2005–2006	4	(21)	4	(21)	11	(58)	0	(0)	19
Unit 6 Total	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
	2004–2005	5	(7)	19	(28)	44	(65)	0	(0)	68
	2005–2006	9	(19)	10	(21)	28	(60)	0	(0)	47

TABLE 5 Unit 6 brown bear harvest chronology by percent, 2000–2005

Unit	Regulatory year	Harvest periods: September 1–15	September 16–30	October 1–15	October 16–31	November 1–15	November 16–30	April 1–15	April 16–30	May 1–15	May 16–31	*n*
6A	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
	2004–2005	(6)	(28)	(11)	(11)	(0)	(0)	(0)	(0)	(22)	(22)	18
	2005–2006	(7)	(29)	(43)	(0)	(0)	(0)	(0)	(0)	(14)	(7)	14
6B	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
	2004–2005	(27)	(9)	(27)	(9)	(0)	(0)	(0)	(9)	(9)	(9)	11
	2005–2006	(0)	(14)	(43)	(0)	(0)	(0)	(0)	(0)	(14)	(29)	7
6C	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
	2004–2005	(0)	(0)	(25)	(0)	(0)	(0)	(0)	(25)	(25)	(25)	4
	2005–2006	(57)	(0)	(14)	(0)	(0)	(0)	(0)	(0)	(0)	(29)	7
6D	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
	2004–2005	(0)	(0)	(6)	(26)	(3)	(0)	(0)	(3)	(20)	(43)	35
	2005–2006	(0)	(0)	(0)	(5)	(5)	(0)	(0)	(11)	(37)	(42)	19
Unit 6 Total	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
	2004–2005	(6)	(9)	(12)	(18)	(1)	(0)	(0)	(4)	(19)	(31)	68
	2005–2006	(11)	(11)	(21)	(2)	(2)	(0)	(0)	(4)	(21)	(28)	47

TABLE 6 Unit 6 brown bear harvest percent by transport method, 2000–2005

Unit	Regulatory year	Percent of harvest								*n*
		Airplane	Boat	Airboat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
6A	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
	2004–2005	100	0	0	0	0	0	0	0	18
	2005–2006	57	29	0	7	0	7	0	0	14
6B	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
	2004–2005	42	25	0	0	0	0	25	8	12
	2005–2006	25	25	0	0	0	0	50	0	8
6C	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
	2004–2005	25	0	0	25	0	0	25	25	4
	2005–2006	17	33	0	17	0	0	33	0	6
6D	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
	2004–2005	40	60	0	0	0	0	0	0	35
	2005–2006	11	79	0	5	0	0	5	0	19
Total	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
	2004–2005	55	35	0	1	0	0	6	3	69
	2005–2006	28	49	0	6	0	2	15	0	47

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
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BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNITS: 7 (3520 mi^2) and 15 (4876 mi^2)

GEOGRAPHIC DESCRIPTION: Kenai Peninsula

BACKGROUND

Brown bears are found throughout the remote lowland forests and intermountain valleys of the Kenai Peninsula, with the possible exception of some coastal portions of Unit 7 and the eastern side of Kachemak Bay. Historical brown bear range remains occupied. 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 mi^2) and the National Park Service (NPS; Kenai Fjords National Park, 885 mi^2) 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 mi^2. 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 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 the Alaska Department of Fish and Game (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). Current IBBST efforts are focused on determining the feasibility of conducting a DNA based mark-recapture census, and obtaining population demographic data.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- 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. Del Frate (1993) derived a population estimate for the Kenai by combining results from a habitat-based model and a density estimate using expert interpretation. By comparing estimates of bear density to other parts of Alaska, he 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 km^2 (7.0 bears per 100 mi^2) he reported for his middle Susitna Study Area (1987). Using the available information, Del Frate estimated the bear density on the Kenai to be 20 bears per 1000 km^2 (5.2 bears per 100 mi^2), and calculated the suitable habitat to be 13,848 km^2 (5347 mi^2). He derived a

brown bear population estimate for Units 7 and 15 by multiplying the estimated suitable habitat by the estimated density. There has never been a formal census conducted to produce a statistically valid estimate for the Kenai brown bear population. The exercise outlined above was conducted in 1993 and likely does not accurately reflect current brown bear numbers.

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

The only documented estimate for the Kenai brown bears population was generated by Del Frate (1993). The estimate was not based on census data from the Kenai Peninsula, probably conservative when you consider brown bear densities in other coastal regions of the state, and likely does not accurately reflect current numbers. Over the last decade, we believe the population has probably increased.

Distribution and Movements

Brown bears inhabit most of the Kenai Peninsula with the exception of coastal areas of Kenai Fjords National Park (KFNP) 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 KFNP (Nuka Bay). Occasionally, individual bears have been observed on the eastern side of Kachemak Bay. It is unknown whether this is a result of bears dispersing 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. The fall brown bear hunting season was closed by emergency order after a 2-day opening in 2004, and was closed altogether during 2005 and 2006.

Hunter Harvest. There were 254 registration permits issued to brown bear hunters for Game Management Units (GMUs) 7 and 15 during 2004 and no permits issued for these GMUs during 2005 or 2006. The 2004 season was closed by emergency order after 2 days and resulted in a

harvest of 4 bears including 3 males and a female (Table 1). Two bears were taken by local residents and 2 were taken by nonlocal (not residing in GMU's 7 or 15) residents (Table 2). All harvest occurred during October (Table 3).

Transport Methods. During the 2004 hunt, 3 successful hunters used boats for transportation, while 1 used an aircraft (Table 4).

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

On 27 November 1998, Kenai Peninsula brown bears were listed as a Population of Special Concern under 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.

During calendar year 2004, there were 11 reported, nonhunting, human-caused brown bear mortalities, consisting of 6 males, 4 females and 1 of unknown sex. Seven of these animals were subadults. Four (all males) were shot at residences, 3 (2 females, 1 of unknown sex) were killed by automobiles, 2 (1 each male and female) were killed by hunters pursuing other species, 1 male was shot by a Kenai National Wildlife Refuge (KNWR) enforcement officer because of injuries it sustained from an unknown cause, and 1 female was shot by a bear guard associated with seismic exploration.

During calendar year 2005, there were 17 reported, nonhunting, human-caused brown bear mortalities, consisting of 8 males, 7 females and 2 of unknown sex. Twelve of these animals were subadults. Five (4 males and a female) were shot at residences, 1 female was killed by an automobile, 5 (2 female, 1 had 2 cubs-of-the-year of unknown sex, and 1 male) were killed by hunters pursuing other species, 4 (2 each males and females) were illegal kills, 1 female was shot by a hiker, and 1 male was shot by an Alaska Bureau of Wildlife Enforcement officer for public safety reasons.

During calendar year 2006, there were 29 reported, nonhunting, human-caused brown bear mortalities, consisting of 14 males, 11 females and 4 of unknown sex. Twenty of these animals were subadults. Six (5 males and a female) were shot at residences, 2 (1 male and 1 of unknown sex) were killed by automobiles, 9 (1 male, 1 female, 1 female with 3 male cubs of the year, and 1 female with 1 each male and female cub of the year) were shot by hunters pursuing other species of game, 3 (2 males, and 1 of unknown sex) were illegal kills, 2 (1 each male and female) were shot by Alaska Bureau of Wildlife enforcement officers for public safety reasons, 1 female was shot by ADF&G staff after someone fractured the bone in her front leg by shooting her with bird shot, 1 female was shot by ADF&G personnel during a bear capture operation, 1 female was shot by a fisheries survey crew member when she charged, 1 female with 2 cubs of the year of unknown sex was shot by an individual recreating, and 1 female was shot by an angler.

Reducing the nonhunting human-caused mortalities for brown bears continues to be a high priority for area staff. Also, the department is working with 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

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, 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 2006 the City of Kenai was the first municipality to be recognized as a Wildlife Conservation Community. The Wildlife Conservation Community Program (WCCP) effort was initiated by ADF&G to reduce defense of life and property killings of brown bears. The basis of the program is to minimize bear attractants (mainly garbage) by promoting the use of bear resistant trash containers. Nonprofit organizations (for the city of Kenai it was the Kenai Peninsula Chapter of Safari Club International) applied for federal grants, and the money has been used to reduce the cost of bear-resistant trash receptacles for residents living in target areas. We hope that reducing (or eliminating) access to readily available garbage will decrease bear activity in human populated areas and reduce DLP killings. We hope the program will make our neighborhoods safer, increase property values, and allow for more responsible management and use of our wildlife resources. Larry Lewis (ADF&G wildlife technician) has been instrumental in bringing this concept forward. The WCCP is a community driven program and requires acceptance by the public and support by local law enforcement officials.

During the next report period we will consider adjustments to the management objectives for allowable human-caused brown bear mortalities. We may decide to focus our objective on adult females and where (urban or remote) the mortalities occur.

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

SELINGER, J. 2005. Units 7 & 15 brown bear management report. Pages 64–74 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Units 7 and 15 brown bear harvest, 2001–2005

Regulatory year	Reported: Hunter Kill M	F	Unk	Total	Reported: Nonhunting kill[a] M	F	Unk	Total estimated kill M	F	(%)	Unk	Total
2001												
Fall 01	1	2	0	3	5	7	0	6	9	(54)	0	15
Spring 02	0	0	0	0	2	1	0	2	1	(33)	0	3
Total	1	2	0	3	7	8	0	8	10	(56)	0	18
2002												
Fall 02	0	0	0	0	5	7	0	5	7	(58)	0	12
Spring 03	0	0	0	0	2	5	0	2	5	(71)	0	7
Total	0	0	0	0	7	12	0	7	12	(63)	0	19
2003												
Fall 03	0	0	0	0	1	8	3	1	8	(67)	3	12
Spring 04	0	0	0	0	4	1	0	4	1	(20)	0	5
Total	0	0	0	0	5	9	3	5	9	(53)	3	17
2004												
Fall 04	3	1	0	4	2	3	1	5	4	(44)	1	10
Spring 05	0	0	0	0	4	3	0	4	3	(43)	0	7
Total	3	1	0	4	3	9	1	6	10	(63)	1	17
2005												
Fall 05	0	0	0	0	4	4	2	4	4	(50)	2	10
Spring 06	0	0	0	0	6	3	0	6	3	(33)	0	9
Total	0	0	0	0	10	7	2	10	7	(70)	2	19

[a] Includes DLP kills, research mortalities, and other known human-caused mortalities.

TABLE 2 Unit 7 and 15 brown bear successful hunter residency, 2001–2005

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters[b] *n*
2001–02[c]	2	(66)	1	(34)	0	(0)	3
2002–03[c]	No hunt held						
2003–04[c]	No hunt held						
2004–05[c]	2	(50)	2	(50)	0	(0)	4
2005–06[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, 2001–2005

Regulatory year	Harvest periods September	October	May	n[a]
2001–02[b]	0	100	0	2
2002–03[b]	No hunt held			
2003–04[b]	No hunt held			
2004–05[b]	0	100	0	4
2005–06[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, 2001–2005

	Percent of Harvest									
Regulatory year	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk.	*n*[a]
2001–02[b]	0	0	33	0	0	0	66	0	0	3
2002–03[b]	No hunt held									
2003–04[b]	No hunt held									
2004–05[b]	25	0	75	0	0	0	0	0	0	4
2005–06[b]	No hunt held									

[a] Does not include nonsport harvest.
[b] Closed by emergency order.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 8 (5,097 mi^2)

GEOGRAPHIC DESCRIPTION: Kodiak and adjacent islands

BACKGROUND

Kodiak's geologic character is not conducive to preserving fossil evidence, so it is not possible to confirm how long bears have been on the archipelago. Kodiak brown bears (*Ursus arctos middendorffi*., however, have been isolated from other bear populations since the last ice age (about 12,000 years ago) (Talbot et al. 2006) and during that time have developed into a unique subspecies. Early human occupants of the archipelago looked to the sea for their sustenance, but they occasionally hunted bears, using 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 Kodiak in the late 1700s to capitalize on abundant fur resources. Bear hides were considered a "minor fur" and sold for about the same price as river otter pelts. The number of bears harvested increased substantially when sea otter populations declined. After the United States acquired Alaska in 1867, bear harvests on Kodiak peaked at as many as 250 bears per year. Commercial fishing activities intensified in the late 1880s, and canneries proliferated throughout the archipelago. Bears were viewed as competitors for salmon and routinely were shot when seen on streams or coasts. At the same time, sportsmen and scientists considered 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 late 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 (NWR) 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, sockeye salmon (*Oncorhynchus nerka*) escapement in 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%) was 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 Kodiak NWR. 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 non-refuge 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 were 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 even authorized the use of dogs to hunt brown bears on northeast Kodiak.

In late 1970, the state curtailed 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 near ranches.

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 an emergency regulation in 1967 and the closure was extended through 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 one bear every four 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 strongly felt 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 native

corporations. Federal management of national forest lands on Afognak was threatened, and Kodiak NWR lost control of 310,000 acres of prime bear habitat (>17% of refuge lands).

In 1975 the state created 19 exclusive guiding areas on the archipelago. They 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 (USFS) began building a logging road between Kazakof (Danger) Bay and Discoverer Bay on Afognak Island, and timber harvesting began in 1977. Under ANCSA's provisions, Native corporations took over management of their recently acquired lands in 1978. Passage of the Alaska National Interest Lands Conservation Act in 1980 added the northwest portion of Afognak Island to the refuge, but it also curtailed Forest Service 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 in north central Kodiak. 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, protection of state lands on the Shearwater Peninsula, and establishment of the Kodiak Brown Bear Research and Habitat Maintenance 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, 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 1990; Barnes and Smith 1995; Barnes and Van Daele 2006; Smith and Van Daele 1988, 1990; Van Daele et al. 1990; Van Daele 2007). A density estimation technique developed by Miller et al. (1987) was applied in two 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.

Kodiak 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 state and federal governments. Paradoxically, 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 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 Kodiak Brown Bear Research and Habitat Maintenance 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, and in spring 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, Kodiak NWR 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 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 Kodiak 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 gender 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 nine study areas with the "intensive aerial survey technique" detailed in Barnes and Smith (1997). 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. 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 most areas.

Population Size

We worked closely with staff from Kodiak NWR and the Alaska Bureau of Wildlife Enforcement to conduct 17 intensive aerial brown bear surveys from 1987 to 2005 (Table 1). These surveys were in nine separate areas on Kodiak Island, and seven areas have been surveyed more than once. Data from these surveys were extrapolated to estimate the total bear population on the archipelago in 1995 (Barnes et al. 1988, Barnes and Smith 1998) and 2005 (Van Daele 2007). The estimated population in 2005 was 3526 bears, 2378 of which were independent (>3 years old). There were an estimated 430 bears on the islands north of Kodiak, 908 on northwest Kodiak, 101 bears on northeast Kodiak, 744 on southeast Kodiak, 1094 on southwest Kodiak, and 249 on the Aliulik Peninsula. The average density on Kodiak Island was 308 bears/1000 km^2 (0.8 bears/mi^2), and for the northern islands it was 189 bears/1000 km^2 (0.5 bears/mi^2). 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. Extrapolation of intensive aerial survey data from all of the survey units on Kodiak Island, coupled with model predictions, indicated a 16.7% increase in the archipelago-wide bear population from 1995 – 2005 (Van Daele 2007) (Table 2).

We successfully completed an intensive aerial survey of the brown bear populations on the Kiliuda and Shearwater peninsulas in May 2005. Survey data indicate bear density of both areas increased since the last survey conducted in 1996. Further analysis suggested the increase was statistically significant in both areas ($p<0.01$). The estimated number of independent bears (not including cubs) in Kiliuda went from 42.6 (standard deviation [sd] = 7.8) in 1996 to 57.4.1 (sd = 7.4) in 2005. In the Shearwater area the estimated number of independent bears went from 67.6 (sd = 8.1) to 106.8 (sd = 15.5). The methods used and conditions encountered during intensive aerial surveys were comparable in 1996 and 2005. In 2006 we attempted to replicate a survey of the Terror Lake area, but weather and vegetative development curtailed our efforts.

Aerial surveys along salmon streams in southwestern Kodiak Island by Kodiak NWR staff indicated little change in composition of the brown bear population during the years they were conducted (Table 3). 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 an increasing portion of the population composed of family groups during the last 15 years of the surveys. Family groups composed 52.6% of the bears classified from 1988 to 1992, 56.8% from 1993 to 1997, and 58.0% from 1998 to 2002.

Distribution and Movements

There have been several investigations of brown bear movements and population dynamics on Kodiak Island in the past 50 years. The Karluk Lake area was investigated from 1954 through 1962 (Troyer and Hensel 1969). There were four major bear research projects on Kodiak Island from 1982 through 2004, all of which included radio telemetry. Each of these studies addressed specific management questions. The Terror Lake hydroelectric project investigation was designed to address concerns that bears would be displaced or otherwise disturbed by construction and operation of a hydroelectric facility in a remote area of Kodiak Island (Smith and Van Daele 1990). The Zachar/Spiridon study investigated the relationship between bears and deer hunters at a time when there were increasing encounters, which were resulting in hunters losing their game and bears being shot in defense of life or property (Barnes 1994). The southwest Kodiak study was designed to assess annual use patterns of salmon spawning areas by bears and explore the possibility of developing an objective method of determining population trends (Barnes 1990). The Aliulik Peninsula research was primarily descriptive in design, investigating the population dynamics of bears living in a unique habitat on the extreme south end of Kodiak (Barnes and Smith 1997). 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). In 2007 a meta-analysis of data collected during and subsequent to those projects was completed (Van Daele 2007) (Appendix 1).

MORTALITY

Harvest

Since statehood, the reported sport harvests of bears in Unit 8 have ranged from 77 (1968–69) to 208 (2005–06) per regulatory year (Table 4). 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 2980 bears (2085 independent bears), we estimated that sport hunters were harvesting 5.5% of the total bear population annually (7.8% of the independent bears).

Season and Bag Limit. The season for resident and nonresident hunters 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 guided nonresidents.

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. 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 four 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 are 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 of Game passed the first three recommendations and deferred action on the fourth.

During its spring 2007 meeting, the board authorized several more changes. Kodiak bear hunters were granted a higher number of drawing permits for hunt areas on eastern Kodiak, and the regulation that penalized guides in southwestern Kodiak whose clients took small female bears was rescinded. The number of bear permits was increased for Afognak, Shuyak and Raspberry islands and those northern islands were divided into three hunt areas to better distribute the hunting pressure. A hunt area border change affected the bear registration hunt along the road system in northeastern Kodiak. That boundary, which was a straight line from Crag Point to Saltery Creek, was changed to follow ridge tops in the same area. The overall size of the hunt area was not changed, but it will be easier for hunters to find the boundary in the field.

The board also established a regulation, starting in the fall 2007 hunting season, that hunters who wound a brown bear will not be able to hunt for another bear during the remainder of that regulatory year. In recent years there had been some confusion about the status of hunters who wound an animal and cannot retrieve it. The board failed to pass a similar proposal in 2005. This regulation was proposed by the Kodiak Fish and Game Advisory Committee to maintain high ethical standards in Kodiak bear hunts and to minimize the wounding of bears.

No emergency orders were issued during this reporting period.

Hunter Harvest. Hunters harvested 169 bears in regulatory year 2004–05 and 208 bears in 2005–06, a rate considerably higher than the previous 5-year mean of 166.2 bears (Table 4). There were 57 bears killed in fall 2004 and 62 killed in fall 2005. The mean annual fall harvest for the

previous five years was 54.4 bears. During the spring of 2005, 112 bears were killed, and in the spring of 2006, 146 bears were killed. The mean annual harvest for the previous 5-year period was 111.8 bears. These totals do not include bears killed under federal subsistence regulations: 4 bears (all males) in 2004–05 and 3 bears (all males) in 2005–06.

Males predominated in the harvest, composing 82% of the sport harvest in 2004–05 and 76% in 2005–06, a rate above the previous 5-year average of 74.6%. Although the current management objective of 60% males was met both years, Miller (1990a) cautioned that using gender 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 31 females in 2004–05 and 50 females in 2005–06, comparable to the annual mean of 42.0 females harvested during the preceding five years. Including other human-caused deaths of females, 39 females were killed in 2004–05 and 57 females were killed in 2005–06, compared to the previous 5-year mean of 46.6 females.

Mean total skull sizes of male bears harvested was 25.2 inches in 2004–05, and 24.7 inches in 2005–06, comparable to the mean skull size of 25.1 inches for the previous 5 years. Skull measurements from harvested females averaged 21.7 inches in 2004–05 and 22.1 inches in 2005–06. The average female skull size during the previous five years was 21.8 inches (Table 5). The mean age of males harvested in 2004–05 was 7.6 years; and the mean age in 2005–06 was not available. The average age of male bears harvested during the previous five years was 8.0 years. Female ages averaged 6.3 years in 2004–05. The average age of female bears harvested during the previous five years was 7.2 years. 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. We also saw an increase in the number and percentage of the harvest that consisted of trophy-sized males (Van Daele 2007).

A gender/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 were required to harvest male bears or females with skulls at least 15 inches long or 9 inches wide. Failure to meet these minimum requirements resulted in loss of a permit during the next season. Since inception of the regulation, guided nonresident harvest declined from a mean of 27.8 bears (1988–89 to 1993–94) to 24.3 bears (1995–96 to 2005–06). Guided nonresident success did not change significantly; it decreased from 66.3% (1988–89 to 1993–94) to 65.3% (1995–96 to 2005–06). 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 gender/skull minimums was 7.5 females/year (1988–89 to 1993–94); after restrictions this average fell to 3.7 females/year (1995–96 to 2005–06). Since 1995, 16 permits have been lost because of undersized females being taken.

Permit Hunts. There were 29 drawing hunt areas in Unit 8 for brown bears, with a total of 472 permits obtainable annually. Each year 319 drawing permits were available to Alaska residents (107 in fall, 212 in spring), and 153 permits were available for nonresidents (53 in fall, 100 in spring). Nonresidents hunting with resident relatives were allocated permits from the resident quota. Nonresident guided permits could be reduced if hunters fail to adhere to the gender/skull

minimums in southwest Kodiak hunt areas. In 2004–05, successful applicants picked up 318 drawing permits; in 2005–06, 321 permits were claimed (Table 6). Annual harvest in the drawing permit areas was 157 in 2004–05 and 195 in 2005–06. The average annual harvest during the previous five years was 153.8.

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 2004–05 we issued 244 registration permits, and in 2005–06 we issued 265 (Table 7). This was an increase over the mean number of registration permits issued in the previous five years (234.4). The number of hunters afield in the registration hunt was 170 in 2004–05 and 179 in 2005–06, also higher than the mean of the previous five years (155.4). Annual harvest in the registration permit area was 12 in 2004–05 and 13 in 2005–06. The average annual registration hunt harvest during the previous 5 years was 12.4.

Hunter Residency and Success. Hunter success in the drawing permit hunts was 51% in 2004–05 and 61% in 2005–06 (Table 6), higher than the mean for the previous 5 years (47.8%). In the registration hunts, hunter success was 7% in both 2004–05 and 2005–06, comparable to the mean for the previous five years (7.8%) (Table 7).

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 2004–05, residents harvested 69 bears and nonresidents took 100 (Table 8). In 2005–06, residents harvested 101 bears and nonresidents took 107 bears. The mean harvest for the previous five years was 76.6 for residents and 89.4 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 9). In 2004–05, 70% of the harvest occurred during the first third of the fall season, and in 2005–06, 81% of the harvest occurred in the first third. During the previous five years, the mean annual percentage of the harvest in the first third of the fall season was 77%. In 2004–05, 53% of the harvest occurred during the last third of the spring season, and in 2005–06, 40% of the harvest occurred in the last third. The mean annual percentage of the harvest in the last third of the spring season during the previous five years was 56.8%.

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 10). 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 mortality resulted in 30 bears in 2004–05 and 23 in 2005–06 (Table 4) that were recovered and sealed. This was higher than the mean annual nonsport mortality of 20.0 bears/year during the previous five years, but was biased by a higher than usual number of bears that died of unknown or natural causes.

Reported DLP kill data is most appropriately analyzed on a calendar year basis, rather than regulatory year (Table 11). During 2004 we saw a spike in the number of bears killed by deer and elk hunters (8), considerably higher than the year average for the previous 5-year period (1.4 bears). This increase was coincident with a lower than normal production of elderberries in the archipelago.

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 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 to state ownership. Current developments affecting brown bears include ongoing commercial timber harvest on Afognak Island, 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 continued to meet twice a month during this reporting period to share information and address bear-related issues in the area. Since finalization of the plan, KUBS has worked with ADF&G and other agencies to implement plan recommendations. Public education projects to develop bear information kiosks on the state ferry *Tustumena* and at the Kodiak airport terminal were completed in 2003, and the group developed and distributed a brochure on bear viewing etiquette ("So you want to see a Kodiak bear…") in 2004. In 2005, they developed and deployed "Be Bear Aware" signs along popular sport fishing streams on the Kodiak road system, and continued work toward developing a training and certification program for bear-viewing guides on Kodiak. That program would be based on the "Best Practices for Viewing Bears" produced by KUBS, ADF&G, NPS, and the guides during the winter of 2002–03. A bear safety DVD ("A guide to brown bear country"), featuring information developed by KUBS and ADF&G, was produced and distributed by a private videographic company (Camera Q) in 2006. The Kodiak NWR has also addressed many bear-related issues in its recently completed Comprehensive Conservation Plan (U.S. Fish and Wildlife Service 2006).

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 virtually 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. Funds from the Kodiak Island Borough, Exxon Valdez settlement funds, ADF&G, and the village of Larsen Bay were 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 completed 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 2007. 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 during this reporting period was a joint effort by ADF&G, Kodiak NWR, the University of Idaho, and the Kodiak Brown Bear Research and Habitat Maintenance Trust to consolidate and analyze more than 20 years of movement, productivity, survival, and harvest data for bears on Kodiak Island. The result of that project was a doctoral dissertation (Van Daele 2007), a report to the Kodiak NWR (Barnes and Van Daele 2006) (abstract included in Appendix 1), and a series of public meetings to seek ways of applying the findings to management actions.

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 2005–06, 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 19 consecutive years and in 38 of 46 years since statehood. The spike in harvest in 2005-06 was probably a result of a combination of weather and vegetative factors that concentrated bears and hunters in coastal areas.

Miller (1990b) suggested that survival rates of productive adult females were the most critical factor driving brown bear populations in Alaska. The model developed with Kodiak data (Van Daele 2007) came to the same conclusion, with female survival and productivity the most sensitive parameters driving population trend; however, during this reporting period there was an increasing population on many parts of the island, and the bear management plan (ADF&G 2002) recommended maintenance of the bear population within a "wildlife-acceptance capacity." Rather than attempting to estimate biological carrying capacity, "acceptance capacity" was defined as a population that was no more than 10% larger than the current (2001) estimated bear population level. The plan also recommended maintaining the tradition of bear hunting, consistent with a conservative management and regulatory regime that avoided overharvest of the resource (ADF&G 2002).

The increasing number and percentage of trophy males in the harvest during the past 30 years was encouraging, however, model results suggested that the number of trophy-sized males in the harvest may be reaching its maximum and higher levels may not be sustainable. To stabilize the population, maintain the current annual harvest of trophy-sized males, and avoid overcrowding of hunters, the model suggested a slight increase in the harvest of adult females in some subunits. It also suggested harvest rates ranging from 5.6–7.9 % of the estimated independent bear population would be appropriate in various harvest subunits on Kodiak (Van Daele 2007).

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 suggested that nonresident hunters and their guides became highly selective because of the risk of losing a permit if a bear failed to meet minimum requirements. Overall, there were few complaints about the system, and the system appears to have been a viable alternative to reductions in the number of permits; however with an apparently increasing population in southwest Kodiak, the restrictions are no longer necessary.

Intensive aerial surveys and composition counts along streams in southern Kodiak Island indicated bear populations on Kodiak Island have remained stable to increasing in most areas 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, analysis methods, and population estimates. This will be especially important 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.

The success of public participation in bear management on the Kodiak Islands has gained a worldwide reputation since 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 techniques they learned, and they have made substantial progress in reducing 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. In 2005 a similar address was given in Mori, Japan. In 2006, the area biologist was invited to Orsa, Sweden and Sapporo, Japan to work with local representatives on brown bear management issues. Government representatives in these locales see better human–bear relations as the only way to protect the brown bear populations in their areas, and they determined that Kodiak was the best example of a place where bears and people have learned to coexist and where bear hunting is sustainable.

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

VAN DAELE, L. J. 2007. Unit 8. Pages 75–108 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

APPENDIX 1 Summary of the research reports "Population dynamics and management of brown bears on Kodiak Island, Alaska" and "Productivity of female brown bears on Kodiak Island 1982-1998"

The dissertation, "Population dynamics and management of brown bears on Kodiak Island, Alaska" (Van Daele 2007), is divided into two chapters, each addressing pertinent aspects of the population dynamics and management of bears on Kodiak Island.

The first chapter, "Ecological flexibility of brown bears on Kodiak Island, Alaska," addresses the home range sizes, habitat use patterns, denning characteristics, and overall population distribution of bears on the island. Data from marked bears in four distinct study areas are analyzed to assess the hypothesis that bears on Kodiak were a single population that could occupy any habitat on the island, and that they moved freely to take advantage of the best resources available.

The second chapter, "Management of brown bear hunting on Kodiak Island, Alaska," builds on the information obtained in the first chapter and uses it to develop a model for sustainable harvest of bears on Kodiak. Brown bear populations along much of the North Pacific Rim are healthy and they provide an important economic resource as trophy hunters seek the largest representatives of the species, yet relatively little research has been published about the population dynamics and harvest management of those brown bears. The purpose of this project was to develop an easily understood model that could be used by bear managers to objectively estimate appropriate harvest strategies and guidelines. We also anticipated that information obtained from Kodiak could be adapted to other coastal bear populations where hunting and other human-caused mortalities are important management considerations.

A third paper, "Productivity of female brown bears on Kodiak Island 1982-1998" (Barnes and Van Daele 2006) analyzes the productivity of radiocollared bears in four distinct study areas on Kodiak Island.

ECOLOGICAL FLEXIBILITY OF BROWN BEARS ON KODIAK ISLAND, ALASKA

Abstract: Brown bear (*Ursus arctos*) population dynamics are challenging to ascertain and generalize because bears are long-lived, widely distributed, and have a great deal of individual variation. We investigated an entire brown bear population by capturing and marking a large sample of bears living in all of the habitats on Kodiak Island, Alaska, and following them for more than two decades. Our study included a geographically closed bear population with no impassable physical barriers within their range. Our hypothesis was that bears on Kodiak were a single population that could occupy any habitat on the island, and that they freely moved to take advantage of the best available resources. We captured 402 bears in four diverse study areas from 1982-1997. Of these, 261 were radiocollared (196 females, 65 males). The radiocollared bears yielded 15,539 relocations including 167 bears (142 females and 25 males) with at least 30 relocations. The mean 100% minimum convex polygon (MCP) home range size for all female bears ($\bar{x}$ = 128.6 km^2) was smaller than that of males ($\bar{x}$ = 251.5 km^2). There was no difference in size of MCPs of males in the various study areas; however, mean size of female home ranges

in Southwest Kodiak were significantly larger than those in the Terror Lake and Aliulik Peninsula areas. Mean 95% fixed kernel utilization distributions (UD) for all female bears ($\bar{x}$ = 50.1 km^2) were significantly smaller than that of males ($\bar{x}$ = 128.1 km^2). There was no difference in size of UDs of males in the various study areas, but mean size of female UDs in Aliulik were significantly larger than those in the Terror Lake and Zachar/Spiridon areas. In all study areas there was considerable overlap of both MCPs and UDs of individual bears. We observed no overt signs of territoriality or intraspecific spatial exclusion that precluded individual bears access to resources. Topographic features, vegetative resources, and salmon availability varied between study areas. We followed 12 cubs from radiocollared sows from dependency to adulthood. Males ranged significantly farther from their maternal ranges (MCP and UD) than did females. Five females (71.4%) and no males were recaptured within maternal MCP ranges and three females (42.9%), and no males were recaptured within maternal UDs. Elevations used by bears varied by study area, by reproductive status, and by season. Bears in northern study areas used higher elevations throughout the year than did bears in southern areas. Overall, females with new cubs used higher elevations throughout the year than all other bears. Den use and chronology also varied by study area. Most females used a single den (95.2%) each year, but there were 4 instances (0.7%) of females not entering dens all winter. Most males also used a single den each winter (76.8%); however, in 13 instances males did not enter dens during the entire year. Bears in the northern study areas spent more time in dens than did bears in southern study areas, with the most notable difference being between females without new cubs in the Terror Lake area (180 days/year) versus those in the Aliulik (100 days/year). Females with new cubs had similar denning periods in all study areas, and in all areas they emerged significantly later than all other females. Most of the variations in resource use and denning chronology appeared to be resource related. The exception to this pattern was sows with new cubs that stayed in dens longer and used suboptimal habitats when they emerged. Despite ample opportunities to move to and from optimal habitats on Kodiak Island, bears stayed in relatively small areas and adapted to locally available resources. Generations of behavioral specialization within local areas have created a population that is a radiating continuum in which bears that live adjacent to each other have similar resource use patterns, but those living in distant locations with dissimilar habitats have considerably different patterns of resource use. The population distribution and mitochondrial DNA analysis confirmed our hypothesis that bears on Kodiak Island were a single population; however resource use patterns rejected the hypothesis that bears all used the same "optimal" habitat. The ecological flexibility of the population allowed bears to expand to all available habitats on the island. This adaptability expanded the carrying capacity over that which would be expected if bears conformed to a uniform habitat use pattern, and ultimately insulated the population from collapse. The radiating continuum distribution complicates bear management because of local carrying capacities and varying population responses to environmental changes.

MANAGEMENT OF BROWN BEAR HUNTING ON KODIAK ISLAND, ALASKA

Abstract: Brown bear (*Ursus arctos*) populations along much of the North Pacific Rim are healthy and provide an important economic resource as trophy hunters seek the largest representatives of the species, yet relatively little research has been published about the population dynamics and harvest management of those brown bears. The purpose of this project

was to gather information on the population dynamics of bears on Kodiak Island, Alaska during a long-term study, and to develop an easily understood model that could be used by managers of coastal bear populations to objectively estimate appropriate harvest strategies and guidelines. There were bear research projects in four separate study areas on Kodiak from 1982-2004, all of which included marked bears. The annual adult male survival rate was comparable in all study areas at 0.809. The overall survival rate for all independent females was 0.867, with one area significantly lower than the others at 0.800. Adolescent annual survival rates were 0.563 for males and 0.889 for females. The major cause of death for males was hunter harvest (91%), while most females died of natural causes (54%). The annual harvest density for all areas during this study was 17.07 independent bears/1000 km^2, and the harvest rates of independent bears ranged from 6.68% to 10.33%. The number of bears harvested remained relatively consistent during the study period, but we saw an increase in the number and the percentage of the harvest that consisted of trophy-sized (total skull size>71 cm) males. Male bears dominated the harvest in all areas and the age structure of the male bear population directly impacted the number of large bears available to hunters, with 56.1% of the males in the oldest age class (>20 years) being trophy-sized. We created a deterministic model using Microsoft Excel® software that operated with user inputs of either measured or estimated data for a variety of population parameters. Model output included estimates of the projected population (by gender) of independent bears in subsequent years, a calculation of the annual population change, and an estimate of the number of bears that will be in the trophy size class. Model predictions were similar to the results of consecutive intensive aerial surveys in three of four study areas. The population dynamics and harvest data collected on Kodiak during this study provided an opportunity for a comprehensive analysis of a closely managed coastal brown bear population that was subjected to annual hunting pressure. Information from bears in all segments of the population, and bears that used a variety of habitats demonstrated that brown bear management must be adaptable to be successful. All indicators suggested that the Kodiak bear population was healthy and productive even as it supported a sustainable harvest that consistently yielded some of the largest bears in North America. To obtain refined harvest strategies, however, managers must consider local population parameters, the management objectives for the area of interest, characteristics of the harvest, and the level of confidence for each of those factors – there is no single harvest rate that is applicable to all situations. We found that when we used our model to explore an assortment of harvest strategies with hunters and managers, it facilitated productive discussions about a multiplicity of options and the potential biological ramifications of various management scenarios.

