Alaska Department of Fish and Game
Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
Management Report
Survey-Inventory Activities
1 July 1995 - 30 June 1998

BLACK BEAR

Mary V. Hicks, Editor

Grants W-24-4, W-24-5, and W-27-1
Study 17.0
December 1999

STATE OF ALASKA
Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME
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DIVISION OF WILDLIFE CONSERVATION
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LOCATION

GAME MANAGEMENT UNIT: Unit 1A (5,300 mi^2)

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 Unit 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 annual harvest increased from 43 bears per season during 1992–94 to 63 bears per season during this report period. The increased harvest is probably due to an increase in 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 hunted, sex, and skull measurements (length plus zygomatic width). We sent premolar teeth extracted from sealed skulls to Matson's Laboratory (Milltown, MT) where ages of harvested bears were determined.

In an effort to better compare and evaluate successful hunters during the past 18 seasons, we ranked the average numbers of hunter-days, mean skull measurements, 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 more successful seasons, meaning that hunters generally harvested older bears with larger skulls while investing less time hunting in these years.

During fall 1994 we initiated a program to capture and relocate garbage-habituated bears from the Ketchikan landfill. Nuisance bear problems have gradually decreased to only a few incidents in 1998.

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 10–20 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

Poelker and Hartwell (1973) estimated a minimum density of 1.4 black bears/mi^2 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^2 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 5000 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 landfill operation was changed to a baling facility. A trapping and relocation project was initiated in September 1994 to ward off potential problems from displacement of black bears from their long-established feeding area. During 1994–1998 we handled 79 bears, and of these we relocated 58 and killed 21. There has been a gradual annual decrease in nuisance bear problems since this program began, with the fewest incidents occurring in 1998.

Population Composition

We lack information to estimate the sex and age composition of the Unit 1A black bear population. Most harvested bears are male probably because of 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 females' teeth during years in which they give birth. For example, during 1994–1998 we were able to obtain partial to complete reproductive histories of 53 harvested female bears from Units 1A and 2 using this method. Age at first reproduction for 43 of these bears varied, with 9% of the females producing cubs at age 4, 37% at age 5, 35% at age 6, and 17% from 7–9 years of age. Females generally had young in alternate years.

Distribution and Movement

Black bears inhabit the mainland and adjacent islands of Unit 1A. Black-colored pelage is most common 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^2 (Erickson et al. 1982). Movement patterns vary greatly among individual bears.

MORTALITY

Season and Bag Limit.

Sep 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. Harvest increased from an average of 43 bears/season during 1992–1995 to 63 bears/season during this report period (Table 1). This increase in harvest appears to be linked to an increase in hunting effort by residents and nonresidents alike, rather than an increase in bear numbers. Similar to prior seasons, males made up over 70% of the bears taken during this report period (Table 1).

Hunters harvest bears throughout the subunit. Some of the highest harvests continue to come from Wildlife Analysis Areas (WAAs) 406, 407, and 510, but during this report period WAAs 820 and 822 also contributed substantially to the harvest (Table 2). WAA 406, which consists of Carroll Inlet, accounted for 22% of the subunit harvest during this report period. WAA 407 (George Inlet and the Ward Cove–Harriet Hunt Lake road) accounted for 13% of the harvest, and WAA 510 (northwest Revillagigedo Island) accounted for 10% of the harvest. WAA 820 (Smeaton Bay) accounted for 13% of the harvest and WAA 822 (Foggy Bay) accounted for 9% (Table 2). Because of its proximity to Ketchikan, WAA 406 is a popular recreational area for Ketchikan residents. 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 via George Inlet, and by highway vehicle up the Ward Cove–Harriet Hunt Lake road system. Ketchikan residents and personnel from the Neets Bay fish hatchery take several bears in WAA 510 each season. WAAs 820 and 822 are accessible by boat from Ketchikan and are also very popular places to hunt.

Our management objective of maintaining an average skull size greater than or equal to 17.5 inches for spring and annually harvested males was achieved in all 3 seasons during this report period (Table 3). Female skull measurements averaged 15.4 inches or greater during this report period (Table 3). We conclude that hunters continue to select for large bears.

During this report period average male ages ranged from 8 to 11 years while average female ages ranged from 5 to 10 years (Table 3). Both male and female ages were similar to the average ages over the past 15 years.

Hunter Residency and Success. Local residents accounted for 52–66% of the harvest during each of the past 3 seasons, while other state residents killed 6–16% of the bears and nonresidents took 18–32% of the harvest (Table 1). When compared with the previous report period, this represents a decrease in harvest by local residents, an increase in harvest by other state residents, and little change in harvest by nonresidents.

We evaluate hunter success on information from successful hunters during the sealing process. To compare year-to-year 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 16 seasons for which scores were obtained (scores could not be established for the 1980/81 and 1989/90 seasons because of missing age data), lowest ranking 1996/97 was identified as the most "successful" season. The second most successful seasons, 1991/92 and 1995/96, were followed closely by 1988/89 and 1994/95. The least successful season during the past 16 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 this report period 52% of the spring kill was harvested during this 3-week period.

The first 10 days of September tend to be the most productive period during the fall season (Table 5). During this report period 28% of the fall harvest was taken 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 (Table 1). We believe this is due to the increase in roads in the Ketchikan area.

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, blocking light from the forest floor. Second-growth stands lack large hollow trees and root masses used 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

Harvest records indicate that the annual black bear kill in Unit 1A remains low relative to the estimated population and is heavily skewed toward males. There are no discernible changes in average skull sizes of harvested bears; we are meeting our objective of maintaining an average spring and annual skull size for males of 17.5 inches.

While the annual harvest only constitutes about 1% of the estimated Unit 1A black bear population, close attention should be paid to specific WAAs to ensure that local overharvesting does not occur. Especially critical are WAAs 406, 407, 510, 822, and 823 where access is relatively easy and interest is high. These areas accounted for over 67% of the 1995–98 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 dynamics of Unit 1A black bears.

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Table 1 Unit 1A Black bear harvest, hunter residency, and hunter transport, 1980–98

		Harvest				Hunter Residency				Transport[a]				
Year	Season	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

		Harvest				Hunter Residency				Transport[a]				
Year	Season	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	10	4	0	2
	Spring	62	5	2	69	45	13	11	0	8	56	4	1	0
	Total	72	8	5	85	59	14	11	1	8	66	8	1	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	1	1	6	2	1	0
	Spring	38	3	0	41	27	6	7	0	1	29	8	2	0
	Total	47	4	0	51	35	6	9	1	2	35	10	3	0
1994/95	Fall	7	2	1	10	5	4	0	1	2	2	2	1	0
	Spring	31	8	0	39	26	3	10	0	4	29	4	2	0
	Total	38	10	1	49	31	7	10	1	6	31	6	3	0
1995/96	Fall	18	9	0	27	22	3	2	0	1	16	7	2	0
	Spring	35	6	0	41	23	8	10	0	5	30	5	1	0
	Total	53	15	0	68	45	11	12	0	6	46	12	3	0

Table 1 Continued

		Harvest				Hunter Residency				Transport[a]				
Year	Season	Males	Females	Unk.	Total	Local	State	N.R.	Unk.	Air	Boat	Road	Other	Unk.
1996/97	Fall	12	4	0	16	12	2	1	1	4		3	1	0
	Spring	30	3	0	33	20	1	12	0	0	0	1	2	0
	Total	42	7	0	49	32	3	13	1	4	7	4	3	0
1997/98	Fall	13	4	0	17	8	2	6	1	3	3	1	0	0
	Spring	52	4	0	56	30	9	17	0	2	8	4	2	0
	Total	65	8	0	73	38	11	23	1	5	1	5	2	0

[a]Does not include DLP, road, or illegal kills.

Table 2 Unit 1A annual black bear harvest by Wildlife Analysis Area (WAA), 1990–1998

	1991/92			1992/93			1993/94			1994/95			1995/96			1996/97			1997/98			Totals			
WAA	M	F	U	M	F	U	M	F	U[a]	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
0101				2										1		2						4	1	0	
0303											1											1	1	0	
0404	6	1		3			4			2			1			1			1			18	1	0	9
0405			1				2						2	1		3						7	1	1	
0406	8	2	1	4	3		[a]	1		10[a]	2	1[a]	9	4		7	1		18	2		72	15	2	9
0407	6[b]			3	2		7			7	5		9	3		6	1		5			43	11	0	4
0408	2[a]	1			5[a]								2			2	1					6	7	0	3
0509	1	1		3	1		2[a]			3[a]			6	4		1	1		1	2		17	9	0	6
0510	7	2	1	3	1		7	1		4	1		5			2			11	1		39	6	1	6
0511	1			1															1			3	0	0	
0612										1												1	0	0	
0613	1			1	2		2				1		4	1		2			1			11	4	0	5
0614							1	1					2									3	1	0	
0715	1		1																2			3	0	1	
0716	2	1														1						3	1	0	
0717																1						1	0	0	
0718										1												1	0	0	
0719	1	1														1	1		1			3	2	0	
0820	2			1						1						2			4			10	0	0	0
0822	3			2			4	1		3			5	1		5	2		12			34	4	0	8
0823	4	1					2			6			5			5			7	1		29	3	0	2
0824													1			1			1			3	0	0	
0825													1									1	0	0	
0826													1						1	1		2	1	0	

[a]Includes DLP kills.
[b]Includes road kills.

Table 3 Hunter effort, mean skull size, and mean age for black bears harvested in Unit 1A, 1980–1998

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

Table 3 Continued

		Hunter Effort		Mean Skull Size[a] (in)				Average Age (years)[b]			
Year	Season	Total Days	No. Hunters	Male	*n*[c]	Female	*n*	Male	*n*	Female	*n*
1988/89	Fall	32	13	17.5	(7)	16.1	(4)				
	Spring	131	43	18.8	(27)	16.2	(1)				
	Total	163	56	18.5	(34)	16.1	(5)	10.0	(15)	7.0	(1)
1989/90	Fall	19	8	17.1	(5)	----	(0)				
	Spring	151	56	18.5	(39)	16.0	(5)				
	Total	170	64	18.4	(44)	16.0	(5)	----	----	----	----
1990/91	Fall	16	13	16.7	(9)	16.4	(3)				
	Spring	272	67	18.0	(56)	15.6	(5)				
	Total	288	80	17.8	(65)	15.9	(8)	10.2	(67)	11.0	(8)
1991/92	Fall	44	20	18.1	(11)	15.9	(7)				
	Spring	120	37	18.2	(32)	16.4	(3)				
	Total	164	57	18.1	(43)	16.1	(10)	11.0	(42)	9.6	(10)
1992/93	Fall	22	13	16.3	(5)	16.6	(10)				
	Spring	38	20	17.9	(18)	15.8	(2)				
	Total	60	33	17.6	(23)	16.4	(12)	8.0	(21)	9.0	(13)
1993/94	Fall	12	10	17.7	(8)	16.1	(1)				
	Spring	87	40	17.4	(38)	15.8	(3)				
	Total	99	50	17.5	(46)	15.9	(4)	9.0	(46)	9.0	(4)
1994/95	Fall	10	8	16.8	(7)	14.6	(2)				
	Spring	98	39	18.1	(31)	16.0	(7)				
	Total	108	47	17.8	(38)	15.7	(9)	9.6	(36)	11.0	(10)
1995/96	Fall	38	27	17.5	(18)	15.7	(8)				
	Spring	73	41	18.3	(35)	15.9	(6)				
	Total	111	68	18.0	(53)	15.8	(14)	8.3	(51)	8.8	(14)

Table 3 Continued

		Hunter Effort			Mean Skull Size[a] (in)				Average Age (years)[b]		
Years	Season	Total Days	No. Hunters	Mean Days Per Hunter	Male	*n*[c]	Female	*n*	Male	*n*	Female
1996/97	Fall	30	16	1.9	16.8	(12)	15.0	(3)			
	Spring	73	33	2.2	18.4	(30)	15.8	(3)			
	Total	103	49	2.1	17.6	(42)	15.4	(6)	10.9	(40)	4.9
1997/98	Fall	47	17	2.8	17.2	(12)	15.6	(4)			
	Spring	139	56	2.5	17.9	(52)	15.9	(3)			
	Total	186	73	2.5	17.8	(64)	15.7	(7)	9.0	(65)	10.0

[a]Skull sizes equal length plus zygomatic width.
[b] Bear ages not available for 1980/81 and 1989/90.
[c] Numbers in parentheses represent sample sizes.

Table 4 Hunter effort (hunter-days/bear), mean skull size, mean age, and rankings of hunter success, mean skull size, and mean age relative to other years in Unit 1A, 1980–1998

Year	Hunter-Days/ Bear[a]		MeanSkull/ Size (in)[b]	Mean Age (Years)	Overall Ranking Score[d]
1980/81	2.6	(7)	16.9	(8)	---
1981/82	2.5	(6)	17.4	(5)	19
1982/83	3.8	(11)	17.1	(6)	27
1983/84	2.7	(8)	16.9	(8)	29
1984/85	2.6	(7)	17.0	(7)	25
1985/86	2.7	(8)	17.5	(4)	20
1986/87	2.5	(6)	17.0	(7)	22
1987/88	2.5	(6)	17.6	(3)	21
1988/89	2.9	(9)	18.1	(1)	15
1989/90	2.6	(7)	18.1	(1)	---
1990/91	3.6	(10)	17.5	(4)	16
1991/92	2.9	(9)	17.7	(2)	12
1992/93	1.8	(2)	17.1	(6)	16
1993/94	2.0	(3)	17.0	(7)	17
1994/95	2.3	(5)	17.4	(5)	15
1995/96	1.6	(1)	17.6	(3)	12
1996/97	2.1	(4)	17.6	(3)	10
1997/98	2.5	(6)	17.6	(3)	15

[a] Numbers in parentheses represent ranking scores for hunter effort for each year relative to all others: 1=lowest.
[b] Numbers in parentheses represent ranking scores for mean skull size each year relative to all others: 1=highest.
[c] Numbers in parentheses represent ranking scores for mean age each year relative to all others: 1=highest.
[d] Overall-ranking score is equal to the sum of the ranking scores for hunter effort, mean skull size, and mean age. Smaller scores represent better seasons.

Table 5 Unit 1A black bear harvest chronology, 1986–1998

Numbers of Animals

Date	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991[a]	1991 1992[a]	1992 1993	1993 1994[a]	1994 1995[a]	1995 1996	1996 1997	1997 1998	Total
Sep 01–10	7	11	4	5	2	11	5	1	5	10	5	2	8
Sep 11–20	9	1	2	2	7	0	5	2	1	3	2	6	0
Sep 21–30	2	2	2	0	2	1	1	2	0	5	5	2	4
Oct 01–10	2	3	1	3	2	1	1	2	1	3	1	3	1
Oct 11–20	1	0	2	0	2	0	0	3	1	4	1	1	5
Oct 21–31	0	1	1	0	0	2	1	0	0	2	2	3	4
Nov 01–10	4	3	0	0	0	1	0	0	0	0	0	0	
Nov 11–20	0	0	2	0	0	1	0	0	0	0	0	0	
Nov 21–30	0	0	0	1	0	2	0	0	0	0	0	0	
December	0	1	0	0	0	1	0	0	0	0	0	0	
January	0	0	0	0	0	0	0	0	0	0	0	0	
February	0	0	0	0	0	0	0	0	0	0	0	0	
March	0	0	0	0	0	0	0	0	0	0	0	0	
Apr 01–10	1	0	0	0	0	0	0	0	0	0	0	0	
Apr 11–20	0	0	0	1	1	2	0	1	0	0	0	1	
Apr 21–30	0	6	0	0	1	1	4	2	1	2	3	10	0
May 01–10	12	5	7	8	9	9	3	7	10	6	9	15	00
May 11–20	8	6	18	28	18	10	4	16	9	13	12	15	57
May 21–31	16	14	13	14	24	10	7	4	9	12	4	12	39
Jun 01–10	0	8	2	5	9	2	0	8	6	3	2	1	6
Jun 11–20	2	2	3	0	4	2	1	2	2	2	1	2	3
Jun 21–30	4	2	0	1	3	1	1	0	2	3	2	0	9

[a]Does not include bears killed during closed season.

LOCATION

GAME MANAGEMENT UNIT: 1B (3,000 mi^2)

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

BACKGROUND

Black bears are indigenous to Unit 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, and the 29 bears killed from July 1995 through June 1996 represent the highest recorded annual harvest.

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, number of days afield, sex, and skull measurements. We also collected premolar teeth for aging at the time of sealing. No data are 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 cannot be used to measure population trends.

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. At the October 1996 Board of Game meeting the Anan Creek Closed Area was changed. Effective July 1, 1997 the Anan Creek drainage within 1 mile of Anan Creek downstream from the mouth of Anan Lake including the area

within a 1-mile radius from the mouth of Anan Creek Lagoon is closed to taking black bear and brown bear. No emergency orders were issued during this report period.

Hunter Harvest. Hunter harvest in Unit 1B has ranged from 11 to 29 bears during this report period (Table 1). Males composed 96%, 95%, and 82% of the kill in 1995, 1996, and 1997 respectively. The average male skull size ranged from 17.4 inches to 18.6 inches (Table 2). The male to female ratio was well above the management goal. The average male skull size fell one tenth of an inch below the management objective in 1997.

Hunter Residency and Success. Although the ratio varies yearly, during the 1995–1997 period nonresident hunters took approximately two thirds of the annual harvest and local residents took about one third. Nonlocal Alaskan hunters took less than 10% of the bears during this time (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

Most nonhunting kills relate to defense of life or property. No reports of nonhunting mortality occurred during the reporting period in Unit 1B (Table 1).

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 indicate that black bear populations are stable in Unit 1B. I recommend no changes to black bear management strategies at this time.

PREPARED BY:	**SUBMITTED BY:**
Edward Crain	Bruce Dinneford
Wildlife Biologist III	Regional Management Coordinator

Table 1 Unit 1B black bear harvest, 1990–1997

Regulatory Year	Hunter kill						Nonhunting kill [a]			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
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	33	0	12
Total	8	4	33	0	12	0	0	0	0	8	67	4	33	0	12
Fall 95	4	1	20	0	5	0	0	0	0	4	80	1	20	0	5
Spring 96	24	0	0	0	24	0	0	0	0	24	100	0	0	0	24
Total	28	1	3	0	29	0	0	0	0	28	96	1	4	0	29
Fall 96	7	0	0	0	7	0	0	0	0	7	100	0	0	0	7
Spring 97	14	1	7	0	15	0	0	0	0	14	93	1	7	0	14
Total	21	1	5	0	22	0	0	0	0	21	95	1	5	0	22
Fall 97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spring 98	9	2	18	0	11	0	0	0	0	9	82	2	18	0	11
Total	9	2	18	0	11	0	0	0	0	9	82	2	18	0	11

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

Table 2 Unit 1B black bear mean skull size[a], 1990–1997

Regulatory Year	Males	*n*	Females	*n*
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
1995	18.1	28	17.2	1
1996	18.6	19	18.7	1
1997	17.4	9	16.0	1

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

Table 3 Unit 1B successful black bear hunter residency, 1990–1997

Regulatory Year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total Successful hunters
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
1995	8	28	1	3	20	69	29
1996	7	32	0	0	15	68	22
1997	3	27	1	9	7	64	11

[a] Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 4 Unit 1B black bear harvest chronology by percent, 1990–1997

Regulatory Year	Month						
	September	October	November	April	May	June	*n*
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
1995	17	0	0	3	76	4	29
1996	18	9	4	0	55	14	22
1997	0	0	0	27	55	18	11

Table 5 Unit 1B black bear harvest in percent by transport method, 1990–1997

Regulatory Year	Airplane	Boat	Highway vehicle	Foot	Unknown	*n*
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	84	0	8	0	12
1995	7	93	0	0	0	29
1996	14	82	0	4	0	22
1997	0	100	0	0	0	11

LOCATION

GAME MANAGEMENT UNIT: 1C (7,600 mi^2)

GEOGRAPHIC DESCRIPTION: The Southeast Alaska mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay

BACKGROUND

Harvest data and hunter information have provided the only information for black bear management decisions in Unit 1C. Because only successful hunts are documented, effort data are unavailable. Black bear teeth have been collected routinely at the time of sealing in order to provide information on the age structure of harvested animals.

The tendency for black bears to take advantage of alternative human-associated food sources remains a serious problem within this subunit. Bears that have become habituated to humans are difficult to discourage, and it is often necessary to move or destroy such nuisance animals. Translocating bears has been only partially successful, since some return to cause further conflicts. Despite enforcement and public education efforts, the numbers of bear-human conflicts and resulting complaints to ADF&G and public safety agencies require 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 the type of commercial services used. A premolar was collected from most bears for age determination. Anecdotal information about conditions in the field was also gathered during sealing.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population data are not available for black bears in Unit 1C, and because only successful hunters are required to report their hunts, data on hunter effort are incomplete (Tables 1 and 2). Harvest data and reported bear activities in the Juneau area indicate a large population (Table 3). Harvest was higher during this report period than in the previous 3 years, averaging 87 bears per year

compared to 59 bears per year in 1992–1994. However, the harvest during the reporting period was still substantially lower than the 102 bears/year taken in the 6-year period from 1986–1991. The annual proportion of male bears taken during the reporting period varied from 86% to 93%. Mean age and annual skull size for male bears were virtually identical with the previous 3 year period, with the mean annual skull size exceeding the management objective. Mean hunter effort (2.7 days/successful hunter) was identical to the previous 3-year mean. Most successful hunters (57%) were residents of the subunit. The majority of successful hunters reported that 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.

While young male bears tend to dominate in reported and investigated nuisance cases, problem animals handled during the reporting period included both sexes, a variety of ages, and virtually all family group possibilities. Bears handled included one sow with 2 male cubs of the year, 6 adult boars, 3 sows without cubs, and 8 young males. Of these, 1 sow, 1 young male, and 1 adult male were destroyed, while the rest were moved to locations away from Juneau.

MORTALITY

Harvest

Season and Bag Limits:	Resident hunters:
September 1–June 30	Resident hunters: 2 bears, not more than one of which may be a blue or glacier bear. Nonresident hunters: 2 bear.

Board of Game Actions and Emergency Orders. None

Hunter Harvest. Hunters reported killing 84, 91, and 86 bears in regulatory years 1995, 1996, and 1997, respectively (Table 3). Males composed 89, 93, and 86% of the harvest during those years, exceeding the management objective of 75% throughout the period. The majority of bears harvested had black pelage, although a "glacier-"colored bear was taken in both 1995 and 1996 (Table 1). Successful hunters spent an average of 2.8 days in the field, the same as the 3-year average for 1982–1994.

Hunter Residency and Success. Nonlocal Alaskans took 11% of all black bears harvested during the reporting period, reaching a high of 18% in 1995. Nonresident hunters took an average of 33% of the black bears harvested, ranging from 19 to 34% during the report period. This compares to a nonresident mean kill of 29% during 1992–1994.

Harvest Chronology. During the reporting period, 82% of the bears taken were killed during the spring season, ranging from 73% (1995) to 91% (1997) in individual years. This compares to the previous 3-year mean of 78%.

Transport Methods. Boats continued to dominate other means of transport to the field and were used by 79% of hunters (Table 1). Other methods included foot, highway vehicles, airplanes, and

off-road vehicles. Roughly twice as many hunters (20%) reported using commercial services compared to the 1992–1994 period. Of these, 4.7% reported using commercial services for transport to the field and another 11% used registered guides. This indicates an increase in guided hunts in the subunit, as 9% of hunters from 1992–1994 used commercial transport to the field and 9.3% used guides.

Other Mortality

During Regulatory Year 1994 ADF&G staff destroyed 1 nuisance bear and another the following year. Four bears were killed in defense of life or property in 1995, 10 in 1996, and 1 in 1997. The one taken in 1997 was killed by police after aggressively pursuing humans in downtown Juneau. A total of 5 bears were killed by vehicles during the reporting period. In all, 22 bears were reported killed in nonhunting situations during the period.

Habitat. Proposed mining projects, residential and commercial development, and forest clear cutting are the primary potentials for changes in bear habitat quality and quantity in the Juneau area. One of 2 large gold mine projects was abandoned during the reporting period, leaving the Kensington Mine north of Berners Bay as the sole prospect for large mine development in the near future. However, transportation alternatives and associated roads, settlements, and development nodes have the potential for changes in disturbance levels, access, and availability of refuse that could affect bears.

Bear habitat near Juneau is 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 discharge restrictions within the urban areas provide a "refugium" surrounding the city where bears are not available for hunter harvest. At the same time, the high human density in the area ensures a high level of conflict with bears.

