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Division of Wildlife Conservation

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# BLACK BEAR



Grants W-24-1, W-24-2, W-24-3

Study 17.0

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**STATE OF ALASKA**  
**Tony Knowles, Governor**

**DEPARTMENT OF FISH AND GAME**  
**Frank Rue, Commissioner**

**DIVISION OF WILDLIFE CONSERVATION**  
**Wayne L. Regelin, Director**

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## **LOCATION**

**GAME MANAGEMENT UNIT:** Unit 1A (5,300 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** That portion of Unit 1 lying south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound.

## **BACKGROUND**

Information about black bears in Subunit 1A is limited to harvest sealing records, anecdotal hunter reports, and observations by department staff. Based on these sources, we believe black bears have remained at relatively high levels throughout the subunit during this report period. The average harvest of nearly 68 bears per season (1985-1992) dropped to 43 during the past 3 seasons, largely due to a decrease in nonresident hunting effort.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Our management objective for Unit 1A black bears is to maintain an average skull size of at least 17.5 inches for male bears harvested each spring and regulatory season. This objective supersedes our previous objective of maintaining a 17.2 inch average for male bears harvested each spring (Larsen 1993).

## **METHODS**

We collected black bear harvest data from successful hunters through a mandatory sealing program initiated in 1973. At the time of sealing, we recorded date and location of kill, numbers of days afield, sex, and skull measurements (length plus zygomatic width). We sent premolar teeth extracted from sealed skulls to Matson's Laboratory (Milltown, MT) to determine the age of harvested bears.

In an effort to better compare and evaluate hunter success among the past 15 seasons, we ranked the average numbers of hunter-days expended for harvested bears, mean skull measurements of harvested bears, and average ages of harvested bears. We then summed the rank values from each of these categories to derive an overall seasonal score. We associate lower combined values with better seasons.

During fall 1994 we captured and relocated garbage-habituated bears from the Ketchikan landfill. Snares and culvert traps were used to capture bears, and we transported them using Bell 206 Jet Long-Rangers provided by the Ketchikan Pulp Company (KPC).

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

In the absence of research or quantitative surveys, we cannot draw definitive conclusions about the status of the Unit 1A black bear population. Based on available harvest information, public reports, and staff observations, we believe the population has remained relatively stable during this report period.

Clearcut logging continues in the subunit. Although clearcuts generally provide bears with an abundance of edible forbs and shrubs during the first ten to twenty years postlogging, they become unproductive as conifer canopies close and eventually prevent sunlight from penetrating to the forest floor. As second growth canopies close, bear populations in those areas are expected to decline (Suring et al. 1988, Wood 1990).

### *Population Size*

Poelker and Hartwell (1973) estimated a minimum density of 1.4 black bears/mi<sup>2</sup> within their study area in western Washington. Wood (1990) speculated that minimum black bear densities in most of Unit 1A are higher than those reported for Washington. He estimated a density of 1.5 bears/mi<sup>2</sup> for most of the forested islands and mainland and lower densities for the more barren portions of the mainland. Using Wood's (1990) figures, we estimate Unit 1A is home to about 5,000 black bears (ADF&G unpubl. data, Ketchikan).

The Ketchikan landfill, home to several garbage-habituated bears for many years, was closed during fall 1994 when the city changed to a baling facility. Having observed over twenty different bears at the landfill, and anticipating potential problems once they were displaced from their long-established feeding area, we initiated a trapping and relocation project in September 1994. Prior to the bears' hibernating in October, we captured and relocated 5 males and 3 females to the Cleveland Peninsula (ADF&G unpubl. data, Ketchikan). Because of the numbers of bears observed at the landfill, we anticipate capturing and relocating several more bears during the next report period.

### *Population Composition*

We lack information to estimate the sex and age composition of the Unit 1A black bear population. Most harvested bears are males because hunters consistently select large bears.

We expect to be able to assess the reproductive history of harvested females using information provided by Matson's Lab. Technicians at the lab recently discovered that distinct markings develop on sows' teeth during years in which they give birth. As an example, one of the sows captured and relocated from the Ketchikan landfill during September 1994 was 22 years old and had given birth to cubs at ages 6, 8, 10, 12, 16, 18, and 20.

### *Distribution and Movement*

Black bears inhabit the mainland and adjacent islands of Unit 1A. The black color phase is most common and occurs throughout the bears' range. The cinnamon color phase occurs only in mainland portions of the subunit.

Bear research completed near Petersburg in Unit 3 indicated that home ranges vary from 1.7-16.2 mi<sup>2</sup> (Erickson et al. 1982). Movement patterns vary greatly among individual bears.

## **MORTALITY**

### *Harvest*

#### Season and Bag Limit

Sept. 1-June 30

Resident hunters: 2 bears, not more than one of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Hunter Harvest. After averaging over 66 bears per season during 1984-1992, the Unit 1A harvest declined to an average of 43 bears per season during this report period (Table 1). This decline seems linked to a decrease in local and nonresident hunting effort rather than a decline in bear numbers. Similar to prior seasons, males composed over 70% of the bears taken during this report period.

Hunters continue to harvest bears from throughout the subunit. The highest harvests continue to come from Wildlife Analysis Areas (WAAs) 406, 407, and 510 (Table 2). In WAA 406, which consists of Carroll Inlet, hunters took 27% of the subunit harvest during this report period; WAA 407 (George Inlet and the Ward Cove-Harriet Hunt Lake road) accounted for 18% of the harvest; and WAA 510 (northwest Revillagigedo Island) held 12% of the harvest. Because of its proximity to Ketchikan, WAA 406 is a popular recreational area for residents of Ketchikan. Additionally, Coastguardsmen at the Shoal Cove Loran station in Carroll Inlet regularly harvest bears from the area. WAA 407 is also easily accessed by Ketchikan residents, by boat up George Inlet and by highway vehicle up the Ward Cove-Harriet Hunt Lake road system. Each season Ketchikan residents and personnel from the Neets Bay fish hatchery take several of the bears in WAA 510.

Our newly established management objective of maintaining an average skull size  $\geq 17.5$  inches for spring and annually harvested males was achieved in all but the spring 1994 season during this report period. During spring 1994, male skulls averaged 17.4 inches (Table 3). Female skull measurements averaged 15.7 inches or greater during this report period. We conclude that hunters continue to select for large bears.

During this report period we received a USDA Forest Service grant to age archived teeth from bears harvested in Unit 1A at Matson's Lab. Average male ages have ranged from 7-11 years during the past 13 years, while female averages have ranged from 6-12 years (Table 3). Although ages are not yet available for the 1994/95 season, the average age of males harvested during 1992-1994 was 8.7 years, and the average age for females was 9.0 years.

Hunter Residency and Success. Local residents harvested 70% of the black bears during each of the past 3 seasons, while other state residents killed 3-12% of the bears; nonresidents took 18-27% of the harvest (Table 1).

We base hunter success on information from successful hunters during the sealing process. To calculate success, we have incorporated average days expended per harvested bear along with mean skull measurements and ages of bears (Table 4). Using this method of assessment, we could not identify any trends. Of the 12 seasons for which we obtained scores (scores could not be established for the 1980/81, 1989/90, and 1994/95 seasons because of missing age data), 1991/92, with its lowest ranking score, was identified as the most "successful" season. The second most successful season was 1988/89, followed closely by 1992/93 and 1993/94. The least successful season during the past 12 years was 1983/84 (Table 4).

Harvest Chronology. Most black bears harvested in Unit 1A are taken during spring. The May 11-31 period consistently has the highest spring harvests (Table 5). During 1983-95, 57% of the spring kill occurred during this 3-week period.

The first 10 days of September are the most productive period during the fall season (Table 5). During 1983-94, hunters took 37% of the fall harvest during this 10-day period.

Transport Methods. Boats continue to provide most of the transportation for Unit 1A bear hunters (Table 1). Although airplanes have historically provided the second most popular source of transportation for hunters, use of highway vehicles equaled or exceeded airplane use in each of the 3 seasons of this report period. We believe the increase in roads in the Ketchikan area has caused this shift in transportation.

#### **NONREGULATORY MANAGEMENT PROBLEMS AND NEEDS**

Habitat changes continue to occur from clearcut logging. Although early succession stages (3-20 years) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory plants as conifer canopies close and light cannot penetrate to the forest floor. Second growth stands lack large hollow trees and root masses used for denning habitat. Although logging may create food for bears initially, the long-term result of logging will be a decline in bear numbers.

#### **CONCLUSIONS AND RECOMMENDATIONS**

Harvest records indicate the annual black bear kill in Unit 1A remains low relative to the estimated population and is heavily skewed toward males, and the average skull size of harvested bears has not changed. Our objective of maintaining an average spring and annual skull size for males of 17.5 inches is being met.

While the annual harvest only composes about 1% of the estimated Unit 1A black bear population, close attention should be paid to specific WAAs to ensure that local over-harvesting does not occur. Especially critical are WAAs 406, 407, and 510 where access is relatively easy, interest is high, and hunters took over 52% of the 1990-95 harvest.

As logging continues and more habitat is converted to second growth forest, we anticipate reductions in bear numbers. Research is needed to better identify and understand the magnitude of these reductions.

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Table 1 Unit 1A black bear harvest, hunter residency, and hunter transport, 1980-95<sup>a</sup>.

Years	Season	Harvest				Hunter Residency				Transport				
		Males	Females	Unk	Total	Local	State	N.R.	Unk	Air	Boat	Road	Other	Unk
1980/81	Fall	3	5	0	8	4	1	3	0	5	2	0	1	0
	Spring	21	2	0	23	17	2	4	0	2	16	3	0	0
	Total	24	7	0	31	21	3	7	0	7	18	3	1	2
1981/82	Fall	5	2	0	7	6	0	1	0	2	5	0	0	0
	Spring	26	2	0	28	19	0	9	0	10	17	1	0	0
	Total	31	4	0	35	25	0	10	0	12	22	1	0	0
1982/83	Fall	5	2	1	8	2	0	5	1	7	1	0	0	0
	Spring	21	4	1	26	21	0	5	0	7	14	3	2	0
	Total	26	6	2	34	23	0	10	1	14	15	3	2	0
1983/84	Fall	14	10	0	24	1	17	5	1	5	11	2	5	1
	Spring	18	6	0	24	20	3	0	1	3	16	4	0	1
	Total	32	16	0	48	21	20	5	2	8	27	6	5	2
1984/85	Fall	11	16	0	27	11	0	11	5	6	11	2	3	5
	Spring	29	1	0	30	22	4	2	2	5	17	6	1	1
	Total	40	17	0	57	33	4	13	7	11	28	8	4	6
1985/86	Fall	15	12	1	28	13	0	12	3	6	13	1	0	8
	Spring	34	6	0	40	23	11	4	2	4	29	4	1	2
	Total	49	18	1	68	36	11	16	5	10	42	5	1	10
1986/87	Fall	16	9	1	26	15	1	10	0	10	12	2	2	0
	Spring	39	4	0	43	27	4	12	0	7	30	0	6	0
	Total	55	13	1	69	42	5	22	0	17	42	2	8	0
1987/88	Fall	13	9	1	23	14	2	4	3	5	9	9	0	0
	Spring	39	4	0	43	34	3	6	0	6	26	11	0	0
	Total	52	13	1	66	48	5	10	3	11	35	20	0	0

Table 1 Continued

Years	Season	Harvest				Hunter Residency				Transport				
		Males	Females	Unk	Total	Local	State	N.R.	Unk	Air	Boat	Road	Other	Unk
1988/89	Fall	11	5	1	17	11	0	2	4	2	5	8	0	2
	Spring	29	2	12	43	19	1	23	0	11	28	4	0	0
	Total	40	7	13	60	30	1	25	4	13	33	12	0	2
1989/90	Fall	5	1	4	10	5	0	4	1	2	4	1	1	2
	Spring	43	5	10	58	37	9	10	2	0	42	14	0	2
	Total	48	6	14	68	42	9	14	3	2	46	15	1	4
1990/91	Fall	10	3	3	16	14	1	0	1	0	13	4	5	2
	Spring	62	5	2	69	45	13	11	0	8	56	4	1	0
	Total	72	8	5	85	59	4	11	1	8	69	8	6	2
1991/92	Fall	12	7	3	22	15	3	4	0	4	10	1	7	0
	Spring	33	3	1	37	16	5	16	0	6	24	5	2	0
	Total	45	10	4	59	31	8	20	0	10	34	6	9	0
1992/93	Fall	5	8	0	13	9	1	3	0	0	8	4	1	0
	Spring	18	2	0	20	14	0	6	0	0	14	2	4	0
	Total	23	10	0	33	23	1	9	0	0	22	6	5	0
1993/94	Fall	9	1	0	10	8	0	2	0	1	6	2	1	0
	Spring	37	3	0	40	27	6	7	0	1	29	8	2	0
	Total	46	4	0	50	35	6	9	0	2	35	10	3	0
1994/95	Fall	6	1	0	7	6	1	0	0	2	2	2	1	0
	Spring	31	8	0	39	26	3	10	0	4	29	4	2	0
	Total	37	9	0	46	32	4	10	0	6	31	6	3	0

\*Does not include DLP, road, or illegal kills.

Table 2 Unit 1A annual black bear harvest by Wildlife Analysis Area (WAA), 1990-1995.

WAA	1990/91			1991/92			1992/93			1993/94			1994/95			Totals			
	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
101							2									2			2
303														1			1		1
404	4			6	1		3			4			2			19	1		20
405	1	1								2						3	1		4
406	20	1	1	8	2		4	3		16	1		10 <sup>a</sup>	2	1 <sup>a</sup>	58	9	2	69
407	5		1	6 <sup>b</sup>			3	2		7			7	5		28	7	1	36
408	1		1	2 <sup>a</sup>	1			5 <sup>ab</sup>								3	6	1	10
509	2			1	1		3	1		2 <sup>a</sup>			3 <sup>a</sup>			11	2		13
510	9 <sup>a</sup>	4		7	2		3	1		7	1		4	1		30	9		39
511	2			1			1									4			4
612													1			1			1
613				1			1	2		2				1		4	3		7
614										1	1					1	1		2
715	2	1		1												3	1		4
716	3	1		2	1											5	2		7
718													1			1			1
719	3			1	1											4	1		5
820	2			2			1						1			6			6
822	10			3			2			4	1		3			22	1		23

Table 2 Continued

	1990/91			1991/92			1992/93			1993/94			1994/95			Totals			
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
823	4			4	1					2			6			16	1		17
824	4															4			4
826			2 <sup>a</sup>															2	2

<sup>a</sup>Includes DLP kills.

<sup>b</sup>Includes road kills.

Table 3 Unit 1A hunter effort, mean skull sizes, and ages for harvested black bears, 1980-1995.

Years	Season	Hunter Effort			Mean Skull Size <sup>a</sup> (in)				Average Age (years) <sup>b</sup>			
		Total Days	No. Hunters	Avg. Days Per Hunter	Male	(n) <sup>c</sup>	Female	(n)	Male	(n)	Female	(n)
1980/81	Fall	24	8	3.0	15.7	(3)	15.8	(4)				
	Spring	56	23	2.4	17.6	(16)	14.6	(1)				
	Total	80	31	2.6	17.3	(19)	15.5	(5)				
1981/82	Fall	18	7	2.6	17.0	(5)	14.5	(1)				
	Spring	70	28	2.5	17.8	(24)	16.1	(2)				
	Total	88	35	2.5	17.7	(29)	15.5	(3)	8.0	(19)	12.0	(2)
1982/83	Fall	23	8	2.9	16.8	(5)	16.8	(2)				
	Spring	105	26	4.0	17.1	(20)	16.2	(3)				
	Total	128	34	3.8	17.1	(25)	16.4	(5)	7.0	(17)	11.0	(5)
1983/84	Fall	57	24	2.4	16.7	(10)	15.7	(10)				
	Spring	73	24	3.0	18.0	(15)	16.5	(4)				
	Total	130	48	2.7	17.5	(25)	15.9	(14)	7.2	(18)	6.3	(12)
1984/85	Fall	49	26	1.9	16.0	(11)	15.9	(16)				
	Spring	90	28	3.2	18.2	(24)	16.0	(1)				
	Total	139	54	2.6	17.5	(35)	15.9	(17)	7.0	(27)	9.7	(12)
1985/86	Fall	79	25	3.2	17.4	(11)	15.8	(10)				
	Spring	95	40	2.4	18.3	(32)	15.4	(5)				
	Total	174	65	2.7	18.1	(43)	15.7	(15)	8.0	(31)	9.4	(12)
1986/87	Fall	52	26	2.0	17.1	(13)	15.6	(9)				
	Spring	123	43	2.9	17.5	(36)	16.4	(4)				
	Total	175	69	2.5	17.4	(49)	15.8	(13)	7.8	(44)	9.8	(13)
1987/88	Fall	38	22	1.7	18.4	(10)	15.7	(8)				
	Spring	125	43	2.9	18.1	(36)	15.5	(4)				
	Total	163	65	2.5	18.1	(46)	15.6	(12)	7.9	(39)	6.3	(9)

Table 3 Continued

Years	Season	Hunter Effort			Mean Skull Size <sup>a</sup> (in)				Average Age (years) <sup>b</sup>			
		Total Days	No. Hunters	Avg. Days Per Hunter	Male	(n) <sup>c</sup>	Female	(n)	Male	(n)	Female	(n)
1988/89	Fall	32	13	2.5	17.5	(7)	16.1	(4)				
	Spring	131	43	3.0	18.8	(27)	16.2	(1)				
	Total	163	56	2.9	18.5	(34)	16.1	(5)	10.0	(15)	7.0	(1)
1989/90	Fall	19	8	2.4	17.1	(5)	----	(0)				
	Spring	151	56	2.7	18.5	(39)	16.0	(5)				
	Total	170	64	2.6	18.4	(44)	16.0	(5)				
1990/91	Fall	16	13	1.2	16.7	(9)	16.4	(3)				
	Spring	272	67	4.1	18.0	(56)	15.6	(5)				
	Total	288	80	3.6	17.8	(65)	15.9	(8)	10.2	(67)	11.0	(8)
1991/92	Fall	44	20	2.2	18.1	(11)	15.9	(7)				
	Spring	120	37	3.2	18.2	(32)	16.4	(3)				
	Total	164	57	2.9	18.1	(43)	16.1	(10)	11.0	(42)	9.6	(10)
1992/93	Fall	22	13	1.7	16.3	(5)	16.6	(10)				
	Spring	38	20	1.9	17.9	(18)	15.8	(2)				
	Total	60	33	1.8	17.6	(23)	16.4	(12)	8.0	(21)	9.0	(13)
1993/94	Fall	12	10	1.2	17.7	(8)	16.1	(1)				
	Spring	87	40	2.2	17.4	(38)	15.8	(3)				
	Total	99	50	2.0	17.5	(46)	15.9	(4)	9.0	(46)	9.0	(4)
1994/95	Fall	10	8	1.3	16.8	(7)	14.6	(2)				
	Spring	98	39	2.5	18.1	(31)	16.0	(7)				
	Total	108	47	2.3	17.8	(38)	15.7	(9)				

<sup>a</sup>Skull sizes equal length plus zygomatic width.

<sup>b</sup> Bear ages not available for 1980/81, 1989/90, and 1994/95.

<sup>c</sup>Numbers in parentheses represent sample sizes.

Table 4. Unit 1A hunter effort (hunter days/bear), mean bear skull sizes, mean bear ages, and scores for harvest, hunter success, skull sizes, and ages relative to other years, 1980-1995.

Years	Hunter Days/ Bear <sup>a</sup>	Mean Skull Size (in) <sup>b</sup>	Mean Age (Years) <sub>c</sub> [DK1]	Overall Ranking Score <sup>d</sup>
1980/81	2.6 (5)	16.9 (8)	--- ---	---
1981/82	2.5 (4)	17.4 (5)	8.4 (5)	14
1982/83	3.8 (9)	17.1 (6)	7.9 (7)	22
1983/84	2.7 (6)	16.9 (8)	6.8 (10)	24
1984/85	2.6 (5)	17.0 (7)	7.8 (8)	20
1985/86	2.7 (6)	17.5 (4)	8.4 (5)	15
1986/87	2.5 (4)	17.0 (7)	8.2 (6)	17
1987/88	2.5 (4)	17.6 (3)	7.6 (9)	16
1988/89	2.9 (7)	18.1 (1)	9.8 (3)	11
1989/90	2.6 (5)	18.1 (1)	--- ---	---
1990/91	3.6 (8)	17.5 (4)	10.3 (2)	14
1991/92	2.9 (7)	17.7 (2)	10.7 (1)	10
1992/93	1.8 (1)	17.1 (6)	8.4 (5)	12
1993/94	2.0 (2)	17.0 (7)	9.0 (4)	13
1994/95	2.3 (3)	17.1 (6)	--- ---	---

<sup>a</sup> Numbers in parentheses represent scores for hunter effort for each year relative to all others: 1 = lowest.

<sup>b</sup> Numbers in parentheses represent scores for mean skull size each year relative to all others: 1 = highest.

<sup>c</sup> Numbers in parentheses represent scores for mean age each year relative to all others: 1 = highest.

<sup>d</sup> Overall score is equal to the sum of the scores for hunter effort, mean skull size, and mean age. Smaller scores represent better seasons.

Table 5 Unit 1A black bear harvest chronology, 1983-1995.

Numbers of Animals <sup>a</sup>													
Date	1983/ 1984	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	Total
January	1	0	0	0	0	0	0	0	0	0	0	0	1
February	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	1	0	0	0	0	0	0	0	0	0	0	1
Apr. 01-10	0	0	0	1	0	0	0	0	0	0	0	0	1
Apr. 11-20	1	0	0	0	0	0	1	1	2	0	1	0	6
Apr. 21-30	7	1	3	0	6	0	0	1	1	4	2	1	26
May 01-10	2	6	5	12	5	7	8	9	9	3	7	10	83
May 11-20	5	7	10	8	6	18	28	18	10	4	16	9	139
May 21-31	6	12	11	16	14	13	14	24	10	7	4	8	139
June 01-10	0	3	6	0	8	2	5	9	2	0	8	6	49
June 11-20	2	0	3	2	2	3	0	4	2	1	2	3	24
June 21-30	0	0	2	4	2	0	1	3	1	1	0	1	15
Sept. 01-10	4	12	10	7	11	4	5	2	11	5	1	5	77
Sept. 11-20	8	7	4	9	1	2	2	7	0	5	2	1	48
Sept. 21-30	5	4	8	2	2	2	0	2	1	1	2	0	29
Oct. 01-10	5	1	2	2	3	1	3	0	1	1	2	1	22
Oct. 11-20	0	1	0	1	0	2	0	2	0	0	3	1	10



Table 5 Continued

Numbers of Animals <sup>a</sup>													
Date	1983/ 1984	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	Total
Oct. 21-31	0	0	0	0	1	1	0	2	2	1	0	0	7
Nov. 01-10	0	0	0	4	3	0	0	0	1	0	0	0	8
Nov. 11-20	1	0	0	0	0	2	0	0	1	0	0	0	4
Nov. 21-30	0	0	0	0	0	0	1	0	2	0	0	0	3
December	0	0	0	0	1	0	0	0	1	0	0	0	2

<sup>a</sup>Does not include bears killed during closed season.

## LOCATION

**GAME MANAGEMENT UNIT:** 1B (3,000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** The Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point

## BACKGROUND

Black bears are indigenous to Subunit 1B and traditionally have been hunted for food and trophies. Roads associated with logging provide easy access to hunters previously restricted to airplanes or boats. The harvest has remained low; only 12 bears were killed from July 1994 through June 1995.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

Maintain an average spring skull size and an average annual male skull size of at least 17.5 inches. Maintain a male to female ratio of 3:1 in the harvest.

## METHODS

Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. At the time of sealing, we recorded date and location of kill, numbers of days afield, sex, and skull measurements. We also collected premolar teeth for aging at the time of sealing. No data is collected from unsuccessful hunters. Comparison of current data to historical records shows harvest trends and offers indirect evidence of population trends.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

Population estimates are not available for black bears in this unit. Information obtained through the sealing process suggests the population is stable.

### MORTALITY

#### *Harvest*

#### Season and Bag Limit

Sept. 1-June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Board of Game Actions and Emergency Orders. No emergency orders were issued during this report period.

Hunter Harvest. Hunter harvest in Unit 1B has ranged from 12 to 14 bears during this report period (Table 1). Males composed 79% of the kill in 1992 but only 67% in 1994. The average male skull size ranged from 17.9 inches to 18.4 inches (Table 2). The average skull size did not fall below the management objective in any year.

Hunter Residency and Success. Nonresident hunters took over half of the total annual harvest. Although the ratio varies yearly, local and nonlocal residents take approximately equal numbers of bears (Table 3).

Harvest Chronology. Most black bears are taken in the spring, with the highest percentage of bears killed in May (Table 4).

Transport Methods. Hunter transportation is mostly by boat with an occasional hunter using aircraft. There are very few roads in the subunit and no communities (Table 5).

Other Mortality. Nonhunting mortality remains relatively low in Unit 1B (Table 1). Most nonhunting kills result from defense of life or property.

Habitat Assessment. Timber harvest continues to pose the most serious threat to black bear habitat. Postlogging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth. This forage source will be lost as the canopy closes, as will the diversity associated with old-growth forests. The long-term effects of logging will be detrimental to black bears.

## CONCLUSIONS AND RECOMMENDATIONS

The percentage of males in the harvest and average male skull size indicates black bear populations are stable in Unit 1B. No recommendations are suggested.

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Table 1. Unit 1B black bear harvest, 1987-1995.

Regulatory Year	Hunter kill						Nonhunting kill <sup>a</sup>			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Fall 87	0	1	50	1	2	NA	0	0	0	0	0	1	50	1	2
Spring 88	7	0	0	0	7	0	0	0	0	7	100	0	0	0	7
Total	7	1	14	1	9	0	0	0	0	7	78	1	11	1	9
Fall 88	0	0	0	0	0	NA	0	0	0	0	0	0	0	0	0
Spring 89	13	4	22	1	18	0	0	0	0	13	72	4	22	1	18
Total	13	4	22	1	18	0	0	0	0	13	72	4	22	1	18
Fall 89	5	1	17	0	6	NA	0	0	0	5	83	1	17	0	6
Spring 90	13	5	28	0	18	0	0	0	0	13	72	5	28	0	18
Total	18	6	25	0	24	0	0	0	0	18	75	6	25	0	24
Fall 90	6	2	25	0	8	NA	0	0	0	6	75	2	25	0	8
Spring 91	5	0	0	0	5	0	0	0	0	5	100	0	0	0	5
Total	11	2	15	0	13	0	0	0	0	11	85	2	15	0	13
Fall 91	4	1	20	0	5	NA	0	0	0	4	80	1	20	0	5
Spring 92	10	0	0	0	10	0	1	0	0	11	100	0	0	0	11
Total	14	1	7	0	15	0	1	0	0	15	94	1	6	0	16
Fall 92	2	2	50	0	4	NA	0	0	0	2	50	2	50	0	4
Spring 93	9	1	10	0	10	0	0	0	0	9	90	1	10	0	10
Total	11	3	21	0	14	0	0	0	0	11	79	3	21	0	14
Fall 93	1	1	50	0	2	NA	0	0	0	1	50	1	50	0	2
Spring 94	8	3	27	0	11	0	0	0	0	8	73	3	27	0	11
Total	9	4	31	0	13	0	0	0	0	9	69	4	31	0	13
Fall 94	0	0	0	0	0	NA	0	0	0	0	0	0	0	0	0
Spring 95	8	4	33	0	12	0	0	0	0	8	67	4	3	0	12
Total	8	4	33	0	12	0	0	0	0	8	67	4	3	0	12

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

**Table 2 Unit 1B black bear skull size<sup>a</sup>, 1987-1994**

<b>Year</b>	<b>Males</b>	<b>n</b>	<b>Females</b>	<b>n</b>
1987	18.5	7	16.8	1
1988	18.3	13	16.2	4
1989	17.8	16	15.8	6
1990	17.3	10	15.7	2
1991	18.1	13	16.3	1
1992	17.9	11	16.9	2
1993	18.4	9	16.0	4
1994	18.2	8	16.9	4

<sup>a</sup> Skull size = total length + zygomatic width in inches.

**Table 3 Unit 1B successful black bear hunter residency, 1987-1994**

Regulatory year	Local resident <sup>a</sup>	(%)	Nonlocal resident	(%)	Non-resident	(%)	Total successful hunters
1987	2	22	0	0	7	78	9
1988	8	44	0	0	10	56	18
1989	11	46	2	8	11	46	24
1990	10	77	1	8	2	15	13
1991	11	73	0	0	4	27	15
1992	8	57	2	14	4	29	14
1993	2	15	3	23	8	62	13
1994	2	17	3	25	7	58	12

<sup>a</sup> Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 4 Unit 1B black bear harvest chronology by percent, 1987-1994

Regulatory year	September	October	December	Month April	May	June	<i>n</i>
1987	11	11	0	0	67	11	9
1988	0	0	0	17	67	17	18
1989	13	8	4	13	58	4	24
1990	31	31	0	0	38	0	13
1991	33	0	0	13	47	7	15
1992	21	7	0	0	64	7	14
1993	8	8	0	15	38	31	13
1994	0	0	0	8	84	8	12

Table 5 Unit1B black bear harvest in percent by transport method, 1987-1994

Regulatory year	Airplane	Boat	Highway vehicle	Foot	Unknown	<i>n</i>
1987	0	100	0	0	0	9
1988	6	94	0	0	0	18
1989	12	83	0	0	5	24
1990	15	77	0	0	8	13
1991	0	100	0	0	0	16
1992	0	100	0	0	0	14
1993	7	93	0	0	0	14
1994	8	83	0	8	0	12

## **LOCATION**

**GAME MANAGEMENT UNIT:** Unit 1C (7,600 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** That portion of Unit 1 draining into Stephens Passage and Lynn Canal between Cape Fanshaw and the latitude of Eldred Rock, including Berners Bay and Sullivan Island, excluding drainages into Faragut Bay.

## **BACKGROUND**

Harvest data and hunter information have provided the only information for management decisions in Subunit 1C. Because only successful hunters report hunting activity, data on hunting effort are unavailable. Black bear teeth have been collected routinely at the time of sealing.

The tendency for black bears to use solid waste as an alternative food is well documented throughout their range. Bears that have become habituated to humans are difficult to discourage, and it is often necessary to move or destroy such nuisance animals. As the human population of Juneau has increased, the numbers of bear-human conflicts and resulting complaints to ADF&G and public safety agencies have also increased, resulting in significant expenditure of effort and resources.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Maintain a 3:1 male to female ratio in the harvest and a mean annual male skull size (length plus width) of at least 17.5 inches.

## **METHODS**

Black bear hides and skulls were sealed by staff of the Departments of Fish and Game and Public Safety. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length and width), date and location of kill, transportation method, and use of commercial services. We collected premolar teeth from most bears to determine age. Anecdotal information about conditions in the field was gathered at the same time.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

Population data is not available for black bears in Unit 1C, and because only successful hunters are required to report their hunts, data on hunter effort is incomplete (Tables 1 and 2). Harvest data and reported bear activity in the Juneau area indicate a large population (Table 3). Harvest was lower during this report period than the previous 6 years, averaging 59 bears per year compared to 102 bears. The proportion of male bears harvested was 92%, an



increase from the previous reporting period. Mean age and annual skull size for male bears also increased, with the mean annual skull size exceeding the management objective. Mean hunter effort (2.7 days/hunter) was very similar to the previous 6-year mean (2.8 days/hunter). Most hunters (57%) were residents of the subunit. Most successful hunters reported they did not use commercial services. Of those hunters who used commercial services, most were nonresidents and most reported using registered guides or commercial transport services.

The Juneau garbage bear problem is not restricted to young male bears. Problem animals handled during the reporting period included both sexes, a variety of ages, and virtually all family group possibilities.

