Alaska Department of Fish and Game
Division of Wildlife Conservation

Federal Aid in Wildlife Restoration
Management Report of
Survey-Inventory Activities
1 July 1990-30 June 1992

BLACK BEAR

· Susan M. Abbott, Editor
Project W-23-4/5, Study 17.0
August 1993

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LOCATION

Game Management Subunit: 1A (5,000 mi^2)

Geographical Description: Unit 1 south of Lemesurier Point, including drainages into Behm Canal and excluding drainages into Ernest Sound

BACKGROUND

No research or quantitative surveys have been conducted on black bears inhabiting southern southeast Alaska. However, based on public reports and Alaska Department of Fish and Game (ADF&G) staff observations, black bears are believed to be abundant throughout Subunit 1A. Data are limited to harvest information obtained from successful bear hunters through a mandatory sealing program which began in 1973. Black bear harvests have generally increased during the past 18 years. Following an average annual bear harvest of 29 from 1974-1980, the subunit harvest increased to 69 during 1981-1987. The kill remained relatively constant during 1987-1990, jumped to a high of 85 during 1990-91, and dropped back to near the 12-year average of 57 in 1991-92.

MANAGEMENT DIRECTION

Management Objective

The management objective for Subunit 1A black bears is to maintain an average skull size of at least 17.2 inches for male bears harvested each spring (January - June).

METHODS

Black bear harvest data are collected from successful hunters through a mandatory sealing program. Information including date and location of kill, sex, and skull measurements are recorded at the time of sealing. Premolar teeth extracted from sealed skulls are sent to Matson's Laboratory (Milltown, MT) for age determination.

In an effort to better compare and evaluate hunter success during the past 12 years, we ranked the total numbers of bears harvested (1 = highest to 11 = lowest), the numbers of hunter-days expended per bear harvested (1 = lowest to 6 = highest), and the mean skull measurements (1 = largest to 8 = smallest). The rank values from each of these categories were then summed to derive an overall ranking score. Low combined values were interpreted as representing the most "successful" seasons.

RESULTS AND DISCUSSION

Population Status and Trend

In the absence of any research or quantitative surveys, it is difficult to draw definitive conclusions about black bear population trends. However, based on harvest information, public reports, and observations by ADF&G personnel, the Subunit 1A black bear population appears stable.

Logging has occurred in parts of the subunit during the past several years. Substantial logging is scheduled for north Revillagigedo Island and the Cleveland Peninsula during the next 5-10 years. Although clearcuts generally provide bears with an abundance of plant foods during the first ten to twenty years, they become very unproductive once the canopy of conifers closes. As canopies of logged areas close throughout the subunit, 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 a study area in western Washington. Wood (1990) speculated that minimum black bear densities in Subunit 1A are higher than in Washington, and used an estimate of 1.5 bears/mi^2 for most forested islands in the subunit, and slightly lower densities for portions of the mainland. Using these density estimates, we estimate that 5,080 black bears reside in Subunit 1A (ADF&G unpubl. data, Ketchikan).

Population Composition: While males consistently make up the bulk of the harvest (Table 1), this is believed to be because hunters select for large bears rather than to naturally occurring sex ratios.

Distribution and Movement: Black bears occur throughout the mainland and adjacent islands of Subunit 1A. The black color phase is most common and occurs throughout the bears' range; however, the cinnamon color phase has occurred on mainland portions of the subunit. Home ranges and movement patterns of black bears inhabiting Subunit 1A have not been studied. However, research conducted near Petersburg in Unit 3 indicated that home ranges of black bears varied from 1.7 mi^2 to 16.2 mi^2 (Erickson et al. 1982). Movement patterns were found to be extremely variable among individual bears.

Mortality

Season and Bag Limit:

Sept. 1 - June 30	Resident hunters:	Two bears, not more than one of which may be a blue or glacier bear.
	Nonresident hunters:	One bear.

Hunter Harvest: With the exception of 1990-91, the annual black bear harvest from Subunit 1A has remained relatively stable at 59-69 bears since 1985 (Table 1). Males have made up 80-90% of the past six years harvest, and have comprised at least 67% of the harvest during the past 12 seasons (Table 1).

While black bear harvests occur throughout most of the subunit, Wildlife Analysis Areas (WAAs) 406 and 510 have accounted for a large portion of the annual harvest (Table 2). WAA 406, which consists of Carroll Inlet, accounted for nearly 23% of the subunit's 1980-92 harvest. Wildlife Analysis Area 510, consisting of the northwest corner of Revillagigedo Island, accounted for 15% of the subunit's 1980-92 harvest (Table 2). WAA 406, because of its proximity to Ketchikan, is a popular recreational area for Ketchikan residents. Coast Guard personnel working at the Shoal Cove Loran Station in Carroll Inlet regularly harvest bears from this area. Ketchikan residents, along with personnel from the Neets Bay fish hatchery account for several bears taken in WAA 510 each season.

Black bear skull sizes from Subunit 1A have varied annually. The management objective of maintaining an average skull size greater than or equal to 17.2 inches for spring males was achieved in all but one year since 1980 (Table 3). Female skull measurements varied relatively little and regularly averaged over 15.5 inches during the past ten seasons (Table 3). We conclude that hunters continue to select for large bears.

With bear ages determined for only the past two seasons (Table 3), it is premature to make comparative evaluations. However, as funds allow, teeth collected from bears harvested during past seasons will be aged in order to evaluate trends.

Hunter Residency and Success: Nonresident harvest varied substantially during the past twelve years, accounting for 10-45% of the annual harvest from Subunit 1A (Table 1). Local residents have taken 46-76% of the annual harvest during the same time period (Table 1).

Annual hunter success is based on information obtained from successful hunters, and does not include input from unsuccessful hunters. Success has been calculated using numbers of bears harvested, average hunter-days expended per bear, and mean skull measurements (Table 4). No trends could be identified using this method of assessment. The lowest ranking score corresponded with the 1989-90 season which is therefore indexed as the most "successful" season among the past twelve. The second most successful season was 1987-88, followed by a four-way tie for the third most successful season (1985-86, 1986-87, 1988-89, and 1990-91). The least successful season during the past twelve was 1982-83 (Table 4).

Harvest Chronology: Most black bears taken in Subunit 1A are harvested during spring. Notably, May 11-31 consistently shows up as the most productive spring period for

harvesting bears (Table 5). During 1980-92, 58% of the spring-killed bears were harvested during this three-week period.

The first ten days of September tend to be the most productive period for the fall season (Table 5). During 1980-92, 37% of the fall-killed bears were harvested during this ten-day period.

Transport Methods: Boats are the most-used source of transportation by bear hunters in Subunit 1A (Table 1). With a few exceptions, airplanes have constituted the second most popular source of transportation, followed by road vehicles (Table 1).

Nonregulatory Management Problems and Needs: Major habitat changes continue to occur as a result of logging activities. While early successional stages (3-20 years) provide black bears with an abundance of plant foods, later stages result in the disappearance of understory plants as conifer canopies close and light is kept from penetrating to the forest floor. Second-growth stands lack large hollow trees and root masses used by bears as denning habitat. We believe that although logging may create foods for bears in the short-term, the long-term result of logging will be a decline in bear numbers.

In the face of continued habitat alterations and hunting interest, it would be helpful to better understand the general ecology and habitat requirements of black bears in Southeast.

CONCLUSIONS AND RECOMMENDATIONS

Harvest records indicate that the annual black bear kill remains quite low, is heavily skewed towards males, and has not resulted in any discernable changes in average skull sizes of harvested bears. The objective of maintaining an average spring skull size for male bears of 17.2 inches is being met.

While the annual harvest only constitutes about 1% of the estimated Subunit 1A black bear population, close attention should be paid to specific WAAs to ensure that local over-harvesting does not occur. Especially critical are WAAs 406 and 510 where access is relatively easy, interest is high, and nearly 38% of the 1980-92 harvest has occurred.

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

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Table 1. Black bear harvest, hunter residency, and hunter transport, Subunit 1A, 1980-92.

		Harvest				Hunter Residency				Transport				
Years	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. (Cont.)

		Harvest				Hunter Residency				Transport				
Years	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	13	4	5	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	69	8	6	2
1991-92	Fall	12	7	3	22	15	3	4	0	4	10	1	7	0
	Spring	33	3	1	37	16	5	16	0	6	24	5	2	0
	Total	45	10	4	59	31	8	20	0	10	34	6	9	0

Table 2. Annual black bear harvest by Wildlife Analysis Area (WAA), Subunit 1A, 1980-1992.

	1980-81			1981-82			1982-83			1983-84			1984-85			1985-86			1986-87		
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U
101				2	1						2		1			1					
404				6			6	1					2	1		5	1		9	1	
405							2		1		1		2				1			1	1
406	4			5	1		5	1		9	2		15	2		14[b]	5		17[a]	4	
407		1		2			3	1		2	2		3[a]	1		2			3	1	
408	2[a]	1								2	1		3[a]	5[a]		3[ab]	2[a]		1[a]		
509				1						2			2				1[a]				
510	3			6			2	1		9			6	5		8	2	1	7	1	
511																					
612	1										2								1		
613	1			1									1			2	1		1		
614										1[a]											
715										1	1		1			2	1		2		
716					1					1			1	1		2	2		5	1	
717							1							1					2	1	
718																					
719	5	1		3			2			2	2					2	2		1	1	
820	3						4	1		1[a]											
821																					
822	4	3		4			1	1	1	2	2		2			6			6	2	
823				1	1						1										
824	1[a]	1[a]																			
825																					
826													1	1		1[a]					

Table 3. Hunter effort, mean skull sizes, and ages for black bears harvested in Game Management Unit 1A, 1980-1992.

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

Table 3. Hunter effort, mean skull sizes, and ages for black bears harvested in Game Management Unit 1A, 1980-1992.

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

Table 3. (Cont.)

		Hunter Effort			Mean Skull Sizes[a] (in)				Average Ages (years)[b]			
Years	Season	Total Days	No. Hunters	Avg. days per hunter	Male	(n)[c]	Female	(n)	Male	(n)	Female	(n)
1988-89	Fall	32	13	2.5	17.5	(7)	16.1	(4)				
	Spring	131	43	3.0	18.8	(27)	16.2	(1)				
	Total	163	56	2.9	18.5	(34)	16.1	(5)				
1989-90	Fall	19	8	2.4	17.1	(5)	----	(0)				
	Spring	151	56	2.7	18.5	(39)	16.0	(5)				
	Total	170	64	2.6	18.4	(44)	16.0	(5)				
1990-91	Fall	16	13	1.2	16.7	(9)	16.4	(3)				
	Spring	272	67	4.1	18.0	(56)	15.6	(5)				
	Total	288	80	3.6	17.8	(65)	15.9	(8)	10.2	(67)	11.0	(8)
1991-92	Fall	44	20	2.2	18.1	(11)	15.9	(7)				
	Spring	120	37	3.2	18.2	(32)	16.4	(3)				
	Total	164	57	2.9	18.1	(43)	16.1	(10)	11.0	(42)	9.6	(10)

[a] Skull sizes equal length plus zygomatic width.
[b] Bear ages not yet obtained for 1980-1990.
[c] Numbers in parentheses represent sample sizes.

Table 4. Reported numbers of black bears harvested, hunter effort (hunter-days/bear), mean skull sizes, and rankings of harvest, hunter success, and skull sizes relative to other years in Subunit 1A, 1980-1992.

Years	Total Harvest[a]		Hunter-Days/ Bear[b]		Mean Skull Sizes (in)[c]		Overall Ranking Score[d]
1980-81	31	(11)	2.6	(2)	16.9	(8)	21
1981-82	35	(9)	2.5	(1)	17.4	(5)	15
1982-83	34	(10)	3.8	(6)	17.1	(6)	22
1983-84	48	(8)	2.7	(3)	16.9	(8)	19
1984-85	57	(7)	2.6	(2)	17.0	(7)	16
1985-86	68	(3)	2.7	(3)	17.5	(4)	10
1986-87	69	(2)	2.5	(1)	17.0	(7)	10
1987-88	66	(4)	2.5	(1)	17.6	(3)	8
1988-89	60	(5)	2.9	(4)	18.1	(1)	10
1989-90	68	(3)	2.6	(2)	18.1	(1)	6
1990-91	85	(1)	3.6	(5)	17.5	(4)	10
1991-92	59	(6)	2.9	(4)	17.7	(2)	12

[a] Numbers in parentheses represent ranking scores for numbers of bears killed during each year relative to all others: 1=highest, 11=lowest.

[b] Numbers in parentheses represent ranking scores for hunter effort for each year relative to all others: 1=lowest, 6=highest.

[c] Numbers in parentheses represent ranking scores for mean skull size each year relative to all others: 1=highest, 8=lowest.

[d] Overall ranking score is equal to the sum of the ranking scores for numbers of bears killed, hunter effort, and mean skull sizes. Lower scores represent better seasons.

Table 5. Black bear harvest chronology[a], Subunit 1A, 1980-1992.

Numbers of Animals													
Date	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	Total
January	0	0	0	1	0	0	0	0	0	0	0	0	1
February	0	0	0	0	0	0	0	0	0	0	0	0	0
March	0	0	1	0	1	0	0	0	0	0	0	0	2
Apr 01-10	0	0	0	0	0	0	1	0	0	0	0	0	1
Apr 11-20	1	0	0	1	0	0	0	0	0	1	1	2	6
Apr 21-30	3	0	3	7	1	3	0	6	0	0	1	1	25
May 01-10	3	2	5	2	6	5	12	5	7	8	9	9	73
May 11-20	5	5	7	5	7	10	8	6	18	28	18	10	127
May 21-31	9	10	4	6	12	11	16	14	13	14	24	10	143
Jun 01-10	2	9	5	0	3	6	0	8	2	5	9	2	51
Jun 11-20	0	1	1	2	0	3	2	2	3	0	4	2	20
Jun 21-30	0	1	0	0	0	2	4	2	0	1	3	1	14
Sep 01-10	3	1	4	4	12	10	7	11	4	5	2	11	74
Sep 11-20	2	2	0	8	7	4	9	1	2	2	7	0	44
Sep 21-30	0	0	2	5	4	8	2	2	2	0	2	1	28
Oct 01-10	0	1	2	5	1	2	2	3	1	3	0	1	21
Oct 11-20	2	1	0	0	1	0	1	0	2	0	2	0	9

Table 5. (Cont.)

Numbers of Animals													
Date	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	Total
Oct 21-31	1	1	0	0	0	0	0	1	1	0	2	2	8
Nov 01-10	0	1	0	0	0	0	4	3	0	0	0	1	9
Nov 11-20	0	0	0	1	0	0	0	0	2	0	0	1	4
Nov 21-30	0	0	0	0	0	0	0	0	0	1	0	2	3
December	0	0	0	0	0	0	0	1	0	0	0	1	2

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

LOCATION

Game Management Units: 1B and 3 (6,000 mi^2)

Geographical Description: Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point and associated islands.

BACKGROUND

Black bears are indigenous to Subunit 1B and Unit 3 and traditionally have been hunted for food and trophies. Road building associated with the timber industry has opened more territory to hunters where previous access was by airplane or boat. The bag limit was increased from 1 to 2 bears in 1984 after a reduction to 1 bear in 1980. The kill in 1977 for Subunit 1B was 3 and 26 were taken in Unit 3. From July 1991 through June 1992, the kill was 16 and 164 for Subunit 1B and Unit 3, respectively.

MANAGEMENT DIRECTION

Management Objectives

The management objectives for area black bears are to maintain a mean skull size of at least 17.0 inches for males and a ratio of 3:1 males to females in the kill.

METHODS

Hunters are required to submit bear skulls and hides for sealing within 30 days of the kill. Sex, skull size (length plus width), location of kill, and other data are collected at the time of sealing. No data are collected for unsuccessful bear hunts. Comparison of current data to historical records shows harvest trend and gives indirect evidence of population trend.

RESULTS AND DISCUSSION

Population Status

Population information is not available for black bears in these units. Information obtained through the sealing process indicates that the populations are stable.

Mortality

Season and Bag Limit:

Sept. 1-June 30

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

Nonresident hunters: One bear.

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

Hunter Harvest: Hunter harvest in Subunit 1B ranged from 24 in 1989 to 15 in 1991 (Table 1). Females comprised 25% of the kill in 1989 but only 15% in 1991. The Unit 3 harvest is similar to that of Subunit 1B (Table 2). From 1987 through 1991 hunters have salvaged meat from 36 to 45% of all the bears killed. The percentage of bears taken for meat varies, with fall hunters taking more bears for meat (25% to 54%) than spring hunters. Resident hunters take 68% to 100% of all black bears taken for meat (ADF&G files). The average male skull size for 1991 was 18.1 inches in Subunit 1B and 18.3 inches in Unit 3 (Table 3). Average skull size was not below the management objective in any year.

Kuiu Island, with 28% of the Unit 3 land area, produced more than half the black bear harvest in Unit 3 during the 4 years before 1991, and 47% in 1991 (Table 4). Not only does Kuiu Island contribute more bears to the harvest, bears there appear larger than bears found in Subunit 1B or on other Unit 3 islands (Table 5). It may be that Kuiu Island has more salmon producing streams than other Unit 3 islands (ADF&G files). Hunter access may also be greater as Kuiu Island has more miles of shoreline per mi^2 of area than other islands. Mitkof and Wrangell islands compare closely in size, human population, logging activity, and road access, yet differ in the number of bears killed on Wrangell Island. The reason for this is not known.

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 Island has no resident bear population. Deer, wolves, and elk are present, and the reason for the lack of black bears is unknown.

Beginning in 1988, most successful hunters reported the number of bears seen before seeing the one they killed. From 1988 through 1991, the average number of bears seen ranged from 7 to 12 for those hunters that saw more than one. Hunters also reported the number of bears that were deliberately passed before selecting the one killed. The average for those that passed up 1 or more bears ranged from 5 to 10 annually. There was no discernable difference between residents and nonresidents (ADF&G files).

Hunter Residency and Success: Local residents take a majority of the black bears killed in Subunit 1B while nonresidents take most of the remainder. Few nonlocal residents take black bears in the subunit. Nonresident hunters usually account for about half of the total kill in Unit 3. Although the ratio varies from year to year, local and nonlocal residents take practically equal numbers of bears (Table 6).

Harvest Chronology: Most black bears are taken in spring, May being the most popular month, producing about half of all Unit 3 bears killed. With the exception of 1990, the fall kill percentage has been increasing (Table 7).

Transport Methods: Hunter transportation is mostly by boat in Subunit 1B with an occasional hunter using aircraft. There are very few roads in the subunit and no communities. Unit 3 hunters strongly favor boat transportation with some using aircraft or highway vehicles. Highway vehicles are primarily used on Mitkof Island but some are used on Wrangell, Kupreanof, and Kuiu islands (Table 8).

Other Mortality: Nonhunting mortality remains low in Units 1B and 3 (Tables 1 and 2). Most nonhunting kills are of bears that are perceived to be a threat to life or property.

Habitat Assessment: Timber harvest continues to pose the most serious threat to black bear habitat. Increased berry production, primarily *Vaccinium sp.*, as a result of clear cut logging may contribute to bear population growth in the short term. This forage source will be lost when canopy closure occurs, thus long term effects of logging will probably be detrimental to black bears.

CONCLUSIONS AND RECOMMENDATIONS

The percentage of males in the harvest, average male skull size, and the number of bears hunters passed before choosing to kill one suggest that black bear populations are stable or increasing in Units 1B and 3. I recommend no changes at this time.

Prepared by:

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Wildlife Biologist III

Submitted by:

Bruce Dinneford
Regional Management Coordinator

Table 1. Subunit 1B black bear harvest, 1987-91.

Regulatory year	Reported: Hunter kill M	F (%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Total estimated kill M (%)	F (%)	Unk.	Total
1987												
Fall 87	0	1 (50)	1	2	NA	0	0	0	0 (0)	1 (50)	1	2
Spring 88	7	0 (0)	0	7	0	0	0	0	7 (100)	0 (0)	0	7
Total	7	1 (14)	1	9	0	0	0	0	7 (78)	1 (11)	1	9
1988												
Fall 88	0	0	0	0	0	NA	0	0	0 (0)	0 (0)	0	0
Spring 89	13	4 (22)	1	18	0	0	0	0	13 (72)	4 (22)	1	18
Total	13	4 (22)	1	18	0	0	0	0	13 (72)	4 (22)	1	18
1989												
Fall 89	5	1 (17)	0	6	NA	0	0	0	5 (83)	1 (17)	0	6
Spring 90	13	5 (28)	0	18	0	0	0	0	13 (72)	5 (28)	0	18
Total	18	6 (25)	0	24	0	0	0	0	18 (75)	6 (25)	0	24
1990												
Fall 90	6	2 (25)	0	8	NA	0	0	0	6 (75)	2 (25)	0	8
Spring 91	5	0	0	5	0	0	0	0	5 (100)	0	0	5
Total	11	2 (15)	0	13	0	0	0	0	11 (85)	2 (15)	0	13
1991												
Fall 91	4	1 (20)	0	5	NA	0	0	0	4 (80)	1 (20)	0	5
Spring 92	10	0	0	10	0	1	0	0	11 (100)	0	0	11
Total	14	1 (7)	0	15	0	1	0	0	15 (94)	1 (6)	0	16

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

Table 2. Unit 3 black bear harvest, 1987-91.

Regulatory year	Reported								Total estimated kill			
	Hunter kill					Non-hunting kill[a]						
	M	F (%)	Unk.	Total	Over bait	M	F	Unk.	M (%)	F (%)	Unk.	Total
1987												
Fall 87	15	5 (21)	4	24	NA	0	0	0	15 (62)	5 (21)	4	24
Spring 88	120	17 (12)	4	141	0	0	0	0	120(85)	17 (12)	4	141
Total	135	22 (13)	8	165	0	0	0	0	135 (82)	22 (13)	8	165
1988												
Fall 88	24	8 (24)	1	33	NA	2	0	0	26 (74)	8 (23)	1	35
Spring 89	142	19 (11)	5	166	0	0	0	0	142 (86)	19 (11)	5	166
Total	166	27 (14)	6	199	0	2	0	0	168 (84)	27 (13)	6	201
1989												
Fall 89	28	11 (28)	0	39	NA	4	0	0	32 (74)	11 (26)	0	43
Spring 90	128	21 (14)	1	150	2	1	0	0	129 (85)	21 (14)	1	151
Total	156	32 (17)	1	189	2	5	0	0	161 (83)	32 (16)	1	194
1990												
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
1991												
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)	3 (23)	0	164

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

Table 3. Subunit 1B and Unit 3 black bear skull size[a], 1987-91.

Year	Males		Females	
	x	n	x	n
Subunit 1B				
1987	18.5	7	16.8	1
1988	18.3	13	16.2	4
1989	17.8	16	15.8	6
1990	17.3	10	15.7	2
1991	18.1	13	16.3	1
Unit 3				
1987	18.7	123	16.1	8
1988	18.5	161	16.6	26
1989	18.3	152	16.7	29
1990	18.5	129	16.0	19
1991	18.3	121	16.4	33

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

Table 4. Unit 3 black bear hunter harvest by island and density, 1989-91.

	Kupreanof 1,090 mi²				Kuiu 746 mi²				Mitkof 211 mi²				Wrangell 220 mi²			
			Average mi²/ bear kill				Average mi²/ bear kill				Average mi²/ bear kill				Average mi²/ bear kill	
Year	Kill	Percent of Unit 3 kill	Male	Female	Kill	Percent of Unit 3 kill	Male	Female	Kill	Percent of Unit 3 kill	Male	Female	Kill	Percent of Unit 3 kill	Male	Female
1987	43	26	29	218	87	52	11	62	22	13	13	53	4	2	220	220
1988	51	26	24	363	118	59	8	37	19	10	13	70	4	2	55	NA
1989	52	28	24	182	109	58	8	39	12	6	23	70	11	6	31	73
1990	55	35	22	363	78	50	12	53	13	8	19	106	7	4	44	110
1991	51	32	25	156	74	47	13	44	17	11	18	42	6	4	44	220

	Etolin 343 mi²				Woewodski 15 mi²				Deer 12 mi²			
			Average mi²/ bear kill				Average mi²/ bear kill				Average mi²/ bear kill	
Year	Kill	Percent of Unit 3 kill	Male	Female	Kill	Percent of Unit 3 kill	Male	Female	Percent of Kill	Unit 3 kill	Male	Female
1987	8	5	43	NA	1	1	15	NA	1	1	12	NA
1988	6	3	69	343								
1989	5	3	86	343								
1990	4	3	86	NA								
1991	9	6	49	172	1	1	15	NA				

Table 5. Unit 3 black bear average male skull size and percent of harvest by major island and season, 1989-91.