Problem Bear Management Activities. Nuisance bear problems varied from year to year during the period. Public awareness of the problem and diligence in managing garbage also vary according to one's personal situation and to a general community sense of the current level of conflict. 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 and new bear recruits learning to use garbage as an alternate food source. Although sometimes frustrating, the cooperative public education process should continue as the best way to prepare members of the public for black bear encounters. We will work with community decision-makers on regulatory remedies as opportunities arise.

Studies to determine the usefulness of aversive conditioning techniques in discouraging problem bears were conducted in 1989 and 1990. Little success was seen with experienced garbage bears, and intensive and repeated treatment of bears is not practical. Translocation of bears is only partly effective because a number of problem bears return to their former urban neighborhoods and habits. Moving bears is expensive in terms of transportation costs and staff time. During the report period staff continued a substantial effort to shift ADF&G's involvement away from instant response to nuisance bear reports to advising callers on how to reduce the attraction for

bears in the hopes that the animal(s) 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. Even so, we handled 7, 2, and 9 garbage bears in 1995, 1996, and 1997, respectively. Of these, 2 were destroyed (one after returning from being moved earlier), and it is likely that some of the others died due to a lack of vacant bear habitat at their transplant sites.

CONCLUSIONS AND RECOMMENDATIONS

The black bear harvest in Unit 1C rebounded during the reporting period after a slump earlier in the decade. This appears to be due to an increase in effort, although we cannot accurately measure this. The number of successful local hunters increased 47% compared to numbers of the previous 3-year period, and the number of nonresident hunters also increased markedly, especially in the last 2 years of the period. The number of days needed to harvest a bear did not change, indicating that the population is large and that bears are no easier to find now than previously.

Harvest data reveal no sign that hunting pressure has been detrimental to the black bear population. Management objectives for Unit 1C are being met, with male skull sizes increasing slightly during the reporting period and a ratio of males to females being maintained greater than the 3:1 objective.

PREPARED BY:

Matthew H. Robus
Wildlife Biologist III

SUBMITTED BY:

Bruce Dinneford
Management Coordinator

Table 1 Unit 1C hunter residency, mean days hunted, and transportation used by successful black bear hunters, 1992–1997

Regulatory Year	Subunit Resident Hunters	Subunit Resident Days	Other AK Resident Hunters	Other AK Resident Days	Non-Resident Hunters	Non-Resident Days	Unknown Hunters	Successful Hunter Effort Hunters	Successful Hunter Effort Days	Airplane	Boat	Highway Vehicle	Foot	ORV	Unknown
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
1995	50	2.2	15	2.7	19	4.8	0	84	2.9	1	67	6	10	0	0
1996	51	2.3	6	3.7	34	2.8	0	91	2.6	7	68	8	7	0	1
1997	47	2.4	7	2.0	32	3.5	0	86	2.8	5	71	6	4	0	0
1995–1997 Mean	49.3	2.3	9.3	2.7	28.3	2.7	---	87	2.8	4.3	68.7	6.7	7.0	0.0	0.3
1992–1994 Mean	34.0	2.4	8	2.6	17	3.5	---	59	2.8	2.3	48.7	2.3	4.0	0.6	0.6

Table 2 Unit 1C commercial services used by successful black bear hunters, 1992–1997

Year	Subunit Residents No	Subunit Residents Yes	Other AK Residents No	Other AK Residents Yes	Non-Residents No	Non-Residents Yes	Total Use No	Total Use Yes	Transport	Registered Guide
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
1995	50	0	15	0	9	10	74	10	1	8
1996	50	1	6	0	16	18	72	19	5	12
1997	40	7	6	1	9	23	55	31	8	13
1995–1997 Mean	46.7	2.7	9.0	0.3	11.3	17.0	67.0	20.0	4.7	11.0
1992–1994 Mean	32.7	0.7	7.3	0.7	8.0	9.0	48.0	10.3	9.0	9.3

Table 3 Unit 1C black bear harvest , 1992–1997

Regulatory Year		Harvest	Non-Hunt Kill	Males	Females	Unk	Male Mean Skull	Male *n*	Male Mean Age	Male *n*	Female Mean Skull	Female *n*	Female Mean Age	Female *n*	Color Variation Black	Blue	Cin.
1992	Total	65		53	11	1	17.1	49	9.0	6	15.9	1	11.0	2	60	0	5
	Fall	23		18	6	0	16.0	18			15.8						
	Spring	42		35	5	1	17.8	31			16.1						
1993	Total	56	1	52	4	0	17.8	51	8.2	50	15.8		14.8	4	49	0	7
	Fall	8		7	3	0	18.1	7			16.2						
	Spring	48		45	1	0	17.8	44			15.7						
1994	Total	57	2	52	5	0	18.1	50	8.0	42	15.2			3	53	0	4
	Fall	8		7	1	0	18.6	6			11.3						
	Spring	49		45	4	0	18.1	1			16.1						
1995	Total	84	6	75	9	0	18.2	73	9.6	62	16.4		8.1	9	74	1	9
	Fall	13		10	3	0	18.3	10			16.9						
	Spring	71		65	6	0	18.2	63			16.2						
1996	Total	91	15	85	6	0	17.8	81	8.7	80	16.0		6.2	6	82	1	8
	Fall	25		25	0	0	17.0	24			0.0						
	Spring	66		60	6	0	18.1	57			16.0						
1997	Total	86	2	74	12	0	17.7	72	7.3	64	15.7	1	7.0	10	78	0	8
	Fall	8		8	0	0	17.5	8			0.0						
	Spring	78		66	12	0	17.7	64			15.7	1					
1995–1997 Mean		87.0	7.6	78.0	9.0	0	17.9*		8.5*		16.0*		7.2*		78	0.7	8.3
1992–1994 Mean		59.3	1.0	52.3	6.7	0.3	17.7*		8.2*		15.7*		11.7*		54	0	5.3

* Weighted means

LOCATION

GAME MANAGEMENT UNIT: 1D (2,700 mi^2)

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 densities are probably lower in Unit 1D than in any other Southeast Alaska mainland area. Brown bear numbers, on the other hand, appear to be relatively high. Although earlier harvest data have not indicated a decline in black bear numbers, the lack of population and hunter effort information makes these determinations impossible. 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

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 the type of commercial services used. A premolar was collected from each bear for age determination. Anecdotal information about field conditions was gathered at the same time. All black bear hunters using bait stations were required to register these sites with ADF&G.

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 are incomplete. Harvest increased during the report period and the mean harvest was nearly 60% higher than the previous 3-year mean. Harvest exhibited a traditional pattern with most bears taken in the spring. The potential indicators of a declining population (i.e., skull and harvest size) mentioned in the previous management report were ambiguous, with skull size decreasing and harvest increasing during the report period. Mean male skull size decreased during 1995–97 and failed to meet the management goal of 17.0 inches during any year of the report period (Table 3). The number of successful hunters was equal to or higher than the previous 3-year mean for hunters of all residency categories. Most reporting hunters did not use commercial services, and

all those who did sought the services of a registered guide. A 3:1 male to female harvest ratio was maintained or exceeded during 1995 and 1996, but was not met during 1997.

MORTALITY

Harvest

Season and Bag Limits.	Resident and nonresident hunters
September 1–June 30	2 bears, not more than one of which may be a blue or glacier bear

Board of Game Actions and Emergency Orders. No regulatory actions were taken during this period.

Hunter Harvest. The Unit 1D black bear harvest ranged from 34 to 40 from 1995 to 1997, averaging 38 (Table 2). Males composed 79, 93, and 70% of the harvest from 1995 through 1997, respectively. The percentage of black bears killed over bait increased from 19% during the previous report period to 39% during 1994–1997. The percentage of cinnamon bears in the harvest decreased from the previous report period but was still substantial at 37% (Table 3). No glacier bears were harvested.

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

Harvest Chronology. The majority of bears (86%) were taken during the spring season during this report period (Table 3).

Transport Methods. Highway vehicles and boats were the major transport means reported by bear hunters and accounted for the access used by 58 and 28% of the hunters respectively (Table 1). Other reported means included foot access, airplanes, and 3- or 4-wheelers. This represents a continual trend toward increased use of highway vehicles for access to hunting areas (Table 1).

HABITAT

Forest management, especially timber harvest, continues to cause the largest effects upon 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. Roads into these areas provide hunters with relatively easy access.

Other Mortality

There were 3 black bears killed in defense of life or property, and 2 harvested illegally during this report period.

CONCLUSIONS AND RECOMMENDATIONS

Although the management objective of maintaining a 3:1 male to female harvest ratio was not met in 1997, it was achieved over the entire report period with 81% of the harvest being males. More of a concern is the second management objective of maintaining a minimum male skull size of 17.0 inches, which was not met for the report period (mean of 16.8 inches) and was only reached during 1995. With harvest increasing in this subunit, we need to monitor skull size closely to determine if there is a continuing trend in this decline.

The increasing popularity of baiting for black bear in this unit has raised several management concerns. First, the increase in harvest over the past 2 report periods is largely the result of successful baiting operations and may reach a nonsustainable level if this trend continues. Secondly, there is some concern from local law enforcement personnel and other unit residents that the harvest of brown bears at or near black bear bait stations may be occurring. These concerns certainly warrant our full attention and will be assessed annually throughout the next report period.

Our understanding of the age structure of harvested bears in this subunit will improve in the future as we are now collecting a premolar tooth for aging from all bears during sealing. We also expect to be able to assess the reproductive history of harvested female bears using tooth information provided by Matson's lab (Milltown, MT). 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 hunter residency, mean days hunted, and transportation used by successful black bear hunters, 1995–1997

Regulatory Year	Subunit Residents		Other AK Residents		Nonresidents		Successful Hunter Effort		Airplane	Boat	Highway Vehicle	ORV/ Wheeler	Foot	Unknown
	Hunters	Days	Hunters	Days	Hunters	Days	Hunters	Days						
1995	27	2.1	3	4.0	4	8.3	34	3.1	2	12	13	2	4	0
1996	35	4.1	2	3.0	3	4.7	40	4.2	0	7	26	0	6	0
1997	30	4.8	3	3.0	7	4.3	40	4.6	0	12	26	0	1	1
1995–1997 Mean	31	3.7	2	3.3	5	5.8	38	4.0	0.7	10.3	21.7	0.7	3.7	0.3
(%)														
1992–1994 Mean	20	2.9	2	2.6	2	4.6	24	3.0	1.0	4.0	13.0	1.0	4.0	0.0
(%)														
1986–1991 Mean	22	3.1	3	3.1	3	7.4	28	3.4	1.4	6.6	6.8	6.0	4.2	4.4
(%)														

Table 2 Unit 1D commercial services used by successful black bear hunters, 1995–1997

Regulatory Year	Subunit Residents		Other AK Residents		Nonresidents		Total Use		Registered Guide
	No	Yes	No	Yes	No	Yes	No	Yes	
1995	23	0	2	1	1	3	26	4	4
1996	35	0	2	0	1	2	38	2	2
1997	30	0	2	0	6	1	38	1	1
1995–1997 Mean	29.3	0.0	2.0	0.3	2.7	2.0	34.0	2.3	2.3
1992–1994 Mean	16.3	0.3	2.0	0.0	0.3	1.7	18.7	2.0	2.0
1989–1991 Mean	22.3	0.0	2.7	0.0	0.7	2.3	25.7	2.3	2.3

Table 3 Unit 1D black bear harvest, 1995–1997

Regulatory Year		Harvest[1]	Males	Females	Unk.	Males: Mean Skull	Males: *n*	Males: Mean Age	Males: *n*	Females: Mean Skull	Females: *n*	Females: Mean Age	Females: *n*	Color: Black	Color: Blue	Color: Ci
1995	Total	34	27	6	1	17.1	26	6.8	17	15.5	6	9.3	6	24	0	10
	Fall 95	1	0	1	0		0			12.3	1			0	0	1
	Spring 96	33	27	5	1	17.1	26			16.2	5			24	0	9
1996	Total	40	37	3	0	16.8	36	7.4	36	15.6	3	7.0	3	23	0	18
	Fall 96	4	4	0	0	16.9	4			----	0			3	0	2
	Spring 97	36	33	3	0	16.7	33			15.6	3			20	0	16
1997	Total	40	28	11	1	16.4	28	6.2	24	16.3	11	6.3	8	26	0	14
	Fall 97	11	6	5	0	14.7	6			16.5	5			9	0	2
	Spring 98	29	22	6	1	17.0	22			13.3	6			17	0	12
1995–1997 Mean		38	30.7	6.7	0.7	16.8*	90	6.7*	77	15.6*	20	7.5*	17	24.3	0.0	14.0
1992–1994 Mean		24	19.7	4.7	0	17.1*	57	9.0*	12	15.7*	13	4.5*	2	12.0	0.0	12.3
1986–1991 Mean		28	19.9	8.1	0	16.9*	93	7.0*	30	15.7*	44	7.6*	14	22.4	0.0	7.2

[1]Table does not include 1 DLP bear in 1996 and 2 in 1997.

LOCATION

GAME MANAGEMENT UNIT: 2 (3600 mi^2)

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 an average of 220 during 1988–1994 to 253 bears per season during this report period. We believe this increase is due largely to increased hunting effort by locals and nonresidents, coupled with increased road access in the unit.

Although we believe the Unit 2 bear population is stable, our concerns about 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 that are included among the important food items eaten by bears. Research is needed to better identify and understand the magnitude of these dynamics.

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 (Jan–Jun) or 18.8 inches for all males taken during a 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) where ages of harvested bears were determined.

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 snow-free period of the first 10–20 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^2. 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. Most harvested bears are males; 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 females' teeth during years in which they give birth. For example, during 1994–1998 we were able to obtain partial to complete reproductive histories of 53 harvested female bears from Units 1A and 2 using this method. Age at first reproduction for 43 of these bears varied, with 9% of the females producing cubs at age 4, 37% at age 5, 35% at age 6, and 17% from 7 to 9 years of age. Generally females had young in alternate years.

Distribution and Movements

Unlike bears on the mainland in Southeast Alaska, black bears in Unit 2 occur in the absence of brown bears. The cinnamon-colored black bear, found in mainland populations, is absent from Unit 2, as is the blue or glacier colored bear that 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.

1 Sep–30 Jun	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 123 bears per season during 1980–1988, and 221 bears per season during 1989–1995, the Unit 2 black bear harvest increased to an average of 253 bears each season during this report period (Table 1). Males have accounted for about 72% of the harvest during the past 18 seasons. Bunnell and Tait (1985) developed a deterministic simulation model that 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), we estimate a maximum annual harvest of no more than 767 bears. To date the highest annual harvest from the unit has constituted only 5.4% of the population estimate (Table 1). It appears, therefore, that our current harvest is well within sustainable levels. Nonetheless, we feel it may be important to evaluate site-specific harvests to guard against local overharvest. 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 18 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, 1317, and 1530 (Table 4). WAA 1420 includes the area from Ratz Harbor to Coffman Cove on the east side of Prince of Wales, WAA 1317 includes the area south and west of Hollis and has boat and road access, 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 15 of the past 18 seasons and all 3 seasons during this report period. Our secondary objective of maintaining an average annual male skull size of 18.8 inches has been achieved during 14 of the past 18 seasons and all 3 seasons during this report period (Table 5). With the exception of the 1986–87 season, 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 (Table 5). From informal questioning of successful hunters, we have learned that many hunters pass up 1 or more bears before ultimately shooting one. We conclude that the large skulls observed in the harvest are the result of hunter selectivity for large bears.

We have observed a slight but steady decline in male ages in 6 of the past 9 seasons. The lowest average age of 6.5 years occurred during the 1997–98 season (Table 5).

Average female ages dropped from a high of 11.0 during 1981–82 to a low of 6.9 during 1986–87, but have been 8.0 years or higher in 8 of the past 10 seasons (Table 5). This increase, together with the relatively low numbers of females harvested and their large average skull sizes, indicates 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 that the nocturnal capture efforts they employed might have increased the chances of encountering older bears. Their findings suggest that 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 65% of the harvest, Alaska residents from communities outside Unit 2 accounted for 16% of the harvest, and local residents took 19% of the harvest (Table 1).

We rated year-to-year hunter success on information obtained 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 sixteen seasons for which scores were obtained (scores could not be established for the 1980–81 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 16 was 1992–93 (Table 6).

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 1984–98, 58% of the spring kill was harvested during this 3-week period.

The first 20 days of September tend to be the most productive hunting period during the fall season (Table 7). During 1984–98, 55% of the fall kill was harvested during this time.

Transport Methods. Until 1985 Unit 2 bear hunters used airplane, boat, and highway transportation relatively equally (Table 1). Since 1986 most hunters have used the Prince of Wales Island road system to access hunting areas. Highway vehicles have accounted for 56% of the transportation used by successful hunters during the past 13 seasons (Table 1), reflecting 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 sunlight 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 approximately 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 this report period has averaged 253, or about 5.4% of the population estimate. Males constituted 72% of the past 18 seasons' harvests. Based on available literature, we believe the harvest 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 18 seasons' harvests have come from WAAs 1318 and 1422, both of which are easily accessible to hunters. We will also continue to evaluate the trends in ages of harvested male bears because of slight but steady declines during at least 6 of the past 9 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; therefore, we have made population estimates 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 from clearcut logging, it is imperative that we attempt to collect quantitative information about the Unit 2 black bear population. We recommend that a black bear research project be initiated in Unit 2 as soon as practicable.

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Table 1 Unit 2 black bear harvest, hunter residency, and hunter transport, regulatory years 1980–1981 through 1997–1998

Regulatory year	Season	Harvest				Hunter residency				Transport[a]				
		Males	Females	Unk	Total	Local	State	NR	Unk	Air	Boat	Road	Other	Unk
1980–1981	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
1981–1982	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
1982–1983	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
1983–1984	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
1984–1985	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
1985–1986	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
1986–1987	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
1987–1988	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
1988–1989	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
1989–1990	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
1990–1991	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
1991–1992	Fall	34	28	5	67	22	22	21	2	3	21	32	4	7

Table 1 Continued

Regulatory year	Season	Harvest				Hunter residency				Transport[a]				
		Males	Females	Unk	Total	Local	State	NR	Unk	Air	Boat	Road	Other	Unk
	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
1992–1993	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
1993–1994	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
1994–1995	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
1995–1996	Fall	50	35	0	85	21	23	41	0	16	7	49	13	0
	Spring	139	27	0	166	39	25	102	0	3	62	86	15	0
	Total	189	62	0	251	60	48	143	0	19	69	135	28	0
1996–1997	Fall	49	39	1	89	15	13	61	0	7	10	62	9	0
	Spring	107	20	0	127	20	30	77	0	4	47	53	23	0
	Total	156	59	1	216	35	43	138	0	11	57	115	32	0
1997–1998	Fall	65	37	2	104	20	6	78	0	4	7	79	13	0
	Spring	152	35	1	188	26	31	131	0	14	74	90	10	0
	Total	217	72	3	292	46	37	209	0	18	81	169	23	0

[a] Does not include DLP, road, or illegal kills.

Table 2 Unit 2 annual black bear harvest by Wildlife Analysis Area (WAA), regulatory years 1990–1991 through 1997–1998

	1991–1992			1992–1993			1993–1994			1994–1995			1995–1996			1996–1997			1997–1998			Totals			
WAA	M	F	U	M	F	U	M	F	U[a]	M	F	U	M[a]	F	U	M	F	U	M	F	U[a]	M	F	U	Total
0901							1						2						4			7	0	0	7
0902	1	3		1	2														1			3	5	0	8
1003	1												1									2	0	0	2
1105	3	1[b]		1		2	2			1			2			4	1	1				13	2	3	18
1107	3	3	1	7	4		6	2		10	3	1	8			7	1		11	1		52	14	2	68
1108	3			3			1									2						9	0	0	9
1209																3	2					3	2	0	5
1210	4	2		2	4		6	2		8			7			6			10			43	8	0	51
1211	1	3		2			11			5	1		8			7	1		6	1		40	6	0	46
1212	1															1						2	0	0	2
1213	2			7			1	1		2			4	3		1			6			23	4	0	27
1214	1	4		14	1		11	4		6[b]	4		15	3		10	1		28	8		98	25	0	123
	4																								
1315	8	7[c]	3	8	2	2	12	2		5	1[c]		11	3		11	5		11	6		66	26	5	97
1316	1	2		4						3	1		8	2		1			2			19	5	0	24
1317	1	2		15	4	1[d]	9	4	1	12	5		18	5		9	4		13	4		88	28	2	118
	2																								
1318	1	2	1	10	6	1[d]	10	7	2	17	4		11	7		13	6		10	4		84	36	4	124
	3[b]																								
1319	5	7	5	8	1	5	10	1	1	12	2		8	7		8	6		8	7		59	31	11	101
1323	2	1	1	3	2		4	1					9						1			19	4	1	24
1332	7	1	1	5	4		7	1		3	2[b]		5	3		10	2		4	2		41	15	1	57
1420	9	5	2	15	3	2	10	8		15	5	2	9	5		14	4		18	3		90	33	6	129
1421	4	1	1	4	1	1	5	4		5	4		5			3	3		5	3		31	16	2	49
1422	1	3	7	17	5	3	19	6		29	9		21	15		20	13		24	11	1	145	62	11	218
	5																								
1525		1								1												1	1	0	2
1526	2			1			10	2		1			6			6	1		15	5		41	8	0	49
1527	1	1		6	1		7			7	1		4	1		4	1		15	6		44	11	0	55
1528	1			1			1	1		2	1		1			5	1		1			12	3	0	15
1529	7	1	4	10		3	6	4		11	3	1	7	2		5	4		16	7		62	21	8	91
1530	1	7		12	4	1	12		1	18	7		15	4		4	3		4	4	1	81	29	3	113
	6																								
1531				1			5	1		6	1		4	1		2			4			22	3	0	25

[a] One bear of unknown sex killed in undisclosed WAA.
[b] Includes DLP kills.
[c] Includes road kills.
[d] Includes illegal kills.