PRODUCTIVITY OF FEMALE BROWN BEARS ON KODIAK ISLAND, ALASKA (1982 – 1998)

Abstract: Long-term reproductive data for brown bears (*Ursus arctos*) have important management implications but are difficult to obtain. In this study we examined reproductive performance of Kodiak brown bears (*U. a. middendorffi*) on four study areas over a span of 17 years (1982-1998); we radiocollared 209 females and monitored them for 943 bear-years to record offspring production and survival. Mean age of first cub production and first weaned litter was 6.7 years and 9.2 years, respectively. Mean litter size for cubs-of-the-year (COY), yearling, 2-year-old and 3 year-old litters was 2.4, 2.1, 2.0, and 2.1, respectively. Adult females in the 9–14 and 15–20 age classes produced the largest COY litters ($\bar{x}$ = 2.4–2.5). The proportion of

females that annually produced COY litters also was greatest in those 2 age classes (0.51 and 0.62). Survival of COY, yearlings and 2-year-olds was 0.67, 0.81, and 0.97, respectively. Mean age of weaned offspring was 2.98 years and the interval between successive weaned litters averaged 3.95 years. We calculated a reproductive rate (weaned offspring/female/yr) of 0.361. The low rate of recruitment of females into the population (0.217 females/adult female/yr) provides incentive for managers to carefully monitor composition and mortality of adult females.

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TABLE 1 Estimated density and observation rates of independent bears[a] in intensive aerial survey areas, Unit 8, 1987–2005

Survey Area	Year	Replicate surveys	Survey rate (min/km^2)	Observed independent bears/hr	Observed independent bears/1000 km^2	Sightability	Est. density ind. bears / 1000 km^2	Standard error	Size of survey area (km^2)	Size of survey area (mi^2)
Terror Lake	1987	3	1.5	3.1	75	0.33	234	29.75	355	137
Terror Lake	1997	4	1.7	3.4	92	0.33	276	31.70	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	22.32	264	102
Sturgeon River	1992–93	4	1.8	2.6	77	0.41	190	18.20	264	102
Sturgeon River	1998	4	1.9	3.0	94	0.41	227	4.43	264	102
Aliulik Peninsula	1992–93	8	1.6	4.0	108	0.53	216	16.95	350	135
Aliulik Peninsula	2002	5	1.4	4.1	92	0.53	173	18.32	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	25.76	267	103
Karluk Lake	2003	4	2.3	5.8	223	0.45	496	30.53	267	103
Spiridon Lake	1995	4	1.9	1.2	38	0.33	118	24.26	287	111
Spiridon Lake	2000	4	1.8	1.5	44	0.33	134	23.28	287	111
Shearwater Peninsula	1996	3	2.2	2.6	92	0.37	252	28.87	269	104
Shearwater Peninsula	2005	4	1.8	4.8	147	0.37	398	17.41	269	104
Kiliuda Bay	1996	4	2.5	2.4	101	0.37	270	24.52	159	61
Kiliuda Bay	2005	4	2.2	3.6	134	0.37	363	23.51	159	61

[a] Does not include cubs still with mother

TABLE 2 Estimates of brown bear numbers and density in each harvest subunit on the Kodiak Archipelago, Alaska, 1995 and 2005

Bear harvest subunit	Area (km^2)	1995[a]			2005[b]			Difference	
		Density[c]	Independent bears[d]	Total bears[e]	Density[c]	Independent bears[d]	Total bears[e]	Independent bears[d]	Total bears[e]
Northern Islands	2,281	101	231	330	132	300	430	+69	+100
Northwest Kodiak	2,983	200	596	808	224	668	908	+72	+100
Northeast Kodiak	1,005	63	63	90	70	71	101	+8	+11
East Kodiak	1,738	146	253	471	230	400	744	+147	+273
Southwest Kodiak	3,498	204	712	1,019	219	765	1,094	+53	+75
Aliulik Peninsula	837	219	183	262	208	174	249	-9	-13
TOTAL	12,342	165	2,038	2,980	193	2,378	3,526	+340	+546

[a] Estimated bear density in 1995 (based on aerial surveys and extrapolation from 1987 – 1994) (Barnes et al. 1988, Barnes and Smith 1998)

[b] Estimated bear density in 2005 (based on aerial surveys and extrapolation from 1987 – 2005)

[c] Estimated density of independent bears per 1,000 km^2

[d] Estimated number of independent bears (excludes dependent cubs)

[e] Estimated number of bears in the harvest subunit (includes dependent cubs and independent bears)

TABLE 3 Unit 8 aerial stream counts of brown bears[a], 1985–2002

Regulatory year	Complete surveys	*Single bears*		*Maternal bears*		*Yearlings & cubs*		*Cubs of the year*		Bears per survey	Total
		Number	%	Number	%	Number	%	Number	%		
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	86.3	518
1994	5	238	48	85	17	110	22	65	13	99.6	498
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	64.6	323
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 National Wildlife Refuge 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 4 Reported brown bear kill data for the Kodiak archipelago by regulatory year and season, 1960–61 through 2005–06

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 4 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 4 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**
2004-05	44	13	0	57	94	18	0	112	138	*82%*	31	0	**169**	7	8	15	30	145	39	15	**199**
2005-06	40	22	0	62	118	28	0	146	158	*76%*	50	0	**208**	11	7	5	23	169	57	5	**231**
6 year mean	*39.5*	*15.7*	*0.0*	*55.2*	*92.2*	*25.7*	*0.0*	*117.8*	*131.7*	*76%*	*41.3*	*0.0*	***173***	*6.7*	*5.2*	*9.8*	*21.7*	*138.3*	*47*	*9.8*	***194.7***

[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 gender
[e] total
[f] percent males in harvest (males/total)

TABLE 5 Total skull size, age, and gender of brown bears killed by sport hunters in Unit 8, 1982–83 through 2005–06

	Males				Females			
Regulatory year	Mean skull size	*n*	Mean age	*n*	Mean skull size	*n*	Mean age	*N*
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
2004-05	25.2	134	7.6	137	21.7	29	6.3	31
2005-06	24.7	156	----	----	22.1	50	----	----

TABLE 6 Unit 8 brown bear harvest data for drawing permit hunts DB 101–159 and 201–259, 1996-97 through 2005-06

	Regulatory year	Permits issued	Permits returned	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total[a] harvest
Fall hunts	1996–97	120	119	5	39	32	73	12	27	0	44
(DB101-129)	1997–98	131	128	2	50	33	67	16	33	0	49
(DB201-229)	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
	2004-05	113	112	3	48	39	76	12	24	0	51
	2005-06	107	107	0	52	35	63	21	38	0	56
Spring hunts	1996–97	219	216	2	50	85	80	21	20	0	106
(DB131-159)	1997–98	235	218	1	50	83	75	26	24	1	110
(DB231-259)	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
	2004-05	205	201	0	52	88	83	18	17	0	106
	2005-06	214	214	1	66	113	81	26	19	0	139

TABLE 6 continued

Combined Fall and Spring Hunts	Regulatory year	Permits issued	Permits returned	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total[a] harvest
(DB101-159)	1996–97	339	335	7	45	117	78	33	22	0	150
(DB201-259)	1997–98	366	346	3	50	116	73	42	26	1	159
	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
	2004–05	318	313	3	51	127	81	30	19	0	157
	2005–06	321	321	1	61	148	76	47	24	0	195

[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 7 Unit 8 brown bear harvest data for registration permit[a] hunt numbers RB 230 and RB 260, 1996-97 through 2005-06

	Regulatory year	Permits issued[a]	Permits returned	Hunters afield	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total harvest
Fall Hunts (RB230)	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
	2004-05	144	143	96	33	6	5	83	1	17	0	6
	2005-06	143	139	94	32	6	5	83	1	17	0	6
Spring Hunts (RB260)	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
	2004-05	100	95	74	26	8	5	83	1	17	0	6
	2005-06	122	122	85	30	8	6	86	1	14	0	7

TABLE 7 continued

	Regulatory year	Permits issued[a]	Permits returned	Hunters afield	Percent did not hunt	Percent successful hunters	Males	%	Females	%	Unk	Total harvest
Combined	1996–97	166	161	100	38	12	9	75	3	25	0	12
Fall and	1997–98	208	153	105	31	8	5	71	2	29	0	7
Spring	1998–99	264	237	171	28	6	11	100	0	--	0	11
Hunts	1999–2000[b]	279	271	189	27	9	14	82	3	18	0	17
(RB230	2000–01	266	238	169	29	5	2	25	6	75	0	8
& RB260)	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
	2004–05	244	238	170	30	7	10	83	2	17	0	12
	2005–06	265	261	179	31	7	11	85	2	15	0	13

[a] No limit on the number of permits issued

[b] Includes 1 female bear illegally killed by a sport hunter

TABLE 8 Residency of successful brown bear hunters[a] in Unit 8, 1996–97 through 2005–06

Regulatory year	Local residents[b]	(%)	Nonlocal residents	(%)	Nonresidents[c]	(%)	Total successful hunters
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
2004-05	17	10	52	31	100	59	169
2005-06	23	11	78	38	107	51	208

[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: 1996–97, 1; 1997–98, 3; 1998–99, 1; 1999–2000, 2; 2000–01, 2; 2001–02, 6; 2002–03, 4; 2003–04, 1; 2004-05, 2; 2005-06, 3

TABLE 9 Chronology of the brown bear harvest by season and period in Unit 8, 1996–97 through 2005–06

Regulatory year	Fall Season							Spring Season							Regulatory Year Total[a]
	25 Oct–6 Nov		7 Nov–18 Nov		19 Nov–25 Nov		Fall Total	1 Apr–15 Apr		16 Apr–30 Apr		1 May–15 May		Spring Total	
	n	%	*n*	%	*n*	%	*n*	*n*	%	*n*	%	*n*	%	*n*	
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
2004-05	40	70	12	21	5	9	57	7	6	46	41	59	53	112	169
2005-06	50	81	9	14	3	5	62	13	9	75	51	58	40	146	208

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

TABLE 10 Unit 8 brown bear harvest percent by transport method, 1994–95 through 2003–04

Regulatory Year	Percent of Harvest								
	Airplane	Horse	Boat	3- or 4-wheeler	Snow machine	ORV	Highway vehicle	Unknown	*n*
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
2004-05	59	0	34	2	0	1	3	1	169
2005-06	55	1	36	3	0	1	2	2	208

TABLE 11 Unit 8 brown bears reported killed in defense of life or property (DLP), 1996–2006

Calendar year	Gender of bear				Location		Cause[a]	
	Males	Females	Unknown	Total	Kodiak road system	Remote	Hunting Related	Other
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	16
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	3	7	1	11	3	8	8	3
2005	2	5	0	7	0	7	4	3
2006								

[a] Data included in previous columns

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 9 (33,638 mi^2)

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 a quality hunting experience for them. 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 coincided with poor salmon escapements in most drainages in 1972 and 1973, which indicated that the bear harvest needed to be reduced. Harvest statistics and the high percentage of marked bears killed in the Black Lake area also supported the conclusion that a harvest reduction was needed. Emergency hunting 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 available 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

- 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 (Quang and Becker, 1997) was used to estimate brown and black bear densities in the northern portion of Unit 9B during a cooperative project with Lake Clark National Park. The

project also provided limited information on population composition. This technique was used to estimate brown bear densities for all of Unit 9A, Unit 9C, 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 and low salmon escapements. With reduced harvests during the late 1970s, bear densities increased. From 1985 to 1990, the average number of independent bears observed during surveys at Black Lake was 102 (range = 86–109); from 1991 to 1996 the average number observed 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. Surveys during 1999–2002 averaged 145 independent bears. These data indicate a reasonably stable population during the last five years in which surveys were conducted. Table 1 summarizes the composition of bears observed annually during surveys.

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 mi^2 in a 469 mi^2 study area. Results were extrapolated by UCUs (uniform coding units) to arrive at estimates of 296, 879, 429, 3176, 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 mi^2 (93 bears/1000 km^2) (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).

More recent density estimates are available from line transect surveys flown between 1999 and 2005 in Units 9A, northern 9B, 9C, and 9D. These surveys suggest that the overall bear density in Unit 9 is now closer to 1 bear/3.5 mi^2 (110 bears/1000 km^2) with an extrapolated population size of 6000–6800 bears occupying lands open to bear hunting. However, the estimate is biased low by a lack of current information for 9E and the southern portion of 9B (1991 densities assumed). 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 with 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 two 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 ($n = 9$).

While conducting line-transect surveys of Unit 9D in 2002, 633 bears were observed, of which, 48% were in family groups and 52% were single bears. Families with cubs made up 10% of all bears seen, and the average litter size was 1.87. Families with yearlings made up 20.2%, and the average litter size was 1.91. Families with young ≥2 years old made up 18%, and the average litter size was 1.92.

Similar surveys were conducted in Unit 9C during 2004 and 2005. The composition of 674 bears was recorded (47% family groups and 53% single bears). Of all the bears observed, 8% of the bears were in family groups with cubs, 21% with yearlings, and 17% with young ≥2 years of age. Average litter size was 1.80, 1.82, and 1.85 for each group, respectively.

Taken as a whole, the composition of bears observed during line transect surveys between 1999 and 2005 suggest a productive population exposed to moderate harvest rates.

MORTALITY

Harvest

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

The open season for 9B was 20 September–21 Octobers 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 on 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 one bear every four regulatory years.

Board of Game Action and Emergency Orders. During the March 2005 Board of Game meeting, the board authorized a brown bear hunt in the Kamishak Special Use Area (KSUA) that would begin during the 2007 regulatory year. The KSUA includes state lands along the Douglas River, Kamishak River, and Little Kamishak River, which are located south and east of the McNeil State Game Sanctuary (MSGS). The area was closed to brown bear hunting in 1985 as part of a land trade negotiation and to offer additional protection to brown bears in the vicinity of the MSGS. The board reversed the decision to open a hunt in the KSUA during the March 2007 board meeting, largely due to public opposition.

The Cold Bay registration hunt in Unit 9D is closed routinely by emergency order after the quota is reached. The fall 2005 season closed 3 October after two males had been taken. To evaluate the necessity of limiting harvests in this area by emergency order, the spring 2006 season was not closed.

Hunter Harvest. During the 2004 regulatory year (RY), only the Naknek registration hunt was open; hunters took 8 bears in the fall and 9 in the spring. During RY 2005 the reported harvest was 640 bears (71% male and 29% female, Table 2). During RY2004 and RY2005, 20 bears were killed by people who were not hunting, but because illegal and nonhunting kills, including defense of life or property (DLP) kills, are rarely reported, I estimate the nonhunting mortality at more than 50 bears.

The mean annual harvest of trophy-sized males, ≥ 8 years old, was 51 (range = 41–58) during the 1975–82 period of population recovery. 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 during regulatory years that are open to hunting. 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 three time periods. Mature bears were 14.3% of the harvest during 1975–82; 16.9% during 1983–88; and 23.1% during 1989–98. Since 1999, 25% of the total harvest has been 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. Harvests averaged 11 bears per regulatory year between 1995 and 1999 and 14 bears between 2000 and 2004. During 2005, 4 bears were harvested using the

registration permit. 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 authorized this hunt only for 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 FWS and the department agreed it was impractical to have a season by emergency announcement in response to nuisance bear complaints. The registration permit hunt was changed to coincide with the normal unitwide season, but was still closed when the seasonal quota had been reached. Current population data suggests that the bear population has increased sufficiently to allow more liberal harvests. During the fall 2005 season two bears were harvested 1 October and the season was closed by emergency order. During the spring 2006 hunt, the season remained open for the duration of the season and 5 bears (3 males and 2 females) were harvested. Given the low harvest, we will continue to leave this hunt open and monitor the harvest to see if it can be merged with the general season.

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 six 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 one bear has been reported during the past three regulatory years (2001, 2002, and 2003). Two permits were issued in 2005, but both hunters were unsuccessful.

Hunter Residency. During RY 2005–06 general seasons, nonresidents took 82% 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 Oct. 1 for the 1999 season. Similarly, since the hunt opening in 9B was advanced to 20 September 72% of the harvests have occurred in September. For all of Unit 9, 65% of the fall harvest and 62% of the spring harvests have occurred during the first week of the hunt since 1999.

Transportation Methods. During 2005–06, 83% 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, which will likely escalate as the bear viewing industry grows.

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. 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 is estimated now 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 identified brown bears as one of the major predators of young calves; however, a more significant portion of the annual mortality of calves occurred over winter, 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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Please cite any information taken from this section, and reference as:

BUTLER, L.B. 2007. Unit 9 brown bear. Pages 109–120 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

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

Regulatory year	Number of surveys attempted	Independant bears		Maternal bears		Offspring > 1year old		Cubs of the year		
		Number	%	Number	%	Number	%	Number	%	Total
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	981
2001	4	351	38	177	19	224	24	176	19	928
2002	4	356	32	234	21	317	29	193	18	1100

TABLE 2 Unit 9 brown bear harvest, RY 1999–2005

Regulatory	Hunter kill						Non-hunting kill[a]			Total reported kill					
Year	M	(%)	F	(%)	Unk	Total	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
2001–02															
Fall 01	209	(61)	132	(39)	0	341	6	2	0	215	(62)	134	(38)	0	349
Spring 02	252	(78)	72	(22)	0	324	0	4	1	252	(77)	76	(23)	1	329
Total	461	(69)	204	(31)	0	665	6	6	1	467	(69)	210	(31)	1	678
2002–03															
Fall 02	5	(63)	3	(38)	0	8	2	0	2	7	(70)	3	(30)	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	(76)	4	(24)	2	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	(69)	197	(31)	2	631
2004–05															
Fall 04	6	(86)	1	(14)	0	7	2	1	4	8	(80)	2	(20)	4	14
Spring 05	6	(67)	3	(33)	0	9	1	1	2	7	(64)	4	(36)	2	13
Total	12	(75)	4	(25)	0	16	3	2	6	15	(71)	6	(29)	6	27
2005–06															
Fall 05	188	(60)	124	(40)	2	314	5	2	0	193	(61)	126	(39)	2	321
Spring 06	260	(80)	64	(20)	3	327	1	1	0	261	(80)	65	(20)	3	329
Total	448	(70)	188	(30)	5	641	6	3	0	454	(70)	191	(30)	5	650

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

TABLE 3 Unit 9 brown bear successful hunter residency, RY 1999–2005

Regulatory Year	Local residents[a]	(%)	Nonlocal residents	(%)	Nonresidents	(%)	Successful hunters[b]
2001–02	12	2	117	18	536	80	665
2002–03	7	54	3	23	3	23	15
2003–04	19	3	126	20	481	77	626
2004–05	5	31	1	6	10	63	16
2005–06	12	2	106	16	523	82	641

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

TABLE 4 Unit 9 brown bear harvest chronology percent by harvest periods, RY 1999–2005

Regulatory Year	July 1 - August 30	September 1 - 30	October 1 - 7	October 8 - 31	November 1 - April 30	May 1 - 17	May 17 - 25	May 26 - June 30	*n*
2001–02	0	8	27	16	0	31	17	1	665
2002–03	0	53	0	0	0	7	7	33	15
2003–04	0	7	26	17	0	30	20	0	622
2004–05	0	44	0	0	0	6	25	25	16
2005–06	0	5	30	14	0	32	19	0	640

TABLE 5 Unit 9 brown bear harvest percent by transport method, RY 1999–2005

Regulatory Year	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unk.	*n*
2001–02	78	0	16	3	0	0	1	2	664
2002–03	7	0	33	20	0	0	33	7	15
2003–04	80	0	16	2	0	0	1	1	623
2004–05	0	0	56	25	6	0	0	13	16
2005–06	83	0	12	2	0	0	1	2	641

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 10 (1536 mi^2)

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 (ADF&G) after 1979. Fifteen drawing permits are issued each year: 7 for the spring hunt and 8 for the fall.

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

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 mi^2. 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 both residents and nonresidents were 1 October–31 December and 10–25 May. The bag limit was one brown bear every four regulatory years by drawing permit only; 15 permits were issued annually.

Board of Game Action and Emergency Orders. There were no Board of Game actions or emergency orders associated with Unit 10 brown bears during this reporting period.

Hunter Harvest. During 1981–96, annual harvests from Unimak Island averaged 5.9 bears (range = 3–9). During the 1997–2005 regulatory years, the average annual harvest was 10.5 bears (range = 7-13). Part of the increase was due to five special governor's permits auctioned off by Safari Club International, Foundation for North American Wild Sheep, and Boone and Crockett Club. Three of these extra permittees were successful in fall 1997, spring 2000, and spring 2005. Hunters harvested a total of 17 bears (76% male) during the 2004 and 2005 regulatory years (Table 1.)

Hunter Residency and Success. Nonresidents accounted for 8% of the harvest during 1981–96 and 52% during 1997–2001. From 2001-2005 nonresidents accounted for 41% of the permit holders and 60% of the brown bear harvest. 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, 84% of permittees hunted, and their success rate increased to 78%.

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, no changes are recommended in the permit hunt at this time.

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

BUTLER, L. B. 2007. Unit 10 brown bear management report. Pages 121–124 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 10 brown bear harvest data by permit hunt, RY 2001–2005

Hunt Number	Regulatory year	Permits issued	Hunter reports[b]	Percent did not hunt[c]	Percent successful hunters	Harvest				
						Male	(%)	Female	(%)	Total
DB375	2001–02	8	8	13	71	4	(80)	1	(20)	5
(Fall)	2002–03	8	8	13	57	1	(25)	3	(75)	4
	2003–04	8	8	13	100	7	(100)	0	(0)	7
	2004–05	8	8	25	100	3	(50)	3	(50)	6
	2005–06[a]	9	9	11	50	4	(100)	0	(0)	4
DB376	2001–02	7	7	14	50	3	(100)	0	(0)	3
(Spring)	2002–03	7	7	0	86	6	(100)	0	(0)	6
	2003–04	7	7	0	71	4	(80)	1	(20)	5
	2004–05	7	7	0	57	3	(75)	1	(25)	4
	2005–06[a]	8	7	50	75	3	(100)	0	(0)	3
DB375 &	2001–02	15	15	13	62	7	(88)	1	(12)	8
DB376	2002–03	15	15	7	71	7	(70)	3	(30)	10
(Combined)	2003–04	15	15	7	86	11	(92)	1	(8)	12
	2004–05	15	15	13	77	6	(60)	4	(40)	10
	2005–06	17	15	29	58	7	(100)	0	(0)	7

[a] Includes one governor's permit

[b] Includes hunters that sealed a bear, but did not turn in a permit report

[c] Includes hunters that did not turn in a permit report and did not seal a bear

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 11 (12,784 mi^2)

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, 1979-1999, 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 recorded 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 were 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 Alaska Department of Fish and Game (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. When the Mentasta caribou numbered more than 3,000 animals, brown bears moved onto the calving ground. They also are important predators of neonatal moose calves. Females with cubs of the year generally emerge from dens later, and 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 season in Unit 11 was 10 August–15 June.. The bag limit was 1 bear every regulatory year; no resident tag fee required.

Board of Game Actions and Emergency Orders. The National Park Service (NPS) and the Federal Subsistence Board established a federal subsistence season for brown bears in 1999. The Board of Game adopted the current season dates during the March 2001 meeting. During the March 2003 meeting, the board further liberalized brown bear hunting by changing the bag limit from 1 bear every 4 years to a bear every year and dropping the $25 resident tag fee requirement.

Hunter Harvest. Seventeen brown bears were reported killed during the 2005–06 season, and 24 during 2004–05 (Table 1). Males composed 65% of the 2005–06 harvest and 58% of the 2004–05 harvest. The 2004–05 harvest was the highest reported since 1964–65. The average harvest since 2001 has been 15.2 bears, up considerably from the 5.6 bears a year average between 1987-88 and 2000-01. The current harvest level is still considered sustainable given the size of the unit. The mean age for males was 8.2 years in 2004–05. Mean ages of bears taken in Unit 11 are highly variable due to the small sample size, but do indicate large, older bears are common, and hunters can select for large trophies.

Hunter Residency and Success. Nonresident hunters took 8 bears during the 2004–05 season and 10 in 2005–06 (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 = 0–5) between 1978 and 1999. Local residents harvested only 1 bear during the 2005–06 season. Harvests by local residents is low and has fluctuated between 1 and 6 bears a year with no trend evident during this reporting period. Successful bear hunters averaged 4.5 days hunting in 2004–05 and 3.2 days during the 2005–06 season. 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 2005–06, 82% of the 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 again now that the bear season opens on Aug.10 as does the sheep season. The moose season opens Aug.20. 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 have been 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 and Chitina-McCarthy roads. In addition, 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) killing during the last 5 years was 1 male taken in spring 2006. 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 likely killed each year than are reported because of the work involved with salvaging and preserving the hides and skulls of bears taken DLP and the remote nature of the Unit 11 communities. 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 from 16 June–9 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. The current DLP kill is not a biological issue.

HABITAT

Assessment

There are few cabins or homesites in this remote unit away from the road system. Future settlement will be limited because much of the land is now included in Wrangell-St. Elias National Park or has been conveyed to Ahtna Inc. Private inholdings and NPS facilities are the only sources of development, especially along the Nabesna and McCarthy roads and in 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, the presence of ungulates and numerous salmon streams throughout the unit.

CONCLUSIONS AND RECOMMENDATIONS

Brown bear harvests in GMU 11 have increased since 2000 with the opening of a federal subsistence season and liberalization of general harvest regulations by the state. Since these regulation liberalizations, the average yearly harvest has increased from 3 to 14 bears a year. The current harvest approaches the 16 bears per year average reported for 1961–1978, though the management objective of harvesting at least 50% males is still being met. The harvest density is

low in GMU 11, with only 0.4 bears per 1000 km^2 taken, compared to 3 bears per 1000 km^2 in GMU 13. The increase in the reported bear harvest is considered sustainable over the long term. Much of the unit remains unhunted and thus a refugia and source of immigration to hunted areas.

The decline in bear harvest after 1978 was a direct result of establishing first of the Wrangell St. Elias National Monument, then the Park and Preserve in 1980. NPS regulations prohibit sport hunting over approximately 60% of Unit 11 designated as hard park, and aircraft access for all subsistence hunting. Hunting within the preserve is also limited through an ATV access permit system. The increase in bear harvests the last 6 years is thought to be a direct result of liberalized seasons and bag limit. The opportunity to hunt caribou, moose, and sheep has decreased dramatically in recent years because these populations have declined substantially. Individuals seeking hunting opportunities with a reasonable chance of success are turning to alternative species such as bears and wolves, for which seasons are long and participation not limited by a permit system. Since the bear hunting season was lengthened to overlap with the sheep and moose seasons in GMU 11, there has been an increase in the harvest of bears by hunters seeking combination hunts. Dropping the tag fee for residents also contributed to the increased take, because problem bears can now be taken near homesites and legally kept.

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 interior grizzly bear populations. 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. No changes in bag limits or season dates are necessary this time.

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

TOBEY, R.W. 2007. Unit 11 brown bear management report. Pages 125–131 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 11 brown bear harvest, 2001–2002 to 2005–06

Regulatory	Hunter kill						Nonhunting kill[a]			Total Kill			
Year	M	(%)	F	(%)	Unk.	Total	M	F	Unk.	M	F	Unk.	Total
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
2004–05													
Fall 04	10	(53)	9	(47)	0	19	0	0	0	10	9	0	19
Spring 05	4	(80)	1	(20)	0	5	0	0	0	4	1	0	5
Total	14	(58)	10	(42)	0	24	0	0	0	14	10	0	24
2005–06													
Fall 05	10	(71)	4	(29)	0	14	0	0	0	10	4	0	14
Spring 06	1	(33)	2	(67)	0	3	1	0	0	2	2	0	4
Total	11	(65)	6	(35)	0	17	1	0	0	12	6	0	18

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

TABLE 2 Unit 11 brown bear successful hunter residency, 2001–2002 to 2005–06

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters
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
2004–05	4	(17)	12	(50)	8	(33)	24
2005–06	1	(6)	6	(35)	10	(59)	17

[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, 2001–2002 to 2005–06

Regulatory year	Harvest percent							
	August	September	October	November	April	May	June	n
2001–02	44	56	--	--	--	--	--	9
2002–03	36	46	9	--	--	--	9	11
2003–04	13	47	13	7	--	--	20	15
2004–05	13	63	4	--	4	4	13	24
2005–06	29	41	12	--	--	6	12	17

TABLE 4 Unit 11 brown bear harvest percent by transport method, 2001–2002 to 2005–06

Regulatory year	Percent of harvest									
	Airplane	Horse	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unk.	n
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
2004–05	46	0	25	13	0	0	4	13	0	24
2005–06	65	0	6	6	0	0	6	18	0	17

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNIT: 12 (9978 mi^2)

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

Brown bears are distributed throughout most of Unit 12. The areas not commonly used by bears (approximately 2500 mi^2) 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 brown 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, brown 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. Although no studies were conducted in Unit 12 in the 1970s, brown bears were found to be an important predator on moose calves in adjacent Unit 13. Unit 12 brown bear hunting regulations were liberalized in 1981 to reduce the bear population and elevate moose calf survival. Harvest was not expected to reduce the brown bear population significantly, but because the sustainable harvest of brown bears was thought to be low (5–8%) at the time (Reynolds and Boudreau 1992), some population reduction was expected, along with increased moose calf survival.

During the mid 1980s, bear harvests increased 29% in Unit 12. Most of the increase was due to greater harvest by Alaska residents, apparently in response to more liberal hunting seasons and bag limits. Concurrently, survival of moose calves to 5 months of age improved in western Unit 12 where bear harvest was highest. Subsequently, the moose population throughout Unit 12

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

slowly increased. However, moose calf survival also improved in portions of Unit 12 where little bear harvest was reported.

During the 1990s, the brown bear population likely remained stable, and in fall 2000 the population was estimated at 350–425 bears (46.6–56.7 bears of all ages/1000 mi^2 of useable habitat; 18.0–21.9 bears of all ages/1000 km^2; Gardner 2003). Management objectives in the early 1990s, called for elevated brown bear harvest until moose numbers approached stated objectives or until brown bear harvest was too high to ensure the viability of the population. In 1994, the Unit 12 brown bear management goal to reduce the brown bear population to increase moose calf survival was eliminated and the management goal was revised to provide for maximum opportunity to hunt brown bears in Unit 12. The management goal has remained the same since 1994.

Research from Unit 13 indicates that sustainable levels of brown bear harvest may be considerably higher than predicted in the past (Tobey 2005). Therefore, harvest levels of 10% or higher may be sustainable in Unit 12. Future work in Unit 13 will help define sustainable harvest levels.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Provide maximum opportunity to hunt brown 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 brown 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 the hunter spent afield. 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., RY04 = 1 July 2004 through 30 June 2005).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

During RY04–RY05, the Unit 12 brown bear population trend likely remained stable at the fall 2000 estimated population of 350–425 bears (46.6–56.7 bears of all ages/1000 mi^2 of useable habitat; 18.0–21.9 bears of all ages/1000 km^2; 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 (Gardner 2003).

During RY04 and RY05, 24 and 22 brown bears were killed in Unit 12, which is within the sustainable yield of at least 28 bears. However, local harvest effects may have occurred in the upper Tok River drainage, within a few miles of Bear Lake at the head of the Tetlin River drainage or between the Nabesna River and the Alaska–Yukon border within the Wrangell Mountains, as about 95% of the harvest occurred in those areas. In the remainder of the unit, harvest was light and likely had no effect on population trend. Therefore, the brown bear population in the entire unit probably remained stable relative to the 2000 estimate.

MORTALITY

Harvest

Season and Bag Limit. During RY04–RY05, the brown bear hunting season in Unit 12 for both resident and nonresident hunters was 10 August–30 June. A bear taken in Unit 12 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 RY04–RY05 the $25 resident tag fee was required to hunt brown bears in Unit 12.

Alaska Board of Game Actions and Emergency Orders. During their spring 2004 meeting, the Alaska Board of Game extended the Unit 12 brown bear hunting season by opening the season on 10 August instead of 1 September.

Hunter Harvest. Based on the estimated brown bear population size and research in Unit 20A (Reynolds and Boudreau 1992), the sustainable harvest in Unit 12 was 28 bears, of which 6 could be adult females >5 years old. This harvest level was not reached during RY03–RY05. In RY03, 8 bears were harvested including 2 females >5 years of age, and the total harvest comprised 63% males. In RY04 a total of 24 bears were harvested, with 3 females >5 years of age, and the total harvest comprised 58% males. During RY05 the total harvest was 22 bears, with 3 females >5 years of age, and the total harvest comprised 50% males. The 3-year (RY03–RY05) average harvest was 18 bears/year, with ≤3 adult females harvested annually and an average of 56% males in the total harvest.

Hunter Residency and Success. During RY04 and RY05, nonresidents took 65% and 75% of the harvest (Table 1). Based on discussions with local and nonlocal residents, their interest in hunting for brown bears in Unit 12 was relatively low because 1) they had already harvested a brown bear in the past and had no interest in harvesting another bear, or 2) they were not interested in taking a bear while hunting moose or sheep. Some hunters stated they would take a brown bear if the tag fee was eliminated.

In RY04 and RY05, all successful nonresident hunters hunted with a guide. These nonresidents harvested bears either within a few miles of Bear Lake at the head of the Tetlin River drainage or between the Nabesna River and the Alaska–Yukon border within the Wrangell Mountains. During those years successful resident hunters primarily harvested bears within the upper Tok and upper Nabesna River drainages while hunting for moose or sheep.

Harvest Chronology. During RY04 and RY05, 79% and 91% of the harvested brown bears were taken during August–September (Table 2). Historically, most bears were harvested when resident and guided nonresident hunters were afield hunting caribou and moose. Between RY94 and RY03, 28% of the annual harvest of brown bears in Unit 12 was taken in the spring (May–June). However, in RY04–RY05, only 8 and 9% of the harvest occurred during the spring. This was caused by fewer guided nonresident hunters during spring in the Nabesna and Chisana River drainages.

Transport Methods. During RY04–RY05, most successful brown bear hunters used airplanes to access hunting areas (Table 3). Most nonresidents used airplanes to get to their hunting area and then hunted using horses. All hunters who used horses in RY04–RY05 were guided nonresident hunters within the Nabesna, Chisana, and White River drainages. Use of ATVs began to increase in the late 1990s, primarily by residents who hunted moose. In RY04–RY05 the majority of successful resident hunters used ATVs, while no successful nonresident hunters used ATVs. Most ATV use occurred in the Alaska Range, west of the Tok Cutoff, where access is easier.

Other Mortality

Intraspecific mortality inflicted by adult male bears is undoubtedly the greatest source of nonhunting bear mortality in Unit 12. No brown bears were recorded taken in defense of life or property incidents during RY04–RY05 (Table 4).

HABITAT

Assessment

Unit 12 offers moderate-quality brown bear habitat with the exception of 2500 mi^2 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 Wildland Fire Management Plan* (Alaska Wildland Fire Coordinating Group 1998) 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, 20- to 80-acre clearcuts will be treated to enhance regeneration of deciduous shrubs with the objective of simulating natural succession. About 1000 acres are planned to be logged and treated during a 5- to 10-year period, beginning during the next few years. Wildfires in Unit 12 burned approximately 434 mi^2 in 1990 and in 2004. Bears and their prey species are expected to benefit from both natural fires and habitat enhancement efforts.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

There were no nonregulatory issues identified for brown bears in Unit 12 during RY04–RY05.

CONCLUSIONS AND RECOMMENDATIONS

Brown bears continue to be well distributed throughout Unit 12 (Gardner 2003). The 2005 population was likely near the 2000 estimate of 350–425 bears (46.6–57.7 bears of all ages/1000 mi^2; 18.0–21.9 bears of all ages/1000 km^2). Harvest regulations were liberal and allowed for maximum hunting opportunity.

We met the management objective to manage harvests so the 3-year mean harvest does not exceed 28 bears and includes at least 55% males in the harvest. The mean harvest during RY03–RY05 was 18 bears, with 56% males. Most of the Unit 12 brown bear harvest was in several fairly concentrated areas where harvest remained fairly stable, e.g., the Tok, Nabesna, Chisana, and White River drainages. I recommend retaining the current goals and objectives. No activities are planned for the next reporting period.