## **MORTALITY**

### *Harvest*

#### Season and Bag Limit

Sept. 1-June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Hunter Harvest. Hunters reported killing 65, 56, and 57 bears in regulatory years 1992, 1993, and 1994, respectively (Table 3). Males composed 82, 93 and 91% of the harvest during those years, exceeding the management objective of 75% throughout the period. Most harvested bears exhibited black pelage, and no glacier bears were harvested (Table 1). Successful hunters spent an average of 2.8 days in the field, compared to the 6-year average (1986-1991) of 2.7.

Two nuisance bears were destroyed during regulatory year 1992, none were taken during 1993, and 1 was killed in 1994. One bear was found dead and another was killed by a car during 1994.

Hunter Residency. Nonresident hunters took an average of 29% of the black bears harvested within Unit 1C during the report period. This was slightly above the previous 6-year mean of 22%.

Harvest Chronology. During the reporting period, the proportion of bears taken in spring composed 78% of the harvest. This is very close to the previous 6-year mean of 80% and the 86% of 1994, but well above the 65% of 1992.

Transport Methods. Boats continued to be the primary means of transport to the field, with 83% of the hunters using this method (Table 1). Other methods included foot, highway vehicles, airplanes, and off-road vehicles. Of hunters using commercial services (Table 2), 49% used commercial transport to the field.

## HABITAT

Proposed mining development projects, residential development, and forest clearcutting are the primary potentials for change in bear habitat quality in the Juneau area. Two large gold mines are proposed for the local mainland, and changes in disturbance levels, access, and availability of refuse could all affect bears. We also anticipate physical habitat changes, such as tailing pond inundation and stockpiling of tailings. Through a cooperative agreement between the mining company and the department, black bear studies were begun in 1990. Bears have been captured and radiocollared at each mine site, and movement data was collected throughout the reporting period. We are in the process of completing reports of this work.

Bear habitat near Juneau is presently affected by one significant, nonnatural factor – human garbage. While bears have probably always been numerous locally, the availability of an attractive alternative food source promotes high bear densities, especially when firearms prohibition within the urban areas provides a "refugium" surrounding the city where bears are not available for hunter harvest. At the same time, high human density in the area ensures frequent conflicts with bears.

### *Problem Bear Management Activities*

Nuisance bear problems were less intense compared to regulatory year 1991. Although this may indicate the ADF&G/CBJ garbage bear program is working, prior experience suggests the problem is cyclic. Public awareness of the problem and diligence in managing garbage has probably decreased since 1991 (the worst nuisance bear year on record), and efforts toward educating the public should continue. Nuisance bear activity has increased steadily since 1992, and 2 bears were destroyed in the spring of regulatory year 1994. If the problem is to be resolved completely, it will be necessary to change the community's handling of solid waste. As long as garbage is easily available to bears, Juneau will continue to experience cyclical periods of problem bear removal.

Studies to determine the usefulness of aversive conditioning techniques in discouraging problem bears were conducted in 1989 and 1990. We had little success working with experienced garbage bears, but intensive and repeated treatment of bears just learning about garbage might be effective, although not practical. Translocation of bears is only partly effective, as a number of problem animals have been documented returning to their former habits and urban neighborhoods. Moving bears is expensive in terms of staff time and transportation costs. During the report period staff made a substantial effort to shift ADF&G's involvement away from instant response to every nuisance bear report to advising callers on ways to reduce the attraction for bears, in hopes the animals will return to wild habitats. Only in the case of an intractable bear who repeatedly causes problems but does not present an immediate danger to human safety (responsibility in acute safety situations lies with public safety agencies) will we make an effort to trap and remove an animal.

## CONCLUSIONS AND RECOMMENDATIONS

Management objectives for Unit 1C are being met, but we are beyond the objective of a 3:1 ratio of males to females in the harvest. Skull sizes increased slightly during the reporting period.

Public education efforts have not solved Juneau's garbage bear problem. Cyclical periods of high conflict between people and bears will continue as long as refuse is easily available to bears and aversive conditioning does not provide relief from the problem. Until local ordinances require mandatory garbage pickup and containment that is more secure than a standard garbage can, Wildlife Conservation staff will continue to deal with garbage bears in this subunit.

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Table 1 Unit 1C residency, mean days hunted, and transportation used by successful black bear hunters, 1992-1994

Regulatory Year	Subunit Resident		Other AK Resident		Nonresident		Unknown Hunters	Successful Hunter Effort		Highway					
	Hunters	Days	Hunters	Days	Hunters	Days		Hunters	Days	Airplane	Boat	Vehicle	Foot	ORV <sup>1</sup>	Unk
1992	35	2.4	9	3.8	21	3.9	0	65	3.0	5	49	4	4	1	0
1993	30	2.5	6	3.0	20	3.3	0	56	2.9	2	51	1	2	0	0
1994	36	2.2	9	2.8	10	3.2	2	57	2.4	0	46	2	6	1	2
Report Period							---								
Mean	34	2.4	8	2.6	17	3.5		59	2.8						
(%)	(57)		(14)		(29)					(4)	(83)	(4)	(7)	(1)	(1)
1986-1991							---								
Mean	63	2.2	15	3.3	22	3.8		100	2.7						
(%)	(63)		(15)		(22)					(6)	(62)	(9)	(6)	(4)	(13)

<sup>1</sup> ORV includes 3- or 4-wheelers, snowmobiles, and other off-road vehicles.

Table 2 Unit 1C commercial services<sup>1</sup> used by hunters, 1992-1994

Year	Subunit Residents		Other AK Residents		Nonresidents		Total Use		Transport	Registered Guide
	No	Yes	No	Yes	No	Yes	No	Yes		
1992	34	0	9	0	9	12	52	12	12	12
1993	29	1	4	2	10	10	43	13	10	10
1994	35	1	9	0	5	5	49	6	5	6
Report Period (%)	(98)	(2)	(92)	(8)	(47)	(53)	(82)	(18)	(49)	(51)
1989-1991 (%)	(100)	---	(100)	---	(59)	(41)	(93)	(7)	---	(100)

<sup>1</sup> No information other than the use of guides is available before 1992.

Table 3 Unit 1C black bear harvest, 1992-1994

Year	Harvest <sup>1</sup>	Males	Females	Unknown	Male				Females				Color Variation			
					Mean Skull <sup>2</sup>	n	Age	n	Mean Skull	n	Age	n	Black	Blue	Cin.	
1992 {	Total	65	53	11	1	17.1	49	9.0	6	15.9	11	11.0	2	60	0	5
	Fall 92	23	18	6	0	16.0	18			15.8	6					
	Spring 93	42	35	5	1	17.8	31			16.1	5					
1993 {	Total	56 [1]	52	4	0	17.8	51	8.2	50	15.8	4	14.8	4	49	0	7
	Fall 93	8	7	3	0	18.1	7			16.2	3					
	Spring 94	48	45	1	0	17.8	44			15.7	1					
1994 {	Total	57 [2]	52	5	0	18.1	50	8.0	42	15.2	5		3	53	0	4
	Fall 94	8	7	1	0	18.6	6			11.3	1					
	Spring 95	49	45	4	0	18.1	1			16.1	4					
Report Period																
Mean	59			---	17.7	150	8.2	98	15.7	20	11.7	9		---		
(%)		(89)	(11)										(91)		(9)	
1986-1991 Mean	102 [10]	80	22	---	17.6	487	7.5	187	15.8	75	8.1	32				
(%)		(78)	(22)										(90)	(0.2)	(9.8)	

<sup>1</sup> Nonhunting kills are reported in brackets and are not included in the harvest total.<sup>2</sup> Skull size equals total length plus zygomatic width.

## **LOCATION**

**GAME MANAGEMENT UNIT:** 1D (2,700 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** That portion of the Southeast Alaska lying north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay.

## **BACKGROUND**

Black bear numbers are probably lower in Subunit 1D than in any other Southeast Alaska mainland area. Brown bear numbers, however, appear to be relatively high. While earlier harvest data have not indicated a decline in black bear numbers, the lack of population data and hunter effort information make these determinations difficult. A relatively high proportion of black bears harvested in Unit 1D exhibit cinnamon pelage.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Maintain a 3:1 male to female ratio in the harvest and a mean annual male skull size of at least 17.0 inches.

## **METHODS**

Alaska Department of Fish and Game staff sealed black bear hides and Public Safety staff sealed skulls. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length and width), date and location of kill, transportation method, and use of commercial services. We also gathered anecdotal information about field conditions. We collected premolar teeth from a few bears for age determination.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

Population information is not available for black bears in Unit 1D, and because only successful hunters (Table 1 and Table 2) are required to report their hunts, data on hunter effort is incomplete. Harvest decreased during the report period and the mean harvest was lower than the previous 6-year mean. Although most bears harvested in 1992 were taken during the fall, harvest during 1993 and 1994 exhibited a more traditional pattern with most bears taken in the spring. During the 6 years before this report period, black bear harvest fluctuated widely in numbers and by season (McCarthy, 1988). The potential indicators of a declining population (i.e., skull and harvest size) mentioned in the previous management report improved to some extent. Mean male skull size increased from the 1988 low and currently is above both the previous 6-year (1986-1991) mean (Table 3) and our management goal of 17.0 inches. The number of successful hunters was lower than the previous 6-year means for hunters of all

residency categories. Most reporting hunters did not use commercial services, and of those who did, all sought the services of a registered guide. A 3:1 male to female harvest ratio was maintained throughout the reporting period. While the mean age at harvest remains acceptable, the ages of only a few of the harvested bears were determined, leaving a possibility of error for this estimate.

## **MORTALITY**

### *Harvest*

#### Season and Bag Limit

Sept. 1 - June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Hunter Harvest. The Unit 1D black bear harvest ranged from 20 to 28 from 1992 to 1994, averaging 24 (Table 2). No nonhunting mortalities were reported. Males comprised 86%, 76%, and 80% of the harvest from 1992 through 1994, respectively. The percentage of cinnamon bears harvested increased over the report period, with the average substantially greater than the previous 6-year mean (Table 3). No glacier bears were harvested.

Hunter Residency. During the reporting period, residents of the subunit continued to harvest most of the bears each year (Table 1). Harvest by residents from other Alaska communities and nonresidents remained at 10%.

Harvest Chronology. The proportion of bears taken during the fall (Table 3) was high during 1992 (57%), but declined to more traditional levels during 1993 (8%) and 1994 (20%). Overall, 30% of the bears harvested were taken during the fall, compared to 48% for the last reporting period and 33% during the 6 years preceding this reporting period (1986-1991).

Transport Methods. Highway vehicles and foot access were the major transport means reported by bear hunters (Table 1). Other reported means included airplanes, 3- or 4-wheelers, and boats. This represents a change from the previous 3 years when boats and 3- or 4- wheelers were used extensively by reporting hunters.

## **HABITAT**

Forest management and the effects of timber harvest continue to be the major effects on black bear habitat. While intensity of black bear use of areas slated for harvest is unknown, much of the black bear harvest comes from forested areas in the upper Chilkat and Kelsall valleys, adjacent to previous cuts.

## **CONCLUSIONS AND RECOMMENDATIONS**

The management objective of maintaining a 3:1 male to female harvest ratio was achieved throughout the reporting period. Although mean age and skull size do not indicate that a



decline is occurring, black bear harvest in this subunit should be monitored carefully. We should determine the age of a greater proportion, preferably all, of harvested bears. High brown bear numbers and habitat changes may cause a decline in black bear numbers and harvest in the future.

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Table 1 Unit 1D residency, mean days hunted, and transportation used by successful black bear hunters, 1992-1994

Year	Subunit Residents		Other AK Residents		Nonresidents		Successful Hunter Effort		Airplane	Boat	Highway Vehicle	3- or 4-Wheeler <sup>1</sup>	Foot	Unknown
	Hunters	Days	Hunters	Days	Hunters	Days	Hunters	Days						
1992	25	2.7	2	2.0	1	1.0	28	2.6	3	1	15	2	4	3
1993	19	4.1	3	2.7	3	9.0	25	4.5	1	3	18	2	3	0
1994	15	1.7	2	3.0	3	5.0	20	2.4	0	0	8	2	2	0
Report Period														
Mean	20	2.9	2	2.6	2	4.6	24	3.0						
(%)	(81.0)		(9.5)		(9.5)				(5.4)	(19.1)	(56.1)	(3.0)	(12.3)	(4.1)
Previous Mean <sup>2</sup>	22	3.1	3	3.1	3	7.4	28	3.4						
(%)	(79)		(12)		(10)				(3.8)	(22.8)	(20.3)	(11.4)	(17.7)	(24)

<sup>1</sup>Includes all off-road vehicles for previous year means.

<sup>2</sup>Mean covers regulatory years 1986 through 1991 for residency statistics and 1989 through 1991 for transportation statistics.

Table 2 Unit 1D commercial services<sup>3</sup> used by hunters, 1992-1994

Year	Subunit Residents		Other AK Residents		Nonresidents		Total Use		Registered Guide
	No	Yes	No	Yes	No	Yes	No	Yes	
1992	24	0	2	0	0	1	24	1	1
1993	19	0	3	0	0	3	22	3	3
1994	15	0	2	0	2	1	17	1	1
Report									
Period (%)	(100)	---	(100)	---	(58)	(42)	(93)	(7)	(100)
1989-1991 (%)	(100)	---	(100)	---	(12)	(88)	(90)	(10)	(100)

<sup>3</sup>No information beyond the use of guides is available prior to 1992.

Table 3. Unit 1D black bear harvest, 1992-1994

Regulatory Year		Harvest <sup>1</sup>	Males	Females	Unknown	Males				Females				Color Variation		
						Mean Skull <sup>2</sup>	Mean (n)	Age	(n)	Mean Skull	Mean (n)	Age	(n)	Black	Blue	Cin.
1992	{Total	28	24	4	0	16.6	23	11.3	7	15.4	4	4.0	1	18	0	10
	{Fall 92	16	14	2	0	17.2	14			16.8	2			14	0	2
	{Spring 93	12	10	2	0	17.7	9			14.1	2			4	0	8
1993	{Total	25	19	6	0	17.3	18	6.0	2	15.9	6	---	0	11	0	14
	{Fall 93	2	2	0	0	16.4	2			15.9	N/A			1	0	1
	{Spring 94	23	17	6	0	17.4	16				6			10	0	13
1994	{Total	20	16	4	0	17.6	16	5.7	3	15.6	3	5.0	1	7	0	13
	{Fall 94	4	3	1	0	15.6	3			16.7	1			3	0	1
	{Spring 95	16	13	3	0	18.1	13			15.1	2			4	0	12
Report Period Mean (%)		24				17.1	57	9.0	12	15.7	13	4.5	2			
			(81)	(19)	(0)									(49)	(0)	(51)
1986-1991 Mean (%)		28				16.9	93	7.0	30	15.7	44	7.6	14	(75)	(0)	(25)
			(71)	(29)	(0)											

<sup>1</sup> Nonhunting kills are reported in parentheses.<sup>2</sup> Skull size equals total length plus zygomatic width.

## **LOCATION**

**GAME MANAGEMENT UNIT:** 2 (3,600 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage.

## **BACKGROUND**

Information about Unit 2 black bears is limited to harvest sealing records, anecdotal public reports, and observations by our staff. We believe the Unit 2 black bear population remained stable during the report period. Annual harvests increased from 27 in 1974 to 154 in 1987/88, then increased to an average of 220 during the past 7 seasons. This increase is due largely to increased hunting effort by nonresidents and increased road access in the unit.

Although we believe the Unit 2 bear population is stable, our concerns for future populations continue because of the extensive habitat changes occurring throughout the unit due to logging. As more old-growth habitat is converted to closed canopy, second growth, we anticipate reductions in bear numbers caused by the loss of sunlight-dependent forbs and shrubs which are eaten by bears. Research is needed to better identify and understand the magnitude of these anticipated reductions.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Our management objective for Unit 2 black bears is to maintain an average skull size of at least 19.1 inches for male bears harvested each spring (January-June) or 18.8 inches for all males taken each regulatory year.

## **METHODS**

We collected black bear harvest data from successful hunters through a mandatory sealing program. At the time of sealing, we recorded date and location of kill, numbers of days hunted, sex, and skull measurements (length plus zygomatic width). We sent premolar teeth extracted from sealed skulls to Matson's Laboratory (Milltown, MT) to determine the ages of harvested bears.

In an effort to better compare and evaluate hunter success among seasons, we ranked the average numbers of hunter-days expended for harvested bears, mean skull measurements of harvested bears, and average ages of harvested bears. We then summed the rank values from each of these categories to derive an overall seasonal score. We associate lower combined scores with better seasons.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

In the absence of research or quantitative surveys, we cannot draw definitive conclusions about the status of the Unit 2 black bear population. Based on available harvest information, public reports, and staff observations, we believe the population has remained stable during this report period.

Clearcut logging continues in the unit. Although clearcuts generally provide bears with an abundance of edible forbs and shrubs during the first 10 to 20 years postlogging, they become unproductive as conifer canopies close and eventually prevent sunlight from penetrating to the forest floor. As second growth canopies close, bear populations in those areas are expected to decline (Suring et al. 1988, Wood 1990).

### *Population Size*

Wood (1990) indicated that unlogged portions of Unit 2 contain some of the best black bear habitat in Southeast Alaska. Based on population estimates from other coastal areas of North America (e.g., Poelker and Hartwell 1973), Wood estimated the Unit 2 black bear density at 1.5 bears/mi<sup>2</sup>. Using Wood's density estimate, we derived a population estimate of 5400 bears for the unit (Larsen 1995).

### *Population Composition*

We lack information to estimate the sex and age composition of the Unit 2 black bear population. Males consistently compose most of the bear harvest. We believe this is due to hunter selectivity for large bears.

We expect to be able to assess the reproductive history of harvested females using information provided by Matson's Lab. Technicians at the lab recently discovered that distinct markings develop on sows' teeth during years in which they have litters. As an example, a sow captured in Unit 1A in September 1994 was determined to be 22 years old and had borne cubs at ages 6, 8, 10, 12, 16, 18, and 20.

### *Distribution and Movement*

Unlike mainland Southeast Alaska, black bears residing in Unit 2 occur in the absence of brown bears. The cinnamon color phase of the black bear, which occurs in mainland populations, is absent from Unit 2, as is the blue or glacier color phase which occurs infrequently in northern portions of Southeast Alaska. Quantitative information about home ranges and movement patterns of Unit 2 black bears is not available.

## MORTALITY

### *Harvest*

#### Season and Bag Limit

Sept. 1 - June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Hunter Harvest. After averaging 123 bears per season during 1980-1988, the Unit 2 black bear harvest increased to over 210 bears each season for the past 7 seasons (Table 1). Males have composed 78% of the harvest during the past 15 seasons. Bunnell and Tait (1985) developed a deterministic simulation model which showed that maximum annual hunting mortality on black bears >1-year-old is 14.2% of the estimated population. Using our population estimate of 5400 bears (Larsen 1995), this would amount to a maximum annual harvest of up to 767 bears. To date, the highest annual harvest from the unit has constituted only 4% of our estimated population. While it appears that our current harvest is well within sustainable levels, we must emphasize that our impressions are based on an unsubstantiated population estimate.

We feel it may be important to evaluate site specific harvests in order to guard against local overharvest. For example, although harvests come from throughout the unit (Table 2), Wildlife Analysis Areas (WAAs) 1318 and 1422 have accounted for about 23% of the harvest during the past 15 seasons (Table 3). WAA 1318 encompasses the area around the communities of Craig and Klawock. This area constitutes Prince of Wales Island's primary population center and offers hunters easy road access. WAA 1422, which includes Tuxecan and El Capitan Passages on west Prince of Wales, also offers easy road access for hunters. Additional WAAs that have received notable hunting pressure more recently include 1420 and 1530 (Table 4). WAA 1420 includes the area from Ratz Harbor to Coffman Cove on the east side of Prince of Wales, and WAA 1530 includes the extensively roaded area around Whale Pass and Exchange Cove on the northeast corner of the island.

Average bear skull sizes have varied annually in Unit 2 (Table 5). Our management objective of maintaining an average spring skull size of at least 19.1 inches for males has been achieved during 13 of the past 15 seasons. We have met our secondary objective of maintaining an average annual male skull size of 18.8 inches during 12 of the past 15 seasons. Female skull measurements have regularly averaged over 16.4 inches, and we noted averages of 17.0 inches or more during 1982/83, 1987/88, and 1994/95. From informal questioning of successful hunters, we have learned that many hunters pass up 1 or more bears before ultimately shooting one. We conclude large skulls observed in the harvest are the result of hunter selectivity for large bears.

During this report period we received a USDA Forest Service grant to age archived teeth from bears harvested in Unit 2. Like skull sizes, ages of harvested bears have varied annually

(Table 5). We have observed a slight but steady decline in male ages in 5 of the past 6 seasons. Missing data for 1989/90 precludes any inference about the 6-year trend, but ages have declined for at least the past 4 seasons.

Female ages dropped from a high of 11.0 during 1981/82 to a low of 6.9 during 1986/87 but subsequently increased to over 8.0 during 1990-1993 (Table 5). This increase, together with the relatively low numbers of females harvested and their large average skull sizes, suggests stability in the female segment of the population. Nonetheless, as Kane and Litvaitis (1992) showed through black bear research in New Hampshire, samples obtained from hunter harvests may differ from actual population structures. They showed the average ages of captured bears to be 6.4 years for males and 8.7 years for females. However, averages for harvested bears were 4.9 years for males and 6.6 years for females. They suggested the nocturnal capture efforts they employed may have increased the chances of encountering older bears. Regardless, their findings suggest we must be cautious when interpreting harvest data.

Hunter Residency and Success. Nonresident black bear hunting in Unit 2 has steadily increased during the past decade. During this report period, nonresidents accounted for 60% of the harvest, while Alaska residents from communities outside Unit 2 accounted for 26% of the harvest, and local residents took 14% of the harvested bears (Table 1).

We base seasonal hunter success on information from successful hunters. To calculate success, we incorporated average days expended per harvested bear with mean skull measurements and ages of bears (Table 6). Using this method of assessment, we could not identify any trends. Of the 12 seasons for which scores were obtained (scores could not be established for the 1980/81, 1989/90, and 1994/95 seasons because of missing age data), 1983/84 and 1987/88 were identified as the most "successful" seasons. The next most successful season was 1981/82, followed by 1984/85 and 1986/87. The least successful season during the past twelve was 1992/93.

Harvest Chronology. Most black bears harvested in Unit 2 are taken during the spring. The May 1-20 period consistently has the highest spring harvests (Table 7). During 1983-1995, 56% of the spring kill was harvested during this 3-week period.

The first 20 days of September are the most productive hunting period during the fall season (Table 7). During 1983-1994, 57% of the fall kill was harvested during this period.

Transport Methods. Until 1985 Unit 2 bear hunters used airplane, boat, and highway transportation in relatively equal amounts (Table 1). Beginning in 1986 most hunters used the expanding Prince of Wales road system to access hunting areas. Highway vehicles have accounted for 58% of the transportation by successful hunters during the past 9 seasons, illustrating the growth of the Unit 2 road system.

#### **NONREGULATORY MANAGEMENT PROBLEMS AND NEEDS**

Habitat changes continue due to clearcut logging. Although early successional stages (3-20 years) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory plants as conifer canopies close and light does not penetrate to



the forest floor. Second growth stands lack large hollow trees and root masses used by bears for denning habitat. We believe that although logging may create food for bears in the short term, the long-term result of logging will be a decline in bear numbers.

## CONCLUSIONS AND RECOMMENDATIONS

We estimate that roughly 5400 bears inhabit Unit 2. We derived this estimate using density information reported by bear researchers working in coastal Washington state.

The annual harvest of black bears from Unit 2 during the past 7 seasons has averaged 220, or 4% of our population estimate. Males constituted 78% of the past 15 seasons' harvest. Based on available literature, we believe the harvest level is within sustained yield limits. We will continue to monitor specific harvest locations to avoid the risk of local overharvest. This is especially important in light of the fact that 23% of the past 15 seasons' harvests have come from WAAs 1318 and 1422, both of which are easily accessible to hunters. We will also continue to closely watch ages of harvested male bears because of slight but steady declines during at least 4 of the past 5 seasons.

Skull measurements of harvested male and female bears have fluctuated over time, but management objectives involving minimum skull measurements have been met regularly. The growth pattern of Unit 2 bears, as determined from skull measurements, seems similar to patterns described for other North American black bear populations (e.g., Marks and Erickson 1966). Males generally attain most of their skull growth by age 7 or 8, while most female skull growth occurs by age 5 or 6.

The actual size of the Unit 2 black bear population is unknown, and population estimates have therefore been made using information from other parts of North America. Given the high interest shown by resident and nonresident hunters, along with the extensive habitat changes occurring as a result of clearcut logging, it is imperative that we attempt to collect quantitative information about the Unit 2 black bear population. We recommend, therefore, that a black bear research project be initiated in Unit 2 as soon as practicable.

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Table 1. Black bear harvest, hunter residency, and hunter transport: Unit 2, 1980-95\*

Years	Season	Harvest				Hunter Residency				Transport				
		Males	Females	Unk.	Total	Local	State	N.R.	Unk.	Air	Boat	Road	Other	Unk.
1980/81	Fall	17	13	0	30	7	15	8	0	6	4	4	14	2
	Spring	49	7	0	56	8	24	24	0	7	12	19	17	1
	Total	66	20	0	86	15	39	32	0	13	16	23	31	3
1981/82	Fall	19	4	1	24	6	14	4	0	2	2	8	12	0
	Spring	72	8	0	80	19	36	25	0	22	17	11	29	1
	Total	91	12	1	104	25	50	29	0	24	19	19	41	1
1982/83	Fall	20	14	2	36	2	23	11	0	7	5	17	4	3
	Spring	48	10	6	64	20	24	20	0	6	21	19	18	0
	Total	68	24	8	100	22	47	31	0	13	26	36	22	3
1983/84	Fall	16	8	0	24	8	7	9	0	9	2	4	8	1
	Spring	79	15	2	96	20	40	36	0	26	33	29	6	2
	Total	95	23	2	120	28	47	45	0	35	35	33	14	3
1984/85	Fall	20	12	0	32	7	11	14	0	11	5	11	5	0
	Spring	46	11	1	58	13	39	5	1	5	34	15	4	0
	Total	66	23	1	90	20	50	19	1	16	39	26	9	0
1985/86	Fall	30	20	3	53	12	30	9	2	5	6	26	11	5
	Spring	95	24	2	121	46	37	38	0	21	33	54	5	8
	Total	125	44	5	174	58	67	47	2	26	39	80	16	13
1986/87	Fall	24	16	0	40	9	16	15	0	4	3	21	4	8
	Spring	106	8	0	114	35	39	40	0	12	50	52	0	0
	Total	130	24	0	154	44	55	55	0	16	53	73	4	8
1987/88	Fall	27	12	1	40	16	14	10	0	3	1	36	0	0
	Spring	100	14	0	114	32	25	51	6	11	38	65	0	0
	Total	127	26	1	154	48	39	61	6	14	39	101	0	0

Table 1 Continued

Years	Season	Harvest				Hunter Residency				Transport				
		Males	Females	Unk.	Total	Local	State	N.R.	Unk	Air	Boat	Road	Other	Unk
1988/89	Fall	65	28	2	95	15	17	60	3	25	9	58	0	3
	Spring	77	18	21	116	18	32	60	6	5	59	47	3	2
	Total	142	46	23	211	33	49	120	9	30	68	105	3	5
1989/90	Fall	28	18	29	75	17	24	30	4	9	17	36	6	7
	Spring	92	15	40	147	25	24	97	1	9	54	81	1	2
	Total	120	33	69	222	42	48	127	5	18	71	117	7	9
1990/91	Fall	47	24	18	89	18	26	40	5	2	16	65	1	5
	Spring	99	16	11	126	30	45	49	2	5	53	53	12	3
	Total	146	40	29	215	48	71	89	7	7	69	118	13	8
1991/92	Fall	34	28	5	67	22	22	21	2	3	21	32	4	7
	Spring	104	29	21	154	18	50	85	1	8	43	94	9	0
	Total	138	57	26	221	40	72	106	3	11	64	126	13	7
1992/93	Fall	42	26	12	80	15	21	44	0	4	9	60	7	0
	Spring	116	18	8	142	12	46	84	0	14	50	75	3	0
	Total	158	44	20	222	27	67	128	0	18	59	135	10	0
1993/94	Fall	52	32	3	87	16	19	52	0	7	8	64	8	0
	Spring	114	19	2	135	19	37	79	0	8	54	58	15	0
	Total	166	51	5	222	35	56	131	0	15	62	122	23	0
1994/95	Fall	59	25	2	86	14	23	49	0	6	7	67	6	0
	Spring	118	29	2	149	16	31	102	0	7	46	92	4	0
	Total	177	54	4	235	30	54	151	0	13	53	159	10	0

\*Does not include DLP, road, or illegal kills.

Table 2. Annual black bear harvest by Wildlife Analysis Area (WAA), Unit 2, 1990-1995.

WAA	1990/91			1991/92			1992/93			1993/94			1994/95			Totals			
	M	F	U	M	F	U	M	F	U <sup>a</sup>	M	F	U	M	F	U	M	F	U	Total
0901										1						1			1
0902	1	1		1	3		1	2								3	6		9
1003	1			1												2			2
1105	3		1	1	1 <sup>a</sup>		1		2	2			1			10	1	3	14
1107	13	2	2	1	1	1	1	4		6	2		10	3	1	39	14	4	57
1108	4			1			1			1						11			11
1209		1					1									1	1		2
1210	10	1	2	4	2		2	4		6	2		8			30	9	2	41
1211	5		2	1	3		2			11			5	1		24	4	2	30
1212		1		1												2			2
1213	3		2	2			7			1	1		2			15	1	2	18
1214	5	3	2 <sup>b</sup>	14	4		14	1		11	4		6 <sup>b</sup>	4		50	16	2	68
1315	6 <sup>b</sup>	4	2	8	7 <sup>a</sup>	3	8	2	2	12	2		5	1 <sup>c</sup>		39	16	7	62
1316	1	1	1	1	2		4						3	1		9	4	1	14
1317	7	4	2	12	2		15	4	1 <sup>d</sup>	9	4	1	12	5		55	19	4	78
1318	8 <sup>b</sup>	3 <sup>d</sup>	1	13 <sup>b</sup>	2	1	10	6	1 <sup>d</sup>	10	7	2	17	4		58	22	5	85
1319	8	4	2	5	7	5	8	1	5	10	1	1	12	2		43	15	13	71
1323	4			2	1	1	3	2		4	1					13	4	1	18

Table 2 Continued

	1990/91			1991/92			1992/93			1993/94			1994/95			Totals			
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
1332	7	1	1	7	1	1	5	4		7	1		3	2 <sup>b</sup>		29	9	2	40
1420	16	1		9	5	2	15	3	2	10	8		15	5	2	65	22	6	93
1421	3	1	1	4	1	1	4	1	1	5	4		5	4		21	11	3	35
1422	14	3 <sup>b</sup>		15	3	7	17	5	3	19	6		29	9		94	26	10	130
1525					1								1			1	1		2
1526	1		3	2			1			10	2		1			15	2	3	20
1527	8	1	1	1	1		6	1		7			7	1		29	4	1	34
1528				1			1			1	1		2	1		5	2		7
1529	12	4		7	1	4	10		3	6	4		11	3	1	46	12	8	66
1530	5	4	4	16	7		12	4	1	12		1	18	7		63	22	6	91
1531							1			5	1		6	1		12	2		14

<sup>a</sup>One bear of unknown sex killed in undisclosed WAA.

<sup>b</sup>Includes DLP kills.

<sup>c</sup>Includes road kills.

<sup>d</sup>Includes illegal kills.

Table 3. Annual black bear harvest from the most heavily used Wildlife Analysis Areas, Unit 2, 1980-1995.