Table 3 Unit 2 annual black bear harvest from the most heavily harvested Wildlife Analysis Areas, regulatory years 1980–1981 through 1997–1998

Regulatory year	Wildlife Analysis Areas					
	1318	1422	1214	1317	1527	1315
1980–1981	5	13	9	12	7	8
1981–1982	13	13	1	8	9	7
1982–1983	8	19	4	4	14	7
1983–1984	13	9	10	6	15	6
1984–1985	9	8	16	7	15	5
1985–1986	22	32	14	11	21	18
1986–1987	31	18	6	21	16	8
1987–1988	34	12	15	22	25	9
1988–1989	43	14	26	13	21	12
1989–1990	37	22	23	7	5	19
1990–1991	12	17	10	13	10	12
1991–1992	16	25	18	14	2	18
1992–1993	17	25	15	20	7	12
1993–1994	19	25	15	14	7	14
1994–1995	21	38	10	17	8	6
1995–1996	18	36	18	23	5	14
1996–1997	19	33	11	13	5	16
1997–1998	14	35	36	17	21	17
Total	351	394	257	242	213	208

Table 4 Unit 2 annual black bear harvest from the most heavily harvested Wildlife Analysis Areas, regulatory years 1990–1991 through 1997–1998

Regulatory year	Wildlife Analysis Areas					
	1422	1420	1530	1318	1317	1319
1990–1991	17	17	13	12	13	14
1991–1992	25	16	23	16	14	17
1992–1993	25	20	17	17	20	14
1993–1994	25	18	13	19	14	12
1994–1995	38	22	25	21	17	14
1995–1996	36	14	19	18	23	15
1996–1997	33	18	7	19	13	14
1997–1998	35	21	9	14	17	15
Total	234	146	126	136	131	115

Table 5 Hunter effort, mean skull size, and mean age of black bears harvested in Unit 2, regulatory years 1980–1981 through 1997–1998

Regulatory year	Season	Hunter effort: Total days	Hunter effort: Hunters	Hunter effort: Avg days per hunter	Mean skull size[a] (in): Male	*n*[c]	Mean skull size[a] (in): Female	*n*	Average age (yr)[b]: Male	*n*	Average age (yr)[b]: Female	*n*
1980–1981	Fall	92	3	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)				
1981–1982	Fall	70	24	2.9	18.1	(15)	15.4	(3)				
	Spring	235	80	2.9	19.2	(58)	17.3	(8)				
	Total	305	104	2.9	19.0	(73)	16.8	(11)	8.0	(61)	11.0	(8)
1982–1983	Fall	76	36	2.1	18.2	(16)	17.4	(13)				
	Spring	224	64	3.5	19.7	(44)	16.8	(10)				
	Total	300	100	3.0	19.3	(60)	17.1	(23)	7.0	(56)	9.0	(19)
1983–1984	Fall	49	24	2.0	18.0	(15)	16.8	(7)				
	Spring	237	96	2.5	19.3	(72)	17.0	(14)				
	Total	286	120	2.4	19.1	(87)	16.9	(21)	7.4	(89)	9.6	(20)
1984–1985	Fall	76	32	2.4	18.5	(15)	16.4	(9)				
	Spring	190	58	3.3	19.7	(42)	16.6	(9)				
	Total	266	90	2.9	19.3	(57)	16.5	(18)	7.5	(55)	8.7	(19)
1985–1986	Fall	119	48	2.5	18.4	(22)	16.5	(17)				
	Spring	398	121	3.3	19.1	(74)	16.8	(18)				
	Total	517	169	3.0	18.9	(96)	16.7	(35)	7.2	(95)	8.5	(32)
1986–1987	Fall	131	40	3.3	17.7	(17)	16.4	(6)				
	Spring	344	114	3.0	19.6	(97)	16.4	(7)				
	Total	475	154	3.1	19.3	(114)	16.4	(13)	8.1	(104)	6.9	(20)
1987–1988	Fall	105	40	2.6	17.2	(23)	16.7	(9)				
	Spring	293	113	2.6	19.5	(94)	17.2	(12)				
	Total	398	153	2.6	19.0	(117)	17.0	(21)	8.0	(99)	7.7	(20)
1988–1989	Fall	328	92	3.6	18.0	(57)	16.9	(26)				
	Spring	414	114	3.6	19.4	(70)	16.7	(18)				
	Total	742	206	3.6	18.8	(127)	16.8	(44)	8.0	(58)	8.0	(10)

Regulatory year	Season	Total days	Hunter effort: Hunters	Hunter effort: Avg days per hunter	Mean skull size[a] (in): Male	*n*[c]	Mean skull size[a] (in): Female	*n*	Average age (yr)[b]: Male	*n*	Average age (yr)[b]: Female	*n*
1989–1990	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	3.1	19.3	(111)	16.9	(27)				
1990–1991	Fall	227	85	2.7	17.8	(38)	16.6	(19)				
	Spring	448	124	3.6	19.1	(93)	16.5	(16)				
	Total	675	209	3.2	18.7	(131)	16.5	(35)	7.7	(128)	8.1	(33)
1991–1992	Fall	184	65	2.8	18.1	(31)	16.8	(25)				
	Spring	653	152	4.3	19.4	(103)	17.0	(28)				
	Total	837	217	3.8	19.1	(134)	16.9	(53)	7.6	(132)	8.2	(56)
1992–1993	Fall	231	80	2.9	17.3	(37)	16.6	(25)				
	Spring	774	141	5.5	19.0	(115)	16.7	(18)				
	Total	1005	221	4.5	18.6	(152)	16.6	(43)	7.2	(152)	8.4	(42)
1993–1994	Fall	291	87	3.3	17.6	(52)	16.8	(33)				
	Spring	480	135	3.6	19.3	(112)	16.7	(21)				
	Total	771	222	3.5	18.8	(164)	16.8	(54)	7.0	(162)	7.0	(50)
1994–1995	Fall	223	86	2.6	18.3	(60)	16.9	(24)				
	Spring	601	149	4.0	19.2	(112)	17.3	(27)				
	Total	824	235	3.5	18.9	(172)	17.1	(51)	7.1	(177)	8.4	(55)
1995–1996	Fall	233	85	2.7	18.3	(50)	16.8	(35)				
	Spring	588	166	3.5	19.2	(135)	17.0	(26)				
	Total	821	251	3.3	18.9	(185)	16.9	(61)	7.1	(185)	8.0	(62)
1996–1997	Fall	355	88	4.0	17.2	(48)	16.8	(38)				
	Spring	543	127	4.3	19.5	(102)	16.6	(19)				
	Total	898	215	4.2	18.8	(150)	16.7	(57)	7.0	(154)	8.7	(57)
1997–1998	Fall	345	103	3.3	17.6	(63)	16.5	(36)				
	Spring	707	188	3.8	19.2	(149)	17.0	(33)				
	Total	1052	291	3.6	18.8	(212)	16.7	(69)	6.5	(215)	8.4	(71)

[a] Skull sizes equal length plus zygomatic width.
[b] Ages not available for regulatory years 1980–1981 and 1989–1990.
[c] Numbers in parentheses represent sample sizes.

Table 6 Hunter effort (hunter-days/bear), mean bear skull sizes, mean bear ages, and rankings of harvest, hunter success, skull sizes, and ages relative to other years in Unit 2, 1980–1998

Regulatory year	Hunter Days/Bear[a]	Mean skull size (in)[b]	Mean age (yr)[c]	Overall ranking score[d]
1980–1981	3.3 (7)	18.3 (6)		
1981–1982	3.0 (4)	18.6 (3)	8.3 (1)	8
1982–1983	3.1 (5)	18.7 (2)	7.5 (5)	12
1983–1984	2.4 (1)	18.7 (2)	7.8 (4)	7
1984–1985	2.9 (3)	18.7 (2)	7.8 (4)	9
1985–1986	3.0 (4)	18.3 (6)	7.5 (5)	15
1986–1987	3.1 (5)	19.0 (1)	7.9 (3)	9
1987–1988	2.6 (2)	18.7 (2)	7.9 (3)	7
1988–1989	3.6 (9)	18.3 (6)	8.0 (2)	17
1989–1990	3.1 (5)	18.6 (3)		
1990–1991	3.2 (6)	18.2 (7)	7.8 (4)	17
1991–1992	3.8 (10)	18.5 (4)	7.8 (4)	18
1992–1993	4.5 (12)	18.1 (8)	7.4 (6)	26
1993–1994	3.5 (8)	18.3 (6)	7.0 (9)	23
1994–1995	3.5 (8)	18.5 (4)	7.1 (8)	20
1995–1996	3.3 (7)	18.4 (5)	7.3 (7)	19
1996–1997	4.2 (11)	18.2 (7)	7.4 (6)	24
1997–1998	3.6 (9)	18.3 (6)	7.0 (9)	24

[a] Numbers in parentheses represent ranking scores for hunter effort for each year relative all others: 1 = lowest.
[b] Numbers in parentheses represent ranking scores for mean skull size each year relative to all others: 1 = highest.
[c] Numbers in parentheses represent ranking scores for mean age each year relative to all others: 1 = highest.
[d] Overall ranking score is equal to the sum of the ranking scores for hunter effort, mean skull size, and mean age. Smaller scores represent better seasons.

Table 7 Black bear harvest chronology[a], Unit 2, regulatory years 1984–1985 through 1997–1998

Date	Number of animals/regulatory year														
	1984–1985	1985–1986	1986–1987	1987–1988	1988–1989	1989–1990	1990–1991	1991–1992	1992–1993	1993–1994	1994–1995	1995–1996	1996–1997	1997–1998	Total
Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feb	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Mar	0	1	1	0	1	0	1	0	0	0	0	0	0	0	4
1–10 Apr	0	2	4	0	1	0	1	0	1	0	0	0	0	0	9
11—20Apr	1	5	7	10	1	5	5	2	3	0	0	3	2	4	48
21–30 Apr	7	14	10	11	7	8	9	26	15	15	12	13	12	26	185
1–10 May	18	27	25	31	21	33	22	49	33	33	55	62	55	81	545
11–20 May	13	38	23	28	38	67	30	40	58	43	37	41	31	42	529
21–31 May	9	26	22	20	33	15	35	18	25	18	27	34	14	26	322
1–10 Jun	5	6	12	5	3	12	11	10	7	14	14	7	6	2	114
11–20 Jun	3	2	5	7	5	1	7	4	1	6	2	4	5	6	58
21–30 Jun	2	0	4	2	5	6	4	5	0	6	2	2	2	0	40
1–10 Sep	16	13	9	16	48	28	46	17	32	27	35	40	45	43	415
11–20 Sep	3	3	9	4	16	11	14	14	20	23	16	12	18	24	187
21–30 Sep	7	7	3	5	8	16	4	7	4	14	9	15	12	15	126
1–10 Oct	2	7	6	3	14	8	9	11	12	7	11	8	4	15	117
11–20 Oct	2	10	2	4	4	1	7	3	8	3	3	1	4	6	58
21–31 Oct	1	3	5	7	3	5	1	3	3	4	6	3	1	0	45
1–10 Nov	1	5	4	1	1	0	3	5	1	6	6	2	2	0	37
11–20 Nov	0	2	0	0	0	1	2	3	0	2	0	2	1	0	13
21–30 Nov	0	1	1	0	0	1	2	0	1	1	0	1	1	0	9
Dec	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2

[a] Does not include bears killed during closed season.

LOCATION

GAME MANAGEMENT UNIT: 3 (3000 mi^2)

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 annual harvest has increased substantially since 1977 when the kill was 26. From July 1997 through June 1998, the kill was 244 for Unit 3, and Kuiu Island accounted for 151 of the Unit 3 harvest.

The mean age of harvested male and female black bears ranges from 7 to 10 years (Table 3). The 1997 mean male age of 6.8 years was lower than in previous years. Reconstruction of reproductive history through tooth section analysis indicates that Unit 3 female black bears begin producing cubs between their fourth and eighth year (Matson's Laboratory (Milltown, Montana USA). Producing females can have cubs every other year. The most prolific female evaluated had 9 pregnancies before being killed. The oldest producing female was 29 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 are 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, recruitment, and sex and age ratios are not available for black bears in Unit 3. Information obtained through the sealing process cannot be used to measure population trends, but the high harvest levels, especially on Kuiu Island, are a concern. It is important that population estimates, recruitment rates, and sex ratios and age ratios be determined.

MORTALITY

Harvest

Season and Bag Limit

September 1–June 30	Resident hunters: 2 bears, not more than one 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 nonresident bag limit to 1 black bear in 1990. No emergency orders were issued during this report period.

Hunter Harvest. Hunter harvest ranged from 233 in 1996 to 244 in 1997 (Table 1). Percent males in the harvest remained high, comprising 79% of the total in 1996 and 81% in 1997. The male to female ratio did not fall below the management objective in any year. The average male skull size ranged from 18.2 inches to 18.3 inches (Table 2). Average skull size was below the management objective each year during the reporting period.

The average successful Unit 3 black bear hunter spent about 3 days hunting in 1995–1997 (Table 4).

During the report period Kuiu Island, with 25% of the Unit 3 land area, produced 53–62% of the black bear harvest in the unit, Kupreanof Island produced 30% to 39%, and Mitkof Island produced 8–20% (Table 5). In 1997, 1 male black bear /6 mi^2 and 1 female/26 mi^2 were killed on Kuiu Island. Kuiu Island black bear skull measurements are usually larger than those of bears on other Unit 3 islands (Table 6) or elsewhere in the state, except for those of Unit 2 black bears. Kuiu Island has more salmon-producing streams than 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^2. Although surrounded by islands with high densities of black bears, Zarembo has few resident black bears. Old reports indicate no resident black bears on Zarembo Island. Deer, wolves, and elk are present; the reason for the lack of black bears is unknown.

Three cinnamon-colored black bears were harvested on Mitkof Island and 2 were harvested on Wrangell Island during the reporting period; all remaining sealed bears were black. The first record of cinnamon bears harvested in Unit 3 was in the spring of 1995 when 3 were taken on Mitkof Island.

Hunter Residency and Success. Nonresident hunters accounted for 64–70% of the 3-year mean harvest. Although the ratio varies yearly, local and nonlocal residents take approximately equal numbers of bears (Table 7).

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 8).

Transport Methods. Hunters primarily used boat transportation to access black bear hunting areas, with some hunters using aircraft or highway vehicles. Highway vehicles are primarily used on Mitkof Island, but some are also used on Wrangell, Kupreanof, and Kuiu islands (Table 9).

Other Mortality

Known nonhunting mortality remains relatively low (Table 1). Most known nonhunting kills are the result of defense of life or property. Mortality from wounding loss is unknown, but anecdotal reports from guides and outfitters suggest such mortality is significant.

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 number of black bears harvested in Unit 3 continues to increase, especially on Kuiu Island. The percentage of males in the harvest remains high, mean male skull size is slightly below management objectives, and the mean male age has decreased. Harvest data do not allow us to measure trends in the black bear populations, but the increasing high harvest is disconcerting. Black bear hunting, particularly on Kuiu Island, should be monitored closely to avoid overharvesting the population. A research project should be established to determine bear density, sex and age ratio, recruitment, and adult mortality including wounding loss.

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Table 1 Unit 3 black bear harvest, 1990–1997

	Hunter kill						Non-hunting kill[a]			Total estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
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
Fall 95	33	13	28	0	46	NA	0	1	0	33	70	14	30	0	47
Spring 96	153	34	18	0	187	0	2	0	0	155	82	34	38	0	189
Total	186	47	20	0	233	0	2	1	0	188	80	48	20	0	236
Fall 96	33	24	42	0	57	NA	0	0	0	33	58	24	42	0	57
Spring 97	150	26	15	0	176	0	0	0	0	150	85	26	15	0	176
Total	183	50	21	0	233	0	0	0	0	183	79	50	21	0	233
Fall 97	41	21	34	0	62	NA	0	0	0	41	66	21	34	0	62
Spring 98	157	25	14	0	182	0	0	0	0	157	86	25	14	0	182
Total	187	46	19	0	244	0	0	0	0	198	81	46	19	0	244

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

Table 2 Unit 3 harvested black bear mean skull size[a], 1990–1997

Regulatory Year	Males	*n*	Females	*n*
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
1995	18.3	182	16.5	45
1996	18.2	179	16.5	48
1997	18.3	192	16.5	45

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

Table 3 Unit 3 harvested black bear mean age, 1991–1997

Regulatory Year	Males	*n*	Females	*n*
1991	7.3	108	7.8	33
1992	8.4	117	9.4	35
1993	7.6	173	8.5	51
1994	8.0	169	8.5	43
1995	7.2	179	9.7	46
1996	7.2	180	8.2	49
1997	6.8	181	8.5	42

Table 4 Unit 3 harvested black bear mean days hunted per successful hunter, 1991–1997

Regulatory Year	Total Days	Total Hunters	Average days Hunted
1991	686	160	4.3
1992	525	164	3.2
1993	863	231	3.7
1994	699	215	3.3
1995	682	231	3.0
1996	663	233	2.8
1997	720	242	3.0

Totals do not include DLP.

Table 5 Unit 3 black bear hunter harvest by island and density, 1990–1997

Regulatory Year	**Kupreanof** 1090 mi^2 Kill	Percent of Unit 3	Average mi^2/bear kill Male	Female	**Kuiu** 746 mi^2 Kill	Percent of Unit 3	Average mi^2/bear kill Male	Female	**Mitkof** 211 mi^2 Kill	Percent of Unit 3	Average mi^2/bear kill Male	Female
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
1995	91	39	16	50	124	53	7	36	9	4	35	70
1996	71	30	19	78	129	55	8	25	20	9	14	42
1997	74	30	18	73	151	62	6	26	8	3	30	211

Table 6 Unit 3 black bear mean male skull size[a] and percent of harvest by major island and season, 1992–1997

		1992				1993				1994			
Island	Season	No. Males	(%)	Average	n	No. Males	(%)	Average	*n*	No. 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

		1995				1996				1997			
Island	Season	No. Males	(%)	Average	n	No. Males	(%)	Average	*n*	No. Males	(%)	Average	*n*
Kupreanof	Fall	13	76	17.6	12	12	60	15.5	12	4	40	17.7	4
	Spring	56	76	18.3	54	45	88	18.4	45	55	85	18.6	54
	Total	69	76	18.1	67	57	80	17.8	57	59	79	18.5	58
Kuiu	Fall	16	70	19.0	16	15	56	17.7	15	32	69	17.9	31
	Spring	87	86	18.3	96	84	82	18.6	82	90	85	18.3	88
	Total	103	83	18.4	112	99	77	18.5	97	122	80	18.2	119

Table 6 Continued

Mitkof	Fall	1	33	18.3	2	4	57	16.7	4	3	100	17.7	2
	Spring	5	83	18.6	5	11	85	18.5	9	4	80	17.4	3
	Total	6	67	18.5	7	15	75	17.9	13	7	87	17.5	5

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

Table 7 Unit 3 black bear successful hunter residency, 1990–1997

Regulatory Year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
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
1995	34	14	51	22	151	64	236
1996	41	18	38	16	154	66	233
1997	31	13	41	17	172	70	244

[a]Local residents are those that reside in Petersburg, Wrangell, or Kake.

Table 8 Unit 3 black bear harvest chronology by percent, 1990–1997

Regulatory Year	Month									
	September	October	November	December	March	April	May	June	July	*n*
1990	11	4	0	0	0	26	48	11	0	157
1991	23	4	0	1	0	14	48	9	0	159
1992	25	4	0	1	0	11	53	5	1	171
1993	15	3	0	0	0	18	47	17	0	235
1994	10	4	0	1	0	11	57	20	1	219
1995	17	2	0	0	0	10	57	13	1	236
1996	22	1	1	0	0	9	57	10	0	233
1997	22	3	1	0	1	14	49	10	0	244

Table 9 Unit 3 black bear harvest, in percent by transport method, 1990–1997

Regulatory Year	Airplane	Boat	3-4 Wheeler	Snow machine	Off-road vehicle	Highway vehicle	Foot	Unknown	*n*
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
1995	5	78	0	0	<1	15	<1	1	236
1996	7	81	0	0	0	11	1	0	233
1997	7	79	1	0	0	11	2	0	244

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

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

BACKGROUND

Within Game Management Unit 5, black bears are almost exclusively in Subunit 5A. Since we began using sealing records, Subunit 5B, dominated by the Malaspina Glacier, accounts for only a few black bears; all have been reported from the head of Disenchantment Bay at the junction of the two subunits. "Glacier" (gray pelage-color variant) bears more frequently inhabit Unit 5 than other management units and are regularly harvested in small numbers.

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 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 plus width), date and location of kill, transportation method, and the type of commercial services used. A premolar was collected from most bears for age determination. Anecdotal information about conditions in the field was also gathered during sealing.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population information is not available for black bears in Unit 5, and because only data from successful hunters are available (Tables 1 and 2), effort information is incomplete. Harvest has remained similar to the level in the previous report period (Table 3). Mean total skull size for males was well below the previous 3-year mean and failed to meet the management goal of 17.0 inches in the 2 most recent years. A 3:1 male to female harvest ratio continues to be maintained. Although not all of the harvested bears have been aged, the preliminary mean age has declined over the period. The majority of successful hunters, especially nonresidents, reported using commercial services. Registered guides were used most often, and transport to the field and nonguided services were used less often.

MORTALITY

Harvest

Season and Bag Limits:

September 1–June 30	Resident hunters: 2 bears, not more than one of which may be a blue or glacier bear. Nonresident hunters: 1 bear.

Board of Game Actions and Emergency Orders. None

Hunter Harvest. Black bear harvests ranged from 12 to 15 from 1995 to 1997, averaging 13.7 per regulatory year (Table 3). More males were harvested than females, exceeding a 3:1 male to female ratio in all years during the reporting period. The percentage of glacier bears in the harvest was about 10%, with 4 taken during this reporting period. No cinnamon bears were harvested.

Hunter Residency and Success. Nonresidents continue to take most of the Unit 5 harvested black bears. During the report period, the percentage of successful black bear hunters that were nonresidents was 71%, compared to 67% from 1992–1994 (Table 1). Alaskans residing outside of Unit 5 harvested 12% of the bears, and Unit 5 residents harvested 17% of the bears taken.

Harvest Chronology. Historically most black bears have been harvested in Unit 5 during the spring. This trend continued throughout this reporting period, with only 2 of the 41 harvested bears taken during a fall season.

Transport Methods. Aircraft and boats continue to be the 2 predominant means of transport for Unit 5 black bear hunters (Table 1); these methods are used as the primary means of transportation in 49% and 46% of reported hunts, respectively. Commercial transport to the field was used by 17% 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 all years of this reporting period. Our objective for male skull size was not met in 2 of the 3 years of the period, and the mean age of harvested bears declined somewhat. Although the number of black bear harvested from this unit is not great, we need to closely monitor this black bear population to determine trends. We continue to process the backlog of unaged teeth from bears taken in this area, and we intend to process all collected teeth in the future.

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Table 1 Unit 5 residency, mean days hunted, and transportation used by successful black bear hunters, 1992–1997

Regulatory Year	Unit Resident		Other AK Resident		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
1995	1	1.0	2	5.5	9	3.4	12	3.6	9	3	0	0	0	0
1996	1	1.0	3	7.0	11	5.4	15	5.4	9	6	0	0	0	0
1997	5	2.6	0	0.0	9	4.8	14	4.0	2	10	0	1	1	0
1995–1997 Mean	2.3	1.5	1.7	4.2	9.7	4.5	13.7	4.3	6.7	6.3	0	0.3	0.3	0
1992–1994 Mean	2.0	1.3	3.0	6.6	9.0	3.5	14.0	3.7	6.0	6.7	0	0	0	0

Table 2 Unit 5 commercial services used by successful black bear hunters, 1992–1997

Regulatory Year	Unit Residents		Other AK Residents		Non-Residents		Total Use		Transport	Registered Guide
	No	Yes	No	Yes	No	Yes	No	Yes		
1992	2	0	2	2	1	13	5	15	7	8
1993	0	0	0	1	1	8	1	9	0	7
1994	4	0	4	0	2	5	7	5	0	0
1995	1	0	2	0	0	9	3	9	0	9
1996	1	0	2	1	0	11	3	9	0	9
1997	5	0	0	0	2	7	7	7	7	7
1995–1997 Mean	2.3	0	1.3	0.3	0.7	9.0	4.3	8.3	2.3	8.3
1992–1994 Mean	2.0	0	2.0	1.0	1.3	8.7	4.3	9.7	2.3	5.7

Table 3 Unit 5 black bear harvest, 1992–1997

Regulatory Year		Harvest	Males	Females	Unk.	Male Mean Skull	*n*	Male Mean Age	(*n*)	Female Mean Skull	*n*	Female Mean Age	*n*	Color Variant Black	Blue	Cin
1992	Total	18	10	8	0	17.1	9	6.3	8	16.1	8	6.7	3	17	1	0
	Fall	1	0	1	0	--	0			15.8	1					
	Spring	17	10	7	0	17.1	9			16.2	7					
1993	Total	10	8	2	0	17.5	8	5.0	1	15.2	2	--	0	8	2	0
	Fall	0	0	0	0	--	0			--	0					
	Spring	10	8	2	0	17.5	8			15.2	2					
1994	Total	14	14	0	0	18.1	13	10.0	9	--	0	--	0	12	2	0
	Fall	0	0	0	0	--	0									
	Spring	14	14	0	0	18.1	13									
1995	Total	12	12	0	0	17.0	11	10.4	9	--	0	--	0	11	1	0
	Fall	0	0	0	0	--	0									
	Spring	12	12	0	0	17.0	11									
1996	Total	15	14	1	0	16.8	13	6.3	8	14.3	1	3.0	1	14	1	0
	Fall	0	0	0	0	--	0			--	0					
	Spring	15	14	1	0	16.8	13			14.3	1					
1997	Total	14	11	3	0	15.9	10	5.3	6	15.5	3	3.0	3	12	2	0
	Fall	2	1	1	0	13.6	1			16.9	1					
	Spring	12	10	2	0	16.1	9			14.8	2					
1995–1997 Mean		13.7	12.3	1.3	0.0	16.6*		7.3*		14.9*		3.0*		12.3	1.3	0
1992–1994 Mean		14.0	10.7	3.3	0.0	17.6*		7.1*		15.7*		6.7*		12.3	1.7	0

* Weighted mean

LOCATION

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

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

BACKGROUND

Black bears are common throughout most of Unit 6, with the exception of Montague, Hinchinbrook, 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^2 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^2 (Grauvogal 1967, McIlroy 1970, Modafferi 1982).

Hunting pressure may have occasionally affected local populations. McIlroy (1970) reported that 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. The road to Whittier scheduled to open during the next reporting period will probably increase hunting pressure on black bears in western PWS.

Factors other than hunting that may affect black bear populations in Unit 6 are food abundance and adverse weather. Competition and predation by brown bears may also locally 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 with a minimum average 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. 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 in Units 6C and 6D. Highest density probably occurred in western and northern PWS. Guides, air charters, and local hunters indicate that black bear density in Unit 6A (and possibly Unit 6B) has been increasing in recent years and is at a high level. This may have been in response to a series of mild winters since 1993.

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 195, 229, and 243 bears in Unit 6 during the report period, respectively (Table 1). Most harvests (78 to 82%) were males, with most (70 to 78%) bears taken in Unit 6D. Hunter harvest during the past 5 regulatory years averaged 197, ranging from a high of 243 in 1997/98 to a low of 155 in 1993/94. The harvest 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 16.8–17.4 inches (Table 2). The largest skulls (17.8–18.4 inches) came from Unit 6A, and the smallest (16.5–16.8 inches) were reported in Unit 6C. Over the past 5 years, no trends were obvious.