Island	Season	1989 Males (%)	1989 x	1989 n	1990 Males (%)	1990 x	1990 n	1991 Males (%)	1991 x	1991 n
Kupreanof										
	Fall 89	5 (71)	15.2	5	6 (86)	16.8	5	5 71	19.2	5
	Spring 90	41 (91)	18.7	40	44 (92)	18.3	44	39 89	18.0	37
	Total	46 (88)	18.3	45	50 (91)	18.2	49	44 86	18.2	42
Kuiu										
	Fall 89	15 (68)	18.1	14	6 (46)	19.0	6	11 61	17.9	10
	Spring 90	75 (86)	18.7	72	58 (89)	18.9	55	46 82	19.0	45
	Total	90 (83)	18.6	86	64 (82)	18.9	61	57 77	18.8	55
Mitkof										
	Fall 89	5 (71)	16.0	4	0		6	60	16.0	6
	Spring 90	6 (60)	18.4	5	11 (92)	18.1	11	6 86	18.7	4
	Total	11 (65)	17.3	9	11 (79)	18.1	11	12 71	17.1	10

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

Table 6. Subunit 1B and Unit 3 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
Subunit 1B				
1987	2 (22)	0 (0)	7 (78)	9
1988	8 (44)	0 (0)	10 (56)	18
1989	11 (46)	2 (8)	11 (46)	24
1990	10 (77)	1 (8)	2 (15)	13
1991	11 (73)	0 (0)	4 (27)	15
Unit 3				
1987	36 (22)	56 (34)	74 (45)	166
1988	34 (17)	49 (25)	116 (58)	189
1989	37 (20)	45 (24)	107 (57)	189
1990	34 (22)	47 (30)	76 (48)	157
1991	33 (21)	29 (18)	97 (61)	159

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

Table 7. Subunit 1B and Unit 3 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods						
	September	October	December	April	May	June	n
Subunit 1B							
1987	11	11	0	0	67	11	9
1988	0	0	0	17	67	17	18
1989	13	8	4	13	58	4	24
1990	31	31	0	0	38	0	13
1991	33	0	0	13	47	7	15
Unit 3	September	October	November	April	May	June	n
1987	9	4	1	17	50	18	166
1988	10	5	2	13	59	12	199
1989	16	4	1	10	64	5	189
1990	11	4	0	26	48	11	157
1991	23	4	1	14	48	9	159

Table 8. Subunit 1B and Unit 3 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest				
	Airplane	Boat	Highway vehicle	Unknown	n
Subunit 1B					
1987	0	100	0	0	9
1988	6	94	0	0	18
1989	12	83	0	5	24
1990	15	77	0	8	13
1991	0	100	0	0	16

Regulatory year	Percent of harvest								
	Airplane	Boat	3-4-wheeler	Snowmachine	Off-road vehicle	Highway vehicle	Foot	Unknown	n
Unit 3									
1987	28	52	2	1	0	1	1	4	166
1988	14	71	0	0	0	14	1	0	199
1989	16	67	0	0	1	14	2	1	189
1990	12	71	2	0	1	12	1	1	157
1991	9	70	1	0	1	16	1	0	159

LOCATION

Game Management Subunit: Subunit 1C (7,600 mi^2)

Geographical Description: Southeast Alaska mainland from Cape Fanshaw to the latitude of Eldred Rock, including Sullivan Island, drainages into Berners Bay, and excluding drainages into Faragut Bay

BACKGROUND

Historically, harvest data and hunter information have provided the basis for management decisions in Subunit 1C. Because only successful hunters are required to report hunting activity, hunting effort data are unavailable. Black bear teeth have been collected at the time of sealing, though they have not been used to determine age in recent years.

The tendency for black bears to use solid waste as an alternative food source is well documented. Bears habituated to human refuse are difficult to discourage, and it is often necessary to move or destroy nuisance animals. As the human population of Juneau has increased, the number of bear-human conflicts and resulting complaints to ADF&G, the Division of Fish and Wildlife Protection, and the Juneau Police Department has climbed, resulting in significant expense to these agencies.

MANAGEMENT DIRECTION

Management Objectives

Management objectives for Subunit 1C black bears are to maintain a mean skull size of at least 17.3 inches for males and a male:female harvest ratio of 3:1.

METHODS

Successful bear hunters are required to present the hide and skull for sealing within 30 days of the kill. We measure the skull and extract a rudimentary premolar for age determination. We also collect other harvest-related data and anecdotal information from hunters at the same time.

RESULTS AND DISCUSSION

Population Status and Trend

Population data are not available; however, harvest data (Table 1) and reported bear activity in the Juneau area suggest a large population. Males continued to comprise a large portion of the harvest, averaging 78% from regulatory years 1989 through 1991. Male skull sizes suggest a stable population; the mean skull size for males during the period was 17.6 inches, very close to the previous report period mean (17.5 for 1984-88).

We handled a spectrum of problem bears during the report period including both sexes, a variety of ages, and all group configurations. The Juneau garbage bear problem is not restricted to young male bears, as believed in past years.

Mortality

Season and Bag Limit.

Sept. 1-June 30	Resident hunters:	Two bears, not more than one of which may be a blue or glacier bear
	Nonresident hunters:	One bear

Hunter Harvest: Hunters reported killing 80, 120, and 131 black bears in 1989, 1990, and 1991, respectively. These compare to a six-year mean harvest of 102. The percentage of males in the harvest equalled or exceeded the management objective of 75% throughout the period; 75% in 1989, 79% in 1990, and 78% in 1991. Successful hunters averaged 2.6 days in the field, compared to the six-year average of 2.7 days. During 1989, one problem bear was destroyed. In 1990, at least three bears were destroyed. During 1991, 15 bears were killed by police or wildlife biologists, and another six were killed in car accidents or other encounters with humans.

Hunter Residency: Nonresident hunters took an average of 17.3% of black bears harvested within Subunit 1C during the report period. This was below the six-year average of 22%.

Harvest Chronology: The spring black bear kill comprised 77% of the annual harvest, ranging from 53% (1991) to 89% (1989). This compares with a six-year mean of 80%.

Transport Methods: The predominant methods used by hunters to reach bear hunting areas were by boat (62%), followed by foot (7%), highway vehicle ,(6%), airplane (5%), and off-road vehicle (4%).

Habitat: Proposed mining development projects continue to be the primary threat to bear habitat in the Juneau area. Two large gold mines are proposed for the mainland within the subunit, and changes in disturbance levels, access, and availability of refuse could affect bears in the future. Physical habitat changes would occur, such as tailing pond inundation and stockpiling of tailings. Through a cooperative agreement between the mining company and ADF&G, black bears have been captured and radio-collared at each mine site and data on movements are being collected. The pre-mining study is funded for three years, ending November 1993.

Bear habitat near Juneau is presently affected by human garbage. Bears have probably always been numerous in this area, but the availability of this food source promotes high densities, especially when firearms prohibitions within the urban area provide a refuge where bears are invulnerable to harvest. At the same time, the high density of humans in the area ensures a high level of conflict with bears.

Problem Bear Management Activities: After several seasons of effort by the Division of Wildlife Conservation and the City and Borough of Juneau (CBJ) to reduce garbage related problems, we experienced the worst year on record in terms of bears destroyed in human/wildlife conflicts. Summer/fall 1991 was a period of intense and prolonged garbage bear problems in Juneau, requiring extraordinary effort from area and regional office staff as well as enforcement agencies. While the reasons for this are varied and to some extent unknown, several facts stand out. The borough's litter control program, stiffened after the heavy garbage bear kill in 1987, suffered from budget cuts and lack of attention during subsequent seasons as few bear incidents were experienced. Public awareness of the problem and diligence in managing garbage apparently declined, although at the time it was hoped that the low level of conflict was a sign that the ADF&G/CBJ garbage bear program was working. While efforts at public education should continue, it will be necessary to make a substantial change in the way the community handles its solid waste if the garbage bear problem is to be resolved. As long as garbage is easily available to bears, Juneau will continue to have cyclical periods of conflict, as problem bears are removed and recruits discover the accessibility of garbage.

Aversive conditioning techniques to discourage bear problems were studied in 1989 and 1990. Little success was found with experienced garbage bears, though intensive and repeated treatment of bears learning about garbage was determined to be potentially effective, though not very practical. Translocation of bears is only partially effective, as a number of problem bears have returned to urban neighborhoods and their former habits. Moving bears is expensive in terms of transportation costs and staff time.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives for Subunit 1C are being met. Skull sizes trended downward slightly during the report period but remained at the desired level even in the lowest year.

Even though harvests during the last two years of the period were above average, a 3:1 male:female ratio in the harvest is being maintained.

Public education efforts have not diminished the Juneau garbage problem. Periods of high conflict between people and bears will continue as long as refuse is easily available to bears. Until local ordinances require mandatory garbage pickup and containment that is more secure than a standard garbage can, Wildlife Conservation staff will continue to have to cope with garbage bears in this subunit.

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Submitted by:

W. Bruce Dinneford
Regional Management Coordinator

Table 1. Black bear harvest parameters for Subunit 1C, 1986-1991.

Year	Harvest	Nonhunting Mortalities	Males (%)	Spring Harvest (%)	Non-res. Harvest (%)	Mean skull size[a] Male $\bar{X}$	Male n	Female $\bar{X}$	Female n
1986	83	12	67	90	22	17.7	62	16.4	10
1987	111	16	85	77	27	17.3	92	15.5	14
1988	86	7	84	83	30	17.6	66	16.2	10
1989	80	1	75	89	16	17.8	54	15.9	7
1990	120	3	79	83	21	17.6	90	15.9	9
1991	131	21	78	59	15	17.3	101	15.9	22
Means	102	10	78	80	22	17.6		16.0	

[a] Skull size equals total length plus zygomatic width.

LOCATION

Game Management Subunit: 1D (2,700 mi^2)

Geographical Description: Southeast Alaska Mainland north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages into Berners Bay

BACKGROUND

Black bear numbers are probably lower in Subunit 1D than in any other Southeast Alaska mainland area. Brown bear numbers, on the other hand, appear relatively high. Although earlier harvest data have not suggested a decline in numbers, the lack of population data and hunter effort information make these determinations difficult.

MANAGEMENT DIRECTION

Management Objective

The black bear management objective for Subunit 1D is to maintain a population capable of sustaining an annual harvest of at least 25 black bears.

METHODS

Successful bear hunters are required to present the hide and skull for sealing within 30 days of harvest. Skull measurements and hunt information are collected at the time of sealing, and in some years a rudimentary premolar has been taken for age determination. We discontinued this practice during the report period within this subunit.

RESULTS AND DISCUSSION

Population Status and Trend

In the years just before this report period, black bear harvest fluctuated widely in numbers and seasonality (McCarthy, 1988). A substantial decrease in harvest and the proportion of bears taken in spring was reported in 1988. During this report period, harvests approximated historic levels and, except in 1991, followed traditional seasonal patterns (see Table 1). Average male skull size trended upwards from the low in 1988 and exceeded the 6-year average by the end of the period. The amount of time it took to bag a bear declined throughout the report period to match the 6-year average in 1991. The

potential indicators of a declining population (i.e., skull size, harvest size) seem to have recovered to some extent.

Mortality

Season and Bag Limit:

Sept. 1 - June 30	Resident hunters:	Two bears, not more than one of which may be a blue or glacier bear.
	Nonresident hunters:	One bear.

Hunter Harvest: The Subunit 1D black bear harvest was 18 in 1989, 34 in 1990, and 27 in 1991 (Table 1). These compare to a 6-year mean of 28. No nonhunting mortalities were reported. Males made up 89% (1989), 59% (1990), and 67% (1991) of the annual harvests. Male skull size trended up through the period, while female skull size trended down. Both were at or above the 6-year average at the end of the period. Of the 79 bears taken, 57 were reported to be black in color and 22 were cinnamon colored.

Hunter Residency: Eight nonresident hunters took black bears in Subunit 1D. Of the 69 Alaska residents, 60 were from Haines, 5 from Juneau, 3 from other areas of the state, and one was from an unknown location.

Harvest Chronology: In 1989 and 1990, the proportion of bears taken in spring was high (83% in 1989, 71% in 1990). In 1991 this proportion declined to 52%, compared to the 6-year mean of 67%.

Transport Methods: In 1990 and 1991, boats, highway vehicles, and foot were the major transport means reported by bear hunters (see Table 2). In 1989, aircraft were used as well, and no transport method predominated.

Habitat: Forest management and timber harvesting continue to significantly effect black bear habitat. Although the extent of black bear use of areas slated for harvest is unknown, much black bear harvest comes from forested areas in the upper Chilkat and Kelsall valleys, adjacent to previous cuts.

CONCLUSIONS AND RECOMMENDATIONS

I recommend that management objectives for this population be changed to be more measurable. For future years, a mean total male skull size of 17.0 inches and a 3:1 male/female ratio in the harvest should be our aim.

Although indications of a decline appear to have faded, we should carefully monitor black bear harvest for further signs of problems. High brown bear numbers and habitat changes may cause a decline in black bear numbers and harvest during the next report period.

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Submitted by:

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Table 1. Black bear harvest parameters for Subunit 1D, 1986-1991.

Year	Harvest	Males (%)	Nonresident Harvest (%)	Spring Harvest (%)	Days Hunted per Bear	Mean skull size[a] Male $\bar{X}$	Male n	Female $\bar{X}$	Female n
1986	54	75	7	66	2.1	17.0	31	16.0	12
1987	23	65	18	82	4.8	17.6	11	15.4	7
1988	10	70	0	50	1.1	16.3	6	15.8	3
1989	18	89	17	83	5.2	16.4	13	16.3	2
1990	34	59	3	71	3.5	16.7	19	14.7	13
1991	27	67	15	52	3.4	17.5	13	15.7	7
Means	28	71	10	67	3.4	16.9		15.7	

[a] Skull size equals total length plus zygomatic width.

Table 2. Transportation methods reported by black bear hunters in Subunit 1D, 1986-1991.

Year	Airplane	Horse/ Dog Team	Boat	3- or 4- Wheeler	Snowmobile	ORV	Highway Vehicle	Foot	Unknown
1989	3	--	3	--	--	2	2	3	5
1990	--	--	9	--	--	5	6	5	9
1991	--	--	6	--	--	2	8	6	5

LOCATION

Game Management Unit: 2 (3,900 mi^2)

Geographical Description: Prince of Wales Island and all adjacent islands south of Sumner Strait and west of Kashevarof Passage

BACKGROUND

Information about Unit 2 black bears has been limited to public reports, incidental ADF&G staff observations, and harvest records. Comparative data are limited to harvest information obtained from successful hunters through a mandatory sealing program, initiated in 1973. Based on these data, bear harvests increased during the past two decades from 27 in 1974 to 222 in 1989-90. The past four seasons' annual harvest has averaged 216 bears.

The Unit 2 black bear population appears stable and is expected to remain so in the near future. With intensive logging occurring throughout the unit, bear numbers will probably decline as newly-logged areas mature into 20+ year old second-growth; this will close conifer canopies and prevent sunlight from reaching the forest floor.

MANAGEMENT DIRECTION

Management Objectives

Black bear management objectives for Unit 2 are to maintain an average skull size of at least 19.1 inches for male bears harvested each spring (January - June), or 18.8 inches for all males taken each regulatory year.

METHODS

We collect black bear harvest data from successful hunters through a mandatory sealing program. Staff record date and location of kill, sex, and skull measurements at the time of sealing. We send premolar teeth extracted from sealed skulls to Matson's Laboratory (Milltown, MT) to determine age.

To better compare and evaluate hunter success during the past 12 years, we ranked the total numbers of bears harvested (1 = highest to 11 = lowest), the numbers of hunter-days expended per bear harvested (1 = lowest to 9 = highest), and the mean skull measurements (1 = largest to 6 = smallest). The rank values from each category were then

summed to derive an overall ranking score. We interpreted low combined values as representing the most "successful" seasons.

RESULTS AND DISCUSSION

Population Status and Trend

No definitive conclusions about black bear population trends can be determined in the absence of research or quantitative surveys. However, based on harvest information, public reports, and observations by ADF&G personnel, the Unit 2 black bear population apparently remained relatively stable the past several years.

Logging has occurred over a large portion of Unit 2 during the past 40 years. The central to northern portion of Prince of Wales Island, and Dall and Long islands are especially influenced. Clearcut logging continues, with numerous proposed cutting units under review on central and northern Prince of Wales Island. While clearcuts generally provide bears with abundant plant foods during the first 10 to 20 years after cutting, they become increasingly unproductive as the conifer canopy closes. As logged areas continue to mature and forest canopies continue to close, bear populations in those areas are expected to decline (Suring et al. 1988, Wood 1990).

Population Size: Wood (1990) pointed out that unlogged areas of Unit 2 contain some of the best black bear habitat in Southeast. Based on population estimates from similar 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 this estimate, he derived a population estimate of 5,100 bears. In the absence of better information, but using updated mi^2 figures for the unit, we estimate the Unit 2 black bear population is 5,400.

Population Composition: Males make up most of the Unit 2 black bear harvest (Table 1), however, we believe this reflects hunter selection for large bears rather than naturally occurring sex ratios. Although sows with cubs are regularly observed throughout Unit 2, no quantitative data are available for use in estimating sex and age composition.

Distribution and Movement: Unlike the mainland portion of Southeast Alaska where black bears coexist with brown bears, no brown bears reside in Unit 2. The cinnamon color phase of the black bear, which occurs in mainland populations, is absent from Unit 2, as is the blue or glacier color phase. Quantitative home range and movement pattern data are not available for black bears in Unit 2.

Mortality

Season and Bag Limit:

Sept. 1 - June 30	Resident hunters:	Two bears, not more than one of which may be a blue or glacier bear.
	Nonresident hunters:	One bear.

Hunter Harvest: The Unit 2 black bear harvest increased from 86 in 1980-81 to over 200 during the past four seasons (Table 1). Males made up 70-80% of the harvest during the past 12 years, and accounted for 83-88% of the harvest during 1981-82, 1986-87, and 1987-88 (Table 1).

The Unit 2 black bear harvests have come from throughout the unit; however, Wildlife Analysis Areas (WAAs) 1318 and 1422 have accounted for about 25% of the past 12 seasons' harvests (Table 2). 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 relatively easy hunter access, producing 13% of the past decade's harvest, and up to 22% of the annual harvest (Table 3). WAA 1422, which includes Tuxecan and El Capitan passages on west Prince of Wales, offers good access and has accounted for 11% of the past decade's harvest, and up to 18% of the annual harvest (Table 3). WAAs 1214, 1315, 1317, and 1527 accounted for 10-18% of the annual harvest during the past decade (Table 3). The combined harvest from WAAs 1318 and 1317 (Twelve-mile Arm) constitutes 20% of the past decades harvest, and up to 36% of the annual harvest.

Average Unit 2 black bear skull sizes have varied annually. Our management objective of maintaining an average spring skull size of at least 19.1 inches for males was achieved for the past 11 consecutive seasons (Table 4). Our secondary objective of maintaining an average male skull size of 18.8 inches was achieved in all but one of the past 11 years (Table 4). Female skull measurements regularly averaged over 16.4 inches, with a high of 17.1 in 1982-83 (Table 4). Informal questioning of successful hunters indicated that many hunters pass up from one to several bears before ultimately shooting one. This suggests that the large skulls observed in the harvest are the result of hunter selectivity for large bears.

Ages of harvested bears have only been determined for the past two seasons (Table 4). It is premature to make any comparative evaluations with the limited data. However, as funds allow, teeth collected from bears harvested during the past several seasons will be aged to create a data set for future use in evaluating trends.

Hunter Residency and Success: Nonresident interest in hunting Unit 2 black bears has steadily increased during the past decade. In four of the past five seasons nonresident

hunters took over half of the Unit 2 harvest (Table 1). In the past four seasons, local hunters took 16-23% of the harvest, and nonlocal state residents accounted for 22-34% (Table 1). In contrast, until 1987, nonlocal state residents annually accounted for as many or more bears as either the local or nonresident hunters. Nonresident interest has increased during the past five years because of the acknowledged opportunity hunters have to bag bears which will place in either the Pope and Young (bow and arrow) or Boone and Crockett (firearm) record books.

We based hunter success data on information obtained from successful hunters which does not include input from unsuccessful hunters. We calculated success using a combination of numbers of bears harvested, average hunter-days expended per bear, and mean skull measurements (Table 5). We could not identify any trends using this assessment method, however, 1989-90, with its lowest ranking score, represented the most "successful" year among the past 12 (Table 5). The 1983-84 and 1987-88 seasons tied as the second most successful, followed by 1986-87. The 1980-81 season ranked the lowest (Table 5).

Harvest Chronology: Most Unit 2 black bears are harvested during spring season. Notably, May is the most productive spring month (Table 6). During 1980-92, nearly 73% of the spring-killed bears were harvested during May. The first 10 days of September tend to be the most productive period of the fall season (Table 6). During 1980-92, 37% of the fall-killed bears were harvested during this period.

Transport Methods: Until spring 1985, Unit 2 bear hunters used airplane, boat, and road transportation in relatively equal amounts (Table 1). Beginning in fall 1985, however, most hunters began to use the expanding Prince of Wales Island road system to access hunting areas. Road access accounted for 50-65% of the transportation sources used by hunters during the past seven seasons (Table 1).

Nonregulatory Management Problems and Needs: Major habitat changes continue to occur in Unit 2 because of logging activities. While early successional stages (3-20 years) provide black bears with abundant plant foods, later stages result in the disappearance of understory plants as conifer canopies close and sunlight does not penetrate 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 decrease bear numbers.

No research has been conducted on black bears inhabiting Unit 2. Faced with continued habitat alterations and increasing hunting interest, it would be timely and helpful to initiate bear research on the general ecology and habitat requirements of black bears in southern Southeast.

CONCLUSIONS AND RECOMMENDATIONS

We based the Unit 2 black bear population assessment on harvest records, public reports, and ADF&G staff observations. We need quantitative research to answer basic ecological questions about bears inhabiting increasingly clearcut and fragmented habitats.

Harvest records indicate that the annual hunter kill increased during the past two decades and exceeded 200 bears during the past four seasons. Using a population estimate of 5,400 bears, this translates into an average annual harvest of about 4% of the estimated population. Males comprised most of the harvests, and no discernable changes were detected in average skull sizes of harvested bears. Our objective of maintaining an average spring skull size for male bears of 19.1 inches is being met, as is the objective of maintaining an average annual male skull size of 18.8 inches.

While the harvest from Unit 2 appears well within accepted guidelines, we should pay close attention to specific WAAs to ensure that local over-harvesting does not occur. Especially critical are WAAs 1318 and 1422 where access is easy and nearly one-fourth of the 1980-92 harvest occurred.

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Table 1. Black bear harvest, hunter residency, and hunter transport, Unit 2, 1980-92.

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

Table 1. (Cont.)

		Harvest				Hunter Residency				Transport				
Years	Season	Males	Females	Unk	Total	Local	State	N.R.	Unk	Air	Boat	Road	Other	Unk
1988-89	Fall	65	28	2	95	15	17	60	3	25	9	58	0	3
	Spring	77	18	21	116	18	32	60	6	5	59	47	3	2
	Total	142	46	23	211	33	49	120	9	30	68	105	3	5
1989-90	Fall	28	18	29	75	17	24	30	4	9	17	36	6	7
	Spring	92	15	40	147	25	24	97	1	9	54	81	1	2
	Total	120	33	69	222	42	48	127	5	18	71	117	7	9
1990-91	Fall	47	24	18	89	18	26	40	5	2	16	65	1	5
	Spring	99	16	11	126	30	45	49	2	5	53	53	12	3
	Total	146	40	29	215	48	71	89	7	7	69	118	13	8
1991-92	Fall	34	28	5	67	22	22	21	2	3	21	32	4	7
	Spring	104	29	21	154	18	50	85	1	8	43	94	9	0
	Total	138	57	26	221	40	72	106	3	11	64	126	13	7

Table 2. Annual black bear harvest by Wildlife Analysis Area (WAA), Unit 2, 1980-1992.