Years	Wildlife Analysis Areas					
	1318	1422	1214	1317	1527	1315
1980/81	5	13	9	12	7	8
1981/82	13	13	1	8	9	7
1982-83	8	19	4	4	14	7
1983/84	13	9	10	6	15	6
1984/85	9	8	16	7	15	5
1985/86	22	32	14	11	21	18
1986/87	31	18	6	21	16	8
1987/88	34	12	15	22	25	9
1988/89	43	14	26	13	21	12
1989/90	37	22	23	7	5	19
1990/91	12	17	10	13	10	12
1991/92	16	25	18	14	2	18
1992/93	17	25	15	20	7	12
1993/94	19	25	15	14	7	14
1994/95	21	38	10	17	8	6
Totals	298	290	192	189	182	161

Table 4. Annual black bear harvest from the most heavily used Wildlife Analysis Areas, Unit 2, 1990-1995.

Years	Wildlife Analysis Areas					
	1422	1420	1530	1318	1317	1319
1990/91	17	17	13	12	13	14
1991/92	25	16	23	16	14	17
1992/93	25	20	17	17	20	14
1993/94	25	18	13	19	14	12
1994/95	38	22	25	21	17	14
Totals	130	93	91	85	78	71



Table 5. Hunter effort, mean skull sizes, and mean ages of black bears harvested in Unit 2, 1980-1995.

Years	Season	Hunter Effort			Mean Skull Size* (in)				Average Age (years) <sup>b</sup>			
		Total Days	No. Hunters	Avg. Days Per Hunter	Male	(n) <sup>c</sup>	Female	(n)	Male	(n)	Female	(n)
1980/81	Fall	92	30	3.1	18.8	(15)	17.2	(10)				
	Spring	190	55	3.5	18.7	(40)	16.7	(7)				
	Total	282	85	3.3	18.7	(55)	16.9	(17)				
1981/82	Fall	70	24	2.9	18.1	(15)	15.4	(3)				
	Spring	235	80	2.9	19.2	(58)	17.3	(8)	8.0	(61)	11.0	(8)
	Total	305	102	3.0	19.0	(73)	16.8	(11)				
1982/83	Fall	76	36	2.1	18.2	(16)	17.4	(13)				
	Spring	224	64	3.5	19.7	(44)	16.8	(10)	7.0	(56)	9.0	(19)
	Total	300	100	3.0	19.3	(60)	17.1	(23)				
1983/84	Fall	49	24	2.0	18.0	(15)	16.8	(7)				
	Spring	237	96	2.5	19.3	(72)	17.0	(14)	7.4	(89)	9.6	(20)
	Total	286	120	2.4	19.1	(87)	16.9	(21)				
1984/85	Fall	76	32	2.4	18.5	(15)	16.4	(9)				
	Spring	190	58	3.3	19.7	(42)	16.6	(9)	7.5	(55)	8.7	(19)
	Total	266	90	2.9	19.3	(57)	16.5	(18)				
1985/86	Fall	119	48	2.5	18.4	(22)	16.5	(17)				
	Spring	398	121	3.3	19.1	(74)	16.8	(18)	7.2	(95)	8.5	(32)
	Total	517	169	3.0	18.9	(96)	16.7	(35)				
1986/87	Fall	131	40	3.3	17.7	(17)	16.4	(6)				
	Spring	344	114	3.0	19.6	(97)	16.4	(7)	8.1	(104)	6.9	(20)
	Total	475	154	3.1	19.3	(114)	16.4	(13)				
1987/88	Fall	105	40	2.6	17.2	(23)	16.7	(9)				
	Spring	293	113	2.6	19.5	(94)	17.2	(12)	8.0	(99)	7.7	(20)
	Total	398	153	2.6	19.0	(117)	17.0	(21)				

Table 5 Continued

Years	Season	Hunter Effort			Mean Skull Size <sup>a</sup> (in)				Average Age (years) <sup>b</sup>			
		Total Days	No. Hunters	Avg. Days Per Hunter	Male	(n) <sup>c</sup>	Female	(n)	Male	(n)	Female	(n)
1988/89	Fall	328	92	3.6	18.0	(57)	16.9	(26)	8.0	(58)	8.0	(10)
	Spring	414	114	3.6	19.4	(70)	16.7	(18)				
	Total	742	206	3.6	18.8	(127)	16.8	(44)				
1989/90	Fall	231	71	3.3	18.4	(22)	17.0	(12)				
	Spring	437	146	3.0	19.5	(89)	16.9	(15)				
	Total	668	217	3.0	19.3	(111)	16.9	(27)				
1990/91	Fall	227	85	2.7	17.8	(38)	16.6	(19)	7.7	(128)	8.1	(33)
	Spring	448	124	3.6	19.1	(93)	16.5	(16)				
	Total	675	209	3.2	18.7	(131)	16.5	(35)				
1991/92	Fall	184	65	2.8	18.1	(31)	16.8	(25)	7.6	(132)	8.2	(56)
	Spring	653	152	4.3	19.4	(103)	17.0	(28)				
	Total	837	217	3.8	19.1	(134)	16.9	(53)				
1992/93	Fall	231	80	2.9	17.3	(37)	16.6	(25)	7.2	(152)	8.4	(42)
	Spring	774	141	5.5	19.0	(115)	16.7	(18)				
	Total	1005	2221	4.5	18.6	(152)	16.6	(43)				
1993/94	Fall	291	87	3.3	17.6	(52)	16.8	(33)	7.0	(162)	7.0	(50)
	Spring	480	135	3.6	19.3	(112)	16.7	(21)				
	Total	771	222	3.5	18.8	(164)	16.8	(54)				
1994/95	Fall	223	85	2.6	18.3	(60)	16.9	(24)				
	Spring	601	149	4.0	19.2	(112)	17.3	(27)				
	Total	824	234	3.2	18.9	(172)	17.1	(51)				

<sup>a</sup>Skull size equals length plus zygomatic width.<sup>b</sup>Ages not available for 1980/81, 1989/90, and 1994/95.<sup>c</sup>Numbers in parentheses represent sample sizes.

Table 6. Hunter effort (hunter days/bear), mean bear skull sizes, mean bear ages, and scores for harvest, hunter success, skull sizes, and ages relative to other years in Unit 2, 1980-1995.

Years	Hunter Days/ Bear <sup>a</sup>	Mean Skull Size (in) <sup>b</sup>	Mean Age (Years)	Overall Score <sup>c</sup>
1980/81	3.3 (7)	18.3 (5)	— —	—
1981/82	3.0 (4)	18.6 (3)	8.3 (1)	8
1982/83	3.1 (5)	18.7 (2)	7.5 (5)	12
1983/84	2.4 (1)	18.7 (2)	7.8 (4)	7
1984/85	2.9 (3)	18.7 (2)	7.8 (4)	9
1985/86	3.0 (4)	18.3 (5)	7.5 (5)	14
1986/87	3.1 (5)	19.0 (1)	7.9 (3)	9
1987/88	2.6 (2)	18.7 (2)	7.9 (3)	7
1988/89	3.6 (9)	18.3 (5)	8.0 (2)	16
1989/90	3.1 (5)	18.6 (3)	— —	—
1990/91	3.2 (6)	18.2 (6)	7.8 (4)	16
1991/92	3.8 (10)	18.5 (4)	7.8 (4)	18
1992/93	4.5 (11)	18.1 (7)	7.4 (6)	24
1993/94	3.5 (8)	18.3 (5)	7.0 (7)	20
1994/95	3.2 (6)	18.5 (4)	— —	—

<sup>a</sup>Numbers in parentheses represent scores for hunter effort for each year relative to all others: 1=lowest.

<sup>b</sup>Numbers in parentheses represent scores for mean skull size each year relative to all others: 1=highest.

<sup>c</sup>Numbers in parentheses represent scores for mean age each year relative to all others: 1=highest.

<sup>d</sup>Overall score is equal to the sum of the scores for hunter effort, mean skull size, and mean age. Smaller scores represent better seasons.

Table 7 Unit 2 black bear harvest chronology<sup>a</sup>, 1983-1995

Number of Animals													
Date	1983/ 1984	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	Total
January	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	1	0	0	0	0	0	0	0	0	1
March	0	0	1	1	0	1	0	1	0	0	0	0	4
Apr. 01-10	0	0	2	4	0	1	0	1	0	1	0	0	9
Apr. 11-20	1	1	5	7	10	1	5	5	2	3	0	0	40
Apr. 21-30	6	7	14	10	11	7	8	9	26	15	15	12	140
May 01-10	33	18	27	25	31	21	33	22	49	33	33	55	380
May 11-20	26	13	38	23	28	38	67	30	40	58	43	37	441
May 21-31	17	9	26	22	20	33	15	35	18	25	18	27	265
June 01-10	6	5	6	12	5	3	12	11	10	7	14	14	105
June 11-20	6	3	2	5	7	5	1	7	4	1	6	2	49
June 21-30	1	2	0	4	2	5	6	4	5		6	2	37
Sept. 01-10	4	16	13	9	16	48	28	46	17	32	27	35	291
Sept. 11-20	9	3	3	9	4	16	11	14	14	20	23	16	142
Sept. 21-30	1	7	7	3	5	8	16	4	7	4	14	9	85
Oct. 01-10	3	2	7	6	3	14	8	9	11	12	7	11	93
Oct. 11-20	1	2	10	2	4	4	1	7	3	8	3	3	48

Table 7 Continued

Number of Animals													
Date	1983/ 1984	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991	1991/ 1992	1992/ 1993	1993/ 1994	1994/ 1995	Total
Oct. 21-31	0	1	3	5	7	3	5	1	3	3	4	6	41
Nov. 01-10	1	1	5	4	1	1	0	3	5	1	6	6	34
Nov. 11-20	2	0	2	0	0	0	1	2	3	0	2	0	12
Nov. 21-30	1	0	1	1	0	0	1	2	0	1	1	0	8
December	1	0	0	0	0	0	0	0	1	0	0	0	2

\*Does not include bears killed during closed season.

## LOCATION

**GAME MANAGEMENT UNIT:** Unit 3 (3,000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Islands of the Petersburg, Kake, and Wrangell area

## BACKGROUND

Black bears are indigenous to Unit 3 and traditionally have been hunted for food and trophies. Roads associated with logging provide easy access for hunters previously restricted to airplanes or boats. The bag limit was increased from 1 to 2 bears in 1984 after a reduction to 1 bear in 1980. The harvest has increased substantially since 1977 when the kill was 26. From July 1994 through June 1995, the kill was 215 for Unit 3.

The average age of harvested male and female black bears ranges from 8 to 9 years. Reconstruction of reproductive history through tooth section analysis shows female black bears begin producing cubs between their fourth and ninth year (Matson's Laboratory (Milltown MT). Producing females have cubs every other year. The most prolific females had 6 pregnancies before being killed. The oldest producing female was 24 years old when she was killed.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

Maintain an average spring skull size and an average annual male skull size of at least 18.5 inches. Maintain a male to female ratio of 3:1 in the harvest.

## METHODS

Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. At the time of sealing, we record date and location of kill, numbers of days in the field, sex, and skull measurements (length plus zygomatic width). We collected premolar teeth extracted from sealed skulls to determine the age of harvested bears. No data is collected from unsuccessful hunters. Comparison of current data to historical records indicates harvest trends and, indirectly, population trends.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

Population estimates are not available for black bears in this unit. Information obtained through the sealing process suggests the populations are stable.

### MORTALITY

#### *Harvest*

#### Season and Bag Limit

Sept. 1-June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Board of Game Actions and Emergency Orders. The Board of Game reduced the bag limit to 1 black bear for nonresidents in 1990. No emergency orders were issued during this report period.

Hunter Harvest. Hunter harvest has ranged from 172 in 1992 to 235 in 1993 (Table 1). Percent males in the harvest increased from 74% in 1992 to 80% in 1994. The average male skull size ranged from 18.5 inches to 18.7 inches (Table 2). Average skull size did not fall below the management objective in any year.

Kuiu Island, with 25% of the Unit 3 land area, produced 51% to 52% of the black bear harvest in Unit 3, Kupreanof Island produced 31% to 36%, and Mitkof Island produced 9% to 10% of the harvest during the report period (Table 3). In 1994, 1 male black bear/8 mi<sup>2</sup> and 1 female/31 mi<sup>2</sup> were killed on Kuiu Island. Kuiu Island black bear skull measurements are larger than those of bears on other Unit 3 islands (Table 4). Kuiu Island has more salmon producing streams than the other Unit 3 islands (ADF&G files). Hunter access may also be greater as Kuiu has more miles of shoreline per square mile of area than other islands.

Zarembo Island is located south of Mitkof and north of Etolin islands, measuring 182 mi<sup>2</sup>. Although surrounded by islands with high densities of black bears, Zarembo has no resident bear population. Deer, wolves, and elk are present; the reason for the lack of black bears is unknown.

In spring of 1995, 3 cinnamon-colored black bears were harvested on Mitkof Island, the first record of cinnamon bears harvested in Unit 3.

Hunter Residency and Success. Nonresident hunters account for about half of the total kill. Although the ratio varies yearly, local and nonlocal residents take approximately equal numbers of bears (Table 5).

Harvest Chronology Most black bears are taken in the spring, with the month of May accounting for about one-half of all Unit 3 bears killed (Table 6).

Transport Methods. Hunters primarily use boat transportation with some using aircraft or highway vehicles. Highway vehicles are primarily used on Mitkof Island, but some are used on Wrangell, Kupreanof, and Kuiu islands (Table 7).

#### *Other Mortality*

Nonhunting mortality remains relatively low (Tables 1). Most nonhunting kills are the result of defense of life or property.

## **HABITAT**

### ***Assessment***

Timber harvest continues to pose the most serious threat to black bear habitat. Postlogging increases in berry production, primarily *Vaccinium* sp., may contribute to short-term bear population growth. This forage source will be lost as canopy closes; thus, long-term effects of logging will be detrimental to black bears.

## **CONCLUSIONS AND RECOMMENDATIONS**

The percentage of males in the harvest and average male skull size suggests black bear populations are stable in Unit 3. I offer no recommendations at this time.

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Bruce Dinneford  
Regional Management Coordinator



Table 1 Unit 3 black bear harvest, 1987-1994

	Hunter kill						Non-hunting kill <sup>a</sup>			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
Fall 87	15	5	21	4	24	NA	0	0	0	15	62	5	21	4	24
Spring 88	120	17	12	4	141	0	0	0	0	120	85	17	12	4	141
Total	135	22	13	8	165	0	0	0	0	135	82	22	13	8	165
Fall 88	24	8	24	1	33	NA	2	0	0	26	74	8	23	1	35
Spring 89	142	19	11	5	166	0	0	0	0	142	86	19	11	5	166
Total	166	27	14	6	199	0	2	0	0	168	84	27	13	6	201
Fall 89	28	11	28	0	39	NA	4	0	0	32	74	11	26	0	43
Spring 90	128	21	14	1	150	2	1	0	0	129	85	21	14	1	151
Total	156	32	17	1	189	2	5	0	0	161	83	32	16	1	194
Fall 90	14	10	42	0	24	NA	0	0	0	14	58	10	42	0	24
Spring 91	121	10	8	2	133	0	0	0	0	121	91	10	8	2	133
Total	135	20	13	2	159	0	0	0	0	135	86	20	13	2	157
Fall 91	29	15	34	0	44	NA	1	3	0	30	62	18	38	0	48
Spring 92	97	18	16	0	115	0	1	0	0	97	84	19	16	0	116
Total	126	33	21	0	159	0	1	4	0	127	77	37	23	0	164
Fall 92	31	17	35	0	48	NA	3	1	1	34	64	18	34	1	53
Spring 93	92	19	16	5	116	0	1	2	0	93	78	21	18	5	119
Total	123	36	22	5	164	0	4	3	1	127	74	39	23	6	172
Fall 93	23	17	53	2	42	NA	3	0	0	26	58	17	38	2	45
Spring 94	156	33	18	0	189	0	1	0	0	157	83	33	17	0	190
Total	179	50	24	2	231	0	4	0	0	183	78	50	21	2	235
Fall 94	19	13	41	0	32	NA	3	0	0	22	63	13	37	0	35
Spring 95	153	30	16	0	183	0	1	0	0	150	83	30	17	0	180
Total	168	43	20	0	215	0	4	0	0	176	80	43	20	0	219

<sup>a</sup> Includes defense of life or property kills, research mortalities, and other known human caused accidental mortality.

Table 2 Unit 3 black bear skull size<sup>a</sup>, 1987-1994

Year	Males	<i>n</i>	Females	<i>n</i>
1987	18.7	123	16.1	18
1988	18.5	161	16.6	26
1989	18.3	152	16.7	29
1990	18.5	129	16.0	19
1991	18.3	121	16.4	33
1992	18.5	119	16.5	33
1993	18.7	172	16.5	47
1994	18.6	166	16.6	39

<sup>a</sup> Skull size = total length + zygomatic width in inches.

Table 3 Unit 3 black bear hunter harvest by island and density, 1987-1994

Kupreanof 1090 mi <sup>2</sup>					Kuiu 746 mi <sup>2</sup>				Mitkof 211 mi <sup>2</sup>					
		Percent of Unit 3	Average mi <sup>2</sup> / bear kill				Percent of Unit 3	Average mi <sup>2</sup> / bear kill				Percent of Unit 3	Average mi <sup>2</sup> / bear kill	
Year	Kill	Unit 3	Male	Female	Kill	Unit 3	Male	Female	Kill	Unit 3	Male	Female		
1987	43	26	29	218	87	52	11	62	22	13	13	53		
1988	51	26	24	363	118	59	8	37	19	10	13	70		
1989	52	28	24	182	109	58	8	39	12	6	23	70		
1990	55	35	22	363	78	50	12	53	13	8	19	106		
1991	51	32	25	156	74	47	13	44	17	11	18	42		
1992	53	31	27	109	88	51	11	39	17	10	23	23		
1993	81	34	16	91	120	51	8	25	22	9	13	35		
1994	78	34	14	91	114	52	8	31	20	9	16	30		

Table 4. Unit 3 black bear average male skull size<sup>a</sup> and percent of harvest by major island and season, 1989-94

Island	Season	1989				1990				1991			
		Males	(%)	Average	n	Males	(%)	Average	n	Males	(%)	Average	n
Kupreanof	Fall	5	71	15.2	5	6	86	16.8	5	5	71	19.2	5
	Spring	41	91	18.7	40	44	92	18.3	44	39	89	18.0	37
	Total	46	88	18.3	45	50	91	18.2	49	44	86	18.2	42
Kuiu	Fall	15	68	18.1	14	6	46	19.0	6	11	61	17.9	10
	Spring	75	86	18.7	72	58	89	18.9	55	46	82	19.0	45
	Total	90	83	18.6	86	64	82	18.9	61	57	77	18.8	55
Mitkof	Fall	5	71	16.0	4	0	0	0	0	6	60	16.0	6
	Spring	6	60	18.4	5	11	92	18.1	11	6	86	18.7	4
	Total	11	65	17.3	9	11	79	18.1	11	12	71	17.1	10
Island	Season	1992				1993				1994			
		Males	(%)	Average	n	Males	(%)	Average	n	Males	(%)	Average	n
Kupreanof	Fall	7	64	17.6	7	7	58	18.6	7	7	64	19.2	7
	Spring	33	79	18.6	33	54	89	18.6	52	59	84	18.5	56
	Total	40	75	18.4	40	61	84	18.6	59	66	85	18.6	63
Kuiu	Fall	17	65	18.1	17	13	52	19.3	12	8	57	18.4	8
	Spring	50	81	19.1	47	72	78	18.8	71	82	82	18.8	78
	Total	67	76	18.8	64	85	73	18.9	83	90	79	18.7	86
Mitkof	Fall	5	56	15.4	5	2	40	16.1	1	5	63	16.9	5
	Spring	4	50	16.1	3	11	79	18.6	11	8	67	19.1	6
	Total	9	53	15.7	8	13	68	18.4	12	13	65	18.1	11

<sup>a</sup>Skull size = total length + zygomatic width.

Table 5 Unit 3 successful black bear hunter residency, 1987-1994

Regulatory year	Local resident <sup>a</sup>	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1987	36	22	56	34	74	45	166
1988	34	17	49	25	116	58	189
1989	37	20	45	24	107	57	189
1990	34	22	47	30	76	48	157
1991	33	21	29	18	97	61	159
1992	36	22	27	16	101	62	164
1993	27	12	75	32	129	56	231
1994	33	15	61	28	121	57	215

<sup>a</sup>Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 6 Unit 3 black bear harvest chronology by percent, 1987-1994

Regulatory year	September	October	December	Month April	May	June	July	n
1987	9	4	1	17	50	18	0	166
1988	10	5	2	13	59	12	0	199
1989	16	4	1	10	64	5	0	189
1990	11	4	0	26	48	11	0	157
1991	23	4	1	14	48	9	0	159
1992	25	4	1	11	53	5	1	171
1993	15	3	0	18	47	17	0	235
1994	10	4	1	11	57	20	1	219

Table 7 Unit 3 black bear harvest, in percent by transport method, 1987-1994

Regulatory year	Airplane	Boat	3- 4- Wheeler	Snow machine	Off-road vehicle	Highway vehicle	Foot	Unknown	n
1987	28	52	2	1	0	1	1	4	166
1988	14	71	0	0	0	14	1	0	199
1989	16	67	0	0	1	14	2	1	189
1990	12	71	2	0	1	12	1	1	157
1991	9	70	1	0	1	16	1	0	159
1992	6	74	0	0	0	13	3	4	172
1993	11	66	0	0	0	18	3	1	235
1994	4	72	1	0	0	23	3	1	219

## **LOCATION**

**GAME MANAGEMENT UNIT:** 5 (5,800 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Cape Fairweather to Icy Bay, Eastern Gulf Coast.

## **BACKGROUND**

Within Unit 5 black bears predominantly inhabit Subunit 5A. Within Subunit 5B, dominated by the Malaspina Glacier, only 14 black bears have been taken since 1971 out of a total of 498 harvested within the Unit. "Glacier" (gray pelage) bears occur more frequently in Unit 5 than in other management units.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Maintain a 3:1 male to female ratio in the harvest and a mean annual male skull size (length plus width) of at least 17.0 inches.

## **METHODS**

Black bear hides and skulls were sealed by staff of the Alaska Departments of Fish and Game and Public Safety. Biological and hunt information collected at the time of sealing included pelage color, sex, skull size (length and width), date and location of kill, transportation method, and type of commercial services. A premolar was collected from some bears for age determination. We also gathered anecdotal information about field conditions.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

Population information is not available for black bears in Unit 5, and because only successful hunters are required to report their hunts (Tables 1 and 2), data on hunter effort is incomplete. Harvest has decreased since the last report period (Table 3). Mean total skull size for males was greater than the previous 6-year mean and exceeds the management goal of 17.0 inches. The mean age at harvest remains acceptable, but only a few of the harvested bears were aged. Most successful hunters, especially nonresidents, reported using commercial services. Registered guides were used most often; hunters used transport to the field and nonguided services less frequently.

### **MORTALITY**

#### *Harvest*

### Season and Bag Limit

Sept. 1 - June 30

Resident hunters: 2 bears, not more than 1 of which may be a blue or glacier bear

Nonresident hunters: 1 bear

Hunter Harvest. Black bear harvests ranged from 10 to 18 from 1992 to 1994, averaging 14 (Table 3). More males were harvested than females, exceeding a 3:1 male to female ratio in 1993 and 1994. However, 8 of 18 (44%) of the bears harvested in 1992 were females. The percentage of glacier bears harvested has remained about 12% since 1986, with 5 taken during this reporting period. No cinnamon bears were harvested.

Hunter Residency. Nonresidents continue to take most of the bears. During the report period, the proportion of black bear hunters that were nonresidents was 64%, a decrease from the previous 6-year mean of 76% (Table 1). Alaskans residing outside of Unit 5 harvested 21% of the bears, with local residents of Unit 5 harvesting only 14% of the bears.

Harvest Chronology. Most black bears have historically been harvested in Unit 5 during the spring. This trend continued throughout this reporting period, with only 1 of the 52 bears harvested taken during a fall season (1992).

Transport Methods. Aircraft and boats continue to be the 2 predominant means of transport for Unit 5 black bear hunters (Table 1). Airplanes and boats were used as the primary means of transportation in 47% and 53% of reported hunts, respectively, and were used nearly equally in each of the 3 seasons. No other transportation methods were used during this reporting period, although other means were used in a few hunts during the last period. Commercial transport to the field was used by 29% of the hunters who reported using commercial services (Table 2).

## **CONCLUSIONS AND RECOMMENDATIONS**

The management objective of maintaining a 3:1 male to female harvest ratio was achieved in 2 of the 3 years of this reporting period. Mean age and mean skull size data do not indicate the population is in an unhealthy state. It is still recommended that skull size, mean age, and the distribution of age classes be monitored closely. We should determine the age of a greater proportion of harvested bears. Based on historical data, a minimum mean male skull size of 17.0 inches and a mean male age of 7 are reasonable objectives.

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Table 1. Unit 5 residency, mean days hunted<sup>1</sup>, and transportation used by successful black bear hunters, 1992-1994

Year	Unit Residents		Other AK Residents		Nonresident		Total Effort		Plane	Boat	ORV	Hwy Vehicle	Foot	Unk
	Hunters	Days	Hunters	Days	Hunters	Days	Hunters	Days						
1992	2	2.5	4	4.0	12	3.6	18	3.6	9	9	0	0	0	0
1993	0	0.0	1	10.0	9	3.6	10	4.2	5	5	0	0	0	0
1994	4	1.5	4	5.8	6	3.2	14	3.4	4	6	0	0	0	0
Report Period Mean (%)	2 (14)	1.8	3 (21)	5.4	9 (65)	3.5	14	3.7	(47)	(53)	---	---	---	---
1986-1991 Mean (%)	2 (7)	2.5	4 (16)	6.2	18 (77)	5.2	24	5.1	(46)	(40)	(1)	(2)	(2)	(9)

<sup>1</sup> Days hunted denoted in parentheses

Table 2. Unit 5 commercial services<sup>1</sup> used by successful hunters, 1992-1994

Year	Unit Residents		Other AK Residents		Nonresidents		Total Use		Transport	Nonguided Services	Registered Guide
	No	Yes	No	Yes	No	Yes	No	Yes			
1992	2	0	2	2	1	13	5	15	7	0	8
1993	0	0	0	1	1	8	1	9	0	2	7
1994	34	0	4	0	2	5	7	5	0	0	0
Report Period (%)	(100)	---	(67)	(33)	(13)	(87)	(31)	(69)	(29)	(8)	(63)
1989-1991 (%)	(100)	---	(95)	(5)	(13)	(87)	(36)	(64)	---	---	(100)

<sup>1</sup>No information beyond the use of guides is available before 1992.

Table 3 Unit 5 black bear harvest, 1992-1994

Year	Harvest	Males	Females	Unknown	Mean Skull <sup>1</sup>	Males		(n)	Age	(n)	Mean Skull	Females		(n)	Age	(n)	Color Variant		
						Mean	Age					Mean	Age				Black	Gray	Cin.
{Total	18	10	8	0	17.1	9	6.3	8	16.1	8	6.7	3	17	1	0				
1992 {Fall 92	1	0	1	0	N/A	----			15.8	1									
{Spring 93	17	10	7	0	17.1	9			16.2	7									
{Total	10	8	2	0	17.5	8	5.0	1	15.2	2	----	0	8	2	0				
1993 {Fall 93	0	0	0	0	N/A	----			N/A	0									
{Spring 94	10	8	2	0	17.5	8			15.2	2									
{Total	14	14	0	0	18.1	13	10.2	9	N/A	0	----	0	12	2	0				
1994 {Fall 94				0	N/A	----													
{Spring 95	0	0	0	0	18.1	13													
	14	14	0																
Report Period																			
Mean	14	11	3	0	17.7	30	8.2	18	15.9	10	6.7	3							
(%)		(76)	(24)														(88)	(12)	----
1986-1991																			
Mean	24	20	4	0	17.4	21	9.0	2	15.3	5	---	0							
(%)		(83)	(17)														(89)	(11)	----

<sup>1</sup> Skull size = total length + zygomatic width.

## LOCATION

**GAME MANAGEMENT UNIT:** 6 (10,140 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Prince William Sound and north Gulf of Alaska Coast

## BACKGROUND

Black bears inhabit most of Unit 6, with the exception of Montague, Hinchinbrook, and several smaller islands in Prince William Sound (PWS), and Kayak and Middleton islands along the North Gulf of Alaska Coast (NGC). Density is highest in western PWS and lower in eastern PWS and along the NGC. Modafferi (1978) roughly estimated densities of 1.4, 0.6 and 0.7 bears/mi<sup>2</sup> in western, eastern PWS, and along the NGC, respectively. Other density estimates for good habitat in PWS have ranged from 1.0 to 25 bears/mi<sup>2</sup> (Grauvogel 1967, McIlroy 1970, Modafferi 1982).

Hunting pressure may have affected local populations. McIlroy (1970) felt declining harvest and hunter success and increasing hunter-days per harvested bear indicated a declining black bear population in Valdez arm between 1966 and 1969. Relatively high hunter effort documented by Modafferi (1978) around Whittier in 1977 may have also indicated a reduced population.

Factors, other than hunting, which may affect black bear populations in Unit 6 are food abundance and adverse weather. Competition and predation by brown bears may also influence black bear numbers.

Harvest monitoring began in 1973, with mandatory sealing of hides. Before this requirement, annual harvests ranged from "practically nil" (Robards 1954) to over 100 during 1965 and 1966 (McIlroy 1970). Sealing records indicated an average annual take of 118 bears from 1973 to 1983, and an average of 241 for the period from 1984 to 1991. An historic high harvest of 279 was reached in 1986.

## MANAGEMENT OBJECTIVES

The management objective for Unit 6 black bear is to maintain a black bear population that will sustain a 3-year average annual harvest of 200 bears composed of at least 75% males, including a minimum average male skull size of 17 inches.

## METHODS

We sealed hides and skulls of all black bears in the reported harvest. Reported harvest included bears taken by licensed hunters and bears killed in defense of life or property. Staff checked each hide for sex identifiers and took skull measurements for total length and zygomatic width. A premolar tooth was pulled and archived for future age estimation. We asked hunters to report harvest date, days hunted, location of harvest, and type of transportation used for access to their hunting area.

We estimated unreported and illegal kills. Unreported harvest included wounding loss and bears taken by hunters and not sealed.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

We did not collect population data. Incidental observations indicated distribution and general abundance were unchanged. Highest density probably occurred in western and northern PWS. Relatively high hunting pressure has probably reduced bear numbers near population centers.

### MORTALITY

#### *Harvest*

Season and Bag Limit. The open season for all hunters in Unit 6 was September 1 to June 30 and the bag limit was 1 bear.

Board of Game Actions and Emergency Orders. The Board of Game took no actions and no emergency orders were issued.

Hunter Harvest. Hunters killed 224, 155, and 198 bears in Unit 6 during the report period, respectively, (Table 1). Most harvests (73-83%) were males, and most (69-79%) harvests occurred in Unit 6D. Hunter harvest during the past 5 regulatory years averaged 212, ranging from a high of 250 in 1990/91 to a low of 155 in 1993/94. The take was abnormally low in spring 1994 because unusually cold weather probably delayed emergence of bears from dens, reducing the availability of animals to hunters. Black bear den emergence was related to weather conditions in Alaska (Schwartz et al. 1986) and Minnesota (Rogers 1987).

Mean skull size among males harvested during the past 3 years was 17.0-17.3 in (Table 2). The largest skulls (17.8-18.8 in) came from Unit 6B, and the smallest (16.6-17.1 in) were reported in Unit 6D. Over the past 5 years, no trends were obvious.

Hunter Residency. Residents of Alaska who did not live in Unit 6 harvested most bears (55-66%) during this reporting period (Table 3). Nonresident hunters had the second highest total take (23-29%), followed by local residents of Unit 6 (10-20%). This pattern varied in Unit 6A, where most bears (46%-83%) were harvested by nonresidents. It was also different in Unit 6C, where most bears (53%-85%) were taken by local residents. The high harvest by local hunters in Unit 6C occurred because the Copper River Highway provided good access. Residency of successful hunters did not change significantly over the past 5 years.