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GROSS, J. A. 2007. Unit 12 brown bear. Pages 132–142 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

TABLE 1 Unit 12 brown bear successful hunter residency, regulatory years 1989–1990 through 2006–2007[a]

Regulatory year	Unit resident (%)	Other residents (%)	Nonresident (%)	Total successful hunters
1989–1990	6 (46)	3 (23)	4 (31)	13
1990–1991	2 (12)	8 (47)	7 (41)	17
1991–1992	2 (17)	4 (33)	6 (50)	12
1992–1993	7 (29)	6 (25)	11 (46)	24
1993–1994	1 (6)	7 (39)	10 (56)	18
1994–1995	2 (14)	1 (7)	11 (79)	14
1995–1996	0 (0)	2 (22)	7 (78)	9
1996–1997	5 (24)	4 (19)	12 (57)	21
1997–1998	2 (18)	1 (9)	8 (73)	11
1998–1999	1 (6)	5 (31)	10 (63)	16
1999–2000	3 (18)	5 (29)	9 (53)	17
2000–2001	4 (12)	10 (30)	19 (58)	33
2001–2002	4 (27)	1 (7)	10 (67)	15
2002–2003	4 (33)	1 (8)	7 (58)	12
2003–2004	1 (13)	2 (25)	5 (63)	8
2004–2005	3 (13)	5 (21)	16 (67)	24
2005–2006	2 (9)	3 (14)	17 (77)	22
2006–2007[b]	1 (6)	4 (25)	11 (69)	16

[a] Does not include defense of life or property kills or illegal kills.
[b] Autumn only.

TABLE 2 Unit 12 brown bear harvest chronology by month, regulatory years 1989–1990 through 2006–2007[a]

Regulatory year	Harvest chronology by month														Total
	Aug	(%)	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	
1989–1990	0	(0)	10	(83)	0	(0)	0	(0)	0	(0)	2	(17)	0	(0)	13[b]
1990–1991	0	(0)	11	(65)	0	(0)	0	(0)	1	(6)	5	(29)	0	(0)	17
1991–1992	1	(8)	9	(75)	0	(0)	0	(0)	1	(8)	1	(8)	0	(0)	12
1992–1993	0	(0)	14	(58)	2	(8)	2	(8)	0	(0)	6	(25)	0	(0)	24
1993–1994	0	(0)	15	(83)	1	(6)	0	(0)	1	(6)	1	(6)	0	(0)	18
1994–1995	0	(0)	11	(79)	0	(0)	0	(0)	1	(7)	2	(14)	0	(0)	14
1995–1996	0	(0)	6	(67)	0	(0)	0	(0)	0	(0)	3	(33)	0	(0)	9
1996–1997	1	(5)	16	(76)	0	(0)	0	(0)	0	(0)	4	(19)	0	(0)	21
1997–1998	0	(0)	8	(73)	0	(0)	0	(0)	0	(0)	3	(27)	0	(0)	11
1998–1999	0	(0)	9	(56)	1	(6)	0	(0)	0	(0)	6	(38)	0	(0)	16
1999–2000	0	(0)	11	(65)	1	(6)	0	(0)	0	(0)	5	(29)	0	(0)	17
2000–2001	0	(0)	23	(70)	1	(3)	0	(0)	0	(0)	9	(27)	0	(0)	33
2001–2002	0	(0)	12	(80)	0	(0)	0	(0)	0	(0)	3	(20)	0	(0)	15
2002–2003	0	(0)	6	(50)	2	(17)	0	(0)	0	(0)	4	(33)	0	(0)	12
2003–2004	0	(0)	5	(63)	0	(0)	0	(0)	0	(0)	3	(37)	0	(0)	8
2004–2005	6	(25)	13	(54)	2	(8)	0	(0)	0	(0)	2	(8)	1	(4)	24
2005–2006	11	(50)	9	(41)	0	(0)	0	(0)	0	(0)	2	(9)	0	(0)	22
2006–2007[c]	6	(38)	10	(62)	0	(0)	0	(0)							

[a] Does not include defense of life or property kills or illegal kills.
[b] Includes 1 bear killed in December.
[c] Autumn only.

TABLE 3 Unit 12 brown bear harvest by transport method, regulatory years 1989 through 2006[a]

Regulatory year	Harvest by transport method (%)									
	Airplane	Horse	Boat	ATV	Snowmachine	ORV	Highway vehicle	Walking	Unk	*n*
1989–1990	4 (31)	2 (15)	1 (8)	0 (0)	1 (8)	4 (31)	0 (0)	0 (0)	1 (8)	13
1990–1991	6 (35)	4 (24)	0 (0)	0 (0)	0 (0)	2 (12)	3 (18)	1 (6)	1 (6)	17
1991–1992	6 (50)	2 (17)	0 (0)	0 (0)	1 (8)	0 (0)	1 (8)	1 (8)	1 (8)	12
1992–1993	10 (42)	7 (29)	0 (0)	1 (4)	2 (8)	0 (0)	2 (8)	0 (0)	2 (8)	24
1993–1994	6 (33)	4 (22)	0 (0)	2 (11)	0 (0)	0 (0)	2 (11)	3 (17)	1 (6)	18
1994–1995	4 (29)	7 (50)	0 (0)	1 (7)	0 (0)	0 (0)	2 (14)	0 (0)	0 (0)	14
1995–1996	1 (11)	7 (78)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (11)	0 (0)	9
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	8 (50)	3 (19)	0 (0)	1 (6)	0 (0)	2 (13)	2 (13)	0 (0)	0 (0)	16
1999–2000	12 (71)	2 (12)	0 (0)	3 (18)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17
2000–2001	10 (30)	12 (36)	1 (3)	5 (15)	0 (0)	0 (0)	5 (15)	0 (0)	0 (0)	33
2001–2002	3 (20)	6 (40)	0 (0)	5 (33)	0 (0)	0 (0)	0 (0)	1 (7)	0 (0)	15
2002–2003	3 (25)	4 (33)	0 (0)	2 (17)	0 (0)	1 (8)	1 (8)	1 (8)	0 (0)	12
2003–2004	4 (50)	1 (13)	0 (0)	2 (25)	0 (0)	0 (0)	1 (13)	0 (0)	0 (0)	8
2004–2005	10 (42)	6 (25)	1 (4)	4 (17)	0 (0)	0 (0)	1 (4)	2 (8)	0 (0)	24
2005–2006	12 (55)	6 (27)	0 (0)	2 (9)	0 (0)	0 (0)	0 (0)	2 (9)	0 (0)	22
2006–2007[b]	6 (38)	6 (38)	1 (6)	2 (13)	0 (0)	0 (0)	1 (6)	0 (0)	0 (0)	16

[a] Does not include defense of life or property kills or illegal kills.
[b] Autumn only.

TABLE 4 Unit 12 brown bear mortality, regulatory years 1989–1990 through 2006–2007

Regulatory year	Reported							Estimated kill		Total estimated kill					
	Hunter kill				Nonhunting kill (DLP)[a]										
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M	(%)	F	(%)	Unk	Total
1991–1992															
Autumn 1991	5	5	0	10	1 (1)	0	0	0	0	6	(55)	5	(45)	0	11
Spring 1992	2	0	0	2	1 (1)	0	0	0	0	3	(100)	0	(0)	0	3
Total	7	5	0	12	2 (2)	0	0	0	0	9	(64)	5	(36)	0	14
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	9	7	0	16	1 (1)	0	0	0	0	10	(59)	7	(41)	0	17
Spring 1994	2	0	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Total	11	7	0	18	1 (1)	0	0	0	0	12	(63)	7	(37)	0	19
1994–1995															
Autumn 1994	5	6	0	11	1 (1)	0	0	0	0	6	(50)	6	(50)	0	12
Spring 1995	2	1	0	3	1 (1)	0	0	0	0	3	(75)	1	(25)	0	4
Total	7	7	0	14	2 (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	1	0	3	0	0	0	0	0	2	(67)	1	(33)	0	3
Total	6	3	0	9	0	0	0	0	0	6	(67)	3	(33)	0	9
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
1997–1998															
Autumn 1997	7	1	0	8	1 (1)	0	0	0	0	8	(89)	1	(11)	0	9
Spring 1998	3	0	0	3	0	1(1)	0	0	0	3	(75)	1	(25)	0	4
Total	10	1	0	11	1 (1)	1(1)	0	0	0	11	(85)	2	(15)	0	13
1998–1999															
Autumn 1998	6	4	0	10	0	1(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(1)	0	0	0	8	(47)	9	(53)	0	17

Regulatory year	Reported							Estimated kill		Total estimated kill					
	Hunter kill				Nonhunting kill (DLP)[a]										
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M	(%)	F	(%)	Unk	Total
1999–2000															
Autumn 1999	4	8	0	12	0	0	0	0	0	4	(33)	8	(67)	0	12
Spring 2000	4	1	0	5	0	0	0	0	0	4	(80)	1	(20)	0	5
Total	8	9	0	17	0	0	0	0	0	8	(47)	9	(53)	0	17
2000–2001															
Autumn 2000	15	9	0	24	2 (2)	1(1)	0	0	0	17	(63)	10	(37)	0	27
Spring 2001	6	3	0	9	0	0	0	0	0	6	(67)	3	(33)	0	9
Total	21	12	0	33	2 (2)	1(1)	0	0	0	23	(64)	13	(36)	0	36
2001–2002															
Autumn 2001	6	6	0	12	3 (3)	0	0	0	0	9	(60)	6	(40)	0	15
Spring 2002	2	1	0	3	0	0	0	0	0	2	(67)	1	(33)	0	3
Total	8	7	0	15	3 (3)	0	0	0	0	11	(61)	7	(39)	0	18
2002–2003															
Autumn 2002	1	7	0	8	0	0	0	0	0	1	(12)	7	(88)	0	8
Spring 2003	4	0	0	4	0	0	0	0	0	4	(100)	0	(0)	0	4
Total	5	7	0	12	0	0	0	0	0	5	(42)	7	(58)	0	12
2003–2004															
Autumn 2003	3	2	0	5	0	0	0	0	0	3	(60)	2	(40)	0	5
Spring 2004	2	1	0	3	0	0	0	0	0	2	(67)	1	(33)	0	3
Total	5	3	0	8	0	0	0	0	0	5	(63)	3	(37)	0	8
2004–2005															
Autumn 2004	11	10	0	21	0	0	0	0	0	11	(52)	10	(48)	0	21
Spring 2005	3	0	0	3	0	0	0	0	0	3	(100)	0	(0)	0	3
Total	14	10	0	24	0	0	0	0	0	14	(58)	10	(42)	0	24
2005–2006															
Autumn 2005	9	11	0	20	0	0	0	0	0	9	(45)	11	(55)	0	20
Spring 2006	2	0	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Total	11	11	0	22	0	0	0	0	0	11	(50)	11	(50)	0	22
2006–2007															
Autumn 2006	12	4	0	16	0	0	0	0	0	12	(75)	4	(25)	0	16

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

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 13 (23,368 mi^2)

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 and the resident tag fee waived.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

- 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. Forty bears were captured and 35 radiocollared in the first year (May 2006) of a study to evaluate population trends in 13A.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Brown bear density estimates are available for two study areas in Subunit 13E, a study area in western 13A, and most recently, a study area including both 13A and 13B. The 1979 estimate of 10.5 independent bears/1000 km^2 on the upper Susitna River (13E) was higher than the 1987

estimate of 6.36 independent bears/1000 km^2 (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 in 13E in 1985 and 1995 were 18.75 and 23.31 independent bears/1000 km^2 (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 western 13A, Nelchina study area was 21.3 independent bears/1000 km^2 (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 two 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 completed across 13A and 13B. The preliminary density estimate from the 13E survey is 32.2 bears/1000km^2, and it is 16.3 bears/1000km^2 for 13A/B (estimates for all bears; Becker, personal communication). Preliminary data from the May 2006 capture event resulted in a known minimum density for all bears in the western 13A study area of 17.2 bears/1000km^2 (within the 95% utilization distribution, kernel parameter H=5500). Just as a reference, if 50-80% of the population was observed during the capture event, the roughly estimated density range would be 22–34 bears/1000km^2.

Population Size

Four separate population estimates have been calculated for Unit 13 in the past 20 years. During the late 1970s an estimate of 1500 brown bears was calculated based 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 $\geq$ 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 surveys between 2000 and 2004 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 for cubs of the year and 1.8 for yearlings (Testa et al. 1998). The most recent composition data are from the May 2006 capture event in 13A, where the average litter sizes were 2.1 for cubs of the year and 2.0 for yearlings. 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 two different censuses 10 years apart. He estimated 82.4 males/100 females in 1985, compared to only 27.8 males/100 females in 1995. Testa et al. (1998) observed 48 males/100 females in the

1998 study in western 13A, compared to the preliminary ratio of 33 males/100 females observed during the May 2006 capture event in largely the same area. Declining male/female ratios may be a reflection of high harvest pressure, and particularly, the protection accompanied sows have under the current hunting regulations.

MORTALITY

Harvest

Since 2002, there has been no closed season in GMU 13, except that portion of 13E 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, and 1 bear every year in the remainder of the unit. The resident $25 tag fee requirement in GMU 13 has been waived by the Board of Game annually since 1995.

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 a 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.

Hunter Harvest. The reported 2005–06 harvest of brown bears was 135 (Table 1). With the exception of the record harvest of 166 bears taken in 1990-2000, harvests since 1995 have averaged 135 bears a year with no trend evident. In total, 1490 bears have been taken since regulations were liberalized 11 years ago in 1995.

The 2005–06 brown bear harvest broken down by subunit was: 13A - 23 bears, 13B - 19, 13C - 11, 13D - 28, and 13E - 54. More bears have been reported harvested from 13E over the years than any other subunit.

The 2005–06 brown bear harvest was 76 (56%) males and 59 (44%) females (Table 1). The mean skull size was 22.5 inches for males and 19.5 inches for females. The mean ages for bears taken in 2005–2006 are not yet available. Mean ages from the prior year were 5.5 years for males and 6.3 years for females. No significant trends are evident in the sex and age data from the harvest.

Interpretation of size and age data in the harvest is difficult (Miller 1993). Kontio et al. (1998) suggest that with an even sex ratio at birth, immigration from lighter or unhunted areas could effectively keep subadult harvest biased towards boars through age 5. With young males comprising 61% (13A, 1994-2005) of the bears harvested up through the first 5 years of age, there appears to be immigration (to 13A) of young males from surrounding areas. If this male bias was due solely to the precocial behavior of 1–3 year old boars compared with sows (which likely makes boars more vulnerable to human harvest), the percentage of boars would be expected to drop in the 4 and 5 age classes, approximating 50% when corrected for cub production and survival rates published by Miller (1988, 1993). The 13A harvest data however, indicates 57% males in the age 4 class, and 71% males in the age 5 class.

In most years, the mean age of males taken in the fall was lower than males taken in the spring. Considering 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. Younger males tend be killed in the fall incidentally by hunters pursuing other big game species. Females taken during the fall tend to be older, larger bears compared to females taken in spring. We speculate that older females are taken in the fall because cubs and 2-year-olds that accompanied them during spring may not be with them later in the year, making more older females legal during the fall.

Hunter Residency and Success. Nonresident hunters took 32 (24%) bears in 2005–06 (Table 2). The number of bears taken by nonresidents has averaged 34 (range = 21-45) over the last 20 years and no trend is evident. The lack of growth in the nonresident harvest reflects the high cost of guided hunts limiting participation by most nonresidents. Local residents took 17 (13%) bears in 2005–06. The number of bears taken by locals shows considerable yearly variation and the yearly changes seem to occur independent of the liberalized hunting regulations. The nonlocal Alaska resident harvest did increase appreciably in those years when hunting regulations were liberalized. Nonlocal Alaska resident bear harvests over the last 5 years have averaged 88 (range = 63–100). Alaska residents are mostly opportunistic bear hunters and need liberal seasons and no tag requirements so they can opportunistically take bears. Bear tags have been purchased by only 7–13% of successful resident hunters since the tag fee was eliminated in 1995. Successful hunters averaged 4.4 days in the field in 2005–06. 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. Successful nonresidents tend to spend about two days more in the field to take a bear than residents.

Harvest Chronology. For the 2005–06 regulatory year, 69% of the harvest was during fall and 31% in 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 but no trend is evident (Table 1). This variation may be related in part to snow conditions influencing access. Deep, late snows provide good snowmachine access that results in an increase in the April harvest. Alternatively, a particularly late breakup could interfere with off-road-vehicle (ORV) access and limit harvests later in May.

Males comprised 53% (n = 48) of the fall harvest in 2005. Except in 2003, males have been predominate in the fall harvest (Table 1). The percent males in the spring 2006 harvest was 64% (n = 27). Since 1980, when spring seasons started, males have averaged 68% (range = 49% - 83%) of the harvest; no trends are evident.

Transport Methods. The most important method of transportation for brown bear hunters in Unit 13 during 2005–06 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 been important since 1989, when design changes improved mobility 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 over the last 15 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 also report 4-wheelers have become the most important method of transportation for

them. Because many bears are taken on combination hunts in the fall, it was to be expected that 4-wheelers would increase in importance for bear harvest.

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), with the remaining hunters indicating bears were harvested as incidental take. Incidental harvests are those in which hunters seek different species but also take a bear. Hunters seeking moose and caribou were responsible for 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 1 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 six brown bears (three males) reported killed in defense of life or property (DLP) between 2001 and 2006. The 5-year average DLP kill of 2.2 bears/year is 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 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 more of a problem in Unit 13 as the area becomes more developed. Because of the increase in population seasonally when bears are out of the den, there are more bear-human encounters. 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 for 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. All the unitwide bear estimates are based on extrapolations of estimated densities. The problems with this are obvious, particularly given the differences in study areas and census techniques.

A population estimate of 1450 bears was extrapolated in 1998 following capture-mark-recapture censuses in GMU 13A and 13E; the lower, most recent population estimate of 1300 was extrapolated from line transect surveys in 13A, 13B and 13E. Bear density estimates for the line transect surveys are lower than those obtained using the capture-recapture technique. If the difference in population estimates is not due to the differences in methodology, there has been a small decline in the population. Such a result would suggest the liberal seasons and bag limit changes have finally started to be effective in reducing the Unit 13 population.

The most recent research focused on monitoring the bear population trend in the 13A study area started in May 2006. The observed minimum density from the capture event was 17.2 bears/1000km2; however, one capture event does not represent an adequate sampling intensity to produce a density estimate. We recommend continuing this work and repetition of a mark-capture estimate comparable to the 1998 census. This area is an important moose hunting area with high neonatal calf predation from bears and receives high bear hunting pressure. Given all the prior work in this area, it is only logical to continue monitoring the impact of bear harvests on bear density and moose calf survival.

Unit 13 has been identified as an intensive management area where the primary management objective is to provide high harvests of ungulates for human use. Research over the last 30 years in GMU 13 has identified brown bears as important predators of moose, taking over 50% of the calves born every year as well as an unknown number of adults. A large experimental reduction in bears was shown to result in an increased survival of moose calves and eventual recruitment of these calves into the population. The BOG has focused on these results and has tried to meet intensive management mandates for more moose, partially by increasing neonatal calf survival. The only practical management option to attempt a reduction in bear numbers unitwide has been to increase the general season harvest of bears. Initial predictions were that liberalized hunting regulations (beginning in 1995) would dramatically reduce the unitwide population, however no dramatic trends are apparent from harvest or preliminary research data.

Board of Game actions liberalizing season dates and bag limit as well dropping the resident tag fee were effective in increasing the bear harvest. Since 1995, 1490 bears have been taken with a yearly average harvest of 135 bears. Prior to Board of Game action, the average yearly take from 1987 to 1995 was only 85. Harvests have stabilized at current levels and no trends are evident. Yearly fluctuations in take are attributed to changes in weather and access, as well as hunting effort for other species because most residents take bears incidentally while hunting moose or caribou.

The high reported harvests since 1995 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 $\geq$ 2.0 year. These rates would give a maximum unitwide sustainable harvest of only 83 given a population of 1450 bears, and only 74 for a population of 1300 bears. The average yearly take of 135 bears for the last 11 years results in an estimated harvest rate of 9-10%, with some years as high as 13%. Such high harvest rates exceed all modeled sustainable rates. If initial population estimates were low or immigration was underestimated, the population could actually be stable.

Whether continued harvests at the current level can reduce bear numbers enough to appreciably reduce brown bear predation on moose calves is unknown. Estimates of changes in productivity, cub survival, and immigration following high harvests are not available. Current regulations that protect the reproductive portion of the population (sows with cubs, and cubs) may protect enough sows to maintain recruitment, thus delaying a population reduction. A reproductively active adult sow is only legal every third or fourth year, thus not as vulnerable to hunting as a male. A decline in the sex ratio suggests that males are being replaced by productive sows.

Immigration of bears from lightly hunted areas (within Unit 13), or from adjacent Denali and Wrangell-St. Elias National parks, may be another reason high harvests of brown bears may not have the predicted impact on bear numbers. The Unit 13 brown bear population is not a closed population, and the extent and effects of migration on bear numbers are unknown. The sex ratio for bears harvested through age 5 shows more males than females are taken, even though there is a 50:50 sex ratio at birth, and precocial behavior by young males is largely negated by age 4 and 5. The most reasonable explanation for the higher take of males, particularly in the age 4 and 5 classes, is that there is immigration into the unit of young dispersing males. Research should focus on determining the impact increased harvests have on productivity and immigration.

I recommend maintaining the current season, bag limit, and resident tag fee waiver. Harvests must be maintained to determine the impacts of high harvests on an Interior brown bear population. The most we can conclude to date is that while providing substantial hunting opportunity and an increased harvest, the population has not dramatically declined as originally predicted. The only discernable population impacts have been alteration of the sex ratio towards females, and possible increases in productivity and immigration. A slow decline in the population may be occurring. We would likely be a lot further along in both our management objective and knowledge of how high harvest rates impact Interior brown bears if we had maintained the liberal regulations we had between 1983 and 1988. Becoming more restrictive at this point, before fully determining effects of current harvest rates is a mistake we should not repeat. To monitor population level effects, I recommend extending the work done in 2006 and completion of another mark-recapture census in 13A which can be compared with past results. Research in 2005 and 2006 documented continued high neonatal moose calf mortality from bears in this area (Dale, personal communication).

There are very limited options for further increasing the take of GMU 13 brown bears. One viable option to further increase hunting effort in GMU 13, would be to change the guide requirement to allow nonresidents to hunt in GMU 13 with an Alaskan resident who has obtained a permit from ADF&G to take nonresident friends or relatives hunting without

compensation. Unit 13 grizzlies are classified as coastal brown bears by Boone & Crocket (Byers and Bettas eds., 1999), 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 who are accompanied by a permitted resident will provide a large, new pool of hunters looking for an inexpensive opportunity to take any legal brown bear.

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

TOBEY, R.W. AND R.A. KELLEYHOUSE. 2007. Unit 13 brown bear. Pages 143-154 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 13 brown bear harvest, 2001–2002 to 2005–2006

Regulatory	Hunter kill						Nonhunting kill[a]			Total Kill			
Year	M	(%)	F	(%)	Unk.	Total	M	F	Unk.	M	F	Unk.	Total
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
2004–05													
Fall 04	48	(53)	43	(47)	0	91	0	1	0	48	44	0	92
Spring 05	34	(69)	15	(31)	0	49	0	0	0	34	15	0	49
Total	82	(59)	58	(41)	0	140	0	1	0	82	59	0	141
2005–06													
Fall 05	49	(53)	44	(47)	0	93	0	0	0	49	44	0	93
Spring 06	27	(64)	15	(36)	0	42	0	0	0	27	15	0	42
Total	76	(56)	59	(44)	0	135	0	0	0	76	59	0	135

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

TABLE 2 Unit 13 brown bear successful hunter residency, 2001–2002 to 2005–2006

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters[b]
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
2004–05	13	(9)	90	(64)	37	(26)	140
2005–06	17	(13)	86	(64)	32	(24)	135

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

TABLE 3 Unit 13 brown bear harvest chronology percent by time period, 2001–2002 to 2005–2006

	Harvest periods																		
Regulatory	July		August		September		October		November		March		April		May		June		n
year	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	
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
2004–05	7	(10)	16	(22)	36	(51)	6	(8)	0	(0)	0	(0)	14	(20)	10	(14)	11	(15)	140
2005–06	5	(7)	22	(30)	36	(48)	6	(8)	0	(0)	0	(0)	13	(18)	10	(14)	7	(10)	135

TABLE 4 Unit 13 brown bear harvest percent by transport method, 2001–2002 to 2005–2006

Regulatory year	Airplane	Horse	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk.	n
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
2004–05	20	1	11	31	12	6	12	6	1	140
2005–06	19	1	9	36	10	0	16	7	1	135

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 14 (6625 mi^2)

GEOGRAPHIC DESCRIPTION: Upper Cook Inlet

BACKGROUND

The brown bear populations in Unit 14 have been influenced by agricultural settlement, increased development, urbanization, and other human activities. Grauvogal's 1990 estimate of 169–262 brown bears was later refined by Harkness (1993) to 185–239 brown bears. Del Frate (2003) noted that public reports and human–bear encounters indicated brown bears were more common than they had been 10–15 years earlier. More recently, there have been increasing reports by black bear bait hunters and others of encounters with brown bears.

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

In recent years a high incidence of human-bear interactions has occurred in some areas of Unit 14, especially in Subunit 14C. For the last twenty years, as many as 8 bears annually have been killed unrelated to hunting. In 1995 two humans were fatally mauled by brown bears in Chugach State Park in Subunit 14C. Efforts have been made to develop educational programs directed at area residents and visitors to reduce the potential for conflicts. However, the Alaska Department of Fish and Game (ADF&G) continues to receive numerous nuisance bear reports.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Subunit 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 Subunit 14B

the goal has been to provide the maximum opportunity to participate in hunting brown bears. In Subunit 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. Previously 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 indicate bears are more common than 15 years ago.

MORTALITY

Harvest

Season and Bag Limit. In Subunits 14A and 14B the season was 1 September31 May. Within Subunit 14C brown bear hunting was closed in the Eagle River, Fort Richardson, Elmendorf, Anchorage, Eklutna, Birchwood, and Chugach State Park management areas. The season in the remainder portion of Subunit 14C was 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. Nonresidents paid $500 for a brown bear tag and had to be accompanied by a guide or a relative within second degree of kindred.

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

Hunter Harvest. During the past 5 years hunters harvested an average of 18 bears (range 10–22) (Table 1). This 5-year average is greater than the 11.8 average for the previous 5-year period

(range 9–15). The female component of the brown bear harvest for the past 5 years ranged from 19% to 53%, averaging 39%. The average yearly total of female bears >2 years of age known killed in the 5-year period 1997–2001 was 9.2 (including DLP - defense of life or property- and other nonhunting mortality).

Hunter Residency. Nonresidents harvested an average of 4.2 bears from 2001 through 2005 (Table 2). All remaining bears were harvested by residents of Unit 14 during this period, except 1 each year taken by nonlocal residents in 2002, 2003, and 2005.

Harvest Chronology. Harvest chronology in Unit 14 has typically peaked during September and secondarily in May (Table 3). In 2005, 81% of the bears were harvested during the fall. One bear was taken in August and 2 were taken in April. During the 2004 season, half of the harvest occurred in September; the balance occurred during April and May (Table 3).

Transport Methods. Successful bear hunters preferred using snowmachines in 2004 and boats in 2005 (Table 4). Previous years showed all-terrain vehicles (ATVs) and/or off-road vehicles (ORVs) to be the preferred method of transportation. Fewer hunters reported taking bears on foot.

Other Mortality

Defense of life or property (DLP) is the primary cause of nonhunting mortality. There were no reported nonhunting mortalities in 2005 and 2 in 2004. These were DLP mortalities from Subunit 14A. No bears were killed by trains during the reporting period. We estimate 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 for 2 of the last 3 years, and the average number of independent females harvested exceeded the objective in 3 of the last 5 years. Harvest objectives are expected to be exceeded in the future.

In 1999, the department recommended to the Board of Game that the brown bear human use objective be increased to the current harvest levels. The human use objective established at that time has been met or exceeded every year since and by all indicators, appears to be sustainable. Frequency of bear sign observed by biologists, reports from the public and black bear bait hunters, incidents and reports of nuisance bears, and an increased harvest level indicate the brown bear subpopulations in Unit 14 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.

The department should continue to monitor the harvest closely, the age of bears taken, and the ratio of females in the total mortality 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 May 31 in 14A and portions of 14C. It is likely that the increase in harvest may be due to increased interest in hunting brown bears in Subunits 14A and 14B and previous season extensions to align season dates in the Southcentral region.

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 and reported often 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. Recently, videos and DVD's titled "Staying Safe in Bear Country" and "Living in Bear Country" have been produced by the department and others with input from staff bear biologists, and made available to the public at ADF&G area offices and at the regional headquarters office. These and similar efforts should be emphasized in Anchorage and the Mat-Su areas to address issues such as garbage placement, bird feeders, human–bear encounters, and advice on how to respond to potentially negative encounters with brown bears.

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

KAVALOK, T. P. 2007. Unit 14 brown bear management report. Pages 155–163 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 14 brown bear harvest, 1996–2005

Regulatory year	Reported: Hunter kill M	F	(%)	Unk.	Total	Reported: Nonhunting kill[a] M	F	Unk.	Estimated unreported kill	Total estimated kill M	(%)	F	(%)	Unk.	Total
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	(33)	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
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

TABLE 1 continued_

Regulatory year	Reported								Estimated unreported kill	Total estimated kill				
	Hunter kill					Nonhunting kill[a]								
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
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	(70)	8	(30)	3	30
2004															
Fall 2004	3	2	(40)	0	5	1	0	0	1	4	(67)	2	(33)	1	7
Spring 2005	5	0	(0)	0	5	1	0	0	1	6	(100)	0	(0)	1	7
Total	8	2	(20)	0	10	2	0	0	2	10	(53)	9	(47)	3	22
2005															
Fall 2005	10	9	(47)	0	19	0	0	0	1	10	(53)	9	(47)	1	20
Spring 2006	2	1	(33)	0	3	0	0	0	1	2	(67)	1	(33)	1	4
Total	12	10	(45)	0	22	0	0	0	2	12	(55)	10	(45)	2	24

[a] Includes DLP kills, illegal kills, other known human-caused accidental mortality

TABLE 2 Unit 14 brown bear successful hunter residency, 1996–2005

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
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
2004	6	(60)	0	(0)	4	(40)	10
2005	14	(64)	1	(4)	7	(32)	22

[a]Unit 14 residents

TABLE 3 Unit 14 brown bear harvest chronology percent by month, 1996–2005

Regulatory year	Harvest periods August	September	October	November	March	April	May	*n*
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
2004	0	50	0	0	0	30	20	10
2005	5	81	0	0	0	9	5	22

TABLE 4 Unit 14 brown bear harvest percent by transport method, 1996–2005

	Percent of harvest							
REGULATORY year	Airplane	Horse	Boat	ATV/ORV	Snowmachine	HIGHWAY vehicle	Foot	*n*
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
2004	10	0	10	20	30	10	20	10
2005	18	0	27	18	5	23	9	22

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 16 (12,255 mi^2)

GEOGRAPHIC DESCRIPTION: West side of Cook Inlet

BACKGROUND

The brown bear population in Unit 16 was estimated by Griese (1993) at 586–1156. 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 and have also relied on reports by long-time residents to refine estimated trends (Griese 1998). Plans are to conduct a line-transect survey (Quang and Becker 1999) in 2007 to develop a statistically rigorous bear density estimate for the unit.

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. In 1984, harvest had increased to 66 bears. Additional liberalizations in 2003 and 2005 resulted in more interest in brown bear hunting in Unit 16 with a reported record harvest of 126 in 2005. During the last 5 years, the harvest averaged 100 bears.

An annual sustainable harvest of 55 bears was first estimated by Griese (1993). This included 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. During 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. More recently, in 2003, the tag requirement was dropped and the 1 in every 4 year bag limit was raised to 1 per year. Then in 2005, the board raised the limit to 2 bears.

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

Brown bear harvests were monitored by collecting data gathered during the sealing of skulls and hides of harvested animals. 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, as well as age data when they were provided from the lab later in the year. Similar data were collected from bears sealed as taken in defense of life or property (DLP), an illegal kill, or other nonhunting mortality.

In 2003 and 2004 Alaska Department of Fish and Game (ADF&G) research staff, with cooperative funding from Denali National Park, investigated the application of a method to survey bears using aerial transect surveys in northeastern Unit 16 and eastern Unit 13 (Quang and Becker 1999). Plans were to apply this survey method to the core area of Unit 16B in Spring 2007. This should provide additional insight into the density of bears in the area and generate a more current population estimate.

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 km^2. Kavalok (2005) reported that the southern end of the unit appeared to have bear density more like adjacent Unit 9A, which is about 150 bears per 1000 km^2. This is probably a higher density estimate than what would be expected in most of Unit 16.

Population Size

The Quang and Becker 2003 surveys in portions of Unit 16 and the surrounding area showed data indicating that the brown bear population in Unit 16 is likely similar to the number reported

by Griese in 1993. It is possible that the population may have decreased following the higher harvests reported in recent years.

MORTALITY

Harvest

The average annual reported brown bear harvest for 2003–2005 in Unit 16 was 114 bears. This included 32 females older than 2 years, which exceeded the management objectives. Nonhunting mortality and estimates of unreported kills from wounding loss and poaching accounted for 11 bears annually (Tables 1 and 2). The average age of female bears for this report period was 6.45 years (n = 53). This was down from 7.4 reported for 2002-2004, but similar to 6.2 reported for 2000-2002.

Season and Bag Limit. In Unit 16A the hunting season was 1 September–31 May. The bag limit was 1 bear every 4 regulatory years. The season in Unit 16B was 10 August–31 May with a bag limit of 2 bears every regulatory year (as of Fall 2005) and no resident tag fee . The exception to this was the season within 1 mile of Wolverine Creek where it was 15 September–31 May. Cubs and females accompanied by cubs were not legal to take.

Board of Game Actions and Emergency Orders. In 2005 the Board of Game increased the bag limit in Unit 16B to 2 bears per regulatory year and 1 bear per regulatory year in Unit 16A outside of Denali State Park. 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. Except for 1997, hunter harvest has increased from the lower harvest levels reported in the early to mid 1990s to a record high of 126 bears in 2005. Harvest dipped during 2002 as a result of poor weather and poor snow conditions during spring. During the last five years, the harvest averaged 80.8 bears (Tables 1 and 2).

Hunter Residency and Success. Nonresident harvest declined from the previous reporting period and was down from historic trends. Nonresidents claimed 48% and 36% of the harvest in 2004 and 2005 respectively (Table 3). Local resident hunters averaged 3.5 % of the harvest for the last 10 years.

Harvest Chronology. In the past, more bears have been taken during fall than spring (Table 4). In 2003, 46 bears were harvested in the spring while 45 were taken during the fall and then in 2004, 76 bears were taken in the spring and 49 bears were taken during the fall. In the past, most bears taken in the fall were incidental to moose hunting. With the elimination of general moose hunting in Unit 16B, the proportion of fall brown bear harvests have declined. Most fall bears were taken in September, and most spring bears were taken in April.

Transport Methods. Successful brown bear hunters reported using airplanes for transportation more often than all other methods combined (Table 5). During 2004 and 2005 respectively, 62% and 63% of successful hunters used aircraft. Snowmobiles have been used more by successful hunters in recent years. Excellent snow conditions in 2004 allowed for 15% of the successful hunters to report using snowmachines; however, only 5% of successful hunters reported using this method in 2005 due to poor snow conditions.

Other Mortality

During the report period, 3 nonhunting kills (1 male and 2 females) were reported in 2004 and none in 2005 (Tables 1 and 2). Consequently, we estimated that approximately 11 bears annually might not be reported.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Griese (1998) noted dangerous interactions between humans and bears caused by sport fishing at Wolverine Creek. ADF&G has 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). The department also assisted in the formation of a public advisory group, the Wolverine Creek Management Committee (WCMC), which was charged with establishing voluntary guidelines for users. This has been in effect since the summer of 2003 with success in addressing some of the issues. WCMC and ADF&G have continued to monitor and evaluate this program and the activities at Wolverine Creek.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives were exceeded during this reporting period. The harvest objective exceeded the desired 3-year average of 28 females older than 2 years, and at the same time the overall harvest was at record levels. By liberalizing seasons and bag limits and eliminating the resident tag fee in Unit 16B, the Board of Game increased the likelihood of additional harvests to reach the desired objectives.