	1980-81			1981-82			1982-83			1983-84			1984-85			1985-86			1986-87		
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U
0901										1						1[a]			2	1	
0902																					
1003																					
1104																					
1105	1									2				1		1			2		
1106																					
1107	2			5						5						9	1		6		
1108	4						1			2			1						4		
1209				1						1											
1210				11			2	1		2				1		2	2		2		
1211				5			2	1					2			4	2		2		
1212																					
1213				3			2			6	1		4	3		4		3	4		
1214	4	5		1			2	2		9	1		10	6		12	2		5	1	
1315	5	3		6	1		5	1	1	6			5			14[a]	4		7	1	
1316	1									3	6		1			2	3	1	2		
1317	8	4		7	1		4			4	2		7			10	1		19	2	
1318	4	1		10[a]	3		6	2		11	1	1	7	2		18	4		27[a]	4	
1319	3			6	2		5	3	3	5	1		5	2		4	1		7		
1323																					
1332																					
1420	6			4	1		4			4	1		3			5			3	1	

Table 2. (Cont.)

	1981-82			1982-83			1983-84			1984-85			1985-86			1986-87				
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U
1421				3			1		1[a]	5	2					2			4	2	
1422	11	2		11	2		10	7	2	6	3		7	1		18	14		14	4	
1524																					
1525		1		7	2		8	1		1	1					1	1				
1526							1				1	1	3			1	1		2		
1527	6	1		8		1	10	4		15			9	6		12	8	1	8	8	
1528							2	1		2	1				1	1			2		
1529	6	1		2			2	1		2	1		1	1		2			8		
1530																					
1531																					

Table 2. (Cont.)

	1987-88			1988-89			1989-90			1990-91			1991-92			Totals			
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
0901	1															5	1	0	6
0902										1	1		1	3		2	4	0	6
1003				2						1			1			4	0	0	4
1104																0	0	0	0
1105	2								3	3		1	3	1[a]		14	2	4	20
1106																0	0	0	0
1107	3			11	2	2	12	1	4	13	2	2[b]	3	3	1	69	9	9	87
1108	5	1		3	1		4			4			3			31	2	0	33
1209											1					2	1	0	3
1210	1			10	5	2	3		7	10	1	2	4	2		47	12	11	70
1211	2			7		1	4	1	1	5		2	1	3		34	7	4	45
1212							1				1		1			2	1	0	3
1213				3	2	1	2	2		3		2	2			33	8	6	47
1214	13	2		18	6	2	17	1	5	5	3	2[a]	14	4		110	33	9	152
1315	7	2		8	2	2[c]	5	3	11[a]	6[a]	4	2	8	7[b]	3	82	28	19	129
1316					1		5	1	1	1	1	1	1	2		16	14	3	33
1317	18	4		9[b]	2	2	6	1		7	4	2	12	2		111	23	4	138
1318	26	8[b]		24[ac]	12[c]	7	18[a]	9[b]	10	8[a]	3[c]	1	13[a]	2	1	172	51	20	243
1319	4			5	2		2	3	5	8	4	2	5	7	5	59	25	15	99

Table 2. (Cont.)

	1987-88			1988-89			1989-90			1990-91			1991-92			Totals			
WAA	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	Total
1323							1	1		4			2	1	1	7	2	1	10
1332							6	1	3	7	1	1	7	1	1	20	3	5	28
1420	3	1		9	4		4	1	4	16	1		9	5	2	70	15	6	91
1421	1	1		1			1		1	3	1	1	4	1	1	25	7	4	36
1422	10	2		11	2	1	12	3	7	14	3[a]		15	3	7	139	46	17	202
1524																0	0	0	0
1525	3			2			2	1						1		24	8	0	32
1526	1			1			4	1		1		3	2			16	3	4	23
1527	20	4	1	15	4	2	2	1	2	8	1	1	1	1		114	38	8	160
1528	1						4						1			13	2	1	16
1529	6	1		2	1		4		4	12	4		7	1	4	54	11	8	73
1530								1	1	5	4	4	16	7		21	12	5	38
1531																0	0	0	0

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

Table 3. Annual black bear harvest from the most heavily used Wildlife Analysis Areas[a], Unit 2, 1980-1992.

	Wildlife Analysis Areas					
Years	1318	1422	1527	1214	1317	1315
1980-81	5	13	7	9	12	8
1981-82	13	13	9	1	8	7
1982-83	8	19	14	4	4	7
1983-84	13	9	15	10	6	6
1984-85	9	8	15	16	7	5
1985-86	22	32	21	14	11	18
1986-87	31	18	16	6	21	8
1987-88	34	12	25	15	22	9
1988-89	43	14	21	26	13	12
1989-90	37	22	5	23	7	19
1990-91	12	17	10	10	13	12
1991-92	16	25	2	18	14	18

[a] WAAs are listed from most utilized to least utilized beginning with WAA 1318.

Table 4. Hunter effort, mean skull sizes, and ages for black bears harvested in Unit 2, 1980-1992.

		Hunter Effort			Mean Skull Sizes[a] (in)				Average Ages (years)[b]			
Years	Season	Total Days	No. Hunters	Avg. days per hunter	Male	(n)[c]	Female	(n)	Male	(n)	Female	(n)
1980-81	Fall	92	30	3.1	18.8	(15)	17.2	(10)				
	Spring	190	55	3.5	18.7	(40)	16.7	(7)				
	Total	282	85	3.3	18.7	(55)	16.9	(17)				
1981-82	Fall	70	24	2.9	18.1	(15)	15.4	(3)				
	Spring	235	80	2.9	19.2	(58)	17.3	(8)				
	Total	305	102	3.0	19.0	(73)	16.8	(11)				
1982-83	Fall	76	36	2.1	18.2	(16)	17.4	(13)				
	Spring	224	64	3.5	19.7	(44)	16.8	(10)				
	Total	300	100	3.0	19.3	(60)	17.1	(23)				
1983-84	Fall	49	24	2.0	18.0	(15)	16.8	(7)				
	Spring	237	96	2.5	19.3	(72)	17.0	(14)				
	Total	286	120	2.4	19.1	(87)	16.9	(21)				
1984-85	Fall	76	32	2.4	18.5	(15)	16.4	(9)				
	Spring	190	58	3.3	19.7	(42)	16.6	(9)				
	Total	266	90	2.9	19.3	(57)	16.5	(18)				
1985-86	Fall	119	48	2.5	18.4	(22)	16.5	(17)				
	Spring	398	121	3.3	19.1	(74)	16.8	(18)				
	Total	517	169	3.0	18.9	(96)	16.7	(35)				
1986-87	Fall	131	40	3.3	17.7	(17)	16.4	(6)				
	Spring	344	114	3.0	19.6	(97)	16.4	(7)				
	Total	475	154	3.1	19.3	(114)	16.4	(13)				
1987-88	Fall	105	40	2.6	17.2	(23)	16.7	(9)				
	Spring	293	113	2.6	19.5	(94)	17.2	(12)				
	Total	398	153	2.6	19.0	(117)	17.0	(21)				

Table 4. (Cont.)

		Hunter Effort			Mean Skull Sizes[a] (in)				Average Ages (years)[b]			
Years	Season	Total Days	No. Hunters	Avg. days per hunter	Male	(n)[c]	Female	(n)	Male	(n)	Female	(n)
1988-89	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)				
1989-90	Fall	231	71	3.3	18.4	(22)	17.0	(12)				
	Spring	437	146	3.0	19.5	(89)	16.9	(15)				
	Total	668	217	3.0	19.3	(111)	16.9	(27)				
1990-91	Fall	227	85	2.7	17.8	(38)	16.6	(19)				
	Spring	448	124	3.6	19.1	(93)	16.5	(16)				
	Total	675	209	3.2	18.7	(131)	16.5	(35)	7.6	(128)	8.1	(32)
1991-92	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)	7.5	(130)	7.9	(53)

[a] Skull sizes equal length plus zygomatic width.
[b] Bear ages not yet obtained for 1980-1990.
[c] Numbers in parentheses represent sample sizes.

Table 5. Reported numbers of black bears harvested, hunter effort (hunter-days/bear), mean skull sizes, and rankings of harvest, hunter success, and skull sizes relative to other years in Unit 2, 1980-1992.

Years	Total Harvest[a]		Hunter-Days/ Bear[b]		Mean Skull Sizes (in)[c]		Overall Ranking Score[d]
1980-81	86	(11)	3.3	(7)	18.3	(5)	23
1981-82	104	(8)	3.0	(4)	18.6	(3)	15
1982-83	100	(9)	3.1	(5)	18.7	(2)	16
1983-84	120	(7)	2.4	(1)	18.7	(2)	10
1984-85	90	(10)	2.9	(3)	18.7	(2)	15
1985-86	174	(5)	3.0	(4)	18.3	(5)	14
1986-87	154	(6)	3.1	(5)	19.0	(1)	12
1987-88	154	(6)	2.6	(2)	18.7	(2)	10
1988-89	211	(4)	3.6	(8)	18.3	(5)	17
1989-90	222	(1)	3.1	(5)	18.6	(3)	9
1990-91	215	(3)	3.2	(6)	18.2	(6)	15
1991-92	221	(2)	3.8	(9)	18.5	(4)	15

[a] Numbers in parentheses represent ranking scores for numbers of bears killed during each year relative to all others: 1=highest, 11=lowest.

[b] Numbers in parentheses represent ranking scores for hunter effort for each year relative to all others: 1=lowest, 9=highest.

[c] Numbers in parentheses represent ranking scores for mean skull size each year relative to all others: 1=highest, 6=lowest.

[d] Overall ranking score is equal to the sum of the ranking scores for numbers of bears killed, hunter effort, and mean skull sizes. Lower scores represent better seasons.

Table 6. Black bear harvest chronology[a], Unit 2, 1980-1992.

Numbers of Animals													
Date	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	Total
January	0	0	0	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	1	0	0	0	0	0	1
March	0	0	1	0	0	1	1	0	1	0	1	0	5
Apr 01-10	0	0	2	0	0	2	4	0	1	0	1	0	10
Apr 11-20	3	0	0	1	1	5	7	10	1	5	5	2	40
Apr 21-30	2	6	6	6	7	14	10	11	7	8	9	26	112
May 01-10	19	14	20	33	18	27	25	31	21	33	22	49	312
May 11-20	18	24	11	26	13	38	23	28	38	67	30	40	356
May 21-31	8	26	6	17	9	26	22	20	33	15	35	18	235
Jun 01-10	4	9	5	6	5	6	12	5	3	12	11	10	88
Jun 11-20	0	1	7	6	3	2	5	7	5	1	7	4	48
Jun 21-30	1	0	6	1	2	0	4	2	5	6	4	5	36
Sep 01-10	6	1	13	4	16	13	9	16	48	28	46	17	217
Sep 11-20	4	3	5	9	3	3	9	4	16	11	14	14	95
Sep 21-30	7	7	1	1	7	7	3	5	8	16	4	7	73
Oct 01-10	4	6	4	3	2	7	6	3	14	8	9	11	77
Oct 11-20	1	4	4	1	2	10	2	4	4	1	7	3	43

Table 6. (Cont.)

Numbers of Animals													
Date	1980 1981	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	Total
Oct 21-31	1	1	3	0	1	3	5	7	3	5	1	3	33
Nov 01-10	4	2	2	1	1	5	4	1	1	0	3	5	29
Nov 11-20	3	0	3	2	0	2	0	0	0	1	2	3	16
Nov 21-30	0	0	1	1	0	1	1	0	0	1	2	0	7
December	0	0	0	1	0	0	0	0	0	0	0	1	2

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

LOCATION

Game Management Unit: 5 (6,235 mi^2)

Geographical Description: Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

BACKGROUND

Within Unit 5 black bears are found mainly in Subunit 5A. Within Subunit 5B, which is dominated by the Malaspina Glacier, only 7 black bears have been taken since 1971 out of a total of 456 harvested within the unit. The blue or glacier bear color variant occurs in relative high abundance in Unit 5.

MANAGEMENT DIRECTION

Management Objectives

Management objectives for Unit 5 black bears are to maintain a 3:1 male/female ratio in the harvest and a population capable of supporting an annual harvest of at least 20 bears.

METHODS

Black bear hides and skulls were sealed by staff of the Departments of Fish and Game and Public Safety. Biological information collected at the time of sealing included pelage color, sex, skull size, and location of kill. Staff gathered anecdotal information about conditions in the field at the same time.

RESULTS AND DISCUSSION

Population Status and Trend

Population information is not available for black bears in Unit 5, and because only successful hunters are required to report their hunts, hunter effort data is incomplete. Harvest has increased since 1971, and harvests during the report period exceeded the 6-year mean (Table 1). Mean total skull size for males was below the 6-year average two of three years. While a 3:1 male/female ratio in the harvest is being maintained, decreases in skull sizes with rising harvest could indicate a declining population.

Mortality

Season and Bag Limit:

Sept. 1 - June 30

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

Nonresident hunters: One bear.

Hunter Harvest: Unit 5 black bear harvests have ranged from 18 to 33 since 1986, averaging 26 (Table 1). The highest harvests occurred during the last two years of the report period. Males dominated the harvest, exceeding a 3:1 male/female ratio in all but the first year of the period, when 20 males and seven females were taken. Three blue-colored bears were harvested in 1989, seven in 1990, and none in 1991.

Hunter Residency: Nonresidents made up 63% (1989), 82% (1990), and 72% (1991) of all black bear hunters. These compare with a 1986-1991 mean of 76%.

Harvest Chronology: Most black bears are taken during spring in Unit 5 (1986-91 mean = 92.5%). During the report period this held true, with 100% (1989), 90% (1990), and 81% (1991) of the bears taken in spring.

Transport Methods: Aircraft and boats are the two predominant means of transport for Unit 5 black bear hunters. These two modes were equal in importance each season during the report period, with both accounting for 40% of reported hunts in 1989, 48% in 1990, and 38% in 1991. Highway vehicles and walking were of minor importance.

CONCLUSIONS AND RECOMMENDATIONS

The management objective of maintaining a 3:1 male/female harvest ratio was achieved in all but the first year of the report period. While the population has provided a harvest of at least 20 black bears, it is not possible to determine whether the second management objective is being met, because population information is not available. I recommend that a measurable objective be used. Therefore, during the next report period, we should monitor the harvest closely to see if total skull size for males decreases further. Based on historical data, we should try to maintain an average male skull size of 17.4 inches.

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Table 1. Unit 5, black bear harvest parameters, 1986-1991.

Year	Harvest	Males	Females	Unknown	Mean skull size[a] Male $\bar{X}$	Male n	Female $\bar{X}$	Female n
1986	24	18	6	0	17.2		15.9	
1987	18	17	1	0	17.6		16.2	
1988	21	21	0	0	18.0		N.A.	3
1989	27	20	7	0	17.3	20	14.9	7
1990	34	24	7	2	17.5	23	15.0	7
1991	32	26	6	0	17.0	25	14.7	6
Mean	26	21	5	0	17.4		15.3	

[a] Skull size equals total length plus zygomatic width.

Table 2. Unit 5 historical black bear harvest by residency and color phase, 1986-1991.

Year	Resident	Nonresident	Total	Color phase Black	Color phase Blue
1986	2	22	24	24	0
1987	5	13	18	13	5
1988	1	20	21	19	2
1989	10	17	27	24	3
1990	6	27	33	26	7
1991	9	23	32	32	0
Mean	6	20	26	23	3

LOCATION

Game Management Unit: 6 (10,140 mi^2)

Geographical Description: Prince William Sound and north Gulf of Alaska Coast

BACKGROUND

Black bears are found in most of Unit 6, with the exceptions of Montague, Hinchinbrook and several smaller islands in Prince William Sound (PWS), and Kayak and Middleton Islands along the north Gulf of Alaska Coast (NGC). Density is highest in western PWS and lower in eastern PWS and along the NGC. Modafferi (1978) estimated densities of 1.4, 0.6, and 0.7 bears/mi^2 in western PWS, 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 (Grauvogel 1967, McIlroy 1970, Modafferi 1982).

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

Factors, other than hunting, which may affect black bear populations in Unit 6 are food abundance and adverse weather. Competition and predation by brown bears may also influence black bear population 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 from 1984 to 1991. An historic high harvest of 279 was reached in 1986.

MANAGEMENT DIRECTION

Management Objectives

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

METHODS

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

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

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

We did not collect population data. Incidental observations indicated distribution and general abundance were unchanged. Highest density probably occurred in western and northern PWS. Bear numbers near population centers have probably been reduced because of high hunting pressure.

Mortality

Harvest:

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

Board of Game Actions and Emergency Orders. The Board of Game took no actions affecting black bears in Unit 6 and no emergency orders were issued.

Hunter Harvest. Hunters killed 200, 250 and 231 bears in Unit 6 during regulatory years 1989-91, respectively (Table 1). Most harvests (76-84%) were males and most (75-80%) harvests occurred in Subunit 6D. Hunter harvests during the past 5 regulatory years averaged 228, ranging from a low of 187 in 1988 to a high of 270 in 1987. A trend in the harvest was not apparent. The take was abnormally low in spring and fall 1989; contamination from the *Exxon Valdez* oil spill probably deterred hunting in PWS.

Mean skull size among males harvested during the past 3 years was 17-17.4 inches (Table 2). The largest skulls (17.6-18.8 in.) came from Subunits 6A and 6B, and the smallest (16.6-17.7 in.) reported were from Subunits 6C and 6D. Over the past 5 years, a unitwide

trend was not obvious. However, in Subunit 6D the mean (16.6 in) in 1991 was well below the means for the previous 4 years (17.1-17.5 in.).

Hunter Residency and Success. Residents of Alaska who did not live in Unit 6 harvested most of the bears (61-66%) during this report period (Table 3). Nonresident hunters had the second highest take (21-26%), followed by local Unit 6 residents (10-14%). This pattern varied in Subunits 6A and 6B, where most bears (43-75%) were harvested by nonresidents. It was also different in Subunit 6C, where most bears (67-80%) were taken by local residents. The high harvest by local hunters in Subunit 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 (62-74%) were taken in May during this report period (Table 4) and during the past 5 years.

Transport Methods. Most successful hunters used boats (56-62%) and airplanes (22-33%) for transportation during the past 3 years. Airplanes provided most (76-100%) of the transportation in Subunits 6A and 6B; boats (29-40%) and highway vehicles (27-40%) were important in Subunit 6C. Variation was minimal over the past 5 years.

Other Mortality:

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

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

CONCLUSIONS AND RECOMMENDATIONS

All population objectives were achieved. However, the reduced skull size in Subunit 6D in 1991 concerns me. We should monitor skull size over the next several years to determine if there is a downward trend.

Harvests of black bears have reached relatively high levels and will probably increase. Unit 6, and particularly Subunit 6D, was an increasingly favored destination for hunters from the Anchorage and Fairbanks areas. Managing the bear population will require an improved estimate of allowable harvest and data to estimate hunter success.

We should estimate the 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 in the population size and sustainable harvest. Hunter success should be determined by requiring unsuccessful black bear hunters to report their activities on a mail-in hunter report. The data would be a valuable indicator of bear population trend and hunting pressure would improve future management decisions

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Table 1. Unit 6 black bear harvest[a], 1987-91.

Subunit/ Regulatory year	Reported: Hunter kill M	F	(%)	Unk.	Total	Reported: Non-hunting kill[a] M	F	Unk.	Estimated kill: Unreported	Illegal	Total estimated kill: M	(%)	F	(%)	Unk.	Total
6A 1987																
Fall 87	2	1	(33)	0	3	0	0	0	0	0	2	(67)	1	(33)	0	3
Spring 88	23	2	(8)	1	26	0	0	0	4	1	23	(92)	2	(8)	6	31
Total	25	3	(11)	1	29	0	0	0	4	1	25	(89)	3	(11)	6	34
1988																
Fall 88	5	1	(17)	1	7	0	0	0	1	0	5	(83)	1	(17)	2	8
Spring 89	18	3	(14)	0	21	0	0	0	3	1	18	(86)	3	(14)	4	25
Total	23	4	(15)	1	28	0	0	0	4	1	23	(85)	4	(15)	6	33
1989																
Fall 89	2	0	(0)	0	2	0	0	0	0	0	2	(100)	0	(0)	0	2
Spring 90	26	0	(0)	0	26	0	0	0	4	1	26	(100)	0	(0)	5	31
Total	28	0	(0)	0	28	0	0	0	4	1	28	(100)	0	(0)	5	33
1990																
Fall 90	4	3	(43)	1	8	0	0	0	1	0	4	(57)	3	(43)	2	9
Spring 91	16	2	(11)	0	18	0	0	0	3	1	16	(89)	2	(11)	4	22
Total	20	5	(20)	1	26	0	0	0	4	1	20	(80)	5	(20)	6	31
1991																
Fall 91	4	3	(43)	0	7	1	0	0	4	0	5	(63)	3	(38)	4	12
Spring 92	19	2	(10)	0	21	0	0	0	5	1	19	(90)	2	(10)	6	27
Total	23	5	(18)	0	28	1	0	0	9	1	24	(83)	5	(17)	10	39
6B 1987																
Fall 87	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 88	9	5	(36)	1	15	0	0	0	2	1	9	(64)	5	(36)	4	18
Total	9	5	(36)	1	15	0	0	0	2	1	9	(64)	5	(36)	4	18

Table 1. (Continued).

Subunit/ Regulatory year	Reported								Estimated kill		Total estimated kill					
	Hunter kill					Non-hunting kill[a]										
	M	F	(%)	Unk.	Total	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
1988																
Fall 88	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 89	5	1	(17)	0	6	0	0	0	1	0	5	(83)	1	(17)	1	7
Total	5	1	(17)	0	6	0	0	0	1	0	5	(83)	1	(17)	1	7
1989																
Fall 89	1	0	(0)	0	1	0	0	0	0	0	1	(100)	0	(0)	0	1
Spring 90	17	0	(0)	0	17	0	0	0	3	1	17	(100)	0	(0)	4	21
Total	18	0	(0)	0	18	0	0	0	3	1	18	(100)	0	(0)	4	22
1990																
Fall 90	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 91	6	1	(14)	0	7	0	0	0	1	0	6	(86)	1	(14)	1	8
Total	6	1	(14)	0	7	0	0	0	1	0	6	(86)	1	(14)	1	8
1991																
Fall 91	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 92	7	0	(0)	0	7	0	0	0	1	0	7	(100)	0	(0)	1	8
Total	7	0	(0)	0	7	0	0	0	1	0	7	(100)	0	(0)	1	8
6C 1987																
Fall 87	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 88	10	2	(17)	0	12	0	0	0	2	1	10	(83)	2	(17)	3	15
Total	10	2	(17)	0	12	0	0	0	2	1	10	(83)	2	(17)	3	15
1988																
Fall 88	0	1	(100)	0	1	0	0	0	0	0	0	(0)	1	(100)	0	1
Spring 89	10	3	(23)	0	13	0	0	0	2	1	10	(77)	3	(23)	3	16
Total	10	4	(29)	0	14	0	0	0	2	1	10	(71)	4	(29)	3	17

Table 1. (Continued).

Subunit/ Regulatory year	Reported								Estimated kill		Total estimated kill					
	Hunter kill					Non-hunting kill[a]										
	M	F	(%)	Unk.	Total	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
1989																
Fall 89	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 90	4	1	(20)	0	5	0	0	0	1	0	4	(80)	1	(20)	1	6
Total	4	1	(20)	0	5	0	0	0	1	0	4	(80)	1	(20)	1	6
1990																
Fall 90	0	0	(0)	0	0	0	0	0	0	0	0	(0)	0	(0)	0	0
Spring 91	11	4	(27)	0	15	0	0	0	2	1	11	(73)	4	(27)	3	18
Total	11	4	(27)	0	15	0	0	0	2	1	11	(73)	4	(27)	3	18
1991																
Fall 91	4	3	(43)	0	7	0	0	0	1	0	4	(57)	3	(43)	1	8
Spring 92	8	2	(20)	0	10	0	0	0	1	1	8	(80)	2	(20)	2	12
Total	12	5	(29)	0	17	0	0	0	2	1	12	(71)	5	(29)	3	20
6D 1987																
Fall 87	11	6	(35)	0	17	1	0	0	3	1	12	(67)	6	(33)	4	22
Spring 88	146	39	(21)	12	197	0	0	0	30	10	146	(79)	39	(21)	52	237
Total	157	45	(22)	12	214	1	0	0	33	11	158	(78)	45	(22)	56	259
1988																
Fall 88	20	13	(39)	1	34	0	1	0	5	2	20	(59)	14	(41)	8	42
Spring 89	73	30	(29)	2	105	0	0	0	16	5	73	(71)	30	(29)	23	126
Total	93	43	(32)	3	139	0	1	0	21	7	93	(68)	44	(32)	31	168
1989																
Fall 89	5	7	(58)	0	12	0	1	0	2	1	5	(38)	8	(62)	3	16
Spring 90	108	24	(18)	5	137	0	0	0	20	7	108	(82)	24	(18)	32	164
Total	113	31	(22)	5	149	0	1	0	22	8	113	(78)	32	(22)	35	180

Table 1. (Continued).