Harvest Chronology. Most bears (57-69%) were taken in May during this reporting period (Table 4) and during the past 5 years.

Transport Methods. Most successful hunters used boats (54-68%) and airplanes (16-29%) for transportation during the past 3 years. Airplanes provided most (50-100%) of the transportation in Units 6A and 6B. Boats (13-30%) and highway vehicles (55%-80%) were important in Unit 6C. Variation was minimal over the past 5 years.

### *Other Mortality*

I estimated that losses from hunters wounding black bear and not recovering them added 10-15% to the yearly take. This was recorded as part of the estimated unreported kill (Table 1).

Modafferi (1978) estimated wounding loss at 33% of the reported harvest in Prince William Sound. He attributed the high loss rate to hunters fatally wounding animals when they take long distance shots at bears on open beach fringes and avalanche slopes during spring.

## **CONCLUSIONS AND RECOMMENDATIONS**

All management objectives were achieved. No season or bag limit changes are recommended.

We should estimate allowable harvest using methods developed by Griese (1991) for brown bears. This involves integrating research results, local knowledge, and existing harvest data to estimate a range of population size and sustainable harvest. Hunter success should be determined by requiring unsuccessful black bear hunters to report their activities on a mail-in hunter report. The data would be a valuable indicator of bear population trend and hunting pressure that could improve future management decisions

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Table 1 Unit 6 black bear harvest, 1990-1995

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill					Nonhunting kill												
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
6A/1990																		
Fall 90	4	3	(43)	1	8	0	0	0	0	1	0	4	(57)	3	(43)	2	9	
Spring 91	16	2	(11)	0	18	0	0	0	0	3	1	16	(89)	2	(11)	4	22	
Total	20	5	(20)	1	26	0	0	0	0	4	1	20	(80)	5	(20)	6	31	
6A/1991																		
Fall 91	4	3	(43)	0	7	0	1	0	0	4	0	5	(63)	3	(38)	4	12	
Spring 92	19	2	(10)	0	21	0	0	0	0	5	1	19	(90)	2	(10)	6	27	
Total	23	5	(18)	0	28	0	1	0	0	9	1	24	(83)	5	(17)	10	39	
6A/1992																		
Fall 92	16	6	(27)	0	22	0	1	0	0	3	1	17	(74)	6	(26)	4	27	
Spring 93	16	2	(11)	0	18	0	1	0	0	2	1	17	(89)	2	(11)	3	22	
Total	32	8	(20)	0	40	0	2	0	0	5	2	34	(81)	8	(19)	7	49	
6A/1993																		
Fall 93	3	0	(0)	0	3	0	0	0	0	0	1	3	(100)	0	(0)	1	4	
Spring 94	10	0	(0)	0	10	1	0	0	0	2	1	10	(100)	0	(0)	3	13	
Total	13	0	(0)	0	13	1	0	0	0	2	2	13	(100)	0	(0)	4	17	



Table 1 Continued

Subunit/ Regulatory year	Reported																
	Hunter kill						Nonhunting kill			Estimated kill		Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
6A/1994																	
Fall 94	0	2	(100)	0	2	0	0	0	0	0	1	0	(0)	2	(100)	1	3
Spring 95	14	2	(11)	0	16	0	0	0	0	3	1	14	(88)	2	(13)	4	20
Total	14	4	(22)	0	18	0	0	0	0	3	2	14	(78)	4	(22)	5	23
6B/1990																	
Fall 90	0	0	(0)	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 91	6	1	(14)	0	7	0	0	0	0	1	0	6	(86)	1	(14)	1	8
Total	6	1	(14)	0	7	0	0	0	0	1	0	6	(86)	1	(14)	1	8
6B/1991																	
Fall 91	0	0	(0)	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 92	7	0	(0)	0	7	0	0	0	0	1	0	7	(100)	0	(0)	1	8
Total	7	0	(0)	0	7	0	0	0	0	1	0	7	(100)	0	(0)	1	8
6B/1992																	
Fall 92	1	1	(50)	0	2	0	0	0	0	0	0	1	(50)	1	(50)	0	2
Spring 93	4	3	(43)	0	7	0	0	0	0	1	1	4	(57)	3	(43)	2	9
Total	5	4	(44)	0	9	0	0	0	0	1	1	5	(56)	4	(44)	2	11

Table 1 Continued

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill					Nonhunting kill												
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
6B/1993																		
Fall 93	0	0	(0)	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0	
Spring 94	3	1	(25)	0	4	0	0	0	0	1	1	3	(75)	1	(25)	2	6	
Total	3	1	(25)	0	4	0	0	0	0	1	1	3	(75)	1	(25)	2	6	
6B/1994																		
Fall 94	0	0	(0)	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0	
Spring 95	6	2	(25)	0	8	0	0	0	0	2	1	6	(75)	2	(25)	3	11	
Total	6	2	(25)	0	8	0	0	0	0	2	1	6	(75)	2	(25)	3	11	
6C/1990																		
Fall 90	0	0	(0)	0	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0	
Spring 91	11	4	(27)	0	15	0	0	0	0	2	1	11	(73)	4	(27)	3	18	
Total	11	4	(27)	0	15	0	0	0	0	2	1	11	(73)	4	(27)	3	18	
6C/1991																		
Fall 91	4	3	(43)	0	7	0	0	0	0	1	0	4	(57)	3	(43)	1	8	
Spring 92	8	2	(20)	0	10	0	0	0	0	1	1	8	(80)	2	(20)	2	12	
Total	12	5	(29)	0	17	0	0	0	0	2	1	12	(71)	5	(29)	3	20	

Table 1 Continued

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill						Nonhunting kill											
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
6C/1992																		
Fall 92	7	2	(22)	0	9	1	0	0	0	2	1	7	(78)	2	(22)	3	12	
Spring 93	7	3	(30)	1	11	5	0	0	0	2	1	7	(70)	3	(30)	4	14	
Total	14	5	(26)	1	20	6	0	0	0	4	2	14	(74)	5	(26)	7	26	
6C/1993																		
Fall 93	1	1	(50)	0	2	0	1	1	0	0	0	2	(50)	2	(50)	0	4	
Spring 94	11	2	(15)	0	13	5	0	0	0	3	1	11	(85)	2	(15)	4	17	
Total	12	3	(20)	0	15	5	1	1	0	3	1	13	(76)	4	(24)	4	21	
6C/1994																		
Fall 94	1	0	(0)	0	1	0	0	0	0	0	0	1	(100)	0	(0)	0	1	
Spring 95	13	1	(7)	0	14	6	0	0	0	3	1	13	(93)	1	(7)	4	18	
Total	14	1	(7)	0	15	6	0	0	0	3	1	14	(93)	1	(7)	4	19	
6D/1990																		
Fall 90	4	7	(64)	0	11	0	3	0	0	2	1	7	(50)	7	(50)	3	17	
Spring 91	141	38	(21)	11	190	0	0	0	0	29	10	141	(79)	38	(21)	50	229	
Total	145	45	(24)	11	201	0	3	0	0	31	11	148	(77)	45	(23)	53	246	

Table 1 Continued

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill						Nonhunting kill											
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
6D/1991																		
Fall 91	22	4	(15)	0	26	0	1	2	0	4	1	23	(79)	6	(21)	5	34	
Spring 92	108	39	(27)	6	153	0	0	2	0	23	8	108	(72)	41	(28)	37	186	
Total	130	43	(25)	6	179	0	1	4	0	27	9	131	(74)	47	(26)	42	220	
6D/1992																		
Fall 92	17	14	(45)	0	31	0	3	4	2	2	2	20	(53)	18	(47)	6	44	
Spring 93	91	28	(24)	5	124	10	0	0	0	15	4	91	(76)	28	(24)	24	143	
Total	108	42	(28)	5	155	10	3	4	2	17	6	111	(71)	46	(29)	30	187	
6D/1993																		
Fall 93	4	4	(50)	0	8	0	1	1	0	1	1	5	(50)	5	(50)	2	12	
Spring 94	92	22	(19)	1	115	3	0	0	0	10	5	92	(81)	22	(19)	16	130	
Total	96	26	(21)	1	123	3	1	1	0	11	6	97	(78)	27	(22)	18	142	
6D/1994																		
Fall 94	8	6	(43)	0	14	0	0	0	0	1	1	8	(57)	6	(43)	2	16	
Spring 95	120	20	(14)	3	143	0	0	0	0	12	6	120	(86)	20	(14)	21	161	
Total	128	26	(17)	3	157	0	0	0	0	13	7	128	(83)	26	(17)	23	177	

Table 1 Continued

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill					Nonhunting kill												
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
UNIT 6																		
TOTAL																		
1990																		
Fall 90	8	10	(56)	1	19	0	3	0	0	3	1	11	(52)	10	(48)	5	26	
Spring 91	175	45	(20)	11	231	0	0	0	0	35	12	175	(80)	45	(20)	58	278	
Total	183	55	(23)	12	250	0	3	0	0	38	13	186	(77)	55	(23)	63	304	
1991																		
Fall 91	30	10	(25)	0	40	0	2	2	0	9	1	32	(73)	12	(27)	10	54	
Spring 92	143	43	(23)	7	193	0	0	2	0	30	10	143	(76)	45	(24)	47	235	
Total	173	53	(23)	7	233	0	2	4	0	39	11	175	(75)	57	(25)	57	289	
1992																		
Fall 92	41	23	(36)	0	64	1	4	4	2	7	4	45	(63)	27	(38)	13	85	
Spring 93	118	36	(23)	6	160	15	1	0	0	20	7	119	(77)	36	(23)	33	188	
Total	159	59	(27)	6	224	16	5	4	2	27	11	164	(72)	63	(28)	46	273	
1993																		
Fall 93	8	5	(38)	0	13	0	2	2	0	1	2	10	(59)	7	(41)	3	20	
Spring 94	116	25	(18)	1	142	9	0	0	0	16	8	116	(82)	25	(18)	25	166	
Total	124	30	(19)	1	155	9	2	2	0	17	10	126	(80)	32	(20)	28	186	

Table 1 Continued

Subunit/ Regulatory year	Reported										Estimated kill		Total estimated kill					
	Hunter kill						Nonhunting kill											
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total	
1994																		
Fall 94	9	8	(47)	0	17	0	0	0	0	1	2	9	(53)	8	(47)	3	20	
Spring 95	153	25	(14)	3	181	6	0	0	0	20	9	153	(86)	25	(14)	32	210	
Total	162	33	(17)	3	198	6	0	0	0	21	11	162	(83)	33	(17)	35	230	

Table 2 Unit 6 black bear harvest mean skull size (length + width), 1990-1995

Subunit	Regulatory year	Males		Females	
		Mean (in)	<i>n</i>	Mean (in)	<i>n</i>
6A	1990/91	18.4	19	15.5	5
	1991/92	18.1	23	17.4	4
	1992/93	17.9	30	15.7	7
	1993/94	18.2	13	--	0
	1994/95	17.0	12	15.8	4
6B	1990/91	18.7	5	15.3	1
	1991/92	18.8	7	--	0
	1992/93	17.8	4	17.0	3
	1993/94	18.7	3	15.0	1
	1994/95	18.2	5	16.0	2
6C	1990/91	17.5	10	15.6	4
	1991/92	17.1	11	15.5	5
	1992/93	17.2	13	15.0	5
	1993/94	17.6	11	15.7	3
	1994/95	16.8	14	15.0	1

Table 2 Continued

Subunit	Regulatory year	Males		Females	
		Mean (in)	<i>n</i>	Mean (in)	<i>n</i>
6D	1990/91	17.1	139	15.2	43
	1991/92	16.6	123	15.6	45
	1992/93	17.1	104	15.7	40
	1993/94	16.9	95	15.7	24
	1994/95	17.0	123	15.5	26
UNIT 6	1990/91	17.3	173	15.3	53
TOTAL	1991/92	17.0	164	15.8	54
	1992/93	17.3	151	15.7	55
	1993/94	17.2	122	15.6	28
	1994/95	17.0	154	15.5	33



Table 3 Unit 6 black bear successful hunter residency, 1990-1995

Subunit	Regulatory year	Local resident <sup>a</sup>	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total Successful hunters <sup>a</sup>
6A	1990/91	0	(0)	7	(27)	19	(73)	26
	1991/92	0	(0)	9	(31)	20	(69)	29
	1992/93	7	(18)	9	(23)	24	(60)	40
	1993/94	1	(8)	6	(46)	6	(46)	13
	1994/95	0	(0)	3	(17)	15	(83)	18
6B	1990/91	0	(0)	3	(43)	4	(57)	7
	1991/92	3	(43)	1	(14)	3	(43)	7
	1992/93	1	(11)	6	(67)	2	(22)	9
	1993/94	0	(0)	2	(50)	2	(50)	4
	1994/95	0	(0)	6	(75)	2	(25)	8
6C	1990/91	10	(67)	4	(27)	1	(7)	15
	1991/92	13	(76)	2	(12)	2	(12)	17
	1992/93	17	(85)	3	(15)	0	(0)	20
	1993/94	8	(53)	3	(20)	4	(27)	15
	1994/95	10	(67)	3	(20)	2	(13)	15

Table 3 Continued

Subunit	Regulatory year	Local resident <sup>a</sup>	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total Successful hunters <sup>b</sup>
6D	1990/91	22	(11)	153	(75)	29	(14)	204
	1991/92	16	(9)	133	(72)	34	(18)	184
	1992/93	19	(12)	106	(68)	28	(18)	155
	1993/94	7	(6)	91	(74)	24	(20)	123
	1994/95	11	(7)	103	(66)	38	(24)	157
UNIT 6	1990/91	32	(13)	167	(66)	54	(21)	253
TOTAL	1991/92	32	(13)	145	(61)	59	(25)	239
	1992/93	44	(20)	124	(55)	54	(24)	224
	1993/94	16	(10)	102	(66)	36	(23)	155
	1994/95	21	(11)	115	(58)	57	(29)	198

<sup>a</sup> Residents of Unit 6.<sup>b</sup> Total includes hunters with unknown residency and subunit.

Table 4 Unit 6 black bear harvest chronology percent by time period, 1990-1995

Subunit	Regulatory year	Harvest periods <sup>a</sup>										n
		September		October		April		May		June		
		1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	
6A	1990/91	0	15	12	4	0	4	50	12	0	4	26
	1991/92	10	10	7	0	0	10	31	24	3	3	29
	1992/93	18	20	8	10	0	8	28	10	0	0	40
	1993/94	15	8	0	0	0	8	46	15	8	0	13
	1994/95	0	11	0	0	0	11	50	28	0	0	18
6B	1990/91	0	0	0	0	0	14	14	43	29	0	7
	1991/92	0	0	0	0	0	0	29	71	0	0	7
	1992/93	0	22	0	0	0	11	56	11	0	0	9
	1993/94	0	0	0	0	0	25	50	25	0	0	4
	1994/95	0	0	0	0	0	0	63	25	13	0	8
6C	1990/91	0	0	0	0	0	0	13	60	20	7	15
	1991/92	12	18	6	6	0	0	6	47	6	0	17
	1992/93	0	35	5	5	0	5	10	20	20	0	20
	1993/94	0	7	7	0	0	0	20	47	20	0	15
	1994/95	0	0	7	0	0	7	40	33	13	0	15
6D	1990/91	3	0	2	0	0	1	12	52	26	1	202
	1991/92	6	7	2	0	0	1	12	51	20	1	182
	1992/93	7	9	3	1	0	1	20	45	13	1	155
	1993/94	3	1	2	1	0	2	17	53	19	2	123
	1994/95	6	1	2	0	0	1	20	41	28	1	157
UNIT 6 TOTAL <sup>b</sup>	1990/91	3	2	3	0	0	2	16	49	23	2	251
	1991/92	7	8	3	0	0	2	15	48	16	1	27
	1992/93	8	14	4	3	0	3	22	35	11	1	224
	1993/94	4	2	2	1	0	3	21	48	17	2	155
	1994/95	5	2	2	0	0	3	26	39	24	1	198

<sup>a</sup> Bears were not taken during November-March.<sup>b</sup> Total includes bears taken in unknown subunits.

Table 5 Unit 6 black bear harvest percent by transport method, 1990-1995

Subunit	Regulatory year	Percent of harvest							Unknown	n
		Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway Vehicle		
6A	1990/91	77	0	15	0	0	4	0	4	26
	1991/92	77	0	10	0	0	0	0	13	30
	1992/93	88	0	3	0	0	0	3	8	40
	1993/94	77	0	0	0	0	0	8	15	13
	1994/95	89	0	0	0	0	0	11	0	18
6B	1990/91	100	0	0	0	0	0	0	0	7
	1991/92	86	0	0	0	14	0	0	0	7
	1992/93	89	0	11	0	0	0	0	0	9
	1993/94	50	0	50	0	0	0	0	0	4
	1994/95	100	0	0	0	0	0	0	0	8
6C	1990/91	7	0	40	0	0	7	27	20	15
	1991/92	0	0	29	0	0	12	35	24	17
	1992/93	0	0	30	5	0	0	55	10	20
	1993/94	0	0	13	7	0	0	80	0	15
	1994/95	7	0	20	7	0	0	67	0	15
6D	1990/91	16	0	72	0	0	2	2	7	204
	1991/92	14	0	73	0	0	0	3	11	184
	1992/93	14	0	72	5	0	0	5	5	155
	1993/94	11	0	83	1	1	0	1	4	123
	1994/95	11	0	81	1	0	0	3	3	157
UNIT 6	1990/91	24	0	62	0	0	2	4	8	253
TOTAL *	1991/92	23	0	59	0	0	0	5	13	240
	1992/93	29	0	54	4	0	0	8	6	224
	1993/94	16	0	68	1	0	0	9	5	155
	1994/95	22	0	66	2	0	0	9	3	198

\* Total includes bear taken in unknown subunits.

## LOCATION

**GAME MANAGEMENT UNITS:** 7 and 15 (8,397 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Kenai Peninsula

## BACKGROUND

Black bears are abundant throughout most of the Kenai Peninsula. In Unit 15A bear densities are estimated at 205 bears/1,000 km<sup>2</sup> for areas within the 1947 burn and 265/1,000 km<sup>2</sup> for the 1969 burn (Schwartz and Franzmann 1991). The popularity of black bear hunting and the number of bears harvested are increasing, especially during the past decade.

The Kenai Peninsula is comprised primarily of federally managed lands. The USDA Forest Service (Chugach National Forest, ca. 2,000 mi<sup>2</sup>) is the principle landowner in Unit 7 along with the USDI Park Service (Kenai Fjords National Park 885 mi<sup>2</sup>). In Unit 15 the U.S. Fish and Wildlife Service (Kenai National Wildlife Refuge) is responsible for management of 3,062 mi<sup>2</sup>. Municipal, private, state, and native corporation lands comprise the remainder of Unit 15.

A synopsis of hunting regulations was provided in Del Frate (1993). Since 1982–83 permits have been required for hunters using bait stations. By spring 1989, a specific season (15 April to 15 June) was established for hunting bears with the use of bait. Dogs may be used to hunt black bear under terms of a permit authorized by the Commissioner of Fish and Game.

Black bear research on the Kenai National Wildlife Refuge began in 1977 as part of a comprehensive predator prey study. Numerous reports have been published which increased our understanding of black bear ecology and management (Franzmann and Schwartz 1986 and 1988, Schwartz and Franzmann 1983, 1989, 1991 and 1992; Schwartz et al. 1983 and 1987, and Smith 1984).

Spruce bark beetles (*Dendroctonus rufipennis*) have infested and killed many older stands of spruce trees on the Kenai Peninsula. Recently, bark beetles have established in many old-growth spruce stands in Units 7 and 15. In 1993, an aerial survey showed 265,972 acres of land were infested with spruce bark beetles (Jim Peterson, ADNR, pers. commun.); much of the mature overstory had died. Several prescriptive logging cuts have been initiated in response. To date, most of the logging has occurred on private land although state timber sales have been planned. Over 44,000 acres of forested land are scheduled for logging in 1996. Reduction of old-growth forests may be detrimental to black bears by removing protective cover, reducing food plants associated with old-growth forests, and increasing human disturbance.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

Maintain a black bear population that will sustain a 3-year average annual harvest of 250 bears composed of no more than 40% females.

## METHODS

The harvest of black bears was monitored through a mandatory sealing program established in 1973. Biological and demographic information was collected from successful hunters. Hides and skulls of black bears were sealed with metal locking tags.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

The black bear population on the Kenai Peninsula is stable but will probably decrease slightly over the next 10 years due to fewer moose in the 1969 burn area and continuing human development into black bear habitat.

We estimated 3000 black bears occupied 5,880 mi<sup>2</sup> of available habitat (Del Frate 1993). The density estimates for portions of Prince William Sound (McIlroy 1972) indicate the densities of black bears in coastal regions of the Kenai Peninsula may exceed 205 bears per 1000 km<sup>2</sup>; however, further research is needed.

#### *Distribution and Movements*

Schwartz and Franzmann (1991) provided an excellent review of radiocollared black bear movements. One of the primary factors affecting distribution and movements of bears was the abundance and distribution of devil's club (*Oplopanax horridus*). Increased productivity of black bears in specific areas was related to the number of moose calves consumed in the spring (Schwartz and Franzmann 1991). As plant succession progresses in the 1969 burn, available browse will decrease and the number of moose calves available to bears will decline.

### MORTALITY

#### *Harvest*

Season and Bag Limit. The season was not closed in Units 7 and 15 and the bag limit was 2 bears; however, only 1 bear can be taken from 1 January through June 30 and 1 bear from 1 July through December 31. Cubs or females accompanied by cubs could not be taken. Bear baiting was allowed from 15 April to 15 June by registration permit (except in Resurrection Creek and its tributaries in Unit 7).

Board of Game Action and Emergency Orders. The Board of Game reduced the bag limit for black bears in March of 1994. The bag limit was reduced to 2 bears; however, no more than 1 bear can be taken from 1 January to 30 June or from 1 July to 31 December. In the fall of 1995, the Board passed a proposal which requires hunters hunting over bait to have completed a hunter education course or to have attended an ADF&G sponsored clinic on bear baiting. This regulation becomes effective spring of 1997. Also beginning in the Spring of 1997 Black bear hunters will be required to salvage all edible meat from bears taken prior to July 1. This proposal was passed during the Spring 1996 meeting.

Hunter Harvest. The 5-year mean annual harvest was 257 animals (range = 209–309 (Table 1). Females averaged 31% of the harvest for the 5-year period, 1990–94, and 30% of the harvest for the most recent 3-year period. The proportion of females in the harvest was within management objectives (<40%).

The number of bait stations increased from 151 stations registered to 106 hunters in 1990 to 423 stations to 245 permittees in 1993 and leveled off to 337 stations registered to 199 hunters in 1995 (Table 3). Bears taken at bait stations accounted for 16.7% of the harvest during the 5-year period 1990–94 (Table 1). Hunters harvested an average of 45 bears over bait during the past 3 regulatory years, 1992–1994 (Table 2); 32% of bears taken over bait during this period were females. Hunters with bait stations in Unit 15A consistently harvested a higher proportion of females (49%) than did hunters using bait on the rest of the Kenai.

Hunter Residency and Success. In 1992 local residents, nonlocal residents, and nonresidents accounted for 49%, 38%, and 11%, respectively, of the black bear harvest in Units 7 and 15. In 1993 local residents, nonlocal residents, and nonresidents accounted for 39%, 48%, and 7%, respectively. In 1994 local residents, nonlocal residents, and nonresidents accounted for 45%, 41%, and 12%, respectively. (Table 4). The proportion of successful hunters has varied between local and nonlocal hunters during the last 5 years while the proportion of nonresidents has increased.

Harvest Chronology. More bears were harvested during the spring than in the fall in each of the past 3 years (Table 5). The proportion of bears taken during spring have increased from 53% to 69% in the last 3 years. Most bears were taken in May. During fall most of the bears were taken in September coincident with moose season.

Transport Methods. Boats, highway vehicles, and airplanes were important methods of transport for successful bear hunters in Units 7 and 15 (Table 6). In 1992 and 1993 highway vehicles were the predominant mode of transportation (27% and 34%), followed by boats (21% and 28%) and aircraft (21% and 15%), respectively. In 1994 boats were predominant, followed by highway vehicles and aircraft with 29%, 19%, and 17%, respectively. In addition, 16%–19% of hunters who took a bear reported walking as their means of transportation. Many of these hunters typically shot bears near their homes.

#### *Other Mortality*

Schwartz and Franzmann (1991) estimated hunter harvests represented 59% of all black bear mortality in Unit 15A. Other mortality included wounding loss (6%), starvation (3%), predation (11%), and unknown causes (20%).

Nonregulatory Management Problems and Needs. Illegal trafficking of bear parts including hides, claws, and gall bladders seems to occur on the Kenai. Public reports indicate trafficking of bear parts occurs occasionally but no enforcement cases have been pursued. Management objectives may be exceeded if market hunting for bear parts becomes a common practice on the peninsula.

## CONCLUSIONS AND RECOMMENDATIONS

Black bears are an important big game species in Units 7 and 15, second only to moose in numbers of animals harvested. Bear hunting is increasing in popularity because of a lengthy season and liberal bag limit. If annual harvests continue to increase, regulatory changes may be necessary to decrease the harvest. Maintenance of a healthy bear population is necessary to ensure liberal recreational opportunities.

Habitat degradation from development and forestry practices may threaten survival of black bears on the Kenai Peninsula. Logging vast areas of mature forest has negative effects on black bears. Devil's club, an important forage species, declines in vigor after logging and exposure to full sunlight. Logging roads improve access, further increasing bear mortality.

Conservative density estimates indicate the population is approximately 3000 bears. Information is needed for mountainous and coastal regions of the Kenai Peninsula to verify population estimates.

The exploitation of 14.2% of the population can be maintained on a sustained yield basis (Miller 1990). Based on a population estimate of 3000 bears, 426 bear mortalities can be sustained annually. Schwartz and Franzmann (1991) found that only 59% of bear mortalities can be attributed to hunting in Unit 15A. This percentage is minimal because of hunters' reluctance to report taking radiocollared bears. Therefore, calculating 59% of 426 allowable annual mortalities yields an allowable hunter harvest of 251 bears. This calculation allows for other forms of bear mortality (wounding loss, natural, and illegal). Managers should caution against overharvesting since the ramifications are long term (Bunnell and Tait 1980, Miller 1990).

Miller (1990) suggested it would be more important to monitor the number of females in the harvest rather than percentage of males. Taylor et al. (1987) noted the effects of hunting pressure on breeding females was critical in sustained yield management. The proposed management objective would limit the number of females taken rather than encourage a high harvest of males.

The Kenai National Wildlife Refuge implemented regulations in 1989 which concentrated hunters using bait into a small area in Unit 15A. A high concentration of evenly distributed bait stations increases the probability that bears would eventually encounter a bait station and a hunter. Hunting over bait allows for a selective harvest of bears; however, the high proportion of females in this harvest indicates baiting may be reducing the number of bears in localized areas of Unit 15A, even though females with cubs are protected.

The management objective was increased to 250 bears per year, allowing a maximum average harvest of 100 female bears (40%). This objective is still within sustained yield management. It is based on conservative population estimates and conservative exploitation rates. The 3-year average harvest of 257 bears slightly exceeds objectives; however, the proportion of females during this period was below objectives. No regulatory changes are recommended at this time. However, if the harvest of black bears continues to increase, regulatory changes may be necessary. We should also consider restricting the use of bait stations to archery hunters. This type of restriction may provide the needed reduction in harvest as well as lower the proportion of females in the harvest. Archery hunters could be allowed to bait without significant impact to the bear population.



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Table 1. Units 7 and 15 black bear harvest<sup>a</sup>, 1990–94

Regulatory year	Reported Hunter Kill						Nonhunting Kill <sup>a</sup>			Total Estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
1990															
Fall 90	42	23	(35)	2	67		2	2	0	44	(62)	25	(35)	2	71
Spring 91	100	41	(29)	4	145		1	0	1	101	(69)	41	(28)	5	147
Total	142	64	(31)	6	212	38	3	2	1	145	(67)	66	(30)	7	218
1991															
Fall 91	76	54	(42)	6	136		4	6	0	80	(55)	60	(41)	6	146
Spring 92	102	42	(29)	5	149		1	0	0	103	(69)	42	(28)	5	150
Total	178	96	(35)	11	285	34	5	6	0	183	(62)	102	(34)	11	296
1992															
Fall 92	87	53	(38)	2	142		3	1	1	90	(61)	54	(37)	3	147
Spring 93	100	59	(37)	3	162		0	0	0	100	(62)	59	(36)	3	162
Total	187	112	(37)	5	304	39	3	2 <sup>b</sup>	1	190	(61)	113	(37)	6	309
1993															
Fall 93	54	17	(24)	2	71		2	2	0	56	(73)	19	(25)	2	77
Spring 94	102	27	(21)	1	130		0	2	0	102	(77)	29	(22)	1	132
Total	156	44	(22)	3	201	45	2	4	0	158	(76)	48	(23)	3	209
1994															
Fall 94	56	21	(27)	1	78		5	1	0	61	(73)	22	(26)	1	84
Spring 95	124	44	(26)	0	168		1	1	0	125	(74)	45	(26)	0	170
Total	180	65	(27)	1	246	51	6	2	0	186	(73)	67	(26)	1	254

<sup>a</sup>Includes DLP kills, research mortalities, and other known human-caused accidental mortality.

Table 2. Units 7 and 15 black bear harvest over bait stations, 1991–95

Calendar year	Unit 7		Subunit 15A		Subunit 15B		Subunit 15C		Total	%
	M	F	M	F	M	F	M	F		
1991	19	2	6	9	0	0	2	0	38	(29)
1992	8	7	4	6	0	1	3	4	34*	(55)
1993	9	4	9	11	0	0	3	3	39	(46)
1994	24	7	10	2	0	0	2	0	45	(20)
1995	28	8	6	5	0	0	1	3	51	(31)

\*One bear of unknown sex.

Table 3. Units 7 and 15 black bear baiting station information for the Kenai Peninsula, 1991–95

Calendar year	Local residents <sup>a</sup>	Nonlocal residents	Non residents	Total permits	Total stations	Bears harvested
1991	100	79	0	179	299	38
1992	100	96	0	196	335	34
1993	127	114	4	245	423	39
1994	95	97	3	195	319	45
1995	91	109	6	199	337	51

\*Resident of Unit 7 or 15.

Table 4. Units 7 and 15 black bear successful hunter residency, 1990–94

Regulatory year	Local <sup>a</sup> Resident (%)		Nonlocal Resident (%)		Nonresident (%)		Residency Unknown (%)		Total Successful Hunters
1990/91	93	(44)	99	(47)	20	(9)	0	(0)	212
1991/92	118	(41)	145	(51)	22	(8)	0	(0)	285
1992/93	149	(49)	117	(38)	32	(11)	6	(2)	304
1993/94	79	(39)	96	(48)	15	(7)	11	(5)	201
1994/95	110	(45)	100	(41)	29	(12)	7	(3)	246

<sup>a</sup>Resident of GMU 7 or 15.

Table 5. Units 7 and 15 black bear harvest chronology percent by time period, 1990–94

Regulatory year	Harvest Periods								n
	July	August	September	October	November	April	May	June	
1990/91	<1	2	18	10	0	<1	45	22	212
1991/92	1	9	30	8	0	1	39	13	285
1992/93	3	8	27	8	<1	3	41	9	304
1993/94	2	7	14	12	<1	1	42	21	201
1994/95	1	8	18	4	0	2	37	30	246

<sup>a</sup>One bear was reported in February.