Bear viewing and hunting are becoming more popular in the unit. At the same time, interest remains in increasing the harvest because of low moose numbers and 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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Please cite any information taken from this section, and reference as:

KAVALOK, T. 2007. Unit 16 brown bear management report. Pages 164–174 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 16A human-caused brown bear mortality, RY 1996–2005

Regulatory year	Reported								Estimated unreported kill	Total estimated kill				
	Hunter kill					Nonhunting kill[a]								
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
1996-97															
Fall	1	1	(50)	0	2	0	0	0		1	(50)	1	(50)	0	2
Spring	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
1997-98															
Fall	2	2	(50)	0	4	0	1	0		2	(40)	3	(60)	0	5
Spring	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
1998-99															
Fall	0	1	(100)	0	1	0	0	0		0	(0)	1	(100)	0	1
Spring	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
1999-00															
Fall	9	2	(18)	0	11	0	0	0		9	(82)	2	(18)	0	11
Spring	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
2000-01															
Fall	6	3	(33)	0	9	0	0	0		6	(67)	3	(33)	0	9
Spring	4	0	(0)	0	4	0	0	0		4	(100)	0	(0)	0	4
Total	10	3	(23)	0	13	0	0	0	2	10	(77)	3	(23)	2	15
2001-02															
Fall	5	2	(29)	0	7	0	0	0		5	(71)	2	(29)	0	7
Spring	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
2002-03															
Fall	3	1	(25)	0	4	0	0	0		3	(75)	1	(25)	0	4
Spring	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

TABLE 1 continued

Regulatory year	Reported								Estimated unreported kill	Total estimated kill				
	Hunter kill					Nonhunting kill[a]								
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
2003-04															
Fall	3	3	(50)	0	6	0	0	0		3	(50)	3	(50)	0	6
Spring	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
2004-05															
Fall	3	1	(25)	0	4	0	0	0		3	(75)	1	(25)	0	4
Spring	6	1	(14)	0	7	0	0	0		6	(86)	1	(14)	0	7
Total	9	2	(18)	0	11	0	0	0	2	9	(82)	2	(18)	2	13
2005-06															
Fall	4	6	(60)	0	10	0	0	0		4	(40)	6	(60)	0	10
Spring	1	1	(50)	0	2	0	0	0		1	(50)	1	(50)	0	2
Total	5	7	(58)	0	12	0	0	0	2	5	(42)	7	(58)	2	14

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

TABLE 2 Unit 16B human-caused brown bear mortality, RY 1996–2005

Regulatory year	Reported								Estimated unreported kill	Total estimated kill					
	Hunter kill					Nonhunting kill[a]									
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
1996-97															
Fall	13	16	(55)	0	29	2	0	0		15	(48)	16	(52)	0	31
Spring	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
1997-98															
Fall	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
1998-99															
Fall	29	21	(42)	0	50	0	3	0		29	(55)	24	(45)	0	53
Spring	10	2	(17)	0	12	0	0	0		10	(83)	2	(17)	0	12
Total	39	23	(37)	0	62	0	3	0	6	39	(60)	26	(40)	6	71
1999-00															
Fall	39	19	(40)	0	48	1	3	0		30	(58)	22	(42)	0	52
Spring	13	1	(7)	0	14	0	1	0		14	(87)	2	(13)	0	15
Total	41	20	(33)	0	61	1	4	0	6	44	(64)	24	(36)	6	74
2000-01															
Fall	17	22	(56)	0	39	1	5	0		18	(45)	27	(60)	0	45
Spring	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
2001-02															
Fall	22	24	(52)	0	46	0	0	0		22	(48)	24	(52)	0	46
Spring	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
2002-03															
Fall	21	19	(48)	0	40	0	2	0		21	(50)	21	(50)	0	42
Spring	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

TABLE 2 continued

Regulatory year	Reported								Estimated unreported kill	Total estimated kill					
	Hunter kill					Nonhunting kill[a]									
	M	F	(%)	Unk.	Total	M	F	Unk.		M	(%)	F	(%)	Unk.	Total
2003-04															
Fall	22	17	(44)	0	39	0	0	0		22	(56)	17	(44)	0	39
Spring	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
2004-05															
Fall	32	12	(27)	0	44	1	1	0		33	(72)	13	(28)	0	46
Spring	56	13	(19)	1	70	0	1	0		56	(80)	14	(20)	1	71
Total	88	25	(22)	1	114	1	2	0	9	89	(77)	27	(23)	10	126
2005-06															
Fall	37	25	(40)	1	63	0	0	0		37	(60)	25	(40)	1	63
Spring	37	13	(26)	1	51	0	0	0		37	(74)	13	(26)	1	51
Total	74	38	(34)	2	114	0	0	0	9	74	(66)	38	(34)	11	123

[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 1996–2005

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total[b] successful hunters
1996	2	(3)	24	(38)	37	(58)	63
1997	1	(3)	17	(44)	21	(54)	39
1998	0	(0)	33	(52)	31	(48)	64
1999	5	(7)	39	(51)	32	(42)	76
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
2004	5	(4)	60	(48)	60	(48)	125
2005	3	(2)	78	(62)	45	(36)	126

[a] Unit 16 residents

[b] Includes unknown residency

TABLE 4 Unit 16 brown bear harvest chronology percent by month, RY 1996–2005

Regulatory year	Harvest periods							*n*
	August	September	October	November	March	April	May	
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
2004	12	23	3	1	1	42	17	125
2005	14	33	10	0	1	19	22	126

TABLE 5 Unit 16 brown bear harvest percent by transport method, RY 1996–2005

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	ATV/ORV	Snowmachine	Highway vehicle	Foot	Other/ Unknown	*n*
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
2004	62	3	8	4	15	0	8	0	125
2005	63	5	14	6	5	2	6	0	126

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 17 A, B, and C (18,800 mi^2)

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 drainages, as well as throughout the Wood River/Tikchik Lakes. Bears also are observed occasionally near aggregations of the Mulchatna caribou herd.

Bears in Game Management Unit 17 are neither as abundant nor usually as large as those found along the Alaska Peninsula, so historically there hadn'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. However, with the decline in the Mulchatna caribou herd, fewer caribou hunters are now coming to Unit 17 (Woolington 2007). 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 multi-species hunts.

Reported harvests are only 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 reported 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 specific to 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, B, and C	10 Sep–25 May	1 bear per regulatory year
Units 17A, B, and C Residents only, by registration permit	1 Sep–31 May	1 bear per regulatory year

Board of Game Actions and Emergency Orders. During its spring 2005 meeting, the Board of Game changed the opening date for the remainder of Unit 17B to 10 September. No emergency orders were issued during this reporting period.

Human-Induced Mortality. During the 2004–05 hunting seasons, 85 hunters reported killing brown bears in Unit 17, 53 males (62%) and 32 females (38%) (Table 1). During the 2005–06 hunting seasons, 119 hunters reported killing brown bears in Unit 17, 67 males (56%) and 52 females (47%) (Table 1). These reported harvests bracket the mean annual reported harvest of the previous five years (95 bears).

The average skull size of bears presented for sealing in 2004–05 was 23.4 inches (n = 53, range 17.8 in.– 26.6 in.) for males and 20.7 inches (n = 32, range 16.8 in.– 23.3 in.) for females. The average skull size of bears presented for sealing in 2005–06 was 23.8 inches (n = 65, range 17.6 in.– 27.1 in.) for males and 20.6 inches (n = 49, range 16.4 in.– 23.9 in.) for females. In 2004–05, 7 bears (6 males, 1 female) were reported killed in Unit 17A; 48 (23 males, 25 females) were reported killed in Unit 17B; and 30 (24 males and 6 females) were reported from Unit 17C. In 2005–06, 16 bears (11 males, five females) were reported killed in Unit 17A, 72 (33 males and 39 females) were reported killed in Unit 17B, and 31 (23 males and 8 females) were reported from Unit 17C. In the past 5 years, 8% of the bears reported killed in the unit have been taken in Unit 17A, 62% in 17B, and 30% in 17C (Table 2).

Hunter Residency and Success. Nonresidents account for most of the brown bear harvest in Unit 17. During the 2004–05 seasons, nonresidents took 83.5% of the bears reported killed in the unit. During the 2005–06 seasons, nonresidents took 66.4% of the bears reported killed in the unit (Table 3).

Harvest Chronology. Fifty bears were reported killed during the fall 2004 hunting season, and 35 bears were reported killed during the spring 2005 season. Seventy-four bears were reported killed during the fall 2005 hunting season, and 45 bears were reported killed during the spring 2006 season (Tables 1 and 4). Prior to 1998, most bears were consistently reported killed in fall 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 of 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), as well as the interest of resident hunters in taking bears while moose and caribou hunting, have 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

Two brown bears were reported killed in defense of life or property in Unit 17 during the 2002–03 regulatory year, and 1 was found dead from unknown causes. There were no reports of bears killed illegally in Unit 17 during 2004–05; however, based on previous years illegal kills likely occurred. Two brown bears were reported killed in defense of life or property in Unit 17 during the 2005–06 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 and 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 and 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 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 two decades. The open landfill formerly used was closed and covered during the previous 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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Please cite any information taken from this section, and reference as:

WOOLINGTON, J.D. 2007. Unit 17 brown bear management report. Pages 175–186 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 17 brown bear harvest, 1994–95 through 2005–06

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	0	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	24	1	85
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

TABLE 1 Continued

Regulatory year	Hunter Kill				Nonhunting Kill				Total reported kill			
	Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
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
2004												
Fall 2004	23	27	0	50	0	1	1	2	23	28	1	52
Spring 2005	30	5	0	35	1	0	0	1	31	5	0	36
Total	53	32	0	85	1	1	1	3	54	33	1	88
2005												
Fall 2005	35	39	0	74	0	1	1	2	35	40	1	76
Fall 2006	32	13	0	45	0	0	0	0	32	13	0	45
Total	67	52	0	119	0	1	1	2	67	53	1	121

TABLE 2 Unit 17 brown bear harvest by subunit, 1991–92 through 2005–06

Regulatory	Unit 17(A)				Unit 17(B)				Unit 17(C)				Unit 17 total			
year	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	32	15	1	48
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
2004-05	6	1	0	7	23	25	0	48	24	6	0	30	53	32	0	85
2005-06	11	5	0	16	33	39	0	72	23	8	0	31	67	52	0	119

TABLE 3 Unit 17 brown bear successful hunter residency, 1991–92 through 2005–06

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
2004-05	5 (5.8)	9 (10.6)	71 (83.5)	85
2005-06	17 (14.3)	23 (19.3)	79 (66.4)	119

[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 2005–06

Regulatory	Fall Season			Spring Season				
Year	1–15 Sep	16–30 Sep	1–15 Oct	1–15 Apr	16–30 Apr	1–15 May	16–30 May	Total
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]
2004-05	4.7%	47.1%	7.1%	16.5%	17.7%	5.9%	1.2%	85
2005-06	25.2%	29.4%	7.6%	3.4%	21.0%	7.6%	5.9%	119

[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 2005–06

Regulatory Year	Percent of harvest									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	Total
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
2004-05	57.7	---	10.6	---	31.8	---	---	---	---	85
2005-06	66.4	--	10.9	---	20.2	---	0.8	1.7	---	119

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 18 (42,000 mi^2)

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 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 for subsistence hunting, and regulations were modified to more closely match local cultural needs and to improve harvest reporting. The WABBMA included all of Units 18 and 17, and parts of Units 9 and 19A In this subsistence hunt area, a registration permit hunt was administered for hunters who pursue bears primarily for their 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, subsistence 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.

- 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 attractive nuisances.

- Communicate and cooperate with 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 the U.S. Fish and Wildlife Service (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.

During the 2004–2005 and the 2005–2006 regulatory years, we sent letters requesting harvest and effort information to registered subsistence hunters and monitored the general hunt harvest through our standard sealing requirements.

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 midpoint of the estimate is 40.3 bears per 1000km^2(Walsh et al 2006). In Unit 18, approximately one-third of the bear habitat is within the study area, and that portion probably has the highest density of brown bears in the unit. We think that unitwide the population is stable and includes approximately 350 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, 56% of the bears taken were males, compared to 61% 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

2004-2005 and 2005-2006

Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 18–General Hunt		
Unit 18		
Resident and Nonresident Hunters: 1 bear every regulatory year	1 Sep–31 May (General hunt only)	1 Sep–31 May (General hunt only)
Unit 18–Subsistence Hunt		
Resident Hunters: 1 bear per regulatory year by registration permit in the WABBMA for subsistence purposes	1 Sep–31 May (Subsistence hunt only)	
Nonresident Hunters:		No open season (Subsistence hunt only)

Board of Game Actions and Emergency Orders During the Board of Game meeting in fall 2003, the resident and nonresident general brown bear season was changed to 1 September–31 May for the entire unit and the bag limit was raised to 1 bear per regulatory year. These changes took effect in July 2004. This season and bag limit was in effect throughout this reporting period.

The Board of Game also reauthorized the brown bear tag fee exemption associated with subsistence registration permit hunting in the unit. In the winter of 2004 the Board of Game authorized ADF&G to manage subsistence harvest on a unit by unit basis within the area previously defined as the WABBMA.

Human Harvest. During the 2004–2005 regulatory year, the Unit 18 reported harvest was 38 bears (0 subsistence and 39 general season), and during 2005–2006 the reported harvest was 23 bears (0 subsistence and 24 general season). Nearly all of the total reported harvest occurs in the area south of the Kuskokwim River; only 8 of 139 bears harvested since 1994 have been taken north of the Yukon River. Additional harvest statistics for the general hunt are shown in Table 1.

Defense of life or property (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 did not have any DLP bears during this reporting period. In the past we have had as many as 6 in 1 year.

Permit Hunts. The subsistence registration permit is available to hunters who take bears primarily for the meat. In the 2004–2005 regulatory year the permit was for the entire WABBMA area. In the 2005–2006 regulatory year each unit had a separate subsistence permit. 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 1 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 or skull is removed from the management area. If a bear is presented for sealing under this last provision, the trophy value of the hide 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 a 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 subsistence registration permit offers them a way to do that without paying the $25 tag fee required under the general hunt regulations.

Hunter Residency and Success. During the 2004–2005 regulatory year, 13 of 39 brown bears harvested under general hunting regulations were taken by nonresidents. During the general hunt in 2005–2006, 12 residents and 12 nonresidents harvested bears.

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 subsistence registration permits (Table 2). In 2004–2005 and 2005-2006 none of the permit hunters 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 that allowed travel by snowmachine, which provided greater access. More recently, the fall harvest has exceeded the spring harvest which is attributed to caribou hunters opportunistically taking bears. Additional harvest chronology data are found in Table 1.

Transport Methods. In 2004–2005, 36 successful hunters used airplanes to access their hunting areas and 3 used a snowmachine. In 2005–2006 all 24 successful hunters used airplanes.

The hunters who use subsistence 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 km^2 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

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 Fish and Game Advisory Committees (AC) and Federal Subsistence Regional Advisory Council (RAC).

CONCLUSIONS AND RECOMMENDATIONS

A density estimate in partnership with the TNWR is 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.

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. We anticipated an increase in harvests with the liberalization of seasons and bag limits during the reporting period. During this reporting period harvests were 39 and 24 bears, the highest ever recorded, but still close to 5% of the population estimate we have inferred from comparing Unit 18 with other adjacent units that have population estimates.

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.

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

PERRY, P. 2007. Unit 18 brown bear management report. Pages 187–194 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 18 general hunting season brown bear harvest

Regulatory year	Total harvest	Southeast of the Kuskokwim								North of the Yukon							
		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							
2004-2005	39	6	11	8	8	1		1			1				3		
2005-2006	24	8	3	5	4	3									1		

TABLE 2 Western Alaska Brown Bear Management Area (WABBMA) brown bear harvest, hunter effort and success, 1996–2006

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
2004-2005	29	27	7	0	0
2005-2006	27	19	11	0[a]	0[a]

[a] In 2005–2006 the administration of the subsistence permits changed from a hunt-area basis to a unit by unit basis

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. Box 115526
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BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNITS: 19, 21A, and 21E (59,756 mi^2)

GEOGRAPHIC DESCRIPTION: 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.

BACKGROUND

Although grizzly bears are distributed throughout Units 19, 21A, and 21E, bear densities and hunter interest vary among units in this area. Most of the harvest pressure is at the higher elevations within the Alaska Range and associated foothills (Units 19B and 19C). Harvest is generally low in other portions of the area.

Estimated population densities are based on extrapolations from research in other areas. 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. Harvest has been fairly constant in all units except Unit 19B, in which harvest increased from the 1990s through spring 2004 to a high of 67 grizzly bears taken in regulatory year (RY) 2003 (RY = 1 July through 30 June, e.g., RY03 = 1 July 2003–30 June 2004).

In 2001 the department established the Experimental Micro Management Area (EMMA) within a 20-mile radius of McGrath (528 mi^2; Fig. 1). The purpose of the EMMA was to focus predator management around McGrath to provide more moose for subsistence needs. This area encompasses the highest density of moose in Unit 19D East (Fig. 1) and was established as a treatment area where predator population manipulations and other management actions could be tested. This includes capture and removal or harvest of grizzly bears.

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

That portion of Units 19D and 19A north of the Kuskokwim River 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 19A and 19B (Aniak River drainage)

- Provide for subsistence uses of grizzly bears.

MANAGEMENT OBJECTIVE

- Manage grizzly bear populations to sustain a mean annual harvest of no more than 100 bears with a minimum of 50% males in the 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. Harvest data were summarized by regulatory year. Population size was estimated using known bear densities in similar habitats and through knowledge gained during bear removal research in the EMMA.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size and Composition

Population surveys or density estimates have not been conducted in these units and are only based on known bear densities in similar habitats (Miller et al. 1997). The habitat in Unit 19A is of moderate quality, which could support a density of 20 bears/1000 mi^2, or 200 bears. Unit 19B contains about 7500 mi^2 of good quality bear habitat, which could support 75 bears/1000 mi^2 or 560 bears. Unit 19C has about 5200 mi^2 of good quality habitat (50 bears/1000 mi^2 = 260 bears) and about 1500 mi^2 of moderate–quality habitat (20 bears/1000 mi^2 = 30 bears). Unit 19D (12,044 mi^2) generally contains poor quality habitat (15 bears/1000 mi^2 = 190 bears) and the population in Unit 19D East (8533 mi^2) is estimated to be 128 grizzly bears. Using these figures, Boudreau (2005) hypothesized there may be 1000–1250 grizzly bears in all of Unit 19. Pegau (1987) estimated a total of 900 bears for the same area.

A similar approach was used for Units 21A and 21E with estimated densities of 25 bears/1000 mi^2 in moderate quality bear habitat and 15 bears/1000 mi^2 in poor habitat. In Unit 21A there are about 4500 mi^2 of moderately good habitat (25 bears/1000 mi^2 = 113 bears) and about 11,500 mi^2 of poor habitat (15 bears/1000 mi^2 = 175 bears). The total population

estimate for Unit 21A therefore, may be 285–335 bears. Unit 21E consists of about 1000 mi^2 of moderately good habitat (25 bears/1000 mi^2 = 25 bears) and about 7000 mi^2 of poor habitat (15 bears/1000 mi^2 = 105 bears). The total population estimate for Unit 21E may be 100–200 bears (Boudreau 2005).

Boudreau's (2005) estimate for the entire 60,352-mi^2 area was 1685–1960 bears, based on extrapolated densities of 15–75 bears/1000 mi^2.

MORTALITY

Harvest

Season and Bag Limit.

Units and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
RY04 and RY05		
Units 19A and 19D. One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun
Units 19B and 19C. One bear every regulatory year.	1 Sep–31 May	1 Sep–31 May
Units 19A and 19B downstream of and including the Aniak River drainage. One bear every regulatory year by registration permit RB600.	10 Aug–30 Jun	No open season
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. In all units the bag limit was liberalized to 1 bear every regulatory year from 1 bear every 4 regulatory years. These regulation changes were presented to the board by ADF&G as part of an effort to simplify and align brown bear hunting regulations throughout the Interior and eastern Arctic. The board also reauthorized the resident tag fee exemption for Unit 19D in RY04 and RY05. Resident tag fee exemptions must be reauthorized each year by the board.

In March 2006, the board increased the bag limit to 2 bears per year in Units 19A and 19D. In May 2006, the board added brown bear to predation control efforts within the EMMA in Unit 19D East, and adopted an updated predator control implementation plan which, for the first time, included grizzly bear control. The plan was approved for 5 years, beginning on 1 July 2004. The department began issuing grizzly bear control permits on 1 September 2006 and will

continue until 30 June of each regulatory year. Requirements and restrictions for the take of grizzly bears included in the Alaska Hunting Regulations apply to the permittees, except as follows: permittees do not have an individual kill limit and they may use bait and take grizzly bears the same-day-airborne at bait stations if the bait stations are registered with the McGrath office. In addition, the board modified hunting regulations to allow permittees and hunters to sell the raw hides and skulls of bears if they obtain a department sale tag and permit.

Hunter Harvest. Grizzly bear harvest has been highly variable among units (Tables 1a–1f). In Unit 19A harvest was low, with 3 to 7 sealed grizzlies per year over a 5-year period (Table 1a). Most of this harvest occurred during the fall season. Unit 19B had by far the highest harvest in the area with 42 to 68 bears reported over the 5 years (Table 1b). Most of this harvest was also during the fall season. Unit 19C had the second highest reported harvest in the McGrath area with 9 to 16 grizzlies taken during the same period (Table 1c). In most years harvest in 19C is highest in the fall, but in RY04 harvest was greatest in the spring. Unit 19D had the lowest reported harvest in all of Unit 19 (Table 1d). Two grizzlies were killed in RY05 in unknown locations within Unit 19. Harvest was low in both Units 21A and 21E with 1–7 bears reported taken (Tables 1e and 1f).

The 5-year mean annual harvest (RY01–RY05) for the entire area was 82 grizzly bears (Table 2) and the proportion of males in reported harvests ranged from 51 to 86% (Table 3). The fall 2003 hunt saw the highest percentage of females taken at 49% (Table 3).

Transport Methods. During RY01–RY05, the vast majority of successful hunters used airplanes as their primary access method (Table 4). The proportion of successful hunters who used aircraft has not changed substantially since sealing began in the 1960s (Boudreau 2005).

Hunter Residency and Success. In RY01–RY05, nonresidents harvested 343 of the 411 bears harvested in this area (Table 5). This indicates a relatively high use of the area by grizzly bear guides and their nonresident clients.

Harvest Chronology. Most harvest occurred during the fall hunting season and specifically in September (Table 2). This is primarily due to guided hunters who opportunistically kill bears while hunting ungulates.

Predator Control Efforts. In 2003, 9 grizzly bears (including 2 cubs-of-the-year) were captured and moved from the EMMA and surrounding area. In 2004, 1 grizzly was removed from the EMMA.

During RY06, 1 grizzly bear control permit was issued, and no grizzly bear control baiting permits. To date no grizzly bears have been reported taken under predator control efforts. No sale tags have been issued for brown bear skulls or hides.

CONCLUSIONS AND RECOMMENDATIONS

Grizzly bear harvest has been stable in all units except Unit 19B, where harvest has increased from 26 bears/year during RY93–RY98 to 55 bears/years during RY01–RY05. During RY03 the reported harvest in Unit 19B was 68 bears, the highest ever recorded. This substantial increase

was during the fall season only. Males still represent the majority of grizzlies harvested in Unit 21B, but the percentage has decreased. The 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 units, including Unit 19B. Harvest reporting by locals still appears to be low in remote areas and anecdotal information indicates that the recent tag fee exemption in Unit 19D had little effect on improving the reporting rate or increasing the harvest in that unit.

Recent work in Unit 13 indicates that sustainable harvest rates are higher than previously reported (Tobey 2005) and current harvest is likely sustainable.

The management objective of 50% males was met. However, this may change with increasing hunting pressure in Unit 19B where bears are often taken by hunters on multiple species hunts who are not specifically targeting large males.

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.

For the next reporting period the additional goals should be established for Unit 19D East and the EMMA

- Maintain grizzly bears as a viable part of natural ecosystem in Unit 19D East.
- Reduce grizzly bear populations as low as possible within the EMMA.

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

PEIRCE, J. M. 2007. Units 19, 21A, and 21E brown bear. Pages 195–211 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

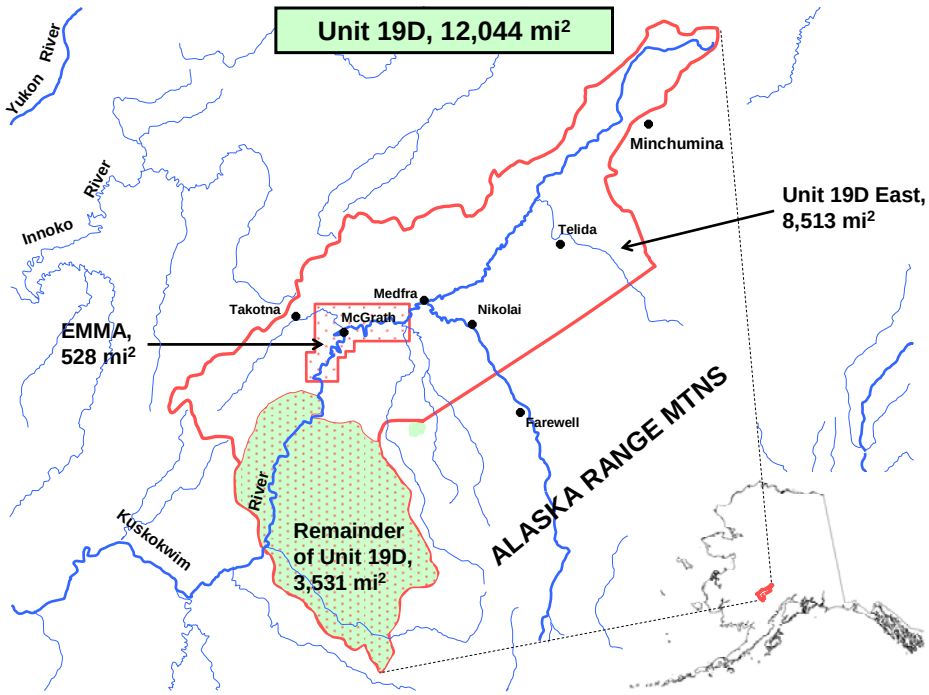

FIGURE 1 Detail area map of Unit 19D

TABLE 1A Unit 19A grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory year	Hunter kill				Nonhunting kill				Total reported kill				
	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	0	1	1	2	2	1	0	3	2	(50)	2	1	5
Spring 2002	1	0	0	1	0	1	0	1	1	(50)	1	0	2
Total	1	1	1	3	2	2	0	4	3	(50)	3	1	7
2002–2003													
Fall 2002	5	1	0	6	0	0	0	0	5	(83)	1	0	6
Spring 2003	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	6	1	0	7	0	0	0	0	6	(86)	1	0	7
2003–2004													
Fall 2003	2	0	0	2	0	0	0	0	2	(100)	0	0	2
Spring 2004	0	0	0	0	1	0	0	1	1	(100)	0	0	1
Total	2	0	0	2	1	0	0	1	3	(100)	0	0	3
2004–2005													
Fall 2004	1	3	0	4	0	0	0	0	1	(25)	3	0	4
Spring 2005	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	2	3	0	5	0	0	0	0	2	(40)	3	0	5
2005–2006													
Fall 2005	2	3	0	5	0	0	0	0	2	(40)	3	0	5
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	2	3	0	5	0	0	0	0	2	(40)	3	0	5

TABLE 1B Unit 19B grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory	Hunter kill				Nonhunting kill				Total reported kill				
year	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	29	18	0	47	0	0	0	0	29	(62)	18	0	47
Spring 2002	3	0	0	3	0	0	0	0	3	(100)	0	0	3
Total	32	18	0	50	0	0	0	0	32	(64)	18	0	50
2002–2003													
Fall 2002	28	20	0	48	1	0	0	1	29	(59)	20	0	49
Spring 2003	5	1	0	6	0	0	1	1	5	(83)	1	1	7
Total	33	21	0	54	1	0	1	2	34	(62)	21	1	56
2003–2004													
Fall 2003	29	27	0	56	0	1	0	1	29	(51)	28	0	57
Spring 2004	10	1	0	11	0	0	0	0	10	(91)	1	0	11
Total	39	28	0	67	0	1	0	1	39	(57)	29	0	68
2004–2005													
Fall 2004	29	21	0	50	0	0	0	0	29	(58)	21	0	50
Spring 2005	4	4	0	8	0	0	0	0	4	(50)	4	0	8
Total	33	25	0	58	0	0	0	0	33	(57)	25	0	58
2005–2006													
Fall 2005	27	15	0	42	0	0	0	0	27	(64)	15	0	42
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	27	15	0	42	0	0	0	0	27	(64)	15	0	42

TABLE 1C Unit 19C grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory	Hunter kill				Nonhunting kill				Total reported kill				
year	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	6	6	0	12	0	0	0	0	6	(50)	6	0	12
Spring 2002	3	1	0	4	0	0	0	0	3	(75)	1	0	4
Total	9	7	0	16	0	0	0	0	9	(56)	7	0	16
2002–2003													
Fall 2002	7	5	0	12	0	0	0	0	7	(58)	5	0	12
Spring 2003	3	0	0	3	0	0	0	0	3	(100)	0	0	3
Total	10	5	0	15	0	0	0	0	10	(67)	5	0	15
2003–2004													
Fall 2003	3	3	0	6	0	0	0	0	3	(50)	3	0	6
Spring 2004	3	1	0	4	0	0	0	0	3	(75)	1	0	4
Total	6	4	0	10	0	0	0	0	6	(60)	4	0	10
2004–2005													
Fall 2004	3	1	0	4	0	0	0	0	3	(75)	1	0	4
Spring 2005	4	4	0	8	0	0	0	0	4	(50)	4	0	8
Total	7	5	0	12	0	0	0	0	7	(58)	5	0	12
2005–2006													
Fall 2005	5	4	0	9	0	0	0	0	5	(56)	4	0	9
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	5	4	0	9	0	0	0	0	5	(56)	4	0	9

TABLE 1D Unit 19D grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory year	Hunter kill				Nonhunting kill				Total reported kill				
	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	2	1	0	3	0	0	0	0	2	(67)	1	0	3
Spring 2002	0	0	0	0	0	0	0	0	0	(n/a)	0	0	0
Total	2	1	0	3	0	0	0	0	2	(67)	1	0	3
2002–2003													
Fall 2002	0	1	0	1	0	0	0	0	0	(0)	1	0	1
Spring 2003	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	1	1	0	2	0	0	0	0	1	(50)	1	0	2
2003–2004													
Fall 2003	1	1	0	2	0	0	0	0	1	(50)	1	0	2
Spring 2004	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	2	1	0	3	0	0	0	0	2	(67)	1	0	3
2004–2005													
Fall 2004	2	2	0	4	1	0	0	1	3	(60)	2	0	5
Spring 2005	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	3	2	0	5	1	0	0	1	4	(67)	2	0	6
2005–2006													
Fall 2005	3	0	0	3	0	0	0	0	3	(100)	0	0	3
Spring 2006	0	0	0	0	0	0	0	0	0	(n/a)	0	0	0
Total	3	0	0	3	0	0	0	0	3	(100)	0	0	3

TABLE 1E Unit 21A grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory	Hunter kill				Nonhunting kill				Total reported kill				
year	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	1	2	0	3	0	0	0	0	1	(33)	2	0	3
Spring 2002	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	1	2	0	3	0	0	0	0	1	(33)	2	0	3
2002–2003													
Fall 2002	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Spring 2003	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	1	0	0	1	0	0	0	0	1	(100)	0	0	1
2003–2004													
Fall 2003	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Spring 2004	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Total	1	0	0	1	0	0	0	0	1	(100)	0	0	1
2004–2005													
Fall 2004	0	2	0	2	0	0	0	0	0	(0)	2	0	2
Spring 2005	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	0	2	0	2	0	0	0	0	0	(0)	2	0	2
2005–2006													
Fall 2005	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	1	0	0	1	0	0	0	0	1	(100)	0	0	1

TABLE 1F Unit 21E grizzly bear harvest by type of kill, regulatory years 2001–2002 through 2005–2006

Regulatory	Hunter kill				Nonhunting kill				Total reported kill				
year	M	F	Unk	Total	M	F	Unk	Total	M	(%)	F	Unk	Total
2001–2002													
Fall 2001	2	0	0	2	0	0	0	0	2	(100)	0	0	2
Spring 2002	2	1	0	3	0	0	0	0	2	(67)	1	0	3
Total	4	1	0	5	0	0	0	0	4	(80)	1	0	5
2002–2003													
Fall 2002	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Spring 2003	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
2003–2004													
Fall 2003	0	2	0	2	0	0	0	0	0	(0)	2	0	2
Spring 2004	3	1	0	4	0	0	0	0	3	(75)	1	0	4
Total	3	3	0	6	0	0	0	0	3	(50)	3	0	6
2004–2005													
Fall 2004	1	0	0	1	0	0	0	0	1	(100)	0	0	1
Spring 2005	5	1	0	6	0	0	0	0	5	(83)	1	0	6
Total	6	1	0	7	0	0	0	0	6	(86)	1	0	7
2005–2006													
Fall 2005	2	1	0	3	0	0	0	0	2	(67)	1	0	3
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	0	0
Total	2	1	0	3	0	0	0	0	2	(67)	1	0	3

TABLE 2 Units 19, 21A, and 21E grizzly bear harvest[a] chronology by month, regulatory years 2001–2002 through 2005–2006

Regulatory year	Harvest chronology by month (%)										
	Sep		Oct		Apr		May		Other[b]		*n*
2001–2002	66	(92)	3	(4)	0	(0)	0	(0)	3	(4)	72
2002–2003	64	(79)	4	(5)	5	(6)	6	(7)	2	(3)	81
2003–2004	68	(84)	1	(1)	7	(9)	5	(6)	0	(0)	81
2004–2005	59	(67)	3	(3)	14	(16)	6	(7)	6	(7)	88
2005–2006	62	(70)	2	(2)	17	(19)	7	(8)	1	(1)	89
Totals	319	(78)	13	(3)	43	(10)	24	(6)	12	(3)	411
Average/Year	64		3		9		5		2		82

[a] Includes defense of life or property kills.
[b] Other = Jan, Mar, Jul, Aug, Nov, and Dec.

TABLE 3 Units 19, 21A, and 21E grizzly bear harvest[a] by sex, regulatory years 2001–2002 through 2005–2006

Regulatory year	Total reported kill				
	M	(%)	F	Unk	Total
2001–2002					
Fall 2001	42	(59)	29	1	72
Spring 2002	9	(75)	3	0	12
Total	51	(61)	32	1	84
2002–2003					
Fall 2002	42	(61)	27	0	69
Spring 2003	10	(91)	1	1	12
Total	52	(65)	28	1	81
2003–2004					
Fall 2003	35	(51)	34	0	69
Spring 2004	19	(86)	3	0	22
Total	54	(59)	37	0	91
2004–2005					
Fall 2004	37	(56)	29	0	66
Spring 2005	15	(63)	9	0	24
Total	52	(58)	38	0	90
2005–2006					
Fall 2005	40	(62)	25	0	65
Spring 2006	0	(0)	0	0	0
Total	40	(62)	25	0	65

[a] Includes defense of life or property kills.

TABLE 4 Units 19, 21A, and 21E grizzly bear harvest[a] by transport method, regulatory years 2001–2002 through 2005–2006

Regulatory year	Harvest by transport method									
	Airplane	Dog Team/ Horse	Boat	3- or 4 wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk	*n*
2001–2002	58	1	4	3	0	0	0	3	3	72
2002–2003	74	0	2	3	0	0	0	2	0	81
2003–2004	68	0	3	4	3	0	0	1	2	81
2004–2005	77	0	4	0	5	0	1	1	0	88
2005–2006	77	1	4	1	3	0	0	3	0	89
Totals	354	2	17	11	11	0	1	10	5	411
Average/Year	71	0	3	2	2	0	0	2	1	82

[a] Includes defense of life or property kills.

TABLE 5 Units 19, 21A, and 21E grizzly bear successful hunter residency[a], regulatory years 2001–2002 through 2005–2006

Regulatory year	Local resident[b]	Nonlocal resident	Nonresident	Total successful
2001–2002	3	14	55	72
2002–2003	2	7	72	81
2003–2004	3	8	70	81
2004–2005	8	10	70	88
2005–2006	3	10	76	89
Totals	19	49	343	411
Average/Year	4	10	69	82

[a] Includes defense of life or property kills.
[b] Local resident defined as any hunter from Units 19, 21A, and 21E.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNITS: 20A, 20B, 20C, 20F, and 25C (39,228 mi^2)

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

BACKGROUND

Grizzly bears occur throughout this area, with higher densities in the mountainous portions of Units 20A and 20C. Harvests tend to be highest in Unit 20A, particularly in the mountains. 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 Units 20F and 25C at moderate to low densities, which coupled with poor access, results in low harvests.