Subunit/ Regulatory year	Reported								Estimated kill		Total estimated kill					
	Hunter kill					Non-hunting kill[a]										
	M	F	(%)	Unk.	Total	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
1990																
Fall 90	4	7	(64)	0	11	3	0	0	2	1	7	(50)	7	(50)	3	17
Spring 91	141	38	(21)	11	190	0	0	0	29	10	141	(79)	38	(21)	50	229
Total	145	45	(24)	11	201	3	0	0	31	11	148	(77)	45	(23)	53	246
1991																
Fall 91	22	4	(15)	0	26	1	2	0	4	1	23	(79)	6	(21)	5	34
Spring 92	108	39	(27)	6	153	0	2	0	23	8	108	(72)	41	(28)	37	186
Total	130	43	(25)	6	179	1	4	0	27	9	131	(74)	47	(26)	42	220
Total																
1987																
Fall 87	13	7	(35)	0	20	1	0	0	3	1	14	(67)	7	(33)	4	25
Spring 88	188	48	(20)	14	250	0	0	0	38	13	188	(80)	48	(20)	65	301
Total	201	55	(21)	14	270	1	0	0	41	14	202	(79)	55	(21)	69	326
1988																
Fall 88	25	15	(38)	2	42	0	1	0	6	2	25	(61)	16	(39)	10	51
Spring 89	106	37	(26)	2	145	0	0	0	22	7	106	(74)	37	(26)	31	174
Total	131	52	(28)	4	187	0	1	0	28	9	131	(71)	53	(29)	41	225
1989																
Fall 89	8	7	(47)	0	15	0	1	0	2	1	8	(50)	8	(50)	3	19
Spring 90	155	25	(14)	5	185	0	0	0	28	9	155	(86)	25	(14)	42	222
Total	163	32	(16)	5	200	0	1	0	30	10	163	(83)	33	(17)	45	241
1990																
Fall 90	8	10	(56)	1	19	3	0	0	3	1	11	(52)	10	(48)	5	26
Spring 91	175[b]	45	(20)	11	231	0	0	0	35	12	175	(80)	45	(20)	58	278
Total	183	55	(23)	12	250	3	0	0	38	13	186	(77)	55	(23)	63	304

Table 1. (Continued).

Subunit/ Regulatory year	Reported								Estimated kill		Total estimated kill					
	Hunter kill					Non-hunting kill[a]										
	M	F	(%)	Unk.	Total	M	F	Unk.	Unreported	Illegal	M	(%)	F	(%)	Unk.	Total
1991																
Fall 91	30	10	(25)	0	40	2	2	0	9	1	32	(73)	12	(27)	10	54
Spring 92	142	43	(23)	6	191	0	2	0	30	10	142	(76)	45	(24)	46	233
Total	172	53	(24)	6	231	2	4	0	39	11	174	(75)	57	(25)	56	287

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

[b] Includes 1 male black bear killed in unknown subunit.

Table 2. Unit 6 black bear harvest mean skull size (length + width), 1987-91.

Subunit	Regulatory Year	Males Mean (in)	n	Females Mean (in)	n
6A	1987/88	17.7	25	15.8	3
	1988/89	18.3	23	16.2	4
	1989/90	17.9	26	0.0	0
	1990/91	18.4	19	15.5	5
	1991/92	18.1	23	17.4	4
6B	1987/88	17.2	8	15.1	5
	1988/89	16.6	4	17.0	1
	1989/90	17.6	17	0.0	0
	1990/91	18.7	5	15.3	1
	1991/92	18.8	7	0.0	0
6C	1987/88	17.6	9	15.3	2
	1988/89	17.5	9	15.7	4
	1989/90	17.7	4	15.1	1
	1990/91	17.5	10	15.6	4
	1991/92	17.1	11	15.5	5
6D	1987/88	17.2	155	15.4	44
	1988/89	17.5	88	15.8	44
	1989/90	17.2	108	15.3	30
	1990/91	17.1	139	15.2	43
	1991/92	16.6	123	15.6	45
Unit 6 Total	1987/88	17.3	197	15.4	54
	1988/89	17.6	124	15.8	53
	1989/90	17.4	155	15.3	31
	1990/91	17.3	173	15.3	53
	1991/92	17.0	164	15.8	54

Table 3. Unit 6 black bear successful hunter residency, 1987-91.

Subunit	Regulatory year	Local resident[a]	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters[b]
6A	1987/88	1	(3)	5	(17)	23	(79)	29
	1988/89	1	(4)	12	(43)	15	(54)	28
	1989/90	0	(0)	7	(25)	21	(75)	28
	1990/91	0	(0)	7	(27)	19	(73)	26
	1991/92	0	(0)	9	(31)	20	(69)	29
6B	1987/88	2	(13)	2	(13)	11	(73)	15
	1988/89	0	(0)	2	(33)	4	(67)	6
	1989/90	0	(0)	8	(44)	10	(56)	18
	1990/91	0	(0)	3	(43)	4	(57)	7
	1991/92	3	(43)	1	(14)	3	(43)	7
6C	1987/88	6	(50)	2	(17)	4	(33)	12
	1988/89	8	(57)	4	(29)	1	(7)	14
	1989/90	4	(80)	0	(0)	1	(20)	5
	1990/91	10	(67)	4	(27)	1	(7)	15
	1991/92	13	(76)	2	(12)	2	(12)	17
6D	1987/88	15	(7)	152	(71)	48	(22)	215
	1988/89	12	(9)	93	(66)	35	(25)	140
	1989/90	16	(11)	109	(73)	21	(14)	150
	1990/91	22	(11)	153	(75)	29	(14)	204
	1991/92	16	(9)	133	(72)	34	(18)	184
Unit 6 Total	1987/88	24	(9)	161	(59)	86	(32)	271
	1988/89	21	(11)	111	(59)	55	(29)	188
	1989/90	20	(10)	124	(62)	53	(26)	201
	1990/91	32	(13)	167	(66)	54[c]	(21)	253[c]
	1991/92	32	(14)	145	(61)	59	(25)	237

[a] Residents of Unit 6. [b] Total includes residency unknown. [c] Includes 1 successful nonresident hunter who took a bear in an unknown subunit.

Table 4. Unit 6 black bear harvest chronology percent by time period, 1987-91.

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	Total n
6A	1987/88	0	7	0	0	0	4	50	39	0	0	28
	1988/89	4	11	0	11	4	11	29	29	4	0	28
	1989/90	0	7	0	0	4	14	50	25	0	0	28
	1990/91	0	15	12	4	0	4	50	12	0	4	26
	1991/92	10	10	7	0	0	10	31	24	3	3	29
6B	1987/88	0	0	0	0	6	0	38	56	0	0	16
	1988/89	0	0	0	0	17	0	67	17	0	0	6
	1989/90	6	0	0	0	0	18	41	24	12	0	17
	1990/91	0	0	0	0	0	14	14	43	29	0	7
	1991/92	0	0	0	0	0	0	29	71	0	0	7
6C	1987/88	0	0	0	0	0	0	25	67	8	0	12
	1988/89	7	0	0	0	0	0	21	64	7	0	14
	1989/90	0	0	0	0	0	0	60	40	0	0	5
	1990/91	0	0	0	0	0	0	13	60	20	7	15
	1991/92	12	18	6	6	0	0	6	47	6	0	17
6D	1987/88	4	2	2	0	0	0	10	47	30	4	215
	1988/89	19	3	1	2	0	1	13	42	17	3	139
	1989/90	3	3	1	1	0	1	19	55	13	3	149
	1990/91	3	0	2	0	0	1	12	52	26	1	202
	1991/92	6	7	2	0	0	1	12	51	20	1	182
Unit 6 total	1987/88	3	2	1	0	0	1	16	48	24	3	271
	1988/89	15	4	1	3	1	2	18	41	14	2	187
	1989/90	3	4	1	1	1	4	26	48	11	3	199
	1990/91	3	2	3	0	0	2	16	49	23	2	251[b]
	1991/92	7	8	3	0	0	2	14	48	16	1	235

[a] Bears were not taken during November-March.

[b] Includes 1 black bear taken in an unknown subunit.

Table 5. Unit 6 black bear harvest percent by transport method, 1987-91.

Subunit	Regulatory year	Percent of harvest: Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	n
6A	1987/88	79	0	10	0	0	0	0	10	29
	1988/89	89	0	7	0	0	4	0	0	28
	1989/90	82	0	7	0	0	0	4	7	28
	1990/91	77	0	15	0	0	4	0	4	26
	1991/92	76	0	10	0	0	0	0	14	29
6B	1987/88	93	0	7	0	0	0	0	0	15
	1988/89	83	0	17	0	0	0	0	0	6
	1989/90	78	0	22	0	0	0	0	0	18
	1990/91	100	0	0	0	0	0	0	0	7
	1991/92	86	0	0	0	14	0	0	0	7
6C	1987/88	17	0	8	0	0	33	17	25	12
	1988/89	0	0	7	7	0	14	36	36	14
	1989/90	0	0	40	0	0	20	40	0	5
	1990/91	7	0	40	0	0	7	27	20	15
	1991/92	0	0	29	0	0	12	35	24	17
6D	1987/88	14	0	81	0	0	1	0	3	215
	1988/89	19	1	74	0	0	0	2	5	140
	1989/90	20	0	69	0	0	3	0	8	150
	1990/91	16	0	72	0	0	2	2	7	204
	1991/92	14	0	73	0	0	0	3	11	184
Unit 6 Total	1987/88	25	0	66	0	0	3	1	4	271
	1988/89	30	1	57	1	0	2	4	6	188
	1989/90	33	0	56	0	0	2	1	7	201
	1990/91	24[a]	0	62	0	0	2	4	8	253[a]
	1991/92	22	0	60	0	0	1	5	12	237

[a] Includes 1 black bear taken by a hunter using an airplane for transport in an unknown subunit.

LOCATION

Game Management Units: 7 (3,520 mi^2) and 15 (4,876 mi^2)

Geographic Description: Kenai Peninsula

BACKGROUND

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

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

Black bears were first given game status in 1939 (Miller 1990). Before 1939 they were classified as "land fur-bearing animals" with liberal seasons and bag limits. For example, the black bear season in 1937 for Fur District 2 (Southcentral Alaska) was open from 1 September to 30 June with a 2 bear limit. Much of the state did not have a closed season and there was no limit. At statehood, the bear season was 10 August to 30 June and the bag limit was 3 bears. Blue or glacier bears were further protected with a bag limit of 1. Cubs of blue or glacier bears or sows with cubs were protected beginning in 1963-64. In 1973-74 all cubs, and sows with cubs were protected. Protection for blue or glacier bears was repealed by 1980-81, and the season was extended to year-round. There have been no regulatory changes since with the exception of bear baiting restrictions.

In 1982-83 permits were required for hunters using bait stations. By spring 1989, a specific season (15 April to 15 June) was established for hunting bears with the use of bait. Dogs may be used to hunt black bear under terms of a permit authorized by the Commissioner of Fish and Game.

Black bear research on the Kenai National Wildlife Refuge began in 1977 as part of a comprehensive predator prey study. Numerous reports have been published which increased our understanding of 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).

MANAGEMENT DIRECTION

Management Objectives

The management objective for black bear in Units 7 and 15 is to maintain a black bear population that will sustain a 3-year average annual harvest of 200 bears composed of at least 60% males.

METHODS

We monitored the black bear harvest through a mandatory sealing program established in 1973. Staff collected biological and demographic information from successful hunters. Hides and skulls of black bears were sealed with metal locking tags. We entered all information into a database with historic information.

I estimated the population by extrapolating the densities calculated by Schwartz and Franzmann (1991) for the 1947 burn to 70% of the Kenai Peninsula (assumed 30% of the landmass was not suitable as black bear habitat because of glaciation and development).

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 fewer moose are in the 1969 burn area and because of human development in black bear habitat. I estimated 3,000 black bears for 5,880 mi^2 of available habitat. 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 1,000 km^2, however, we need further research.

Distribution and Movements:

Schwartz and Franzmann (1991) provided an excellent review of radio-collared black bear movements. One of the primary factors affecting distribution and movements of bears was the abundance and distribution of devil's club (*Oplopanax horridus*). Increased productivity of black bears in specific areas was related to the number of moose calves consumed in the spring (Schwartz and Franzmann 1991). As plant succession progresses in the 1969 burn, available browse will decrease and the number of moose calves available to bears will decline. Bear productivity in this area is expected to decline to 1947 burn levels within the next 10 years.

Logging vast areas of mature forest can negatively effect black bears. Devil's club, an important forage species, declines in vigor after logging and exposure to full sunlight. Logging roads improve access and can result in higher bear mortality. Planned reforestation is not expected to improve moose habitat and increase bear productivity.

Mortality

Harvest:

Season and Bag Limit. The season was open in Units 7 and 15 and the bag limit was 3 bears. Cubs or females accompanied by cubs could not be taken. Bear baiting was allowed from 15 April to 15 June (except in Resurrection Creek and its tributaries in Unit 7).

Board of Game Action and Emergency Orders. In 1987 the Board of Game reduced the year-round baiting season to the period 15 April to 15 June. The board also required hunters to register with the ADF&G before establishing bait stations.

Hunter Harvest. During the 5-year period 1987-91, the number of black bears harvested more than doubled from 141 to 285 bears (Table 1). The 5-year mean annual harvest was 200 animals (range = 141-285), however, the mean annual hunter harvest of black bears for the most recent 3-year period, 1989-91, has increased to 224 bears (range = 175-285) which exceeded management objectives. Females averaged 31% of the harvest for the 5-year period, 1987-91, and 33% of the harvest for the most recent 3-year period. The proportion of females in the harvest was within management guidelines (40%) except during autumns of 1987 (42%) and 1991 (42%).

Bears taken at bait stations accounted for 15% of the harvest during the 5-year period 1987-91 (Table 1). An average of 32 bears (range = 25-38) was harvested over bait during the past 3 regulatory years (Table 2) and 44% of the bears taken over bait during this period were females.

Residents registered all bait stations on the Kenai Peninsula by residents. The number of bait stations has increased from 151 stations registered to 106 hunters in 1990, to 335 stations registered to 196 hunters in 1992 (Table 3). Hunters with bait stations in Subunit 15A consistently harvested a higher proportion of females (58%). The Kenai National Wildlife Refuge implemented regulations which concentrated hunters using bait into a small area in this subunit. A high concentration of bait stations increased the probability that bears would eventually encounter a bait station and a hunter. Hunting over bait allows for a selective harvest of bears, however it appeared hunters using bait in Subunit 15A took the first bear available. The high proportion of females in this harvest suggests baiting may be reducing the number of bears in localized areas of Subunit 15A even though females with cubs are protected.

Defense of life and property kills are not included in hunter harvests. It should be noted that DLP kills increased over the past 5 years (Table 1).

Hunter Residency and Success. Local residents, residents, and nonresidents accounted for 45%, 46%, and 8% respectively, of the black bear harvest in Units 7 and 15 during 1989-91 (Table 4). The ratio of successful hunters by residency has not varied during the 5-year period of 1987-91 (Table 4).

Harvest Chronology. More bears were harvested during the spring than in the fall, during each of the past 3 years (Table 5). Sixty nine percent of the bears killed in spring were taken in May (Table 5). During the fall, an average of 54% of the bears were taken in September coincident with moose season. Over one-half of the bears taken in fall were killed during September and the percentage of bears killed in September increased each year between 1987-1991 from 44% to 63%.

Transport Methods. Boats, highway vehicles, and airplanes were important methods of transport for successful bear hunters in Units 7 and 15 (Table 6). Over one-fifth of the hunters who took a bear reported walking, as their means of transport.

Other Mortality:

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

Nonregulatory Management Problems and Needs

The illegal traffic of bear parts including hides, claws, and gall bladders occurs on the Kenai. Public reports indicate traffic of bear parts occurs occasionally but enforcement cases have not 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. Bear hunting is increasing in popularity because of a lengthy season and liberal bag limit. If annual harvests continue to increase, regulatory changes may be necessary to decrease the harvest.

Annual harvests are exceeding management objectives. Conservative density estimates suggest the population is approximately 3,000 black bears. Information is needed for mountainous and coastal regions of the Kenai Peninsula to verify population estimates.

The average annual black bear harvest exceeded management objectives on the Kenai Peninsula during 1982-86, (5-year mean = 241, ADF&G Unpubl. Data). Schwartz and Franzmann (1991) found no noticeable impact to the population during this time and concluded hunting was probably compensatory. Therefore, the management objectives should be revised to the following:

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

The management objective could be safely increased to 250 bears per year and would allow a maximum average harvest of 100 female bears. This objective is still within sustained yield management and is based on conservative population estimates and exploitation rates. If we identify localized overharvests of bears area specific restrictions may be necessary.

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

I recommend no regulatory changes at this time. However, if the harvest of black bears continues to increase, changes may be necessary. We should consider restricting the use of bait stations to archery hunters. This restriction may provide the needed reduction in harvest as well as lower the proportion of females in the harvest. Archery hunters could be allowed to bait without significant impact to the bear population.

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Table 1. Units 7 and 15 black bear harvest[a], 1987-91.

Regulatory year	Reported Hunter kill M	F	(%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Total estimated kill M	(%)	F	(%)	Unk.	Total
1987															
Fall 87	39	28	(42)	1	68		1	0	0	40	(58)	28	(41)	1	69
Spring 88	49	21	(30)	3	73		1	1	0	50	(67)	22	(29)	3	75
Total	88	49	(36)	4	141	16	2	1	0	90	(63)	50	(35)	4	144
1988															
Fall 88	53	32	(38)	2	87		0	0	0	53	(61)	32	(37)	2	87
Spring 89	71	25	(26)	4	100		2	0	0	73	(72)	25	(25)	4	102
Total	124	57	(31)	6	187	36	2	0	0	126	(67)	57	(30)	6	189
1989															
Fall 89	56	19	(25)	1	76		2	1	0	58	(73)	20	(25)	1	79
Spring 90	69	27	(28)	3	99		0	0	0	69	(70)	27	(27)	3	99
Total	125	46	(27)	4	175	25	2	1	0	127	(71)	47	(26)	4	178
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

[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, 1987-91.

Regulatory year	Unit 7		Subunit 15A		Subunit 15B		Subunit 15C			
	M	F	M	F	M	F	M	F	Total	%
1987/88	4	3	2	3	0	0	2	1	16[a]	(47)
1988/89	9	3	12	8	0	0	3	1	36	(33)
1989/90	5	2	2	10	0	0	5	1	25	(52)
1990/91	19	2	6	9	0	0	2	0	38	(29)
1991/92	8	7	4	6	0	1	3	4	34[b]	(55)

[a] One bear of unknown sex during 1987-88
[b] One bear of unknown sex during 1991-92

Table 3. Units 7 and 15 black bear baiting station information, 1989-92.

Regulatory year	Local residents[a]	Nonlocal residents	Total permits[b]	Total stations	Bears killed
1989	44	62	106	165	36
1990	60	46	106	151	25
1991	100	79	179	299	38
1992	100	96	196	335	34

[a] Resident of Units 7 or 15.
[b] All hunters that registered bait stations were Alaska residents.

Table 4. Units 7 and 15 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1987/88	61	(43)	71	(50)	9	(6)	141
1988/89	77	(41)	93	(50)	16	(9)	187[b]
1989/90	93	(53)	67	(38)	15	(9)	175
1990/91	93	(44)	99	(47)	20	(9)	212
1991/92	118	(41)	145	(51)	22	(8)	285

[a] Resident of Unit 7 or 15.
[b] 1 hunter of unknown residency.

Table 5. Units 7 and 15 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods July	August	September	October	November	April	May	June	n
1987/88	5	10	21	11	<1	<1	34	17	141
1988/89	5	6	24	11	0	2	37	13	187[a]
1989/90	4	7	23	9	0	6	37	14	175
1990/91	<1	2	18	10	0	<1	45	22	212
1991/92	1	9	30	8	0	1	39	13	285

[a] One bear was reported in February.

Table 6. Units 7 and 15 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest									n
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1987/88	15	5	24	0	0	6	19	15	16	141
1988/89	14	6	21	0	0	10	22	11	15	187
1989/90	11	9	25	0	0	5	19	22	10	175
1990/91	8	5	26	0	0	7	20	22	11	212
1991/92	15	3	28	2	<1	7	16	19	11	285

LOCATION

Game Management Unit: 11 (14,000 mi^2)

Geographic Description: Wrangell Mountains

BACKGROUND

Black bears are considered numerous in portions of Unit 11 where favorable forested habitat exists. 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 appears to be increasing.

MANAGEMENT DIRECTION

Management Objectives

The management objective for Unit 11 black bears is to 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 suggested black bears were abundant wherever suitable habitat occurred in the unit. The lower Chitina River Valley appeared to be especially favorable bear habitat with salmon available in a number of streams. Black bear numbers in the lower Chitina were 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. There were no regulatory actions taken in 1992 regarding black bear hunting in Unit 11.

Hunter Harvest. Hunters reported taking 14 black bears during the 1991-92 season. This take was the same as the previous year's take but slightly higher than the 5-year (1987-92) mean harvest of 12 bears per year (Table 1). Males comprised 71% of the 1991-92 take, compared to an average of 67% per year reported during the last 5 years (1987-92). The mean skull size for males taken in 1991-92 was 16.5 inches, compared to the 5-year mean of 17.0 inches. The average skull size of females in the 1991-92 harvest was 16.5 inches, compared to the 5-year mean of 15.8 inches.

Hunter Residency and Success. Nonresident hunters took 43% of the 1991-92 black bear harvest (Table 2). Nonresidents have averaged 3.3 bears per year (range = 0-18), or 30% of the harvest in Unit 11 since 1973. Most nonresidents reported using a guide and usually harvested a bear during the fall season while on a hunt for other big game species such as sheep. The percent of black bears in the harvest taken by local residents declined from 40% of the 1987-88 harvest to none reported during the last 2 years (Table 2). The take by nonlocal Alaskans increased during the report period. Successful bear hunters averaged 3.0 days hunting during the 1991-92 season, slightly less time than the 3.5 day average reported for all successful bear hunters since 1973.

Data obtained from bear sealing certificates indicated 64% of the successful hunters were specifically hunting black bears. The remainder reported taking a bear incidentally to other hunting activities. In 1991-92, 50% of the successful hunters salvaged some or all of the bear meat. Only 1 black bear was reported taken over bait during each of the last 2 years (Table 1).

Harvest Chronology. During 1991-92, 12 (86%) bears were taken in the fall and only 2 (14%) during the spring. Since 1973, 73% of the black bear harvest occurred during the fall season. During the 5-year period 1987-92, the highest bear harvests occurred during September and May (Table 3).

Transportation Methods. Aircraft, highway vehicles, and walking were the methods of transportation most often reported by successful black bear hunters (Table 4). Aircraft use was popular by nonresidents, especially those on mixed-bag hunts during the fall.

Other Mortality:

Unreported harvests by remote rural residents do occur. These probably involve DLP situations around remote cabins. Reporting is minimal because of the transportation difficulties in remote portions of the unit. Also, DLP bears may be claimed in the sport harvest because of the liberal bag limit and no closed season. Hunters taking a bear under DLP conditions are required to turn over the hide and skull to ADF&G.

CONCLUSIONS AND RECOMMENDATIONS

Black bear harvests are low and we do not believe the harvests influence the unitwide bear population. The proportion of males in the harvest exceeds the 60% management guideline for black bear harvests in this unit.