Hunter Residency. Residents of Alaska who did not live in Unit 6 harvested most bears (53–60%) during this reporting period (Table 3). Nonresident hunters had the second highest total take (22–31%), followed by local residents of Unit 6 (14–18%). This pattern varied in Unit 6A, where most bears (59–70%) were harvested by nonresidents. It was also different in Unit 6C, where most bears (48–70%) 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 (65 to 70%) were taken in May during this reporting period (Table 4) and during the past 5 years.

Transport Methods. Most successful hunters used boats (58–65%) and airplanes (14–22%) for transportation during the past 3 years. Airplanes provided most (67–100%) of the transportation in Units 6A and 6B. Highway vehicles (30–94%), boats and 4-wheelers were important in Unit 6C. ATV's have become increasingly popular in Unit 6C during the last 2 years.

Other Mortality

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

CONCLUSIONS AND RECOMMENDATIONS

We achieved all management objectives. No season or bag limit changes are recommended.

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 effort that would improve future management decisions, particularly because we can anticipate increased hunter effort in western Unit 6D when the road to Whittier opens. We should also consider estimating 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.

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Table 1 Unit 6 black bear harvest, 1993–1997

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/1993																	
Fall 93	3	0	(0)	0	3	0	0	0	0	0	1	3	(10)	0	(0)	1	4
Spring 94	10	0	(0)	0	10	1	0	0	0	2	1	10	(10)	0	(0)	3	13
Total	13	0	(0)	0	13	1	0	0	0	2	2	13	(10)	0	(0)	4	17
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	(13)	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
6A/1995																	
Fall 95	5	1	(17)	1	7	0	1	0	0	0	2	6	(86)	1	(14)	3	10
Spring 96	24	1	(4)	0	25	0	0	0	0	1	3	24	(96)	1	(4)	4	29
Total	29	2	(6)	1	32	0	1	0	0	1	5	30	(94)	2	(6)	7	39
6A/1996																	
Fall 96	2	1	(33)	0	3	0	0	0	0	1	1	2	(67)	1	(33)	2	5
Spring 97	18	2	(10)	0	20	0	0	0	0	2	2	18	(90)	2	(10)	4	24
Total	20	3	(13)	0	23	0	0	0	0	3	3	20	(87)	3	(13)	6	29

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
6A/1997																	
Fall 97	4	0	(0)	0	4	0	0	0	0	1	1	4	(10)	0	(0)	2	6
Spring 98	17	2	(11)	2	21		0	0	0	2	2	17	(89)	2	(11)	6	25
Total	21	2	(9)	2	25	0	0	0	0	3	3	21	(91)	2	(9)	8	31
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
6B/1995																	
Fall 95	2	0	(0)	0	2	0	0	0	0	0	0	2	(10)	0	(0)	0	2
Spring 96	6	1	(14)	0	7	0	0	0	0	1	1	6	(86)	1	(14)	2	9
Total	8	1	(11)	0	9	0	0	0	0	1	1	8	(89)	1	(11)	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/1996																	
Fall 96	2	0	(0)	0	2	0	0	0	0	0	1	2	(10)	0	(0)	1	3
Spring 97	4	0	(0)	1	5	0	0	0	0	1	1	4	(10)	0	(0)	3	7
Total	6	0	(0)	1	7	0	0	0	0	1	2	6	(10)	0	(0)	4	10
6B/1997																	
Fall 97	0	0	(0)	0	0	0	0	0	0	0	1	0	(0)	0	(0)	1	1
Spring 98	6	2	(25)	0	8	0	0	0	0	1	1	6	(75)	2	(25)	2	10
Total	6	2	(25)	0	8	0	0	0	0	1	2	6	(75)	2	(25)	3	11
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	(10)	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

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/1995																	
Fall 95	0	0	(0)	0	0	0	0	0	0	0	1	0	(0)	0	(0)	1	1
Spring 96	15	3	(17)	0	18	10	0	0	0	3	1	15	(83)	3	(17)	4	22
Total	15	3	(17)	0	18	10	0	0	0	3	2	15	(83)	3	(17)	5	23
6C/1996																	
Fall 96	6	3	(33)	0	9	0	1	2	0	1	1	7	(58)	5	(42)	2	14
Spring 97	8	3	(27)	0	11	3	1	0	0	2	1	9	(75)	3	(25)	3	15
Total	14	6	(30)	0	20	3	2	2	0	3	2	16	(67)	8	(33)	5	29
6C/1997																	
Fall 97	4	5	(56)	0	9	0	1	0	0	1	1	5	(50)	5	(50)	2	12
Spring 98	14	4	(22)	0	18	4	0	0	0	2	2	14	(78)	4	(22)	4	22
Total	18	9	(33)	0	27	4	1	0	0	3	3	19	(68)	9	(32)	6	34
6D/1993																	
Fall 93	4	4	(50)	0	8	0	1	1	0	1	1	5	(50)	5	(50)	2	12
Spring 94	92	2	(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

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/1994																	
Fall 94	8	6	(43)	0	14	0	0	0	0	1	1	8	(57)	6	(43)	2	16
Spring 95	120	2	(14)	3	143	0	0	0	0	12	6	12	(86)	20	(14)	21	161
Total	128	2	(17)	3	157	0	0	0	0	13	7	12	(83)	26	(17)	23	177
6D/1995																	
Fall 95	8	1	(56)	0	18	0	0	0	1	1	2	8	(44)	10	(56)	4	22
Spring 96	90	2	(23)	1	118	4	2	0	0	8	6	92	(77)	27	(23)	15	134
Total	98	3	(27)	1	136	4	2	0	1	9	8	10	(73)	37	(27)	19	156
6D/1996																	
Fall 96	24	1	(31)	1	36	0	2	0	0	2	2	26	(70)	11	(30)	5	42
Spring 97	118	2	(16)	2	143	5	0	0	0	10	10	11	(84)	23	(16)	22	163
Total	142	3	(19)	3	179	5	2	0	0	12	12	14	(81)	34	(19)	27	205
6D/1997																	
Fall 97	9	5	(36)	0	14	0	2	2	0	1	2	11	(61)	7	(39)	3	21
Spring 98	142	2	(14)	1	167	12	0	0	0	8	6	14	(86)	24	(14)	15	181
Total	151	2	(16)	1	181	12	2	2	0	9	8	15 3	(83)	31	(17)	18	202

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																	
1993																	
Fall 93	8	5	(38)	0	13	0	2	2	0	1	2	10	(59)	7	(41)	3	20
Spring 94	116	2	(18)	1	142	9	0	0	0	16	8	11	(82)	25	(18)	25	166
Total	124	3	(19)	1	155	9	2	2	0	17	10	12	(80)	32	(20)	28	186
1994																	
Fall 94	9	8	(47)	0	17	0	0	0	0	1	2	9	(53)	8	(47)	3	20
Spring 95	153	2	(14)	3	181	6	0	0	0	20	9	15	(86)	25	(14)	32	210
Total	162	3	(17)	3	198	6	0	0	0	21	11	16	(83)	33	(17)	35	230
1995																	
Fall 95	15	1	(42)	1	27	0	1	0	1	1	5	16	(59)	11	(41)	8	35
Spring 96	135	3	(19)	1	168	14	2	0	0	13	11	13	(81)	32	(19)	25	194
Total	150	4	(22)	2	195	14	3	0	1	14	16	15	(78)	43	(22)	33	229
1996																	
Fall 96	34	1	(31)	1	50	0	3	2	0	4	5	37	(69)	17	(31)	10	64
Spring 97	148	2	(16)	3	179	8	1	0	0	15	14	14	(84)	28	(16)	32	209
Total	182	4	(19)	4	229	8	4	2	0	19	19	18 6	(81)	45	(19)	42	273

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
1997																	
Fall 97	17	1	(37)	0	27	0	3	2	0	3	5	20	(63)	12	(38)	8	40
Spring 98	180	3	(15)	3	216	16	0	0	0	13	11	18	(85)	33	(15)	27	240
Total	197	4	(18)	3	243	16	3	2	0	16	16	20	(82)	45	(18)	35	280

Table 2 Unit 6 black bear harvest mean skull size (length + width), 1993–1997

Subunit	Regulatory year	Males		Females	
		Mean (in)	*n*	Mean (in)	*n*
6A	1993/94	18.2	13	-	0
	1994/95	17.0	12	15.8	4
	1995/96	18.4	26	15.0	2
	1996/97	17.8	20	16.7	3
	1997/98	18.0	21	15.5	2
6B	1993/94	18.7	3	15.0	1
	1994/95	18.2	5	16.0	2
	1995/96	17.4	5	17.0	1
	1996/97	16.4	4	-	0
	1997/98	18.4	6	16.5	2
6C	1993/94	17.6	11	15.7	3
	1994/95	16.8	14	15.0	1
	1995/96	15.9	15	16.0	2
	1996/97	16.8	11	15.4	5
	1997/98	16.7	18	15.0	8

Table 2 Continued

Subunit	Regulatory year	Males		Females	
		Mean (in)	*n*	Mean (in)	*n*
6D	1993/94	16.9	95	15.7	24
	1994/95	17.0	123	15.5	26
	1995/96	17.4	85	15.9	34
	1996/97	16.8	111	15.6	22
	1997/98	17.0	139	15.3	24
UNIT 6	1993/94	17.2	122	15.6	28
TOTAL	1994/95	17.0	154	15.5	33
	1995/96	17.4	131	15.9	39
	1996/97	16.8	168	15.7	40
	1997/98	17.1	194	15.3	42

Table 3 Unit 6 black bear successful hunter residency, 1993–1997

Subunit	Regulatory year	Local resident resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total Successful hunters[a]
6A	1993/94	1	(8)	6	(46)	6	(46)	13
	1994/95	0	(0)	3	(17)	15	(83)	18
	1995/96	4	(13)	8	(25)	19	(59)	32
	1996/97	2	(9)	5	(22)	16	(70)	23
	1997/98	1	(4)	8	(32)	15	(60)	25
6B	1993/94	0	(0)	2	(50)	2	(50)	4
	1994/95	0	(0)	6	(75)	2	(25)	8
	1995/96	3	(33)	1	(11)	5	(56)	9
	1996/97	2	(29)	3	(43)	2	(29)	7
	1997/98	0	(0)	4	(50)	4	(50)	8
6C	1993/94	8	(53)	3	(20)	4	(27)	15
	1994/95	10	(67)	3	(20)	2	(13)	15
	1995/96	11	(61)	3	(17)	4	(22)	18
	1996/97	14	(70)	3	(15)	2	(10)	20
	1997/98	13	(48)	11	(41)	3	(11)	27

Table 3 Continued

Subunit	Regulatory year	Local resident resident [a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total Successful hunters [b]
6D	1993/94	7	(6)	91	(74)	24	(20)	123
	1994/95	11	(7)	103	(66)	38	(24)	157
	1995/96	17	(13)	91	(67)	24	(18)	136
	1996/97	21	(12)	126	(70)	30	(17)	179
	1997/98	21	(12)	106	(59)	54	(30)	181
UNIT 6	1993/94	16	(10)	102	(66)	36	(23)	155
TOTAL	1994/95	21	(11)	115	(58)	57	(29)	198
	1995/96	35	(18)	103	(53)	52	(27)	195
	1996/97	39	(17)	137	(60)	50	(22)	229
	1997/98	35	(14)	131	(54)	76	(31)	243

[a] Residents of Unit 6.

[b] Total includes hunters with unknown residency and subunit.

Table 4 Unit 6 black bear harvest chronology percent by harvest period, 1993 to 1997

Subunit	Regulatory year	Harvest periods [a] September 1-15	September 16-30	October 1-15	October 16-31	April 1-15	April 16-30	May 1-15	May 16-31	June 1-15	June 16-30	*n*
6A	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
	1995/96	3	6	6	6	0	9	53	16	0	0	32
	1996/97	0	9	4	0	0	35	43	4	0	4	23
	1997/98	8	4	4	0	0	16	44	20	0	4	25
6B	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
	1995/96	11	0	11	0	0	0	44	22	11	0	9
	1996/97	14	14	0	0	0	0	29	43	0	0	7
	1997/98	0	0	0	0	0	0	50	50	0	0	8
6C	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
	1995/96	0	0	0	0	0	0	11	72	17	0	18
	1996/97	15	20	10	0	0	10	10	25	0	10	20
	1997/98	15	8	8	0	0	0	27	35	8	0	26
6D	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
	1995/96	8	3	1	1	0	2	32	37	16	1	135
	1996/97	13	4	2	0	0	1	20	50	9	0	179
	1997/98	3	2	2	1	0	1	27	44	18	2	181
UNIT 6 TOTAL [b]	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
	1995/96	7	3	2	2	0	3	34	36	13	1	194
	1996/97	12	7	3	0	0	5	22	43	7	1	229
	1997/98	5	3	2	0	0	2	29	40	15	2	242

[a] Bears were not taken during November-March.
[b] Total includes bears taken in unknown subunits.

Table 5 Unit 6 black bear harvest percent by transport method, 1993 to 1997

Subunit	Regulatory year	Percent of harvest								
		Airplane	Horse	Boat	3- or 4-Wheeler	Snow-machine	ORV	Highway Vehicle	Unknown	*n*
6A	1993/94	77	0	0	0	0	0	8	15	13
	1994/95	89	0	0	0	0	0	11	0	18
	1995/96	91	0	0	0	0	0	3	6	32
	1996/97	78	0	0	13	0	0	9	0	23
	1997/98	76	0	0	8	0	0	12	4	25
6B	1993/94	50	0	50	0	0	0	0	0	4
	1994/95	100	0	0	0	0	0	0	0	8
	1995/96	67	0	22	0	0	0	11	0	9
	1996/97	71	0	0	0	0	0	29	0	7
	1997/98	100	0	0	0	0	0	0	0	8
6C	1993/94	0	0	13	7	0	0	80	0	15
	1994/95	7	0	20	7	0	0	67	0	15
	1995/96	0	0	6	0	0	0	94	0	18
	1996/97	0	0	10	15	0	0	65	10	20
	1997/98	0	0	15	22	0	0	30	33	27

Table 5 Continued

Subunit	Regulatory year	Percent of harvest								n
		Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	
6D	1993/94	11	0	83	1	1	0	1	4	123
	1994/95	11	0	81	1	0	0	3	3	157
	1995/96	6	0	82	3	0	0	7	3	136
	1996/97	9	0	82	2	0	0	7	0	179
	1997/98	4	0	82	5	0	0	6	3	181
UNIT 6	1993/94	16	0	68	1	1	0	9	5	155
TOTAL [a]	1994/95	22	0	66	2	0	0	9	3	198
	1995/96	22	0	58	2	0	0	14	3	195
	1996/97	17	0	65	4	0	0	13	1	229
	1997/98	14	0	63	7	0	0	9	6	243

[a] Total includes bear taken in unknown subunits.

LOCATION

GAME MANAGEMENT UNITS: 7 and 15 (8397 mi^2)

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/1000 km^2 for areas within the 1947 burn and 265/1000 km^2 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 comprises primarily federally managed lands. The USDA Forest Service (Chugach National Forest, ca. 2,000 mi^2) is the principal landowner in Unit 7 along with the USDI Park Service (Kenai Fjords National Park 885 mi^2). In Unit 15 the U.S. Fish and Wildlife Service (Kenai National Wildlife Refuge) is responsible for management of 3062 mi^2. 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–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 that are increasing 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). The department collected black bear femurs to assist a Brigham Young University study on bone density and aging of North American black bears (Westwood 1996).

Spruce bark beetles (*Dendroctonus rufipennis*) have infested and killed many older stands of spruce trees on the Kenai Peninsula. Several prescriptive logging cuts have been initiated in response. To date, most logging has occurred on private land, although many state timber sales have been planned. 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 by providing access into previously secure areas.

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 department monitors the harvest of black bears through a mandatory sealing program established in 1973. Hides and skulls of all black bears reported killed are sealed with metal locking tags. Biological and demographic information is collected and entered on bear sealing forms. Harvest data are reported using the division's reporting program BEARSEAL.

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 because of fewer moose in the 1969 burn area and continuing human encroachment into black bear habitat.

We estimated that 3000 black bears occupy 5880 mi^2 (15,053 km^2) 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^2 (Schwartz and Franzmann 1991); 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*). Devil's club may be affected in areas where spruce bark beetles have killed most of the overstory spruce trees. USDA Forest Service is currently studying the effects of spruce bark beetles and logging of bark beetle-killed spruce trees on devil's club survival.

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. This may result in a decrease in black bear density in this area.

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 could be taken from 1 January through June 30 and 1 bear from 1 July through December 31. Cubs or females accompanied by cubs are protected. Bear baiting was allowed from 15 April to 15 June by registration permit (except in Resurrection Creek and its tributaries in Unit 7). Black bears may also be taken with the aid of dogs under a permit authorized by the Alaska Department of Fish and Game (ADF&G).

Board of Game Action and Emergency Orders. The Board of Game reduced the bag limit for black bears in its spring 1994 meeting. 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 requiring hunters using bait to have completed a hunter education course or to have attended an ADF&G sponsored clinic on bear baiting. This regulation became effective in the spring of 1997 for Unit 15 and in 1998 for Unit 7. Also beginning in the spring of 1997, black bear hunters were required to salvage all edible meat from bears taken before July 1. This proposal was passed during the Spring 1996 Board of Game meeting.

Hunter Harvest. The 5-year mean annual harvest was 243 animals (range = 209–263 (Table 1). Females averaged 27% of the harvest during this same period. During the past 3 regulatory years, the harvest has increased slightly from 237 in 1995 to 250 in 1996 and to 263 in 1997. The total harvest and the proportion of females in the harvest were within management objectives (<40%). However, the increasing trend in harvest needs to be monitored closely because we are at the upper levels of our objectives.

The number of bait stations increased from 151 stations registered to 106 hunters in 1990 to a peak of 423 stations to 245 permittees in 1993 (Table 3). Since then an average of 206 permittees have operated 332 bait stations. Bears taken at bait stations accounted for 19% of the harvest during the 5-year period 1994–98 (Table 1). Hunters harvested an average of 44 bears over bait during the past 3 regulatory years, 1995–1998 (Table 2); 25% of bears taken over bait during this period were females. Hunters with bait stations in Unit 7 harvested a higher proportion of females (40%) than did hunters using bait on the rest of the Kenai.

Hunter Residency and Success. In 1995 local residents (residents of the Kenai Peninsula), nonlocal residents, and nonresidents accounted for 57%, 31%, and 9%, respectively, of the black bear harvest in Units 7 and 15. In 1996 local residents, nonlocal residents, and nonresidents accounted for 51%, 29%, and 18%, respectively. In 1997 local residents, nonlocal residents, and nonresidents accounted for 49%, 32%, and 19% of the black bear harvest, respectively (Table 4). The proportion of successful hunters has varied between local and nonlocal hunters during the last 10 years while the proportion of nonresidents has continued to increase.

Harvest Chronology. More bears were harvested during the spring (approximately 60% of all bears) than in the fall in each of the past 8 years (Table 5). Most bears taken in the spring were taken in May. During fall most of the bears were taken in September coincident with moose season. There was a slight increase in the percentage of bears taken in July. Many of these bears were nuisance bears taken by hunters.

Transport Methods. Boats, highway vehicles, and airplanes were important methods of transport for successful bear hunters in Units 7 and 15 (Table 6). In 1995 and 1996 highway vehicles were the predominant mode of transportation (32% both years) followed by boats (30 and 28%) and aircraft (7 and 15%), respectively. In 1997 boats were predominant, followed by highway vehicles and aircraft with 34%, 24%, and 12%, respectively. In addition, 13–19% of hunters who took a bear reported walking as their means of transportation. It is unclear whether these hunters typically shot bears near their homes or reported walking from a secondary point of origin (i.e., trail head, recreational cabin, etc.).

Other Mortality

Schwartz and Franzmann (1991) estimated that 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%).

HABITAT

Habitat degradation from development and forestry practices may threaten survival of black bears on some areas of the Kenai Peninsula. Logging vast areas of mature forest can have 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 to both legal and illegal traffic, which may also affect bear mortality.

NONREGULATORY MANAGEMENT PROBLEMS AND NEEDS

Illegal trafficking of bear parts including hides, claws, and gall bladders occurs on the Kenai. Although public reports indicate trafficking of bear parts occurs occasionally, 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 continues to increase in popularity because of a lengthy season, liberal bag limit, and an alternative meat source to other big game. 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.

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. Miller (1990) estimated an exploitation rate of 14.2% of the bears in his study area. Based on a population estimate of 3000 bears and applying his exploitation rate to the Kenai Peninsula, 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. They suggested that this percentage is minimal because of hunters' reluctance to report taking radiocollared bears. Conservatively, 59% of 426 allowable annual mortalities yields an allowable hunter harvest of 251 bears. This conservative calculation allows for other forms of bear mortality (wounding loss, natural, and illegal).

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 current management objectives recommend a limit to the number of females taken (maximum of 40% of 250 or 100 female bears annually). The average harvest of female bears during this reporting period was 74 and was within management objectives.

Hunters that intend to hunt from bait stations must have completed a bear baiting clinic. This clinic stresses good hunter ethics and encourages hunters to harvest male bears. Since this regulation became effective, the percentage of female bears taken by hunters using bait has declined.

The Kenai National Wildlife Refuge implemented regulations in 1989 that 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. This type of baiting may eventually result in localized overharvest of bears. It is recommended the KNWR extend their baiting opportunities to other parts of the refuge or alternate areas to disperse hunters.

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 250 bears is on the upper end of 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. One regulatory change worth consideration would be restricting the use of bait stations to archery hunters. This type of restriction may provide the needed reduction in harvest and maintain a lower proportion of females in the harvest.

Habitat degradation from development and forestry practices may threaten survival of black bears on some areas of the Kenai Peninsula. Logging vast areas of mature forest can have 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 to both legal and illegal traffic, which may also affect bear mortality.

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Table 1 Units 7 and 15 black bear harvest[a], 1990–98

Regulatory year	Reported Hunter Kill						Nonhunting Kill[a]			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	2	1	90	(61)	55	(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	1	190	(61)	114	(37)	6	310
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	48	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	50	6	2	0	186	(73)	67	(26)	1	254
1995															
Fall 95	75	40	(35)	0	115		3	2	0	78	(65)	42	(35)	0	120
Spring 96	85	32	(27)	0	117		0	0	0	85	(73)	32	(27)	0	117
Total	160	72	(31)	0	232	38	3	2	0	163	(69)	74	(31)	0	237

Table 1 Continued

Regulatory year	Reported Hunter Kill						Nonhunting Kill[a]			Total Estimated kill					
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	M	(%)	F	(%)	Unk.	Total
1996															
Fall 96	58	37	(39)	0	95		0	0	0	58	(61)	37	(39)	0	95
Spring 97	116	35	(23)	1	152		0	3	0	116	(75)	38	(25)	1	155
Total	174	72	(29)	1	247	54	0	3	0	174	(70)	75	(30)	1	250
1997															
Fall 97	73	34	(32)	0	107		1	0	0	74	(64)	34	(36)	0	108
Spring 98	117	36	(24)	0	153		0	2	0	117	(75)	38	(25)	0	155
Total	190	70	(27)	0	260	39	1	2	0	191	(73)	72	(27)	0	263

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

Table 2 Units 7 and 15 black bear harvest over bait stations, 1991–98

Calendar year	Unit 7		Subunit 15A		Subunit 15B		Subunit 15C		Total	%F
	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[a]	(55)
1993	9	4	9	11	0	0	3	3	39	(46)
1994	26	7	10	3	0	0	2	0	48	(21)
1995	26	8	6	6	0	0	1	3	50	(34)
1996	18	8	9	3	0	0	0	0	38	(29)
1997	23	9	14	2	0	1	5	0	54	(22)
1998	18	7	11	3	0	0	0	0	39	(26)

[a]One bear of unknown sex.

Table 3 Units 7 and 15 black bear baiting station information for the Kenai Peninsula, 1991–98

Calendar year	Local residents[a]	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	48
1995	91	109	6	206	337	50
1996	101	91	5	197	325	38
1997	111	114	4	229	365	54
1998	79	108	0	202[b]	314[b]	39

[a] Resident of Unit 7 or 15.

[b] Figures include 15 permits (30 stations) that were not entered into the database. Residency was not available however suspected to be all local residents.

Table 4 Units 7 and 15 black bear harvest by residency, 1990–97

Regulatory year	Local[a] Resident	(%)	Nonlocal Resident	(%)	Nonresident	(%)	Residency Unknown	(%)	Total Successful Hunters[b]
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
1995/96	135	(57)	74	(31)	22	(9)	5	(2)	237
1996/97	128	(51)	74	(29)	44	(18)	5	(2)	251
1997/98	128	(49)	83	(32)	51	(19)	1	(<1)	263

[a] Resident of GMU 7 or 15.
[b] Includes non-sport bears

Table 5 Units 7 and 15 black bear harvest chronology percent by time period, 1990–97

Regulatory year	Harvest Periods July	August	September	October	November	April	May	June	*n*
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
1995/96[a]	5	18	21	6	0	2	34	15	232
1996/97	4	12	19	4	0	<1	45	16	247
1997/98	3	9	22	7	0	2	39	18	260

[a]One bear was reported in December.