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). Also, the department 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 (≥11% of the population versus ≤6% before 1981). As a result, Reynolds (1999) documented a 36% decline in the bears (≥2-years old) in this area 1981 to 1992. However, based on current findings in Unit 13, where harvest rates are most studied (Miller 1990; Testa 2004; Tobey 2005), it is apparent that actual sustainable harvest rates of grizzly bears are still not well understood.

In the early 1990s, Eagan (1995) estimated grizzly bear numbers in the management area at unit (e.g., Unit 20), subunit (e.g., Unit 20A), and subarea (e.g., Unit 20A mountains, Unit 20A Tanana Flats) scales using a stratified approach based on topography, habitat, and accessibility to

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

humans. These estimates provided more precise measures of harvest rates across the management area, and subsequently, improved evaluation of harvest-based management objectives.

Ballard et al. (1981) and Gasaway et al. (1992) identified grizzly bears as significant predators of moose in Units 13 and 20E, respectively. In the Unit 20A foothills, Valkenburg (1997) identified grizzly bears as important predators of Delta caribou herd neonates. Also, Boertje et al. (2000) estimated that grizzlies killed about 730 of the 4450 moose that died annually in Unit 20A in the late 1990s. Grizzly bear predation is generally considered additive to other sources of mortality based on experiments that reduced grizzly predation with responses in ungulate survival (Ballard and Miller 1990; Gasaway et al. 1992; Boertje et al. 1995; Testa 2004:1448–1449; Keech 2005). 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, consistent with that assertion, Keech (1999) reported low mortality rates of moose calves as a result of grizzly bear predation.

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 ≤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—harvest by hunters, 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. Alaska Department of Fish and Game (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., RY04 = 1 July 2004 through 30 June 2005), 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 Eagan (Eagan 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 mi^2 (1300 km^2) were excluded from the high-density stratum, and 386 mi^2 (1000 km^2) were excluded from the super-density stratum. Population size was estimated using extrapolations from strata densities of low, 3–8 bears/1000 mi^2 (1–3 bears/1000 km^2); medium, 13–26 bears/1000 mi^2 (5–10 bears/1000 km^2); high, 36–44 bears/1000 mi^2 (14–17 bears/1000 km^2); and super, 52–78 bears/1000 mi^2 (20–30 bears/1000 km^2).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Unit 20A. Eagan (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 mi^2 (2.5 bears/1000 km^2).

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 mi^2 [20–30 grizzly bears/1000 km^2]). Although Dean (1987) estimated 88 bears/1000 mi^2 (34 bears/1000 km^2) 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 the medium-density classification it received. 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 Units. 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 mi^2 (6.2 grizzly bears/1000 km^2). However, this estimate is likely conservative based on recent work in Unit 20E in what Eagan considered to be fairly poor (medium-density) habitat.

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 units. These seasons and bag limits applied to both resident and nonresident hunters.

Harvest by Hunters. The combined harvests in Units 20A, 20B, 20C, 20F, and 25C were higher in RY04–RY05 ($\bar{x}$ = 34.5) than during the previous 3-year period ($\bar{x}$ = 26.6; Tables 1a–e). This resulted from a high take (44 bears) in RY04, which may have been due to hunters taking advantage of the bag limit being liberalized from 1 bear/4 years to 1 bear/year in 2004. Other human-caused mortality (DLP kills, illegal kills, etc.) resulted in 5 bear deaths in RY04–RY05, which was higher than the 3 nonhunting-related bear deaths in RY02–RY03, but lower than the 8 reported in RY00–RY01.

Harvest Zones.

Unit 20A Mountains — We estimate the 3-year (2001–2003) mean annual human-caused mortality (8.3 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 ≤8% of the bears ≥2 years old.

Eastern half of Unit 20B — The 3-year (2003–2005) mean annual human–caused mortality of 6.3 bears ≥2 years of age slightly exceeded 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 (2003–2005) mean annual human–caused mortality of 15.7 bears ≥2 years of age was well below our objective of 26 bears ≥2 years of age for this management area (Table 2). However, at the subarea scale, we met our objectives of a 3-year (2003–2005) mean annual human–caused mortality of bears ≥2 years of age for Unit 20C with 3 bears, Unit 20F with 2 bears, and Unit 25C with 3.7 bears, but exceeded the objective for Unit 20A Tanana Flats with a harvest of 3.7 bears and for western Unit 20B with 3.3 bears.

Percent Males in Harvest by Unit. The objective for a 3-year (RY03–RY05) mean proportion of ≥55% males in the harvest was met in Units 20B (59%), 20C (82%), 20F (80%) and 25C (82%); Unit 20A was slightly below the objective at 49% males in the harvest (Tables 1a–e).

Hunter Residency and Success. As in previous years, Alaska residents harvested the majority (76%) of the grizzly bears during RY04–RY05 (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 ≤8% of the bears ≥2 years old in all management areas except for the eastern portion of Unit 20B. We also exceeded harvest objectives in subareas Unit 20A Tanana Flats and western Unit 20B. In those cases, because the 3-year mean, annual, human-caused mortality was exceeded by <1 bear, I am not recommending immediate regulatory action, since sustainable harvest rates may be higher than previously estimated (Tobey 2005). In general, we need to monitor areas with high harvest densities, as those areas may be subject to localized overharvest, especially since seasons and bag limits were liberalized in 2004. We met our objective to manage for a 3-year mean, annual, human-caused mortality of at least 55% males in all units except Unit 20A. This was an improvement over the previous 3 year period where we met the objective in only 2 of the 5 units.

We will continue to 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., ADF&G's information and education program and bear hunting seminars). We recommend educating hunters about how harvest of females may affect the population.

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

YOUNG, D. D., JR. 2007. Units 20A, 20B, 20C, 20F, and 25C brown bear. Pages 212–228 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

TABLE 1A Unit 20A grizzly bear harvest, regulatory years 2001–2002 through 2005–2006

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
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
2004–2005												
Fall 2004	5	8	0	13	0	0	0	5	8	0	13	
Spring 2005	0	1	0	1	0	0	0	0	1	0	1	
Total	5	9	0	14	0	0	0	5	9	0	14	36
2005–2006												
Fall 2005	7	2	0	9	0	1	0	7	3	0	10	
Spring 2006	0	0	0	0	0	0	0	0	0	0	0	
Total	7	2	0	9	0	1	0	7	3	0	10	70

[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 2001–2002 through 2005–2006

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
2001–2002												
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
2002–2003												
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
2003–2004												
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
2004–2005												
Fall 2004	12	4	0	16	0	0	0	12	4	0	16	
Spring 2005	0	0	0	0	1	0	0	1	0	0	1	
Total	12	4	0	16	1	0	0	13	4	0	17	76
2005–2006												
Fall 2005	5	3	0	8	1	1	0	6	4	0	10	
Spring 2006	0	0	0	0	0	0	0	0	0	0	0	
Total	5	3	0	8	1	1	0	6	4	0	10	60

[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 2001–2002 through 2005–2006

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
2001–2002												
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
2002–2003												
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
2003–2004												
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
2004–2005												
Fall 2004	5	1	0	6	0	0	0	5	1	0	6	
Spring 2005	1	1	0	2	0	0	0	1	1	0	2	
Total	6	2	0	8	0	0	0	6	2	0	8	75
2005–2006												
Fall 2005	1	0	0	1	0	0	0	1	0	0	1	
Spring 2006	0	0	0	0	0	0	0	0	0	0	0	
Total	1	0	0	1	0	0	0	1	0	0	1	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 2001–2002 through 2005–2006

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
2001–2002												
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
2002–2003												
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
2003–2004												
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
2004–2005												
Fall 2004	1	0	0	1	0	0	0	1	0	0	1	
Spring 2005	0	0	0	0	1	0	0	1	0	0	1	
Total	1	0	0	1	1	0	0	2	0	0	2	100
2005–2006												
Fall 2005	1	0	0	1	0	0	0	1	0	0	1	
Spring 2006	0	0	0	0	0	0	0	0	0	0	0	
Total	1	0	0	1	0	0	0	1	0	0	1	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 1E Unit 25C grizzly bear harvest, regulatory years 2001–2002 through 2005–2006

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
2001–2002												
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
2002–2003												
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
2003–2004												
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
2004–2005												
Fall 2004	4	0	0	4	0	0	0	4	0	0	4	
Spring 2005	1	0	0	1	0	0	0	1	0	0	1	
Total	5	0	0	5	0	0	0	5	0	0	5	100
2005–2006												
Fall 2005	4	1	1	6	0	0	0	4	1	1	6	
Spring 2006	0	0	0	0	0	0	0	0	0	0	0	
Total	4	1	1	6	0	0	0	4	1	1	6	80

[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 2001 through 2005

Harvest zone	Area (mi^2)	Calendar year	Bears killed			3-yr Mean harvest		Harvest density[c]
			All ages[a]		≥2 yr[b]	All ages	≥2 yr[b]	
Unit 20A mountains	3081[d]	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
		2004	10	(0)	10	9.7	9.0	3.2
		2005	7	(0)	7	8.7	8.3	2.3
Eastern half of Unit 20B	4929	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
		2004	12	(1)	10	7.3	6.7	2.0
		2005	7	(3)	7	7.0	6.3	1.4
Unit 20A Flats, western half of Unit 20B, Unit 20C outside Denali National Park, Units 20F and 25C	26,278[e]	2001	14	(1)	14	16.3	14.6	0.5
		2002	21	(2)	20	19.0	17.3	0.8
		2003	8	(3)	8	14.0	13.3	1.6
		2004	24	(2)	23	17.3	16.3	4.7
		2005	16	(0)	16	16.3	15.7	3.2

[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 m^2.
[d] Excludes about 500 m^2 (1300 km^2) of nonbear habitat in glaciers and above 6000 ft (1850 m).
[e] Excludes 4450 m^2 (11,500 km^2) that is closed to hunting in Denali National Park.

TABLE 3 Units 20A, 20B, 20C, 20F, and 25C grizzly bear successful hunter residency[a], regulatory years 2001–2002 through 2005–2006

Regulatory year	Resident (%)	Nonresident (%)	Unknown (%)	*n*
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
2004–2005	32 (73)	12 (27)	0 (0)	44
2005–2006	20 (80)	5 (20)	0 (0)	25

[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 2001–2002 through 2005–2006

Regulatory	Harvest chronology percent by month/day[a]								
	Sep					May			
year	1–15	16–30	Oct–Nov	Total	Apr	1–15	16–31	Total	*n*
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
2004–2005	50	27	14	91	2	2	5	9	44
2005–2006	80	16	4	100	0	0	0	0	25

[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 2001–2002 through 2005–2006

Regulatory year	Harvest percent by transport method[a]								
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	Other ORV	Highway vehicle	Other/Unk	*n*
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
2004–2005	20	9	11	36	0	0	9	14	44
2005–2006	28	4	12	48	0	0	0	8	25

[a] Does not include DLP, research mortality, or other human-caused accidental or illegal mortality.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
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BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNIT: 20D (5637 mi^2)

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 July and ends 30 June; e.g., RY91 = 1 July 1991 through 30 June 1992), 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 a Unit 20D harvest objective of 5–15 bears per year was established. 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.

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

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 Alaska Department of Fish and Game (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 185–220 total bears, with 140–167 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 used these estimates during RY04–RY05 based on similar habitat elsewhere, even though harvest rates have increased since 1993 and evidence suggests that brown bears largely vacated recent large burns.

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 mi^2, 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 109–134 total bears. This estimate was based on Boertje et al.'s (1987) radiotelemetry study of brown bear predation. Boertje subtracted fractions of home ranges outside a 4000-km^2 study area to calculate minimum and probable maximum brown bear density estimates for Unit 20E in early May. Densities varied from 26 to 32 bears ≥2 years old/1000 mi^2 in unburned habitat in May, plus 23% for cubs and yearlings. C. Gardner (ADF&G, unpublished data) recently used a contemporary DNA-based hair mark–recapture design to confirm a similar density in unburned areas of Unit 20E, but strikingly lower densities in burned habitat.

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 RY04–RY05 the Unit 20D brown bear bag limit was 1 bear/year, with no resident tag fee required, and the hunting season was 10 August–30 June.

Alaska Board of Game Actions and Emergency Orders.

RY04 — The Alaska Board of Game considered and approved proposal 147 to reauthorize the brown bear tag fee exemption for all of Unit 20D. The board also considered and approved proposal 254 to make the bag limit in all of Unit 20D 1 bear every regulatory year.

RY05 — The Alaska Board of Game considered and approved an annual reauthorization of the brown bear tag fee exemption for Unit 20D.

Hunter Harvest and Other Mortality.

RY04 — Hunters killed 15 bears (Table 1) and met the harvest objective. One of these bears was killed as a DLP bear. Hunter take consisted of 47% males which did not meet the management objective. Hunters killed 11 bears in Unit 20D south of the Tanana River and 4 north of the Tanana River. Twelve bears were killed during fall, and 3 were killed during spring (Table 2).

The total reported mortality of 15 bears was an estimated 7–8% of the unitwide brown bear population and 9–11% of bears ≥2 years old.

I estimated that 1 bear was killed each year and not reported. Adding this estimated mortality to reported mortality results in estimated total mortality of 16 bears (Table 2).

RY05 — Hunters killed 14 bears (Table 1) and met the harvest objective. The harvest comprised 43% male bears, which was below the management objective. Hunters killed 12 bears in southern Unit 20D and 2 north of the Tanana River. Two of the bears were killed illegally.

The total reported mortality of 14 bears was an estimated 6–8% of the unitwide brown bear population and 8–10% of the estimated bears ≥2 years old.

I estimated that 1 bear was killed each year and not reported. Adding this estimated mortality to reported mortality results in estimated total mortality of 15 bears (Table 2).

During RY03–RY05, 34 brown bears were known to have been killed in Unit 20D, including 17 (50%) males. This is slightly below the management objective to have a 3-year average of at least 55% males in the harvest.

Hunter Residency and Success. Most brown bears continued to be killed in Unit 20D by Alaska residents. During RY04–RY05, local residents killed 41% of bears, nonlocal residents killed 45%, and nonresidents killed 10% (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 August–September (Table 4).

Transport Methods. During RY04–RY05 the most commonly used transportation types for hunting brown bears in Unit 20D were foot, 3- or 4-wheelers, and highway vehicles (Table 5).

CONCLUSIONS AND RECOMMENDATIONS

The harvest objective of 5–15 bears per year was met in RY04–RY05, although the objective to harvest predominantly male bears was not met. The Board of Game reauthorized brown bear tag fee exemptions in Unit 20D as part of an intensive management program to increase numbers of moose and caribou, and liberalized the season and bag limit in Unit 20D so that regulations were uniform throughout the unit.

Annual mortality increased in Unit 20D since the $25 resident tag fee was eliminated in portions of Unit 20D beginning in 1992. However, nuisance bears killed in defense of life or property and other nonhunting mortality continued 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 was 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 board's 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 include increasing the size of these ungulate populations. While there is no evidence that increasing bear harvest is sufficient to increase ungulate numbers outside urban areas of Alaska, 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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Please cite any information taken from this section, and reference as:

DUBOIS, S. D. 2007. Unit 20D brown bear. Pages 229–239 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

TABLE 1 Unit 20D brown bear mortality[a] with differing hunting regulations, regulatory years 1987–1988 through 2005–2006

Regulatory year	Southern Unit 20D: West of Gerstle River M	West of Gerstle River F	East of Gerstle River M	East of Gerstle River F	Unk location M	Unk location F	Total M	Total F	Northern Unit 20D M	Northern Unit 20D F	Total Unit 20D M	Total Unit 20D F	Total bears 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	2	3	0	1	0	0	2	4	0	0	2	4	6
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	3	2	1	1	0	0	4	3	0	0	4	3	7
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	5	3	2	2	0	0	7	5	0	1	7	6	13
Total kill	36	20	16	11	0	0	52	31	17	8	69	39	108
Kill/Year	Avg 7		Avg 3		Avg 0		Avg 10		Avg 3		Avg 14		
% Male	64		59		0		63		68		64		
	1 bear/yr, 10 Aug–30 Jun, no tag fee[b]												

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
2003–2004	1	1	2	0	0	0	3	1	1	0	4	1	5
2004–2005	5	5	1	0	0	0	6	5	1	3	7	8	15
2005–2006	3	6	2	1	0	0	5	7	1	1	6	8	14
Total kill	9	12	5	1	0	0	14	13	3	4	17	17	34
Kill/Year	Avg 7		Avg 2		Avg 0		Avg 9		Avg 2		Avg 11		
% Male	43		83		0		52		43		50		

[a] Includes nonhunting mortality.
[b] Hunting regulation.

TABLE 2 Unit 20D brown bear mortality[a], regulatory years 2000–2001 through 2005–2006

Regulatory year	Reported							Estimated kill		Total reported and estimated kill			
	Hunter kill				Nonhunting kill[a]								
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M	F	Unk	Total
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
2004–2005													
Fall 2004	5	7	0	12	0	0	0	1	0	5	7	1	13
Spring 2005	2	1	0	3	0	0	0	0	0	2	1	0	3
Total	7	8	0	15	0	0	0	1	0	7	8	1	16
2005–2006													
Fall 2005	5	4	0	9	0	0	0	1	0	5	4	1	10
Spring 2006	1	4	0	5	0	0	0	0	0	1	4	0	5
Total	6	8	0	14	0	0	0	1	0	6	8	1	15

[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 2005–2006

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
2004–2005	7	7	1	0	15
2005–2006	5	6	2	1	14

[a] Residents of Unit 20D.

TABLE 4 Chronology of Unit 20D brown bear harvest and nonhunting mortality by month, regulatory years 1989–1990 through 2005–2006

Regulatory year	Chronology of harvest by month								
	Aug	Sep	Oct	Nov	Apr	May	Jun	Other	*n*
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
2004–2005	6	5	1	0	0	2	1	0	15
2005–2006	5	4	0	0	0	4	1	0	14

TABLE 5 Unit 20D percent of brown bear harvest (includes legal and illegal harvest; excludes DLP) by transport method, regulatory years 1989–1990 through 2005–2006

Regulatory year	Percent harvest by transport method										
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Foot	Other	Unk	*n*
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
2004–2005	13	0	7	27	0	0	20	33	0	0	15
2005–2006	14	7	7	21	0	0	14	29	0	7	14

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 PO Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNIT: 20E (10,680 mi^2)

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 brown 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 brown bears was identified as a major factor in maintaining the moose population in Unit 20E at low densities (0.2 moose/mi^2, 0.5 moose/km^2; Gasaway et al. 1992). Hunting regulations were liberalized in an attempt to reduce the brown bear population to a level that would result in a decline in predation on moose calves. Regulation changes included lengthening the brown bear season; increasing the bag limit from 1 bear/4 years to 1 bear/year; and waiving the $25 resident brown bear tag fee during regulatory year (RY) 1984 through RY89 and RY02–RY06 (RY begins 1 July and ends 30 June; e.g., RY05 = 1 July 2005 through 30 June 2006). Annual brown bear harvest increased from a mean of 3 during RY66–RY81 to a mean of 19 during RY82–RY88 and declined slightly during RY89–RY05 to a mean of 14.

During the mid 1980s, Boertje et al. (1987) estimated the brown bear population in a 4000-mi^2 portion of Unit 20E at 41 bears of all ages/1000 mi^2 (16/1000 km^2) as of 1 May annually and 31 bears of all ages/1000 mi^2 (12/1000 km^2) by 1 November annually. Even with liberal regulations beginning in the early 1980s, brown 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 that time and variable harvest distribution, a

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

population decline was not clearly documented. Though the moose population increased temporarily, multiple causative factors were described unrelated to a possible decline in grizzly numbers (Gasaway et al. 1992).

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Provide maximum opportunity to hunt brown bears in Unit 20E.

MANAGEMENT OBJECTIVES

- Manage for temporary reductions in the brown 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 brown 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 an ungulate population is depleted or has reduced productivity, and regulatory action to significantly reduce harvest becomes necessary. Brown bears are the primary predator on newborn moose calves in Unit 20E, and the moose population has been kept at low densities by predation (Gasaway et al. 1992). Brown bears are also an important predator on newborn caribou calves (Boertje and Gardner 1999).

METHODS

Brown bears harvested in Unit 20E must be sealed within the unit or at the Tok Alaska Department of Fish and Game (ADF&G) office 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.

Population estimates within Unit 20E were based on extrapolations of density estimates obtained during studies in central Unit 20E during 1985–1986 (Boertje et al. 1987) and in Unit 20A, 100 miles to the west of Unit 20E, during 1981–1998 (Reynolds and Boudreau 1992), and a recent brown bear population survey conducted by ADF&G within a 2002-mi^2 portion of southern Unit 20E using a DNA-based mark–recapture estimate technique (C. Gardner, ADF&G, unpublished data, Fairbanks, 2007).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Gardner (2001) estimated that the Unit 20E brown bear population was stable at 475–550 bears (44.3–51.3 bears of all ages/1000 mi^2, 17.1–19.8/1000 km^2) in autumn 2000. This estimate is based on Unit 20E harvest statistics collected since 1977. This estimate is higher than the estimate of 31–41 bears of all ages/1000 mi^2 (16/1000 km^2; Boertje et al. 1987), which was based on telemetry data in a 1540-mi^2 low elevation portion of Unit 20E.

In summer 2006 (May–July) a brown bear population survey was conducted by ADF&G within a 2002-mi^2 portion of southern Unit 20E using a DNA-based mark–recapture estimate technique (C. Gardner, unpublished data, Fairbanks, 2007). A density estimate was developed for a 686.5 mi^2 portion (core area) of the larger (2002 mi^2) survey area, which was entirely within the west-central portion of the bear control area. The survey results indicated the brown bear density was 28–35 bears/1000 mi^2 (10.7–13.4 bears/1000 km^2) within the core area. This was close to the 31–41 bears/1000 mi^2 estimated from spring to fall in 1985–1986 by Boertje et al. (1987). Based on the conclusions of Boertje et al. (1987) and the results of the 2006 population survey, Gardner's 2001 Unit 20E brown bear population estimate may have been liberal (C. Gardner, personal communication). Gardner's recent study showed that brown bears avoided the large recent burns in Unit 20E, but bears probably redistributed themselves rather than died in the burns.

By extrapolating the density estimate developed from the 2006 brown bear population estimate in southern Unit 20E, I estimated the 2006 brown bear population within the 4074-mi^2 bear control area to be 114–141 bears of all ages during midsummer (C. Gardner, unpublished data). This is less than the 2005 estimate of 170 brown bears within the bear control area, which was based on extrapolation of a density estimate obtained in central Unit 20E during 1985–1986 and on intensive research studies in Unit 20A, 100 miles to the west, during 1981–1998 by ADF&G (Boertje et al. 1987; Reynolds and Boudreau 1992).

The habitat within the 4074-mi^2 bear control area is representative of the majority (7310 mi^2) of southern and eastern Unit 20E, where similar harvest and fire patterns and habitat quality exist. Within this portion of Unit 20E, the bear density was likely 28–35 brown bears/1000 mi^2 following the fires of 2004–2005, similar to the control area. The 3370-mi^2 northwestern portion of Unit 20E did not experience extensive fires during 2004–2005 and the population likely remained relatively stable at 34–41 brown bears/1000 mi^2 (C. Gardner, personal communication). By extrapolating these density estimates, I estimated the Unit 20E bear population, during midsummer 2006, to be 320–394 bears of all ages.

Brown bear hunting regulations in Unit 20E were liberalized in 1982 in an effort to reduce bear numbers and predation on moose calves. Gardner (2003) estimated a 2% annual decline in the brown bear population in portions of Unit 20E, during 1982–1988 and 1992–1996, because localized harvest levels exceeded possible sustainable levels. However, Gardner (2003) reported that harvest was within sustainable levels in Unit 20E as a whole. For example, during RY82–RY05, brown bear harvest was less than the level that resulted in an unsustainable 32% decline in the Unit 20A brown bear population (Reynolds and Boudreau 1992).

Research in Unit 13 indicated that sustainable levels of brown bear harvest may be considerably higher than the approximately 6% sustainable harvest that researchers had predicted in the past (Tobey 2005), suggesting that harvest levels of 10% or more of the population may be sustainable in Unit 20E. During RY04–RY05, harvest of brown bears in Unit 20E likely had no effect on population trend because harvest was <4% of the total estimated population during both years and 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
RY04		
Unit 20E.		
1 bear every regulatory year.	10 Aug–30 Jun (General hunt only)	10 Aug–30 Jun
RY05		
Unit 20E.		
2 bears every regulatory year.	10 Aug–30 Jun (General hunt only)	10 Aug–30 Jun

During RY04–RY05, 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, except in Unit 20E where the annual bag limit was 2 bears. During RY04–RY05 the $25 resident tag fee was waived for hunting brown 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 brown bear tag fee in Unit 20E outside of Yukon–Charley Rivers National Preserve during RY04–RY05. During their March 2004 meeting, the board increased the bag limit to 2 bears annually, allowed the sale of handicrafts made of the skin of brown bears, and approved the Upper Yukon Tanana Predation Control Program (control program), which allowed baiting of brown bears. The goal of the control program was a 60% reduction in the brown bear population in a 2700-mi^2 area in southern Unit 20E, to reduce brown bear predation on moose calves to initiate an increase in the moose population toward intensive management objectives. Alaska residents permitted under the control program were allowed to take an unlimited number of brown bears, but no more than 60% of the estimated population. During their May 2006 meeting, the board increased the brown bear control area to 4074 mi^2 and modified the control program to allow predator control permittees to take a bear at a bait station the same day they were airborne, provided the permittee was at least 300 feet from the airplane at the time of taking.

Hunter Harvest. Hunters reported killing 16 bears in RY04 and 12 in RY05 (Table 1). The 5-year (RY01–RY05) average harvest was 15 bears. The mean percentage of males harvested during RY01–RY05 was 60%. During RY04 and RY05, males represented 69% and 67% of the harvest, respectively.

Hunter Residency and Success. Resident hunters took 88% and 92% of the brown bear harvest in RY04 and RY05 (a total of 14 and 11 bears taken by residents and 2 and 1 taken by nonresidents, in RY04 and RY05 respectively; Table 2). Historically, little guided hunting for brown bears occurred in Unit 20E. Nonresidents accompanied by second-degree of kindred residents occasionally take a bear while hunting moose or caribou. Since 1995, guided nonresident brown bear hunters in remote portions of the unit harvested 1–3 bears/year.

Harvest Chronology. During RY04–RY05, 50–81% of brown bears harvested in Unit 20E were taken during August and September, when moose and caribou hunters were afield (Table 3). Fewer bears (19–33% of the total annual harvest) were taken in the spring during RY04 and RY05.

Transport Methods. During RY04, airplanes (44%) and 4-wheelers (31%) were the modes of transportation used by most successful bear hunters (Table 4). During RY05, highway vehicles/walking (50%) and airplanes (42%) were the modes of transportation used by most successful bear hunters. Use of airplanes by successful brown bear hunters in Unit 20E increased as more big game hunters accessed the more remote areas.

Other Mortality

During RY04–RY05, there were no brown bears reported killed in defense of life or property in Unit 20E. Most nonhunting-caused brown bear mortality was undoubtedly the result of intraspecific strife and cannibalism (Boertje et al. 1987).

During RY04–RY06, a total of 2, 3 and 1 bears were killed by brown bear control permittees respectively, with only 1 of these bears killed over bait in spring RY04 (Table 1). Further details can be found in the 2005, 2006, and 2007 *Upper Yukon–Tanana Predation Control Implementation Plan* in Alaska Administrative Code 5 AAC 92.125 and activity reports to the Alaska Board of Game (ADF&G Boards Support files, Juneau).

HABITAT

Assessment

All of Unit 20E is suitable brown 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 brown bears. However, there are no arctic ground squirrels and salmon are virtually absent. Both are food sources elsewhere. Habitat diversity is improving because implementation of the *Alaska Interagency Wildland Fire Management Plan* (Alaska Wildland Fire Coordinating Group 1998) during the early 1980s allowed wildfires and prescribed burns to occur on hundreds of thousands of acres.

Enhancement

The implementation of the *Alaska Interagency Fire Management Plan* allowed wildfires to burn in more areas than before 1984. In 2004 and 2005, approximately 1875 mi^2 of habitat burned within, or adjacent to, Unit 20E. Revegetation of preferred plant species in burned-over areas is expected to eventually provide better forage for brown bears than is available in mature forests of black or white spruce.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Research in Unit 20E and other parts of Alaska demonstrated that brown bear and wolf predation can be the primary factor limiting 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. Brown 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 brown bear harvest and an estimated 2% annual decline in the bear population, but several other factors could also have contributed to the temporary increase in neonatal survival (Gasaway et al. 1992). Gardner (2001) concluded that the Unit 20E moose population continued to be limited primarily by brown bear predation on calves and that moose numbers would increase if brown bear numbers or their predation efficiency on moose calves were reduced.

Liberal brown bear hunting regulations during the past 23 years, and the implementation of the bear control program in RY04–RY06, have proven ineffective at reducing brown bear numbers to a low enough level to reduce predation on moose calves. However, the brown bear population redistributed out of recently burned areas of the bear control area, which likely resulted in reduced local predation on moose calves. Additional research will evaluate moose calf survival within the bear control area.

Additional methods for reducing brown bear numbers continue to be explored by the Board of Game. Additional methods of brown bear predation control appear to be necessary to increase moose numbers.

CONCLUSIONS AND RECOMMENDATIONS

In midsummer 2006, an estimated 320–394 bears of all ages resided in Unit 20E. Harvest data indicated the population had fluctuated little since 1981, despite the most liberal hunting regulations in Alaska. Low harvest rates were 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 brown bears, and 2) an 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 localized impacts to brown bear numbers are unlikely.

Brown bear management in Unit 20E provides maximum bear hunting opportunity, which meets our management goal to provide maximum opportunity to hunt brown bears. Incidental bear harvest by high numbers of moose and caribou hunters, liberal seasons and bag limits, and an active brown bear control program were unsuccessful at reducing the bear population. During

RY04–RY05, total hunter harvest and bear control kills likely had no effect on the Unit 20E population trend, because kills represented <6% of the total estimated population during both years. We did not meet our management objective to temporarily reduce the brown bear population or to reduce brown bear predation where it may be limiting moose population growth. Therefore, the management objective to reduce bear harvests to allow for bear population stabilization or recovery after the moose populations increased to desired levels was also not met.

Additional incentives, or methods and means other than those allowed under current hunting regulations or the current brown bear control program, are necessary if the brown bear population is to be adequately reduced. Several ideas to increase the number of brown bears killed include allowing nonresidents to hunt brown bears in Unit 20E without a guide under general hunting regulations, allowing sale of tanned hides, snaring as a means of take, and a bag limit of any bear under the bear control program.

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

GROSS, J. A. 2007. Unit 20E brown bear. Pages 240–252 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

TABLE 1 Unit 20E brown bear mortality, regulatory years 1992–1993 through autumn 2006

Regulatory year	Reported							Estimated kill		Total estimated kill			
	Hunter kill				Nonhunting kill[a]								
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M (%)	F	Unk	Total
1992–1993													
Autumn 1992	7	3	1	11	0	0	0	0	0	7	3	1	11
Spring 1993	2	1	0	3	0	0	0	0	0	2	1	0	3
Total	9	4	1	14	0	0	0	0	0	9 (69)	4	1	14
1993–1994													
Autumn 1993	9	10	0	19	0	0	0	0	0	9	10	0	19
Spring 1994	0	2	0	2	0	0	0	0	0	0	2	0	2
Total	9	12	0	21	0	0	0	0	0	9 (43)	12	0	21
1994–1995													
Autumn 1994	6	4	0	10	0	0	0	0	2	7	5	0	12
Spring 1995	1	0	0	1	0	0	0	0	0	1	0	0	1
Total	7	4	0	11	0	0	0	0	2	8 (62)	5	0	13
1995–1996													
Autumn 1995	5	8	0	13	0	0	0	0	0	5	8	0	13
Spring 1996	5	3	0	8	0	0	0	0	0	5	3	0	8
Total	10	11	0	21	0	0	0	0	0	10 (48)	11	0	21
1996–1997													
Autumn 1996	10	10	0	20	0	0	0	0	1	11	10	0	21
Spring 1997	2	2	0	4	0	0	0	0	0	2	2	0	4
Total	12	12	0	24	0	0	0	0	1	13 (52)	12	0	25
1997–1998													
Autumn 1997	7	4	0	11	0	0	0	0	1	7	4	1	12
Spring 1998	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	7	4	0	11	0	0	0	0	1	7 (64)	4	1	12
1998–1999													
Autumn 1998	6	5	0	11	1	0	0	0	0	7	5	0	12
Spring 1999	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	5	0	11	1	0	0	0	0	7 (58)	5	0	12
1999–2000													
Autumn 1999	0	2	0	2	0	0	0	0	0	0	2	0	2
Spring 2000	2	1	0	3	0	0	0	0	0	2	1	0	3
Total	2	3	0	5	0	0	0	0	0	2 (40)	3	0	5

Regulatory year	Reported							Estimated kill		Total estimated kill				
	Hunter kill				Nonhunting kill[a]									
	M	F	Unk	Total	M	F	Unk	Unreported	Illegal	M (%)		F	Unk	Total
2000–2001														
Autumn 2000	10	8	0	18	0	1	0	0	0	10		9	0	19
Spring 2001	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	0	19
2001–2002														
Autumn 2001	6	3	0	9	0	0	0	0	0	6		3	0	9
Spring 2002	2	0	0	2	0	0	0	0	0	2		0	0	2
Total	8	3	0	11	0	0	0	0	0	8	(73)	3	0	11
2002–2003														
Autumn 2002	6	6	0	12	0	0	0	0	0	6		6	0	12
Spring 2003	2	0	0	2	0	0	0	0	0	2		0	0	2
Total	8	6	0	14	0	0	0	0	0	8	(57)	6	0	14
2003–2004														
Autumn 2003	5	11	0	16	0	0	0	0	0	5		11	0	16
Spring 2004	2	2	0	4	0	0	0	0	0	2		2	0	4
Total	7	13	0	20	0	0	0	0	0	7	(35)	13	0	20
2004–2005														
Autumn 2004	9	4	0	13	0	0	0	0	0	9		4	0	13
Spring 2005	2	1	0	3	2	0	0	0	0	4		1	0	5
Total	11	5	0	16	2[b]	0	0	0	0	13	(72)	5	0	18
2005–2006														
Autumn 2005	5	3	0	8	1	0	0	0	0	6		3	0	9
Spring 2006	3	1	0	4	2	0	0	0	0	5		1	0	6
Total	8	4	0	12	3[b]	0	0	0	0	11	(73)	4	0	15
2006–2007														
Autumn 2006[c]	3	3	0	6	1[b]	0	0	0	0	4	(57)	3	0	7

[a] Includes bears killed by bear control permittees, defense of life or property kills, research mortalities, and other known human-caused accidental mortality.
[b] All bears were killed by predator control permittees.
[c] Preliminary harvest.

TABLE 2 Unit 20E residency of successful brown bear hunters, regulatory years 1992–1993 through autumn 2006

Regulatory year	Resident	(%)	Nonresident	(%)	Unknown	(%)	Total successful hunters
1992–1993	12	(86)	2	(14)	0	(0)	14
1993–1994	20	(95)	1	(5)	0	(0)	21
1994–1995	9	(82)	2	(18)	0	(0)	11
1995–1996	9	(43)	9	(43)	3	(14)	21
1996–1997	22	(92)	2	(8)	0	(0)	24
1997–1998	9	(82)	2	(18)	0	(0)	11
1998–1999	8	(73)	3	(27)	0	(0)	11
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
2004–2005	14	(88)	2	(12)	0	(0)	16
2005–2006	11	(92)	1	(8)	0	(0)	12
Autumn 2006[a]	3	(50)	3	(50)	0	(0)	6

[a] Preliminary harvest.

TABLE 3 Unit 20E chronology of brown bear harvest by month, regulatory years 1992–1993 through autumn 2006

Regulatory year	Harvest by month														
	Aug	(%)	Sep	(%)	Oct	(%)	Nov	(%)	Apr	(%)	May	(%)	Jun	(%)	*n*
1992–1993	4	(29)	5	(36)	2	(14)	0	(0)	0	(0)	1	(7)	2	(14)	14
1993–1994	6	(29)	12	(57)	1	(5)	0	(0)	1	(5)	1	(5)	0	(0)	21
1994–1995	2	(18)	8	(73)	0	(0)	0	(0)	0	(0)	0	(0)	1	(9)	11
1995–1996	3	(14)	10	(48)	0	(0)	0	(0)	1	(5)	6	(29)	1	(5)	21
1996–1997	7	(29)	13	(54)	0	(0)	0	(0)	0	(0)	2	(8)	2	(8)	24
1997–1998	2	(18)	9	(82)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	11
1998–1999	5	(45)	6	(55)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	11
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	(22)	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
2004–2005	4	(25)	9	(56)	0	(0)	0	(0)	0	(0)	2	(13)	1	(6)	16
2005–2006	2	(17)	4	(33)	2	(17)	0	(0)	0	(0)	3	(25)	1	(8)	12
Autumn 2006[a]	2	(33)	4	(67)	0	(0)	0	(0)							6

[a] Preliminary harvest.