One reason the Unit 11 black bear population receives relatively light hunting pressure is most of the unit is included in Wrangell-St. Elias Park/Preserve. National Park Service regulations prohibit sport hunting in portions of the unit designated as park. Subsistence hunting by local rural residents continues in these areas; however, aircraft cannot be used to access park areas. This effectively closes much of the park to all hunting. Sport hunting and aircraft access is allowed in areas designated as preserve.

I recommend no changes in season length or bag limits.

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Table 1. Unit 11 black bear harvest[a], 1987-91.

Regulatory year	Reported Hunter kill M	F	(%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Estimated kill Unreported	Illegal	Total estimated kill M	(%)	F	(%)	Unk.	Total
1987																	
Fall 87	4	2	(33)	0	6	0	0	0	0	1		4	(67)	2	(33)	1	7
Spring 88	3	1	(25)	0	4	0	0	0	0	1		3	(75)	1	(25)	1	5
Total	7	3	(30)	0	10	0	0	0	0	2		7	(70)	3	(30)	2	12
1988																	
Fall 88	6	0	(0)	0	6	0	0	0	0	1		6	(100)	0	(0)	1	7
Spring 89	3	0	(0)	0	3	0	0	0	0	1		3	(100)	0	(0)	1	4
Total	9	0	(0)	0	9	0	0	0	0	2		9	(100)	0	(0)	2	11
1989																	
Fall 89	2	3	(60)	0	5	0	0	0	0	1		2	(40)	3	(60)	1	6
Spring 90	4	2	(33)	0	6	0	0	0	0	1		4	(67)	2	(33)	1	7
Total	6	5	(46)	0	11	0	0	0	0	2		6	(54)	5	(46)	2	13
1990																	
Fall 90	6	1	(14)	0	7	0	0	0	0	1		6	(86)	1	(14)	1	8
Spring 91	1	3	(75)	3	7	1	0	0	0	1		1	(25)	3	(75)	4	8
Total	7	4	(36)	3	14	1	0	0	0	2		7	(64)	4	(36)	5	16
1991																	
Fall 91	9	3	(25)	0	12	0	0	0	0	1		9	(75)	3	(25)	1	13
Spring 92	1	1	(50)	0	2	1	0	0	0	1		1	(50)	1	(50)	1	3
Total	10	4	(29)	0	14	1	0	0	0	2		10	(71)	4	(29)	2	16

[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, 1987-91.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1987/88	4	(40)	2	(20)	4	(40)	10
1988/89	2	(22)	6	(67)	1	(11)	9
1989/90	2	(18)	4	(36)	5	(46)	11
1990/91	0	(0)	10	(71)	4	(29)	14
1991/92	0	(0)	8	(57)	6	(43)	14

[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 time period, 1987-91.

Regulatory year	Harvest periods							n
	August	September	October	November	April	May	June	
1987/88	20	40	0	0	0	40	0	10
1988/89	11	46	0	0	11	22	0	9
1989/90	27	18	0	0	0	55	0	11
1990/91	21	21	7	0	14	36	0	14
1991/92	36	50	0	0	0	14	0	14

Table 4. Unit 11 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest									n
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1987/88	40	0	30	0	0	0	20	10	0	10
1988/89	44	0	0	0	0	11	22	0	22	9
1989/90	46	0	18	0	0	0	0	18	18	11
1990/91	43	7	0	0	0	21	14	0	14	14
1991/92	43	0	0	0	0	0	29	14	14	14

LOCATION

Game Management Unit: 12 (9,977 mi^2)

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

BACKGROUND

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

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

MANAGEMENT DIRECTION

Management Goals

Management goals for Unit 12 black bears are 1) to protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem; and 2) to provide the greatest sustained opportunity to participate in hunting black bears.

Management Objective

The management objective for area black bears is to maintain a black bear population capable of sustaining an annual harvest of at least 30 black bears, of which at least 55% are males.

METHODS

Annual harvest information was obtained from hunter reports collected during mandatory sealing of hunter-killed bears. These reports provided data on harvest location and date, hunter residency and effort, sex of the bear, skull size, salvage of meat, defense of life or property, incidental take, and baiting. A premolar was extracted for possible aging.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

We did not conduct censuses or surveys in Unit 12 to determine the black bear population size or trend. However, hunter reports and observations made by ADF&G personnel suggest black bears are present in all suitable habitats in Unit 12. Based on limited radio telemetry data collected in Unit 12 and on more rigorous data collected in Subunit 20A, I estimated the black bear density in Unit 12 to be between 1 bear/4-7 mi^2 in black bear habitat and the population size to be between 700 and 1,000 bears.

Population Composition:

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

The black bear population in Unit 12 appears productive, based on numerous sightings of family groups with cubs or yearlings. The interval between parturition and weaning ranged from 2 to 3 years, similar to what has been found in other Interior Alaska black bear populations (Miller 1987).

Distribution and Movements:

Black bears are distributed throughout forested areas which comprise approximately 4,500 mi^2 of Unit 12. During fall and spring, bears move into the shrub habitat zones to feed on berries and succulent vegetation. A forest fire burned approximately 100,000 acres in the Tok River valley in 1990 and will probably influence black bear distribution and movements, but the effects of the influence are not yet known.

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

Mortality

Harvest:

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

Board of Game Actions and Emergency Orders. In 1988, the Board of Game restricted the use of black bear bait stations in Unit 12 to the period from 15 April to 30 June. Each hunter is limited to two bait stations and is required to register each station with the Division of Wildlife Conservation. The effect of this regulation on the overall harvest has been minor. Only a few bears were taken over bait during fall before the regulation change. Most bears killed during fall are taken opportunistically while hunters pursue other species.

No other board actions or emergency orders concerning Unit 12 black bears occurred during the report period.

Hunter Harvest. Eighteen black bears were reported harvested in Unit 12 during 1991-92, below the 5-year average annual harvest of 23 (Table 1). The low harvest is probably a result of a forest fire in the Tok River drainage that burned much of the area normally used for spring black bear hunting. Many traditional bait stations were burned and most affected hunters chose not to hunt that year rather than set baits in new areas. Males comprised 83% of the harvest (n = 15) and females 17% (n = 3), exceeding the 5-year average sex ratio in the harvest of 67% males and 33% females. Mean skull size of 13 males taken in 1991-92 was 16.1 inches, slightly lower than the 5-year mean of 16.4 inches. The mean skull size of the three females harvested (14.6 inches) was smaller than the 5-year mean of 15.3 inches; however, the sample size was too small to make meaningful comparisons.

Most (76.4%) of the harvest occurred in the Tok and Tanana River valleys. Some meat was salvaged from 93% of the reported harvest, similar to the 5-year mean of 92%.

Hunter Residency and Success. Alaskan residents harvested 100% (56% by local residents) of the black bears taken in Unit 12 during 1991, exceeding the 5-year mean of 89% (Table 2). During 1987-91 hunting seasons, successful hunters included a mean of 64% local residents. Nonresident harvest ranged from 0% to 29% annually, with a mean of 11%. No measure of hunter success was available because nonsuccessful hunters were not required to report. In 1991, successful hunters spent 8.4 days afield hunting black bears, compared with the 5-year average of 4.4 days. This increased effort is probably a result of fewer people hunting over bait and relying more on road hunting to find bears. Also, some new bait stations were set in areas without any knowledge of bear distribution or movement patterns. Nothing indicates that the increased effort was because of a reduced bear population.

Harvest Chronology. During 1991, hunters harvested 15 bears (83%) during spring and 2 during fall (11%) (Table 3). This is a higher than normal spring harvest (5-year mean was 62%). Causes for the low harvest during fall are not known. However, the blueberry crop in fall 1991 was plentiful throughout Unit 12 even in the lowlands; black bears may not have moved into the shrub habitats to find berries so that they were less vulnerable to hunters.

Transport Methods. Highway vehicles were the most commonly used (71%) mode of transportation for successful black bear hunters in 1991 (Table 4). During the past 5 years, 51% of the reported harvested black bears were taken by hunters using highway vehicles. Airplanes and boats were the next most commonly used transportation methods.

Other Mortality:

Most black bear mortality in Unit 12 is naturally caused. Grizzly bears may kill black bears and adult male black bears may be responsible for a significant portion of mortality of cub bears. There are 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 50% of Unit 12 is suitable black bear habitat. Because grizzly bears are moderately abundant and are an important source of mortality for black bears of all age classes (Miller 1987), they limit black bear distribution to areas offering adequate escape cover. Black bears eat a variety of berry species in Unit 12. All these species are generally available throughout the unit, but their abundance is directly affected by climatic conditions. During 1990 the Tok forest fire burned approximately 100,000 acres of prime black bear habitat, but its impact on the black bear population is not known.

Enhancement:

The implementation of the Alaska Interagency Fire Management Plan and the Tok forest fire are expected to enhance black bear habitat over the long term in Unit 12. Extensive areas of black spruce forest climax habitat exist in the unit, with understories nearly devoid of high-quality black bear food. If an additional area is disturbed by fire, the average age of successional habitats will be lower. A younger, more diverse habitat mosaic will be more productive of bear food plants.

CONCLUSIONS AND RECOMMENDATIONS

During the report period, the management goals and objective were met. In Unit 12, 89% of the black bears are harvested by state residents, of which 63% are local residents. Black bears are an important food source and 92% of bears were salvaged for their meat. However, there did appear to be less interest in hunting black bears after the Tok forest fire destroyed many of the traditionally used bait stations. Based on hunter reports and public and departmental sightings nothing indicates that the current harvest level is excessive. The proportion of males in the harvest remained high (5-year average = 67%)

and the skull size of males remained fairly consistent and comparable with sizes of harvested males from the adjacent and lightly hunted portions of Subunit 20E. I recommend no changes in seasons and bag limits.

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Table 1. Unit 12 black bear harvest, 1987-91.

Regulatory year	Reported: Hunter kill M	F	Unk.	Total	Baited	Non-hunting kill M	F	Unk.	Estimated kill: Unreported	Illegal	Total reported and estimated kill: M (%)	F (%)	Unk.	Total
1987														
Fall 87	9	1	0	10	0	0	0	0	0	0	9 (90)	1 (10)	0	10
Spring 88	6	11	0	17	2[a]	1	0	0	0	0	7 (39)	11 (61)	0	18
Total	15	12	0	27	2[a]	0	0	0	0	0	15 (56)	12 (44)	0	27
1988														
Fall 88	15	5	0	20	0	0	0	0	0	0	15 (75)	5 (25)	0	20
Spring 89	5	1	0	6	1[a]	0	0	0	0	0	5 (83)	1 (17)	0	6
Total	20	6	0	26	1[a]	0	0	0	0	0	20 (77)	6 (23)	0	26
1989														
Fall 89	4	2	0	6	0	0	0	0	0	0	4 (67)	2 (33)	0	6
Spring 90	5	8	0	13	8	0	0	0	0	0	5 (39)	8 (61)	0	13
Total	9	10	0	19	8	0	0	0	0	0	9 (47)	10 (53)	0	19
1990														
Fall 90	5	1	0	6	0	0	0	0	0	0	5 (83)	1 (17)	0	6
Spring 91	12	5	1	18	5	0	0	0	0	0	12 (71)	5 (29)	1	18
Total	17	6	1	24	5	0	0	0	0	0	17 (74)	6 (26)	1	24
1991														
Fall 91	3	0	0	3	0	0	0	0	0	0	2 (100)	0 (0)	1	3
Spring 92	12	3	0	15	7	0	0	0	0	0	12 (80)	3 (20)	0	15
Total	15	3	0	18	7	0	0	0	0	0	14 (82)	3 (18)	1	18

[a] Data not accurately recorded during these years.

Table 2. Unit 12 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total Successful Hunters
1987-88	18 (75)	3 (13)	3 (12)	24
1988-89	10 (42)	7 (29)	7 (29)	24
1989-90	15 (83)	2 (11)	1 (6)	18
1990-91	15 (63)	7 (29)	2 (8)	24
1991-92	10 (56)	8 (44)	0 (0)	18

[a] Unit 12 and Subunit 20E residents.

Table 3. Unit 12 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest Periods								
	July	August	September	October	November	April	May	June	n
1987-88	15	11	11	0	0	0	22	41	27
1988-89	8	38	31	0	0	0	15	8	26
1989-90	5	11	16	0	0	0	63	5	19
1990-91	0	4	21	0	0	0	54	21	24
1991-92	0	6	6	0	0	0	41	47	17

Table 4. Unit 12 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of Harvest								
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	n
1987	0	7	0	0	0	4	52	37	27
1988	38	8	0	4	0	4	23	23	26
1989	10	0	26	0	0	0	58	5	19
1990	4	4	8	13	0	0	50	21	24
1991	6	0	6	12	0	0	71	6	17

LOCATION

Game Management Unit: 13 (23,000 mi^2)

Geographic Description: Nelchina Basin

BACKGROUND

Black bears are considered numerous in portions of Unit 13 with suitable forest habitat. Harvest data are not available before 1973 when sealing of black bears became mandatory. Average annual harvests have increased 32% from a mean of 62 bears per year between 1973-79 to an average of 82 bears per year since 1980. Black bears are gaining in status as a desirable big game animal, and black bear hunting seems more popular than in the past.

MANAGEMENT DIRECTION

Management Objectives

The management objective for area black bears is to 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 kill by interviewing successful hunters and sealing bears presented for examination. We measured skulls of sealed bears, determined sex of bears, and extracted a premolar tooth was extracted for aging.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

We have not conducted black bear surveys or censuses in most of Unit 13. However, field observations and harvest data suggested black bears were 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 was marginal black bear habitat and his results may not reflect bear densities found 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 were not available. Black bear densities, even in good habitat, were lower in Unit 13 than in areas like the Kenai Peninsula.

Distribution and Movements:

Black bears usually are found in forested habitats except during 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. The season on black bears in Unit 13 was open year round and the bag limit was 3 bears per year.

Board of Game and Emergency Orders. The Board of Game took no regulatory actions about black bears in Unit 13 during 1992.

Hunter Harvest. The reported harvest of black bears during the 1991-92 season was 69 bears, a 22% decline from the 1990-91 harvest of 88 bears and 8% below the 5-year (1987-92) average annual harvest of 75 (Table 1). Males comprised 70% (n = 47) of the 1991-92 take and females 30% (n = 20), similar to the 71% males reported in the take during the past 5 years (1987-90). Since 1973, males have comprised 67% of the unitwide harvest. The mean skull size for males was 15.7 inches in 1991-92, compared to the 5-year mean of 16.2 inches. The mean skull size for females was 15.7 inches in the 1991-92 harvest, compared to the 5-year mean of 15.5 inches.

Subunit 13D had the highest reported harvest with 32 (46%) bears, followed by Subunit 13E with 22 (32%), Subunit 13C with 7 (10%), and Subunits 13A and 13B with 4 (6%) each. Similar harvest proportions were observed in prior years with the majority of the harvests reported from Subunits 13D and 13E. Despite increased settlement DLP harvests remain low, possibly because we sealed DLP bears as sport kills. With a 3-bear bag limit and no closed season, there was little reason 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 13 (19%) black bears during 1991-92 (Table 2). Overall, nonresidents have averaged 15 bears per year or 21% of the harvest in Unit 13 since 1973. During the 1991-92 season, 14% (10) of the successful hunters reported using a guide. Most guided hunters were nonresidents. Residents of Unit 13 killed 10 (14%) black bears during 1991-92 compared to 15 (17%) the previous year. Residents of other units took the remaining 46 (67%) bears.

Successful black bear hunters averaged 3.6 days in the field in 1991-92, similar to the 3.5 day average reported for successful hunters since 1973. Data obtained in 1991-92 from bear sealing certificates indicated one-half (50%) of the successful hunters were specifically hunting black bears. Incidental take was higher (55%) during fall when other big game species were hunted, than in spring (39%) when only bear seasons were open.

In 1991-92, 74% of the successful hunters salvaged some or all of the bear meat compared to 71% the previous year. Only 1 bear was reported as shot at a bait station in 1991-92 compared to 7 in 1990-91 (Table 1). Hunting over bait did not appear as popular in Unit 13 as in other units, possibly because grizzly bears were abundant and they will readily use bait stations.

Harvest Chronology. During the 1991-92 season, spring harvest was 28 (41%) bears, compared to 41 (59%) killed in fall. Since 1973, 64% of the Unit 13 black bear harvest has occurred during fall. September was the most important month during fall season, while the most bears harvested during spring were taken in May (Table 3). Over 10% of the bear harvest occurred during summer when hides were worthless as trophies. Summer kills were presumably for meat or DLP kills.

Transport Methods. Among successful 1991-92 bear hunters, aircraft (28%), highway vehicles (17%), and boats (15%) were the most popular methods of transportation (Table 4). These percentages were similar to those observed in previous years. Because of the combined importance of highway vehicles, walking, boats and ORVs, roadside black bear populations apparently received the greatest hunting pressure.

Other Mortality:

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

Habitat Assessment

Unit 13 black bears seem to prefer extensive tracts of spruce forests with more marginal habitat types of forested land bordering rivers surrounded by upland shrub zones. Subunits 13D and 13E have the most extensive areas of heavily timbered spruce forests and

contain more black bears. Newly adopted land management objectives specify a reduction in fire suppression activities in remote portions of Unit 13 and a return to a natural fire regime. This will result in an interspersion of forest stands in different successional stages. This could result in a change in the amount of black bear habitat available in the future. Both Subunits 13D and 13E also have salmon runs available to black bears which affords an alternate food source not available in more interior units.

CONCLUSIONS AND RECOMMENDATIONS

We do not currently collect harvest data from unsuccessful black bear hunters, so we have no way of determining hunting effort. The number of hunters seeking information on black bear hunting has increased, and black bear hunting has apparently become more popular. We expect this trend to continue as hunters seek alternative big game hunting opportunities because of increasing competition, shorter hunting seasons, and increased use of permit hunts for more popular big game species. We should collect this data because it is important to evaluate changes in hunting pressure and success rates as an indication of bear abundance. I recommend that a system of collecting hunting data from unsuccessful hunters be developed and implemented.

Black bear harvests increased in Unit 13 during the 1980s. Males comprise 68% of the kill over the past 5 years. Because this figure is well above the current management objective of 60% males in the harvests, current harvest rates are felt to be within a sustainable level. However, the average skull size for males in the harvest declined over the past 3 years. A decline in average skull size for males in the harvest means either we have a productive population with lots of young males that are more susceptible to harvest, or we have removed many older, larger bears. If the latter is true, we should eventually see a decline in the percent males taken in the harvest, at which time a reduction in season length or bag limits will be necessary. Should a reduction in the harvest become necessary, I recommend that the bag limit on black bears be reduced to 1 bear per year for sport hunters. This should reduce the overall take of females because hunters would be more selective before shooting a bear knowing they could not take another later in the year. Black bear populations can sustain higher harvest rates if most animals taken are males and the females are left to reproduce.

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Table 1. Unit 13 black bear harvest[a], 1987-91.

Regulatory year	Reported Hunter kill M	F	(%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Estimated kill Unreported	Illegal	Total estimated kill M (%)	F (%)	Unk.	Total
1987															
Fall 87	25	17	(41)	1	43	0	0	0	0		3	25 (59)	17 (41)	4	46
Spring 88	21	9	(30)	3	33	5	0	1	0		3	21 (68)	10 (32)	6	37
Total	46	26	(36)	4	76	5	0	1	0		6	46 (63)	27 (37)	10	83
1988															
Fall 88	27	21	(44)	2	50	0	0	0	0		3	27 (56)	21 (44)	5	53
Spring 89	19	6	(24)	1	26	6	0	0	0		3	19 (76)	6 (24)	4	29
Total	46	27	(37)	3	76	6	0	0	0		6	46 (63)	27 (37)	9	82
1989															
Fall 89	31	11	(26)	0	42	0	0	0	0		3	31 (74)	11 (26)	3	45
Spring 90	17	4	(19)	1	22	5	1	0	0		3	18 (82)	4 (18)	4	26
Total	48	15	(24)	1	64	5	1	0	0		6	49 (77)	15 (23)	7	71
1990															
Fall 90	33	9	(21)	2	44	0	0	0	0		3	33 (79)	9 (21)	5	47
Spring 91*	34	8	(19)	2	44	7	0	0	0		3	34 (81)	8 (19)	5	47
Total	67	17	(20)	4	88	7	0	0	0		6	67 (80)	17 (20)	10	94
1991															
Fall 91	26	13	(33)	2	41	0	0	0	0		3	26 (67)	13 (33)	5	44
Spring 92	21	7	(25)	0	28	1	0	0	0		3	21 (75)	7 (25)	3	31
Total	47	20	930)	2	69	1	0	0	0		6	47 (70)	20 (30)	8	75

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

* Nonresidents in May 1991.

Table 2. Unit 13 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1987/88	13	(17)	50	(66)	13	(17)	76
1988/89	16	(21)	45	(59)	15	(20)	76
1989/90	14	(22)	40	(62)	10	(16)	64
1990/91	15	(17)	46	(52)	27	(31)	88
1991/92	10	(14)	46	(67)	13	(19)	69

Table 3. Unit 13 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods							
	July	August	September	October	April	May	June	n
1987/88	3	6	45	3	0	29	14	76
1988/89	4	12	46	4	0	29	5	76
1989/90	6	15	53	2	2	30	3	64
1990/91	2	8	39	1	1	41	8	88
1991/92	4	9	39	7	1	22	17	69

Table 4. Unit 13 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest									
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	n
1987/88	29	1	4	0	0	12	15	21	18	76
1988/89	36	3	8	1	0	11	20	16	7	76
1989/90	27	3	19	2	0	17	11	13	9	64
1990/91	31	5	7	1	0	7	13	23	15	88
1991/92	28	4	15	1	0	7	17	12	16	69

LOCATION

Game Management Unit: 14 (6,625 mi^2)

Geographical Description: Upper Cook Inlet

BACKGROUND

Black bears were common or abundant during the 1970s, and because they were believed to be underutilized, hunting was encouraged. Biologists began collecting harvest information through the sealing process beginning in 1973. Survey data were lacking in Unit 14, so Grauvogel (1990) and Harkness (1990) used estimated densities of black bears in study areas of adjacent units to bracket probable population numbers. They postulated Unit 14 had 750-1,450 bears, but conservatively estimated a population of 750-1,050 which produced a sustainable annual harvest of 83-158 bears.

Bear baiting was an illegal hunting method between 1977 and 1982. It was reauthorized in 1982, and black bear harvests increased. Before 1982, hunters harvested an annual average of 68 bears of which 34% were females. By 1987, the Unit 14 harvest increased to a peak of 133 bears, with 38% of the harvest taken at baiting stations. In Subunit 14A, baiting accounted for one-half of the subunit harvest. Concerns that total harvest and harvest of females were high and causing a population decline, precipitated restrictions in the length of bear baiting season and baiting in Subunit 14C was eliminated after 1987.

MANAGEMENT DIRECTION

Management Goals

Two sets of management goals were assigned to Unit 14 in 1976. In Subunits 14A and 14B the goal was to provide the greatest opportunity to participate in hunting black bears. In Subunit 14C the goal was 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 which appears to be largely unaffected by human harvest. The human use objective is to provide liberal opportunities to hunt black bears with average annual harvests of less than 80 bears.

METHODS

We monitored the black bear harvest by sealing skulls and hides of bears taken by hunters or killed for other reasons. Staff measured skulls of sealed bears, determined sex of bears, and extracted a premolar tooth for aging. Successful hunters also gave us date and location of kill and hunter effort. We asked if the kill was incidental, if taken from a bait station, and if meat was salvaged.

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

RESULTS AND DISCUSSION

Population Status and Trend

Black bear numbers in Unit 14 appeared to stabilize after recent declines. Previously, high densities of hunters in portions of Subunit 14A apparently caused a decline in bear density. The trend was indicated by a 56% decline in spring harvest by baiters from spring 1988 to spring 1990 (Table 1). During the decline hunting pressure in Unit 14 fluctuated but remained high (Table 2).

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

Population Size:

We estimated a population of 530 to 1,080 black bears, a 29% reduction in the lower end of range estimates. This estimate includes 210-420 bears in Subunit 14A, 150-300 animals in Subunit 14B and 180-360 bears in Subunit 14C.