Table 6 Units 7 and 15 black bear harvest percent by transport method, 1990–97

Regulatory year	Percent of Harvest									
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	*n*
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
1995/96	7	5	30	6	0	0	32	19	1	232
1996/97	15	2	28	7	0	<1	32	14	2	247
1997/98	12	6	34	10	0	0	24	13	1	260

LOCATION

GAME MANAGEMENT UNIT: 11 (12,800 mi^2)

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 1997 regarding black bear hunting in Unit 11.

Hunter Harvest. Hunters reported taking 12 black bears during the 1995–96 season, 18 during the 1996–97 season and 8 in 1997–98. Mean annual take of black bears for the last 5 years is 15 (Table 1). Males have composed 79% of the harvest for the last 5 years (1993–97). The mean skull size for males taken in 1997–98 was 16.8 inches, equal to the 5-year mean of 16.8 inches. The average skull size of females for the last 5 years is 15.7 inches.

Hunter Residency and Success. Nonresident hunters have taken 17% of the harvest during the last 5 years (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 1997. 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 2.7 days hunting during the 1997–98 season, slightly less time than the 3.5 day average reported for all successful bear hunters since 1973.

Data 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 and 1992, but 30 have been reported during the last 5 years (Table 1).

Harvest Chronology. May and September are the 2 most important months for harvesting black bears. During the last 2 years, 19 (76%) bears were taken in the spring and 6 (24%) were taken in the fall. Between 1973 and 1993, 76% of the black bear harvest occurred during the fall season. Change in harvest chronology during the last 5 years was attributed to nonlocal resident Alaskans' increasing spring bear baiting.

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 the Alaska Department of Fish & Game.

CONCLUSIONS AND RECOMMENDATIONS

Black bear harvest chronology has changed during the past 5 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 the Unit

11 bear population. Males predominate in the harvest and meet 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 hunting by nonlocal residents 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 but can be used in the preserve. This effectively closes much of the park to all hunting. As a result, most of the harvest is along the road system. No changes in season length or bag limits are recommended.

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Table 1 Unit 11 black bear harvest[a], 1992–97

Regulatory year	Reported Hunter kill M	F	(%)	Unk.	Total	Over bait	Nonhunting kill[a] M	F	Unk.	Estimated kill Unreported Illegal	M	(%)	F	(%)	Unk.	Total estimated kill Total
1992																
Fall 92	6	2	(25)	1	9	0	1	0	0	1	6	(75)	2	(25)	2	11
Spring 93	3	0	(0)	0	3	1	0	0	0	1	3	(100)	0	(0)	1	4
Total	9	2	(18)	1	12	1	1	0	0	2	9	(82)	2	(18)	3	15
1993																
Fall 93	5	1	(17)	0	6	0	0	0	0	1	5	(83)	1	(17)	1	7
Spring 94	9	3	(25)	0	12	5	0	0	0	1	9	(75)	3	(25)	1	13
Total	14	4	(20)	0	18	0	0	0	0	2	14	(80)	4	(20)	2	20
1994																
Fall 94	5	1	(17)	0	6	0	0	0	0	1	5	(83)	1	(17)	1	7
Spring 95	9	3	(25)	0	12	10	0	0	0	1	9	(75)	3	(25)	1	13
Total	14	4	(22)	0	18	0	0	0	0	2	14	(78)	4	(22)	2	20
1995																
Fall 95	2	1	(33)	0	3	0	0	0	0	1	3	(75)	1	(25)	0	4
Spring 96	8	1	(11)	0	9	1	0	0	0	1	8	(80)	2	(20)	0	10
Total	10	2	(17)	0	12	0	0	0	0	2	11	(79)	3	(21)	0	14
1996																
Fall 96	3	1	(25)	0	4	0	0	0	0	1	3	(60)	2	(40)	0	5
Spring 97	10	4	(29)	0	14	11	0	0	0	1	11	(73)	4	(27)	0	15
Total	13	5	(28)	0	18	0	0	0	0	2	14	(70)	6	(30)	0	20
1997																
Fall 97	2	0	(0)	0	2	0	0	0	0	1	2	(100)	0	(0)	0	3
Spring 98	5	0	(0)	0	5	3	0	0	0	1	5	(100)	0	(0)	0	6
Total	7	0	(0)	0	7	0	0	0	0	2	7	(100)	0	(0)	0	9

[a]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, 1992–97

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters
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
1995/96	2	(17)	4	(33)	6	(50)	12
1996/97	0	(0)	17	(94)	1	(6)	18
1997/98	0	(0)	7	(100)	0	(0)	7

[a]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 month, 1992–97

Regulatory year	Harvest periods August		September		October		November		April		May		June		*n*
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
1995/96	0	(0)	3	(25)	0	(0)	0	(0)	0	(0)	9	(75)	0	(0)	12
1996/97	4	(22)	0	(0)	0	(0)	0	(0)	2	(11)	11	(61)	1	(5)	18
1997/98	1	(14)	1	(14)	0	(0)	0	(0)	0	(0)	5	(72)	0	(0)	7

Table 4 Unit 11 black bear harvest percent by transport method, 1992–97

Regulatory year	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	*n*
	Percent of harvest									
1992/93	0 (0)	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
1995/96	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (17)	4 (33)	6 (50)	12
1996/97	0 (0)	0 (0)	0 (0)	8 (44)	0 (0)	0 (0)	8 (44)	0 (0)	2 (12)	18
1997/98	0 (0)	0 (0)	1 ()	0 (0)	0 (0)	0 (0)	3 (43)	2 (29)	1 (14)	7

LOCATION

GAME MANAGEMENT UNIT: 12 (9978 mi^2)

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

BACKGROUND

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.

Since 1992, interest in hunting black bears, particularly at bait stations during spring, has increased. During fall, most black bears are harvested incidentally during hunts for other species. Annually, most bears are taken by local residents and are an important meat source particularly in spring. Even before regulations were implemented requiring the salvage of black bear meat from 1 January–31 May, meat was salvaged from over 90% of all black bears harvested by local residents.

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 of black bears that maintains 55% or more males in the combined harvests during the most recent 3 years.

METHODS

Department staff 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, baiting, salvage of meat, incidental take, and defense of life or property. A premolar was extracted from most of the bears during the sealing process; however, black bear teeth have not been sectioned or aged for several years. Harvest data were summarized by regulatory year (RY = 1 July–30 June).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

During the report period no population surveys were conducted in Unit 12 to determine the black bear population size and trend. Based on limited radiotelemetry data collected in Unit 12 (Kelleyhouse 1990) and on more rigorous data collected in Unit 20A, I estimated the black bear density in Unit 12 was 16–22 bears/100 mi^2 of black bear habitat and the population size was 700–1000 bears. During the report period, no substantial climatic anomalies or habitat alterations occurred. Therefore, the population was probably stable.

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 between male and female bears cause males to be more vulnerable to hunters.

During the past 5 years, productivity of the black bear population in Unit 12 appeared adequate based on the age structure of the harvest and 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, was 2–3 years (Kelleyhouse 1990). This was similar to other black bear populations in Interior Alaska (Miller 1987).

Distribution and Movements

Black bears are distributed throughout the forested areas that include approximately 4500 mi^2 of Unit 12. During fall and spring, bears move into the shrub zones to feed on berries and succulent vegetation. In 1990 a forest fire burned approximately 156 mi^2 of black bear habitat in the Tok River valley and undoubtedly reduced black bear use of the area. By 1994, bears began using the edges of the burn for feeding. Beginning in 1997, incidental sightings indicated black bears were utilizing most areas of the burn.

Kelleyhouse (1990) investigated black bear movements in a portion of Unit 12. He reported home ranges of 16 mi^2 for an adult female (29 relocations over 3 summers), 3 mi^2 for a subadult male (7 relocations over 1 summer), and 63 mi^2 for an adult male (15 relocations over 1 year).

MORTALITY

Harvest

Season and Bag Limit. There was no closed season for black bears in Unit 12, and the bag limit was 3 bears. Harvesting of cubs or females accompanied by cubs was prohibited.

Board of Game Actions and Emergency Orders. During 1996 the Alaska Board of Game adopted a regulation requiring the meat, hide, and skull from black bear harvested during 1 January–31 May to be salvaged in units requiring sealing, which includes Unit 12. During

1998 the board adopted a regulation allowing the sale of handcrafted items made from black bear fur.

Hunter Harvest. During the report period, 31–43 black bears were harvested (Table 1). Estimated harvest rate was 3–6%. Since RY 1992–1993, black bear harvest has increased. During this 5-year period the average annual harvest was 35.2 bears, compared to 23.8 bears during the previous 5 years and 26.6 bears since RY 1980–1981. During the current report period, males composed 71–81% of the harvest ($\bar{x}$ = 77%), exceeding the harvest objective. The previous 5-year average sex ratio was 77.4% males.

Mean skull size of males taken during RY 1995–1996 through RY 1997–1998 was 16.5–16.9 inches. Increased harvest since RY 1992–1993 has not affected male skull size. Average skull size of harvested male black bears in Unit 12 has remained consistent since RY 1980–1981. During RY 1992–1993 through RY 1997–1998, average skull size was 16.4 inches (s = 0.415), compared to 16.4 inches (s = 0.437) during RY 1980–1981 through RY 1991–1992.

The majority of black bear harvest in Unit 12 occurred along the road system within the Tok and Tanana River valleys. Few hunters accessed remote portions of Unit 12 to hunt black bear.

Hunter Residency and Success. During the report period, Alaskan residents harvested 86–97% ($\bar{x}$ = 91%) of the black bears in Unit 12 (Table 2). Of these, Unit 12 residents took 69–73%. During the previous 5 years, the average annual percent harvest for Alaska residents was 96%. The average percent harvest by Unit 12 residents was 68%. Historically, nonresidents have harvested few black bears in Unit 12. During RY 1990–1991 through RY 1995–1996, the nonresident annual percent harvest was 0–8% ($\bar{x}$ =3%). During RY 1996–1997 and RY 1997–1998, this percentage increased to 11 and 14%, respectively. This resulted in only 4 additional bears each year. In both cases, 2 guides were responsible for the additional harvest.

No measure of hunter success was available because nonsuccessful hunters were not required to report. During the report period successful hunters spent an average of 2.5 and 3.8 days afield hunting black bears during the fall and spring, respectively. The fewer days afield during the fall by successful hunters reflected that most black bears were taken incidentally to other species. The yearly average was 3.4 days below the 5-year average of 8.7 days. The primary difference was improved success at bait stations.

Harvest Chronology. During the report period, the average percent harvest taken during the spring was 70% (Table 3). The average percentage of the harvest taken in spring during the previous 5 years was 78%. Harvest during fall of RY 1996–1997 was the second highest fall harvest since RY 1974–1975. Berries were not plentiful in 1996 due to freezing conditions during spring and drought conditions throughout spring and summer. Possibly, food resources during that fall were reduced, and black bears had to search over greater distances, bringing bears more in contact with hunters. Four bears were shot coming into homes or camps that fall.

During this report period, hunters at bait stations averaged 68% of the spring harvest, exceeding the previous 5-year average (49%). Since RY 1995–1996, 89% of the fall harvest was taken incidentally during hunts for other species. During the previous 5 years, 69% of black bear harvest in fall was taken incidentally.

Transport Methods. Highway vehicles were the most commonly used (annual $\bar{x}$ = 51%) mode of transportation for successful black bear hunters during the report period (Table 4). During the previous 5 years, hunters using highway vehicles killed an annual average of 49% of the black bears reported taken. Increased use of 4-wheelers for black bear hunting is expected as more hunters are beginning to pioneer more inaccessible areas to bait black bears.

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. There are varieties of berry species used by black bears in Unit 12 that are generally available throughout the unit. Their annual abundance is directly affected by climate. The Tok Fire in 1990 burned approximately 156 mi^2 of prime black bear habitat. Its initial impact on the local black bear population is unknown, but suitable black bear food sources are annually increasing, bringing more black bears to the area.

Enhancement

The implementation of the Alaska Interagency Fire Management Plan and the 1990 Tok Wildfire are expected to enhance black bear habitat over the long term in Unit 12. Extensive areas of climax black spruce forest are in the unit with understories nearly devoid of high-quality black bear food. A younger, more diverse habitat mosaic will be more productive of food plants preferred by black bears.

CONCLUSIONS AND RECOMMENDATIONS

During the report period we met the management goals and objective. In Unit 12 an average of 91% of the black bears were harvested by state residents, of which 72% were local residents. Black bear meat is an important food source particularly in the spring for local residents. Based on hunter report data and public and departmental sightings, there is no indication that harvest was excessive. The percentages of males in the harvest were high ($\bar{x}$ = 77%). Average male skull size was 16.7 inches and has remained consistent since 1980. I recommend no changes in the seasons and bag limits.

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Table 1 Unit 12 black bear harvest, regulatory years 1990–1991 through 1997–1998

Regulatory year	Reported								Estimated kill		Total reported and estimated kill			
	Hunter kill					Nonhunting kill[a]								
	M	F	Unk	Total	Baited	M	F	Unk	Unrep	Illegal	M (%)	F (%)	Unk (%)	Total
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
1995–1996														
Fall 1995	5	3	0	8	0	0	0	0	0	0	5 (63)	3 (37)	0 (0)	8
Spring 1996	17	6	0	23	11	0	0	0	0	0	17 (74)	6 (26)		23
Total	22	9	0	31	11	0	0	0	0	0	22 (71)	9 (29)	0 (0)	31
1996–1997														
Fall 1996	21	2	0	23	0	0	1	0	0	0	21 (88)	3 (12)	0 (0)	24
Spring 1997	14	6	0	20	16	0	0	0	0	0	14 (70)	6 (30)	0 (0)	20
Total	35	8	0	43	16	0	1	0	0	0	35 (80)	9 (20)	0 (0)	44

Regulatory year	Reported										Total reported and estimated kill							
	Hunter kill					Nonhunting kill[a]			Estimated kill		M (%)		F (%)		Unk (%)		Total	
	M	F	Unk	Total	Baited	M	F	Unk	Unrep	Illegal								
1997–1998																		
Fall 1997	2	2	0	4	0	0	0	0	0	0	2	(50)	2	(50)	0	(0)	4	
Spring 1998	30	7	0	37	27	0	0	0	0	0	30	(81)	7	(19)	0	(0)	37	
Total	32	9	0	41	27	0	0	0	0	0	32	(78)	9	(22)	0	(0)	41	

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

Table 2 Unit 12 black bear successful hunter residency, regulatory years 1990–1991 through 1997–1998

Regulatory year	Unit resident (%)	Other residents (%)	Nonresident (%)	Total successful hunters
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
1995–1996	20 (69)	8 (28)	1 (3)	29
1996–1997	32 (73)	7 16)	5 (11)	44
1997–1998	27 (73)	5 (14)	5 (14)	37

Table 3 Unit 12 black bear harvest chronology percent by month, regulatory years 1990–1991 through 1997–1998

Regulatory year	Harvest chronology percent by month								
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	*n*
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
1995–1996	7	10	10	0	0	0	38	34	29
1996–1997	9	7	36	0	0	0	39	9	44
1997–1998	5	0	5	0	0	0	71	20	41

Table 4 Unit 12 black bear harvest by transport method, regulatory years 1990–1991 through 1997–1998

Regulatory year	Harvest by transport method (%)									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unknown	*n*
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
1995–1996	2 (7)	1 (3)	1 (3)	4 (14)	0 (0)	0 (0)	16 (55)	5 (17	0 (0)	29
1996–1997	5 (11)	1 (2)	2 (5)	8 (18)	0 (0)	0 (0)	19 (43)	6 (14)	3 (7)	44
1997–1998	0 (0)	0 (0)	2 (5)	10 (24)	0 (0)	0 (0)	22 (54)	7 (17)	0 (0)	41

LOCATION

GAME MANAGEMENT UNIT: 13 (23,000 mi^2)

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 a mean 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 structure that will sustain a harvest of at least 60% males.

METHODS

Department staff monitored the black bear harvest by interviewing successful hunters and by sealing bears presented for examination. Data obtained at sealing include measuring skulls and determining sex of bears, hunter methods, means, and effort.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Black bear surveys and 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^2. Females had an observed mean litter size of 2.1 (range = 1–4) cubs of the year and 1.9 (range = 1–3) yearlings. However, Miller 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 usually inhabit 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 is no closed season on black bears in Unit 13, and the bag limit is 3 bears per year.

Board of Game Actions and Emergency Orders. The Board of Game passed a regulation that required the salvage of meat from black bears taken from 1 January to 31 May, starting in the spring of 1997.

Hunter Harvest. The reported harvest of black bears during the 1997–98 season was 101 bears, a 29% increase from the 1996–97 harvest (n = 78) and 23% above the 5-year (1992–96) average annual harvest of 82 (Table 1). Males composed 62% (n = 62) of the 1997–98 harvest and females 38% (n = 38) with one sex unknown. Overall, males have composed 66% of the historic harvest since 1979, but the percent males has declined slightly the last 2 years to 61%. Black bear harvests with 60% or more males in the bag are considered sustainable.

Mean skull size for males was 16.6 inches in 1997–98, the same as the 5-year (1992–96) mean of 16.6 inches. Mean skull size for females was 15.6 inches in the 1997–98 harvest, only slightly larger than the 5-year mean of 15.4 inches. Overall, no trends are evident in the average size of the black bears taken in Unit 13 during this reporting period. A large or prolonged increase or decrease in the size of bears in the harvest is felt to reflect a change in the age composition of the harvest. This is monitored because age data are not collected for black bears in this unit.

In 1997–98, Unit 13D had the highest reported harvest with 48 (47%) bears, followed by 13E with 35 (35%), 13A with 10 (10%), 13B and C with 3 (3%) each. Similar harvest proportions were observed in prior years, with most of the harvests reported from Units 13E and 13D. The DLP kill averaged 1 bear/year throughout this reporting period. Despite increased settlement, reported DLP kills remain low because DLP bears are most likely 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 23 (23%) black bears during 1997–98 (Table 2). During the last 3 years, the black bear take by nonresidents has averaged 20 bears/year. This is an increase of 33% over the 1973–94 average of 15 bears/year. Residents of Unit 13 killed 23 (23%) black bears during 1997–98 and have averaged 20 bears/year throughout this reporting period. The remaining 54 bears harvested during 1997–98 were taken by nonlocal Alaska residents who also accounted for the largest portion of the Unit 13 black bear harvest during this report period.

Successful resident black bear hunters spent an average of 4.6 days in the field in 1997–98, while nonresidents averaged 6.8 days. These effort figures suggest that hunters are spending more time in the field to take a bear when compared to the 3.6 day average reported by all hunters since 1973. Much of the increase in hunting effort was by resident hunters during the spring season. A possible explanation for the increased effort during the spring is that hunters were spending more time at bait stations because of the effort needed to establish a successful station. Hunting over bait has increased in popularity in Unit 13 during this report period. Nineteen bears were reported shot on a bait station in 1997–98, compared to 13 the previous year and as few as 5 as recently as 1994 (Table 1).

Harvest Chronology. During the 1997–98 season, the spring harvest was 43 (43%) bears, compared to 58 (57%) in the fall. Overall, since 1979 41% of the Unit 13 black bear harvest has occurred during spring. Most of the spring harvest is during May. September has the highest reported harvest during fall, except in 1995 and 1996 (Table 3). The increase in the harvest during August 1995 was attributed to liberalized brown bear regulations that opened the brown bear season on 10 August in 1995 and put more bear hunters in the field that year. In August 1996 hunting pressure was increased because a Tier 1 caribou hunt put thousands of additional caribou hunters in the field. Surprisingly, the black bear harvest declined in August 1997 even though there was a Tier I hunt that fall. During the last 5 years, harvests during June and July have been an important component of the harvest with over 20% of the take during the summer when hides are poor. Some summer kills were presumably for meat or DLP bears reported as sport kills.

Transport Methods. Among successful 1997–98 bear hunters, highway vehicles (27%) and walking (22%) were the most popular methods of transportation (Table 4). Aircraft use fluctuates considerably between years but was the most important method of transportation during the 1995–96 season. Surprisingly, 4-wheelers are not as important to black bear hunters as they are for hunters after other big game. The best explanation for this is that the best black bear habitat is heavily timbered and has fewer trails for ATV access. Because of the combined importance of highway vehicles and walking, roadside black bear populations received the greatest hunting pressure.

Other Mortality

Miller (1987) observed 35% mortality among cubs of the year accompanying radiocollared females in the upper Susitna River study area. In this study, additional natural mortality also occurred among radio collared adult black bears. Miller believed 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 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 more black bears than other subunits and also have the most extensive areas of heavily timbered spruce forests. 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 interspersion of forest stands in different successional stages that could reduce prime black bear habitat. Availability of salmon could also cause higher numbers of black bears in Units 13D and 13E; salmon provide an alternative source of nutrition unavailable in more interior units.

CONCLUSIONS AND RECOMMENDATIONS

Black bear harvests have increased during this reporting period. Successful hunters also reported that they spent more time hunting before they took a bear. With the possible exception of a few additional bears taken during August 1996, the increase in the black bear harvest was not attributed to a high incidental take by Tier I caribou hunters because most bears were taken from units with few caribou. It appears that black bears are becoming a more important primary game species rather than being incidentally taken to other species. This conclusion is supported by chronology data showing high harvests during periods of little other big game hunting opportunity. Methods and means data indicate baiting, a black bear-specific hunting method, has increased in popularity.

Harvest levels currently reported on black bears in Unit 13 are considered sustainable. Unit 13, especially subunits D and E, has extensive areas of forest habitat ideal for black bears. Access is extremely limited and harvests are low over much of the best black bear habitat. Transportation data indicate that most harvest occurs near the road system. Increased harvests along the road system could result in slight declines in the percent males in the harvest. Black bear numbers in areas of heavy hunting pressure are currently maintained by immigration from unharvested areas and by annual production. The fact that taking cubs and sows with cubs is prohibited ensures that productive females are afforded protection. Females would have to predominate in the harvest for a number of years before a population decline would be a concern.

Harvest data are not currently collected from unsuccessful black bear hunters; thus, we have no way of determining total 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 important in monitoring hunt conditions and, to some extent, 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. Additional changes to season length or bag limits are not recommended at this time.

LITERATURE CITED

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Table 1 Unit 13 black bear harvest[a], 1992–98

Regulatory Year	Reported hunter kill M	F	(%)	Unk.	Total	Over bait	Nonhunting kill[a] M	F	Unk	Estimated Kill Unreported Illegal	M	(%)	F	(%)	Unk.	Total
1992-93																
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
1993-94																
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
1994-95																
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
1995-96																
Fall 95	27	15	(36)	0	42	0	0	0	0	3	27	(64)	15	(36)	3	45
Spring 96	31	14	(31)	0	45	14	0	0	0	3	31	(69)	14	(31)	3	48
Total	58	29	(33)	0	87	14	1	0	0	6	59	(67)	29	(33)	6	94
1996-97																
Fall 96	29	17	(37)	0	46	0	0	0	0	3	29	(63)	17	(37)	3	49
Spring 97	18	12	(40)	2	32	13	0	0	0	3	18	(60)	12	(40)	5	35
Total	47	29	(38)	2	78	13	2	1	0	6	49	(62)	30	(38)	8	87
1997-98																
Fall 97	32	25	(44)	1	58	0	0	0	0	3	32	(56)	25	(44)	4	61
Spring 98	30	13	(30)	0	43	19	0	0	0	3	30	(70)	13	(30)	3	46
Total	62	38	(38)	1	101	19	1	1	0	6	63	(62)	39	(38)	7	109

[a]Includes Defense of Life or Property kills, research mortalities, and other known human-caused accidental mortality.