TABLE 4 Unit 20E brown bear percent harvest by transport method, regulatory years 1992–1993 through autumn 2006

Regulatory year	Percent harvest by transport method									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unk	*n*
1992–1993	43	0	0	21	0	7	29	0	0	14
1993–1994	24	0	10	14	0	19	5	29	0	21
1994–1995	27	0	9	18	0	9	18	18	0	11
1995–1996	62	0	10	10	0	5	5	10	0	21
1996–1997	42	4	0	8	0	8	21	17	0	24
1997–1998	45	0	0	45	0	0	0	9	0	11
1998–1999	73	0	0	0	0	18	0	9	0	11
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	21	0	7	29	7	14	7	14	0	14
2003–2004	40	0	0	30	10	0	10	10	0	20
2004–2005	44	0	13	31	0	0	6	6	0	16
2005–2006	42	0	0	0	8	0	33	17	0	12
Autumn 2006[a]	67	0	0	0	0	0	33	0	0	6

[a] Preliminary harvest.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 P.O. Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNITS: 21B, 21C, 21D, and 24 (51,135 mi^2)

GEOGRAPHIC DESCRIPTION: Middle Yukon River, Koyukuk River, Nowitna River and Melozitna River drainages

BACKGROUND

Grizzly bear density is thought to be low (10 bears/1000 mi^2) to moderate (25 bears/1000 mi^2) 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 mi^2) 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), based on local oral history. 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 and Koyukuk Rivers during the summer and early fall, when fish camps were in operation and bears were attracted to those 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

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

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, no increased harvest in Unit 24 was observed.

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., RY05 = 1 July 2005 through 30 June 2006).

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 10–12 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≅50, 21C≅100, 21D≅200), assuming 25 bears/1000 mi^2 in the highest density bear habitat and 10 bears/1000 mi^2 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 mi^2 within Gates of the Arctic National Park (7000 mi^2), 33/1000 mi^2 in the Brooks Range outside the park (6500 mi^2), and 22–33 bears/1000 mi^2 in the remainder of Unit 24 to the south (14,500 mi^2). 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 in RY04.

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

Seasons and Bag Limits during RY05.

Units and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Units 21B and 21C		
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 21D	10 Aug–30 Jun	No open season
One bear every regulatory year by registration permit.	(Subsistence hunt only)	
	10 Aug–30 Jun	10 Aug–30 Jun
One bear every regulatory year.		
Unit 24		
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

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. Seasons were standardized throughout Region III at the 2004 board meeting from 10 August to 30 June and to allow 1 bear every regulatory year on the general hunt. The tag fee exemption was again adopted for Unit 21B at the 2006 meeting.

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 who 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. Seasons were standardized throughout Region III at the 2004 board meeting from 10 August to 30 June and to allow 1 bear every regulatory year on the general hunt.

Hunter Harvest. Grizzly bear harvest in Units 21B, 21C, and 21D was low ($\bar{x}$ = 8.3 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 18.5 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 RY00 through fall 2006, males made up 76% of the reported harvest, which was an adequate level to maintain recruitment. The percent of males in the harvest was similar to the 80% reported for RY98 through fall 2003 (Stout 2005). 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, but due to funding constraints, ages for RY04–RY05 were not available at the time of this report.

In Unit 24, the average annual grizzly bear harvest by hunters for RY00 through RY05 was 17.3 bears (Table 2). The reported 3-year average harvest (RY03–RY05) for the northern (north of Allakaket) and southern (remaining) portions of the unit was 12.3 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 (RY01–RY05) for the entire unit was 21.0 bears. Of the reported harvest for that same period, 55% were males and 45% were females, which was a similar to the previously reported harvest of 58% males and 42% 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 10–12% may be sustainable. Based on the estimated sustainable harvest rate of 5–6%, a harvest of 51–102 bears can be sustained in Unit 24.

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 and more favorable open habitat for hunting.

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 during RY02–RY05 in those units was 1.5 bears for local hunters, 1.0 for nonlocal residents, and 4.5 for nonresidents. From RY96 through fall 2006 the mean annual number of successful hunters was 7.4, which was up by one bear from the previous management report.

Residents of Alaska who did not live in Unit 24 and nonresidents hunters accounted for most of the reported harvest in that unit (Table 5). Most of this harvest was incidental to fall moose hunting. Local residents took relatively few bears. Nonresidents account for an increasingly larger and more consistent proportion of the harvest. Reported harvest was in the range of 10–15 bears annually until RY00, when hunters reported harvesting 25 bears, the highest harvest since 1973. Harvest during RY00–RY03 averaged 20.3 bears, an increase from the average harvest of 12.7 bears during RY94–RY99. However, harvest during RY04–RY06 declined to an average harvest of 14.3 bears, similar to levels observed prior to the RY00–RY03 temporary increase.

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 RY03 through RY05 most kills occurred during the fall (73%), incidental to hunting other game species. From RY04 to RY06, transportation to the hunt area was via highway vehicle (34%), airplane (19%), boat (28%), horseback/dog team (6%), or by foot and other methods (12%), and was consistent with previously reported values.

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 reported and unreported harvest of 18 bears was below the harvest objective of 25 bears, and the population was probably increasing. With the current conservative population estimate of 350–400 bears, a sustainable annual harvest of 35–48 grizzly bears can probably 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. 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 continue to be a management priority.

In Unit 24, the management objective of maintaining a population that could sustain the stated level of harvest was achieved. During this reporting period (RY04–RY05), harvest throughout the unit was very low and was not a factor influencing the population. 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 55% of the harvest being males.

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, which has a relatively high density of grizzly bears, based on habitat.

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. Due to funding constraints during the reporting period, ages of harvested bears were not obtained in time for this report.

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

STOUT, G. W. 2007. Units 21B, 21C, 21D and 24 brown bear. Pages 253–264 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Project 4.0. Alaska Department of Fish and Game. Juneau, Alaska, USA.

TABLE 1 Units 21B, 21C, and 21D brown/grizzly bear mortality, regulatory years 2000–2001 through fall 2006

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
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	1	0	0	1	0	1	0	1	5	0	1	1	5	7
Spring 2005	6	2	0	8	0	0	0	0	5	0	6	2	5	13
Total	7	2	0	9	0	1	0	1	10	0	7	3	10	20
2005–2006														
Fall 2005	2	2	0	4	0	0	0	0	5	0	2	2	5	9
Spring 2006	3	2	0	5	0	0	0	0	5	0	3	2	5	10
Total	5	4	0	9	0	0	0	0	10	0	5	4	10	19
2006–2007														
Fall 2006	4	1	0	5	0	0	0	0	5	0	4	1	5	10

[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 2000–2001 through fall 2006

Regulatory year	Reported													
	Hunter kill				Nonhunting kill[a]				Estimated kill		Total estimated kill			
	M	F	Unk	Total	M	F	Unk	Total	Unreported	Illegal	M	F	Unk	Total
2000–2001														
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
2001–2002														
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
2002–2003														
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
2003–2004														
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
2004–2005														
Fall 2004	5	1	0	6	0	1	0	1	3	2	5	2	5	12
Spring 2005	1	2	0	3	0	0	0	0	0	0	1	2	0	3
Total	6	3	0	9	0	1	0	1	3	2	6	4	5	15
2005–2006														
Fall 2005	8	3	0	11	0	0	0	0	3	2	8	3	5	16
Spring 2006	1	2	0	3	0	0	0	0	0	0	1	2	0	3
Total	9	5	0	14	0	0	0	0	3	2	9	5	5	19
2006–2007														
Fall 2006	8	1	0	9	0	0	0	0	3	2	8	1	5	14

[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 2006[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
2004–2005	1	1	7	9
2005–2006	0	1	8	9
Fall 2006	1	3	1	5

[a] Nonhunting kill not included.

TABLE 4 Unit 21B, 21C, and 21D brown/grizzly bear successful hunter residency, regulatory years 1994–1995 through fall 2006

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
2004–2005	1	0	8	9
2005–2006	3	2	4	9
Fall 2006[b]	0	2	3	5

[a] Units 21B, 21C, and 21D residents.
[b] Preliminary.

TABLE 5 Unit 24 brown/grizzly bear successful hunter residency, regulatory years 1994–1995 through fall 2006

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
2004–2005	0	8	1	9
2005–2006	1	6	7	14
Fall 2006[b]	0	6	3	9

[a] Unit residents.

[b] Preliminary.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
907-465-4190 P.O. Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 22 (25,200 mi^2)

GEOGRAPHIC 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 introduction of the gold mining and reindeer herding industries. The population began to recover slowly when 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 and consequences. 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 of serious concern to the public. 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, 2000).

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 analyze data.

- Improve communication with the public to reduce illegal and unreported harvest, and improve understanding of defense of life or property 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 the public.

- 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 Defense of Life or Property (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 and Village Public Safety Officers to deter or destroy problem bears. An electric fence bear exclosure 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 do not have a current population estimate for brown bears in Unit 22. A census, completed during the early 1990s, estimated the brown bear population in western Unit 22B and Units 22C, 22D and 22E at 458 bears >2 years old (density: 1 bear per 27 mi^2). The density estimate varied almost two-fold within the study area with the highest densities (1 bear per 20 mi^2) in the western portion of Unit 22B, and the lowest densities (1 bear per 39 mi^2) in the southern portion of Unit 22E (Miller and Nelson, 1993). Based on observations by staff, guides and long-time residents of Unit 22, we believe bear numbers increased unit wide during the 1990s and early

2000s. During that time, reports of bear encounters and complaints about nuisance bears were frequent; 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 began occurring in the westernmost parts of the unit where bears previously were seldom seen (Persons, 2000). Since 1997 the Board of Game has incrementally liberalized bear hunting regulations in Unit 22 and since 1998 the average annual reported harvest increased 70% over the period from 1990–1997. Observations indicate we still have a productive bear population, but in the last few years there have been indications from staff and public observations of fewer bears. There has also been a substantial reduction in complaints about problem bears. All of this indicates that harvest may be stabilizing or reducing bear numbers at least in the readily accessible areas along the Nome road system.

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.

No regulation changes to seasons or bag limits went into effect during the reporting period.

2004–2005 and 2005–2006 Regulatory Years Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 22(A) RESIDENTS & NONRESIDENTS: One bear every regulatory year	1 Aug–31 May	1 Aug–31 May
Unit 22(B) RESIDENT HUNTERS: One bear every regulatory year	1 Aug–31 May	
NONRESIDENT HUNTERS: One bear every regulatory year by drawing permit only. Up to 27 permits maybe issued in combination with Unit 22C.		1 Aug–31 May

2004–2005 and 2005–2006 Regulatory Years Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 22(C) RESIDENTS: One bear every 4 regulatory years	1 Aug–31 Oct 10 May–25 May	
NONRESIDENTS: One bear every 4 regulatory years by drawing permit only. Up to 27 permits maybe 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 maybe 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 maybe 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	1 Aug–31 Oct	

2004–2005 and 2005–2006 Regulatory Years Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts) 10 May–25 May	Nonresident Open Season
RESIDENTS: One bear per regulatory year by registration permit in the Northwest Alaska Brown Bear Management Area for subsistence purposes		
NONRESIDENTS:		No Open Season

Board of Game Actions and Emergency Orders. In January 2004 the board adopted administrative changes to subsistence bear hunts by eliminating subsistence management areas and allowing administration of subsistence registration bear hunts on a unit by unit basis. In Unit 22 subsistence bear hunt RB700 was replaced by RB699. There were no changes to seasons, bag limits or permit conditions.

In March 2004 and 2005 the board reauthorized the brown bear resident tag fee exemption in Unit 22. The board adopted two changes during the November 2005 meeting which liberalized brown bear regulations in Unit 22A. The first change increased the resident bag limit to 2 brown bears per year, and the second lengthened the season north of the Golsovia River drainage to 1 August–15 June.

Human-Induced Harvest. The department maintained a population in accordance with its management goal during the reporting period. The population sustained a 3-year mean annual reported harvest of at least 50% males; 162 of 263 (62 %) bears reported harvested during 2003–2005 were male.

Ninety-three bears were harvested during the 2004 regulatory year and 87 bears were taken during the 2005 regulatory year (Table 1). The average annual harvest since 1998 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.

Annual reported harvest of male bears has consistently exceeded the female harvest, with male bears averaging approximately 67% of the harvest for the period 1961 through 2003. In 2004–2005 male bears composed 53% of the harvest, and in 2005–2006 males bears composed 69% of the harvest.

Since Unit 22 age records began in 1967, the age of harvested bears has averaged 6.3 years annually, and during this reporting period harvested bears averaged 6.3 years (6.9 in 2004 and 5.6 in 2005).

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 hunt, when travel conditions and snowmachines allow access to remote areas of the unit. Since 1967, the age of bears harvested during the fall portion of the season has averaged 5.7 years, while the age of bears taken from the spring portion of the season has averaged 7.0 years.

Much of the harvest is by local recreational hunters who are not selective and shoot whatever bear presents itself first, however, large bears are available for serious trophy hunters; 23 of 172 bears (13%) taken during this reporting period had skull sizes of 24 inches or larger. The number of record book bears taken during 1990–2003 (n=136) averaged 10 bears per year, or 15% of the average annual harvest.

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.

Four 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.

In 2004–2005, 3 Unit 22 residents registered for the Northwest Alaska Brown Bear Management Area (NWABBMA) subsistence hunt RB700, and in 2005–2006, 7 people registered for the Unit 22 subsistence bear hunt RB699. Hunters did not harvest a bear in either hunt. Brown bears are seldom hunted for food in Unit 22 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 Subsistence Division and Kawerak Inc. 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, Koyuk, and Unalakleet were surveyed. In 2004–2005 Unalakleet residents reported harvesting 4 bears, 2 of which were previously unreported. None of the other communities surveyed reported bear harvest.

Permit Hunts. During each year of the reporting period 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. A continuous season from 1 September – 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. The drawing hunt system used in Units 22B, 22C, 22D, and 22E for nonresident hunters allows managers to evaluate hunter effort and success.

The nonresident success rate was 68% in Units 22B and 22C and 50% in Units 22D and 22E during the reporting period. In Units 22B and 22C, 93% of the available drawing hunt permits were issued to nonresident hunters, and in Units 22D and 22E 46% 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 2004–2005, 45% of the harvest occurred in the spring and in 2005–2006 spring harvest represented 51% 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 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

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. During the 1990s and early 2000s, moose recruitment rates declined to less than 10% in much of Unit 22, 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

We believe that throughout the 1990s Unit 22 brown bear numbers increased above the density estimated in the bear census and research study reported in 1991. During the same period moose populations and recruitment rates declined in most parts of the unit and we attribute current moose declines to be largely the result of 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 regulatory years since 2000–2001 annual harvest has reduced to between a low of 84 bears in 2002 and a high of 93 bears in 2004 (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 comprised 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, 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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Please cite any information taken from this section, and reference as:

GORN, T. 2007. Unit 22 brown bear management report. Pages 265–276 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

TABLE 1 Unit 22 brown bear harvest[a] for regulatory years 2004–2005 and 2005–2006

Regulatory Year	Reported harvest											
	Hunter kill				Non-hunting kill				Total			
	M	F	Unk.	Total	M	F	Unk.	Total	M	F	Unk.	Total
2004–2005												
Fall 2004	21	29	0	50	1	0	1	2	22	29	1	52
Spring 2005	27	14	0	41	0	0	0	0	27	14	0	41
Subsistence	0	0	0	0	0	0	0	0	0	0	0	0
Total	48	43	0	91	1	0	1	2	49	43	1	93
2005–2006												
Fall 2005	28	14	0	42	2	0	0	2	30	14	0	44
Spring 2006	30	12	1	43	0	0	0	0	30	12	1	43
Subsistence	0	0	0	0	0	0	0	0	0	0	0	0
Total	58	26	1	85	2	0	0	2	60	26	1	87

[a] Represents the total known harvest including nonresident permit hunt harvest, DLP and other human-caused accidental mortality.

TABLE 2 Proportion of Unit 22 successful brown bear hunters based on residency for regulatory years 2002-2003 through 2005-2006

Regulatory Year	Successful hunters								
	Local Residents[a]		Nonlocal Residents		Nonresidents		Unknown		Total
	(*n*)	%	(*n*)	%	(*n*)	%	*(n)*	%	(*n*)
2002-2003	36	43%	13	15%	32	38%	3	4%	84
2003-2004	39	43%	16	18%	31	34%	4	4%	90
2004-2005	41	44%	10	11%	38	41%	4	4%	93
2005-2006	39	45%	9	10%	35	40%	4	5%	87

[a] Hunters residing in Unit 22

TABLE 3 Sex of Unit 22 brown bear harvest[a] for regulatory years 2004–2005 and 2005–2006

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
2004–2005																		
Fall 2004	8	3	0	4	8	0	3	10	0	6	8	0	0	0	0	21	29	0
Spring 2005	11	4	0	11	2	0	4	1	0	0	6	0	1	1	0	27	14	0
2005–2006																		
Fall 2005	12	5	0	6	4	0	5	2	0	5	3	0	0	0	0	28	14	0
Spring 2006	11	5	0	5	3	0	4	2	0	7	1	1	3	1	0	30	12	1

[a] Includes nonresident permit hunts, subsistence harvest and non-hunting mortalities.

TABLE 4 Unit 22 brown bear harvest by transport method for regulatory years 1997–2005

Regulatory Year	Number harvested							
	Airplane	Boat	Snowmachine	ORV	Highway vehicle	Walk	Unknown	Total (*n*)
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	89
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
2004-2005	0	18	25	27	10	8	5	93
2005-2006	2	16	30	21	9	3	6	87

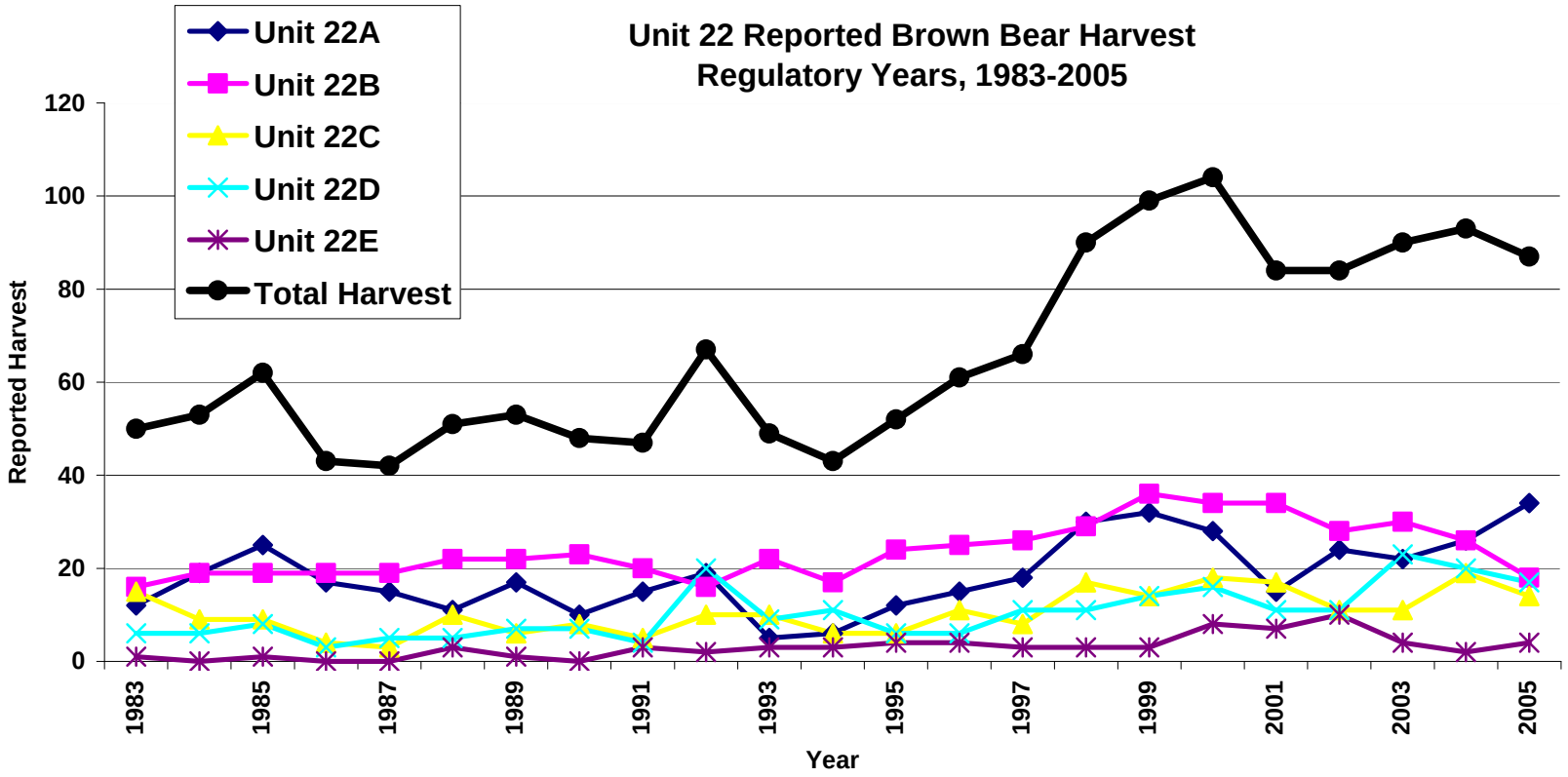

FIGURE 1 Unit 22 reported brown bear harvest, regulatory years 1983-2005

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: July 2004
To: June 2006

LOCATION

GAME MANAGEMENT UNIT: 23 (43,000 mi^2)

GEOGRAPHIC 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 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 nonresident drawing permit hunts (DB781 – fall; DB791 – spring); 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 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 mi^2 in the lower 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 more accurate than sealing data. Many brown bears taken under defense of life or property (DLP) regulations are not reported, and many of those that have been reported have not been entered into the statewide harvest files. As a result, harvest data in future reports will likely differ from that reported here.

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, some long-term commercial operators, and opportunistic observations of agency staff. The National Park Service (NPS) conducted a brown bear census in the upper Noatak River (June 2005) drainage and in the southwest portion of Unit 23 (June 2006) while attempting to develop a new bear census technique. However, this information has not yet been released.

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 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 mi^2 (Ballard et al. 1991). There is no other published, 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 preventing the harvest of cubs or sows with cubs have historically made it virtually impossible to harvest adult 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 2004–2005 and 2005–2006 regulatory years:

2004–2005 and 2005–2006 Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 23		
Residents: One bear per regulatory year; no tag required	1 Aug–31 May (General hunt)	
Nonresidents: One bear every regulatory year by drawing permit (34 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 seal the hide and skull. Salvage of meat was optional under this hunt.

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 need only 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. Federally-qualified hunters were required to register for a subsistence permit (RB700) before hunting brown bears on Cape Krusenstern National Monument, Kobuk Valley National Park or Gates of the Arctic National Park.

Hunter Harvest. Harvest levels in 2004–2005 and 2005–2006 continued the trend of a general increase in harvests, with substantial annual variability that dates back to the early 1960s (Fig. 1). During this reporting period no bears were taken under the subsistence registration permit hunt (Table 1). This is likely because general hunting regulations are now as liberal as subsistence regulations (although methods and means for hunting, and salvage requirements differ between these hunts). Residents of Unit 23 still harvest brown bears for food; however, they now do so under the general hunt. Community harvest assessments suggest that the number of brown bears taken for food is low (Table 2).

Annual variation in harvest levels is probably mainly affected by weather and snow conditions, especially during spring, which strongly affect timing of emergence from dens, hunter 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 of increasing harvests because few bears have historically 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.

Combining all community harvest assessment data for Unit 23 indicates 0.0052 brown bears were taken annually on a per capita basis. Extrapolating that to the entire unit (6563 people excluding Kivalina and Point Hope which do not harvest brown bears for food) suggests 30–35 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 community of Kotzebue. Therefore, I recalculated the local harvest by applying the per capita harvest rate determined from community harvest assessments only to outlying villages in Unit 23 (3468 people excluding Kivalina, Point Hope, and Kotzebue). This approach estimated 15-20 bears were taken annually by villages in Unit 23. During 1996–1997 through 2005–2006, residents of Kotzebue reported taking an average 9 bears annually. Adding the mean annual Kotzebue brown bear harvest to the village per capita harvest estimate suggests that residents of Unit 23 have taken approximately 25-30 brown bears annually in recent years. Although residents of Kivalina and Point Hope rarely, if ever, harvest brown bears for food, a few bears (mean=3 bears every 10 years from 1961-62 through 2005-2006) are taken for trophies primarily by non-Native residents of these communities (e.g. teachers). My ‘best guess’ based on community harvest assessment data is that residents of Unit 23 take 25–35 bears annually. This is 2 to 3 times higher than the

number of bears reported through the registration permit and sealing systems (median=13 bears/yr during 1996-1997 through 2005-2006).

Some human-caused mortality of bears continues to be unreported in Unit 23. This includes bears taken under defense of life and property but not reported. Many residents of Unit 23 feel DLP reporting requirements are onerous or fear they have broken the law and will be cited for shooting a bear out of season or without a hunting license. As a result, many DLP bears are not reported to the department. Therefore, our harvest data is a conservative index of total human-induced brown bear mortality.

As in previous years, more brown bears were reported taken in the Noatak drainage during this reporting period than in any other drainage (Fig. 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 River and Selawik River drainages. However, in 1998–1999 brown bear harvests began to increase in the Kobuk River drainage and harvests there have remained relatively high since that time.

In order to further break down the geographic distribution of harvest, I plotted harvest levels for the 7 individual guide-outfitter (G-O) areas in Unit 23 (Fig. 3). Most of the Unit 23 brown bear harvest has consistently come from G-O areas 1, 2 and 6. Harvests were consistently <5 bears/yr for each of G-O areas 3, 4, 5 and 7, so are omitted from Fig. 3 to reduce clutter. In 6 of the last 8 years, more bears were taken from G-O area 6 (the Squirrel, Aggie and Eli River drainages, and the lower portion of the Noatak River) than from any other G-O area in Unit 23 (Fig. 3). Guide-outfitter area 6 includes the area most heavily hunted for bears by residents of Kotzebue (Igichuk Hills, Aggie River, Eli River and upper Squirrel River drainage). Additionally, residents of Noorvik and Kiana hunt bears within this area as well. Prior to 2000–2001, local hunters tended to take more bears than nonresidents and nonlocal resident hunters in G-O area 6. However, during 2001–2002, 2004–2005 and 2005–2006, nonresident hunters took more bears than local or nonlocal resident hunters in G-O area 6. This increase in nonresident harvest within G-O area 6 may be attributable to high levels of guiding in G-O area 6. Only 1 community (Noatak) occurs within G-O areas 1 and 2, and nonresident and nonlocal Alaska resident hunters have historically reported taking more bears there than local residents.

There was no trend in the proportion of males in the total Unit 23 harvest (Fig. 4). Likewise, there was no trend in median skull size for all bears or when analyzed by sex (Fig. 5). There was no trend in median age of bears taken throughout the unit, and no difference in median age of male vs. female bears (Fig. 6).

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 (G-O areas 1 and 2). Telemetry results indicate bears commonly move among these drainages (Ballard et al. 1991). If hunting has 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 bears. For this subset of harvest data, there was no trend in the proportion of male bears in the total harvest, in the median skull size of male bears harvested, or in the age of bears taken.

Brown bear hunting regulations in Unit 23 have been modified many times since 1962. Prior to 1980, harvests by nonresidents were high and increasing rapidly (Fig. 7). In 1980–1981 the department first established a unitwide drawing permit to regulate nonresident hunters hunts in Unit 23, which probably curtailed that trend. Since 1992, brown bear regulations have been incrementally liberalized in this unit 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. There is little data available to monitor total hunter effort and success rates for bear hunters (under general hunt regulations, only successful hunters are required to provide harvest data). Even so, I suspect weather has had a greater effect on success rates than hunting regulations *per se'*. However, increasing the number of nonresident brown bear permits, lengthening all hunting seasons, adopting a 1 bear/year bag limit and not counting it against more restrictive bag limits in other game management units, eliminating the resident tag requirement and establishing the subsistence registration hunt collectively increased the number of bear hunters in the unit (Fig. 1). Increasing levels of commercial hunting-related activities, such as guiding and transporting, undoubtedly complemented the effects of regulatory changes on bear hunter numbers as well.

Despite these myriad changes, brown bear harvests have increased only slowly through time (Fig. 1). Our harvest data provide no red flags that brown bears are being overharvested, and the vast majority of reports from the public indicate that bears are numerous. My opportunistic observations of brown bears while flying throughout the unit in recent years suggest brown bear numbers are stable (Fig. 8).

Permit Hunts. Participation in the NWABBMA registration hunt has declined probably as a result of increasingly liberal general hunting regulations. No bears were reported taken under the subsistence registration permit hunt during this reporting period (Table 1). This hunt should remain in place for 2 reasons, though. First, bear numbers will eventually decline and we will be forced to restrict hunting. Retaining subsistence hunting regulations will facilitate that process and protect subsistence hunters. Also, the NPS requires federally qualified subsistence hunters to register before hunting brown bears on National Park or Monument lands because this is the only mechanism available for collecting harvest information from these areas.

Nonresident brown bear hunts were administered through 2 drawing permit hunts, DB781 (fall hunt; 34 permits available each year during this reporting period) and DB791 (spring hunt; 24 permits available each year). Nonresidents took 13 bears through hunt DB781 in 2004 (10 males, 2 females, 1 unknown sex); and 10 bears through hunt DB791 in 2005 (9 males, 1 female). Nonresidents took 8 bears through hunt DB781 in 2005 (7 males, 1 female); and 7 bears through hunt DB791 in 2006 (all males).

Hunter Residency and Success. Prior to 1981–1982 nonresident hunters consistently took more bears than either local or nonlocal resident hunters (Fig. 7). Since then the number and proportion of bears taken by local residents, nonlocal residents and nonresidents have varied substantially among years. However, nonlocal resident hunters have tended to take more bears than either other group since 1992–1993. This may be related to increasing numbers of nonlocal resident hunters who incidentally take bears while hunting moose and caribou during August and September. Nonlocal resident and nonresident hunters collectively took 74% and 69% of the

total reported Unit 23 harvest during 2004–2005 and 2005–2006, respectively (Fig. 7, Table 4; these percentages do not include community harvest assessment data). Numbers of nonresident bears hunters are limited by the number of drawing permits available. There is no limit on numbers of resident hunters, though, and the number of bears taken by both local and nonlocal residents has increased since the 1960s; however, this increase in harvest has been greatest for nonlocal residents. For example, in 5 of the last 6 regulatory years, nonlocal residents have taken more brown bears than either residents of Unit 23 or nonresident hunters (Fig. 7).

Harvest Chronology. During the 1960s, more bears were taken during spring (January–April) than fall (August–December; Fig. 8). This may have been because Kotzebue-based hunters pursuing polar bears during spring hunted for grizzlies when weather prevented them from going out on the ice (W. Thompson, personal communication). Since 1970 the majority of the harvest has been taken during fall. There are several possible explanations for this seasonal disparity. In 1972 the marine mammals protection act made it illegal for non-Natives to take polar bears in Alaska, and numbers of visiting hunters here during spring declined (R. Schaeffer, personal communication). In recent years the department has provided more nonresident drawing permits during fall than during spring. Also, the only big game animals to hunt in Unit 23 during spring are brown bears. In contrast, during fall many nonlocal hunters come to Unit 23 to hunt moose, caribou and sheep, and some of them take a bear incidentally while hunting other species. As in the past, substantially more bears were taken during September than in any other month during this reporting period (Table 5).

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 now combine use of airplanes and snowmachines to hunt bears during spring. 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.

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, are continually replaced by bears from lightly hunted areas, e.g., the upper Noatak drainage and Brooks Range. Harvest data may be insensitive to changes in brown bear populations (H. Reynolds, personal communication). Without census data, human harvests could skew population sex and age structures and not be reflected in harvest data.
- The high proportion of total harvest being taken in G-O area 6 during recent years may force the department to allocate nonresident brown bear permits among G-O areas within Unit 23. This could more evenly distribute harvest throughout the unit as long as total numbers of nonresident brown bear permits are not increased.

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

DAU, J. 2007. Unit 23 brown bear. Pages 277–299 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

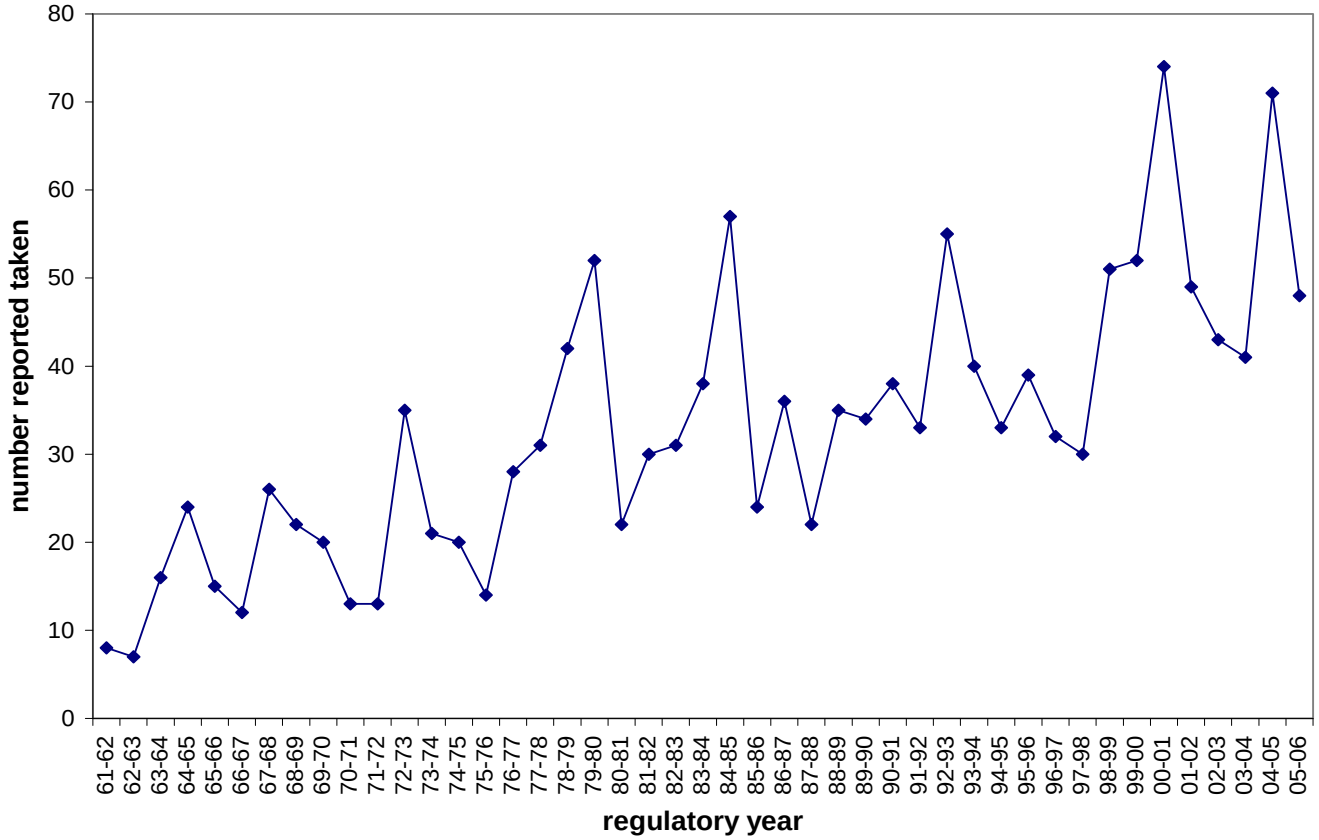

FIGURE 1 Unit 23 brown bear harvest, 1961–1962 through 2005–2006 (sealing and registration permit data)

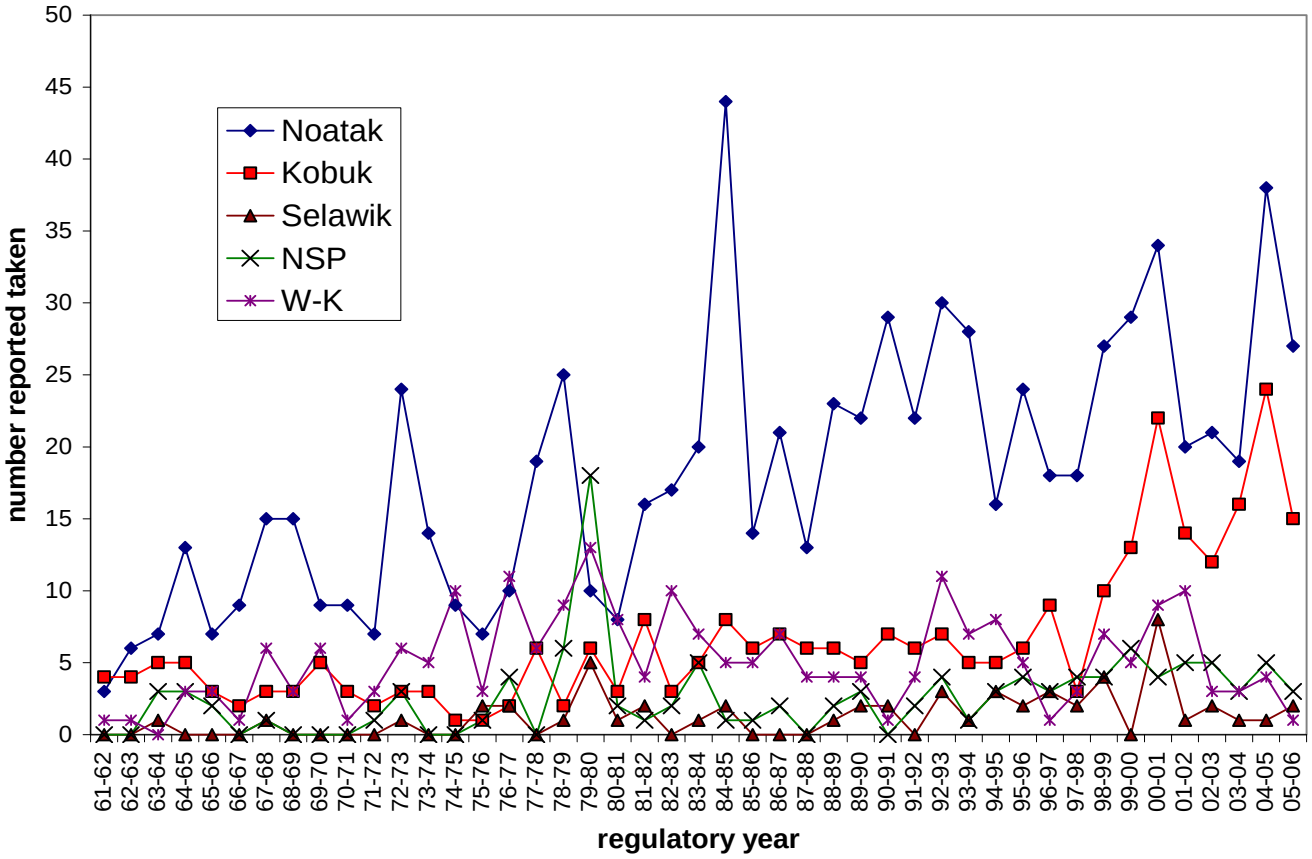

FIGURE 2 Unit 23 brown bear harvest by drainage, 1961–1962 through 2005–2006 (sealing and registration permit data). NSP = Northern Seward Peninsula; W-K = Wulik/Kivalina.