Earlier estimates are based on densities of 1 bear/2-4.3 mi^2 from studies in remote or lightly roaded areas of Alaska (Miller et al. 1987, Schwartz et al. 1984). Most of Unit 14 is substantially more settled than those study areas, making previous estimates overly optimistic. Removing approximately 360 mi^2 of settled area from the habitat base, 3,610 mi^2 (which excludes land above 2,500 ft. elevation and glaciers), leaves 3,250 mi^2 of habitat. We assume the average bear density is 1 bear/3-6 mi^2.

Mortality

Harvest:

Season and Bag Limit. No closed season on black bears occurred in Unit 14 and the bag limit was 1 bear. During regulatory years 1989/90, 1990/91 and 1991/92 there was not a closed season in Unit 14, however, within Chugach State Park the open season was the day after Labor Day through 20 May; and in Subunit 14A, the season was 1 September through 25 May. Baiting black bears was not allowed within Subunit 14C, but hunting over bait was allowed by registration permit between 15 April and 25 May in Subunit 14A and between 15 April and 31 May in Subunit 14B.

Board of Game Actions and Emergency Orders. The board continued efforts to reduce and stabilize bear harvests while minimizing female mortalities. Regulations were enacted during 1988/89 which limited baiting to 15 April to 15 June, closed Subunit 14C to baiting, and limited baiters to a maximum of 2 bait stations. Upon recommendations from the department, the board reduced the Unit 14 bag limit to 1 bear and reduced the baiting season to 15 April to 31 May. These additional restrictions took effect during 1990/91. The harvest of sows continued to exceed estimated sustainable level, and the department recommended reducing spring and summer hunting seasons in Subunit 14A to effect a 20-25% reduction in harvest of sows. The board adopted regulations effective in the 1992/93 regulatory year which closed the period of 26 May to 31 August to black bear hunting in Subunit 14A.

Hunter Harvest. In contrast to harvest trends and record high harvests during the 1980s, bear harvests stabilized between 1989-91 in Subunits 14A and 14C (Tables 3 and 4). Hunters in Subunit 14A killed an average of 50 bears annually with an average of 37% being females (Table 3); baiters were responsible for 33% of the harvest (Table 1). In Subunit 14C, the average kill was 20 bears with 27% being females (Table 4).

A closed moose season and reduced baiting season combined with late arrival of springs apparently caused Subunit 14B harvests to decline (Table 5). Deep snow during 1989/90 contributed to the mortality of 30% of the Subunit 14B moose population and the closure of the fall 1990 hunting season. Typically, 50% of the subunit harvest was taken during fall in conjunction with moose season. Lingering snow cover in 1991 and 1992 coincided with the baiting season being shortened by 15 days. Access to bait stations was difficult and bear movement from dens appeared late. Resulting harvests declined from 34 during 1989/90 to 5 bears in 1990/91 and 14 bears the following year (Table 5).

We issued an average of 166 (range = 130-201) bear baiting permits over the past 4 years (Table 2). Baiters accounted for about 25% of the bears harvested in Unit 14 and they appeared to be less effective than other hunters at selecting male bears (Table 1). When we compared spring black bear harvests in Unit 14 between 1987-1991, baiters typically killed a higher proportion of females except during 1990/91 (Fig. 1). Over the past 5

years, hunters taking bears over bait have averaged 42% females compared to 32% females harvested by nonbaiters.

Hunter Residency and Success. During the most recent 3 regulatory years, Unit 14 residents averaged 90% of the harvest (Table 6). Nonresidents and other Alaska residents each accounted for 5%.

Harvest Chronology. Bear baiting season was reduced by closing the season at the end of May instead of mid-June. We assumed the shorter baiting season was responsible for a reduced June harvest. June bear harvests averaged 32% of the annual harvests before restrictions in 1990/91 (Table 7). Subsequently, June harvests have averaged 9%, and the last-half of May has become the primary harvest period.

Transport Methods. Successful hunters' transportation methods deviated little from previous trends. Three and 4-wheelers, apparently listed under "ORV" or "Other/Unknown", were favored by Unit 14 bear hunters (Table 8). Airplanes, boats and highway vehicles were popular but used less often than 3 or 4-wheelers.

Other Mortality:

Nonhunting kills represented less than 5% of reported mortality (Tables 3-5). Nonhunting mortality in Subunit 14C was higher compared to other subunits in Unit 14. Subunit 14C accounted for 64% of the total (11) reported for the past 3 regulatory years. High human densities, extensive areas closed to hunting, shorter hunting seasons and behavior of subunit residents, were contributing factors. Hunters have few opportunities to remove problem bears legally. Grauvogel (1990) suggested many nonhunting kills in the rest of the unit were unreported, which, if true, would bias comparisons.

CONCLUSIONS AND RECOMMENDATIONS

Under current data collection methods, the population objective cannot be verified. Subjective interpretations of reported bear sightings and harvests provide no clues as to whether hunting is affecting the black bear population. Intuitively, the population objective implies that all harvest be compensatory, which is unlikely. We estimate the population to number between 530 and 1,080 black bears.

The Unit 14 human use objective was not attained until the latter 2 years of this report period. The average harvest for regulatory years 1990/91 and 1991/92 reached 81 bears, while the 101 bears killed during 1989/90 season exceeded the objective.

The high harvest of adult females is perhaps more important than total harvest. Annual female harvests (this includes adult and subadult females) initially fluctuated between 15-31 in Unit 14, averaging 20 (Table 9). After baiting was reauthorized in 1982/83, the

number of females harvested increased from 22 to a peak of 55 during 1986/87. A decline in female harvests followed, perhaps tracking a population decline. Based on harvest trends, an annual female harvest of less than 30 females may have been sustainable. However, since the population declined, the sustainable female harvest declined.

Assuming the female harvest that can be sustained is 4% of the total huntable population, and assuming the huntable population in Unit 14 is closer to 600 than it is to 1,000, the sustainable annual harvest of sows (adult and subadult females) is 24-30. We estimate the sustainable harvests of sows by subunit at 12-14 for Subunit 14A, and 6-8 bears each in Subunits 14B and 14C.

The number of adult females harvested influences the population more than subadult females; the number of adults and subadults in harvests is unknown. Preventing female harvests from exceeding 30 bears should keep the harvest of adult sows below 25 bears.

The human use objective should relate to the maximum sustainable female harvest. I recommend the current 5-year human-use objective be changed to read: "To provide liberal opportunity to hunt black bears with an annual harvest that includes no more than 30 female bears."

An average of 25 females was harvested following hunting restrictions in 1990/91 and 1991/92. Further bear hunting restrictions in Unit 14 appear unwarranted. However, when we evaluated Subunit 14A, the female harvest (average = 16) appeared to exceed sustainable levels (12-14) for the subunit. A reduction in season length which would produce a 20-25% reduction of the harvest of females was recommended for Subunit 14A.

I recommend a density estimate be developed based on data collected in Unit 14. Much weight is given to population estimates projected from densities obtained in adjacent units, however, sustainable harvest levels need to be based on reliable population estimates if they are to be meaningful.

I strongly recommend the department take an active role in teaching bear hunters, especially those hunting black bears over bait, to identify and select male bears. Baiting is considered an effective management tool in many North American jurisdictions (McLaughlin and Smith, 1991). However, its usefulness depends on the hunter knowing harvest objectives, the impacts of taking sows, and how to differentiate sexes of bears. Brochures, magazine articles, slide shows, and readily available video tapes are most successful in educating hunters and should be used to educate bear baiters.

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Table 1. Unit 14 black bear harvest over bait stations, 1987-91.

Regulatory year	Subunit 14A			Subunit 14B			Subunit 14C[a]			Total (% Female)[b]	
	M	F	Unk.	M	F	Unk.	M	F	Unk.		
1987/88[c]	21	20	4	3	0	0	3	0	0	51	(43)
1988/89	21	13	3	3	0	1	--	--	--	41	(35)
1989/90	8	11	0	6	3	0	--	--	--	28	(50)
1990/91	12	7	0	1	0	0	--	--	--	20	(35)
1991/92	6	4	2	2	1	0	--	--	--	15	(38)

[a] Baiting not allowed in Subunit 14C following 1987/88.
[b] Percent female of known sex bears.
[c] Includes fall harvest: 2 females in Subunit 14A and 3 males in Subunit 14B

Table 2. Unit 14 black bear baiting station information, 1988-91.

Regulatory year	Local residents[a]	Nonlocal residents	Total permits[b]	Total stations	Bears killed
1988/89	166	0	166	271	41
1989/90	130	0	130	192	28
1990/91	196	4	201	321	20
1991/92	164	1	166	255	15

[a] Residents of Unit 14.
[b] One nonresident registered in each of the 1990/91 and 1991/92 seasons.

Table 3. Subunit 14A black bear harvest, 1987-91.

Regulatory year	Reported Hunter kill M	F (%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Estimated Illegal kill	Total estimated kill M (%)	F (%)	Unk.	Total
1987													
Fall 87	14	12 (46)	1	27	2	1	0	0		15 (56)	12 (44)	1	28
Spring 88	33	25 (43)	5	63	43	0	0	0		33 (57)	25 (43)	5	63
Total	47	37 (44)	6	90	45	1	0	0	9	48 (56)	37 (44)	15	100
1988													
Fall 88	8	5 (39)	0	13	0	0	0	0		8 (62)	5 (38)	0	13
Spring 89	33	16 (33)	3	52	37	0	1	0		33 (60)	17 (40)	3	38
Total	41	21 (34)	3	65	37	0	1	0	7	41 (65)	22 (35)	10	73
1989													
Fall 89	6	5 (46)	1	12	0	0	0	0		6 (55)	5 (45)	1	12
Spring 90	17	19 (53)	1	37	19	0	0	0		17 (47)	19 (53)	1	37
Total	23	24 (51)	2	49	19	0	0	0	5[c]	23 (49)	24 (51)	7	54
1990													
Fall 90	10	5 (33)	0	15	0	1	0	0		11 (69)	5 (31)	0	16
Spring 91	21	11 (34)	1	33	19	1	0	0		22 (67)	11 (33)	1	34
Total	31	16 (34)	1	48	19	2	0	0	5	33 (67)	16 (33)	6	55
1991													
Fall 91	18	8 (33)	0	24	0	0	1	0		16 (64)	9 (36)	0	25
Spring 92	19	7 (27)	3	29	12	0	0	0		19 (73)	7 (27)	3	29
Total	35	15 (30)	3	53	12	0	1	0	5	35 (69)	16 (31)	8	59

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

Table 4. Subunit 14C black bear harvest[a], 1987-91.

Regulatory year	Reported Hunter kill M	F (%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Estimated Illegal kill	Total estimated kill M (%)	F (%)	Unk.	Total
1987													
Fall 87	4	2 (33)	1	7	0	0	0	0		4 (67)	2 (33)	1	7
Spring 88	11	5 (31)	0	16	3	0	0	0		11 (69)	5 (31)	0	16
Total	15	7 (32)	1	23	3	0	0	0	5	15 (68)	7 (32)	6	28
1988													
Fall 88	0	4(100)	0	4	0	0	0	0		0 (00)	4(100)	0	4
Spring 89	4	1 (20)	0	5	0	1	1	0		5 (71)	2 (29)	0	7
Total	4	5 (56)	0	9	0	1	1	0	2	5 (45)	6 (55)	2	13
1989													
Fall 89	5	0 (00)	0	5	0	1	0	0		6 (100)	0 (00)	0	6
Spring 90	11	2 (15)	0	13	0	0	0	0		11 (85)	2 (15)	0	13
Total	16	2 (11)	0	18	0	1	0	0	3	17 (89)	2 (11)	3	22
1990													
Fall 90	4	1 (20)	0	5	0	0	1	0		4 (67)	2 (33)	0	6
Spring 91	7	6 (46)	0	13	0	1	0	0		8 (57)	6 (43)	0	14
Total	11	7 (39)	0	18	0	1	1	0	3	12 (60)	8 (40)	3	23
1991													
Fall 91	5	2 (29)	0	7	0	2	0	1		7 (78)	2 (22)	1	10
Spring 92	10	5 (33)	1	16	0	1	0	0		11 (69)	5 (31)	1	17
Total	15	7 (32)	1	23	0	3	0	1	4	18 (72)	7 (28)	6	31

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

Table 5. Subunit 14B black bear harvest[a], 1987-91.

Regulatory year	Reported Hunter kill M	F (%)	Unk.	Total	Over bait	Non-hunting kill[a] M	F	Unk.	Estimated Illegal kill	Total estimated kill M (%)	F (%)	Unk.	Total
1987													
Fall 87	13	4 (24)	1	18	3	0	0	0		13 (76)	4 (24)	1	18
Spring 88	0	1(100)	1	2	0	0	0	0		0 (00)	1 (100)	1	2
Total	13	5 (28)	2	20	3	0	0	0	3	13 (72)	5 (28)	5	23
1988													
Fall 88	3	4 (57)	1	8	0	0	0	0		3 (43)	4 (57)	1	8
Spring 89	8	3 (27)	4	15	4	0	0	0		8 (73)	3 (27)	4	15
Total	11	7 (39)	5	23	4	0	0	0	3	11 (61)	7 (39)	8	26
1989													
Fall 89	10	4 (29)	3	17	0	0	0	0		10 (71)	4 (29)	3	17
Spring 90	12	5 (29)	0	17	9	0	0	0		12 (71)	5 (29)	0	17
Total	22	9 (29)	3	34	9	0	0	0	4	22 (71)	9 (29)	7	38
1990													
Fall 90	2	0 (0)	0	2	0	0	0	0		2 (100)	0 (0)	0	2
Spring 91	3	0 (0)	0	3	1	1	0	0		4 (100)	0 (0)	0	4
Total	5	0 (0)	0	5	1	1	0	0	2	6 (100)	0 (0)	2	8
1991													
Fall 91	6	1 (14)	0	7	0	0	0	0		6 (86)	1 (14)	0	7
Spring 92	4	3 (43)	0	7	3	0	0	0		4 (57)	3 (43)	0	7
Total	10	4 (29)	0	14	3	0	0	0	2	10 (71)	4 (29)	2	16

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

Table 6. Unit 14 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Total successful hunters
1987/88	124	(93)	6	(5)	3	(2)	133
1988/89	89	(92)	5	(5)	3	(3)	97
1989/90	87	(86)	5	(5)	9	(9)	101
1990/91	64	(90)	4	(6)	3	(4)	71
1991/92	85	(93)	4	(4)	2	(2)	90

[a] Unit 14 residents.

Table 7. Unit 14 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods													n
	July	Aug.	Sept. % 1-15	16-30	October % 1-15	16-31	Mar. %	April % 1-15	16-30	May % 1-15	16-31	June % 1-15	16-30	
1987/88	13	4	10	8	3	2	0	0	0	4	23	23	11	133
1988/89	2	2	14	5	2	0	0	0	1	5	28	34	6õ¼	97
1989/90	3	3	15	8	3	2	0	0	0	16	29	12	10	101
1990/91	3	0	13	8	7	0	0	0	1	13	48	4	3	71
1991/92	4	7	22	7	2	0	1	1	0	6	39	8	3	90

Table 8. Unit 14 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest						
	Airplane	Horse	Boat	ORV[a]	Highway vehicle	Other/ Unknown	n
1987/88	16	1	14	24	20	26	133
1988/89	7	0	16	35	21	22	97
1989/90	15	5	14	33	17	17	101
1990/91	17	1	11	23	23	25	71
1991/92	16	0	19	18	12	36	90

[a] Includes ORVs and 3- or 4-wheelers.

Table 9. Unit 14 black bear hunter harvest composition, 1973-91.

Regulatory year	Reported hunter kill				Total
	Male	%	Female	%	
1973/74	54	(71)	22	(29)	79
1974/75	22	(58)	16	942)	47
1975/76	50	(62)	31	(38)	90
1976/77	25	(61)	16	(39)	48
1977/78	24	(59)	17	(41)	49
1978/79	27	(61)	17	(39)	55
1979/80	37	(71)	15	(29)	58
1980/81	62	(69)	28	(31)	100
1981/82	58	(74)	20	(26)	87
1982/83	45	(67)	22	(33)	75
1983/84	52	(68)	24	(32)	86
1984/85	48	(59)	34	(42)	88
1985/86	55	(56)	44	(44)	108
1986/87	67	(55)	55	(45)	131
1987/88	75	(61)	49	(41)	133
1988/89	56	(63)	33	(37)	97
1989/90	61	(64)	35	(37)	101
1990/91	47	(67)	23	(33)	71
1991/92	60	(70)	26	(30)	90

LOCATION

Game Management Unit: 16 (12,445 mi^2)

Geographic Location: West side of Cook Inlet

BACKGROUND

Hunting pressure for black bears in easily accessible portions of Unit 16 is intensive, however, in expansive stands of mature timber difficult access precludes most hunting. Black bears are most accessible near rivers and streams during spring and late fall and in alpine berry patches during late summer and early fall.

Harvests declined during years of poor berry production. Annual harvests averaged 133 black bears over the last 5 years (range = 118-152) (Table 1). Baiting has contributed significantly to the spring harvest in recent years. The management goal for the unit was to provide maximum opportunity to participate in black bear hunting.

MANAGEMENT DIRECTION

Management Objectives

Management objectives for area black bears are to maintain current black bear populations with a sex and age structure to sustain a harvest composed of at least 60% males.

METHODS

We monitored harvest by sealing skulls and hides of black bears. Staff measured sealed skulls, determined sex, and extracted a premolar tooth for aging. We collected information from successful hunters on the date and location of harvest, and hunter effort.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

Black bears are frequently observed by local residents, fishers, and other recreational visitors. Pilots and boaters commonly sight black bears while traveling in the unit. They appear to be abundant throughout the unit. Population trend is unknown.

Distribution and Movements:

Black bears are found throughout Unit 16 below 5,000 ft elevation. They are most abundant within or near vast timberland areas below 3,500 ft elevation. Limited movements to salmon streams and alpine berry patches occur in summer and early fall.

Mortality

Harvest:

Season and Bag Limit. In Unit 16 the black bear season was from 1 July through 30 June with a bag limit of 3 bears.

Board of Game Action and Emergency Orders. The Board of Game did not make any changes to the black bear season or bag limit during this report period.

Hunter Harvest. From 1987-88 through 1991-92 the reported harvest of black bears in Unit 16 has been stable (Table 1). The only anomaly occurred in spring 1990 when the harvest declined compared to other spring bear harvests. Poor access resulting from lingering, deep snowcover contributed to the lower harvest. Twenty-nine percent of all black bears taken during this period were killed in Subunit 16A and 71% in Subunit 16B (Tables 2 and 3). Males comprised 67% of the overall harvest.

Nearly 50% of the black bears killed in spring were taken over bait, however the practice has not resulted in an increased harvest. Illegal take in the unit is probably substantial given the extensive summer-long fisheries and the proliferation of remote cabin sites.

Hunter Residency and Success. The proportion of bears harvested by residents of Unit 16, other residents, and nonresidents has fluctuated slightly with no apparent trend over the past 5 years (Table 4).

Harvest Chronology. Nearly 30% of all black bears were taken during June while 16% of the harvest occurred in May. Another 20% were taken from 16 September to 13 October, while 16% were killed from 26 August to 15 September (Table 5).

Transport Methods. Successful hunters used aircraft most frequently for by successful hunters. Boats, ORVs, horses, and "other" means of transportation were also used successfully by hunters (Table 6). Access differences in Subunits 16A and 16B were reflected in the transportation data. In Subunit 16A boats and "other" methods, including automobiles, were most often used by successful hunters, compared with Subunit 16B where aircraft and boats were most commonly used (Tables 7 and 8).

Nonregulatory Management Problems Needs

We need to develop a viable technique for estimating black bear population levels. We should also require unsuccessful hunters to report, at least during spring season.

CONCLUSIONS AND RECOMMENDATIONS

The management objective of at least 60% males in the harvest was met in both Subunit 16A (65%) and Subunit 16B (67%). Harvests have averaged 133 black bears over the past 5 years, nearly identical to the 1984-88 mean harvest of 135. Harvest levels and chronology varied slightly from year to year, probably a function of break-up, water levels in spring, the length of the moose season, and the extent of the fall alpine berry crop. Harvests of baited bears increased 43% during 1990-91 and 1991-92 compared to the 3 previous seasons. This activity should be closely monitored to insure local overharvests do not occur. Data on non-hunting and illegal kills are virtually nonexistent. Few bears are claimed as DLP kills because the season runs year-long. Illegal killing of "problem" bears is probably significant given the extent of human activity during summer. Only public education can influence this problem. Without population and hunting effort data, definitive conclusions regarding the health of the Unit 16 black bear population from year to year are subjective at best.

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Table 1. Unit 16 black bear harvest[a], 1987-91.

Regulatory year	Reported hunter kill						Non-hunting kill[a]			Estimated kill		Total estimated kill			
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	F	Unk.	Total
1987															
Fall 87	38	16	(30)	7	51	0						38	16	7	51
Spring 88	34	34	(50)	1	69	31						34	34	1	69
Total	72	50	(41)	8	130	31	0	0	1	Unk.		72	50	9	131
1988															
Fall 88	46	14	(23)	3	63	0						46	14	3	63
Spring 89	51	24	(32)	0	75	29						51	24	0	75
Total	97	38	(28)	3	138	29	0	0	0	Unk.		97	38	3	138
1989															
Fall 89	50	19	(28)	4	73	0						50	19	4	73
Spring 90	24	18	(41)	3	44	22						24	18	3	44
Total	74	37	(33)	7	118	22	0	0	0	Unk.		74	37	7	118
1990															
Fall 90	32	17	(35)	4	53	0						32	17	4	53
Spring 91	41	24	(37)	11	72	43						41	24	7	72
Total	73	41	(36)	11	125	43	0	0	0	Unk.		73	41	11	125
1991															
Fall 91	47	23	(33)	2	72	0						47	23	2	72
Spring 92	55	24	(28)	2	78	34						55	21	2	78
Total	102	44	(30)	4	150	34	1	1	0	Unk.		102	44	6	152

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

Table 2. Subunit 16A black bear harvest[a], 1987-91.

Regulatory year	Reported hunter kill						Non-hunting kill[a]			Estimated kill		Total estimated kill			
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	F	Unk.	Total
1987															
Fall 87	13	3	(19)	3	19	0	--	--	--				--	--	--
Spring 88	13	10	(43)	0	23	12	--	--	--				--	--	--
Total	26	13	(33)	3	42	12					Unk.		--	--	--
1988															
Fall 88	10	3	(23)	0	13	0	--	--	--				--	--	--
Spring 89	11	7	(39)	0	18	8	--	--	--				--	--	--
Total	21	10	(32)	0	31	8					Unk.		--	--	--
1989															
Fall 89	13	7	(35)	2	22	0	--	--	--				--	--	--
Spring 90	7	5	(43)	0	12	9	--	--	--				--	--	--
Total	20	12	(38)	2	34	9					Unk.		--	--	--
1990															
Fall 90	8	5	(38)	1	14	0	--	--	--				--	--	--
Spring 91	15	8	(35)	1	24	12	--	--	--				--	--	--
Total	23	13	(36)	2	38	12					Unk.		--	--	--
1991															
Fall 91	8	6	(43)	0	14	0	--	--	--				--	--	--
Spring 92	18	9	(33)	0	27	13	--	--	--				--	--	--
Total	26	15	(37)	0	41	13					Unk.		--	--	--

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

Table 3. Subunit 16B black bear harvest[a], 1987-91.