Table 2 Unit 13 black bear successful hunter residency, 1992–98

Regulatory year	Local resident	(%)	Other resident	(%)	Nonresident	(%)	Successful hunters[a]
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
1995/96	21	(24)	42	(48)	21	(24)	87
1996/97	19	(24)	41	(53)	17	(22)	78
1997/98	23	(23)	54	(53)	23	(23)	101

[a] Includes residency unknown hunters. Table 3. Unit 13 black bear harvest chronology percent by time period, 1992–98

Table 3 Unit 13 black bear harvest chronology percent by month, 1992–97

	Harvest periods														
Regulatory year	July		August		September		October		April		May		June		*n*
1992/93	9	(11)	15	(18)	32	(39)	4	(5)	0	(0)	19	(24)	2	(2)	83
1993/94	1	(2)	12	(19)	22	(35)	2	(3)	0	(0)	17	(27)	9	(14)	63
1994/95	8	(8)	11	(11)	29	(29)	1	(1)	1	(1)	36	(36)	14	(14)	100
1995/96	3	(3)	20	(23)	18	(21)	1	(1)	1	(1)	27	(31)	17	(20)	87
1996/97	3	(4)	21	(27)	20	(26)	2	(3)	0	(0)	21	(27)	11	(14)	78
1997/98	7	(7)	14	(14)	36	(36)	1	(1)	2	(2)	28	(28)	13	(13)	101

Table 4 Unit 13 black bear harvest (percent) by transport method, 1992–98

	Percent of harvest																		
Regulatory year	Airplane		Horse		Boat		3- or 4-wheeler		Snowmachine		ORV		Highway vehicle		Walk		Unknown		*n*
1992/93	16	(19)	1	(1)	6	(7)	11	(13)	0	(0)	1	(1)	31	(37)	12	(14)	5	(6)	83
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
1995/96	28	(32)	2	(2)	8	(9)	15	(17)	0	(0)	1	(1)	16	(18)	11	(13)	6	(7)	87
1996/97	16	(21)	0	(0)	15	(19)	11	(14)	0	(0)	1	(1)	24	(31)	11	(14)	0	(0)	78
1997/98	16	(16)	5	(5)	12	(12)	15	(15)	0	(0)	1	(1)	27	(27)	22	(22)	3	(3)	101

LOCATION

GAME MANAGEMENT UNIT: 14 (6625 mi^2)

GEOGRAPHIC DESCRIPTION: Upper Cook Inlet

BACKGROUND

Grauvogel (1990), Harkness (1990), and Griese (1996) estimated black bear populations in Unit 14. Harkness and Grauvogel estimated a population of 750–1050 with a sustainable annual harvest of 83–158 bears. Griese reevaluated total available habitat and considered recent excessive harvest of sows to conclude that the number of black bears in Unit 14 approached the lower end of the range of 530–1080. Griese assumed a population near 700 to establish maximum sustainable harvest of 24–30 sows for the unit.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

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.

MANAGEMENT OBJECTIVES

The population objective is to maintain a population that 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 80 bears with the annual sow harvest not exceeding 30 (not to exceed 14 sows in Unit 14A or 8 sows in each of Units 14B and 14C).

METHODS

Department staff 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 sex of bears, recorded date and location of kill and hunter effort 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 stations were required to register them with the department; no more than 2 bait stations were allowed per hunter.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Black bear numbers in Unit 14 increased slightly during this reporting period. The increase may be a result of more restrictive hunting opportunities. Increased reports of bear-human conflicts may also indicate an increasing population; however, more reports may simply be the result of increased human activity within bear habitat and increasing habituation of bears.

Bear densities within Unit 14 ranged from low to moderate. Large lowland areas associated with the communities of Anchorage–Eagle River and Palmer–Wasilla exclude some bears. The highest black bear densities within the unit probably are in eastern Unit 14C.

Population Size

Griese (1996) previously estimated black bear numbers at 530–1080. No additional data have become available to modify that estimate.

MORTALITY

Harvest

Season and Bag Limit. During this reporting period, the open season in Unit 14A was September 1–May 25. In Unit 14C within Chugach State Park, open season was from the day after Labor Day to May 20. The remainder of Unit 14 had no closed season. The bag limit was 1 bear in all portions of Unit 14. 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 14B.

Board of Game Actions and Emergency Orders. The Board took action in the spring of 1996 requiring hunters using bait for black bears in Unit 14 to have attended a hunter education course before they went afield. Key objectives were to address ethical methods of baiting, effects of violating conditions of the bait station registration permit, and to improve hunters' abilities to identify sex of bears. Attendance at a Basic Hunter Education course, Alaska Bowhunter Education (IBEP) course, or a bear hunter clinic that included bear baiting information was required beginning in the spring of 1997.

Hunter Harvest. Bear harvest increased slightly during 1995–97 (Table 1). Hunters during this period reported an average annual kill of 88 bears, including an average of 25 (28%) sows. Hunters using bait, which is allowed only within Units 14A and 14B, harvested 40% of the total for those units (Tables 2–3). In Unit 14C the average annual kill was 20 bears (Table 4), up slightly from the average annual kill of 18 black bears during the 1992–94 period.

During this reporting period 32% of bears harvested by baiters in Units 14A and 14B were females. Females composed 19% of the nonbaited spring bear harvest in Unit 14A and 14B. Similarly, females made up 22% of the spring harvest in Unit 14C where bait is currently not permitted. The high proportion of females shot by baiters during this reporting period is consistent with data from previous reporting periods.

Baiting Participation. The number of hunters who used bait in Unit 14 decreased during this reporting period (Table 5). The declining use of bait in Unit 14 appeared to coincide with increased use of bait in Unit 16A (Griese 1999), indicating a shift in preferred hunting areas by bear baiters. The cause of this may be a response to bait station crowding in Unit 14A, a longer baiting season in Unit 16, and increased awareness of better hunting conditions in units more distant from human population centers.

Hunter Residency and Success. During this reporting period Unit 14 residents averaged 94% of the harvest (Table 6). Nonresidents and other Alaska residents accounted for 6%.

Harvest Chronology. The peak of harvest in Unit 14 occurs during May, with slightly more harvest during the second half of May. Baiting plays a role in the large spring harvest in this unit. A second smaller peak in harvest of black bears occurs during September when hunters are in the field pursuing bears and other large game (Table 7).

Transport Methods. Transportation methods varied little from previous trends. Most hunters in Unit 14 used ORV/ATVs and highway vehicles to access the field (Table 8). Unit 14 black bear hunters also commonly, yet less frequently, used airplanes and boats.

Other Mortality

Nonhunting kills represented 16.5% of all reported mortality in Unit 14 (Tables 2–4) during this period. Units 14A and 14C were responsible for 14 and 37 reported nonhunting kills, respectively.

CONCLUSIONS AND RECOMMENDATIONS

Under current data collection methods, the population objective is unverifiable. However, there is no indication of excessive overharvest. The population estimate remains between 530 and 1080 black bears.

Unit 14 human-use objectives were attained during this report period. The average annual harvest was 88 bears, higher than the management objective of 80 bears. Average sow harvest was 25 bears, less than the estimated allowable harvest of 30 females in Unit 14. However, the sow harvest in Unit 14A did exceed that unit's objective in 1997. Defense of life or property kills remain high, particularly in Unit 14C. Continued expansion of the human population into areas occupied by bears and an increase in bear numbers have resulted in increased nonhunting harvest of bears. Providing information and education to the public remains a high priority in Unit 14C. There is, however, a segment of the public who will not tolerate bears in close proximity to homes. In addition, some individuals are unwilling to keep human food sources from becoming available to bears. Because of this, regulations such as garbage ordinances may be necessary to reduce nonhunting mortality.

Current seasons and bag limits are successful at keeping total harvest and the harvest of sows within objective levels in Units 14B and 14C. Reported harvest during this reporting period indicated a high use of Unit 14A; however, current information does not suggest regulatory changes are needed. Management objectives are conservative, and the Unit 14 population can sustain harvest in excess of the current objectives.

The department should continue the role of teaching bear hunters, especially those hunting black bears over bait, to identify and select male bears. Brochures, magazine articles, slide shows, and readily available videos 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 bear baiting seminar. Course information during seminars 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, 1973–97

Regulatory	Reported Harvest					
Year	Male	(%)[a]	Female	(%)[a]	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
1995/96	52	71%	21	29%	0	73
1996/97	71	76%	22	24%	0	93
1997/98	66	68%	31	32%	0	97

[a]Includes only bears of known sex.

Table 2 Unit 14A black bear harvest, 1993–97

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Baited[a]	Reported: Nonhunting kill[b] M	F	Unk.	Estimated unreported kill[c]	Total estimated kill M (%)	F (%)	Unk.	Total
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
1995													
Fall 95	5	5 (50)	0	10	0	3	1	0		8 (57)	6 (43)	0	14
Spring 96	22	8 (27)	0	30	19	1	0	0		23 (74)	8 (26)	0	31
Total	27	13 (33)	0	40	19	4	1	0	4	31 (69)	14 (31)	4	49
1996													
Fall 96	8	4 (33)	0	12	0	3	1	0		11 (69)	5 (31)	0	16
Spring 97	27	6 (18)	0	33	17	2	0	0		29 (83)	6 (17)	0	35
Total	35	10 (22)	0	45	17	5	1	0	5	40 (78)	11 (22)	5	56
1997													
Fall 97	4	5 (56)	0	9	0	0	1	0		4 (40)	6 (60)	0	10
Spring 98	31	17 (35)	0	48	28	2	0	0		33 (66)	17 (34)	0	50
Total	35	22 (39)	0	57	28	2	1	0	6	37 (62)	23 (38)	6	66

[a] Bears reported taken over legally established bait stations

[b] Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.

[c] Assumes approximately 10% of reported harvest.

Table 3 Unit 14B black bear harvest, 1993–97

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Baited[a]	Reported: Nonhunting kill[b] M	F	Unk.	Estimated unreported kill[c]	Total estimated kill M (%)	F (%)	Unk.	Total
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 (00)	0	9	0	0	0	1		9 (100)	0 (00)	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
1995													
Fall 95	4	3 (43)	0	7	0	0	0	0		4 (57)	3 (43)	0	7
Spring 96	7	4 (36)	0	11	7	0	0	0		7 (64)	4 (36)	0	11
Total	11	7 (39)	0	18	7	0	0	0	2	11 (61)	7 (39)	2	20
1996													
Fall 96	10	5 (33)	0	15	0	0	0	0		10 (67)	5 (33)	0	15
Spring 97	6	1 (14)	0	7	3	0	0	0		6 (86)	1 (14)	0	7
Total	16	6 (27)	0	22	3	0	0	0	2	16 (73)	6 (27)	2	24
1997													
Fall 97	6	0 (0)	0	6	0	0	0	0		6(100)	0 (0)	0	6
Spring 98	12	2 (14)	0	14	7	1	0	0		13 (87)	2 (13)	0	15
Total	18	2 (10)	0	20	7	1	0	0	2	19 (90)	2 (10)	2	23

[a] Bears reported taken over legally established bait stations

[b] Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.

[c] Assumes approximately 10% of reported harvest.

Table 4 Unit 14C black bear harvest, 1993–97

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Baited[a]	Reported: Nonhunting kill[b] M	F	Unk.	Estimated unreported kill[c]	Total estimated kill M (%)	F (%)	Unk.	Total
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	5	2	1		17 (77)	5 (23)	1	23
Total	14	5 (26)	0	19	0	6	2	1	3	20 (74)	7 (26)	4	31
1995													
Fall 95	8	0 (0)	0	8	0	4	0	0		12(100)	0 (0)	0	12
Spring 96	6	1 (14)	0	7	0	6	1	0		12 (86)	2(14)	0	14
Total	14	1 (7)	0	15	0	10	1	0	3	24 (92)	2 (8)	3	28
1996													
Fall 96	8	2 (20)	0	10	0	4	3	0		12 (71)	5 (29)	0	17
Spring 97	12	4 (25)	0	16	0	2	5	1		14 (61)	9 (39)	1	24
Total	20	6 (23)	0	26	0	6	8	1	4	26 (65)	14(35)	5	45
1997													
Fall 97	2	4 (67)	0	6	0	3	1	3		5 (50)	5 (50)	3	13
Spring 98	11	3 (21)	0	14	0	4	0	0		15 (83)	3 (17)	0	18
Total	13	7 (35)	0	20	0	7	1	3	3	20 (71)	8 (29)	6	34

[a] Bears reported taken over legally established bait stations

[b] Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.

[c] Assumes approximately 10% of reported harvest.

Table 5 Unit 14 black bear hunter baiting participation, 1988–1997

Regulatory year	Number of permittees	Number of stations registered SU 14A	SU 14B
1988/89	166	240	32
1989/90	130	153	41
1990/91	200	259	65
1991/92	165	215	41
1992/93	175	237	42
1993/94	190	256	39
1994/95	147	183	44
1995/96	159	185	52
1996/97	146	164	46
1997/98	137	155	40

Table 6 Unit 14 black bear successful hunter residency, 1993–97

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters
1993/94	45	(96)	1	(2)	0	(0)	47
1994/95	72	(90)	2	(3)	3	(4)	80
1995/96	69	(95)	0	(0)	4	(5)	73
1996/97	88	(95)	1	(1)	4	(4)	93
1997/98	91	(94)	3	(3)	3	(3)	97

[a] Unit 14 residents

Table 7 Unit 14 black bear hunter harvest chronology percent by month, 1993–97

Regulatory year	Percent of harvest									
	July–Aug	Sep 1–15	Sep 16–30	Oct	Nov.–Mar	Apr	May 1–15	May 16–31	June	*n*
1993/94	6	6	9	2	2	9	26	26	15	47
1994/95	10	8	5	3	3	0	33	29	11	80
1995/96	11	12	8	3	0	1	22	38	4	73
1996/97	9	14	10	6	1	5	18	31	5	93
1997/98	4	14	2	1	0	3	16	51	8	97

Table 8 Unit 14 black bear harvest percent by transport method, 1993–97

Regulatory year	Percent of harvest							
	Airplane	Horse	Boat	Snowmachine	ORV/ATV	Highway vehicle	Other/unknown	*n*
1993/94	9	2	19	0	15	30	25	47
1994/95	13	1	13	1	23	34	16	80
1995/96	18	3	4	0	26	26	23	73
1996/97	17	0	11	1	32	28	11	93
1997/98	14	0	6	0	35	27	18	97

LOCATION

GAME MANAGEMENT UNIT: 16 (12,445 mi^2)

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 based on survey data from Unit 16. Griese (1996) estimated Unit 16 black bear numbers to be at 1400–2800 (mid point estimate of 2100) by projecting densities of black bears estimated for study areas in adjacent game management units.

Trends in black bear harvest may reflect 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 since sealing requirements began (Faro 1989). Recently, the bulk of the harvest shifted from fall to spring, a product of baiting opportunity and increased interest in hunting black bears (Faro 1989).

Faro (1989) believed that black bear numbers were affected to some degree by hunting. He identified decreasing male skull size and an increasing percentage of the harvest being females as an indication of hunters affecting the accessible areas of the unit. Harkness (1993) repeated Faro's (1990) concern about the growing harvest by bear baiters. Griese (1996) pointed out that longtime residents, familiar with the area, agreed the black bear density in some areas was reduced.

Another concern expressed by Harkness (1993) was the unknown level of bears killed as 'nuisances' and not reported. Harvest by Unit 16 residents, reported through hunter sealing data, 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 all households (76–79) in northern Unit 16B would have produced 26–34 bears as unreported harvest. Sealing data during that period indicated that Unit 16 residents harvested, at most, 5 bears.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

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

MANAGEMENT OBJECTIVES

The department adopted management objectives during 1992. The population objective is to maintain a population size that appears 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 (not to exceed 13 sows in Unit 16A nor 56 sows in Unit 16B).

METHODS

Department staff 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 and determined sex of bears, date and location of kill, and hunter effort 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 stations with the department; no more than 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 this report analyzes bear kill by regulatory year (1 July–30 June). Previous reports summarized data by calendar year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Black bear numbers remained stable, or possibly increased, during 1995–98, but during spring 1999 lower hunter levels (Tables 2–3) may have been in response to restrictions placed on bait station locations along the major river systems. However, reduced black bear baiting effort that spring (Table 7) may also be responsible for the lower harvest.

Population Size

No refinement was attempted for Griese's 1996 estimate of 1400–2800 (midpoint estimate of 2100) black bears in Unit 16.

Population Composition

No composition information is available for Unit 16 black bears.

Distribution and Movements

No information is available for movements of Unit 16 black bears.

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 of Denali State Park in northern Unit 16A. Beginning in spring 1998 black bear bait stations were not allowed within ¼ mile from the banks of portions of certain rivers. The restrictions applied to the Unit 16 shorelines of the Susitna River, Yentna River below its confluence with the Kichatna River, the Skwentna River below its confluence with the Talchulitna River, Deshka River (Kroto Creek) below the confluence with Trapper Creek, and Alexander Creek.

Board of Game Actions and Emergency Orders. In the March 1997 meeting, the board adopted a department proposal that intended to physically separate black bear baiters from fishermen, campers, and boaters on rivers that serve as primary transportation corridors. The board accomplished this separation by requiring black bear baiters to place bait stations no closer than ¼ mile from the banks of portions of certain rivers as described in the *Season and Bag Limit* section.

During the March 1999 meeting, the board extended the black bear baiting season in Unit 16B to June 30 (effective Spring 2000). They acted on a public proposal that asked for opportunity to take advantage of perceived black bear abundance. The department did not argue against the proposal because population information was weak.

Hunter Harvest. Reported black bear harvest by hunters reached a peak during 1998 (Table 1) with 219 bears and a record 152 male bears. Previous peaks in annual harvest occurred during 1973, 1980, and 1991, all because of high fall harvest. During 1980 the reported harvest for Unit 16 reached the highest level recorded, yet the confirmed number of males killed was only 145. During 1996–1998 the average annual male harvest reached 120 and was the highest recorded for any 3-year period. Concurrently, the female harvest remained slightly below 30% of the harvest. The peak in harvest during 1998 came about apparently as a result of abundant berry crops and/or salmon that drew bears out into the open during the fall moose hunting season.

The composition of the hunter harvest during 1995–98 averaged 72% males or 120 males and 46 females annually (Table 1).

Baiting Participation. Table 7 indicates the number of hunters using bait in Unit 16 peaked during spring 1995 at 130 baiters who established 220 bait stations. However, during spring 1998 and 1999 (regulatory years 1997 and 1998), the number of baiters and their bait stations dropped sharply, probably in response to new baiting restrictions along the major river systems.

Hunter Residency and Success. During 1995–98 Alaska residents averaged 70% of the harvest (Table 5). Nonresidents accounted for an average of 30%. This composition reflects a substantial increase in nonresident hunters.

Harvest Chronology. The chronology of harvest shifted substantially during regulatory year 1998–99, with a major shift of the harvest to August and September (Table 6). The following spring harvest declined roughly 35%, probably a result of a temporary depletion of legal bears and reduced spring baiting effort (Table 7). Bear baiting opportunities had shifted hunting effort and harvest to the spring (Griese 1996). Historically, fall had accounted for most of the bear harvest (Faro 1989).

Transport Methods. Successful bear hunters in Unit 16 preferred aircraft and boats as their method of transportation (Table 6). However, baiting interest and effort in Unit 16A in recent years have increased the portion of hunters who used highway vehicles and "ORV" (Griese 1996). But throughout most of the unit, successful hunters still prefer to use airplanes for transport.

Other Mortality

Reported nonhunting kills represented a minor fraction of the total reported harvest. However, it is suspected that nuisance black bear kills are numerous and seldom reported due to inconvenience and fear of repercussions. Estimates of nonreported harvested bears (Table 2 and Table 3) were adjusted to reflect a higher portion in the total harvest (Griese 1996).

CONCLUSIONS AND RECOMMENDATIONS

Under current data collection methods, the population objective is unverifiable. A subjective interpretation of harvest data indicated a decline in the accessible portion of the black bear population during spring 1999, following the peak harvest during fall 1998. Being unable to compare harvest to effort makes relating harvest trends to population trends difficult.

Unit 16 human-use objectives were partially attained during this report period. The reported average annual harvest was 166 bears, well below the maximum of 210 bears. The reported average sow harvest was 46, with 19 in Unit 16A and 26 in 16B. The true harvest could easily be higher due to unreported kills, either by hunters or as nuisance bears. Even at the reported level of harvest, the harvest of sows in 16A exceeded the estimated sustainable yield.

Further changes in seasons or bag limits are not recommended. Harvest levels on sows exceeded objectives in Unit 16A, but in light of the Board of Games action to liberalize bear baiting in Unit 16B, restrictions in Unit 16A may be premature.

I recommend that hunters participating in bear hunting in Unit 16 and all of Southcentral 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 impacts from changing hunting patterns. The harvest ticket system used by moose, caribou, and sheep could easily be adapted to black bear and brown bear. Costs to administer the program are certainly warranted by the increased interest by hunters in black bear.

I also recommend the department continue the role of teaching bear hunters to identify and select male bears, especially those hunting black bears over bait. Recent harvest composition indicates that hunters are becoming aware of the desire to weight the harvest toward boars. We should continue this educational effort and promptly produce a video to supplement instruction. 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. Course information should be standardized to ensure instruction is the same from all instructors.

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Table 1 Unit 16 historical reported black bear harvest by hunters, 1973–98

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	77	32	(29)	1	110
1995	101	36	(26)	3	140
1996	101	32	(24)	0	133
1997	107	39	(27)	0	146
1998	152	67	(31)	0	219

Table 2 Unit 16A black bear harvest, 1993–98

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Baited[a]	Reported: Nonhunting kill[b] M	F	Unk.	Estimated unreported kill[c]	Total estimated kill M (%)	F (%)	Unk.	Total
1993													
Fall 93	10	1 (08)	0	11	0	2	0	0		12 (92)	1 (08)	0	13
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	37 (79)	10 (21)	7	54
1994													
Fall 94	4	1 (20)	0	5	0	1	0	0		5 (83)	1 (17)	0	6
Spring 95	24	11 (31)	0	35	26	0	0	0		24 (69)	11 (31)	0	35
Total	28	12 (32)	0	40	26	1	0	0	7	30 (71)	12 (29)	0	49
1995													
Fall 95	9	3 (25)	0	12	0	0	0	0		9 (75)	3 (25)	0	12
Spring 96	22	11 (33)	0	33	21	1	0	0		23 (68)	11 (32)	0	34
Total	31	14 (31)	0	45	21	1	0	0	8	32 (70)	14 (30)	8	54
1996													
Fall 96	6	7 (54)	0	13	0	0	0	0		6 (46)	7 (54)	0	13
Spring 97	28	11 (28)	0	39	31	0	0	0		28 (72)	11 (28)	0	39
Total	34	18 (35)	0	52	31	0	0	0	9	34 (65)	18 (35)	9	61
1997													
Fall 97	11	6 (35)	0	17	0	0	0	0		11 (65)	6 (35)	0	17
Spring 98	15	12 (44)	0	27	18	0	0	0		15 (56)	12 (44)	0	27
Total	26	18 (41)	0	44	18	0	0	0	8	26 (59)	18 (41)	8	52

Table 2 Continued

Regulatory year	Reported								Estimated unreported kill[c]	Total estimated kill			
	Hunter kill					Nonhunting kill[b]							
	M	F (%)	Unk.	Total	Baited[a]	M	F	Unk.		M (%)	F (%)	Unk.	Total
1998													
Fall 98	24	10 (29)	0	34	0	0	0	0		24 (71)	10 (29)	0	34
Spring 99	16	11 (41)	0	27	19	0	0	0		16 (59)	11 (41)	0	27
Total	40	21 (34)	0	61	19	0	0	0	10	40 (66)	21 (34)	10	71

[a] Bears reported taken over legally established bait stations

[b] Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.

[c] Assumes an unreported harvest of roughly 15–17% of reported harvest.

Table 3 Unit 16B black bear harvest, 1993–98

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Baited[a]	Reported: Nonhunting kill[b] M	F	Unk.	Estimated unreported kill[c]	Total estimated kill M (%)	F (%)	Unk.	Total
1993													
Fall 93	12	5 (29)	2	19	0	0	0	0		12 (71)	5(29)	2	19
Spring 94	39	15 (28)	0	54	22	1	0	0		40 (73)	15 (27)	0	55
Total	51	20 (28)	2	73	22	1	0	0	15	52 (72)	20 (28)	17	91
1994													
Fall 94	18	2 (11)	0	20	0	1	0	0		19 (89)	2 (11)	0	21
Spring 95	29	16 (36)	1	46	30	0	0	0		29 (64)	16 (36)	1	46
Total	47	18 (28)	1	66	30	1	0	0	13	48 (73)	18 (27)	14	80
1995													
Fall 95	24	12 (33)	0	37	0	0	0	0		24 (67)	12 (33)	1	37
Spring 96	32	10 (24)	2	44	24	0	0	0		32 (76)	10 (24)	2	44
Total	56	22 (28)	3	81	24	0	0	0	16	56 (72)	22 (28)	19	97
1996													
Fall 96	13	8 (38)	0	21	0	1	0	0		14 (64)	8 (36)	0	22
Spring 97	39	6 (13)	0	45	21	1	0	0		40 (87)	6 (13)	0	46
Total	52	14 (21)	0	66	21	2	0	0	13	54 (79)	14 (21)	0	81
1997													
Fall 97	27	10 (37)	0	37	0	0	0	0		27 (63)	10 (37)	0	37
Spring 98	43	11 (20)	0	54	31	1	0	0		44 (80)	11 (20)	0	55
Total	70	21 (23)	0	91	31	1	0	0	18	71 (77)	21 (23)	18	110

Table 3 Continued

Regulatory year	Reported								Estimated unreported kill[c]	Total estimated kill			
	Hunter kill					Nonhunting kill[b]							
	M	F (%)	Unk.	Total	Baited[a]	M	F	Unk.		M (%)	F (%)	Unk.	Total
1998													
Fall 98	80	37 (32)	0	117	0	1	1	0		81 (68)	38 (32)	0	119
Spring 99	20	6 (23)	0	26	11	0	0	0		20 (77)	6 (23)		0
26													
Total	100	43 (30)	0	143	11	1	1	0	28	101 (70)	44 (30)	28	173

[a] Bears reported taken over legally established bait stations

[b] Includes defense of life or property kills, illegal kills, and other known human-caused accidental mortality.