Table 6. Units 7 and 15 black bear harvest percent by transport method, 1990–94

Regulatory year	Percent of Harvest								<i>n</i>	
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk		Unknown
1990/91	8	5	26	0	0	7	20	22	11	212
1991/92	15	3	28	2	<1	7	16	19	11	285
1992/93	21	5	21	4	0	<1	27	19	3	304
1993/94	15	3	28	3	0	0	34	16	1	201
1994/95	17	1	29	10	0	<1	19	18	0	246

## LOCATION

**GAME MANAGEMENT UNIT:** 11 (14,000 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Wrangell Mountains

## BACKGROUND

Black bears are numerous in those portions of Unit 11 having favorable forested habitat. Harvests have averaged 11 (range = 1–32) black bears per year since 1973 with wide yearly fluctuations in the number of bears taken. Black bears are gaining stature as desirable big game animals, and black bear hunting is increasing.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

Maintain the existing population of black bears with a sex and age structure that will sustain a harvest composed of at least 60% males.

## METHODS

We monitored the black bear harvest by interviewing successful hunters and sealing black bears presented for examination. We measured skulls of sealed bears, determined sex of bears, and extracted a premolar tooth for aging.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

Black bear surveys or censuses have not been conducted in Unit 11. However, field observations and harvest data indicate black bears were abundant in suitable habitat throughout the unit. The lower Chitina River Valley is especially favorable bear habitat with salmon available in a number of streams. Black bear numbers in this area are the highest in the unit and probably approached densities observed elsewhere in southcentral Alaska.

### MORTALITY

#### *Harvest*

Season and Bag Limit. There was no closed season for black bears in Unit 11 and the bag limit was 3 bears.

Board of Game Actions and Emergency Orders. No regulatory actions were taken in 1995 regarding black bear hunting in Unit 11.

Hunter Harvest. Hunters reported taking 18 black bears during the 1994–95 season. This take was the same as the previous year's but slightly higher than the 5-year (1989–94) mean harvest of 14 bears per year (Table 1). Males comprised 78% of the 1994–95 take, compared to an average of 71% reported during the last 5 years (1989–94). The mean skull size for males taken in 1994–95 was 16.8 inches, similar to the 5-year mean of 16.9 inches. The average skull size of females in the 1994–95 harvest was 15.5 inches, slightly lower than the 5-year mean of 15.7 inches.

Hunter Residency and Success. Nonresident hunters took 11% of the 1994–95 harvest and 21% of the 5-year black bear harvest (Table 2). Historically, nonresidents have averaged between 3 and 4 bears per year (range = 0–18), or 30% of the harvest in Unit 11 between 1973 and 1991. Most nonresidents reported using a guide and usually harvested a bear during the fall while hunting other big game species such as sheep. The percent of black bears in the harvest taken by local residents varied from no bears taken to 28 % of the harvest (Table 2). The take by nonlocal Alaskans remained high over the reporting period. Successful bear hunters spent an average of 3.4 days hunting during the 1994–95 season, slightly less time than the 3.5 day average reported for all successful bear hunters since 1973.

Data obtained from bear sealing certificates indicated 72% of successful hunters were specifically hunting black bears. The remainder reported taking a bear incidentally to other hunting activities. In 1994–95, 61% of the successful hunters salvaged some or all of the bear meat. There was only 1 black bear reported taken over bait each year between 1990–92 but 15 were reported during the last 2 years (Table 1).

Harvest Chronology. During the last 2 years, 12 (67%) bears were taken in the spring and 6 (33%) were taken in the fall. Between 1973 and 1993, 73% of the black bear harvest occurred during the fall season. Change in harvest chronology during the last 2 years was attributed to nonlocal resident Alaskans' increasing spring bear baiting. May and September are the 2 most important months for harvesting black bears.

Transportation Methods. Highway vehicles and 4-wheelers were the methods of transportation most often reported by successful black bear hunters (Table 4). Aircraft use was primarily by nonresidents on mixed-bag hunts during the fall.

#### *Other Mortality*

Remote rural residents continue their unreported harvests. These most likely involve DLP kills around remote cabins. Reporting is minimal because of the transportation difficulties in remote portions of the unit. Also, some locals consider black bears a nuisance animal that creates damage at cabins and homesites. Some DLP bears are claimed in the sport harvest because of the liberal bag limit and no closed season. Hunters taking a bear under DLP conditions are required to turn over the hide and skull to ADF&G.

## CONCLUSIONS AND RECOMMENDATIONS

Black bear harvests increased during the past 2 years, primarily due to increased spring harvests by nonlocal Alaskan residents. These hunters were primarily seeking bears, evident by the increased number of bears taken over bait. Even with the increased take, the harvest of black



bears remains quite low and is not believed to exert an influence over unit bear populations. Males predominate in the harvest, yet the proportion of males in the harvest meets management objectives for harvest composition.

Because most of Unit 11 is included in Wrangell St. Elias Park/Preserve, the black bear population receives relatively light hunting pressure. National Park Service regulations prohibit sport hunting in portions of the unit designated as park. Subsistence hunting by local rural residents continues in these areas; however, aircraft cannot be used to access park areas. This effectively closes much of the park to all hunting. As a result, most of the harvest is along the existing road system. Sport hunting and aircraft access is allowed in areas designated as preserve. No changes in season length or bag limits are recommended.

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Table 1. Unit 11 black bear harvest<sup>a</sup>, 1989-95

Regulatory year	Reported						Nonhunting kill <sup>a</sup>			Estimated kill		Total estimated kill			
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)
1989															
Fall 89	2	3	(60)	0	5	0	0	0	0		1	2	(40)	3	(60)
Spring 90	4	2	(33)	0	6	0	0	0	0		1	4	(67)	2	(33)
Total	6	5	(45)	0	11	0	0	0	0		2	6	(55)	5	(45)
1990															
Fall 90	6	1	(14)	0	7	0	0	0	0		1	6	(86)	1	(14)
Spring 91	1	3	(75)	3	7	1	0	0	0		1	1	(25)	3	(75)
Total	7	4	(36)	3	14	1	0	0	0		2	7	(64)	4	(36)
1991															
Fall 91	9	3	(25)	0	12	0	0	0	0		1	9	(75)	3	(25)
Spring 92	1	1	(50)	0	2	1	0	0	0		1	1	(50)	1	(50)
Total	10	4	(29)	0	14	1	0	0	0		2	10	(71)	4	(29)
1992															
Fall 92	6	2	(25)	1	9	0	1	0	0		1	6	(75)	2	(25)
Spring 93	3	0	(0)	0	3	1	0	0	0		1	3	(100)	0	(0)
Total	9	2	(18)	1	12	1	1	0	0		2	9	(82)	2	(18)
1993															
Fall 93	5	1	(17)	0	6	0	0	0	0		1	5	(83)	1	(17)
Spring 94	9	3	(25)	0	12	0	0	0	0		1	9	(75)	3	(25)
Total	14	4	(20)	0	18	0	0	0	0		2	14	(80)	4	(20)
1994															
Fall 94	5	1	(17)	0	6	0	0	0	1	5	(83)	1	(17)	1	7
Spring 95	9	3	(25)	0	12	0	0	0	0	1	9	(75)	3	(25)	1
Total	14	4	(22)	0	18	0	0	0	2	14	(78)	4	(22)	2	20

<sup>a</sup>Includes Defense of Life or Property kills, research mortalities, and other known human-caused accidental mortality.

Table 2. Unit 11 black bear successful hunter residency, 1989–95

Regulatory year	Local <sup>a</sup> resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1989/90	2	(18)	4	(36)	5	(46)	11
1990/91	0	(0)	10	(71)	4	(29)	14
1991/92	0	(0)	8	(57)	6	(43)	14
1992/93	2	(17)	8	(67)	2	(17)	12
1993/94	5	(28)	10	(55)	3	(17)	18
1994/95	2	(11)	14	(78)	2	(11)	18

<sup>a</sup>Resident of Unit 11 or National Park Service subsistence community for Wrangell-St. Elias National Park/Preserve.

Table 3. Unit 11 black bear harvest chronology percent by time period, 1989-95.

Regulatory year	Harvest Periods												June <i>n</i>
	August		September		October		November		April		May		
1989/90 3	(27)	2	(18)	0	(0)	0	(0)	0	(0)	6	(55)	0	(0) 11
1990/91 3	(21)	3	(21)	1	(7)	0	(0)	2	(14)	5	(36)	0	(0) 14
1991/92 5	(36)	7	(50)	0	(0)	0	(0)	0	(0)	2	(14)	0	(0) 14
1992/93 2	(17)	6	(50)	0	(0)	0	(0)	0	(0)	3	(25)	0	(0) 12
1993/94 0	(0)	2	(11)	4	(22)	0	(0)	0	(0)	10	(56)	2	(11) 18
1994/95 0	(0)	2	(11)	4	(22)	0	(0)	0	(0)	10	(56)	2	(11) 18

Table 4. Unit 11 black bear harvest percent by transport method, 1989-95

Regulatory year	Percent of Harvest														n				
	Airplane		Horse		Boat		3- or 4-Wheeler		Snowmachine		ORV		Highway vehicle			Walk		Unknown	
1989/90	5	(46)	0	(0)	2	(18)	0	(0)	0	(0)	0	(0)	0	(0)	2	(18)	2	(18)	11
1990/91	6	(43)	1	(7)	0	(0)	0	(0)	0	(0)	3	(21)	2	(14)	0	(0)	2	(14)	14
1991/92	6	(43)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(29)	2	(14)	2	(14)	14
1992/93	1	(8)	0	(0)	1	(8)	0	(0)	0	(0)	0	(0)	4	(33)	4	(33)	3	(25)	12
1993/94	2	(11)	1	(5)	1	(5)	0	(0)	0	(0)	0	(0)	10	(56)	3	(17)	1	(5)	18
1994/95	1	(5)	0	(0)	1	(5)	6	(33)	0	(0)	0	(0)	8	(44)	2	(11)	0	(0)	18

## **LOCATION**

**GAME MANAGEMENT UNIT:** 12 (9978 mi<sup>2</sup>)

**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**

Historically, human use of black bears in Unit 12 has been relatively low, despite liberal hunting regulations and moderate bear population levels. From the 1960s to the present, most black bear hunting has been confined to areas along the highway system and the Tanana River.

Recently, interest in hunting black bears at bait stations, particularly in the spring, has increased. During fall most black bears are harvested incidentally during hunts for other species. Annually, most bears are taken by local residents. Some meat is salvaged from most black bears taken in Unit 12.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT GOALS**

- Protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem.
- Provide the greatest sustained opportunity to participate in hunting black bears.

### **MANAGEMENT OBJECTIVES**

- Manage for a harvest of black bears that maintains 55% or more males in the combined harvests for the most recent 3 years.

## **METHODS**

We collected annual harvest information from hunters during the mandatory sealing process of hunter-killed bears. These reports provided data on harvest location and date, hunter residency and effort, sex of the bear, skull size, salvage of meat, defense of life or property, incidental take, and baiting. A premolar was extracted from each bear during the sealing process; however, black bear teeth have not been sectioned or aged for several years.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

No censuses or surveys were conducted in Unit 12 to determine the black bear population size and trend. However, hunter reports and observations by department personnel indicate black bears are present in all suitable habitats in Unit 12. Based on limited radiotelemetry data collected in Unit 12 and on more rigorous data collected in Unit 20A, I estimated the black bear density in Unit 12 to be between 16–22 bears/100 mi<sup>2</sup> of black bear habitat and the population size to be between 700 and 1000 bears.

#### *Population Composition*

Few data were available on population composition in Unit 12. Sex ratios in the harvest were not representative of the population because sows with cubs were protected by regulation. In addition, behavioral differences of male and female bears cause males to be more vulnerable to hunters.

The black bear population in Unit 12 seems to be productive, based on numerous sightings of sow-cub and sow-yearling family groups. The reproductive interval (length of time between parturition and weaning), determined by observations of radiocollared bears, ranged from 2 to 3 years, similar to what has been found in other Interior Alaska black bear populations (Miller 1987).

#### *Distribution and Movements*

Black bears are distributed throughout the forested areas, composing approximately 4500 mi<sup>2</sup> of Unit 12. During fall and spring, bears move into the shrub zones to feed on berries and succulent vegetation. A forest fire burned approximately 156 mi<sup>2</sup> of black bear habitat in the Tok River valley in 1990 and undoubtedly reduced the amount of black bear use in the area. By 1994 black bears began feeding on the edges of the burn.

Based on an investigation in a portion of Unit 12, Kelleyhouse (1990) reported black bear home ranges of 16 mi<sup>2</sup> for an adult female (29 relocations over 3 summers), 3 mi<sup>2</sup> for a subadult male (7 relocations), and 63 mi<sup>2</sup> for an adult male (15 relocations).

### MORTALITY

#### *Harvest*

Season and Bag Limit. There is no closed season for black bears in Unit 12; the bag limit is 3 bears. The harvesting of cubs or females accompanied by cubs is prohibited.

Board of Game Actions and Emergency Orders. No Board of Game actions or emergency orders concerning Unit 12 black bears occurred during the report period.

Hunter Harvest. During 1994–1995, 34 black bears were reported harvested in Unit 12 exceeding the 5-year average annual harvest of 29 (Table 1). Males comprised 88.2% of the harvest ( $n = 30$ )

exceeding the 5-year average sex ratio in the harvest of 77.3% males. Mean skull size of 22 males taken in 1994–1995 was 16.5 inches, comparable to the 5-year mean of 16.1 inches.

Most (65.5%) of the harvest occurred in the main Tok and Tanana River drainages. Some meat was salvaged from 73% of the reported harvest, below the 5-year mean of 84%. Only 44% of the successful nonlocal and nonresident black bear hunters salvaged meat.

Hunter Residency and Success. Alaskan residents harvested 94% of the black bears in Unit 12 during 1994–1995 (71% by local residents), comparable with the 5-year mean of 97% (Table 2). The average percent harvest by local residents has been 68%. The nonresident percent harvest ranged from 0% to 4% annually, averaging 2.6%. No measure of hunter success was available as unsuccessful hunters are not required to report. In 1994–1995 successful hunters spent an average of 8.2 days afield hunting black bears compared to the 5-year average of 8.7 days.

Harvest Chronology. During 1994, 23 bears (68%) were harvested during spring and 7 during fall (21%) (Table 3). The average percentage of the harvest taken in spring during the past 5 years was 74%. Hunters at bait stations during spring accounted for 57% of the harvest, comparable to the 5-year average (52%). During the past 5 years, 69% of black bear harvest in fall was taken incidentally during hunts for other species.

Transport Methods. Highway vehicles were the most commonly used (35%) mode of transportation for successful black bear hunters in 1994 (Table 4). During the past 5 years, 50% of the reported harvested black bears were killed by hunters using highway vehicles. The decline in the use of highway vehicles by black bear hunters is due to an increase in the use of 4-wheelers to create and travel to bait stations.

#### *Other Mortality*

Most black bear mortality in Unit 12 is natural rather than human-caused. Grizzly bears kill black bears and adult male black bears are a significant cause of cub bear mortality. There is no data on mortality rate of cubs in this area; however, Miller (1987) found that cubs of the year had a natural mortality rate of 35% in the Susitna Basin.

### **HABITAT**

#### *Assessment*

Approximately one-half of Unit 12 is suitable black bear habitat. Because grizzly bears are moderately abundant and are an important source of mortality for black bears of all age classes (Miller 1987), they limit black bear distribution to areas offering adequate escape cover. Black bears forage a variety of berry species in Unit 12. Berry abundance is directly affected by climate. The Tok Fire in 1990 burned approximately 156 mi<sup>2</sup> of prime black bear habitat, but its impact on the black bear population is unknown.

#### *Enhancement*

The implementation of the Alaska Interagency Fire Management Plan and the Tok Fire are expected to enhance black bear habitat in Unit 12. Extensive areas of climax black spruce forest



exist in the unit with understories nearly devoid of high-quality black bear food. If an additional area is disturbed by fire, the average age of successional habitats will decline. A younger, more diverse habitat mosaic will be more productive of bear food plants.

## CONCLUSIONS AND RECOMMENDATIONS

During the report period, the management goals and objective were met. In Unit 12 during the past years, 97% of black bears were harvested by state residents, of which 68% are local residents. The fact that some meat was salvaged on 84% of bears taken by residents illustrates that bear meat is an important food source. Based on hunter reports and public and departmental sightings, there is no indication the current harvest level is excessive. The percentages of males in the harvest remained high (5-year average = 77%). Male skull size remained fairly consistent and is comparable with the mean size of harvested male bears from the adjacent and lightly hunted Unit 20E. I recommend no changes in the seasons and bag limits.

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Table 1 Unit 12 black bear harvest, 1990-1994

Regulatory year	Reported										Total reported and estimated kill				
	Hunter kill					Nonhunting kill <sup>a</sup>			Estimated kill		M (%)	F (%)	Unk (%)	Total	
	M	F	Unk	Total	Baited	M	F	Unk	Unrep	Illegal					
1990-1991															
Fall 1990	5	1	0	6	0	0	0	0	0	0	5 (83)	1 (17)	0 (0)	6	
Spring 1991	12	5	1	18	5	0	0	0	0	0	12 (67)	5 (28)	1 (5)	18	
Total	17	6	1	24	5	0	0	0	0	0	17 (71)	6 (25)	1 (4)	24	
1991-1992															
Fall 1991	3	0	0	3	0	0	0	0	0	0	3 (100)	0 (0)	0 (0)	3	
Spring 1992	12	3	0	15	8	0	0	0	0	0	12 (80)	3 (20)	0 (0)	15	
Total	15	3	0	18	8	0	0	0	0	0	15 (82)	3 (18)	0 (0)	18	
1992-1993															
Fall 1992	8	3	1	12	0	0	0	0	0	0	8 (67)	3 (25)	1 (8)	12	
Spring 1993	17	6	0	23	14	0	0	0	0	0	17 (74)	6 (26)		23	
Total	25	9	1	35	14	0	0	0	0	0	25 (71)	6 (26)	1 (3)	35	
1993-1994															
Fall 1993	3	0	1	4	0	4	1	0	0	0	7 (78)	1 (11)	1 (11)	9	
Spring 1994	17	6	0	23	13	0	0	0	0	0	17 (74)	6 (26)	0 (0)	23	
Total	20	6	1	27	13	4	1	0	0	0	24 (75)	7 (22)	1 (3)	32	
1994-1995															
Fall 1994	7	0	0	7	0	0	0	0	0	0	7 (100)	0 (0)	0 (0)	7	
Spring 1995	23	4	0	27	13	0	0	0	0	0	23 (85)	4 (15)	0 (0)	27	
Total	30	4	0	34	13	0	0	0	0	0	30 (88)	4 (12)	0 (0)	34	

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

Table 2 Residency of Unit 12 successful black bear hunters, 1990-1994

Regulatory year	Unit resident (%)	Other residents		Total successful hunters
		(%)	Nonresident (%)	
1990-1991	15 (63)	7 (29)	2 (8)	24
1991-1992	10 (56)	8 (44)	0 (0)	18
1992-1993	26 (74)	8 (23)	1 (3)	35
1993-1994	21 (78)	5 (19)	1 (3)	27
1994-1995	24 (71)	8 (24)	1 (3)	34

Table 3 Chronology of black bear harvest in Unit 12, percent by time period, 1990-1994

Regulatory year	Harvest periods								n
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	
1990-1991	0	4	21	0	0	0	54	21	24
1991-1992	0	6	6	0	0	0	41	47	17
1992-1993	3	11	20	0	0	3	46	17	35
1993-1994	0	7	7	0	0	0	41	44	27
1994-1995	7	7	10	0	0	0	33	43	30

Table 4 Unit 12 black bear harvest by transport method, 1990-1994

Regulatory year	Method of transportation (%)												<i>n</i>
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unknown				
1990-1991	1 (4)	1 (4)	2 (8)	3 (13)	0 (0)	0 (0)	12 (50)	0 (0)	5 (21)	24			
1991-1992	1 (6)	0 (0)	1 (6)	2 (12)	0 (0)	0 (0)	13 (71)	0 (0)	1 (5)	18			
1992-1993	3 (9)	0 (0)	4 (11)	7 (20)	0 (0)	2 (6)	16 (46)	1 (3)	2 (6)	35			
1993-1994	1 (3)	0 (0)	1 (3)	9 (33)	0 (0)	1 (3)	11 (41)	1 (3)	1 (3)	27			
1994-1995	2 (6)	1 (3)	3 (9)	7 (21)	0 (0)	1 (3)	12 (35)	7 (21)	1 (3)	34			

## LOCATION

GAME MANAGEMENT UNIT 13 (23,000 mi<sup>2</sup>)

GEOGRAPHIC DESCRIPTION Nelchina Basin

## BACKGROUND

Black bears are numerous in portions of Unit 13 with suitable forest habitat. Harvest data are not available before 1973 when the sealing of black bears became mandatory. Average annual harvests have increased 32% from a mean of 62 bears per year between 1973–79 to an average of 81 bears per year since 1980. Black bears are gaining in status as a desirable big game animal, and black bear hunting seems much more popular than in the past.

## MANAGEMENT DIRECTION

### MANAGEMENT OBJECTIVES

Maintain the existing population of black bears with a sex and age structure that will sustain a harvest composed of at least 60% males.

## METHODS

We have monitored the black bear harvest by interviewing successful hunters and by sealing bears presented for examination. We measured skulls of sealed bears, determined sex of bears, and extracted a premolar tooth for aging.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

Black bear surveys or censuses have not been conducted in most of Unit 13. However, field observations and harvest data indicate black bears are abundant in appropriate habitat. A trend in bear abundance has not been documented.

A black bear census was conducted in 1985 along a portion of the upper Susitna River, in conjunction with the Susitna Hydroelectric Project (Miller 1987). Results indicated a density of 1 black bear/4.3 mi<sup>2</sup>. Females had an observed mean litter size of 2.1 (range = 1–4) cubs-of-the-year and 1.9 (range = 1–3) yearlings. Miller, however, considered the study area to be marginal black bear habitat, and his results may not be indicative of bear densities in more favorable forested habitat within the unit. A population estimate for Unit 13 has not been attempted because density estimates for bears in more favorable or typical forested habitat are not available. Black bear densities, even in areas of Unit 13 having good habitat, are thought to be lower than in areas like the Kenai Peninsula.

### *Distribution and Movements*

Black bears are usually found in forested habitats except during the fall and occasionally in spring when they move into shrub zones to feed on berries and succulent vegetation (Miller 1987).

### **MORTALITY**

#### *Harvest*

Season and Bag Limit. There was no closed season on black bears in Unit 13 and the bag limit was 3 bears per year.

Board of Game Actions and Emergency Orders. No regulatory actions were taken by the Board of Game during 1995 regarding black bears in Unit 13.

Hunter Harvest. The reported harvest of black bears during the 1994–95 season was 100 bears, a 59% increase from the 1993–94 harvest ( $n = 63$ ) and 32% above the 5-year (1988–93) average annual harvest of 76 (Table 1). Males composed 70% ( $n = 70$ ) of the 1994–95 take and females 30% ( $n = 30$ ). Overall, males have composed 64% of the historic harvest since 1973. Mean skull size for males was 16.6 inches in 1994–95, compared to the 5-year (1988–93) mean of 16.2 inches. Mean skull size for females was 15.6 inches in the 1994–95 harvest, compared to the 5-year mean of 15.5 in.

In 1994–95, Unit 13E had the highest reported harvest with 43 (43%) bears, followed by 13D with 36 (36%), 13A with 12 (12%), 13C with 5 (5%), and 13B with 4 (4%). Similar harvest proportions were observed in prior years with most of the harvests reported from Units 13E and 13D. Despite increased settlement, reported DLP kills remain low, possibly because DLP bears were sealed as sport harvests. With a 3-bear bag limit and no closed season, there is little incentive to report a black bear taken as a DLP bear and subsequently turn it over to ADF&G per DLP regulations.

Hunter Residency and Success. Nonresidents took 15 (15%) black bears during 1994–95 (Table 2). Overall, nonresidents have averaged 15 bears per year, (20% of the harvest), in Unit 13 since 1973. During the 1994–95 season, 9% (9) of successful hunters reported using a guide. Most guided hunters were nonresidents and hunted during the fall, presumably on a multispecies hunt. Residents of Unit 13 killed 25 (25%) black bears during 1994–95 compared to 7 (11%) the previous year. The remaining 1994–95 harvest of 55 (55%) bears were taken by residents of other units.

Successful black bear hunters spent an average of 3.0 days in the field in 1994–95, slightly less than the 3.5 day average reported for successful hunters since 1973. Sixty-one percent of successful black bear hunters in 1994–95 indicated they did not take a bear incidentally but were specifically hunting black bears. Incidental take was higher (48%) during the fall, when other big game species were hunted than in the spring (30%) when only bear seasons were open.

In 1994–95, 78% of successful hunters salvaged some or all of the bear meat. During recent seasons meat salvage has been high, with up to 70% of the hunters salvaging some meat. Eight bears were reported shot at a bait station in 1994–95 compared with 5 the previous year (Table 1). Hunting over bait did not appear to be as popular in Unit 13 as in other units, possibly because grizzly bears are abundant and could be encountered at bait stations.

Harvest Chronology. During the 1994–95 season, the spring harvest was 51 (51%) bears, compared to 49 (49%) in the fall. Overall, since 1973, 63% of the Unit 13 black bear harvest has occurred during the fall season. Most of the fall harvest is in September, and the most bear harvest in spring occurs in May (Table 3). Surprisingly, almost 19% of the bear harvest occurred during the summer when hides are poorer trophies. Summer kills were presumably for meat or DLP bears reported as sport kills.

Transport Methods. Among successful 1994–95 bear hunters, boats (22%), highway vehicles (21%), and 4-wheelers (20%) were the most popular methods of transportation (Table 4). Aircraft use has declined in recent years. Because of the combined importance of highway vehicles, walking, and ORVs, roadside black bear populations received the greatest hunting pressure.

#### *Other Mortality*

Miller (1987) observed 35% mortality among cubs-of-the-year accompanying radio-collared females in the upper Susitna River study area. In this study, additional natural mortality also occurred among radiocollared adult black bears. Miller felt predation by brown bears was an important source of natural mortality for black bears of all age classes.

### **HABITAT**

#### *Assessment*

Black bears in Unit 13 appear to prefer extensive tracts of spruce forest and, to a lesser degree, forested land bordering rivers and surrounded by upland shrub zones. Currently, Units 13D and 13E have the most extensive areas of heavily timbered spruce forests and contain more black bears. Current fire management objectives specify a reduction in fire suppression activities in remote portions of Unit 13 and a return to a natural fire regime. This may eventually result in an interspersed forest stands in different successional stages which could cause a reduction of preferred black bear habitat. Higher numbers of black bears in Units 13D and 13E could, in part, be attributed to the availability of salmon which provide an alternative source of nutrition not available in more interior units.

### **CONCLUSIONS AND RECOMMENDATIONS**

Harvest data is not currently collected from unsuccessful black bear hunters; thus, we have no way of determining hunting effort. There has been an increase in the number of hunters seeking information on black bears, and it appears that black bear hunting has become more popular. This trend is expected to continue as hunters seek alternative big game

hunting opportunities because of increasing competition, shorter hunting seasons, and increased use of permit hunts for the more popular big game species. Data used to evaluate changes in hunting pressure and success rates are an important indication of bear abundance. Currently, this information is collected only from successful hunters. I recommend that a system to collect these data from unsuccessful hunters be developed and implemented.

Yearly reported harvest rates for black bears in Unit 13 have fluctuated widely during the last 10 years. Large differences in yearly kill figures reflect hunting effort, weather, hunting conditions, and vulnerability of bears, more than changes in black bear numbers. Bear harvests increased gradually during the late 70s and into the early 80s, then leveled off. Overall, harvest has been in an upward trend that fluctuates yearly.

Hunt effort data do not indicate bears are becoming harder to take. Transportation data show most bears are taken near roads, trails, or waterways. Presumably hunting pressure and harvests in remote portions of the unit with limited access are very low with large portions of the unit having nearly no bears taken.

The average skull sizes for males and females remain high for this area. Males predominate in the harvest, composing 68% of the reported kill during the reporting period. This figure is well above the management objectives of 60% males in the harvest. Harvest rates for black bears are higher if males predominate in the harvest and females are left in the population to reproduce. No changes in season dates or bag limits are recommended at this time.

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Table 1. Unit 13 black bear harvest<sup>a</sup>, 1989—95

Regulatory year	Reported						Nonhunting kill <sup>a</sup>			Estimated kill		Total estimated kill					
	Hunter kill																
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
1989																	
Fall 89	31	11	(26)	0	42	0	0	0	0		3	31	(74)	11	(26)	3	45
Spring 90	17	4	(19)	1	22	5	1	0	0		3	18	(82)	4	(18)	4	26
Total	48	15	(24)	1	64	5	1	0	0		6	49	(77)	15	(23)	7	71
1990																	
Fall 90	33	9	(21)	2	44	0	0	0	0		3	33	(79)	9	(21)	5	47
Spring 91*	34	8	(19)	2	44	7	0	0	0		3	34	(81)	8	(19)	5	47
Total	67	17	(20)	4	88	7	0	0	0		6	67	(80)	17	(20)	10	94
1991																	
Fall 91	26	13	(33)	2	41	0	0	0	0		3	26	(67)	13	(33)	5	44
Spring 92	21	7	(25)	2	30	1	0	0	0		3	21	(75)	7	(25)	5	33
Total	47	20	(30)	4	71	1	0	0	0		6	47	(70)	20	(30)	10	77
1992																	
Fall 92	41	18	(31)	3	62	0	1	0	0		3	42	(70)	18	(30)	6	66
Spring 93	15	5	(25)	1	21	5	0	0	0		3	15	(74)	5	(26)	4	24
Total	56	23	(29)	4	83	5	1	0	0		6	57	(71)	23	(29)	10	90
1993																	
Fall 93	27	9	(25)	1	37	0	1	1	0		3	28	(74)	10	(26)	4	42
Spring 94	17	8	(32)	1	26	5	0	0	0		3	17	(68)	8	(32)	4	29
Total	44	17	(28)	2	63	5	1	1	0		6	45	(71)	18	(29)	8	71
1994																	
Fall 94	31	18	(37)	0	49	0	1	0	0		3	32	(64)	18	(36)	3	53
Spring 95	39	12	(24)	0	51	8	0	0	0		3	39	(76)	12	(24)	3	54
Total	70	30	(30)	0	100	8	1	0	0		6	71	(71)	30	(29)	6	107

<sup>a</sup>Includes Defense of Life or Property kills, research mortalities, and other known human-caused accidental mortality.

\* Nonresidents in May 1991.

Table 2. Unit 13 black bear successful hunter residency, 1989-95

Regulatory year	Local resident (%)		Nonlocal resident (%)		Nonresident (%)		Total successful hunters <sup>a</sup>
1989/90	14	(22)	40	(62)	10	(16)	64
1990/91	15	(17)	46	(52)	27	(31)	88
1991/92	11	(15)	47	(66)	13	(19)	71
1992/93	22	(28)	52	(65)	6	(7)	83
1993/94	7	(11)	39	(62)	17	(27)	63
1994/95	25	(26)	55	(58)	15	(16)	100

<sup>a</sup> Includes unknown residency.