Regulatory year	Reported hunter kill						Non-hunting kill[a]			Estimated kill		Total estimated kill			
	M	F	(%)	Unk.	Total	Over bait	M	F	Unk.	Unreported	Illegal	M	F	Unk.	Total
1987															
Fall 87	25	13	(34)	4	42	0	--	--	--				--	--	--
Spring 88	21	24	(53)	1	46	19	--	--	--				--	--	--
Total	46	37	945)	5	88	19					Unk.		--	--	--
1988															
Fall 88	36	11	(23)	3	50	0	--	--	--				--	--	--
Spring 89	40	17	930)	0	57	21	--	--	--				--	--	--
Total	76	28	927)	3	107	21					Unk.		--	--	--
1989															
Fall 89	37	12	(25)	2	51	0	--	--	--				--	--	--
Spring 90	17	12	(41)	3	32	13	--	--	--				--	--	--
Total	54	24	(31)	5	83						Unk.		--	--	--
1990															
Fall 90	24	12	(33)	3	39	0	--	--	--				--	--	--
Spring 91	26	16	(38)	6	48	31	--	--	--				--	--	--
Total	50	28	(36)	9	87	31					Unk.		--	--	--
1991															
Fall 91	39	17	930)	2	58	0	--	--	--				--	--	--
Spring 92	37	12	(25)	2	51	21	--	--	--				--	--	--
Total	76	29	(28)	4	109	21					Unk.		--	--	--

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

Table 4. Unit 16 black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident	(%)	Nonlocal resident	(%)	Nonresident	(%)	Unk.	(%)	Total successful hunters
1987/88	1	(1)	104	(79)	26	(20)	0	131	
1988/89	7	(5)	88	(64)	43	(31)	0	138	
1989/90	4	(3)	89	(75)	25	(21)	0	118	
1990/91	3	(2)	87	(69)	34	(27)	2	(2)	126
1991/92	0		114	(76)	35	(23)	1	(1)	150

Table 5. Unit 16 black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods					n
	1 July - 25 Aug	26 Aug - 15 Sept	16 Sept - 13 Oct	28 Apr - June 1	2 - 30 June	
1987/88	13	11	24	15	37	130
1988/89	16	13	17	21	33	135
1989/90	13	15	34	18	20	115
1990/91	15	20	8	20	37	123
1991/92	11	21	15	29	23	150

Table 6. Unit 16 black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	n
1987/88	38	3	28	0	1	6	11	13	131
1988/89	47	9	27	0	0	5	7	4	138
1989/90	42	3	30	0	0	9	6	10	118
1990/91	47	0	33	0	1	3	10	6	126
1991/92	53	2	25	2	0	5	8	6	150

Table 7. Subunit 16A black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	n
1987/88	12	0	38	0	0	10	12	29	42
1988/89	10	0	48	0	0	16	19	7	31
1989/90	12	0	32	0	0	24	21	12	34
1990/91	8	0	53	0	0	5	21	13	38
1991/92	17	0	27	5	0	12	24	15	41

Table 8. Subunit 16B black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest								n
	Airplane	Horse	Boat	3 or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1987/88	50	5	24	0	1	5	10	6	88
1988/89	58	12	21	0	0	2	4	4	107
1989/90	54	5	28	0	0	4	0	10	83
1990/91	64	0	24	0	1	2	5	3	87
1991/92	66	3	24	1	0	2	2	3	109

LOCATION

Game Management Unit: 17 (18,771 mi^2)

Geographical Description: Northern Bristol Bay

BACKGROUND

Black bears occur in most forested areas of Subunits 17B and 17C east of the Wood River and the Wood River Lakes. Black bears are not known to occur in Subunit 17A. Densest populations appear to be in the upper Mulchatna and Nushagak river drainages and near the Tikchik Lakes. We have no information on population density in the unit.

Black bears are usually harvested incidentally during fall moose and caribou seasons. Some local residents target black bears for food. We have no measure of harvest levels because successful hunters in Unit 17 have no reporting requirements.

MANAGEMENT DIRECTION

Management Objectives

Management objectives for Unit 17 black bears are to maintain existing populations of black bears with a sex and age structure that will sustain a harvest composed of at least 60% males.

METHODS

Sealing is not required in Unit 17, however, we monitor the black bear harvest by interviewing successful hunters and sealing all black bears voluntarily presented for examination. We measure skulls of sealed bears, determine sex, and extract a tooth for aging. Important black bear habitat is identified incidentally during moose and caribou surveys for use in land-use decisions.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

There has never been an effort to delineate the population status or trend of black bears in Unit 17. Funding is not allocated for managing this species and we do not conduct surveys. Incidental observations during moose and caribou surveys, and anecdotal reports by local residents suggest the black bear population along upper Nushagak River drainages is declining. We know nothing about black bears in other portions of the unit.

Mortality

Harvest:

Season and Bag Limit. There is no closed season on black bears in Unit 17 and the bag limit is 3 bears per year.

Hunter Harvest. We have no way to assess the number of bears killed, the sex or age composition of the harvest, or the distribution of harvest. We seal less than 5 bears annually. The actual harvest is probably 5-10 times that number.

CONCLUSIONS AND RECOMMENDATIONS

Objective data are not available on the population density of black bears in the unit. We have little data on harvests because there are no reporting or sealing requirements for black bears harvested in Unit 17. Without adequate population or harvest data it is difficult to manage this population. The department should propose to the Board of Game a sealing requirement or some other method for hunters to report their harvest of black bears from the unit.

Black bears are subject to increasing hunting pressure as more hunters come into the area to harvest caribou from the expanding Mulchatna herd. We have subjective evidence the black bear population is declining in some parts of the subunit but we currently have no way to analyze the apparent decline.

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LOCATION

Game Management Unit: 20A, 20B, 20C, and 20F (34,080 mi^2)

Geographical Description: Central-Lower Tanana and Middle Yukon River drainages

BACKGROUND

Black bears are found throughout Interior Alaska (approximately 2,000-4,000 in the four subunits discussed in this report); however, only a few studies of black bear ecology or population dynamics have been completed. Since 1988, a cooperative project between ADF&G and the U.S. Army has yielded important information about black bear reproduction, mortality, and density on the Tanana Flats (Hechtel 1991). A portion of this project involved a study of habitat use and denning ecology of black bears (Smith 1991) that should be completed in the near future. In 1967, Hatler completed a Master's thesis on Interior Alaska black bear ecology. Johnson (1982) reported on his investigation of female black bear reproduction.

Black bears provide an important source of meat, hides, and/or recreation for hunters in some areas. Interest in hunting black bears has increased in recent years, concurrent with an increase in the Fairbanks human population, an increased interest in hunting during the spring, and a decrease in hunting opportunities for other species. More information about black bear ecology and population dynamics has been sought to ensure that the current year-round season and three-bear bag limit will not adversely affect the black bear population.

MANAGEMENT DIRECTION

Management Goals

Management goals for area black bears are to: 1) protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem; 2) provide the greatest sustained opportunity to participate in hunting black bears; and 3) protect human life and property in human-bear interactions.

Management Objectives

Recent studies indicate that sex ratio of the harvest is perhaps the most important indicator of population trend obtained from harvest data (Miller and Aumiller 1989). Thus, management objectives include minimum percentages of males in the harvest. Harvests in Subunits 20A, 20C, and 20F are relatively low, so we combined years/areas

for the objectives to increase sample sizes. We listed the following objectives in our most recent performance report (ADF&G, in press):

1. In Subunit 20A, to maintain a black bear population capable of sustaining an annual harvest with at least 55% males in the combined harvests of the most recent 3 years.

2. In Subunit 20B, to maintain a black bear population capable of sustaining a maximum annual harvest of 150 bears, of which at least 55% are males.

3. In Subunits 20C and 20F, to maintain a black bear population capable of sustaining a harvest that includes at least 50% males in the combined harvests from both subunits from the most recent 3 years.

METHODS

We obtained annual harvest information from hunter reports recorded during the mandatory sealing of hunter-killed black bears. Black bear sealing certificates included data on kill location, date of kill, sex, skull size, meat salvaged, defense of life or property, hunter residency, incidental take, commercial services used, and baiting. We coded sealing certificates from bears killed in this area according to Uniform Coding Units (UCUs). We suggested revisions in the bear sealing certificate format and content, many of which were incorporated into new certificates printed in June 1992. During sealing, we collected premolars and sent them to Matson's Laboratory (Milltown, MT) 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 Subunit 20A. We assisted in a cooperative research project between the U.S. Army and ADF&G by radio-tracking collared bears and by visiting winter dens to replace collars and determine fecundity of females. Methods used for this project are described by Hechtel (1991).

Since 1989, hunters have been required to register before hunting black bears over bait during spring. In 1992, we recorded whether or not permittees were military personnel. We also prepared hunter information leaflets to summarize black bear baiting regulations, encourage hunters to harvest selectively, and ask for a voluntary reduction in the Subunit 20B harvest, especially of female black bears.

Annual harvest data reported here may show some difference when compared with previous reports. These differences are related to harvest compilation that was based on calendar years before 1988 but on regulatory years since then. We also calculated percentage of males in the harvest only using data from bears whose sex was known. Most information presented in this report will be for the years since the last management

report (last 3 years). Hunters are required to seal black bear hides from Unit 20 but not from Unit 25. Data from black bear harvests in Subunit 25C are sparse and not included in this report.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

Densities of northern black bears are relatively low compared with other areas. Our current estimates for the number of black bears in this area include 500-700 bears in the Tanana Flats in Subunit 20A, 750-1,200 bears in Subunit 20B; 700-1,000 in the portion of Subunit 20C outside Denali National Park; and 400-700 in Subunit 20F (ADF&G 1989). These were calculated based on Hechtel's (1991) estimate that 12-18 black bears (excluding cubs of the year)/100 mi^2 (46-67/1,000 km^2) inhabited a 100-mi^2 portion of his study area on the Tanana Flats in 1989. This density is similar to the estimates of 17 bears/100 mi^2 in the Susitna River area (Miller et al. 1987), but much lower than the 39-52 bears/100 mi^2 on the Kenai Peninsula (Schwartz and Franzmann 1991).

Population Composition:

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

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). During fall, black bears feed primarily on berries in open meadows or alpine areas. The mean home range size of marked black bears in the Tanana Flats was estimated to include 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 is open all year in Unit 20 with a bag limit of three 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. Regulations for hunting black bears at bait stations have changed several times in recent years. Prior to 1982, black bear baiting was legal with minimal regulations. From mid-1982 through 1983, baiting was legal by permit only. From 1984 through 30 June 1988, baiting was legal without a permit or restrictions in seasons. Since 1 July 1988, hunters have been required to register with ADF&G to hunt black bears over bait, obtain a registration number, mark the bait station with their name and other information, and have no more than two bait stations. Since July 1988, baiting for black bears has been limited to a spring season. In this study area, baiting was allowed from 15 April to 15 June in 1989 and 1990 and from 15 April to 30 June in 1991 and 1992 in response to the later emergence of bears from hibernation north of the Alaska Range. The board also rejected proposals to allow the trapping or sale of black bears.

In spring 1992 the board gave the department discretionary authority through registration permits to limit the number of bears taken over bait or to close portions of units to baiting to avoid localized overharvest. The board also passed a regulation requiring hunters to leave evidence of sex on all black and grizzly bears harvested statewide until sealing.

Hunter Harvest. The annual Subunit 20A harvest has ranged from 14 to 41 black bears since 1984. Hunters have harvested 98 black bears during the last 3 years combined (1989-91), 66% (63/96) of which were males (Table 1).

Since 1984, the annual Subunit 20B harvest ranged from 83 to 157 black bears. During the last 3 years, the annual harvest included 89 bears (1989), an all-time high of 157 bears (1990), and 101 bears (1991). The percentage of males in these harvests was 70% (62/89), 64% (99/155), and 62% (58/94), respectively (Fig. 1). The 1990 harvest exceeded our objective to keep the harvest ≤150 bears. Because of concern that this level of harvest could not be sustained, we asked the public to comply voluntarily to reduce harvest, especially of females. We prepared several leaflets that described the concepts. The following year (1991), harvest returned to previous levels, but probably not due solely to voluntary reductions in harvest. Hunting pressure and bear behavior were probably changed by the record 14-inch snowfall in mid-May 1992.

Annual harvests of black bears in Subunits 20C and 20F are relatively low; ≤30 black bears per year have been reported harvested since 1984. In Subunits 20C and 20F combined, hunters harvested 124 black bears during the last 3 years, 72% (86/120) of which were males.

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 subunits and the mean harvest during the last 5 years, we estimate that the proportion of the bear population that is harvested is approximately 5-7% in Subunit 20A, 9-15% in Subunit 20B, and 2-5% in Subunits 20C and 20F.

Age of Harvested Bears. During the last 4 years (1988-91), the annual mean age of male black bears harvested in Subunit 20B has been less than 4 years old (Fig. 2, Table 2). Before 1988, mean ages ranged from 4.6 to 6.3 years old. Fifty-three percent (29/55) of the males harvested in 1991-92 were 2- or 3-year olds, which are the ages that offspring disperse from their mothers in Interior Alaska (Hechtel 1991). The oldest male harvested in 1991-92 was 9 years old. In contrast, males 10 years and older were common in the harvest before 1988. Most of the harvest consisted of 2-year-olds in the fall harvest and 3-year-olds in the spring harvest.

A decrease in the mean age of harvested bears does not necessarily mean that the population has declined, or that the population is more heavily hunted. Harvest age does not necessarily reflect population age either because bears are not harvested randomly from the population, some sex/age classes are more vulnerable than others, and hunters are often selective for certain sex/age classes. However, age data will assist us in "managing by consensus of indicators" (ADF&G 1989). Within Subunit 20B, we believe that the lower mean age of males indicates a lower population because the harvest has been relatively high, hunting pressure is high and increasing, and productivity of females is relatively low (see Bear Management Issues section). The present high levels of harvest may be sustained by immigration of subadult males, thus the lower mean age.

Mean ages of harvested females are of limited management use because sows with cubs are protected. As expected, the mean ages of harvested females in Subunit 20B (4.1-7.0 years old since 1987) were higher than for males and had a broader range. We had age data for 35 females harvested in 1992; 7 of these were older than 10 years old, with the oldest being 20 years old.

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

Distribution of Harvest. Most black bear harvest is taken within the road-accessible portions of Subunit 20B. Bait stations are more prevalent along the road system because of the logistics of transporting heavy, bulky bait. The distribution of 1992 harvest reflects this trend: 22% of the harvest was from the Chena River drainage (readily accessible from Chena Hot Springs Road and Fort Wainwright), 20% from the main Tolovana River drainage (accessible from the Elliott Highway mile 49-109), and 14% from the Chatanika River drainage (accessible from the Steese Highway and Elliott Highway mile 3-16) (Table 3).

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 Subunit 20B and the Fort Wainwright land in Subunit 20A are hunted intensively.

Registration of Bait Stations. The number of hunters registering to hunt black bears over bait has increased steadily since the registration requirement was implemented in spring 1989. In spring 1989, 220 hunters registered 314 bait stations (a hunter can register for one or two bait stations) for Subunit 20B (Table 4). In contrast, during spring 1992, 517 hunters registered 929 bait stations for Subunit 20B. This is a 3-fold increase in the number of bait stations permitted for Subunit 20B. Eighty percent (929/1,164) of the bait stations registered for the Fairbanks area were for Subunit 20B (Table 5). We do not have information on how many permittees actually set up bait stations.

In addition to the increased number of hunters registering bait stations, baiting for black bears appears more widespread than a decade ago. In 1983, black bear baiting was popular in Subunit 20B but not common elsewhere in Region 3 (232 permits issued for Subunit 20B and <20 permits issued for each of the other subunits in Region III) (report to Board of Game, 1986). Baiting is still most popular in Subunit 20B; however, interest in baiting in other subunits has increased (109 permits issued for Subunit 20A and 81 permits issued for Subunit 20F in spring 1992) (Table 5).

Approximately half (49%, 569/1,164) of the bait station permits issued for the Fairbanks area (including Subunit 25C) were registered by military hunters (Table 5). This interest by military hunters for hunting black bears is part of the reason the Army cooperatively funded the Tanana Flats black bear research project in Subunit 20A.

Harvest Over Bait Stations. Since registration permits for baiting have been required (spring 1989), the proportion of the spring black bear harvest from Subunits 20A, 20B, 20C, and 20F taken over bait has steadily increased from 59% (69/117) in 1989 to 88% (116/132) in 1992 (Tables 6, 7).

Most spring 1992 harvest (61%, 81/132) was from Subunit 20B. Nearly all (93%, 75/81) this harvest was taken over bait. We have no information on the percentage of the harvest taken by military personnel.

Hunter Residency and Success. During the last 3 years, most bears were harvested by residents of Subunit 20 (76-91%) and by state residents (92-95%) (Table 8). Nonresidents harvested a small proportion (5-7%) of the annual harvest. An increasing proportion of the harvest is taken by Alaska residents residing outside Subunit 20.

We have no data on success rates for black bear hunters because only successful hunters are required to report.

Harvest Chronology. Most black bears are harvested soon after emerging from dens when hide quality is best, generally mid-May through mid-June (Fig. 3). Winter hair begins to shed by mid-June and hide quality is poorer. Hide quality improves in fall and black bear hunting resumes while hunters are pursuing other species.

Hunters harvested black bears from 5 May through 9 October in 1989, from 24 April through 29 September in 1990, and from 12 April through 7 October in 1991. Although the first bear harvested in 1992 was taken 6 May, the subsequent snowfall in mid-May was probably responsible for the fact that most bears were harvested in June rather than in late May.

Transport Methods. During the last 3 years, most black bears harvested were taken by hunters using boats (34%) or aircraft (33%) in Subunit 20A; highway vehicles (50%) and ORVs (22%) in Subunit 20B; boats (64%) in Subunit 20C; and highway vehicles (77%) in Subunit 20F (Table 9).

Defense of Life or Property. The number of black bears taken in defense of life or property (DLP) is higher than reported. A year-round season and bag limit of 3 bears allows many hunters to legally harvest bears that would otherwise be taken under the DLP provision. During the last 5 regulatory years, only 12 black bears have been recorded as DLPs (1 in 20A, 5 in 20B, 5 in 20C, and 1 in 20F). Data from these 12 bears are included in this report, unless noted.

Human-bear conflicts may increase as more rural areas are developed. To minimize these conflicts, the ADF&G Commissioner approved two policies in March 1990 relating to bears; "Policy for managing bear/human conflicts in Alaska" and "Policy on solid waste management and bears in Alaska." An updated version of the pamphlet "Bears and You" with advice on avoiding bear encounters was printed and distributed to the public.

There may be more human-bear conflicts than normal in 1993 if bears went into fall 1992 hibernation in poor condition because of the record September snowstorm (24" of snow, 3 times the previous record) that probably impaired their ability to forage for berries.

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).

A study of 41 marked black bears in the Tanana Flats recently documented several instances of natural mortality (Hechtel 1991). Based on information from 15 cubs in 6 litters, a cub mortality rate of 27% was estimated after 4 cubs died (2 entire litters of 2). Two adult marked black bears also died of natural causes. In one instance, a healthy 23-year-old female black bear was killed and eaten by a grizzly bear that dug her out of her den on 9 October 1989. In another instance, an 11-year-old female's collar was found under the snow near where she denned. The collar was chewed up and had a clump of black bear fur attached to it. It appeared that something may have killed and eaten her.

Cubs-of-the-year that accompanied radio-collared females in the upper Susitna River drainage had a natural mortality rate of 35% (Miller et al. 1987).

Habitat

According to preliminary results of a study of habitat use of black bears in the Tanana Flats (Smith 1991), bears tend to select for willow/alder and birch/aspen habitats. Bears used the birch/aspen and marshland habitat more in spring and used the heath meadow habitat more in fall. There was no seasonal change in their use of spruce or willow/alder habitats.

Habitat types for 47 dens used during winters 1988-89 through 1990-91 were also recorded (Hechtel 1991). The number of dens in each habitat type included 17 in alder/willow shrub, 15 in spruce forest, 9 in birch/aspen stands, and 6 in heath meadows. Three bears made ground nests rather than digging dens. No dens were found in marsh habitat. Only one instance of den re-use was documented in this area and included a collared female and her three 2-year olds (J. Hechtel, pers. commun.).

Contrary to previous concerns regarding black bear denning on the Tanana Flats, denning habitat was not limited, dens were not concentrated on buttes, and conflicts did not occur with military training missions (Hechtel 1991). Despite the lack of major relief features and the poorly drained nature of the Tanana Flats, there was no apparent shortage of or concentration of den sites.

Bear Management Issues

Several issues related to black bear management will probably affect our research and management programs for black bears:

1. Listing in Appendix II of CITES. Black bears in the United States are now listed in Appendix II as a "look-alike" species. Because of this listing, Taylor (1992) advised that we (the department) increase our efforts to collect better harvest data throughout the state during the next few years. We currently collect harvest data primarily in the road-accessible Game Management Units in Alaska, including four of the five subunits in the Fairbanks area (sealing not required in Subunit 25C).

2. To seal or use harvest report cards? We have repeatedly discussed the advantages and disadvantages of sealing black bears rather than converting to an alternate system, such as a harvest report card like other big game species or a questionnaire. We would not object to converting to an alternate system in outlying subunits. However, we recommend retaining the sealing requirement for black bears in Subunits 20A and 20B. The harvest and age information we receive by sealing bears in these two subunits is important for continuing to monitor heavy/increasing hunting pressure around the urban area and the development of population-based management. Sealing yields better estimates of harvest than harvest reports.

3. Illegal trade in bear parts. Some Canadian provinces have experienced bear population declines as a result of poaching bears for the sale of gall bladders (Taylor 1992). Gall bladders are sold primarily in Korea, where the highest price paid last year for a single gall bladder was $18,300. It is still legal to sell bear parts in four states in the U.S., which reduces the effectiveness of laws in other states, such as Alaska, that prohibit their sale. In addition, some hunters would like the opportunity to sell hides from black bears that they harvested for meat, such as is legal with Dall sheep.

4. Baiting. Each time the Board of Game considers proposals involving bear baiting, there are numerous proposals ranging from liberalizing baiting seasons to prohibiting use of bait stations. Complaints regarding baiting include failure of hunters to remove bait stations, bait stations creating a safety hazard to other people in the area, and problems resulting from bears becoming habituated to eating human-supplied garbage. There has also been confusion about whether or not it is legal to set up a commercial bait station and charge hunters for using it. The practice of using bait stations will probably continue to receive close scrutiny.

5. Increased hunting pressure, especially by military personnel. Interest in hunting black bears by military hunters has been high and increasing. Nonresident military hunters do not need to purchase a hunting license or big game tag if hunting on military land, therefore the Fort Wainwright and Eielson Air Force Base land in Subunits 20A and 20B are hunted intensively. There are several advantages to this intensive hunting pressure. Harvests of black bears on military land near Fairbanks may benefit moose calf survival in these areas (black bears killed 40% of the moose calves in a study in the western Interior, Osborne et al. 1991) and may help decrease human-bear conflicts near the urban area. Reducing opportunity to military personnel to hunt on military land would probably just distribute that hunting pressure elsewhere. Therefore, even though black bears may be harvested very intensively in some relatively small areas, we have not recommended changes in regulations.

6. Lower reproductive rates. The reproductive potential of the black bear population helps determine the exploitation rate that can be sustained. In the Tanana Flats research project (Hechtel 1991; J. Hechtel, pers. commun.), the age that females had their first litter was relatively high, and the reproductive interval was relatively long. The age at which females had their first litter included: none (0/9) of the 4-year-olds, 25% (2/8) of the 5-year olds, 67% (4/6) of the 6-year-olds, and 50% (1/2) of the 7-year-olds. On the Kenai Peninsula, some female black bears have their first litter as 3-year-olds, and most have their first litter at least by age 4 (T. Spraker, pers. commun.). Most females in the Tanana Flats project denned with their 2-year-old offspring, which means the reproductive interval was a year longer than other areas. Because of this lower productivity in northern bears, more cautious management may be necessary.

CONCLUSIONS AND RECOMMENDATIONS

We are currently meeting all our management objectives for black bears in this area. The Subunit 20A harvest is relatively low and included more than 55% males (66%) in the harvest from the most recent 3 years (96 bears). In Subunits 20C and 20F combined, the harvest from the most recent 3 years combined (124 bears) was 72% males. In Subunit 20B, the 1991 harvest was <150 bears (101 bears), of which more than 55% (62) were males.

Weather conditions in 1992 may affect productivity of the black bear population in several ways. Productivity of females in 1992 and 1993 may be lower than normal because of the 1992 record snowfall in Fairbanks in mid-May (14 inches) and mid-September (24 inches, 3 times the previous record). The condition of sows at the beginning of the denning period (related to berry production or availability) and the duration of denning (such as a late spring) are two important factors governing the size of litters emerging in the spring (Hatler 1967). In addition, if females do not have cubs as a result of this weather, or for any reason, they can be legally harvested. Removing a substantial number of mature females from the population decreases the exploitation rate that can be sustained.