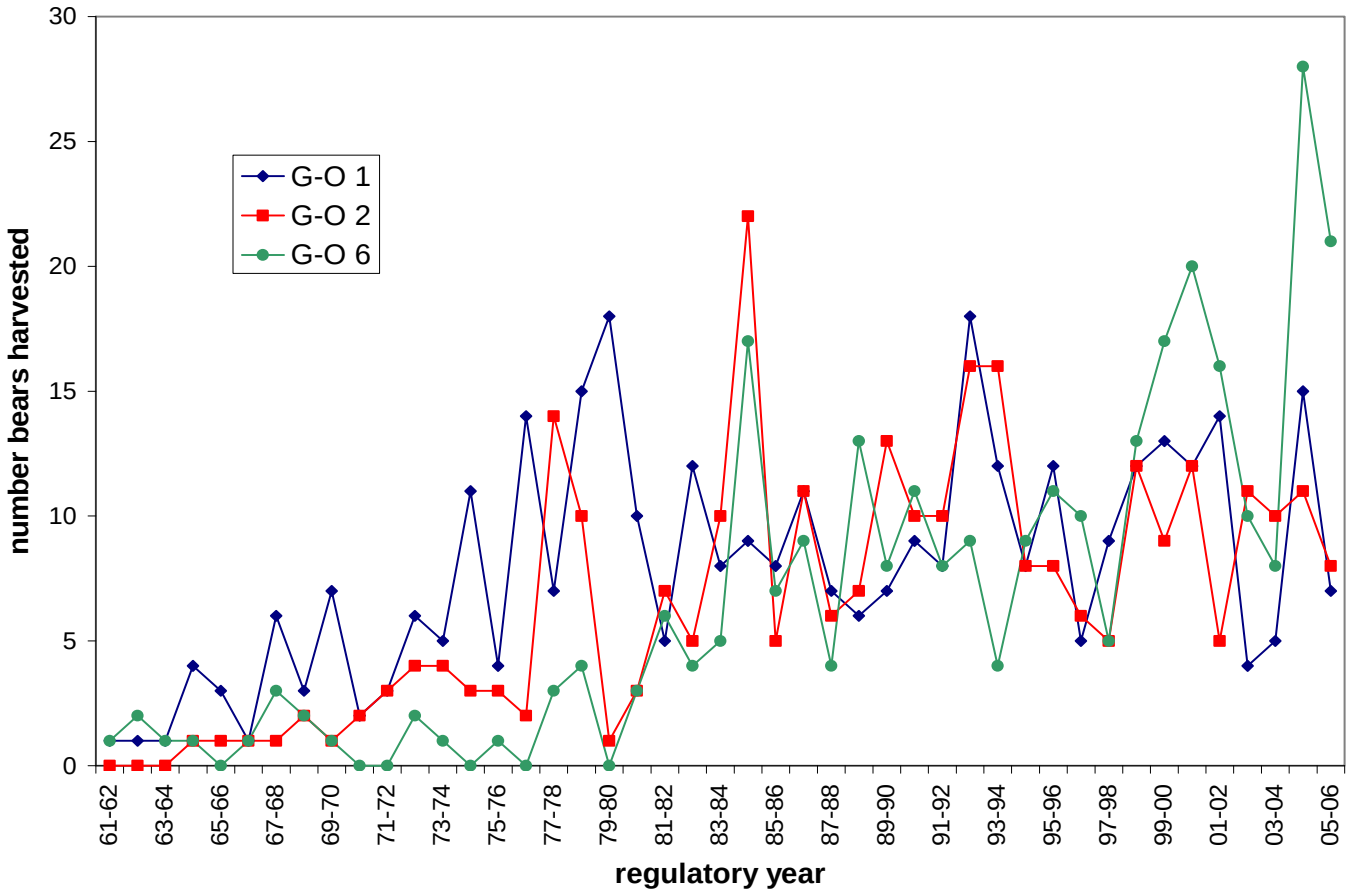

FIGURE 3 Numbers of brown bears taken in 3 guide-outfitter areas in Unit 23, 1961-1962 through 2005-2006

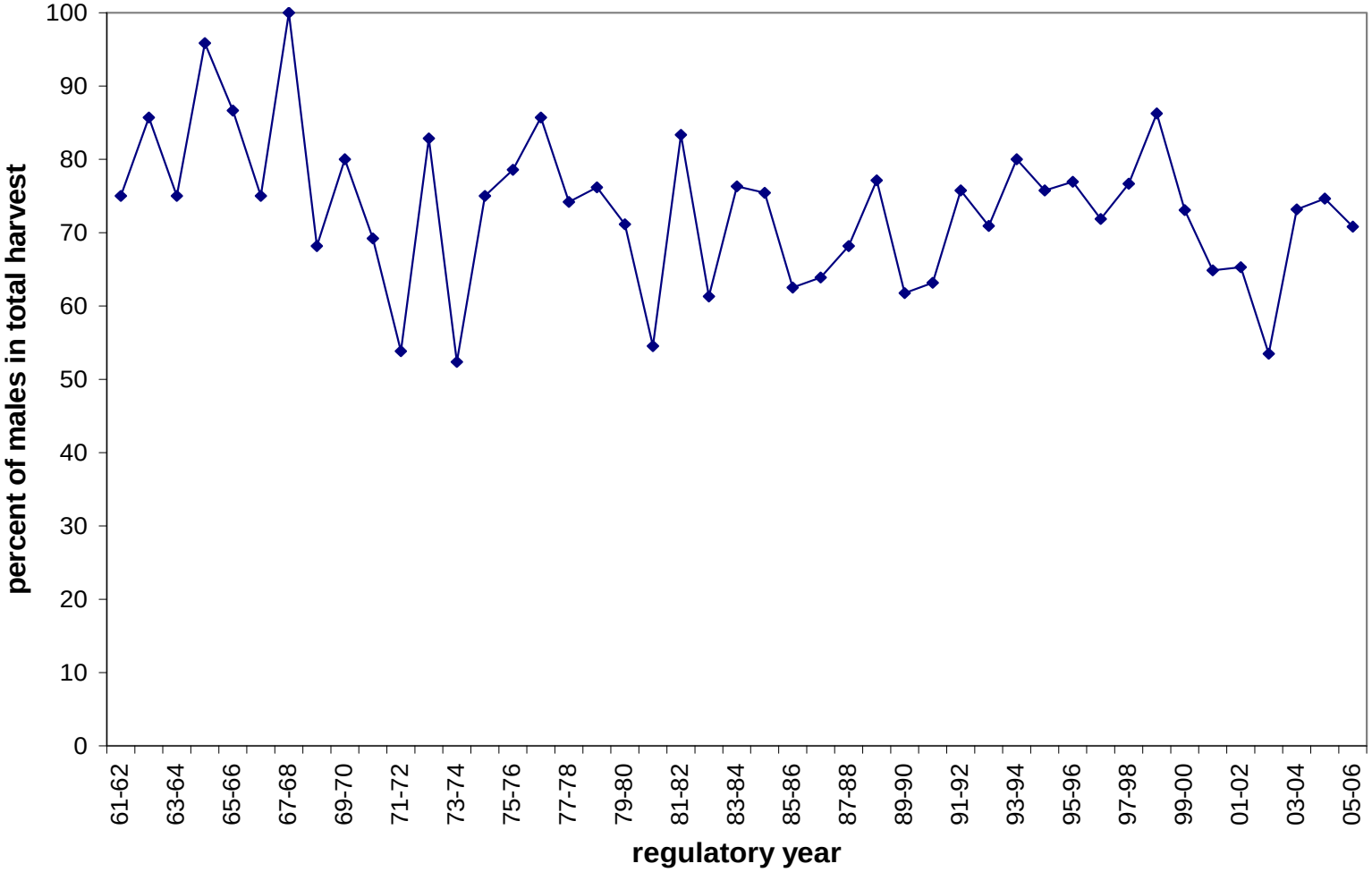

FIGURE 4 Percent males in Unit 23 brown bear harvest, 1961–1962 through 2005–2006 (sealing and registration permit data)

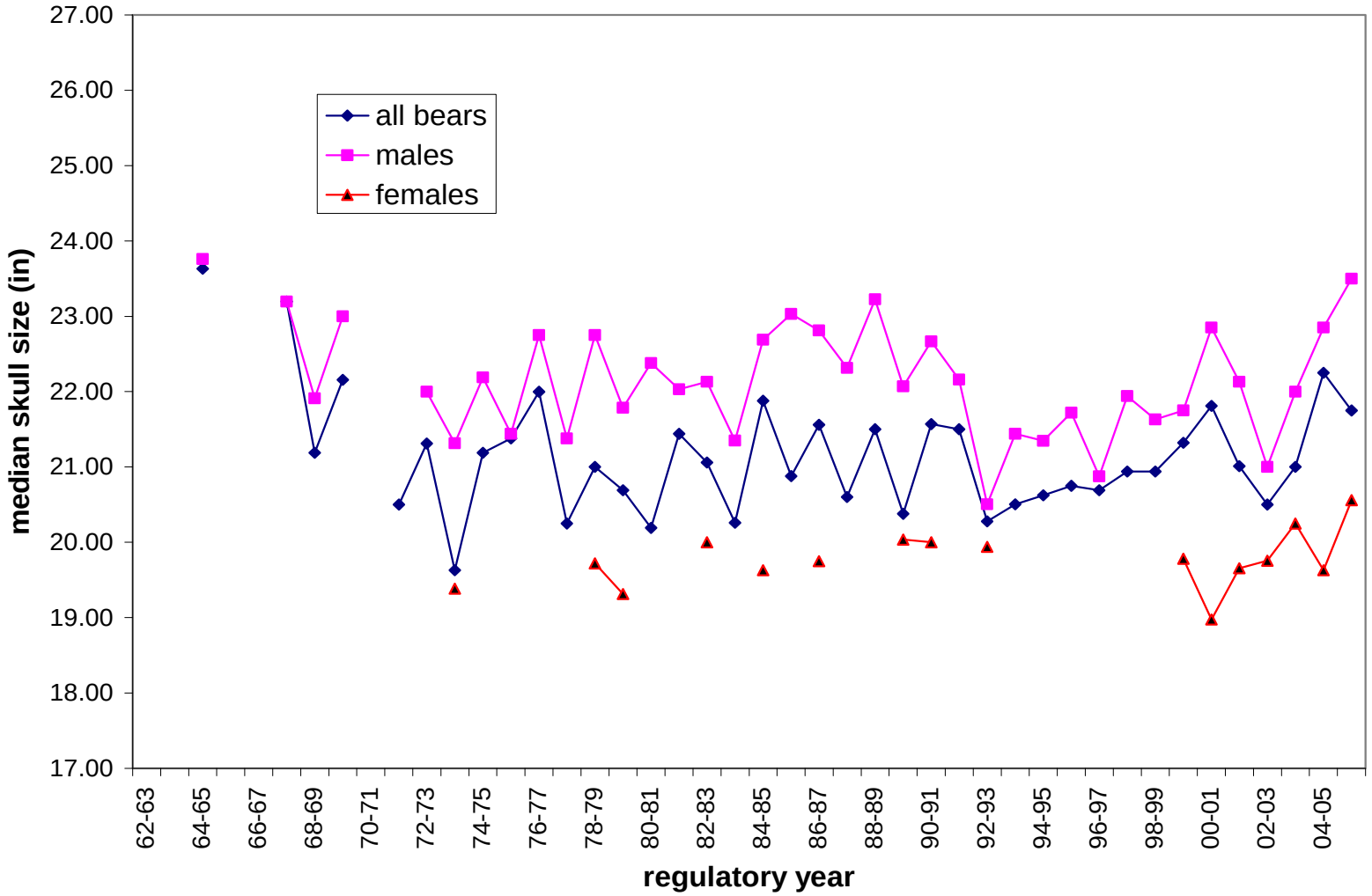

FIGURE 5 Median skull size of brown bears taken in Unit 23, 1962–1963 through 2005–2006 (sealing data; excludes years when sample size <10 bears)

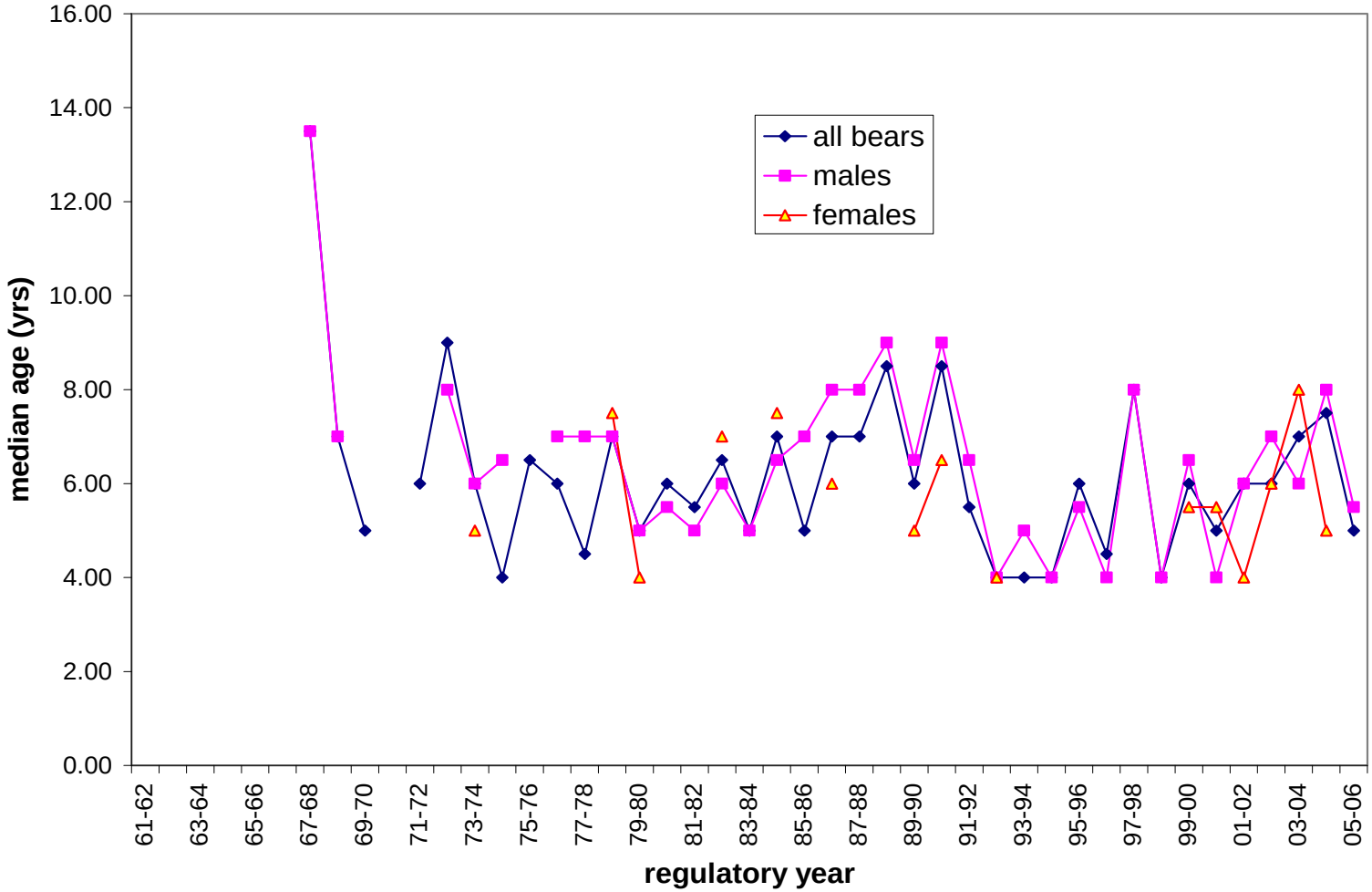

FIGURE 6 Median age of brown bears harvested in Unit 23 by sex, 1961-1962 through 2005–2006 (sealing data; excludes years when sample size <10 bears)

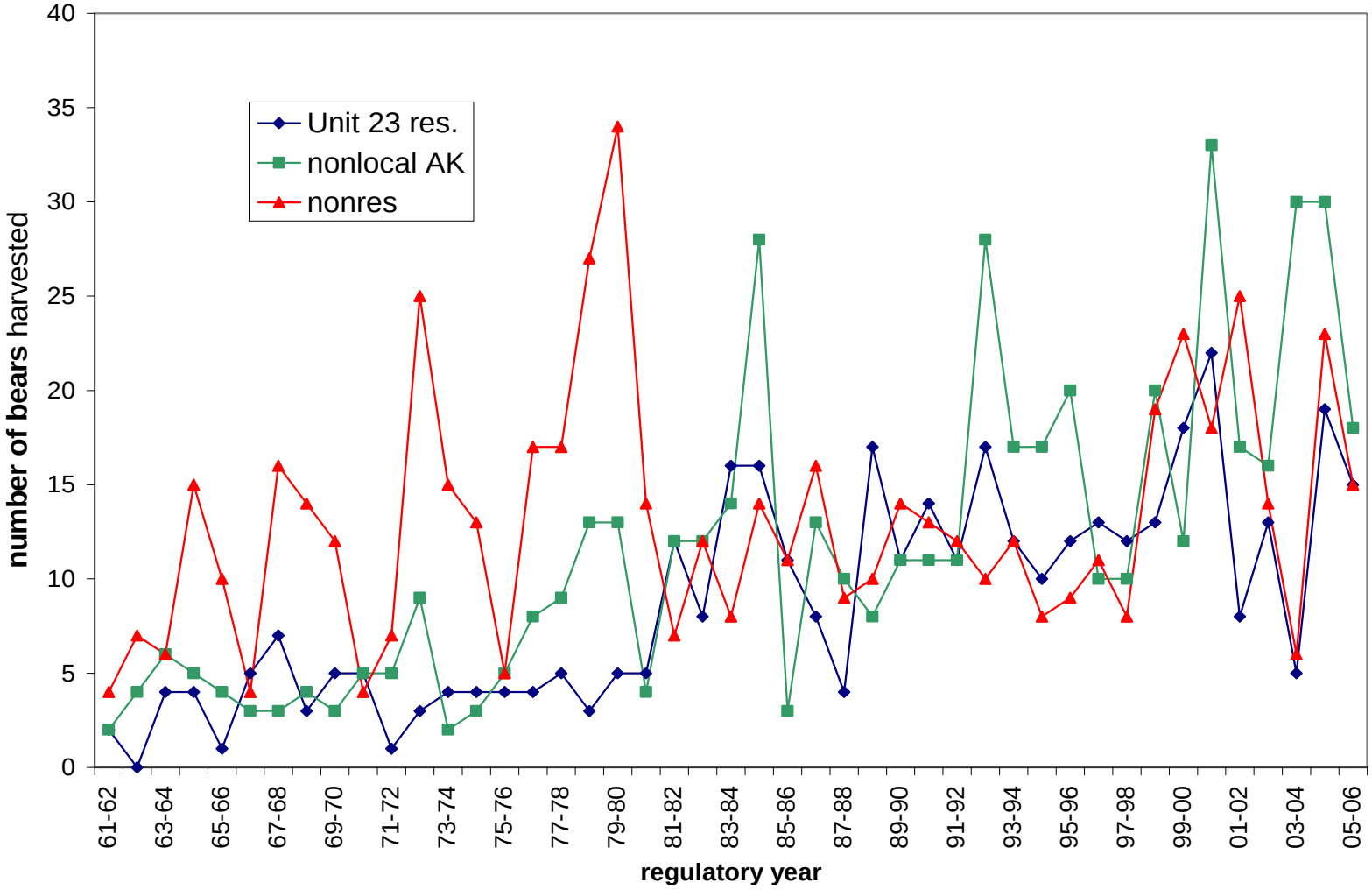

FIGURE 7 Unit 23 brown bear harvest by hunter residence, 1961–1962 through 2005–2006 (sealing and registration permit data)

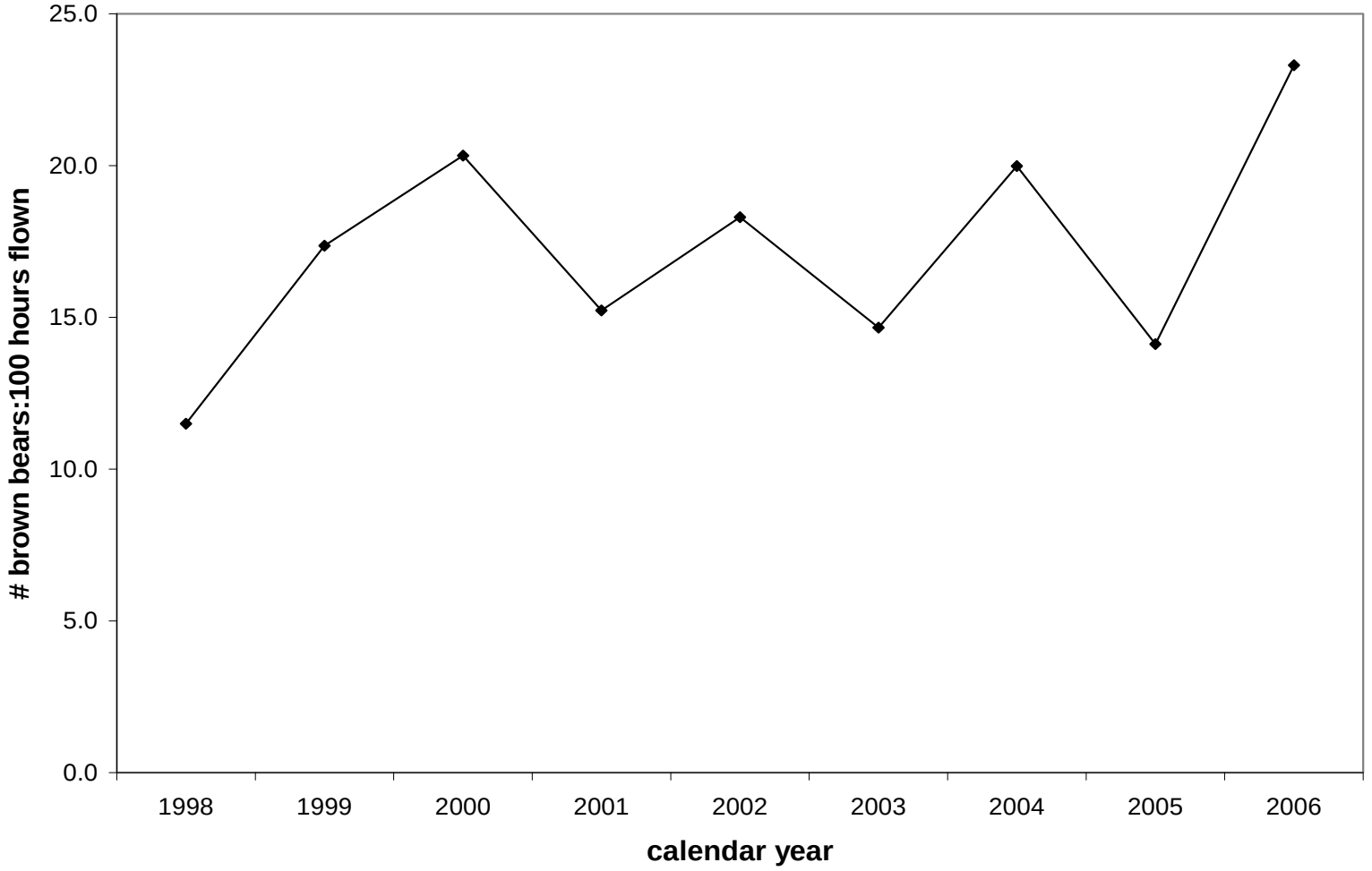

FIGURE 8 Opportunistic observations of brown bears by J. Dau (Unit 23 Area Wildlife Management Biologist) per 100 flight hours in Unit 23, 1998-2006 (flight hours ranged from approximately 500-700 hrs/year)

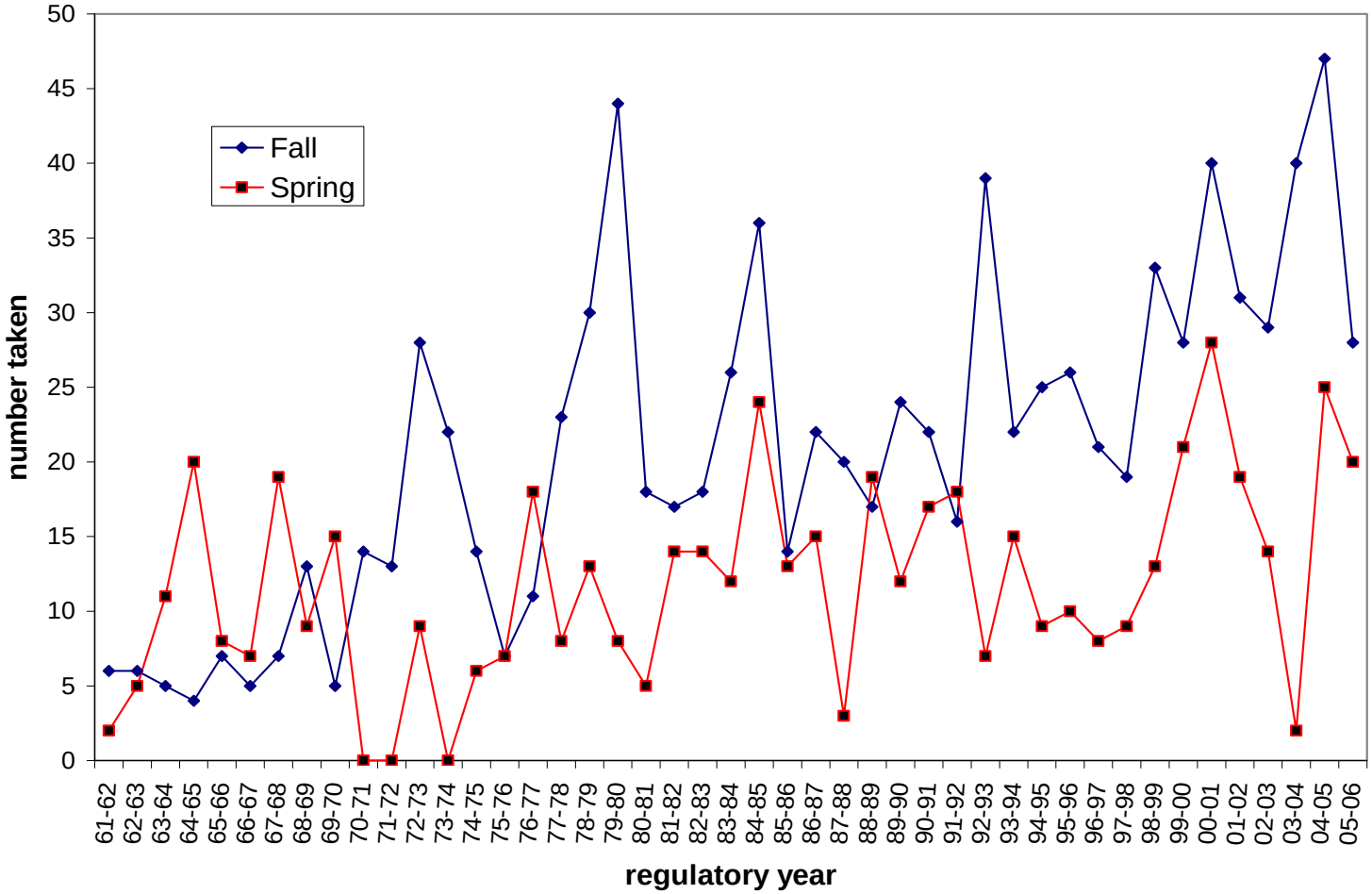

FIGURE 9 Unit 23 brown bear harvest by season (fall defined as August-December; spring January-April), 1961-1962 through 2005-2006

TABLE 1 Reported harvest of brown bears in Unit 23, 1996-1997 through 2005-2006, by hunt type (excludes bears reported with hunt type unknown; sealing and registration permit data)

Year	General Hunt	DB781	DB791	RB700	Unk. & DLP	Total
1998-1999	27	12	6	6	1	52
1999-2000	25	11	9	5	3	53
2000-2001	50	6	11	10	1	78
2001-2002	22	11	12	3	2	50
2002-2003	25	7	4	4	3	43
2003-2004	36	4	1	0	1	42
2004-2005	49	12	10	0	1	72
2005-2006	33	8	7	0	0	48

TABLE 2 Brown bear harvests in Unit 23 based on community harvest assessments (Georgette et al. 2005)

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
Kobuk	2003-2004	123	4	0.0325
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		3637	19	0.0052

TABLE 3 Reported Unit 23 brown bear harvest by drainage, 1979–1980 through 2001–2002 (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	26
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	77
2001–2002	20	14	1	5	10	50
2002–2003	21	12	2	5	3	43
2003–2004	19	16	1	3	3	42
2004-2005	38	24	1	5	4	72
2005-2006	27	15	2	3	1	48

TABLE 4 Unit 23 brown bear harvest[a] by hunter residency, 1985–1986 through 2005–2006 (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
2004-2005	18	28	24	2	72
2005-2006	15	17	16	0	48

[a] Includes nonresident permit hunts and excludes nonhunting mortalities.

TABLE 5 Monthly harvest of brown bears in Unit 23, 1988–1989 through 2005–2006 (sealing and registration permit data)

	JULY	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Unk	Total
1990–1991	0	0	21	1	0	0	0	0	0	14	3	0	0	39
1991–1992	0	0	15	1	0	0	0	0	0	12	6	0	0	34
1992–1993	0	4	36	3	0	0	0	0	1	11	0	0	0	55
1993–1994	1	0	21	2	0	0	0	0	0	14	3	0	0	41
1994–1995	1	0	23	1	0	0	0	0	0	6	4	0	0	35
1995–1996	0	0	26	2	0	1	0	0	0	8	4	0	0	41
1996–1997	1	0	22	1	0	0	0	0	0	7	2	1	0	34
1997–1998	1	0	17	1	0	0	0	0	0	9	2	0	0	30
1998–1999	0	0	32	1	0	0	0	0	2	5	11	0	1	52
1999–2000	1	3	25	0	0	0	0	0	0	17	6	1	0	53
2000–2001	0	2	36	1	0	0	0	0	0	22	11	1	5	78
2001–2002	0	0	30	0	1	0	0	0	0	9	10	0	0	50
2002–2003	0	0	27	2	0	0	0	0	1	8	5	0	0	43
2003–2004	0	9	29	1	0	0	0	0	0	2	0	0	1	42
2004-2005	0	4	40	2	1	2	2	2	1	17	6	1	1	79
2005-2006	0	1	26	0	0	0	0	0	0	13	6	0	2	48

TABLE 6 Reported Unit 23 brown bear harvest by transport method, 1985–1986 through 2005–2006 (sealing and registration permit data)

REGULATORY YEAR	AIRPLANE	Boat	4-wheeler	Snow-machine	Unknown	Total
1985–1986	15	1	0	8	3	27
1986–1987	20	7	0	6	4	37
1987–1988	17	4	1	0	1	23
1988–1989	13	3	0	11	9	36
1989–1990	24	4	0	6	2	36
1990–1991	24	6	0	8	1	39
1991–1992	20	2	0	11	1	34
1992–1993	32	3	5	1	15	56
1993–1994	24	0	1	10	7	42
1994–1995	17	8	1	7	3	36
1995–1996	20[a]	5[b]	2	7	8	41
1996–1997	18	3	0	4	9	34
1997–1998	15	7	1	4	3	30
1998–1999	25	10	1	7	9	52
1999–2000	19	3	0	0	12	34
2000–2001	41	7	1	20	9	78
2001–2002	26	10	1	12	1	50
2002–2003	22	9	0	10	2	43
2003–2004	28	11	1	1	1	42
2004–2005	34	13	3	20	2	72
2005–2006	25	5	0	18	0	48

[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.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. Box 115526
Juneau, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006[1]

LOCATION

GAME MANAGEMENT UNITS: 25A, 25B, 25D, 26B, and 26C (73,755 mi^2)

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 (RY = 1 July through 30 June, e.g., RY71 = 1 July 1971 through 30 June 1972), Units 26B and 26C were closed to brown bear hunting. In subsequent years a variety of regulations were used to limit harvest and allow for an increase in brown bear numbers. Regulations have been gradually liberalized as populations recovered. A conservative harvest objective of no more than 5% of estimated populations has been used in recent years.