Table 3. Unit 13 black bear harvest chronology percent by time period, 1989-95

Regulatory year	Harvest periods												<i>n</i>		
	July		August		September		October		April		May			June	
1989/90	4	(6)	3	(5)	34	(53)	1	(2)	1	(2)	19	(30)	2	(3)	64
1990/91	2	(2)	7	(8)	34	(39)	1	(1)	1	(1)	36	(41)	7	(8)	88
1991/92	3	(4)	6	(9)	27	(39)	5	(7)	1	(1)	15	(22)	12	(17)	69
1992/93	9	(11)	15	(19)	31	(39)	4	(5)	0	(0)	19	(24)	1	(1)	79
1993/94	3	(5)	10	(16)	22	(35)	2	(3)	0	(0)	18	(28)	8	(13)	63
1994/95	9	(9)	10	(10)	29	(29)	1	(1)	0	(0)	38	(38)	13	(13)	100

Table 4. Unit 13 black bear harvest percent by transport method, 1989-95

Regulatory year	Percent of harvest															<i>n</i>
	Airplane	Horse	Boat	3- or 4-Wheeler		Snowmachine		ORV	Highway vehicle		Walk		Unknown			
1989/90	17 (27)	2 (3)	12 (19)	1 (2)	0 (0)	11 (17)	7 (11)	8 (13)	6 (9)	64						
1990/91	27 (31)	4 (5)	6 (7)	1 (1)	0 (0)	6 (7)	11 (13)	20 (23)	13 (15)	88						
1991/92	19 (28)	3 (4)	10 (15)	1 (1)	0 (0)	5 (7)	12 (17)	8 (12)	11 (16)	69						
1992/93	16 (20)	1 (1)	6 (7)	11 (14)	0 (0)	0 (0)	30 (37)	12 (15)	5 (6)	81						
1993/94	13 (21)	6 (9)	6 (9)	8 (13)	0 (0)	2 (3)	20 (32)	7 (11)	1 (2)	76						
1994/95	13 (13)	0 (0)	22 (22)	20 (20)	0 (0)	2 (2)	21 (21)	18 (18)	4 (4)	100						

## **LOCATION**

**GAME MANAGEMENT UNIT:** 14 (6,625 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Upper Cook Inlet

## **BACKGROUND**

Black bear populations in Unit 14 were estimated by Grauvogel (1990), Harkness (1990), and Griesse (1996). Harkness and Grauvogel estimated a population of 750–1050 black bears, providing a sustainable annual harvest of 83–158 bears. Griesse reevaluated available habitat, considering recent excessive harvest of sows, and estimated the population near 700 (range = 530–1080) to establish maximum sustainable harvest of 24–30 sows for the unit.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Two management goals were assigned to Unit 14 in 1976. In Units 14A and 14B the goal was to provide the greatest opportunity to participate in hunting black bears. In Unit 14C the goals were to provide an opportunity to hunt black bears under aesthetically pleasing conditions and to provide an opportunity to view, photograph, and enjoy black bears.

The population objective is to maintain a population which is largely unaffected by human harvest. The human use objective is to provide liberal opportunities to hunt black bears with annual average harvests of <80 bears, with the annual sow harvest not exceeding 30 (14 sows in Unit 14A; 8 sows in each of Units 14B and 14C).

## **METHODS**

We monitored the black bear harvest by sealing skulls and hides of bears shot by hunters or killed for other reasons. We measured skulls of sealed bears, determined their sex, and recorded date and location of kill and hunter effort from successful hunters. Hunters were asked if the kill was incidental or taken from a bait station and if meat was salvaged. Hunters who hunted over bait were required to register them with the department; up to 2 bait stations were allowed.

Harvest data were compared with those of previous years. Data summaries provided in this report were not directly comparable to summaries in reports before 1992 because, unlike previous years, this report analyzes bear kill by regulatory year. Previous reports summarized data by calendar year.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

Black bear numbers in Unit 14 probably increased or remained stable. The potential increase was a product of more restrictive hunting opportunities and a subsequent reduction in the harvest of sows.

Bear densities ranged from low to moderate. Large lowland areas associated with the communities of Anchorage–Eagle River and Palmer–Wasilla exclude most bears. Highest densities within the unit probably occur in eastern Unit 14C.

### *Population Size*

Black bear numbers were previously estimated at 530 to 1080 by Griese (1996). No additional information has become available to modify that estimate

## **MORTALITY**

### *Harvest*

Season and Bag Limit. During regulatory year 1992/93, 1993/94 and 1994/95, the open season in Unit 14A was September 1–May 25 and in Unit 14C within Chugach State Park, the open season was from the day after Labor Day to May 20. In the remainder of Unit 14 there was no closed season. The bag limit was 1 bear. While baiting black bears was not allowed within Unit 14C, baiting was allowed by registration permit between April 15 and May 25 in Unit 14A and between April 15 and May 31 in Unit 14 B.

Board of Game Actions and Emergency Orders. The Board took action in the spring of 1996 to require hunters using bait for black bears in Unit 14 to attend 1 of 3 hunter education courses offered in the state in hopes of improving baiters' harvest statistics. Key objectives were to improve baiters' abilities to identify sex of bears and to address ethical methods of baiting and effects from violating conditions of the permit. Baiting should allow hunters to be more selective and to harvest a higher percentage of males. Attendance at a Basic Hunter Education course, Alaska Bowhunter Education (IBEP) course or a bear hunter clinic which included bear baiting information will be required beginning Spring of 1997.

Hunter Harvest. Bear harvest declined during 1992–94 primarily due to a decline in the harvest of sows (Table 1). Hunters during this period reported an average annual kill of 71 bears, with harvest of sows averaging 19 (27%). Hunters using bait, which is allowed only within Units 14A and 14B, harvested 35% of the total for those subunits (Tables 2 and 3). In Unit 14C the average annual kill was 18.0 bears (Table 3), down slightly from the average annual kill of 20 taken during the 1989–91 period (Griese 1996).

Poor fall hunting conditions, a late spring the following year, and restrictive baiting seasons were responsible for one of the lowest annual harvest levels in over 20 years of reported harvest for Unit 14 (Table 1). We attribute the reduced fall harvest during 1993 to a poor blueberry crop and moose hunter redistribution to Unit 13. Spring 1994 was a slow starting season; in fact, many baiters reported seeing no bears before the season closed.

Baiters in Unit 14 remained less effective at selecting male bears than hunters not using bait. When we compared Unit 14 spring black bear harvests during 1987–91, baiters typically killed a higher proportion of females (Griese 1996). During 1992–95 spring bear harvest composition (Subunits 14A and B only) was 36% females for baiters and 25% for nonbaiters. Again, baiters were less selective in their harvest strategy.

Baiting Participation. Table 5 indicates the number of hunters using bait in Unit 14 declined during Spring 1995, possibly a reaction to the previous spring's poor success. The number of permitted stations also declined within Unit 14A in spring 1995. However, during this period the number of stations in Unit 14B remained stable.

Hunter Residency and Success. During the most recent 3 regulatory years, Unit 14 residents averaged 93% of the harvest (Table 6). Nonresidents and other Alaskan residents accounted for 7%.

Harvest Chronology. Reduced season length in Unit 14A was primarily responsible for a minor shift in the peak of harvest, typically the last 16 days of May. The peak showed signs of shifting toward the first 15 days (Table 7).

Transport Methods. Hunters' transportation methods deviated little from previous trends. Three- and 4-wheelers were favored by Unit 14 bear hunters (Table 8). Airplanes, boats and highway vehicles were used equally but less than 3- or 4-wheelers.

#### *Other Mortality*

Nonhunting kills represented 11% of all reported mortality (Tables 1-3). Units 14A and 14C were each responsible for 12 reported nonhunting kills.

## CONCLUSIONS AND RECOMMENDATIONS

Under current data collection methods, the population objective is unverifiable. A broadly subjective interpretation of reported bear sightings and harvest failed to provide clues to whether hunting is currently affecting black bear numbers. The population estimate remains between 530 and 1080 black bears.

We attained Unit 14 human use objectives this report period. The average annual harvest reached 71 bears, well below the maximum of 80 bears. Average sow harvest was 22, with 11 in Unit 14A, 5 in Unit 14B and 6 in Unit 14C.

Current seasons and bag limits are adequately controlling total harvest and the harvest of sows, keeping them within objective levels.

I strongly recommend the department continue teaching bear hunters to identify and select male bears, especially those hunting black bears over bait. Brochures, magazine articles, slide shows, and readily available video tapes have been most successful in educating hunters in the past. Using these media should also be considered for educating bear baiters in addition to the required attendance at a Hunter Education Course where the topic is covered. The course information should be standardized to ensure the message is the same from all instructors.

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Table 1. Unit 14 black bear hunter harvest composition, 1973-94

Regulatory Year	Reported Hunter Kill					
	Male	(%) <sup>a</sup>	Female	(%) <sup>a</sup>	Unk	Total
1973-74	54	71	22	29	3	79
1974-75	22	58	16	42	9	47
1975-76	50	62	31	38	9	90
1976-77	25	61	16	39	7	48
1977-78	24	59	17	41	8	49
1978-79	27	61	17	39	11	55
1979-80	37	71	15	29	6	58
1980-81	62	69	28	31	10	100
1981-82	58	74	20	26	9	87
1982-83	45	67	22	33	8	75
1983-84	52	68	24	32	10	86
1984-85	48	59	34	41	6	88
1985-86	55	56	44	44	9	108
1986-87	67	55	55	45	9	131
1987-88	75	60	49	40	9	133
1988-89	56	63	33	37	8	97
1889-90	61	64	35	36	5	101
1990-91	47	67	23	33	1	71
1991-92	60	70	26	30	4	90
1992-93	59	71	24	29	3	86
1993-94	30	65	16	35	1	47
1994-95	61	77	18	23	1	80

<sup>a</sup>Includes only bears of known sex.



Table 2. Unit 14A black bear harvest, 1990-94

Regulatory year	Reported Hunter kill					Nonhunting kill <sup>b</sup>			Estimated unreported kill <sup>c</sup>	Total estimated kill			
	M	F (%)	Unk.	Total	Baited <sup>a</sup>	M	F	Unk.		M (%)	F (%)	Unk.	Total
1990													
Fall 90	10	5 (33)	0	15	0	1	0	0		11 (69)	5 (31)	0	16
Spring 91	21	11 (34)	1	33	18	1	0	0		22 (67)	11 (33)		34
Total	31	16 (33)	1	48	18	2	0	0	5	33 (68)	16 (32)	6	55
1991													
Fall 91	16	7 (30)	0	23	0	1	0	0		17 (71)	7 (29)	0	24
Spring 92	19	7 (27)	3	29	12	0	1	0		19 (70)	8 (30)	3	30
Total	35	14 (29)	3	52	12	1	1	0	5	36 (71)	15 (29)	8	59
1992													
Fall 92	14	6 (30)	1	21	0	1	1	1		15 (68)	7 (32)	2	24
Spring 93	18	6 (25)	2	26	15	0	0	0		18 (75)	6 (25)	2	26
Total	32	12 (27)	3	47	15	1	1	1	5	33 (72)	13 (28)	9	55
1993													
Fall 93	2	3 (60)	0	5	0	1	0	0		3 (50)	3 (50)	0	6
Spring 94	15	6 (29)	1	22	11	2	0	0		17 (74)	6 (26)	1	24
Total	17	9 (35)	1	27	11	3	0	0	4	20 (69)	9 (31)	5	34
1994													
Fall 94	8	0 (00)	0	8	0	1	0	1		9 (100)	0 (00)	1	10
Spring 95	26	10 (28)	1	37	20	2	1	1		28 (72)	11 (28)	2	41
Total	34	10 (23)	1	45	20	3	1	2	5	37 (77)	11 (23)	8	56

<sup>a</sup> Bears reported taken over legally established bait stations.<sup>b</sup> Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.<sup>c</sup> Assumes approximately 10% of reported harvest in addition.

Table 3. Unit 14B black bear harvest, 1990–94

Regulatory year	Reported Hunter kill					Nonhunting kill <sup>b</sup>			Estimated unreported kill <sup>c</sup>	Total estimated kill			
	M	F (%)	Unk.	Total	Baited <sup>a</sup>	M	F	Unk		M (%)	F (%)	Unk.	Total
1990													
Fall 90	2	0 (0)	0	2	0	0	0	0		2 (100)	0 (0)	0	2
Spring 91	3	0 (0)	0	3	1	1	0	0		4 (100)	0 (0)	0	4
Total	5	0 (0)	0	5	1	1	0	0	2	6 (100)	0 (0)	2	8
1991													
Fall 91	6	1 (14)	0	7	0	0	0	0		6 (86)	1 (14)	0	7
Spring 92	4	3 (43)	0	7	3	0	0	0		4 (57)	3 (43)	0	7
Total	10	4 (40)	0	14	3	0	0	0	2	10 (71)	4 (29)	2	16
1992													
Fall 92	6	3 (33)	0	9	0	0	1	0		6 (60)	4 (40)	0	10
Spring 93	5	2 (29)	0	7	4	0	0	0		5 (71)	2 (29)	0	7
Total	11	5 (31)	0	16	4	0	1	0	2	11 (65)	6 (35)	2	19
1993													
Fall 93	2	1 (33)	0	3	0	0	1	0		2 (50)	2 (50)	0	4
Spring 94	2	3 (60)	0	5	2	0	0	0		2 (40)	3 (60)	0	5
Total	4	4 (50)	0	8	2	0	1	0	1	4 (44)	5 (56)	1	10
1994													
Fall 94	9	0 (0)	0	9	0	0	0	1		9 (100)	0 (0)	1	10
Spring 95	4	3 (43)	0	7	3	0	0	0		4 (57)	3 (43)	0	7
Total	13	3 (19)	0	16	3	0	0	1	2	13 (81)	3 (19)	3	19

<sup>a</sup> Bears reported taken over legally established bait stations.<sup>b</sup> Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.<sup>c</sup> Assumes an additional 10% of reported harvest.

Table 4. Unit 14C black bear harvest, 1990-94

Regulatory year	Reported Hunter kill					Nonhunting kill <sup>b</sup>			Estimated unreported kill <sup>c</sup>	Total estimated kill			
	M	F (%)	Unk	Total	Baited <sup>a</sup>	M	F	Unk		M (%)	F (%)	Unk	Total
1990													
Fall 90	4	1 (20)	0	5	0	0	1	0		4 (67)	2 (33)	0	6
Spring 91	7	6 (46)	0	13	0	1	0	0		8 (57)	6 (43)	0	14
Total	11	7 (39)	0	18	0	1	1	0	3	12 (60)	8 (40)	2	22
1991													
Fall 91	5	2 (29)	0	7	0	2	0	1		7 (78)	2 (22)	1	10
Spring 92	10	5 (33)	1	16	0	1	0	0		11 (69)	5 (31)	1	17
Total	15	7 (32)	1	23	0	3	0	1	4	18 (72)	7 (28)	5	30
1992													
Fall 92	9	5 (36)	0	14	0	2	0	0		11 (69)	5 (31)	0	16
Spring 93	7	2 (22)	0	9	0	0	0	0		7 (78)	2 (22)	0	9
Total	16	7 (30)	0	23	0	2	0	0	3	18 (72)	7 (28)	3	28
1993													
Fall 93	2	2 (50)	0	4	0	0	2	0		2 (33)	4 (67)	0	6
Spring 94	7	1 (13)	0	8	0	1	0	0		8 (89)	1 (11)	0	9
Total	9	3 (25)	0	12	0	1	2	0	2	10 (67)	5 (33)	2	17
1994													
Fall 94	2	2 (50)	0	4	0	1	0	0		3 (60)	2 (40)	0	5
Spring 95	12	3 (20)	0	15	0	3	2	1		15 (75)	5 (25)	1	21
Total	14	5 (26)	0	19	0	4	2	1	3	18 (72)	7 (28)	4	29

<sup>a</sup> Bears reported taken over legally established bait stations<sup>b</sup> Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.<sup>c</sup> Assumes an additional 10% of reported harvest.

Table 5. Unit 14 black bear hunter baiting participation, 1988–1994

Regulatory year	Number of permittees	Number of stations	
		SU 14A	SU 14B
1988	166	240	32
1989	130	153	41
1990	200	259	65
1991	165	215	41
1992	175	237	42
1993	190	256	39
1994	147	183	44

Table 6. Unit 14 black bear successful hunter residency, 1990–94

Regulatory year	Local <sup>a</sup> resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1990/91	66	(93)	2	(3)	3	(4)	71
1991/92	86	(96)	2	(2)	2	(2)	90
1992/93	75	(87)	2	(2)	7	(8)	86
1993/94	45	(96)	1	(2)	0	(0)	47
1994/95	72	(90)	2	(3)	3	(4)	80

<sup>a</sup> Unit 14 residents

Table 7. Unit 14 black bear harvest chronology percent by time period, 1990-94

Regulatory year	Percent of harvest ( <i>n</i> )									<i>n</i>
	July- Aug.	Sept. 1-15	Sept. 16-30	Oct.	Nov.- Mar.	Apr.	May 1-15	May 16-31	June	
1990/91	3	13	8	7	0	1	13	48	7	71
1991/92	11	22	7	2	1	1	6	39	11	90
1992/93	6	27	12	7	0	3	17	26	2	86
1993/94	6	6	9	2	2	9	26	26	15	47
1994/95	10	8	5	3	3	0	33	29	11	80
Avg.	7	16	8	4	1	2	18	34	9	

Table 8. Unit 14 black bear harvest percent by transport method, 1990-94

Regulatory year	Percent of harvest ( <i>n</i> )						Highway vehicle	Other/ unknown	<i>n</i>
	Airplane	Horse	Boat	Snowmachine	ORV/ATV				
1990/91	17	1	11	0	23		23	25	71
1991/92	16	0	19	0	18		12	36	90
1992/93	17	2	9	0	26		16	29	86
1993/94	9	2	19	0	15		30	25	47
1994/95	13	1	13	1	23		34	16	80
Avg.	15	1	14	<1	21		22	27	

## **LOCATION**

**GAME MANAGEMENT UNIT:** 16 (12,445 mi.<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** West Side of Cook Inlet

## **BACKGROUND**

Harkness (1993) considered black bears abundant based on reported observations from the public. However, there had been no documented attempts to estimate a unit population.

Trends in black bear harvest levels have reflected fall berry crops (Faro 1990), the length of moose season, and conditions for access during late spring (Harkness 1993). Reported harvest levels have fluctuated from 67 to 250 black bears since sealing requirements began (Faro 1989). Recently, the bulk of the harvest shifted from fall to spring, a product of baiting opportunities and increased interest in hunting black bears (Faro 1989).

Faro (1989) believed that hunting was affecting black bear numbers to some degree. He identified decreasing male skull size and an increasing percentage of the harvest being females as an indication of hunters having an affect in accessible areas of the unit. Harkness (1993) repeated Faro's (1990) concern about bear baiters' increased harvest.

Another concern expressed by Harkness (1993) was the unreported number of bears killed as 'nuisances.' Harvest reported through sealing data by Unit 16 resident hunters ranged from 0–8 bears taken annually and bears reported killed DLP were seldom reported (range 0–7 annually). Scott et al. (1993) found, in nonrandom 56–71% samples of northern Unit 16B households, a harvest of 0.34–0.45 bears per household annually during 1982 and 1983. A projection across total households (76–79) in northern Unit 16B would have produced 26–34 bears as unreported harvest. Sealing data from Unit 16 residents during that period included only 5 harvested bears.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

The management goal assigned to Unit 16 in 1976 was to provide the greatest opportunity to participate in hunting black bears.

Management objectives were tentatively adopted by the department during 1992. The population objective is to maintain a population size which appears to be largely unaffected by human harvest. The human use objective is to provide liberal opportunities to hunt black bears with annual average harvests of less than 210 bears with the annual sow harvest not exceeding 69 (13 sows in Unit 16A and 56 sows in Unit 16B).

## **METHODS**

The black bear harvest was monitored by sealing skulls and hides of bears shot by hunters or killed for other reasons. Skulls of sealed bears were measured; sex of bears was determined; and

date and location of kill and hunter effort was obtained from successful hunters. Hunters were asked if the kill was incidental, if taken from a bait station, and if meat was salvaged. Hunters who hunted over bait were required to register them with the department; up to two bait stations were allowed.

Harvest data were compared with those of previous years. Data summaries provided in this report were not directly comparable to summaries in reports before 1992, because unlike previous years, this report analyzes bear kill by regulatory year. Previous reports summarized data by calendar year.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

Black bear numbers remained stable during 1992–94. However, reports from a few hunters familiar with Unit 16 over the last 20 years indicate black bear numbers were at a reduced density, at least in fall alpine areas.

#### *Population Size*

Black bear numbers were estimated at 1400–2800 (midpoint estimate of 2100). I assumed that black bear densities were 25–50 bears/100 mi<sup>2</sup>, similar to densities estimated by Miller (1987) and Schwartz et al. (1991). I also estimated 5,600 mi<sup>2</sup> of black bear habitat, equivalent to current moose habitat estimates for the unit.

### MORTALITY

#### *Harvest*

Season and Bag Limit. During this reporting period there was no closed season for black bear hunting in Unit 16. The bag limit was 3 bears, excluding cubs and sows accompanied by cubs. Baiting black bears was allowed by registration permit between April 15 and June 15, outside Denali State Park in northern Unit 16A.

Board of Game Actions and Emergency Orders. The Board included Unit 16 black bear baiters in a group of bowhunters who are required to have completed the state sanctioned bowhunter education course. No other actions were taken affecting black bear seasons and bag limits in Unit 16.

Hunter Harvest. Reported black bear harvest declined slightly during 1992–94 (Table 1), averaging 118 bears annually. In the previous 5-year period, average annual harvest was 135 bears.

The apparent decline in harvest between the 2 periods occurred primarily in the female segment of Unit 16B. Average reported annual harvest was 45 bears (13 females) in Unit 16A (Table 2) and 73 bears (18 females) in Unit 16B (Table 3) during 1992–94. During 1987–91 average annual harvest was 95 bears in Unit 16B, including 29 females (Harkness 1993).

The composition of the hunter harvest during 1992–94 averaged 73% males (83), 31 females, and 3 unknown sex annually (Table 1). This seems an improvement over the previous 5-year period when average composition was 67% males (86), 42 females, and 7 unknown sex.

Baiting Participation. Table 4 indicates the number of hunters using bait in Unit 16 almost tripled since 1988. The greatest increase occurred in 1991, the year more restrictive baiting seasons and bag limits were enacted for Unit 14. The number of permitted stations increased 4-fold within Unit 16A and more than doubled in Unit 16B. During 1990–1994 harvest by baiters remained stable in Subunit 16B (Table 3), while harvest by baiters in Subunit 16A (Table 2) more than doubled.

Hunter Residency and Success. During 1992–94 Alaska residents averaged 77% of the harvest (Table 5). Nonresidents accounted for an average of 21%. Residency composition has changed little since 1987.

Harvest Chronology. The chronology of harvest changed little during 1990–94, with over 50% of harvest occurring during June and the last half of May. (Table 6). Bear baiting opportunities have shifted hunting effort and harvest to the spring. Historically, fall had accounted for most of the bear harvest (Faro 1989).

Transport Methods. Baiting interest and effort in Unit 16A has increased the portion of the harvest by hunters who used highway vehicles and “ORV,” which includes 4-wheelers (Table 7). When fall was the prime harvest period, presumably a product of combined moose/bear hunting opportunities, airplanes were the primary transportation method.

#### *Other Mortality*

Reported nonhunting kills represented a minor fraction of total reported harvest. However, it is suspected that nuisance black bear kills are numerous and seldom reported due to inconvenience and fear of repercussions.

## CONCLUSIONS AND RECOMMENDATIONS

Under current data collection methods, the population objective is unverifiable. A subjective interpretation of harvest data suggested stability but failed to provide clues to whether hunting is affecting black bear numbers. Being unable to compare harvest to effort makes relating harvest trends to population trends difficult.

Unit 16 human use objectives were attained during this report period. The average annual harvest was 141 bears, well below the maximum of 210 bears. The reported average sow harvest was 31, with 13 in Unit 16A and 18 in Unit 16B. However, the true sow harvest in Unit 16A could easily be exceeding the objective levels if unreported kills, including both nuisance bears and hunter-killed, were primarily females.

Changes in seasons or bag limits are unwarranted. Current seasons and bag limits are adequately controlling total harvest and the harvest of sows, keeping them within objective levels.



**I strongly recommend hunters participating in bear hunting in Unit 16 and all of South-central Alaska be required to report unsuccessful hunting effort.** In the absence of population monitoring options, tracking success rates by hunters may be the only valid method to determine impact by changing hunting patterns. The harvest ticket system used by moose, caribou, and sheep could easily be adapted to black bear and brown bear. Because of increased hunter interest in black bears, costs to administer the program are warranted.

I also recommend the department continue teaching bear hunters to identify and select male bears, especially those hunting with bait. Brochures, magazine articles, slide shows, and readily available videotapes have been most successful in educating hunters. Using these media should also be considered for educating bear baiters in addition to their required attendance at a hunter education course. The course information should be standardized to ensure the message is the same from all instructors.

A problem that should be addressed by modifying bear baiting permit conditions is baiting bears near river banks. Many reports of baiting sites near or on river banks are received from fishermen, residents, and other boaters visiting Unit 16. Rivers in the unit are much like roads or trails in other parts of the state and should be treated the same. Bait stations allowed within 1/4 mile of any navigable river, floatplane accessible lake, or constructed airstrip pose the same situation as those within 1/4 mile of roads or maintained trails.

**I recommend the department include the distance restriction for baiting to include 1/4 mile of navigable rivers and streams, floatplane accessible lakes, and established airstrips.** The purpose is to reduce the conflict between bear baiting and other activities requiring use of access routes.

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Table 1. Unit 16 historical reported black bear harvest by hunters, 1973-94

Regulatory year	Males	Females (%)	Unk	Total
1973	119	58 (33)	15	192
1974	47	14 (23)	6	67
1975	65	30 (32)	11	106
1976	55	33 (38)	14	102
1977	74	33 (31)	15	122
1978	78	59 (43)	16	153
1979	67	27 (29)	14	108
1980	145	78 (35)	27	250
1981	71	44 (38)	14	129
1982	46	35 (43)	6	87
1983	58	41 (41)	4	103
1984	85	53 (38)	11	149
1985	98	46 (32)	4	148
1986	87	46 (35)	9	142
1987	73	50 (41)	8	131
1988	97	38 (28)	3	138
1989	74	37 (33)	7	118
1990	74	41 (36)	11	126
1991	111	46 (29)	4	161
1992	87	32 (27)	7	126
1993	88	31 (26)	2	121
1994	74	31 (30)	1	106

Table 2. Unit 16A black bear harvest, 1990-94

Regulatory year	Reported					Nonhunting kill <sup>b</sup>			Estimated unreported kill <sup>c</sup>	Total estimated kill				Total		
	Hunter kill					M	F	Unk		M (%)	F (%)	Unk				
	M	F	(%)	Unk	Total								Baited <sup>a</sup>			
1990																
Fall 90	8	5	(38)	1	14	0	0	0		8	(62)	5	(38)	1	14	
Spring 91	15	8	(35)	1	24	12	0	0	0		15	(65)	8	(35)	1	24
Total	23	13	(36)	2	38	12	0	0	0	6	23	(64)	13	(36)	8	44
1991																
Fall 91	8	6	(43)	0	14	0	0	0	0		8	(57)	6	(43)	0	14
Spring 92	20	9	(31)	0	29	13	1	1	0		21	(68)	10	(32)	0	31
Total	28	15	(35)	0	43	13	1	1	0	7	29	(64)	16	(36)	7	52
1992																
Fall 92	11	6	(35)	2	19	0	0	0	0		11	(65)	6	(35)	2	19
Spring 93	17	9	(35)	1	27	13	0	0	0		17	(65)	9	(35)	1	27
Total	28	15	(35)	3	46	13	0	0	0	7	28	(65)	15	(35)	10	53
1993																
Fall 93	11	1	(08)	0	12	0	2	0	0		13	(93)	1	(07)	0	14
Spring 94	25	9	(26)	0	34	25	0	0	0		25	(74)	9	(26)	0	34
Total	36	10	(22)	0	46	25	2	0	0	7	38	(79)	10	(21)	7	55
1994																
Fall 94	4	1	(20)	0	5	0	1	0	0		5	(83)	1	(17)	0	6
Spring 95	26	13	(33)	0	39	30	0	0	0		26	(67)	13	(33)	0	39
Total	30	14	(32)	0	44	30	1	0	0	7	31	(69)	14	(31)	0	52

<sup>a</sup> Bears reported taken over legally established bait stations<sup>b</sup> Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.<sup>c</sup> Assumes an additional 15% of reported harvest.

Table 3. Unit 16B black bear harvest, 1990-94

Regulatory year	Reported									Estimated unreported kill <sup>c</sup>	Total estimated kill				Total
	Hunter kill					Nonhunting kill <sup>b</sup>			M (%)		F (%)	Unk			
	M	F (%)	Unk	Total	Baited <sup>a</sup>	M	F	Unk							
1990															
Fall 90	24	12 (33)	3	39	0	0	0	0		24 (67)	12 (33)	3	39		
Spring 91	26	16 (38)	6	48	31	0	0	0		26 (62)	16 (38)	6	48		
Total	50	28 (36)	9	87	31	0	0	0	18	50 (64)	28 (36)	27	106		
1991															
Fall 91	40	17 (30)	2	59	0	0	0	0		40 (70)	17 (30)	2	59		
Spring 92	43	14 (25)	2	59	28	0	0	0		43 (75)	14 (25)	2	59		
Total	83	31 (27)	4	118	28	0	0	0	24	83 (73)	31 (27)	28	142		
1992															
Fall 92	23	7 (23)	2	32	0	0	0	0		23 (77)	7 (23)	2	32		
Spring 93	36	10 (22)	2	48	22	0	0	0		36 (78)	10 (22)	2	48		
Total	59	17 (22)	4	78	22	0	0	0	16	59 (78)	17 (22)	20	96		
1993															
Fall 93	12	5 (29)	2	19	0	0	0	0		12 (71)	5 (29)	2	19		
Spring 94	40	16 (29)	0	56	24	1	0	0		41 (72)	16 (28)	0	57		
Total	52	21 (29)	2	75	24	1	0	0	15	53 (71)	21 (29)	17	91		
1994															
Fall 94	18	2 (10)	0	20	0	1	0	0		19 (90)	2 (10)	0	21		
Spring 95	26	15 (37)	1	42	26	0	0	0		26 (63)	15 (37)	1	42		
Total	44	17 (28)	1	62	26	1	0	0	12	45 (73)	17 (27)	13	75		

<sup>a</sup> Bears reported taken over legally established bait stations<sup>b</sup> Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.<sup>c</sup> Assumes roughly 20% of reported harvest in addition.

Table 4. Unit 16 black bear successful hunter residency, 1990-94

Regulatory year	Local <sup>a</sup> resident (%)		Nonlocal resident (%)		Nonresident (%)		Total successful hunters
1990/91	3	(2)	87	(69)	34	(27)	126
1991/92	0	(0)	114	(76)	35	(23)	150
1992/93	6	(5)	93	(74)	25	(20)	126
1993/94	7	(6)	84	(69)	30	(25)	121
1994/95	11	(10)	72	(68)	19	(18)	106

<sup>a</sup> Unit 16 residents

Table 5. Unit 16 black bear harvest chronology percent by time period, 1990-94

Regulatory year	Percent of harvest ( <i>n</i> )									<i>n</i>
	July-Aug.	Sept. 1-15	Sept. 16-30	Oct.	Nov.-Mar.	Apr.	May 1-15	May 16-31	June	
1990/91	17	17	7	2	2	1	2	14	39	126
1991/92	13	17	11	4	0	0	3	24	28	161
1992/93	11	17	8	4	0	2	7	21	30	126
1993/94	11	13	7	2	0	1	7	36	31	121
1994/95	16	5	0	3	0	1	3	36	37	106
Avg.	13	13	7	3	<1	1	4	25	33	

Table 6. Unit 16 black bear harvest percent by transport method, 1990–94

Regulatory year	Percent of harvest						Other/Unk <sup>b</sup>	<i>n</i>
	Airplane	Horse	Boat	Snowmachine	ORV <sup>a</sup>	Highway vehicle		
1990/91	47	0	33	1	3	5	11	126
1991/92	52	2	25	0	8	4	9	161
1992/93	40	2	32	0	7	10	9	126
1993/94	37	1	34	1	7	12	8	121
1994/95	24	0	39	1	14	12	10	106

<sup>a</sup> Includes 3- and 4-wheelers, tracked vehicles, etc.

<sup>b</sup> Includes hunters who indicated they walked.

Table 7. Unit 16 black bear hunter baiting participation, 1988–1994

Regulatory year	Number of permittees	Number of stations	
		SU 16A	SU 16B
1988	47	33	40
1989	52	38	35
1990	107	60	114
1991	112	79	93
1992	121	104	92
1993	118	91	99
1994	130	124	96

## **LOCATION**

**GAME MANAGEMENT UNIT:** 17 (18,800 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Northern Bristol Bay

## **BACKGROUND**

Black bears inhabit many forested areas of Game Management Unit 17 and are most visible during the fall as they forage on berries along open hillsides in Units 17B and 17C. Black bears are less common along salmon streams and near human settlements, primarily because of brown bear competition and predation. There have been no research activities conducted in Unit 17, so we do not have a complete understanding of the density, key denning areas, and other aspects of this bear population.