[c] Assumes an unreported harvest equaling roughly 20% of reported harvest.

Table 4 Reported residency by successful Unit 16 black bear hunters,1993–98

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Successful hunters
1993/94	7	(6)	84	(69)	30	(25)	121
1994/95	8	(8)	77	(73)	20	(19)	110
1995/96	9	(7)	102	(76)	24	(18)	140
1996/97	11	(8)	80	(61)	40	(31)	133
1997/98	3	(2)	99	(68)	44	(30)	146
1998/99	8	(4)	144	(66)	66	(30)	219

[a] Unit 16 residents

Table 5 Chronology of Unit 16 black bear harvest by hunters, percent by month, 1993–98.

	Harvest period (percent of *n*)									
Regulatory year	July–Aug	Sep 1–15	Sep 16–30	Oct	Nov–Mar	Apr	May 1–15	May 16–31	June	*n*
1993/94	11	6	7	2	0	1	7	36	31	121
1994/95	15	5	0	3	0	1	3	37	36	110
1995/96	15	14	11	2	0	1	4	24	28	140
1996/97	10	11	5	0	0	2	8	35	30	133
1997/98	12	11	14	1	1	1	2	34	26	146
1998/99	19	34	17	4	<1	0	<1	6	19	219
Avg.	14	16	10	2	<1	1	4	26	27	869

Table 6 Reported method of transportation by hunters harvesting Unit 16 black bear, percent by transport method, 1993–98.

	Method of transportation (percent of *n*)							
Regulatory year	Airplane	Horse	Boat	Snowmachine	ORV[a]	Highway vehicle	Other/ Unk[b]	*n*
1993/94	37	1	34	1	7	12	8	121
1994/95	23	0	41	1	14	12	10	110
1995/96	46	1	22	0	9	12	10	140
1996/97	26	2	37	0	17	13	5	133
1997/98	42	6	23	1	13	11	4	146
1998/99	42	5	19	0	15	12	6	219
Avg.	37	3	28	<1	13	12	7	869

a Includes 3 and 4-wheelers, tracked vehicles, etc.

b Includes hunters who indicated they 'walked'

Table 7 Hunter participation in baiting Unit 16 black bear, 1988–1998

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
1995	123	114	86
1996	124	116	95
1997	97	89	67
1998	83	81	64

LOCATION

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

GEOGRAPHIC DESCRIPTION: Northern Bristol Bay

BACKGROUND

Black bears inhabit many of the forested areas of Game Management Unit 17 and are most visible during the fall while they forage on berries along open hillsides in Subunits 17B and 17C. Black bears are less common along salmon streams and near human settlements, primarily because of competition from and predation by brown bears. 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 or age composition of the harvest, or the distribution of harvest.

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

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

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

Related Management Activities

- Monitor the hunt by interviewing hunters and sealing all harvested black bears.

METHODS

Each black bear legally harvested or killed in defense of life or property (DLP) in the unit is sealed, the skull is measured and sex determined, and a premolar tooth is extracted and archived. At the time of sealing we record data on hunter residency, number of days hunted, date of kill,

transportation used, 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 that the black bear population along upper Nushagak River drainages continues to decline.

Distribution and Movements

We know little about the overall distribution and movements of black bears in this unit. I suspect that 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. Areas important for denning remain unknown.

MORTALITY

Harvest

Season and Bag Limit.

Unit 17

August 1–May 31	Residents:	2 bears per year
	Nonresidents:	1 bear per year

Board of Game Actions and Emergency Orders. No Board of Game actions or Emergency Orders occurred during this reporting period.

Human-Induced Mortality. Before 1994 there were no sealing or reporting requirements for black bear hunters in Unit 17. Our incidental observations indicated that black bears were subject to the same increasing hunting pressure as other big game species in Unit 17B because 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 1995–96 season hunters in Unit 17 reported harvesting 18 black bears, including 13 males (72%) and 5 females (28%). The average total skull size was 16.7" for males and 16.2" for females. Successful hunters spent an average of 4.3 days afield. No hunters killed more than 1 bear. At least some meat was salvaged from 4 bears (22%). Guided hunters took 10 of the 18

bears. At least 2 of the successful nonresident hunters took black bears using big game tags from other species.

During the 1996–97 season hunters in Unit 17 reported harvesting 26 black bears, including 19 males (73%), 6 females (23%), and 1 bear of unknown sex (4%). The average total skull size was 16.4" for males and 15.9" for females. Successful hunters spent an average of 4.8 days afield. One hunter reported killing more than 1 bear. At least some meat was salvaged from 6 bears (23%). Guided hunters took 14 of the 26 bears. At least 7 of the successful nonresident hunters took black bears using big game tags from other species.

During the 1997–98 season hunters in Unit 17 reported harvesting 18 black bears, including 12 males (67%), and 6 females (33%). The average total skull size was 16.2" for males and 16.7" for females. Successful hunters spent an average of 4.0 days afield. No hunters reported killing more than 1 bear. At least some meat was salvaged from 4 bears (22%). Guided hunters took 10 of the 18 bears. At least 4 of the successful nonresident hunters took black bears using big game tags from other species.

Hunter Residency and Success. Nonresidents account for most of the reported black bear harvest in Unit 17. During the 1995–96 season, nonresidents took 72% of the harvested bears reported in the unit, Unit 17 residents took 6%, and other Alaska residents took 22%. During the 1996/97 season, nonresidents took 85% of the harvested bears reported in the unit, Unit 17 residents took none, and other Alaska residents took 15%. During the 1997–98 season, nonresidents took 89% of the bears reported harvested in the unit, Unit 17 residents took none, and other Alaska residents took 11% (Table 3).

Harvest Chronology. All black bears reported harvested in Unit 17 during this reporting period were killed during the fall. (Table 4).

Transport Methods. Most successful black bear hunters used aircraft for access, although 2 hunters in fall 1997 reported walking to their hunt area (Table 5).

Other Mortality

Although natural deaths associated with age, brown bears, and moose occur in the unit, we do not collect data on natural mortalities for black bears in Unit 17.

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 provide an abundant food supply for bears. Human settlements are relatively small and unobtrusive.

NONREGULATORY PROBLEMS/NEEDS

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

CONCLUSIONS AND RECOMMENDATIONS

Initiation of mandatory sealing in 1994 and restricted seasons are indications of the importance the department places on this resource in Unit 17. Data derived from these actions, when coupled with continued information from hunters and local residents, 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, 1990/1991–1997/1998

Regulatory year	Hunter Kill				Nonhunting Kill				Total reported kill			
	Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1990/91[a]	---	---	---	---	0	0	0	0	---	---	---	---
1991/92[a]	---	---	---	---	0	0	0	0	---	---	---	---
1992/93[a]	---	---	---	---	1	0	0	1	---	---	---	---
1993/94[a]	---	---	---	---	0	0	0	0	---	---	---	---
1994/95	6	7	0	13	0	0	0	0	6	7	0	13
1995/96	13	5	0	18	0	0	0	0	13	5	0	18
1996/97	19	6	1	26	0	0	0	0	19	6	1	26
1997/98	12	6	0	18	0	0	0	0	12	6	0	18

[a] Harvest reporting and sealing was not required in Unit 17 before 1994.

Table 2 Unit 17 black bear harvest by subunit, 1990/91–1997/98

Regulatory year	Subunit 17A M	17A F	17A Unk	17A Total	17B M	17B F	17B Unk	17B Total	17C M	17C F	17C Unk	17C Total	Unit 17 total M	Unit 17 total F	Unit 17 total Unk	Unit 17 total 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
1995/96	0	0	0	0	12	4	0	16	1	1	0	2	13	5	0	18
1996/97	0	0	0	0	18	6	1	25	1	0	0	1	19	6	1	26
1997/98	0	0	0	0	10	5	0	15	2	1	0	3	12	6	0	18

[a] harvest reporting and sealing not required in Unit 17 before 1994.

Table 3 Unit 17 black bear successful hunter residency, 1990/91–1997/98

Regulatory year	Local[a] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters[b]
1990/91[c]	---	---	---	---
1991/92[c]	---	---	---	---
1992/93[c]	---	---	---	---
1993/94[c]	---	---	---	---
1994/95	0 (---)	2 (15%)	11 (85%)	13
1995/96	1 (6%)	4 (22%)	13 (72%)	18
1996/97	0 (---)	4 (15%)	22 (85%)	26
1997/98	0 (---)	2 (11%)	16 (89%)	18

[a] residents of Unit 17.

[b] total may be higher than the sum of the columns due to hunters of unknown residency.

[c] harvest reporting and sealing not required in Unit 17 before 1994.

Table 4 Unit 17 black bear harvest chronology percentage by month, 1990/91–1997/98

Regulatory year	Month of harvest										
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Total
1989/90[a]	---	---	---	---	---	---	---	---	---	---	---
1990/91[a]	---	---	---	---	---	---	---	---	---	---	---
1991/92[a]	---	---	---	---	---	---	---	---	---	---	---
1992/93[a]	---	---	---	---	---	---	---	---	---	---	---
1993/94[a]	---	---	---	---	---	---	---	---	---	---	---
1994/95[b]	46%	39%	15%	0%	0%	0%	0%	0%	0%	0%	13
1995/96[b]	33%	67%	0%	0%	0%	0%	0%	0%	0%	0%	18
1996/97[b]	42%	58%	0%	0%	0%	0%	0%	0%	0%	0%	26
1997/98[b]	33%	67%	0%	0%	0%	0%	0%	0%	0%	0%	18

[a] Season dates: No closed season; 3-bear bag limit

Prior to 1994/95 sealing was not required and no harvest data are available.

b - 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, 1990/91–1997/98

Regulatory year	Percent of harvest									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	Total
1990/91[a]	---	---	---	---	---	---	---	---	---	---
1991/92[a]	---	---	---	---	---	---	---	---	---	---
1992/93[a]	---	---	---	---	---	---	---	---	---	---
1993/94[a]	---	---	---	---	---	---	---	---	---	---
1994/95	39%	0%	54%	0%	0%	0%	0%	8%	0%	13
1995/96	78%	22%	0%	0%	0%	0%	0%	0%	0%	18
1996/97	81%	19%	0%	0%	0%	0%	0%	0%	0%	26
1997/98	89%	0%	0%	0%	0%	0%	0%	11%	0%	18

[a] harvest reporting and sealing not required in Unit 17 before 1994.

LOCATION

GAME MANAGEMENT UNIT: 20A, 20B, 20C, and 20F (34,079 mi^2)

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. During 1988–1991 a cooperative project conducted by ADF&G with support from the U.S. Army 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 recreation for hunters in some areas. With growth of the Fairbanks human population, interest in hunting black bears is increasing, especially during spring. More information about black bear ecology and population dynamics has helped ensure 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; therefore, management objectives call for a minimum percentage of males in the harvest.

- Maintain a black bear population that sustains a harvest of at least 55% males in the combined harvests for the most recent 3 years in all units.
- 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 date and location, sex, skull size, amount of meat salvaged, defense of life or property kills, 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, Montana, USA) 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. Hechtel (1991) described the methods used for this project.

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.

There are some differences between annual harvest data reported here and annual harvest data reported previously. Prior to 1988, data were summarized by calendar year. Since 1988, data were summarized by regulatory year (RY = 1 July–30 June).

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 included 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). Population estimates were calculated based on Hechtel's (1991) density estimate of 12–18 black bears/100 mi^2 (46–67/1000 km^2), excluding cubs of the year, inhabiting this Tanana Flats study area in 1989. The density estimate was then applied to the estimated amount of suitable black bear habitat in each unit. This density is similar to the estimate of 17 bears/100 mi^2 in the Susitna River area (Miller et al. 1987), but it is much lower than the 39–52 bears/100 mi^2 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 were not representative of sex ratios in the population because females with cubs were protected by regulation. In addition, behavioral differences of male and female bears may have resulted 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 23 mi^2 for adult females, 32 mi^2 for subadult females, 230 mi^2 for adult males, and 93 mi^2 for subadult males (Hechtel 1991).

MORTALITY

Harvest

Season and Bag Limit. The black bear hunting season was 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. During the January 1996 meeting, the Board of Game 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 took effect on 15 April 1997.

At their March 1996 meeting, the board also approved a proposal to require the salvage of all edible meat from black bears killed during a portion of the spring season (1 Jan–31 May) in units where sealing is required. We submitted this proposal in response to a board request. The definition of edible meat for black bears includes the meat of the front quarters, hind quarters, and meat along the back bone (back straps). This regulation took effect in spring 1997.

Hunter Harvest. Since RY 1984–1985, the harvest during any regulatory year for black bears in Unit 20A was 14–64 (Table 1). During the last 3 regulatory years, the harvest included 51 bears (RY 1995–1996), 58 bears (RY 1996–1997), and 60 bears (RY 1997–1998). The male representation in these harvests was 67% (33/49), 55% (32/58), and 66% (39/59), respectively. The 3-year (RY 1995–1996 through RY 1997–1998) combined harvest was 169 bears, with 63% (104/166) males.

Since RY 1984–1985, the harvest of black bears in Unit 20B was 83–177 (Table 1). During the last 3 regulatory years, the harvest included 162 bears (RY 1995–1996), 174 bears (RY 1996–1997), and 159 bears (RY 1997–1998). The male representation in these harvests was 72% (117/162), 61% (106/173), and 70% (110/158), respectively. The 3-year (RY 1995–1996 through RY 1997–1998) combined harvest was 495 bears, with 68% (333/493) males.

Since RY 1984–1985, the harvest of black bears in Unit 20C was 7–41 (Table 1). During the last 3 regulatory years, the harvest included 12 bears (RY 1995–1996), 41 bears (RY 1996–1997), and 35 bears (RY 1997–1998). The male representation in these harvests was 83%

(10/12), 73% (30/41), and 53% (18/34), respectively. The 3-year (RY 1995–1996 through RY 1997–1998) combined harvest was 88 bears, with 67% (58/87) males.

Since RY 1984–1985 the harvest of black bears in Unit 20F was 5–46 (Table 1). During the last 3 regulatory years, the harvest included 34 bears (RY 1995–1996), 40 bears (RY 1996–1997), and 31 bears (RY 1997–1998). The male representation in these harvests was 62% (21/34), 68% (27/40), and 74% (23/31), respectively. The 3-year (RY 1995–1996 through RY 1997–1998) combined harvest was 105 bears, with 68% (71/105) males.

The average annual reported harvest in all units from RY 1984–1985 through RY 1989–1990 was 155 bears, compared to an average annual reported harvest of 263 bears for RY 1990–1991 through RY 1997–1998. The increasing harvest trend since RY 1990–1991 occurred in all 4 units (Table 1). The average male representation in the harvest during these periods was 64% (581/908) and 67% (1309/2077), respectively.

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 regulatory years, we estimated the proportion of black bears harvested was approximately 8–11% in Unit 20A, 14–22% in Unit 20B, 3–4% in Units 20C, and 5–9% in Unit 20F.

Distribution of Harvest. Most black bear harvest was within the road-accessible portions of Unit 20B. Bait stations were more prevalent along the road system because of the logistics of transporting heavy, bulky bait. The distribution of harvests reflected this trend. Other trends in harvest included increased participation in black bear hunting and hunters traveling farther away from the road system and from Fairbanks to hunt black bears (possibly to avoid crowding).

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 were hunted intensively. Approximately half of the bear harvest in these areas was by military personnel.

Registration of Bait Stations. Regulations for hunting black bears at bait stations changed several times in recent years. Prior to RY 1981–1982, 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 RY 1987–1988, 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, have no more than 2 bait stations, and limit baiting to the spring season. In addition, baiting was restricted to 15 April–15 June during RY 1989–1990 and to 15 April–30 June during RY 1990–1991 through RY 1997–1998 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 using 314 bait stations in spring 1989, when registration became mandatory, to a peak of 615 hunters using 1154 bait stations in spring 1993 (Table 2).

Harvest at Bait Stations. Since RY 1990–1991, 63–79% of the annual black bear harvest in Unit 20 was at bait stations (Table 2). On average, 70% (604/857) of the annual black bear harvest occurred at bait stations during this reporting period.

Hunter Residency and Success. During this reporting period, most black bears were harvested by state residents (89–95%), and 92–94% of the state residents were residents of Unit 20 (Table 3). Nonresident harvest was 5–11% of the total annual harvest. We have no data on success rates for black bear hunters because only successful hunters were required to report.

Harvest Chronology. Most of the annual black bear harvest occurred during May and June, which coincides with the baiting season and with den emergence. During this reporting period, 79% of the harvest was during these 2 months (Table 4). Factors that influenced harvest chronology for black bears included the opportunity to use bait, vulnerability of bears, hide quality, and seasonal activity of hunters.

Transport Methods. During this reporting period, the most common methods of transportation used by successful black bear hunters were boats and 4-wheelers in Unit 20A, 4-wheelers and highway vehicles in Unit 20B, boats and airplanes in Unit 20C, and highway vehicles and 4-wheelers in Unit 20F (Table 5).

Defense of Life or Property. The number of black bears taken in defense of life or property (DLP) was probably much higher than reported. A year-round season, a bag limit of 3 black bears, and requirements associated with DLP kills probably resulted in some black bears reported as sport-harvested bears that would otherwise be taken under DLP provisions. Our records indicated that during the last 3 years, 8 black bears were recorded as DLPs.

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, but necropsy results revealed the presence of extensive cancerous tissue in several internal organs.

CONCLUSIONS AND RECOMMENDATIONS

We met our management objectives for sex ratio of the black bear harvests. Before this report, the management objectives were not consistent for the units under consideration. The objectives were simplified because there was no biological or ethical reason for the differences among units. The average percent males in the harvest for the units ranged from 63% in Unit 20A to 68% in Units 20B and 20F, which is well above the minimum objective of 55%.

Based on the population estimates for the individual units, the average annual harvest rates for the last 3 years were below the maximum sustainable exploitation rate of 12% in Units 20A (8–11%), 20C (3–4%), and 20F (5–9%). In Unit 20B the average annual harvest rate for the last 3 years exceeded the maximum sustained exploitation rate (the harvest was 14–22% of the estimated population). The most plausible explanation for the Unit 20B rates was a low population estimate. Evidence supporting this explanation included more than 10 consecutive years of data in which the percent males in the harvest was >60%, a relatively constant number of problem black bear calls and black bear sightings, and the fact that the Unit 20B population estimate was calculated by extrapolating Unit 20A data. As with some extrapolations, differences in habitat quality can significantly bias the estimates. I recommend we determine a better estimate of the black bear population in Unit 20B. I also recommend that we closely monitor the harvest in Unit 20B and be prepared to recommend regulatory changes if we obtain sufficient evidence that the black bear harvest is exceeding maximum sustained yield.

We met our objective of minimizing bear-human conflicts in the Fairbanks area. High black bear harvest reduced the potential for problems. We also provided the public with information and worked to reduce the incidence 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.

Bear baiting has become an important issue for antihunting 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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Table 1 Units 20A, 20B, 20C and 20F black bear harvest[a], regulatory years 1984–1985 through 1997–1998

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
1992–1993	20A	13	8	0	21	27	16	0	43	40	24	0	64

Table 1 Continued

Regulatory year	Area	Fall				Spring				Annual total			
		Male	Female	Unk	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
	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
1995–1996	20A	9	1	1	11	24	15	1	40	33	16	2	51
	20B	14	6	0	20	103	39	0	142	117	45	0	162
	20C	5	0	0	5	5	2	0	7	10	2	0	12
	20F	1	0	0	1	20	13	0	33	21	13	0	34
	Total	29 (81%)	7	1	37	152 (69%)	69	1	222	181 (70%)	76	2	259
1996–1997	20A	15	16	0	31	17	10	0	27	32	26	0	58
	20B	25	14	1	40	81	53	0	134	106	67	1	174
	20C	12	7	0	19	18	4	0	22	30	11	0	41
	20F	5	0	0	5	22	13	0	35	27	13	0	40
	Total	57 (61%)	37	1	95	138 (63%)	80	0	218	195 (63%)	117	1	313
1997–1998	20A	9	8	0	17	30	12	1	43	39	20	1	60
	20B	12	8	1	21	98	40	0	138	110	48	1	159
	20C	3	3	0	6	15	13	1	29	18	16	1	35
	20F	2	0	0	2	21	8	0	29	23	8	0	31
	Total	26 (58%)	19	1	46	164 (69%)	73	2	239	190 (67%)	92	3	285

[a] 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.

Table 2 Units 20A, 20B, 20C, and 20F black bear bait station registration and harvest, regulatory years 1990–1991 through 1997–1998

Regulatory year	Hunters registering bait stations	Bait stations	Harvest		
			Taken over bait (%)	Not taken[a] over bait (%)	Total harvest[b]
1990–1991	358	570	175 (70)	76 (30)	251
1991–1992	450	767	118 (66)	62 (34)	180
1992–1993	615	1154	176 (64)	100 (36)	276
1993–1994	542	901	175 (73)	66 (27)	241
1994–1995	575	899	221 (79)	59 (21)	280
1995–1996	593	958	190 (73)	69 (27)	259
1996–1997	596	951	197 (63)	116 (37)	313
1997–1998			217 (76)	68 (24)	285

[a] Not taken over bait harvest includes bears taken outside of the baiting season.
[b] Total harvest does not include harvest where baited or unbaited was unknown.

Table 3 Units 20A, 20B, 20C, and 20F successful hunter residency, regulatory years 1989–1990 through 1997–1998

Regulatory year	Residents			Nonresident	Unk (%)	Total successful hunters[b]
	Local[a] (%)	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
1995–1996	226 (92)	19 (8)	245 (95)	14 (5)	0 (0)	259
1996–1997	260 (94)	18 (6)	278 (89)	34 (11)	1 (<1)	313
1997–1998	238 (94)	16 (6)	254 (89)	30 (11)	1 (<1)	285

[a] Resident of Unit 20.

[b] Excludes data from DLPs that were not taken as a legal harvest.