Beginning in RY77, all brown bear hunters in Units 25A, 26B, and 26C were required to obtain drawing permits. As bear populations recovered, regulatory changes included applying the permit requirement only to nonresidents and increasing the number of permits issued in some areas. Only nonresidents were required to obtain drawing permits in Units 25A and 26C beginning in RY84, and in Unit 26B 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 closure of the September moose

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

hunting season in most of Unit 26 that also 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 elevated 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, 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 based on extrapolations from studies done in portions of eastern Brooks Range in Unit 26B and 25A; (3600 mi^2; Reynolds 1976), Unit 26C (Reynolds and Garner 1987) or in similar habitat in the western Brooks Range in Unit 26A (Reynolds and Hechtel 1984; Reynolds 1992). In 1993, population estimates were adjusted slightly from the original extrapolated estimates based on better technology to calculate the area of bear habitat and increased knowledge of bear densities in certain types of bear habitat. In addition, a new aerial transect density estimating technique was applied in portions of Unit 26B during 1999–2003 (H. Reynolds, ADF&G [retired], unpublished data).

Harvest data were obtained from mandatory sealing documents. Harvest data were summarized by regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

No brown bear population surveys were conducted during the report period, RY04–RY05. Population estimates are listed below for the eastern Brooks Range and upper Yukon River drainage in Units 25A, 25B, 25D, and 26C and were based on extrapolation from studies in the area or in similar habitat.

Units 25A, 25B, and 25D —The current estimate of brown bears in Units 25A, 25B, and 25D is based on the 1993 estimate of approximately 1200 brown bears (2.4 bears/100 mi^2; Table 1). Availability of habitat for brown bears in this area has not changed substantially since 1993, harvest was below a conservative sustainable yield of 5%, and in most years the proportion of harvest was ≥60% males. Thus, it is likely that bear densities remained unaffected by reported harvest. There is a possibility the population increased or some expanded to new habitat, because local residents on the Yukon River observed more brown bears along the river corridor recently compared to years prior to 2000.

Units 26B and 26C — The current estimate of 269 brown bears (1.8 bears/100 mi^2) in Unit 26B was based on a population estimate conducted during 1999–2003 (H. Reynolds, ADF&G [retired], unpublished data). This recent estimate confirmed the reliability of the 1993 estimate which was 1.7 bears/100 mi^2. This is considered a low to moderate density of brown bears in the Arctic. At one time, we suspected that bear densities near Prudhoe Bay were at an artificially high concentration because food was available in dumpsters and in the Prudhoe Bay landfill and productivity of bears was high for northern Alaska (Shideler and Hechtel 2000). However; postweaning mortality was high (91%) due to human-induced mortality (R. Shideler, ADF&G, unpublished data). Thus, the subpopulation near Prudhoe Bay may or may not have been inflated. Human food was no longer available to bears in the Prudhoe Bay area during the report period.

The current estimate for Unit 26C is based on the 1993 estimate of approximately 390 brown bears. Availability of habitat for brown bears in this area has not changed substantially since

1993. Harvest was below a conservative sustainable yield of 5% since 1993, and in most years the proportion of harvest was ≥ 60% males. Thus, it is likely that bear populations were unaffected by reported harvest.

Reproductive Parameters

In Unit 26B, some reproductive parameters have been measured in conjunction with a research project investigating use of the North Slope oilfields by brown bears (Shideler and Hechtel 2000). Data collected through 2004 (R. Shideler, ADF&G, unpublished data) indicate that females that had access to human food were younger at age of first year of reproduction (6 yr, *n* = 5) compared with those that were not food conditioned (8.6 yr, *n* = 16). Litter size was similar at about 2 cubs per litter. Additionally, the mean reproductive interval was lower for food conditioned bears (3.3 yr) compared with non-food conditioned bears (4.8 yr), and reproductive parameters observed in the non-food conditioned bears were similar compared to other non-food conditioned brown bears in the Arctic (Reynolds 1981; Nagy et al. 1983; McLoughlin et al. 2003).

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. 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

Harvest

Season and Bag Limits RY04–RY06[a].

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 1 Mar–15 Jun

Units and Bag Limits	Resident Open Season	Nonresident Open Season
Unit 26B, that portion within the Dalton Highway Management Corridor		
RESIDENT HUNTERS: One bear every regulatory year by drawing permit only; up to 20 permits may be issued.	1 Sep–31 Dec	
One bear every regulatory year.	1 Mar–31 May	
NONRESIDENT HUNTERS: One bear every regulatory year by drawing permit only; up to 20 permits will be issued.		1 Sep–31 Dec 1 Mar–31 May
Remainder of 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–31 Dec 1 Mar–31 May
Unit 26C		
RESIDENT AND NONRESIDENT HUNTERS: One bear every regulatory year.	10 Aug–30 Jun	10 Aug–30 Jun

[a] There is a discrepancy in the codified regulation regarding the number of permits that may be issued for nonresident hunters.

Alaska Board of Game Actions and Emergency Orders.

March 2002 — In March 2002 a more liberal hunting season in Unit 25D was established in connection with the *Yukon Flats Cooperative Moose Management Plan* (ADF&G 2002), which resulted in a number of regulation proposals designed to reduce predation on moose. The Unit 25D brown bear season was extended from 1 September–31 May to 1 March–30 November. This extended season, particularly during the summer, provided opportunity for residents to take brown bears at their fish camps on the Yukon River.

In Unit 26B, the board established a drawing permit hunt (DB990) for brown bears in the Dalton Highway Corridor Management Area (DHCMA). Up to 10 permits could be issued and the bag limit was 1 bear every 4 years, with a 1 September–31 May season. This regulation was prompted by the increasing number of bow hunters using the DHCMA, and the desire to limit opportunistic brown bear hunting by inexperienced bow hunters in the open terrain in Unit 26B yet provide opportunity for bow hunters who intended to hunt brown bears.

March 2004 — 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 Alaska 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. All areas were changed to a 1 bear every year bag limit. Furthermore, several modifications to the brown bear permit hunts in Unit 26B were made: Hunt DB990 (archery only within the DHMCA) was changed from a resident and nonresident hunt to a resident only hunt because of modifications made to the nonresident hunts DB987 and DB997. The board also increased the number of permits that may be issued from 10 to 20 and limited the permit season to 1 September–31 December. Thus a general grizzly bear hunting season of 1 March–31 May was established for residents only. For the nonresident hunts DB987 and DB997, the hunt boundary was changed from "Unit 26B, outside the Dalton Highway Corridor Management Area" to "Unit 26B" (hunters were still required to hunt by archery only within the DHCMA). These hunts combined issued up to 10 permits. However, because of the modifications to all 3 hunts, there is a discrepancy in codified regulation as to the number of permits that can be issued for the nonresident hunts. I believe the intent was to increase the number of permits that may be issued from 10 to 20, similar to the resident hunt. A "housekeeping" proposal to clarify this should be submitted to the March 2008 Board of Game meeting. No proposals were submitted to the March 2006 meeting.

Hunter Harvest.

Units 25A, 25B, and 25D — In Unit 25A, 24 brown bears were reported harvested each year during the report period (RY04 and RY05; Table 2). The proportion of males in the harvest was 50% in both years. Most of the harvest occurred in the Chandalar drainage between the North Fork Chandalar and Wind River (67% and 71%). The remaining harvest took place in the Sheenjek or Coleen Rivers. Beginning in RY02, bear harvest increased by approximately 10 bears compared to the previous 5 years (RY97–RY01; range: 7–14). Most of the harvest was due to an increase in guided nonresident hunters. During the past 10 years (RY96–RY05), 180 brown bears were sealed, 58% were males (n = 176), and most bears were harvested in the fall (Table 2). No trends were detected in mean age and mean skull size during this period. The mean age of brown bears harvested was 7 (n = 22) and 8 (n = 21) years in RY04 and RY05 compared to a 10-year mean age of 8.9 years (RY96–RY05; n = 163). The mean skull size was 19.3 (n = 21) and 19.5 (n = 21) inches in RY04 and RY05 compared to a 10-year mean skull size of 19.3 inches (RY96–RY05; n = 173). Future analyses of mean age and mean skull size will involve analysis by sex also. Reported nonhunting kills were low (Table 2), and included defense of life or property (DLP), research mortalities, or other known human-caused accidental mortality.

In Units 25B and 25D, 2 and 1 brown bears were reported harvested in RY04 and RY05 (Table 3). Reported harvest in these 2 subunits was low in most years (2–6 bears; Table 3). In RY02, 10 brown bears were reported harvested which was likely related to efforts to increase bear harvest as prescribed in the *Yukon Flats Cooperative Moose Management Plan*. 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 and as a result, the harvest of bears by local residents increased on the Yukon Flats. We suspect that many bears were not reported because of the difficulty of sealing a bear in a remote area. Subsequently, the Council of Athabascan Tribal Government (CATG) conducted bear harvest interviews for RY05 with community hunters in Beaver, Birch Creek, Chalkyitsik, Circle, Fort Yukon, Stevens Village, and Venetie. During this survey, hunters reported killing 37 brown bears and 149 black bears (Thomas and Fleener, 2006 Yukon Flats moose, bear, and wolf harvest data collection final report, CATG unpublished data).

Some of these bears may have been killed as DLP rather than hunting. Nonetheless, many brown bears were not sealed.

Units 26B and 26C — In Unit 26B, 6 and 2 brown bears were reported harvested in RY04 and RY05 (Table 4). Since RY96, reported harvest ranged 2–25 bears and 113 bears were sealed. In most years the proportion of males exceeded 60% (Table 4). Recent reported harvests indicated that we are harvesting within a conservative sustainable yield of 5%. No trends were detected in mean age and mean skull size during the past 10 years, RY96–RY05 ($\bar{x}$ age = 7.6 years, $\bar{x}$ skull size = 19.6 inches). Due to small sample sizes in RY04 and RY05, no comparisons were made to the 10-year average.

Other human caused mortality has been documented in Unit 26B. Most of the reported nonhunting kill in Unit 26B were DLPs. Several were food-conditioned bears around Prudhoe Bay and the oilfield infrastructure, particularly in RY01 when 7 nonhunting kills were reported (Table 4). Substantial efforts by ADF&G and the North Slope Borough to address food-conditioned bears resulted in the borough using bear-proof dumpsters and making the dump inaccessible to bears. Harvest and nonhunting kills combined did not exceed 13 bears, except in RY01 (Table 4). It is worth noting that some marked bears that were killed by humans were not reported.

In Unit 26C, 10 and 14 brown bears were reported harvested in RY04 and RY05 (Table 5). The proportion of males in the harvest was 40% in RY04 and 38% in RY05. Since RY96, reported harvest ranged 2–14 bears annually, 88 bears were sealed and 56% were males (Table 5). Our management objective is to sustain an annual harvest of 19 brown bears (≥60% males) and since 1996, harvest has been below 19. No trends were detected in mean age and mean skull size during the past 10 years, RY96–RY05 ($\bar{x}$ age = 8.9 years, $\bar{x}$ skull size = 19.8 inches). Due to small sample sizes in RY04 and RY05, no comparisons were made to the 10-year average.

Permit Hunts. During RY04–RY05, nonresident hunters in Unit 26B were required to obtain drawing permits for the 1 September–31 December hunting season. The bag limit was 1 bear every regulatory year. For hunt DB987, 2 permits were available in RY04 and RY05, and 8 permits were available in RY06. No permits were issued in RY04, 1 permit was issued in RY05, and 6 permits were issued RY06 (Table 6). No bears were harvested RY04 and RY05 and 1 female bear was harvested in RY06 (Table 6). For hunt DB997, 4 permits were available and the season was 1 March–31 May. No permits were issued in RY04 and RY05 and 1 permit was issued in RY06. No bears were harvested during all 3 regulatory years (Table 6).

A drawing permit was required for Alaska residents hunting within the DHCMA in Unit 26B during the 1 September–31 December season. The bag limit was 1 bear every regulatory year. Fifteen permits were available in RY04 and RY05; and 20 in RY06 (Table 6). All available permits were issued and only 1 female bear was harvested in RY06 (Table 6).

Hunter Residency and Success.

Units 25A, 25B, and 25D — In Unit 25A, residents of Alaska took 50% (12) and 29% (7) of the reported harvest during RY04 and RY05, and nonresidents took 50% (12) and 71% (17) of the reported harvest. The proportion of nonresidents harvesting brown bears has been ≥48% since

1995 and frequently ≥70% (Table 7). In Units 25B and 25D, 2 brown bears were reported harvested by local residents in RY04 and 1 brown bear by an Alaskan resident in RY05 (Table 8). Generally, only a few local residents reported taking bears. Because local residents report infrequently, these figures probably under-represent the number taken by local hunters.

Units 26B and 26C — In Unit 26B, 100% (2) and 83% (5) of the reported harvest was taken by Alaska residents during RY04 and RY05. Since 1998 most of the reported harvest was taken by residents of Alaska when the permit system was more restricted for nonresidents and some guides were not present in the area (Table 9). In Unit 26C, 20% (2) and 50% (7) of the reported harvest was taken by Alaska residents during RY04 and RY05. In general, since 1995, a greater proportion of the harvest was taken by nonresidents (≥ 50%); although the total number of bears taken in Unit 26C was small (range: 6–14; Table 10).

Transport Methods. In Unit 25A, most brown bears were harvested during aircraft-supported hunts, with a few taken by hunters accessing the area by horse. In Units 25B and 25D, boats and snowmachines were used for transportation. In Unit 26B, hunters used aircraft, highway vehicles, and boats. In Unit 26C, hunters used aircraft.

Chronology of Harvest.

Units 25A, 25B, and 25D — In Unit 25A, 29% (n = 24) and 32% (n = 24) of the brown bears were harvested in August RY04 and RY05. The remaining bears were harvested in September. In previous years, there was no August season and only 1 or 2 bears were harvested in May. In Units 25B and 25D, most harvested bears were not reported, but data collected by CATG in 2005 indicated that bears in these subunits were harvested in June and September (Thomas and Fleener, 2006 Yukon Flats moose, bear, and wolf harvest data collection final report, CATG unpublished data).

Units 26B and 26C — In Unit 26B, 17% of the bears were harvested in May, 66% in September, and 17% in August (out of season) in RY04 (n = 6). The 2 bears reported harvested in RY05 were taken in September. In Unit 26C, 60% (n = 10) and 78% (n = 14) of the brown bears were harvested in August RY04 and RY05. The remaining bears were harvested in September.

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 (Thomas and Fleener, 2006 Yukon Flats moose, bear, and wolf harvest data collection final report, CATG unpublished data). Some of this mortality was probably DLP. Continued efforts are necessary to encourage local residents to report harvest and seal bears. As mentioned previously, mortality due to DLP was high in some years in Unit 26B.

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 (largely infanticide by male bears), 12% for yearlings, and 13% for 2-year-olds.

CONCLUSIONS AND RECOMMENDATIONS

Brown bear populations in the eastern Brooks Range and North Slope appear to be mostly stable since the late 1980s; although there may be a slight increase in the number of brown bears along the Yukon River according to observations by residents of the area. Reported harvest remained below conservative sustainable yields and considerable opportunity for brown bear hunting was available across the entire region. All management goals were met.

We partially met our first objective to 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. The reported harvest in Unit 25A was 24 bears in RY04 and in RY05 with 50% males in the harvest both years. Fifty percent males is below our management objective of a minimum of 60%; however over a 10-year period, the average proportion of males in the harvest was 58%. We will continue to monitor the harvest in Unit 25A, although we are still harvesting below sustained yield.

In Units 25B and 25D, few bears were reported harvested; however, household surveys conducted by CATG indicated that 37 brown bears were taken in Units 25D. This exceeds our first management objective of 29 brown bears, yet, our third management was to manage for a temporary reduction in brown bear numbers in Unit 25D to decrease predation on moose. Thus, there is some indication that we at least partially met our third management objective.

We partially met our second objective to maintain a brown bear population capable of sustaining a mean annual harvest of 13 bears in Unit 26B and 19 bears in Unit 26C, with a minimum of 60% males in the harvest. In Unit 26B, few bears were reported harvested and in most years over a 10-year period, the proportion of males in the harvest exceeded 60%. In Unit 26C, 10 and 14 brown bears were reported harvested in RY04 and RY05 and the proportion of males in the harvest was ≤40%. Forty percent males is below our management objective of a minimum of 60%; however over a 10-year period, the average proportion of males in the harvest was 56%. We will continue to monitor the harvest in Unit 26C, although we are still harvesting below sustained yield.

Management goals and objectives for moose populations have been considered in setting brown bear management goals and objectives in Unit 25D in accordance with the *Yukon Flats Cooperative Moose Management Plan* (ADF&G 2002). One of the goals of the plan is to increase moose numbers and reduce predation by grizzly bears, black bears, and wolves. Moose populations in many areas in Interior Alaska are currently limited by predation, and brown bears are an important predator on newborn moose calves (Gasaway et al. 1992; Bertram and Vivion 2002). In addition, goals and objectives for brown bear in Unit 25D are influenced the by state's intensive management law. The Board of Game determined that the moose population in Unit 25D is important for providing high levels of human consumptive use, and they must consider intensive management in this area if regulatory action to significantly reduce moose harvest becomes necessary. We will be developing and presenting an Intensive Management Plan for Unit 25D to the Board of Game to consider in March 2008. There is a possibility that more specific brown bear management objectives for Unit 25D may be developed from this plan.

Other ungulate populations of concern involving predation by brown bears include muskoxen on the eastern North Slope in Units 26B and 26C. Muskoxen numbers on the eastern North Slope have declined substantially and the decline (in combination with other factors) may be partially due to predation by brown bears (Lenart 2007). A research project investigating factors influencing this muskox population was initiated in spring 2007 and will continue through July 2008. More information about the effects of predation by brown bears on muskoxen may surface during this research project. Results of this research project may influence brown bear management objectives in Unit 26B in the future.

For the March 2008 BOG meeting, I recommend submitting a housekeeping proposal to clarify the number of drawing permits that may be issued for the nonresident hunts (DB987 and DB997) combined in Unit 26B. The clarification should be "up to 20 permits." In addition, I recommend opening the resident and nonresident brown bear season earlier in Unit 26B on 25 August instead of 1 September. Harvest has been below sustained yield and an earlier season would provide additional bear hunting opportunity when more caribou hunters are in the field. There may be additional proposals submitted depending on the outcome of the Intensive Management Plan for Unit 25D.

For the next report period, the management objectives will be:

- In Units 25A, 25B, 26B, and 26C, manage for a 3-year mean annual human-caused brown bear mortality of ≤5% of the current estimated brown bear population in each subunit.

- In Units 25A, 25B, 26B, and 26C, manage for a 3-year mean annual human-caused mortality of at least 60% males.

- In Unit 25D, manage for a temporary reduction in grizzly bear numbers and predation on moose. After moose populations increase to desired levels, reduce bear harvests to allow the bear population to recover.

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

LENART, E. A. 2007. Units 25A, 25B, 25D, 26B, and 26C brown bear. Pages 300–323 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Project 4.0. Juneau, Alaska, USA.

TABLE 1 Units 25A, 25B, 25D, 26B, and 26C brown bear population parameters and estimated sustainable harvest, 1993–2006[a]

Unit	Area (mi^2)	Estimated[a] 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

[a] Density estimates for Units 25A, 25B, 25D and Unit 26C were based on extrapolations from studies done in portions of the eastern Brooks Range or in similar habitat in the western Brooks Range during the 1980s and early 1990s. Density estimate for Unit 26B was based on an aerial line transect method conducted during 1999–2003.

TABLE 2 Unit 25A brown bear mortality, regulatory years 1995–1996 through 2005–2006

Regulatory year	Reported: Hunter kill[a] M	F	(%)	Unk	Total	Nonhunting kill[b] M	F	Unk	Total known kill M	(%)	F	(%)	Unk	Total
1995–1996														
Fall 1995	10	4	(29)	0	14	0	1	0	10	(67)	5	(33)	0	15
Spring 1996	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	10	4	(29)	0	14	0	1	0	10	(67)	5	(33)	0	15
1996–1997														
Fall 1996	11	9	(45)	1	21	0	0	0	11	(55)	9	(45)	1	21
Spring 1997	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	11	9	(45)	0	21	0	0	0	11	(55)	9	(45)	1	21
1997–1998														
Fall 1997	6	6	(50)	0	12	1	0	0	7	(54)	6	(46)	0	13
Spring 1998	0	2	(100)	0	2	0	0	0	0	(0)	2	(100)	0	2
Total	6	8	(57)	0	14	1	0	0	7	(47)	8	(53)	0	15
1998–1999														
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
1999–2000														
Fall 1999	11	2	(15)	0	13	0	0	0	11	(85)	2	(15)	0	13
Spring 2000	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	11	2	(15)	0	13	0	0	0	11	(85)	2	(15)	0	13
2000–2001														
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
2001–2002														

Regulatory year	Reported												
	Hunter kill[a]					Nonhunting kill[b]			Total known kill				
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
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
2002–2003														
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
2003–2004														
Fall 2003	11	13	(54)	1	25	1	0	0	12	(48)	13	(52)	1	26
Spring 2004	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	11	13	(54)	1	25	1	0	0	12	(48)	13	(52)	1	26
2004–2005														
Fall 2004	12	12	(50)	0	24	0	0	0	12	(50)	12	(50)	0	24
Spring 2005	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	12	12	(50)	0	24	0	0	0	12	(50)	12	(50)	0	24
2005–2006														
Fall 2005	12	12	(50)	0	24	0	0	0	12	(50)	12	(50)	0	24
Spring 2006	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	12	12	(50)	0	24	0	0	0	12	(50)	12	(50)	0	24

[a] Includes permit harvest.
[b] Includes DLP kills, research mortalities, and other known human-caused mortality.

TABLE 3 Units 25B and 25D brown bear mortality, regulatory years 1995–1996 through 2005–2006

Regulatory year	Reported								Total known kill				
	Hunter kill[a]					Nonhunting kill[b]							
	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	1	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

Regulatory year	Reported: Hunter kill[a] M	F	(%)	Unk	Total	Nonhunting kill[b] M	F	Unk	Total known kill 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	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	1	0	0	1	(100)	0	(0)	0	1
Total	6	4	(40)	0	10	1	0	0	7	(64)	4	(36)	0	11
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	1	0	0	1	(100)	0	(0)	0	1
Total	1	0	(0)	0	1	1	0	0	2	(100)	0	(0)	0	2
2004–2005														
Fall 2004	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 2005	1	0	(0)	0	1	1	0	0	2	(100)	0	(0)	0	2
Total	2	0	(0)	0	2	1	0	0	3	(100)	0	(0)	0	3
2005–2006														
Fall 2005	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Spring 2006	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] Includes DLP kills, research mortalities, and other known human-caused mortality.

TABLE 4 Unit 26B brown bear mortality, regulatory years 1995–1996 through 2005–2006

Regulatory year	Reported: Hunter kill[a] M	F	(%)	Unk	Total	Nonhunting kill[b] M	F	Unk	Total known kill 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[c]														
Fall 1996	15	7	(32)	0	22	1	0	0	16	(70)	7	(30)	0	23
Spring 1997	1	2	(67)	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[c]														
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)	1	(100)	0	1
Total	1	2	(67)	0	3	0	1	0	1	(25)	3	(75)	0	4
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	1	1	0	7	(58)	5	(42)	0	12
Spring 2001	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	7	4	(36)	0	11	1	1	0	8	(62)	5	(38)	0	13

Regulatory year	Reported: Hunter kill[a] M	F	(%)	Unk	Total	Nonhunting kill[b] M	F	Unk	Total known kill M	(%)	F	(%)	Unk	Total
2001–2002[d]														
Fall 2001	10	3	(23)	0	13	2	4	1	12	(63)	7	(37)	1	20
Spring 2002	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	11	3	(21)	0	14	2	4	1	13	(65)	7	(35)	1	21
2002–2003														
Fall 2002	4	2	(33)	0	6	1	1	0	5	(63)	3	(37)	0	8
Spring 2003	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	4	2	(33)	0	6	1	1	0	5	(63)	3	(37)	0	8
2003–2004														
Fall 2003	4	2	(33)	0	6	1	0	0	7[e]	(71)	2	(29)	0	9
Spring 2004	0	1	(100)	0	1	0	0	0	0	(0)	1	(100)	0	1
Total	4	3	(43)	0	7	1	0	0	7[e]	(62)	3	(38)	0	10
2004–2005														
Fall 2004	2	3	(60)	0	5	0	0	0	2	(40)	3	(60)	0	5
Spring 2005	1	0	(0)	0	1	0	0	0	1	(100)	0	(0)	0	1
Total	3	3	(50)	0	6	0	0	0	3	(50)	3	(50)	0	6
2005–2006														
Fall 2005	0	2	(100)	0	2	0	1	0	0	(0)	3	(100)	0	3
Spring 2006	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	0	2	(100)	0	2	0	1	0	0	(0)	3	(100)	0	3

[a] Includes permit harvest.
[b] Includes DLP kills, research mortalities, and other known human-caused mortality.
[c] Harvest was high in regulatory years 1996 and 1997 because the nonresident drawing permit hunts (Db987 and DB997) were eliminated. They were reinstated in 1998.
[d] There were several DLP bears in the Prudhoe Bay complex because they were food-conditioned bears and garbage was not properly managed.
[e] Two marked bears known to be harvested were not reported.

TABLE 5 Unit 26C brown bear mortality[a,b], regulatory years 1995–1996 through 2005–2006

Regulatory year	Reported								Total known kill				
	Hunter kill					Nonhunting kill[b]							
	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	(67)	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	1	0	0	7	(78)	2	(22)	0	9
Spring 2000	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	6	2	(25)	0	8	1	0	0	7	(78)	2	(22)	0	9
2000–2001														
Fall 2000	8	5	(38)	0	13	1	0	1	9	(64)	5	(36)	0	15
Spring 2001	0	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	15

Regulatory year	Reported								Total known kill				
	Hunter kill					Nonhunting kill[b]							
	M	F	(%)	Unk	Total	M	F	Unk	M	(%)	F	(%)	Unk	Total
2001–2002														
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
2002–2003														
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
2003–2004														
Fall 2003	2	4	(66)	0	6	0	0	0	2	(33)	4	(67)	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	(67)	0	6
2004–2005														
Fall 2004	4	6	(60)	0	10	1	1	0	5	(42)	7	(58)	0	12
Spring 2005	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	4	6	(60)	0	10	1	1	0	5	(42)	7	(58)	0	12
2005–2006														
Fall 2005	5	8	(62)	1	14	1	0	0	6	(43)	8	(57)	1	15
Spring 2006	0	0	(0)	0	0	0	0	0	0	(0)	0	(0)	0	0
Total	5	8	(62)	1	14	1	0	0	6	(43)	8	(57)	1	15

[a] Includes permit harvest.
[b] Includes DLP kills, research mortalities, and other known human-caused mortality.

TABLE 6 Unit 26B brown bear harvest data by permit hunt, regulatory years 2000–2001 through 2006–2007

Hunt[a]	Regulatory year	Permits available	Permits issued	Number Reported	Did not Hunt (%)	Unsuccessful (%)	Successful (%)	Males	Females	Unk	Total harvest
DB987	2000–2001	2	2	2	0 (0)	0 (0)	2 (100)	2	0	0	2
	2001–2002	2	1	1	0 (0)	0 (0)	1 (100)	0	1	0	1
	2002–2003	2	1	1	1 (100)						0
	2003–2004	2	0								0
	2004–2005	2	0								0
	2005–2006	2	1	1	1 (100)	0 (0)	0 (0)	0	0	0	0
	2006–2007	8	6	6	1 (17)	4 (80)	1 (20)	0	1	0	1
DB997	2000–2001	2	0								0
	2001–2002	2	1	1	1 (100)	0 (0)	0 (0)	0	0	0	0
	2002–2003	2	0								0
	2003–2004	2	0								0
	2004–2005	4	0								0
	2005–2006	4	0								0
	2006–2007	4	1	1	1 (100)						0
DB990	2002–2003	6	6	6	1 (17)	5 (100)					0
	2003–2004	6	6	4	2 (50)	0 (0)	2 (100)	1	1	0	2
	2004–2005	15	15	12	7 (58)	4 (80)	1 (20)	0	1	0	1
	2005–2006	15	15	15	5 (33)	9 (90)	1 (10)	0	1	0	1
	2006–2007	20	20	19	12 (63)	6 (86)	1 (14)	0	1	0	1

[a] DB987 was for nonresidents outside of the Dalton Highway Corridor Management Area (DHMCA) in the fall during regulatory years 2000–2001 through 2003–2004. Beginning in regulatory year 2004–2005, the hunt area was all of Unit 26B.

DB997 was for nonresidents outside of the DHMCA in the spring during regulatory years 2000–2001 through 2003–2004. Beginning in regulatory year 2004–2005, the hunt area was all of Unit 26B.

DB990 was instituted beginning in regulatory year 2002 and was a resident and nonresident drawing hunt within the DHCMA. Beginning in regulatory year 2004–2005, it was a resident only hunt.

TABLE 7 Unit 25A residency of successful brown bear hunters, regulatory years 1995–1996 through 2005–2006

Regulatory year	Local resident[a] (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
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 (8)	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
2004–2005	0 (0)	12 (50)	12 (50)	24
2005–2006	0 (0)	7 (29)	17 (71)	24

[a] Includes only residents of the subunit.

TABLE 8 Unit 25B and 25D residency of successful brown bear hunters, regulatory years 1995–1996 through 2005–2006

Regulatory year	Local resident[a] (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
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
2004–2005	2 (100)	0 (0)	0 (0)	2
2005–2006	0 (0)	1 (100)	0 (0)	1

[a] Includes only residents of the subunit.

TABLE 9 Unit 26B residency of successful brown bear hunters[a], regulatory years 1995–1996 through 2005–2006

Regulatory year	Local resident[b] (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1995–1996	0 (0)	6 (55)	5 (45)	11
1996–1997	1 (4)	11 (44)	13 (52)	25
1997–1998	0 (0)	9 (36)	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
2004–2005	0 (0)	5 (83)	1 (17)	6
2005–2006	0 (0)	2 (100)	0 (0)	2

[a] Includes permit harvest.

[b] Includes only residents of the subunit.

TABLE 10 Unit 26C residency of successful brown bear hunters[a], regulatory years 1995–1996 through 2005–2006

Regulatory year	Local[b] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
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
2004–2005	0 (0)	2 (20)	8 (80)	10
2005–2006	0 (0)	7 (50)	7 (50)	14

[a] Includes permit harvest.

[b] Includes only residents of the subunit.

WILDLIFE

MANAGEMENT REPORT

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 P.O. BOX 115526
JUNEAU, AK 99811-5526

BROWN BEAR MANAGEMENT REPORT

From: 1 July 2004
To: 30 June 2006

LOCATION

GAME MANAGEMENT UNIT: 26A (56,000 mi^2)

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 outside the state, have continued to show an interest in hunting bears in Unit 26A. Subsistence hunting regulations allow residents to hunt brown bears primarily for food in Unit 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^{o} 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 km^2 with a 95% confidence interval of 28.1–31.5 bears/1000 km^2 (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). The drawing permit hunt has since been eliminated, but 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 km^2 on the coastal plain, 10–30 bears/1000 km^2 in the foothills, and 10–20 bears/1000 km^2 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

Unit and Bag Limits	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 26A General Hunt Resident and Nonresident Hunters: 1 bear every regulatory year.	1 Aug–31 May	1 Aug–31 May
Unit 26A Subsistence Hunt Resident Hunters: 1 bear per regulatory year by registration permit	1 July–31 May	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 the Alaska Department of Fish and Game (ADF&G), guides, and hunters.

During the fall 2003 meeting the Board of Game did away with the Northwest Alaska Brown Bear Management Area regulation and created a Unit 26A subsistence registration brown bear hunt that is designed for people who hunt bears for food. Tags and sealing procedures are not required, hunters cannot use aircraft for transportation, and people can report by mail.

During the fall 2005 meeting, the Board of Game lengthened the seasons for the general brown bear hunt from 20 Aug–31 May to 1 Aug–31 May and the season for the subsistence registration brown bear hunt from 20 Aug–31 May to 1 July–31 May.

Human-Induced Harvest. Fifteen bears were sealed during 2004–2005. No bears were reported killed in defense of life and property (DLP). All 15 bears were killed in Unit 26A East (Table 1). Eleven bears were males and 4 were females (Table 2).

Only 2 sealing certificates were received at the Barrow office or at ADF&G's Information Management Section during 2005–2006. Both bears were killed in Unit 26A East (Table 1). Both were males (Table 2). There were no DLP kills reported. It seems improbable that only 2 bears were actually harvested. It is more likely that several sealing certificates were somehow lost in the harvest reporting system.

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 the unreported estimated kill column on 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 2004–2005 (15 bears) was similar to recent years (14 in 2002–2003 and 16 in 2003–2004), 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 2004–2005, the mean skull size for males was 21.1 inches and 19.2 inches for females; the mean age was 9.9 years for males and 7.5 years for females. During 2005–2006 the mean skull size for males was 23.5 inches and the mean age was 19 years. There were no females reported harvested (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 subsistence permit hunt.

Hunter Residency and Success. Of the 15 bears sealed in Unit 26A during 2004–2005, 9 were harvested by nonresidents, 6 by nonlocal Alaska residents, and 0 by North Slope residents. During 2005–2006, 1 of 2 bears was reported harvested by a nonresident and 1 by a nonlocal Alaska resident (Table 4).

Harvest Chronology. During 2004–2005, 8 bears were harvested during August and 7 in September. During 2005–2006, 1 bear was reported harvested in August and 1 in September (Table 5).

Transport Methods. Most bear hunters continued to use aircraft as transportation in Unit 26A. During 2004–2005, 12 hunters used aircraft for transportation and 3 used a boat. During 2005–2006 both hunters used aircraft for transportation. (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 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 15 bears harvested during 2004–2005. 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. We received only 2 sealing certificates in 2005-2006. It is unlikely the there were so few bears harvested and we are continuing to search within the ADF&G system to try to find any missing certificates.

Oil, gas, and mineral exploration and development are potential hazards to brown bear habitat. Reynolds (personal communication) 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 alternate hunting regulations for subsistence users. The regulations are designed for people who hunt bears for food. The regulation eliminates tags and sealing procedures and allows 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. The season was again lengthened in 2005, so the general season starts on 1 August and the subsistence season on 1 July. It has been surprising that, since 1996, the bear harvest has been less than before the regulations were liberalized. This might be explained by 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 be selective toward males. Because the harvest remains well below the allowable sustained yield of approximately 51 bears, we recommend no changes in regulations.

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

CARROLL, G. 2007. Unit 26A brown bear management report. Pages 324–339 *in* P. Harper, editor. Brown bear management report of survey and inventory activities 1 July 2004–30 June 2006. Alaska Department of Fish and Game. Juneau, Alaska.

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	2004–2005	2005–2006
26A West	400	20	6	0	4	4	0	0
26A East	500–720	25–36	12	13	10	12	15	2
Total	900–1200	45–56	18	13	14	16	15	2

[a] Includes DLP bears

TABLE 2 Unit 26A brown bear harvest[a], 1985–2006

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	(54)	6	(46)		13				
Spring 1996	6	(60)	3	(30)	1(10)	10				
Total	13	(57)	9	(39)	1(10)	23	2	25	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
2004-2005[c]	11	(73)	4	(27)		15	0	15	6-12	21-27
2005-2006[c]	2	(100)	0	(0)		2	0	2	6-12	8-14

[a] Permit hunt harvest included.

[b] Includes DLP kills, research mortalities, and other known human-caused accidental mortality

[c] In 2004-2005 and 2005-2006 bears were only harvested in the fall.

TABLE 3 Unit 26A brown bear skull size and age, 1985–2006

	Mean skull size, inches				Mean age, years			
Regulatory year	Male	*N*	Female	*N*	Male	*n*	Female	*n*
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
2004-2005	21.1	10	19.2	4	9.9	10	7.5	4
2005-2006	23.5	2	-	0	19	2	-	0

TABLE 4 Unit 26A brown bear successful hunter[a] residency, 1985–2006

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
2004-2005	0	6	9	0	15
2005-2006	0	1	1	0	2

[a] Hunters in permit hunts are included.
[b] Local means North Slope residents.

TABLE 5 Unit 26A brown bear harvest chronology by time period, 1985–2006

Regulatory year	Aug	Sep	Oct	Nov	Apr	May	June	*N*
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
2004-2005	8	7	0	0	0	0	0	15
2005-2006	1	1	0	0	0	0	0	2

TABLE 6 Unit 26A brown bear harvest[a] percent by transport method, 1985–2006

Regulatory	Transport method for brown bear harvest														
	Airplane		Horse		Boat		Snowmachine		ORV		Walk		Unknown		Total
Year	*n*	(%)	*n*	(%)	*n*	(%)	*n*	(%)	*N*	(%)	*n*	(%)	*n*	(%)	*n*
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	(81)			3	(11)	1	(4)	1	(4)					26
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
2004-2005	12	(80)			3	(20)									15
2005-2006	2	(100)													

[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.

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