Before 1994, hunters were not required to report or seal black bears harvested in Unit 17 and the department did not allocate funding specifically for black bear management. Consequently, we had no way of assessing the number of bears killed, the sex and age composition or distribution of harvest.

Incidental observations by biologists during moose and caribou surveys and anecdotal reports by local residents suggest the black bear population along upper Nushagak River drainages has been declining the past several years. Nothing is known about the status of black bear populations in other portions of the unit.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT OBJECTIVES**

Maintain existing populations of black bears with a sex and age structure that will sustain a harvest of at least 60% males.

- Monitor the hunt by interviewing hunters and sealing all black bears harvested.
- Identify and document important black bear habitat for use in land use decisions.

## **METHODS**

We seal each black bear legally harvested or killed in defense of life or property (DLP) in the unit and measure the skull, determine sex, and extract and archive a premolar tooth. At the time of sealing, we record data on hunter residency, number of days hunted, date of kill, method of transportation, and location of the kill. When possible, we investigate circumstances surrounding DLP and illegal kills. We collect subjective population data during caribou and moose surveys. Reports from fieldworkers are also used to estimate bear population trends.



## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

No objective data are available on the population density of black bears in the unit. Incidental observations during moose and caribou surveys and anecdotal reports by local residents suggest the black bear population along the upper Nushagak River drainages continues to decline. I did not see any bears during 0.5 hr aerial surveys of the Chichitnok drainage on 30 August 1994 and 30 August 1995.

#### *Distribution and Movements*

We know little about the overall distribution and movements of black bears in this unit. I suspect the greatest densities are in the spruce forest habitats along the upper Mulchatna and Nushagak rivers and along the Chichitnok River. Black bears are also commonly seen along the upper Kokwok and Nuyakuk rivers. Black bears are most obvious when they concentrate along hillsides in the autumn where berries are abundant. We also see individual bears and family groups near postcalving aggregations of caribou in June and July. We still do not know the denning areas.

### MORTALITY

#### *Harvest*

#### Season and Bag Limit

Unit 17 August 1–May 31

Residents - 2 bears per year

Nonresidents - 1 bear per year

Hunter Harvest. Prior to 1994 there were no sealing or reporting requirements for black bear hunters in Unit 17. Our incidental observations suggested that black bears were subject to the same increasing hunting pressure as other big game species in Subunit 17B, as more hunters came into the area to harvest caribou from the Mulchatna herd. Local residents also expressed concerns of overharvest by hunters and sportfishers along the upper Nushagak River drainages.

During the 1994–95 season, hunters in Unit 17 reported harvesting 13 black bears, including 6 males (46%) and 7 females (54%). The average skull size was 18.1" for males and 15.8" for females. Successful hunters spent an average of 6.8 days afield. No hunters killed more than 1 bear. Most bears (62%) were harvested in the upper Nushagak River drainages. At least some meat was salvaged from 3 bears (23%).

Board of Game Actions and Emergency Orders. During their spring 1994 meeting, the Board passed a proposal submitted by the Nushagak Advisory Committee restricting black bear regulations. Starting in the 1994–95 season, the black bear hunting season in Unit 17 was reduced from no closed season to August 1–May 31. The bag limit was reduced from 3 bears to 2 bears for residents and 1 bear for nonresidents. The Board also instituted a sealing requirement for black bears taken in Unit 17.

In 1995 a Dillingham resident petitioned the Board to further restrict black bear regulations because of concerns of overharvest in the upper Nushagak River area. The Board deferred action on this request until spring 1997 so the department can evaluate the effects of reduced seasons and bag limits implemented during the 1994-95 season.

Hunter Residency and Success. During the 1994-95 season, nonresidents accounted for 85% of the reported black bear harvest in Unit 17 (Table 3).

Harvest Chronology. In 1994-95, all 13 black bears were killed in Unit 17B during fall. Six bears (2 males, 4 females) were killed in August, 5 (2 males, 3 females) in September, and 2 (2 males) in October (Table 4).

Transport Methods. Most successful black bear hunters used boats (54%) or aircraft (39%) for access (Table 5).

#### *Other Mortality*

One black bear was killed in defense of life or property during this reporting period. It was shot in August 1992 by a hunting guide in a base camp near lower Tikchik River. The subadult male was persistent in his attempts to raid the camp and was not deterred even when kicked on the nose.

### **HABITAT**

#### *Assessment*

Black 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. Increasing ungulate populations in the unit and seasonally abundant berry crops also provide an abundant food supply for bears. Human settlements are relatively small and unobtrusive.

### **NONREGULATORY PROBLEMS/NEEDS**

Black bears rarely are near human settlements in Unit 17, and there have been few reports of adversarial encounters between humans and black bears in the backcountry. No nonregulatory problems or needs exist in the unit at this time.

## **RESULTS AND CONCLUSIONS**

Initiation of mandatory sealing, restricted seasons, and specific funding for black bear management are indications of the importance the department places on this resource in Unit 17. Data derived from these actions, when coupled with continued input from hunters and local residents, will enhance our ability to evaluate the status of the black bear population and allow us to make more informed management decisions.

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Table 1. Unit 17 black bear harvest, 1990–95

Regulatory year	Hunter Kill				Nonhunting Kill				Total reported kill			
	Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1990/91 <sup>a</sup>	---	---	---	---	0	0	0	0	---	---	---	---
1991/92 <sup>a</sup>	---	---	---	---	0	0	0	0	---	---	---	---
1992/93 <sup>a</sup>	---	---	---	---	1	0	0	1	---	---	---	---
1993/94 <sup>a</sup>	---	---	---	---	0	0	0	0	---	---	---	---
1994/95	6	7	0	13	0	0	0	0	6	7	0	13

<sup>a</sup> Harvest reporting and sealing not required in Unit 17 before 1994.

Table 2. Unit 17 black bear harvest by subunit, 1990–95

Regulatory year	Subunit												Unit 17 total			
	17A				17B				17C				M	F	Unk	Total
	M	F	Unk	Total	M	F	Unk	Total	M	F	Unk	Total				
1990/91	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1991/92	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1992/93	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1993/94	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1994/95	0	0	0	0	6	7	0	13	0	0	0	0	6	7	0	13

<sup>a</sup> Harvest reporting and sealing not required in Unit 17 before 1994.

Table 3. Unit 17 black bear successful hunter residency, 1990–95

Regulatory year	Local <sup>a</sup> resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters <sup>b</sup>
1990/91 <sup>c</sup>	---	---	---	---
1991/92 <sup>c</sup>	---	---	---	---
1992/93 <sup>c</sup>	---	---	---	---
1993/94 <sup>c</sup>	---	---	---	---
1994/95	0 (---)	2 (15%)	11 (85%)	13

<sup>a</sup> Residents of Unit 17.

<sup>b</sup> Total may be higher than the sum of the columns due to hunters of unknown residency.

<sup>c</sup> Harvest reporting and sealing not required in Unit 17 prior to 1994.

Table 4. Unit 17 black bear harvest chronology percentage by time period, 1990–95

Regulatory year	Month of harvest										Total
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	
1989/90 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---	---
1990/91 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---	---
1991/92 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---	---
1992/93 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---	---
1993/94 <sup>b</sup>	46%	39%	15%	0%	0%	0%	0%	0%	0%	0%	13

<sup>a</sup> Season dates: no closed season; 3 bear bag limit. Prior to 1993/94 sealing was not required and no harvest data are available.

<sup>b</sup> Season dates: August 1–May 31; 2 bears for residents, 1 bear for nonresidents.

Table 5. Unit 17 black bear harvest percentage by transport method, 1990–95

Regulatory year	Percent of harvest									Total
	Airplane	Horse	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1990/91 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---
1991/92 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---
1992/93 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---
1993/94 <sup>a</sup>	---	---	---	---	---	---	---	---	---	---
1994/95	39%	0%	54%	0%	0%	0%	0%	8%	0%	13

<sup>a</sup> Harvest reporting and sealing not required in Unit 17 before 1994.

## **LOCATION**

**GAME MANAGEMENT UNIT:** 20A, 20B, 20C, and 20F (34,079 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Central-Lower Tanana and Middle Yukon River drainages

## **BACKGROUND**

Black bears are throughout Interior Alaska (approximately 2000–4000 in the 4 units discussed in this report); however, only a few studies of black bear ecology or population dynamics have been completed. Since 1988 a cooperative project conducted by ADF&G with support from the US Army has yielded important information about black bear reproduction, mortality, and density on the Tanana Flats (Hechtel 1991). A portion of this project involved a study of habitat use and denning ecology of black bears (Smith 1994). In 1967 Hatler completed a Master's thesis on Interior Alaska black bear ecology. Johnson (1982) investigated production of offspring by female black bears in Units 20A and 20B.

Black bears provide an important source of meat, hides, and/or recreation for hunters in some areas. Interest in hunting black bears is increasing, with an increase in the Fairbanks human population and increased interest in hunting during spring. More information about black bear ecology and population dynamics has helped ensure that the current year-round season and 3-bear bag limit will not adversely affect the population.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT GOALS**

- Protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem.
- Provide the greatest sustained opportunity to participate in hunting black bears.
- Protect human life and property in human-bear interactions.

### **MANAGEMENT OBJECTIVES**

Sex ratio of the harvest is a key management indicator of appropriate levels of harvest in these units and management objectives call for a minimum percentage of males in the harvest. Harvests in Units 20C and 20F were relatively low, so we combined data from multiple years and areas to increase sample sizes. We listed the following objectives in our most recent performance report (Boudreau 1995):

- 1 In Unit 20A, maintain a black bear population capable of sustaining an annual harvest with at least 55% males in the combined harvests of the most recent 3 years.
- 2 In Unit 20B, maintain a black bear population capable of sustaining a maximum annual harvest of 150 bears, of which at least 55% are males.

- 3 In Units 20C and 20F, maintain a black bear population capable of sustaining a harvest that includes at least 50% males in the combined harvests from both units from the most recent 3 years.
- 4 Minimize human-bear conflicts by providing information and assistance to the public and to agencies.

## METHODS

We collected annual harvest information from hunter reports recorded during the mandatory sealing of hunter-killed black bears. Black bear sealing certificates included data on kill location, date of kill, sex, skull size, meat salvaged, defense of life or property, hunter residency, incidental take, commercial services used, and baiting. We recorded the distribution of bears killed in the area using the Uniform Coding Units (UCUs). During sealing, we collected premolars and sent them to Matson's Laboratory (Milltown, Mont) for sectioning and age determination.

We continued to gather information on the population dynamics and habitat use of black bears on the Tanana Flats portion of Unit 20A. Methods used for the project are described by Hechtel (1991).

Since 1989 hunters have been required to register before hunting black bears at bait stations in spring. We also prepared hunter information leaflets to summarize black bear baiting regulations, encouraging hunters to harvest males instead of females.

Some differences in annual harvest data reported here, compared with previous reports, are related to harvest compilation that was based on calendar years prior to 1988 but on regulatory years since. For example, regulatory year 1994–1995 starts 1 July 1994 and ends 30 June 1995. Percentages of males in the harvest were calculated using only data from bears whose sex was known.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

Densities of northern black bears are relatively low compared to other areas. Current estimates for the number of black bears in the area include 500–700 bears in the Tanana Flats in Unit 20A, 750–1200 bears in Unit 20B, 700–1000 in the portion of Unit 20C outside Denali National Park, and 400–700 in Unit 20F (Boudreau 1995). These were calculated based on Hechtel's (1991) density estimate of 12 to 18 black bears (excluding cubs of the year)/100 mi<sup>2</sup> (46–67/1000 km<sup>2</sup>) inhabiting his Tanana Flats study area in 1989. This density is similar to the estimate of 17 bears/100 mi<sup>2</sup> in the Susitna River area (Miller et al. 1987) but much lower than the 39–52 bears/100 mi<sup>2</sup> estimated to inhabit portions of the Kenai Peninsula (Schwartz and Franzmann 1991).

### *Population Composition*

No estimate of population composition is available for this black bear population. Sex ratios in the harvest are not representative of sex ratios in the population because sows with cubs are protected by regulation. In addition, behavioral differences of male and female bears may result in higher vulnerability of males.

### *Distribution and Movements*

The distribution of black bears shifts seasonally. During spring, bears use moist lowlands where early growing vegetation, especially *Equisetum*, is the bulk of their diet (Hatler 1967). Dispersal of young occurs in the spring usually before the breeding season. Immature males disperse longer distances than immature females. During fall black bears feed primarily on berries in open meadows or alpine areas. Mean home range sizes of marked black bears in the Tanana Flats were calculated at 23 mi<sup>2</sup> for adult females, 32 mi<sup>2</sup> for subadult females, 230 mi<sup>2</sup> for adult males, and 93 mi<sup>2</sup> for subadult males (Hechtel 1991).

## **MORTALITY**

### *Harvest*

Season and Bag Limit. The black bear hunting season is open year-round in Unit 20 with a bag limit of 3 bears. Since July 1972 the taking of cubs (first year of life) and females accompanied by cubs has been prohibited.

Board of Game Actions and Emergency Orders. At their January 1996 meeting, the Board of Game (BOG) approved a proposal to require black bear hunters who use bait in Units 20B, 14, and 15, to pass a bear baiting education course, general hunter education course, or international bow hunter education course in order to register a bait station. This regulation will take effect beginning 15 April 1997.

At their March 1996 meeting, the BOG also approved a proposal to require the salvage of all edible meat from black bears killed during the spring season (1 Jan–30 Jun). The definition of edible meat to be salvaged will be the same as is required for ungulates. This regulation will take effect in spring 1997.

Hunter Harvest. The annual harvest of black bears in Unit 20A ranged from 14 to 64 black bears from 1984 to the present. Hunters harvested 154 black bears during the last 3 years combined (1992–1995), 68% (104/153) of which were males (Table 1).

Since 1984 the annual Unit 20B harvest ranged from 83 to 177 black bears. During the last 3 regulatory years, the annual harvest included 158 bears (1992–1993), 138 bears (1993–1994), and 177 bears (1994–1995). The percentage of males in these harvests was 63% (99/158), 67% (90/134), and 69% (122/176), respectively (Table 1). The harvest during 1992–1993 and 1994–1995 exceeded our objective to keep the harvest  $\leq 150$  bears.



Annual harvests of black bears in Unit 20C are relatively low;  $\leq 30$  black bears/year have been reported harvested since 1984. In Unit 20C hunters harvested 63 black bears during the last 3 years, 80% (49/61) of which were males (Table 1).

Annual harvests in Unit 20F increased substantially in recent years. From 1984 to 1989 the total reported harvest was 61 bears (range 5–13/yr). In comparison, during 1990–1995 the total reported harvest was 182 bears (range 24–46/yr). The average number of bears harvested per year increased between the 2 time periods from 10.1/yr to 36.4/yr. In Unit 20F hunters harvested 126 black bears during the last 3 years, 66% (84/126) of which were males (Table 1).

The estimated maximum sustainable exploitation rate is approximately 12% for Interior black bear populations (Hechtel 1991). Based on our population estimates for each of the units and the mean harvest during the last 3 years, we estimate the proportion of black bears harvested is approximately 7–10% in Unit 20A, 13–21% in Unit 20B, 2–3% in Units 20C, and 6–11% in Unit 20F.

Age of Harvested Bears. Since 1992 the mean age of harvested bears was 5.5 (range = 5.4–5.5) (Fig 1). For the same time period, the mean age of harvest in Unit 20B alone was 5.2 years (range = 4.9–5.4), lower than the mean age for the entire area, although the difference is not statistically significant.

Mean age of harvested females are of limited management use because sows with cubs are protected. As expected, the mean age of harvested females in Unit 20B (6.04–7.80 years old since 1992) were higher than for males (3.95–4.80 years old). We have age data for 53 females harvested in 1994; 8 of these were older than 10 years old, with the oldest being 23 years. I also calculated the mode age of harvested bears by year to assess possible trends. From 1973 to 1980 the mode ages were generally higher than they have been since 1981. Mode ages have been relatively stable since 1981. During the last 3 regulatory years (1992–1995), the annual mode age for all black bears harvested in Units 20A, 20B, 20C, and 20F was 3 years (Fig 1). Conversely, the mean age of bears killed since 1973 was relatively stable ( $\bar{x}$  = 5.36, range = 4.17–6.32) (Fig 1). Thirty-six percent (73/200) of the males harvested in 1994–1995 were 2 or 3 years old, the ages that offspring disperse from their mothers in Interior Alaska (Hechtel 1991). The oldest male harvested in 1994–1995 was 21 years.

Changes in the mode ages from the 1973–1980 period to 1981–1995 is probably the product of a harvest relatively light in proportion to the population before 1981, especially in units other than Unit 20B. When harvest is lower, more bears would be able to reach older age classes. In contrast, for the latter period when a larger proportion of the population is harvested, bears killed by hunters should be younger. This would explain the older mode age of harvest when bear harvests were lower overall. The present high levels of harvest may be sustained by immigration of subadult males and thus could contribute to the overall lower mode age.

We did not calculate mean age for bears harvested in other units because of the small sample sizes for males.

Distribution of Harvest. Most black bear harvest is within the road-accessible portions of Unit 20B. Bait stations are more prevalent along the road system because of the logistics of transporting heavy, bulky bait. The distribution of 1991–1995 harvest reflects this trend. A second trend in harvest is that hunters are traveling farther away from the road system and from Fairbanks to hunt black bears.

Nonresident military hunters can hunt black bears without purchasing a big game tag or license if they hunt on military land. Therefore, military land such as the Yukon Maneuver Area in Unit 20B and the Fort Wainwright land in Unit 20A are hunted intensively. Approximately half of the bear harvest is by military personnel.

Registration of Bait Stations. Regulations for hunting black bears at bait stations have changed several times in recent years. Prior to 1982, black bear baiting was legal with minimal regulations. From mid 1982 through 1983, permits were required to hunt bears at bait stations. From 1984 through June 1988, baiting was legal without permits or restrictions in season. Since July 1988, hunters have been required to register to hunt black bears at bait stations, mark bait stations with the hunter's name and other information, and have no more than 2 bait stations. Since July 1988 baiting for black bears has been limited to spring season. In this study area, baiting was allowed from 15 April to 15 June during 1989–1990 and from 15 April to 30 June since 1991 in response to the later emergence of bears from hibernation north of the Alaska Range.

The number of hunters registering to hunt black bears at bait stations has increased from 220 hunters and 314 bait stations in spring 1989, when registration became mandatory, to 542 hunters and 1154 bait stations in spring 1993 (Table 2). In spring 1994, 575 hunters registered 899 bait stations; however, the number of permittees who actually set up bait stations is unknown.

Harvest at Bait Stations. Since 1989, when registration permits for baiting were first required in Unit 20, 57–74% of the black bear harvest has been at bait stations (Table 2).

Hunter Residency and Success. During the last 3 years, most black bears were harvested by state residents (87–92%); 82–89% were residents of Unit 20 (Table 3). Nonresidents harvested a small proportion (6–9%) of the annual harvest. We have no data on success rates for black bear hunters because only successful hunters are required to report.

Harvest Chronology. Most black bears are harvested soon after emerging from dens when hide quality is best. Based on spring 1995 data, the peak of harvest is generally from mid May through mid June (Fig 2). Winter hair begins to shed by mid June and hide quality is poor, improving in fall when black bear hunting resumes while hunters pursue other species.

Hunters killed black bears from 2 May through 2 November in 1992, from 28 April through 10 October in 1993, from 29 April through 4 October in 1994, and from 4 May 1995. During spring 1995 the peak harvest occurred from 26 May to 10 June.

Transport Methods. During the last 3 years, most harvested black bears were taken by hunters using boats (42–51%) in Unit 20A; highway vehicles (47–58%) and 4-wheelers (25–38%) in Unit 20B; boats (48–59%) in Unit 20C; and highway vehicles (76–82%) in Unit 20F (Table 4).

Defense of Life or Property. The number of black bears taken in defense of life or property (DLP) is probably much higher than reported. A year-round season and bag limit of 3 black bears allows many hunters to legally harvest bears that would otherwise be taken under DLP provisions. During the last 5 regulatory years, only 16 black bears were recorded as DLPs (7 in Unit 20A, 3 in Unit 20B, 4 in Unit 20C, and 2 in Unit 20F). Data from these 16 bears are included in the report, unless noted.

#### *Other Mortality*

Causes of natural mortality of black bears include predation, food shortages that result in undernourished cubs and yearlings (Rogers 1977), and flooding of natal dens (Alt 1984). Hechtel (1991) reported several instances of natural mortality. During the spring 1996 recollaring effort, a bear died after being immobilized for recollaring, but necropsy results revealed the presence of extensive cancerous tissue in several internal organs.

## CONCLUSIONS AND RECOMMENDATIONS

We are currently meeting our management objectives for sex ratio of the black bear harvests in Units 20A, 20C, and 20F. The Unit 20A harvest is relatively low and included more than 55% males (68%) in the harvest from the most recent 3 years (153 bears). In Units 20C and 20F combined, the harvest from the most recent 3 years combined was 189 black bears, comprising 70% males.

In Unit 20B the number of hunter-killed black bears exceeded our harvest objective in 1992–1993 and 1994–1995 but was less than our objective in 1993–1994. The 1992–1993 harvest was >150 bears (158), of which more than 55% (63%) were males. The 1993–1994 harvest was <150 bears (138), of which 67% were males. The 1994–1995 harvest was >150 bears (177), of which 69% were males. Based on sex ratio and age of bears harvested in Unit 20B, exceeding the objective is not having any apparent adverse effect on the population. The population size may be higher than is estimated (750–1200). One of the shortfalls of the current estimates for Units 20B, 20C, and 20F is that they are based on extrapolation of black bear density estimates for the Tanana Flats in Unit 20A. As with some extrapolations, differences in habitat quality and hunter effort can significantly bias the estimates. I recommend we determine a better estimate of the black bear population in Unit 20B.

We met our objective of minimizing bear-human conflicts in the Fairbanks area. High black bear harvest is reducing the potential for problems. We also provided the public with information and worked to reduce the incidences of DLP kills. Increased interest in black bear hunting and the subsequent increase in harvest should continue to be monitored closely. As an important part of this monitoring, I recommend that teeth from harvested bears continue to be processed to provide age structure of the harvest.

The BOG considered proposals on baiting twice during this reporting period. Each time the BOG considered proposals ranging from liberalizing baiting seasons to prohibiting all use of bait stations. The BOG recently passed regulations requiring both an education course in order to use bait and the salvage of all edible meat from black bears killed during spring season. Bear baiting has become an important issue for anti-hunting groups in the western United States, and they have

been successful in eliminating it as a method to hunt bears in some western states. The practice in Alaska of using bait stations will probably continue to receive close scrutiny.

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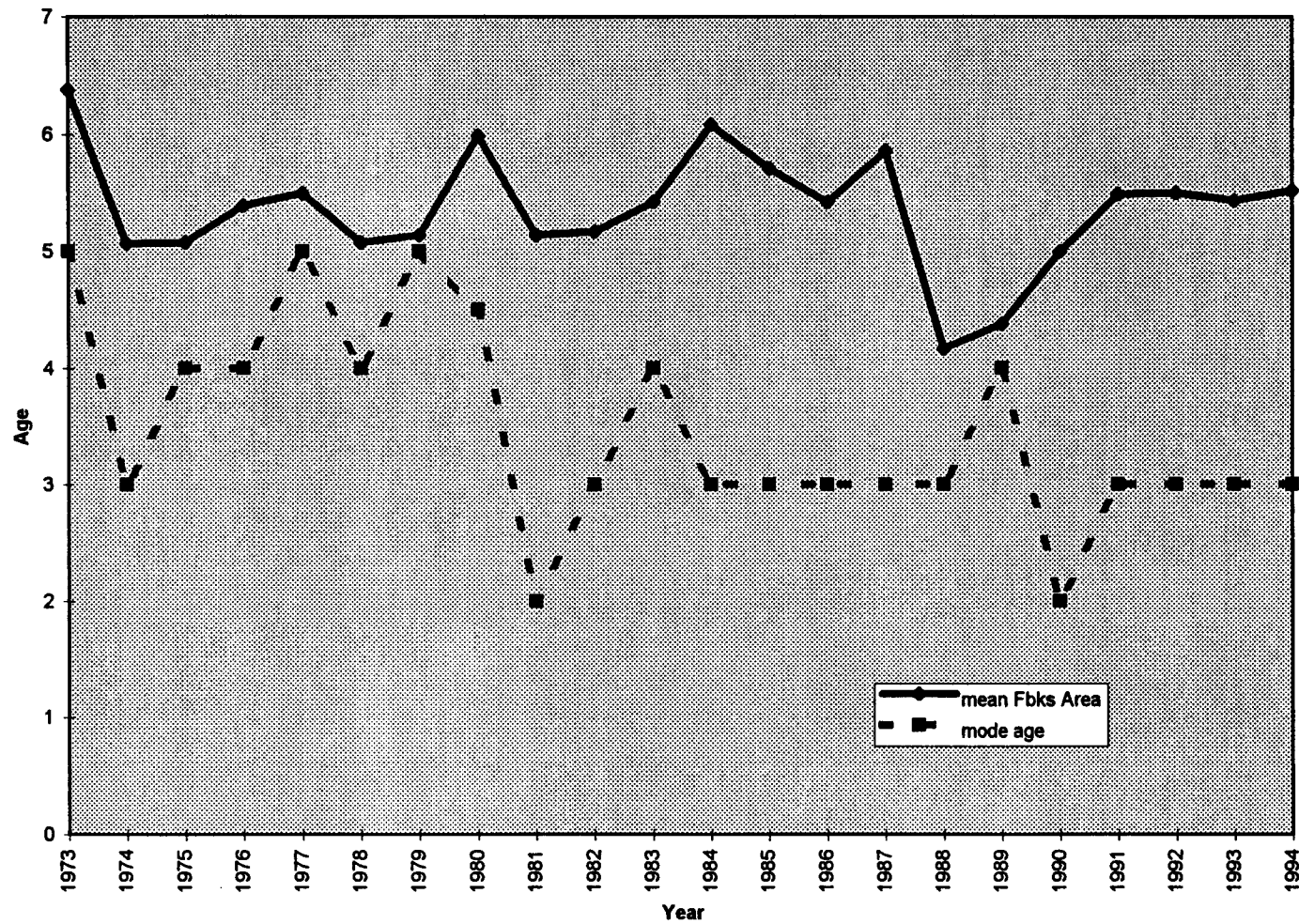


Figure 1 Comparison of mean and mode age of black bears harvested in the Fairbanks Area Units 20A, 20B, 20C, and 20F

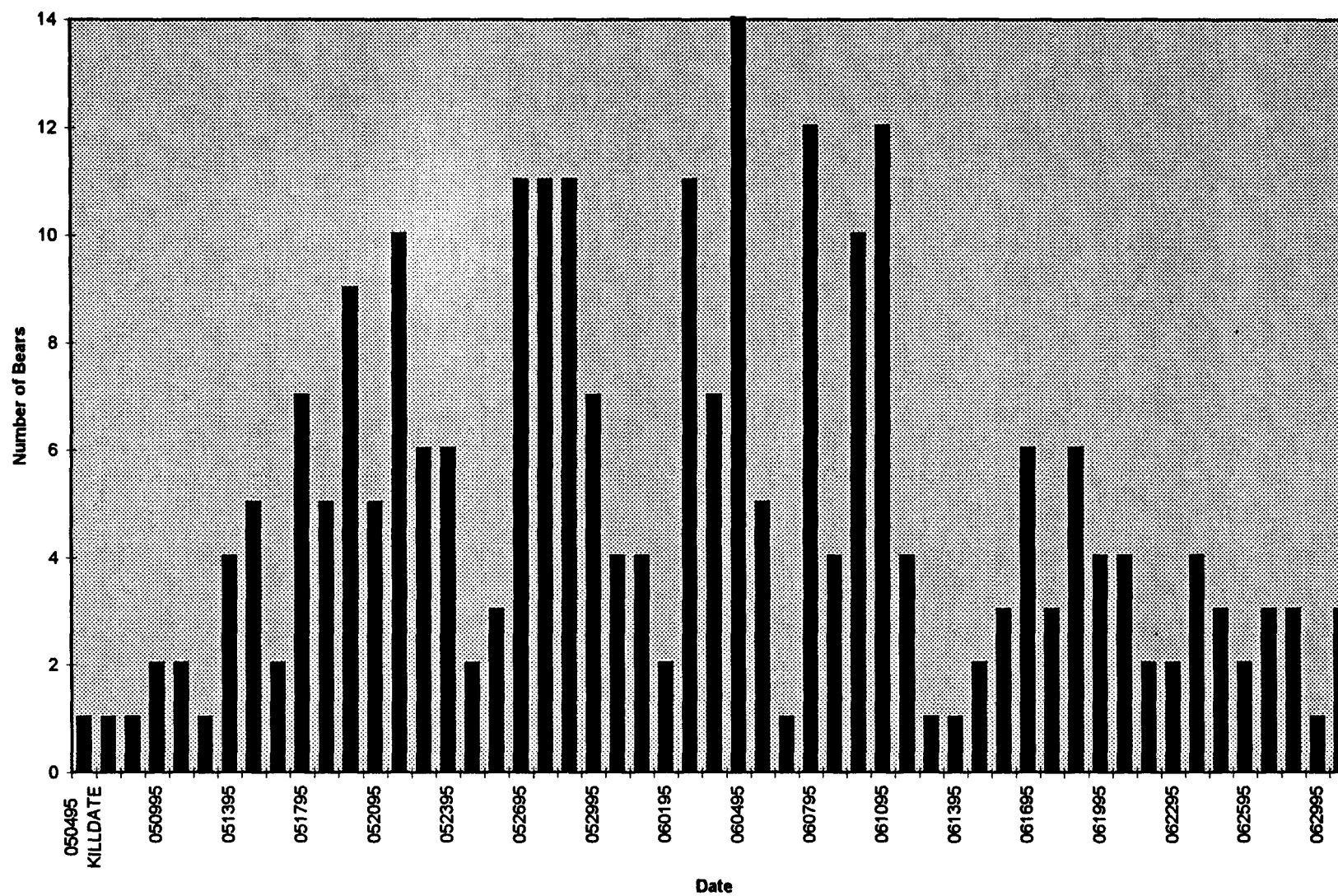


Figure 2 Chronology of black bear harvest for Units 20A, 20B, 20C, and 20F in spring 1995

Table 1 Black bear harvest<sup>a</sup> by sex and season in Units 20A, 20B, 20C, and 20F, regulatory years 1984–1995

Regulatory year	Area	Fall				Spring				Annual total			
		Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1984-1985	20A	13	18	0	31	8	2	0	10	21	20	0	41
	20B	24	20	1	45	22	15	1	38	46	35	2	83
	20C	7	1	0	8	1	0	0	1	8	1	0	9
	20F	4	4	1	9	2	2	0	4	6	6	1	13
	Total	48 (53%)	43	2	93	33 (63%)	19	1	53	81 (57%)	62	3	146
1985-1986	20A	6	2	0	8	4	2	0	6	10	4	0	14
	20B	14	13	0	27	46	21	0	67	60	34	0	94
	20C	2	1	0	3	3	2	1	6	5	3	1	9
	20F	0	2	0	2	3	2	0	5	3	4	0	7
	Total	22 (55%)	18	0	40	56 (67%)	27	1	84	78 (63%)	45	1	124
1986-1987	20A	10	9	0	19	11	2	1	14	21	11	1	33
	20B	31	12	3	46	40	32	2	74	71	44	5	120
	20C	1	1	0	2	3	2	0	5	4	3	0	7
	20F	1	1	0	2	2	1	0	3	3	2	0	5
	Total	43 (65%)	23	3	69	56 (60%)	37	3	96	99 (62%)	60	6	165
1987-1988	20A	16	11	1	28	5	7	0	12	21	18	1	40
	20B	36	15	5	56	36	30	1	67	72	35	6	113
	20C	6	5	0	11	9	2	1	12	15	7	1	23
	20F	1	2	1	4	5	2	0	7	6	4	1	11
	Total	59 (64%)	33	7	99	55 (57%)	41	2	98	114 (64%)	64	9	187
1988-1989	20A	8	5	0	13	14	5	1	20	22	10	1	33
	20B	22	4	0	26	54	27	0	81	76	31	0	107
	20C	3	4	0	7	5	1	0	6	8	5	0	13
	20F	5	1	0	6	3	7	0	10	8	8	0	16
	Total	38 (73%)	14	0	52	76 (66%)	40	1	117	114 (68%)	54	1	169
1989-1990	20A	7	3	1	11	8	6	0	14	15	9	1	25
	20B	13	4	0	17	49	23	0	72	62	27	0	89
	20C	6	3	0	9	3	1	0	4	9	4	0	13
	20F	3	0	0	3	6	2	0	8	9	2	0	11
	Total	29 (74%)	10	1	40	66 (67%)	32	0	98	95 (69%)	42	1	138
1990-1991	20A	7	3	0	10	19	11	0	30	26	14	0	40
	20B	6	7	0	13	93	49	2	144	99	56	2	157
	20C	4	1	0	5	14	5	2	19	18	6	2	26
	20F	3	2	0	5	18	7	0	27	21	9	0	30
	Total	20 (61%)	13	0	33	144 (67%)	72	4	220	164 (66%)	85	4	253
1991-1992	20A	9	5	1	15	13	5	0	18	22	10	1	33
	20B	11	8	1	20	47	28	6	81	58	36	7	101
	20C	3	2	0	5	12	3	2	17	15	5	2	22
	20F	4	3	0	7	12	4	0	16	16	7	0	23
	Total	27 (60%)	18	2	47	84 (68%)	40	8	132	111 (62%)	58	10	179

Table 1 Continued

Regulatory <sup>b</sup> year	Area	Fall				Spring				Annual total			
		Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1992-1993	20A	13	8	0	21	27	16	0	43	40	24	0	64
	20B	25	11	0	36	74	48	0	122	99	59	0	158
	20C	12	2	0	14	6	1	1	8	18	3	1	22
	20F	5	3	0	8	19	12	0	31	24	15	0	39
	Total	55 (70%)	24	0	79	126 (62%)	77	1	204	181 (63%)	101	1	283
1993-1994	20A	6	9	0	15	21	10	1	32	27	19	1	47
	20B	9	6	1	16	81	38	3	122	90	44	4	138
	20C	3	0	0	3	12	4	1	17	15	4	1	20
	20F	2	2	0	4	28	9	0	37	30	11	0	41
	Total	20 (53%)	17	1	38	142 (68%)	61	5	208	162 (66%)	78	6	246
1994-1995	20A	6	1	0	7	31	5	0	36	37	6	0	43
	20B	11	3	0	14	111	51	1	163	122	54	1	177
	20C	3	2	0	5	13	3	0	16	16	5	0	21
	20F	2	2	0	4	28	14	0	42	30	16	0	46
	Total	22 (73%)	8	0	30	183 (71%)	73	1	257	205 (71%)	81	1	287

<sup>a</sup> Includes bears killed in defense of life or property. Parentheses indicate percentage of bears of known sex that were male. Data for 1989-1992 from counts of sealing certificates.