Table 4 Units 20A, 20B, 20C, and 20F black bear harvest chronology by month, regulatory years 1995–1996 through 1997–1998

Unit	Regulatory year	Harvest Period (%) May	Jun	Jul	Aug	Sep	Other	*n*
20A	1995–1996	19 (37)	21 (41)	1 (2)	1 (2)	9 (18)	0 (0)	51
	1996–1997	14 (24)	13 (22)	4 (7)	3 (5)	24 (41)	0 (0)	58
	1997–1998	30 (50)	13 (22)	0 (0)	4 (7)	13 (22)	0 (0)	60
	Subtotal (%)	63 (37)	47 (28)	5 (3)	8 (5)	46 (27)	0 (0)	169 (20)
20B	1995–1996	62 (38)	80 (49)	2 (1)	2 (1)	16 (10)	0 (0)	162
	1996–1997	53 (30)	81 (47)	10 (6)	5 (3)	25 (14)	0 (0)	174
	1997–1998	73 (46)	65 (41)	2 (1)	3 (2)	15 (9)	1 (<1)	159
	Subtotal (%)	188 (38)	226 (46)	14 (3)	10 (2)	56 (11)	1 (<1)	495 (58)
20C	1995–1996	2 (17)	5 (42)	0 (0)	0 (0)	5 (42)	0 (0)	12
	1996–1997	10 (24)	11 (27)	1 (2)	1 (2)	17 (41)	1 (2)	41
	1997–1998	19 (54)	10 (29)	1 (3)	0 (0)	5 (14)	0 (0)	35
	Subtotal (%)	31 (35)	26 (30)	2 (2)	1 (1)	27 (31)	1 (1)	88 (10)
20F	1995–1996	15 (44)	18 (53)	0 (0)	0 (0)	1 (3)	0 (0)	34
	1996–1997	15 (37)	20 (50)	0 (0)	1 (3)	4 (10)	0 (0)	40
	1997–1998	16 (52)	13 (42)	0 (0)	1 (3)	1 (3)	0 (0)	31
	Subtotal (%)	46 (44)	51 (49)	0 (0)	2 (2)	6 (6)	0 (0)	105 (12)
	Total	328 (38)	350 (41)	21 (2)	21 (2)	135 (16)	2 (<1)	857

Table 5 Units 20A, 20B, 20C, and 20F black bear harvest by transport method, regulatory years 1995–1996 through 1997–1998

Unit	Regulatory year	Harvest by transport method (%)									*n*
		Airplane	Horse	Boat	4-wheeler	Snowmachine	Other ORV	Highway vehicle	Walk	Other/ Unk	
20A	1995–1996	9 (18)	2 (4)	28 (55)	5 (10)	0 (0)	1 (2)	1 (2)	1 (2)	4 (8)	51
	1996–1997	6 (10)	0 (0)	29 (50)	18 (31)	0 (0)	0 (0)	2 (3)	1 (2)	2 (3)	58
	1997–1998	13 (22)	0 (0)	23 (38)	17 (28)	0 (0)	1 (2)	1 (2)	3 (5)	2 (2)	60
20B	1995–1996	10 (6)	0 (0)	13 (8)	60 (37)	0 (0)	5 (3)	66 (41)	8 (5)	0 (0)	162
	1996–1997	11 (6)	0 (0)	33 (19)	60 (34)	0 (0)	1 <1)	59 (34)	10 (6)	0 (0)	174
	1997–1998	9 (6)	0 (0)	38 (24)	59 (37)	0 (0)	0 (0)	41 (26)	10 (6)	2 (1)	159
20C	1995–1996	5 (42)	0 (0)	5 (42)	2 (17)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	12
	1996–1997	7 (17)	0 (0)	26 (63)	4 (10)	1 (2)	0 (0)	0 (0)	3 (7)	0 (0)	41
	1997–1998	4 (11)	0 (0)	27 (77)	2 (6)	0 (0)	0 (0)	1 (3)	0 (0)	1 (3)	35
20F	1995–1996	0 (0)	1 (3)	2 (6)	2 (6)	0 (0)	0 (0)	29 (85)	0 (0)	0 (0)	34
	1996–1997	2 (5)	0 (0)	4 (10)	10 (25)	0 (0)	3 (7)	19 (48)	2 (5)	0 (0)	40
	1997–1998	1 (3)	0 (0)	1 (3)	12 (39)	0 (0)	2 (6)	15 (48)	0 (0)	0 (0)	31

LOCATION

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

GEOGRAPHIC DESCRIPTION: Central Tanana Valley near Delta Junction

BACKGROUND

Black bears are widely distributed in Unit 20D. Most black bear harvest in Unit 20D is 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 sustained yield of black bears with 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, in defense of life or property, or from other sources such as road kill. 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 or not the meat was salvaged. Data were summarized by regulatory year (RY = 1 July–30 June).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

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

Anecdotal information from residents and hunters in Unit 20D during this reporting period indicated that black bears were numerous throughout the area.

Distribution and Movements

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

MORTALITY

Harvest

Season and Bag Limit. There was no closed season on black bears in Unit 20D during RY 1995–1996 through RY 1997–1998. 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 using bait could not establish more than 2 bait stations and were required to acquire a permit issued by the Alaska Department of Fish and Game.

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

Harvest by Hunters. Reported black bear harvest by hunters in Unit 20D during this reporting period ranged from 19 (RY 1995–1996) to 30 (RY 1997–1998) (Table 1). Mean annual harvest was 25 bears/year, an increase from 15 bears/year harvested during the previous 5 regulatory years. In addition, 1 bear was killed in defense of life or property during RY 1995–1996 and 2 were killed during RY 1997–1998.

Harvest increased substantially during RY 1997–1998. This increase was due in part to increased numbers of bears taken at bait stations (Table 1). During the previous 5 years (RY 1992–1993 through RY 1996–1997) bears taken at bait stations averaged 7 (range 6–8), but increased to 15 bears taken during RY 1997–1998. During RY 1997–1998, 4 hunters reported taking 2 bears each.

Males composed 75% of reported harvest of known-sex bears from RY 1995–1996 through RY 1997–1998; females composed 25% of the reported harvest. MacHutchon and Smith (1988), as reported by Hechtel (1991), suggested a harvest in excess of 35% females could warrant detailed harvest assessment to determine excessive harvest. Because harvest was predominantly males, more detailed harvest assessment was not needed during this reporting period.

Hunting bears at bait stations contributed significantly to the spring bear harvest. During the RY 1995–1996 through RY 1997–1998 spring seasons, a mean of 65% of bears killed were killed at bait stations (range = 47–79%) (Table 1). This was an increase from a mean of 57% of spring bears killed at bait stations during the previous 3 years (range 54–58%).

Harvest Locations. The reported harvest did not exceed harvest objectives during RY 1995–1996 or RY 1996–1997 (Table 2). However, the harvest objective was exceeded south of the Tanana River during the 1997–1998 season with a harvest of 22 bears.

Most black bears (65%) were harvested south of the Tanana River during this reporting period (Table 2). Reported harvest averaged 16 bears/year (range = 12–22) during the last 3 years. This take represented an annual harvest of 7.1% of the estimated adult population south of the Tanana River.

The reported harvest north of the Tanana comprised 35% of the unitwide harvest from RY 1995–1996 through RY 1997–1998 and averaged 8 bears/year (range = 6–11). Harvest represented an annual take of 1.5% of the estimated adult population north of the Tanana River.

Hunter Residency. Black bear harvest by nonlocal residents began increasing in RY 1993–1994 and has remained high, ranging from 40–53% of hunters during this reporting period (Table 3). Few nonresidents killed black bears in Unit 20D.

Harvest Chronology. Most bears continued to be harvested in May–June and August–September (Table 4).

Transportation Methods. The most popular modes of transportation for black bear hunters in Unit 20D continued to be 3- or 4-wheelers and highway vehicles (Table 5). Other commonly used modes of transportation include airplanes, boats, and walking.

CONCLUSIONS AND RECOMMENDATIONS

We monitored harvest of black bears to assure that hunting did not have negative effects on the population. Liberal seasons and bag limits provided hunters maximum opportunity to hunt black bears in Unit 20D. Harvest levels generally met management objectives; however, harvest exceeded the management objective of 15 black bears south of the Tanana River during RY 1997–1998. Because this is the first time harvest has exceeded the objective and because most bears harvested are males, no changes in regulations are recommended at this time. 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 becomes excessive.

The management objective will be changed during the next reporting period to a harvest not to exceed 15 black bears south of the Tanana River and 35 black bears north of the Tanana River. I am changing the harvest north of the Tanana River to allow a harvest proportional to the estimated population.

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Table 1 Unit 20D black bear harvest, regulatory years 1987–1988 through 1997–1998

Regulatory year	Reported: Hunter kill M (%)	F (%)	Unk	Total	Baited	Nonhunting kill[a] M	F	Unk	Estimated kill Unrep	Illegal	Total reported and estimated kill M (%)	F (%)	Unk(%)	Total
1987–1988														
Fall 1987	5 (50)	5 (50)	0 (0)	10	--	0	0	0	0	0	5 (50)	5 (50)	0 (0)	10
Spring 1988	6 (86)	1 (14)	0 (0)	7	--	0	0	0	0	0	6 (86)	1 (14)	0 (0)	7
Total	11 (65)	6 (35)	0 (0)	17	--	0	0	0	0	0	11 (65)	6 (35)	0 (0)	17
1988–1989														
Fall 1988	4 (57)	3 (43)	0 (0)	7	--	0	0	0	0	0	4 (57)	3 (43)	0 (0)	7
Spring 1989	5 (71)	2 (29)	0 (0)	7	--	0	0	0	0	0	5 (71)	2 (29)	0 (0)	7
Total	9 (64)	5 (36)	0 (0)	14	--	0	0	0	0	0	9 (64)	5 (36)	0 (0)	14
1989–1990														
Fall 1989	6 (75)	2 (25)	0 (0)	8	--	0	0	0	0	0	6 (75)	2 (25)	0 (0)	8
Spring 1990	8 (89)	1 (11)	0 (0)	9	--	0	0	3	0	0	8 (89)	1 (11)	3 (25)	12
Total	14 (82)	3 (18)	0 (0)	17	--	0	0	3	0	0	14 (82)	3 (18)	3 (15)	20
1990–1991														
Fall 1990	2 (100)	0 (0)	0 (0)	2	--	0	0	1	0	0	2 (100)	0 (0)	1 (33)	3
Spring 1991	5 (71)	2 (29)	0 (0)	7	--	0	0	0	0	0	5 (71)	2 (29)	0 (0)	7
Total	7 (78)	2 (22)	0 (0)	9	--	0	0	1	0	0	7 (78)	2 (22)	1 (10)	10
1991–1992														
Fall 1991	6 (100)	0 (0)	0 (0)	6	--	0	0	0	0	0	6 (100)	0 (0)	0 (0)	6
Spring 1992	3 (100)	0 (0)	0 (0)	3	--	0	0	0	0	0	3 (100)	0 (0)	0 (0)	3
Total	9 (100)	0 (0)	0 (0)	9	--	0	0	0	0	0	9 (100)	0 (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 (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 (0)	14	8	0	0	0	0	0	6 (43)	8 (57)	0 (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)	0 (0)	3	0	0	0	0	0	0	3 (100)	0 (0)	0 (0)	3
Spring 1995	6 (55)	5 (46)	0 (0)	11	6	0	0	0	0	0	6 (55)	5 (46)	0 (0)	11
Total	9 (64)	5 (36)	0 (0)	14	6	0	0	0	0	0	9 (64)	5 (36)	0 (0)	14
1995–1996														
Fall 1995	3 (75)	1 (25)	0 (0)	4	0	0	0	0	0	0	3 (75)	1 (25)	0 (0)	4
Spring 1996	10 (67)	5 (33)	0 (0)	15	7	1	0	0	0	0	11 (69)	5 (31)	0 (0)	16
Total	13 (68)	6 (32)	0 (0)	19	7	1	0	0	0	0	14 (70)	6 (30)	0 (0)	20

Table 1 Continued

Regulatory year	Reported											Estimated kill		Total reported and estimated kill							
	Hunter kill									Nonhunting kill[a]											
	M	(%)	F	(%)	Unk	(%)	Total	Baited	M	F	Unk	Unrep	Illegal	M	(%)	F	(%)	Unk	(%)	Total
1996–1997																				
Fall 1996	9	(82)	2	(18)	0	(0)	11	0	0	0	0	0	0	9	(82)	2	(18)	0	(0)	11
Spring 1997	6	(50)	6	(50)	0	(0)	12	8	0	0	0	0	0	6	(50)	6	(50)	0	(0)	12
Total	15	(65)	8	(35)	0	(0)	23	8	0	0	0	0	0	15	(65)	8	(35)	0	(0)	23
1997–1998																				
Fall 1997	8	(73)	3	(27)	0	(0)	11	0	1	0	0	0	0	9	(75)	3	(25)	0	(0)	12
Spring 1998	17	(90)	1	(5)	1	(5)	19	15	1	0	0	0	0	18	(90)	1	(5)	1	(5)	20
Total	25	(87)	4	(13)	1	(3)	30	15	2	0	0	0	0	27	(84)	4	(13)	1	(3)	32

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

Table 2 Unit 20D black bear harvest location, regulatory years 1987–1988 through 1997–1998

Regulatory year	South of Tanana River		North of Tanana River		
	n	%	*n*	%	*n*
1987–1988	14	(82)	3	(18)	17
1988–1989	9	(67)	5	(33)	14
1989–1990	10	(56)	7	(44)	17
1990–1991	4	(45)	5	(56)	9
1991–1992	7	(78)	2	(22)	9
1992–1993	10	(50)	10	(50)	20
1993–1994	13	(52)	12	(48)	25
1994–1995	10	(71)	4	(29)	14
1995–1996	13	(68)	6	(32)	19
1996–1997	12	(52)	11	(48)	23
1997–1998	22	(73)	8	(27)	30

Table 3 Unit 20D black bear successful hunter residency, regulatory years 1987–1998 through 1997–1998

Regulatory year	Local[a] 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 (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 (0)	14
1995–1996	9 (47)	10 (53)	0 (0)	19
1996–1997	12 (52)	10 (44)	1 (4)	23
1997–1998	18 (60)	12 (40)	0 (0)	30

[a] Local residents are residents of Unit 20D.

Table 4 Unit 20D black bear harvest chronology percent by month, regulatory years 1987–1988 through 1997–1998

Regulatory year	Harvest periods								
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	*n*
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	11	11	11	0	0	0	32	37	19
1996–1997	17	17	13	0	0	0	30	22	23
1997–1998	3	17	17	0	0	0	43	20	30

Table 5 Unit 20D black bear harvest percent by transport method, regulatory years 1987–1988 through 1997–1998

Regulatory year	Percent by transport method										
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walk	Other	Unk	*n*
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[a]	16	0	5	47	0	0	16	11	5	0	19
1996–1997	9	0	26	30	0	4	17	13	0	0	23
1997–1998	10	0	10	30	0	0	47	3	0	0	30

[a] Jul–Dec 1995 only.

LOCATION

GAME MANAGEMENT UNIT: 20E (10,681 mi^2)

GEOGRAPHIC DESCRIPTION: Fortymile, Charley, and Ladue River drainages, including the Tanana Uplands and all drainages into the south bank of the Yukon River upstream from and including the Charley River drainage

BACKGROUND

Black bears are throughout forested habitat in Unit 20E. Grizzly bear abundance was depressed during the 1960s and early 1970s from federal predator control poisoning efforts of the 1950s. Observations by long-term residents of the area indicate that black bears were more common during the 1960s and early 1970s than today. However, grizzly bears increased in numbers until the mid-1980s. Reduced black bear abundance may have been caused by grizzly bear competition and predation and declining habitat quality. Fire suppression activities in Unit 20E have allowed extensive areas to become climax black spruce stands that do not produce high-quality black bear food.

Currently, the black bear population in Unit 20E seems stable. The highest densities are 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 monitored harvest data through mandatory sealing of hunter-killed black bears and bears killed by defense of life or property. Information collected included harvest date and location, sex of the bear, skull size, transportation mode, number of days hunted, salvage of meat, and bait use. A premolar tooth was extracted from most of the bears brought in for sealing; however, black bear teeth have not been sectioned for aging for several years. Harvest data were summarized by regulatory year (RY = 1 July–30 June).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We did not conduct any population surveys during the report period to determine black bear population size and trend. I estimated the Unit 20E black bear population was 1000–1500 bears. My estimate is based on population data collected in Unit 12 during the early 1980s and recently in Unit 20A using radiotelemetry. The composition of the population is unknown. No major weather anomalies or major changes to the available black bear habitat have occurred in the past 5 years, and the population was likely stable.

Distribution and Movements

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

MORTALITY

Harvest

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

Board of Game Actions and Emergency Orders. During 1996 the Alaska Board of Game adopted a regulation requiring the meat, hide, and skull from black bears harvested during 1 January–31 May be salvaged in units requiring sealing, which included Unit 20E. During 1998 the board adopted a regulation allowing the sale of handcrafted items made from black bear fur. No other board actions or emergency orders occurred during this reporting period.

Hunter Harvest. During the report period, the annual reported harvest was 7–23 black bears ($\bar{x}$ = 17 bears) in Unit 20E (Table 1). The previous 5-year average harvest was 14 bears. The historically low harvest (0.5–2% harvest rate) was due to low hunter interest. Incidental take accounts for 50–85% of the annual harvest. Most hunters in the area consider black bears as an alternative meat source, and few select to hunt specifically for black bears. Between RY 1990–1991 and RY 1997–1998, only 8/56 (14.3%) of the black bears harvested during the spring in Unit 20E were killed at bait stations, compared to 107/186 (57.8%) black bears in Unit 12.

During the report period, the average skull size of males was 16.2 inches (n = 32). The previous 5-year average was 16.7 inches. The combined percent males in the harvest was 65% compared to 74% the previous 5 years. Consistent skull sizes and high percentage of males in the harvest indicated human-induced mortality had minimal effects on this population. These 2 parameters will be monitored closely to detect any changes in the black bear population.

Hunter Residency and Success. During the report period, state residents took 92% of the black bears harvested, and residents of the unit took 38% (Table 2). Since RY 1990–1991, unit residents have taken 53% of the harvested black bears. During spring few nonlocal residents

travel to Unit 20E to hunt black bears, and during most years unit residents take over 80% of the spring harvest. Nonresidents harvested 4 bears during the report period, yet nonresidents have only taken 8 black bears (7%) during the past 8 years.

No measure of hunter success was available because nonsuccessful hunters were not required to report. During the report period, the number of days spent afield by successful hunters was 2.8–6.8 ($\bar{x}$ = 4.6 days). The previous 5-year average was 2.7 days. Annually, the average number of days successful hunters reported spending afield was 2.9–3.5 days during the fall, compared to 1.5–16.7 days during spring. During 1996 2 hunters reported spending 30 and 60 days hunting at their respective bait stations.

Harvest Chronology. During the report period, 57–71% ($\bar{x}$ = 63%) of the black bear harvest was during fall. Since RY 1990–1991, 53% of the black bear harvest has occurred during fall (Table 3). Black bear harvest in July was primarily due to black bears wandering into fish camps or into people's yards, and harvest during August and September was incidental to caribou and moose hunting.

Transport Methods. During the report period, highway vehicles were the most commonly used (35%) mode of transportation for successful black bear hunters (Table 4). Boats and 4-wheelers were the next most commonly used transportation type. The use of 4-wheelers for hunting black bears, moose, and caribou has increased by comparable amounts over the past 5 years, indicating that most black bear hunting was incidental to hunting moose and caribou.

HABITAT

Assessment

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

Enhancement

The implementation of the Alaska Interagency Fire Management Plan allowed wildfires to burn in more areas than before 1984. Also, a prescribed burn plan was implemented that will create a mosaic of vegetative types throughout the unit. Revegetation of preferred plant species in burned-over 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 were lightly harvested and, subsequently, harvest had little effect on the status and trend of the population. The percentage of males in the harvest the past 3 years was 65%. I recommend no changes in seasons or bag limits.

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SUBMITTED AND REVIEWED BY:

Roy A Nowlin
Regional Management Assistant

Table 1 Unit 20E black bear harvest, regulatory years 1990–1991 through 1997–1998

Regulatory year	Reported								Estimated kill		Total reported and estimated kill							
	Hunter kill					Nonhunting kill[a]												
	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)			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	
1995–1996																		
Fall 1995	11	3	0	14	0	0	0	0	0	0	11	(79)	3	(21)	0	(0)	14	
Spring 1996	5	4	0	9	1	0	0	0	0	0	5	(56)	4	(44)	0	(0)	9	
Total	16	7	0	23	1	0	0	0	0	0	16	(70)	7	(30)	0	(0)	23	
1996–1997																		
Fall 1996	8	7	0	15	0	0	0	0	0	0	8	(53)	7	(47)	0	(0)	15	
Spring 1997	2	4	0	6	4	0	0	0	0	0	2	(33)	4	(67)	0	(0)	6	
Total	10	11	0	21	4	0	0	0	0	0	10	(48)	11	(52)	0	(0)	21	
1997–1998																		

Table 1 Continued

Regulatory year	Reported								Estimated kill		Total reported and estimated kill			
	Hunter kill					Nonhunting kill[a]								
	M	F	Unk	Total	Baited	M	F	Unk	Unrep	Illegal	M (%)	F (%)	Unk	Total
Fall 1997	4	0	0	4	0	0	0	0	0	0	4 (100)	0 (0)	0 (0)	4
Spring 1998	3	0	0	3	0	0	0	0	0	0	3 (100)	0 (0)	0 (0)	3
Total	7	0	0	7	0	0	0	0	0	0	7 (100)	0 (0)	0 (0)	7

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

Table 2 Unit 20E black bear successful hunter residency, regulatory years 1990–1991 through 1997–1998

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
1995–1996	7 (30)	13 (57)	3 (13)	23
1996–1997	7 (41)	9 (53)	1 (6)	17
1997–1998	3 (43)	4 (57)	0 (0)	7

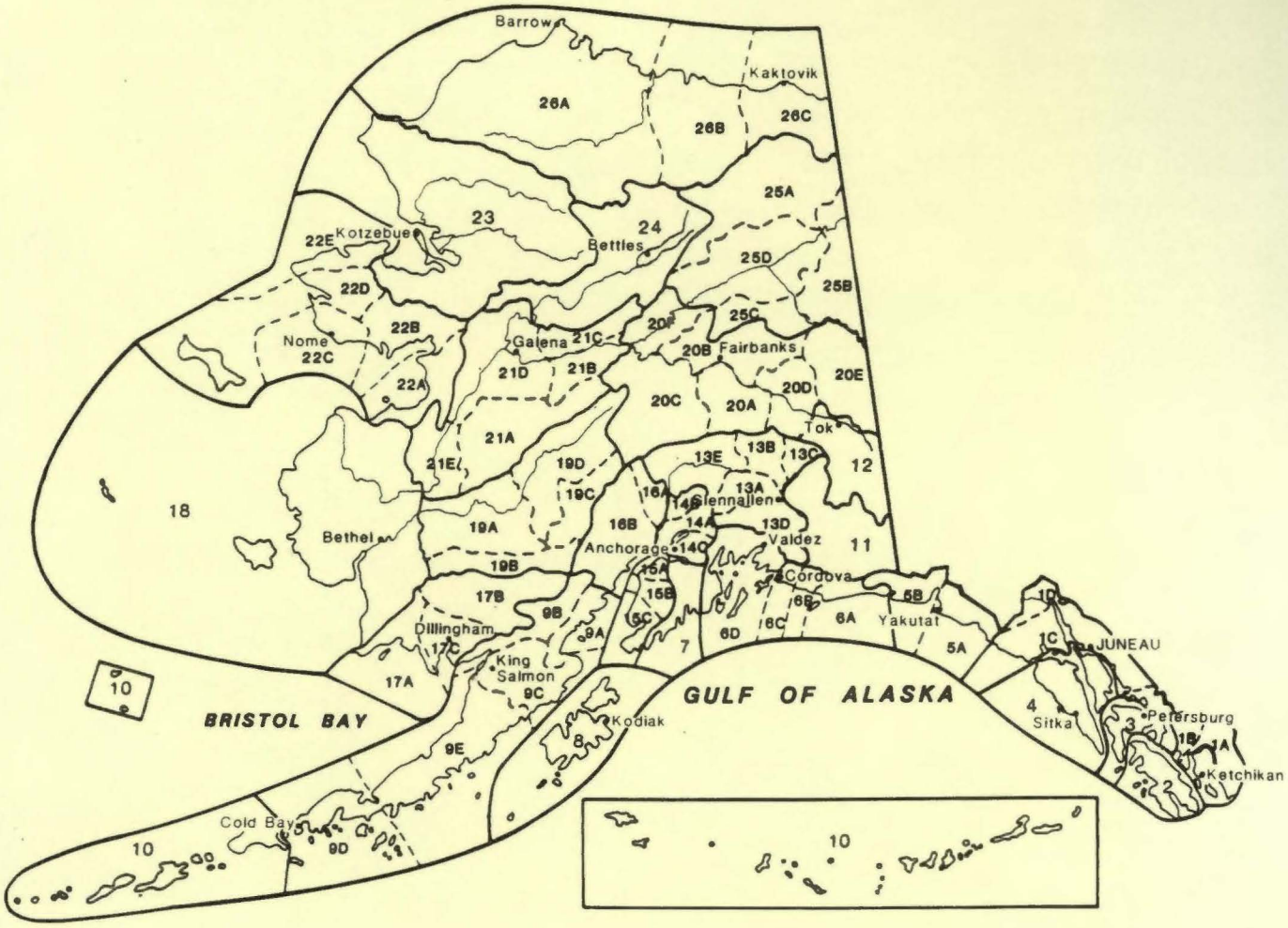
Table 3 Unit 20E black bear harvest chronology percent by month, regulatory years 1990–1991 through 1997–1998

Regulatory year	Harvest periods (%)								
	Jul	Aug	Sep	Oct	Nov	Apr	May	Jun	*n*
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
1995–1996	0	39	22	0	0	0	39	0	23
1996–1997	14	29	29	0	0	0	10	19	21
1997–1998	0	14	43	0	0	0	29	14	7

Table 4 Unit 20E black bear harvest percent by transport method, regulatory years 1990–1991 through 1997–1998

Regulatory year	Harvest percent by transport method (%)									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Walking	Unknown	*n*
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
1995–1996	1 (4)	0 (0)	7 (30)	2 (9)	0 (0)	0 (0)	10 (43)	2 (9)	1 (4)	23
1996–1997	1 (5)	0 (0)	4 (21)	6 (29)	0 (0)	2 (9)	7 (33)	1 (5)	0 (0)	21
1997–1998	0 (0)	0 (0)	3 (43)	1 (14)	0 (0)	0 (0)	1 (14)	2 (29)	0 (0)	7

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.

Grow