<sup>b</sup> Regulatory year includes fall and the following spring; i.e., RY1984 includes data from July 1984 through June 1985.



Table 2 Bait station registration and harvest of black bears in Units 20A, 20B, 20C, and 20F, 1990–1994

Regulatory year	Number of hunters registering bait stations	Number of bait stations	Harvest <sup>a</sup>		
			Taken over bait (%)	Not taken <sup>b</sup> over bait (%)	Total harvest <sup>c</sup>
1990	358	570	175 (70)	76 (30)	251
1991	450	767	118 (66)	62 (34)	180
1992	615	1154	176 (64)	100 (36)	276
1993	542	901	175 (73)	66 (27)	241
1994	575	899	221 (79)	59 (21)	280

<sup>a</sup> 1990 through 1994 baiting season was 15 Apr through 30 Jun.

<sup>b</sup> Not taken over bait harvest includes bears taken outside of the baiting season.

<sup>c</sup> Total harvest does not include harvest where baited or unbaited was unknown.

Table 3 Residency of successful black bear hunters in Units 20A, 20B, 20C, and 20F, regulatory years 1989–1990<sup>a</sup> through 1994–1995

Regulatory year	Residents			Nonresident	Unk (%)	Total successful hunters <sup>c</sup>
	Local <sup>b</sup> (%)	Nonlocal (%)	Total (%)			
1989-1990	127 (91)	5 (4)	132 (94)	7 (5)	1 (1)	140
1990-1991	221 (89)	8 (3)	229 (92)	18 (7)	1 (<1)	248
1991-1992	133 (76)	30 (17)	163 (93)	12 (7)	0	175
1992-1993	234 (82)	14 (5)	248 (87)	27 (9)	12 (4)	287
1993-1994	211 (84)	12 (5)	223 (89)	19 (8)	8 (3)	250
1994-1995	258 (89)	10 (3)	268 (92)	16 (6)	6 (2)	290

<sup>a</sup> Prior to 1989-1990, black bear data were compiled by calendar year rather than regulatory year.

<sup>b</sup> Resident of Unit 20.

<sup>c</sup> Excludes data from DLPs that were not taken as a legal harvest. Data from harvest matrix.

Table 4 Transport methods for successful black bear hunters in Units 20A, 20B, 20C, and 20F, regulatory years 1992–1994

Unit	Regulatory year	Method of transportation									<i>n</i>
		Airplane	Horse	Boat	4-wheeler	Snowmachine	Other ORV	Highway vehicle	Walk	Other/ Unk	
20A	1992	16	0	42	13	0	8	5	14	3	64
	1993	13	0	51	13	0	4	11	4	4	47
	1994	14	0	42	26	0	5	14	0	0	43
20B	1992	3	1	5	25	6	2	58	3	1	158
	1993	4	0	5	37	0	1	51	1	1	138
	1994	8	0	4	38	0	0	47	2	1	177
20C	1992	14	0	59	5	0	0	14	0	9	22
	1993	25	0	55	5	0	0	5	5	5	20
	1994	24	0	48	19	0	0	0	10	0	21
20F	1992	0	0	8	8	0	0	82	2	0	39
	1993	0	0	20	2	0	0	76	2	0	41
	1994	0	0	11	7	0	2	78	2	0	46

## **LOCATION**

**GAME MANAGEMENT UNIT:** 20D (5637 mi<sup>2</sup>)

**GEOGRAPHICAL DESCRIPTION:** Central Tanana Valley near Delta Junction

## **BACKGROUND**

Black bears are widely distributed in Unit 20D. Most black bear harvest in Unit 20D occurs near the road system south of the Tanana River, in the northwestern portion of the subunit along the Richardson Highway and along major river systems.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT GOALS**

- Protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem.
- Provide the greatest sustained opportunity to participate in hunting black bears.

### **MANAGEMENT OBJECTIVE**

- Manage for a harvest not to exceed 15 black bears south of the Tanana River and 15 black bears north of the Tanana River.

## **METHODS**

I collected harvest data through mandatory sealing of bears killed by hunters or in defense of life or property. Data collected from each black bear killed included color phase, sex, skull length and width, transportation used by the hunter, date of kill, number of days hunted, location of kill, hunter name and address, and whether meat was salvaged.

## **RESULTS AND DISCUSSION**

### **POPULATION STATUS AND TREND**

Accurate estimates of black bear population size and population trends are unavailable for Unit 20D.

#### *Population Size*

An accurate estimate of black bear population size is not available for Unit 20D. However, based on Hechtel's (1991) estimate of 17.5 adult black bears/100 mi<sup>2</sup> in adjacent Unit 20A, I calculated an estimate of approximately 750 black bears in Unit 20D. I estimated that approximately 525 bears were north of the Tanana River and 225 bears were south of the Tanana River.

### *Distribution and Movements*

Black bears are distributed throughout Unit 20D except in the most heavily populated areas and in treeless alpine habitat. No information is available concerning black bear movements in Unit 20D.

### **MORTALITY**

#### *Harvest*

Season and Bag Limit. There was no closed season on black bears in Unit 20D during 1992–1995. The bag limit was 3 per year. Cubs or sows accompanied by cubs were not legal to harvest. Black bear baiting was allowed from 15 April through 30 June; however, hunters were required to obtain a permit issued by the Alaska Department of Fish and Game and could not establish more than 2 bait stations.

Board of Game Actions and Emergency Orders. No regulations were passed during this reporting period that affected black bear hunting in Unit 20D.

Human Harvest. Reported black bear harvest by hunters in Unit 20D during this reporting period ranged from 14 (1994–1995) to 25 (1993–1994) (Table 1). Mean annual harvest was 19.7 bears per year, an increase from 14.0 bears per year harvested during the previous 5 regulatory years.

Reported harvest of known sex bears from 1992–1993 to 1995–1996 was 62.9% male and 37.1% female. Percent females in the Unit 20D harvest increased from the previous 5 regulatory years when females made up 24.2% of harvest of known sex bears. MacHutchon and Smith (1988), as reported by Hechtel (1991), suggest a harvest in excess of 35% females may warrant detailed harvest assessment to determine excessive harvest.

Females were harvested in nearly equal percentages north and south of the Tanana River in Unit 20D. Female bears composed 37.1% of the reported harvest south of the Tanana River and 37.0% of the harvest north of the Tanana River. Therefore, females were not harvested at a higher rate in the more accessible southern Unit 20D. The harvest of females should be monitored closely, and if females continue to increase in the harvest, harvest goals and harvest rates should be evaluated more closely.

Hunting bears at bait stations contributed significantly to the spring bear harvest. During the 1993–1995 spring seasons, a mean of 56.8% of bears killed were killed at bait stations (range = 54.5%–58.3%) (Table 1).

Harvest Locations. The reported harvest did not exceed the harvest objectives either north or south of the Tanana River. Most black bear harvest occurred in southern Unit 20D during this reporting period (Table 2). During 1992–1993 to 1995–1996, 56.9% of the black bears have been taken south of the Tanana River. Reported harvest south of the Tanana River averaged 11.0 bears per year (range = 10–13), excluding the partial 1995–1996 season. This harvest represents an estimated 5.0% of the adult population south of the Tanana River.

The reported harvest in northern Unit 20D comprised 43.1% of the unitwide harvest from 1992–1993 to 1995–1996. Excluding the fall portion of the 1995–1996 season, harvest averaged 8.7

bears per year (range = 4–12). This harvest represents an estimated 1.7% of the adult population north of the Tanana River.

Hunter Residency. Black bear harvest by nonlocal residents has increased since 1992–1993. During the previous 5 years (1987–1988 to 1991–1992), local residents averaged 68% of the harvest, but harvest by local residents declined to 47% during this reporting period (Table 3). Nonlocal hunters have increased their harvest rate from 23% (1987–1988 to 1991–1992) to 42% during this reporting period. Harvest rates by nonresidents remained fairly constant.

Harvest Chronology. Most bears continue to be harvested during the May–June spring hunting season, and during the August–September fall hunting season (Table 4).

Transportation Methods. The most popular modes of transportation for black bear hunters in Unit 20D continue to be boats, 3- or 4-wheelers, highway vehicles, and walking (Table 5). These modes of transportation account for 50–100% of the annual black bear harvest.

## **HABITAT**

### *Assessment and Enhancement*

This reporting period we did no black bear habitat assessment or enhancement.

## **CONCLUSIONS AND RECOMMENDATIONS**

Liberal seasons and bag limits are providing hunters maximum opportunity to hunt black bears in Unit 20D. Harvest did not exceed management objectives for northern or southern portions of the unit. However, mean annual harvest increased from the previous 5 years, the proportion of females in the harvest increased, and nonlocal residents show more interest in hunting Unit 20D black bears this reporting period. No changes in regulations are recommended at this time; however, harvest rates should be monitored closely in the future to determine if harvest continues to increase and if the proportion of females in the harvest continues to increase and becomes excessive.

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Table 1 Unit 20D black bear harvest, 1987-1995

Regulatory year	Reported										Total reported and estimated kill			
	Hunter kill					Nonhunting kill <sup>a</sup>			Estimated kill					
	M (%)	F (%)	Unk	Total	Baited	M	F	Unk	Unrep	Illegal	M (%)	F (%)	Unk	Total
1987-1988														
Fall 1987	5 (50)	5 (50)	0	10	—	0	0	0	0	0	5 (50)	5 (50)	0	10
Spring 1988	6 (86)	1 (14)	0	7	—	0	0	0	0	0	6 (86)	1 (14)	0	7
Total	11 (65)	6 (35)	0	17	—	0	0	0	0	0	11 (65)	6 (35)	0	17
1988-1989														
Fall 1988	4 (57)	3 (43)	0	7	—	0	0	0	0	0	4 (57)	3 (43)	0	7
Spring 1989	5 (71)	2 (29)	0	7	—	0	0	0	0	0	5 (71)	2 (29)	0	7
Total	9 (64)	5 (36)	0	14	—	0	0	0	0	0	9 (64)	5 (36)	0	14
1989-1990														
Fall 1989	6 (75)	2 (25)	0	8	—	0	0	0	0	0	6 (75)	2 (25)	0	8
Spring 1990	8 (89)	1 (11)	0	9	—	0	0	3	0	0	8 (89)	1 (11)	3	9
Total	14 (82)	3 (18)	0	17	—	0	0	3	0	0	14 (82)	3 (18)	3	20
1990-1991														
Fall 1990	2 (100)	0 (0)	0	2	—	0	0	1	0	0	2 (100)	0 (0)	1	3
Spring 1991	5 (71)	2 (29)	0	7	—	0	0	0	0	0	5 (71)	2 (29)	0	7
Total	7 (78)	2 (22)	0	9	—	0	0	1	0	0	7 (78)	2 (22)	1	10
1991-1992														
Fall 1991	6 (100)	0 (0)	0	6	—	0	0	0	0	0	6 (100)	0 (0)	0	6
Spring 1992	3 (100)	0 (0)	0	3	—	0	0	0	0	0	3 (100)	0 (0)	0	3
Total	9 (100)	0 (0)	0	9	—	0	0	0	0	0	9 (100)	0 (0)	0	9
1992-1993														
Fall 1992	4 (57)	2 (29)	1 (14)	7	0	0	0	0	0	0	4 (57)	2 (29)	1 (14)	7
Spring 1993	9 (75)	3 (25)	0	12	7	0	0	1	0	0	9 (69)	3 (23)	1 (8)	13
Total	13 (68)	5 (26)	1 (5)	19	7	0	0	1	0	0	13 (65)	5 (25)	2 (10)	20
1993-1994														
Fall 1993	6 (55)	4 (36)	1 (9)	11	0	0	0	0	0	0	6 (55)	4 (36)	1 (9)	11
Spring 1994	6 (43)	8 (57)	0	14	8	0	0	0	0	0	6 (43)	8 (57)	0	14
Total	12 (48)	12 (48)	1 (4)	25	8	0	0	0	0	0	12 (48)	12 (48)	1 (4)	25
1994-1995														
Fall 1994	3 (100)	0	0	3	0	0	0	0	0	0	3 (100)	0	0	3
Spring 1995	6 (55)	5 (46)	0	11	6	0	0	0	0	0	6 (55)	5 (46)	0	11
Total	9 (64)	5 (36)	0	14	6	0	0	0	0	0	9 (64)	5 (36)	0	14
1995-1996														
Fall 1995	5 (83)	1 (17)	0	6	0	0	0	0	0	0	5 (83)	1 (17)	0	6

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

Table 2 Location of kill for black bears harvested in Unit 20D, 1987–1995

Regulatory year	% Killed south of Tanana River	% Killed north of Tanana River	<i>n</i>
1987-1988	82	18	17
1988-1989	67	33	14
1989-1990	56	44	17
1990-1991	45	56	9
1991-1992	78	22	9
1992-1993	50	50	20
1993-1994	52	48	25
1994-1995	71	29	14
1995-1996 <sup>a</sup>	67	33	6

<sup>a</sup> Jul-Dec 1995 only.

Table 3 Residency of successful black bear hunters in Unit 20D, 1987–1995

Regulatory year	Local <sup>a</sup> resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1987-1988	13 (76)	3 (18)	1 (6)	17
1988-1989	8 (57)	4 (29)	2 (14)	14
1989-1990	10 (59)	6 (35)	1 (6)	17
1990-1991	6 (67)	1 (11)	2 (22)	9
1991-1992	8 (89)	1 (11)	0	9
1992-1993	13 (68)	3 (16)	3 (16)	19
1993-1994	8 (32)	13 (52)	4 (16)	25
1994-1995	7 (50)	7 (50)	0	14
1995-1996 <sup>b</sup>	2 (33)	4 (67)	0	6

<sup>a</sup> Local residents are residents of Unit 20D.

<sup>b</sup> Jul-Dec 1995 only.



Table 4 Chronology of black bear harvest in Unit 20D, percent by time period 1987–1995

Regulatory year	Harvest periods								n
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	
1987-1988	12	18	29	0	0	6	24	12	17
1988-1989	7	14	29	0	0	0	21	29	14
1989-1990	0	18	29	0	0	0	41	12	17
1990-1991	0	22	0	0	0	0	33	44	9
1991-1992	33	0	0	0	0	0	33	33	9
1992-1993	5	5	26	0	0	0	32	32	19
1993-1994	0	12	32	0	0	0	32	24	25
1994-1995	7	14	0	0	0	0	43	36	14
1995-1996 <sup>a</sup>	33	33	33	0	0				6

<sup>a</sup> Jul-Dec 1995 only.

Table 5 Unit 20D black bear harvest transport methods by percent, 1987–1995

Year	Method of transportation										n
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Other	Unk	
1987-1988	6	0	0	0	0	24	24	29		18	17
1988-1989	21	0	29	7	0	7	14	7		14	14
1989-1990	0	6	12	0	0	47	18	0		18	17
1990-1991	0	0	11	22	0	33	22	0		11	9
1991-1992	0	0	11	22	11	0	33	22		0	9
1992-1993	5	0	21	26	0	11	21	11	5	0	19
1993-1994	8	0	24	44	0	0	4	16	4	0	25
1994-1995	0	0	14	29	0	0	29	29	0	0	14
1995-1996 <sup>a</sup>	50	0	17	0	0	0	0	17	17	0	6

<sup>a</sup> Jul-Dec 1995 only.

## **LOCATION**

**GAME MANAGEMENT UNIT:** 20E (10,681 mi<sup>2</sup>)

**GEOGRAPHICAL 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**

Black bears inhabit forested habitat in Unit 20E. Observations by long-term residents of the area indicate that black bears were more common during the 1960s and early 1970s than they are at present. Reduced black bear abundance may have been caused by grizzly bear competition and predation. In contrast, grizzly bear abundance was depressed during the 1960s and early 1970s, apparently related to federal predator control poisoning efforts of the 1950s, but has since recovered to near natural densities.

Currently, the black bear population in Unit 20E seems stable. The highest densities may be found in hardwood habitats in the Kechumstuk Creek drainage and near the village of Chicken. Historically, interest in black bear hunting in the subunit has been relatively low.

## **MANAGEMENT DIRECTION**

### **MANAGEMENT GOALS**

- Protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem.
- Provide the greatest sustained opportunity to participate in hunting black bears.

### **MANAGEMENT OBJECTIVES**

- Manage for a harvest of black bears that maintains 55% or more males in the combined harvests of the most recent 3 years.

## **METHODS**

We collected harvest data through mandatory sealing of hunter and defense of life or property killed bears. Information collected included harvest location and date, sex of the bear, skull size, transportation method, number of days afield, salvage of meat, and use of bait. A premolar tooth was extracted from each bear during the sealing process; however, black bear teeth have not been sectioned for aging for several years.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

No censuses or surveys were conducted in Unit 20E to determine black bear population size and trend. Hunter reports and bear sighting data indicate that black bears inhabit all appropriate habitat. Based on population data collected in Unit 12 during the early 1980s and recently in Unit 20A, I estimated the Unit 20E black bear population to be between 1000 and 1500 bears. The composition of the population is unknown. No major changes to the available black bear habitat have occurred in the past 5 years and the population is probably stable.

#### *Distribution and Movements*

Black bears inhabit all of the forested habitats within Unit 20E. Their movement patterns within the subunit are unknown.

### MORTALITY

#### *Harvest*

Season and Bag Limit. There is no closed season for black bears in Unit 20E; the bag limit is 3 bears. Harvest of cubs and females accompanied by cubs is prohibited.

Board of Game Actions and Emergency Orders. No Board of Game actions or emergency orders concerning Unit 20E black bears occurred during the report period.

Hunter Harvest. In the 1994–1995 regulatory year, hunters reported taking 18 black bears (15 males, 3 females) in Unit 20E (Table 1). The 5-year average harvest was 13 bears. The historically low harvest in Unit 20E is due to low hunter interest. Incidental take accounts for 60–85% of the annual harvest. Most hunters in the area consider black bears an alternative meat source and few select to hunt specifically for black bears, including those who hunt using bait. Between 1990 and 1995, only 3/38 (7.9%) of the black bears harvested during spring in Unit 20E were killed at bait stations. Meat was salvaged from over 90% of the black bears harvested in the subunit during this time period.

In 1994–1995 the average skull size of 7 males taken was 16.6 inches, comparable to the 5-year average of 16.8 inches. The percent males in the harvest was 83%, exceeding the 5-year average of 74%. The high percentage of males in the harvest and consistently large skull sizes indicate human-induced mortality is having minimal effects on this population.

Hunter Residency and Success. During 1994–1995 all black bears harvested in Unit 20E were taken by state residents; 72% were residents of the subunit (Table 2). Since 1990 unit residents have taken 59% of the black bears killed in Unit 20E. Only 4 black bears (6%) were killed by nonresidents during the past 5 years.

No measure of hunter success was available as unsuccessful hunters are not required to report. During the 1991–1992 regulatory year each successful hunter reported spending 5.1 days afield compared with the 5-year average of 2.7 days.

Harvest Chronology. During 1994–1995, 10 (59%) black bears were taken during spring; 3 (40%) were taken in the fall (Table 3). During the past 5 years, 54% of hunter-killed black bears were harvested during spring. Black bear harvest during July is primarily due to black bears wandering into fish camps or into people's yards.

Transport Methods. During 1994–1995 highway vehicles were the most commonly used (56%) mode of transportation for successful black bear hunters in Unit 20E (Table 4). During the past 5 years, 53% of the reported harvested black bears were taken by hunters using highway vehicles. Boats and 4-wheelers were also commonly used methods.

## **HABITAT**

### *Assessment*

Black bear habitat is extensive in Unit 20E. Only treeless habitat, generally above elevations of 4000 feet, is not considered to be black bear habitat. Blueberries, crowberries, and cranberries are widely available in Unit 20E, but bearberries are available in only a few areas. Unnatural changes in the quantity and quality of black bear habitat is not expected because little development is occurring or planned in Unit 20E.

### *Enhancement*

The implementation of the Alaska Interagency Fire Management Plan has allowed wildfires to burn in more areas than occurred before 1984. Revegetation of preferred plant species in burned areas is expected to provide better forage for black bears than is available in mature forests of black or white spruce.

## **CONCLUSIONS AND RECOMMENDATIONS**

We are meeting all management goals and objectives. Black bears in Unit 20E are lightly harvested and, subsequently, harvest is having little effect on the status and trend of the population. The percentage of males in the harvest the past 3 years was 77%. I recommend no changes in seasons or bag limits.

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Table 1 Unit 20E black bear harvest, 1990–1994

Regulatory year	Reported										Total reported and estimated kill					
	Hunter kill					Nonhunting kill <sup>a</sup>			Estimated kill							
	M	F	Unk	Total	Baited	M	F	Unk	Unrep	Illegal	M (%)	F (%)	Unk	Total		
1990-1991																
Fall 1990	2	4	0	6	0	0	0	0	0	0	2 (33)	4 (67)	0 (0)	6		
Spring 1991	3	2	0	5	0	0	0	0	0	0	3 (60)	2 (40)	0 (0)	5		
Total	5	6	0	11	0	0	0	0	0	0	5 (45)	6 (55)	0 (0)	11		
1991-1992																
Fall 1991	2	1	0	3	0	1	0	0	0	0	3 (75)	1 (25)	0 (0)	4		
Spring 1992	5	0	0	5	0	0	0	0	0	0	5 (100)	0 (0)	0 (0)	5		
Total	7	1	0	8	0	1	0	0	0	0	8 (89)	1 (11)	0 (0)	9		
1992-1993																
Fall 1992	6	2	0	8	0	0	0	0	0	0	6 (75)	2 (25)	0 (0)	8		
Spring 1993	9	3	0	12	1	0	0	0	0	0	9 (75)	3 (25)	0 (0)	12		
Total	15	5	0	20	1	0	0	0	0	0	15 (75)	5 (25)	0 (0)	20		
1993-1994																
Fall 1993	4	2	0	6	0	0	0	0	0	0	4 (67)	2 (33)	0 (0)	6		
Spring 1994	4	1	0	5	0	0	0	0	0	0	4 (80)	1 (20)	0 (0)	5		
Total	8	3	0	11	0	0	0	0	0	0	8 (73)	3 (27)	0 (0)	11		
1994-1995																
Fall 1994	6	1	0	7	0	0	0	0	0	0	6 (86)	1 (14)	0 (0)	7		
Spring 1995	9	2	0	11	2	0	0	0	0	0	9 (82)	2 (18)	0 (0)	11		
Total	15	3	0	18	2	0	0	0	0	0	15 (83)	3 (17)	0 (0)	18		

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

Table 2 Residency of successful black bear hunters in Unit 20E, 1990-1994

Regulatory year	Unit resident (%)	Other residents (%)		Nonresident (%)	Total successful hunters
1990-1991	7 (64)	4 (36)	0 (0)		11
1991-1992	6 (75)	2 (25)	0 (0)		8
1992-1993	9 (45)	8 (40)	3 (15)		20
1993-1994	6 (55)	4 (36)	1 (9)		11
1994-1995	13 (72)	5 (28)	0 (0)		18

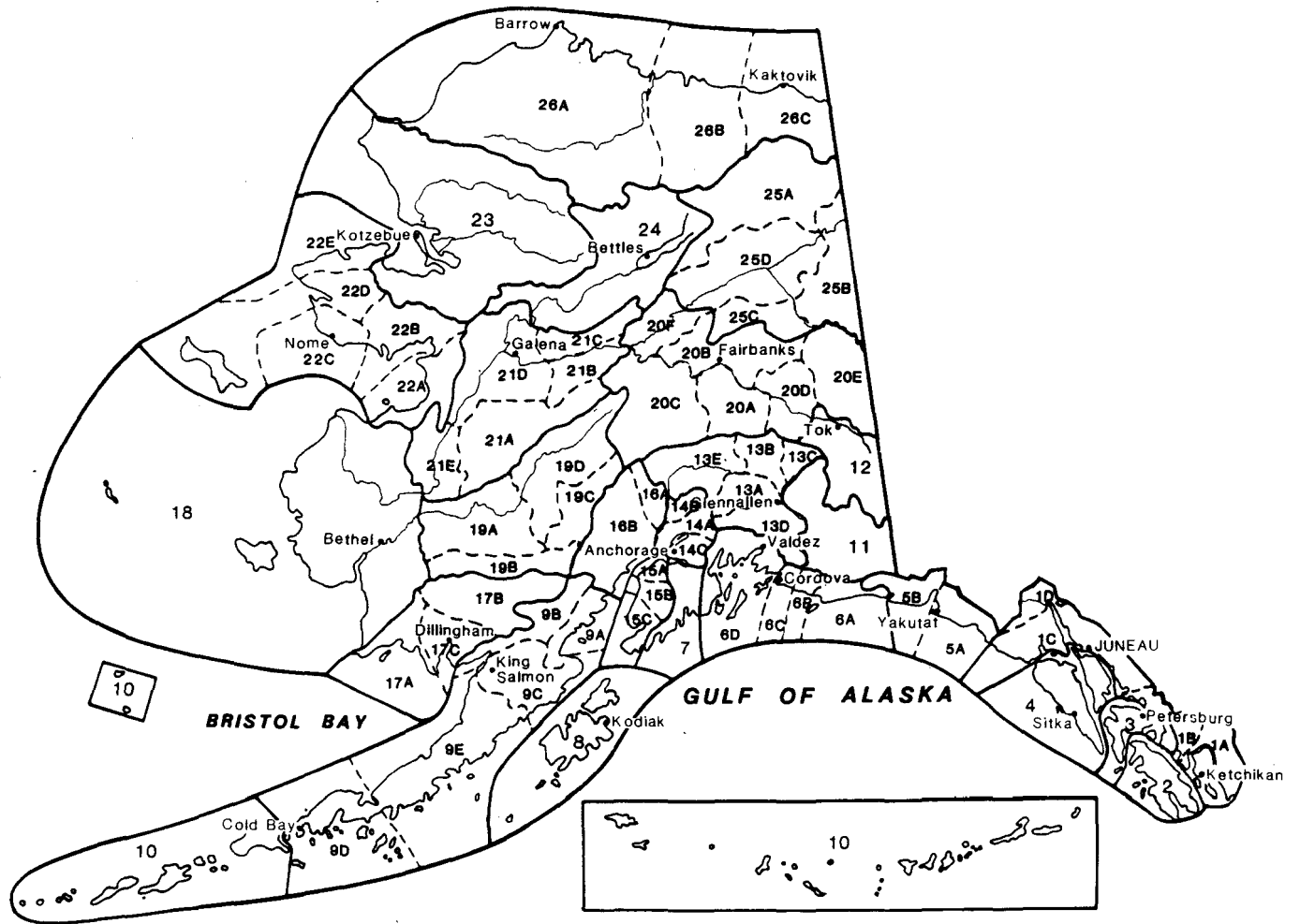
Table 3 Chronology of black bear harvest in Unit 20E, percent by time period 1990-1994

Regulatory year	Harvest periods								n
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	
1990-1991	0	36	18	0	0	0	27	18	11
1991-1992	13	13	13	0	0	0	13	50	8
1992-1993	5	30	5	0	0	0	30	30	20
1993-1994	9	36	0	9	0	0	36	9	11
1994-1995	12	12	18	0	0	0	41	18	17

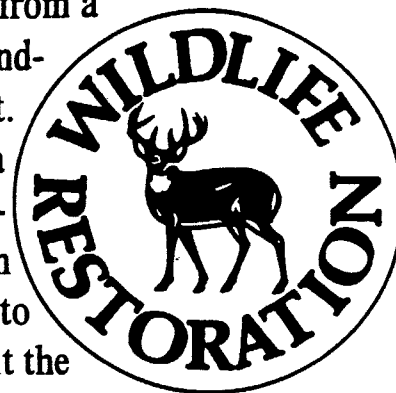
Table 4 Unit 20E black bear harvest percent by transport method, 1990-1994

Regulatory year	Method of transportation (%)										n
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unknown		
1990-1991	0 (0)	0 (0)	2 (18)	1 (9)	0 (0)	0 (0)	7 (64)	1 (9)	0 (0)	11	
1991-1992	2 (25)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (63)	0 (0)	1 (13)	8	
1992-1993	2 (10)	0 (0)	4 (20)	0 (0)	0 (0)	0 (0)	2 (60)	1 (5)	1 (5)	20	
1993-1994	0 (0)	0 (0)	2 (18)	4 (36)	0 (0)	0 (0)	2 (18)	2 (18)	1 (9)	11	
1994-1995	0 (0)	0 (0)	3 (17)	5 (28)	0 (0)	0 (0)	10 (56)	0 (0)	0 (0)	18	

# Alaska's Game Management Units



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. Seventy-five percent of the funds for this report are from Federal Aid.



Pat Costello



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