We expect the demand for consumptive use of black bears in the Fairbanks area to remain high and possibly increase. In 1990, we exceeded our Subunit 20B harvest quota (157 bears) and we will continue to monitor the Subunit 20B harvest to ensure that it does not exceed the sustainable quota. The high proportion of subadult males in the harvest, despite heavy hunting pressure, suggests that some portions of Subunit 20B may be overharvested and replenished by immigrating subadult males. The population of resident adult males may be very low in these areas.

We recommend examining sustainable harvest quotas for Subunit 20B after more thoroughly analyzing and gathering data on density, productivity, and mortality. This could include continuing the research project on the Tanana Flats and estimating hunter effort by sending questionnaires to hunters who register bait stations. Six of the nine black bears that retained functional radiocollars until 1993 were adult females from which we can gather more information on reproductive rates.

We recommend adding the following objective to our list:

4. To minimize human-bear conflicts by providing information and assistance to the public and to agencies.

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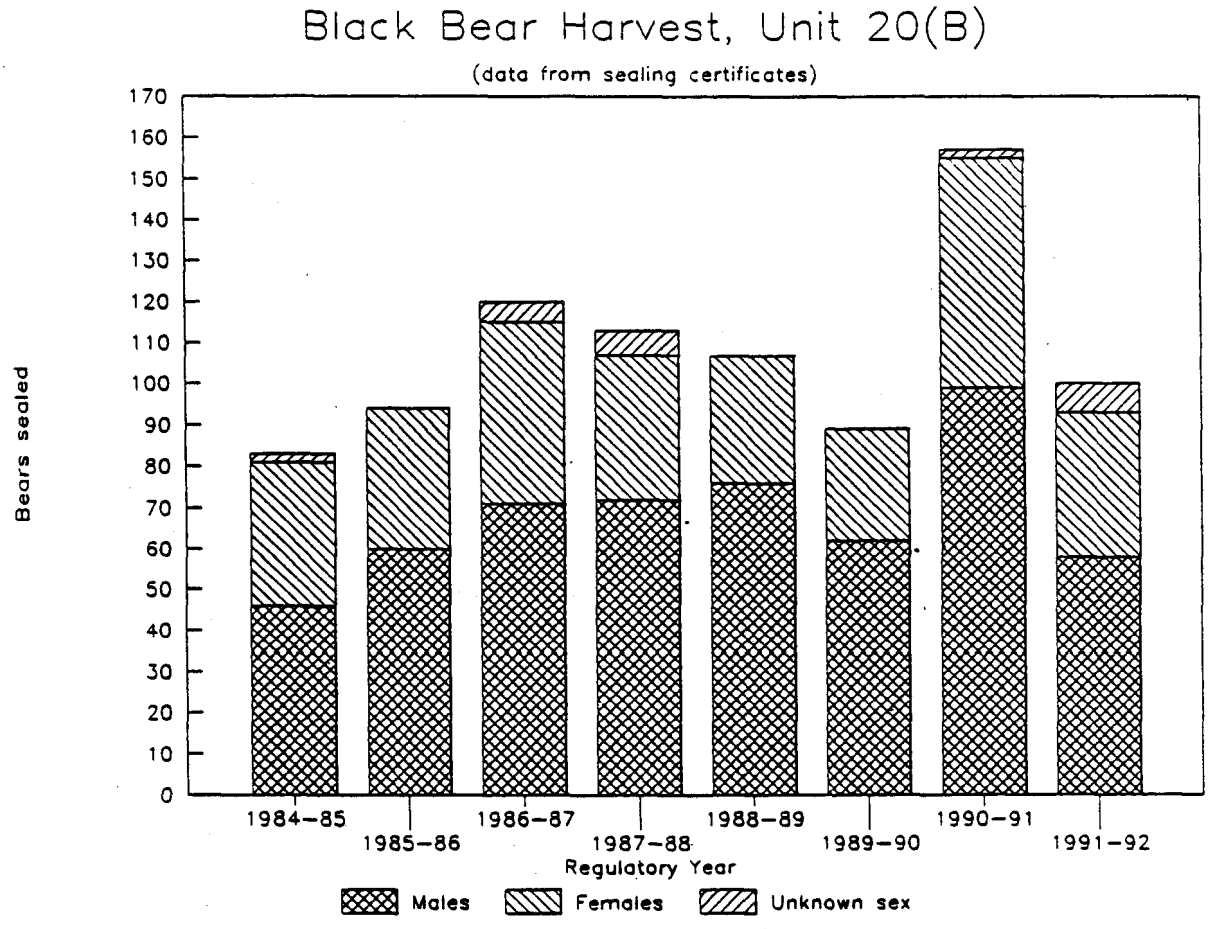

Figure 1. Sex of black bears harvested in Subunit 20B, 1984-1991.

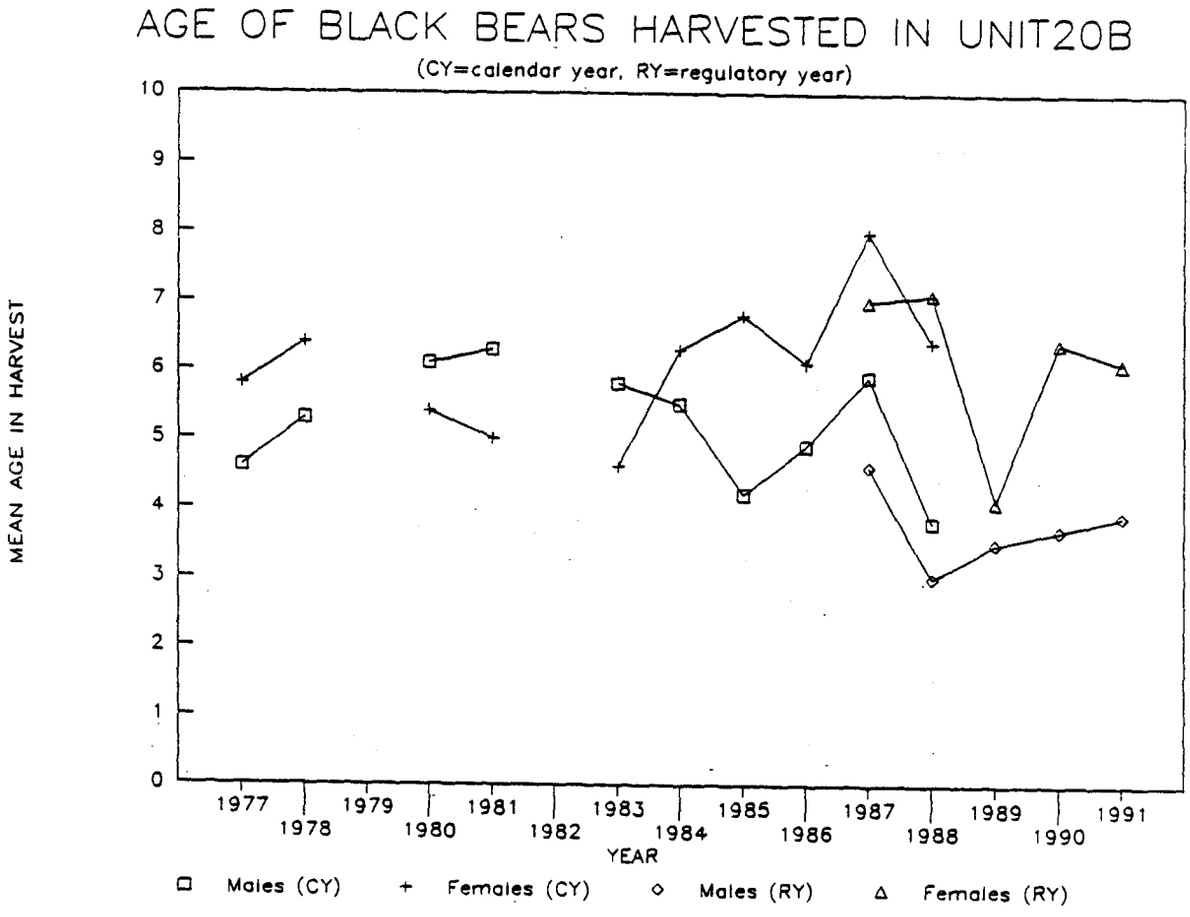

Figure 2. Mean ages of black bears harvested in Subunit 20B, 1977-91.

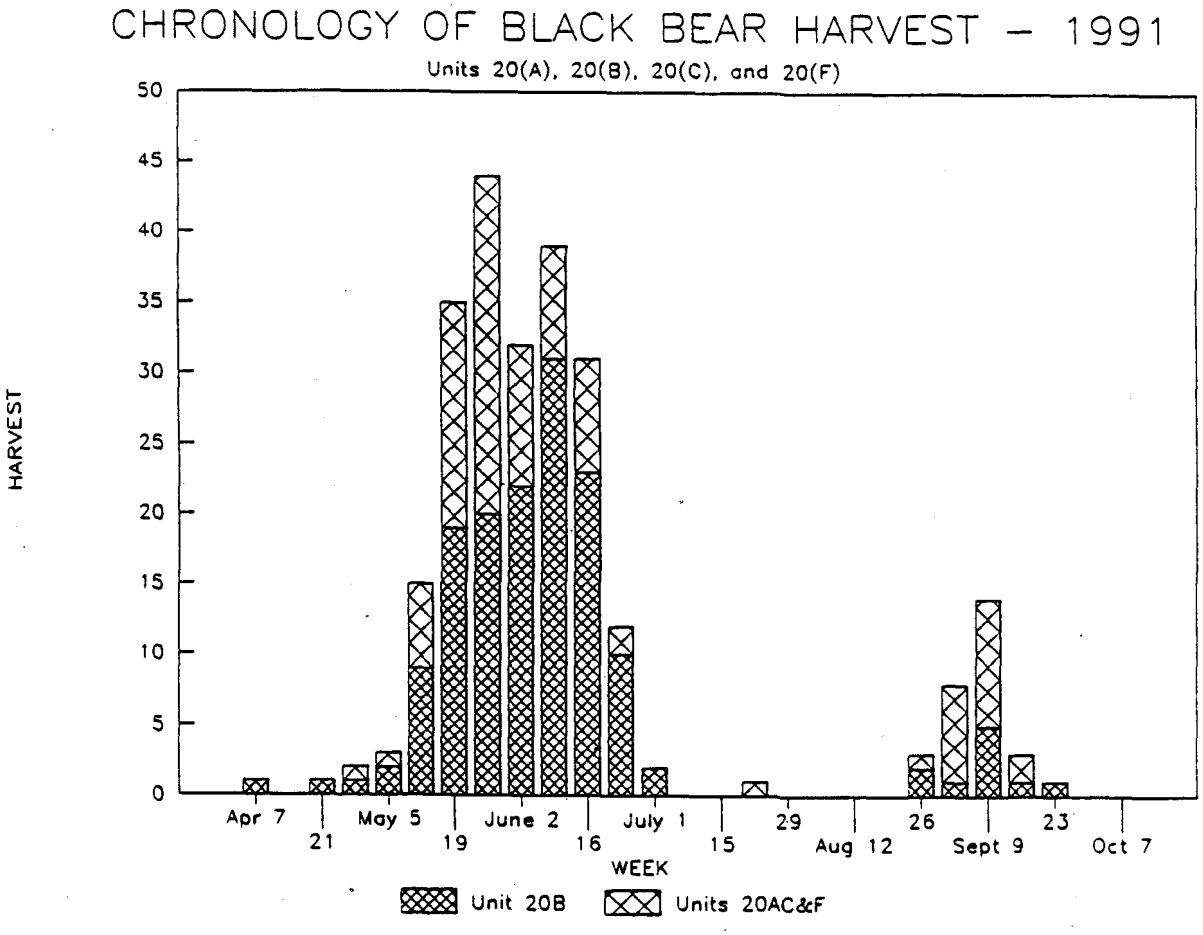

Figure 3. Chronology of black bear harvest in Subunits 20A, 20B, 20C, and 20F, in 1991 (calendar year).

Table 1. Black bear harvest[a] by sex and season in Subunits 20A, 20B, 20C, and 20F, regulatory years 1984-92.

Regulatory		Fall				Spring				Annual total			
Year	Area	Male	Female	Unk.	Tot.	Male	Female	Unk.	Tot.	Male	Female	Unk.	Tot.
1984-85	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	43	2	93	33	19	1	53	81	62	3	146
		(53%)				(63%)				(57%)			
1985-86	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	18	1	18	56	27	1	84	78	45	1	124
		(55%)				(67%)				(63%)			
1986-87	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	23	1	69	56	37	3	96	99	60	6	165
		(65%)				(60%)				(62%)			
1987-88	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	33	7	99	55	41	2	98	114	64	9	187
		(64%)				(57%)				(64%)			
1988-89	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	14	0	52	76	40	1	117	114	54	1	169
		(73%)				(66%)				(68%)			
1989-90	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	10	1	40	66	32	0	98	95	42	1	138
		(74%)				(67%)				(69%)			

Table 1. Continued.

Regulatory		Fall				Spring				Annual total			
Year	Area	Male	Female	Unk.	Tot.	Male	Female	Unk.	Tot.	Male	Female	Unk.	Tot.
1990-91	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	13	0	33	144	72	4	220	164	85	4	253
		(61%)				(67%)				(66%)			
1991-92	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	18	2	47	84	40	8	132	111	58	10	179
		(60%)				(68%)							
1992-93	20A	14	8	0	22								
	20B	23	14	2	39								
	20C	9	2	1	12								
	20F	6	3	0	9								
	Total	52	27	3	82								
		(66%)											

[a] Includes bears killed in defense of life or property. Parentheses indicate percentage of bears of known sex that were male. Data for 1989-92 from counts of sealing certificates.

[b] Regulatory year includes fall and the following spring, i.e., RY1984 includes data from July 1984 through June 1985.

[c] Preliminary data as of 1/5/93.

Table 2. Mean ages of black bears harvested in Subunit 20B, 1977-91.

	Mean Age			
	Calendar Year		Regulatory Year	
Year	M	F	M	F
1977	4.6	5.8		
1978	5.3	6.4		
1979				
1980	6.1	5.4		
1981	6.3	5.0		
1982				
1983	5.8	4.6		
1984	5.5	6.3		
1985	4.2	6.8		
1986	4.9	6.1		
1987	5.9	8.0	4.6	7.0
1988	3.8	6.4	3.0	7.0
1989			3.5	4.1
1990			3.7	6.4
1991			3.9	6.1

Table 3. Distribution of black bear harvest in Subunit 20B, 1991.

Area (UCUs)	Fall 91	Spring 92	Annual harvest	% of Total
Manley, Baker Creek (0101)	4	2	6	6
Tolovana River, Elliott Hwy mile 49-109 (0201-0204)	2	18	20	20
Tatalina River, Elliott Hwy mile 32-49 (0206)	0	5	5	5
Washington Creek, Elliott Hwy mile 16-32 (0207)	1	0	1	1
Chatanika River (0208, 0209)	2	12	14	14
Minto Flats (0210)	3	4	7	7
Mid and Upper Goldstream Creeks (0211, 0212)	0	11	11	11
Bonanza Creek (0300s)	1	6	7	7
Chena River (0400s)	5	17	22	22
Salcha/Moose Creek (0500s, 0600s)	2	6	8	8
Total			101	

Table 4. Number of hunters registering black bear bait stations for Subunit 20B, 1989-92.

Year	No. hunters registering	No. stations registered[a]
1989	220	314
1989	358	570
1991	450	767
1992[b]	517	929

[a] Each hunter may register one or two bait stations.
[b] Data from ADF&G database files.

Table 5. Number of black bear bait stations registered in Subunits 20A, 20B, 20C, 20F, and 25C, 15 April-30 June 1992, and participation by military hunters (mil).

Subunit	Registered Bait Stations												Spring Harvest			
	Bait Station No. 1				Bait Station No.2				Total							
	Non-Mil.	Mil.	Total	% Mil.	Non-Mil.	Mil.	Total	% Mil.	Non-Mil.	Mil.	Total	% Mil.	With Bait	W/O Bait	Unk.	Total
20A	47	12	59	20	40	10	50	20	87	22	109	20	14	4	0	18
20B	227	272	499	55	222	208	430	48	449	480	929	52	75	5	1	81
20C	6	4	10	40	12	5	17	29	18	9	27	33	11	6	0	17
20F	22	25	47	53	25	17	42	40	39	42	81	52	16	0	0	16
25C	1	6	7	86	1	10	11	91	2	16	18	88	0	1	0	1
Total	303	319	622		300	250	550		595	569	1,164	116	16	1	133	

Table 6. Percent of annual black bear harvest taken at bait stations in Subunits 20A, 20B, 20C, and 20F, 1987-92[a].

Subunit	Regulatory Year									
	1987-88		1988-89		1989-90		1990-91		1991-92	
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
20A	4	50	0	40	0	29	0	83	0	78
20B	48	70	0	69	0	78	0	83	0	93
20C	9	17	0	33	0	75	0	47	0	65
20F	50	29	0	33	0	88	0	78	0	100
Total	31	58	0	59	0	71	0	80	0	88

[a] Since July 1988, hunting black bears over bait has been allowed only during spring. Data prior to 1990 taken from previous S&I reports.

Table 7. Number of black bears harvested at bait stations in Subunits 20A, 20B, 20C, and 20F, regulatory years, 1987-92[a].

	Regulatory Year									
	1987-88		1988-89		1989-90		1990-91		1991-92	
Subunit	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
20A	1	6	0	8	0	4	0	25	0	14
20B	27	47	0	56	0	56	0	120	0	75
20C	1	2	0	2	0	3	0	9	0	11
20F	2	2	0	3	0	7	0	21	0	16
Total	31	57	0	69	0	70	0	175	0	116

[a] Since July 1988 harvesting black bears over bait has been allowed only during spring. Data prior to 1990 taken from previous S&I reports.

Table 8. Subunits 20A, 20B, 20C, and 20F black bear successful hunter residency, regulatory years 1989-90[a] through 1991-92.

	Residents					
	Local[b]	Nonlocal	Total	Nonresident	Unknown	Total number
Regulatory year	No. %	No. %	No. %	No. %	No. %	successful hunters[c]
1989-90	127 (91)	5 (4)	132 (94)	7 (5)	1 (1)	140
1990-91	221 (89)	8 (3)	229 (92)	18 (7)	1 (<1)	248
1991-92	133 (76)	30 (17)	163 (93)	12 (7)	0	175

[a] Prior to 1989-90, black bear data were compiled by calendar year rather than regulatory year.
[b] Resident of Unit 20.
[c] Excludes data from DLP's that were not taken as a legal harvest. Data from harvest matrix.

Table 9. Subunits 20A, 20B, 20C, and 20F black bear harvest percent by transport method, regulatory years 1989-91.

Unit	Regulatory year	Percent of harvest									
		Airplane	Horse	Boat	4-wheeler	Snowmachine	Other ORV	Highway vehicle	Walk	Other/ Unknown	n
20A	1989	32	0	40	0	0	8	12	4	4	25
	1990	33	0	43	0	0	5	5	2	12	40
	1991	33	0	18	3	0	18	15	9	3	33
	Total	33	0	34	1	0	10	10	5	7	98
20B	1989	3	0	6	4	0	18	52	10	7	95
	1990	1	0	10	3	0	22	50	14	1	153
	1991	4	0	6	1	0	26	50	8	6	101
	Total	2	0	8	3	0	22	50	11	4	349
20C	1989	25	0	50	0	0	0	8	0	17	12
	1990	4	0	68	0	0	24	4	0	0	25
	1991	11	0	67	0	0	6	11	6	0	18
	Total	11	0	64	0	0	13	7	2	4	55
20F	1989	0	0	0	0	0	0	100	0	0	10
	1990	0	0	9	0	0	0	62	16	12	32
	1991	0	0	9	0	0	4	86	0	0	22
	Total	0	0	8	0	0	2	77	8	6	64

LOCATION

Game Management Subunit: 20D (5,640 mi^2)

Geographical Description: Central Tanana Valley near Delta Junction

BACKGROUND

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

MANAGEMENT DIRECTION

Management Goals

Management goals for Subunit 20D black bears are to: 1) protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem, and 2) provide the greatest sustained opportunity to participate in hunting black bears.

Management Objective

The management objective for Subunit 20D black bears is to maintain a black bear population capable of sustaining annual harvests of 15 bears north of the Tanana River and 15 bears south of the Tanana River.

METHODS

We collected harvest data through mandatory sealing of bears killed by hunters or in defense of life or property. Data collected from each black bear include 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 any meat was salvaged.

RESULTS AND DISCUSSION

Population Status, Composition, Size, and Trend

Accurate estimates of black bear population size, composition, or trend are unavailable for Subunit 20D. However, based on Hechtel's (1991) estimate of 17.5 adult black bears/100 mi^2 in adjacent Subunit 20A, I estimated 750 black bears in Subunit 20D with approximately 525 bears north of the Tanana River and 225 bears south of the Tanana.

Distribution and Movements:

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

Mortality

Season and Bag Limit:

There was no closed season on black bears in Subunit 20D during this report period. The bag limit was three bears per year. Cubs or sows accompanied by cubs were not legal to harvest. Black bear baiting was allowed from 15 April through 30 June; however, hunters were required to obtain a permit issued by the ADF&G and could not establish more than two bait stations.

Human-induced Mortality:

Reported black bear harvest by hunters in Subunit 20D ranged from 9 (1990-91 and 1991-92) to 17 (1987-88 and 1989-90) in the last 5 years (Table 1) and did not exceed the harvest objective. Mean annual harvest during this time was 13 bears.

Unreported harvest is estimated at eight bears per year (Table 1). Total estimated human-induced mortality (reported and unreported harvest) ranged from 14 to 28 bears during the previous 5 years, with a 5-year mean annual mortality of 21 bears.

Reported harvest the previous 5 years was 76% male and 24% female. MacHutchon and Smith (1988), as reported by Hechtel (1991), suggest that a harvest greater than 35% females may warrant detailed harvest assessment to determine if excessive harvest is occurring. Subunit 20D harvest does not appear excessive at this time.

Harvest Locations:

The reported harvest did not exceed the harvest objective for north or south of the Tanana River. Most black bears killed in Subunit 20D are taken south of the Tanana River (Table

2). During the past 5 years, 66% of the black bears were taken south of the Tanana River and reported harvest averaged 9 bears per year (range = 5-14). This harvest represents 4% of the estimated adult population south of the Tanana River. During the past 5 years, 33% of the Subunit 20D harvest was taken north of the Tanana River and averaged five bears per year (range = 2-7). This harvest represents 1% of the estimated adult population north of the Tanana River. There are no changing trends in harvest location at this time.

Hunter Residency:

Most black bears killed in Subunit 20D were taken by local residents. During the last 5 years, local residents killed from 57% to 89% of the bears each year (Table 3). The 5-year mean harvest was 67% by local residents, 22% by nonlocal residents, and 9% by nonresidents.

Harvest Chronology:

During the previous 5 years, most black bears were killed during May (28%) and September (26%) (Table 4).

Transportation Methods:

ORVs, highway vehicles, boats, or walking were the modes of transportation used by 70% of the hunters who harvested black bears during the previous 5 years (Table 5).

Natural Mortality:

The rate of natural mortality for black bears is unknown in Subunit 20D.

Habitat Assessment and Enhancement

No black bear habitat assessment or enhancement was done during this report period.

Board of Game Actions and Emergency Orders

No regulations were passed during this reporting period that affected black bear hunting in Subunit 20D.

CONCLUSIONS AND RECOMMENDATIONS

Liberal seasons and bag limits are providing hunters the maximum opportunity to hunt black bears in Subunit 20D. Even with liberal seasons and bag limits, harvest is within management objectives at this time. No changes in harvest trends are apparent and I recommend no change in current seasons and bag limits for Subunit 20D.

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Table 1. Subunit 20D black bear harvest, 1987-92.

Regulatory year	Reported							Estimated kill		Total reported and estimated kill			
	Hunter kill				Non-hunting kill[a]								
	M (%)	F (%)	Unk.	Total	M	F	Unk.	Unreported	Illegal	M (%)	F (%)	Unk.	Total
1987-88													
Fall 87	5 (50)	5 (50)	0	10	0	0	0	4	0	5 (50)	5 (50)	4	14
Spring 88	6 (86)	1 (14)	0	7	0	0	0	4	0	6 (86)	1 (14)	4	11
Total	11 (65)	6 (35)	0	17	0	0	0	8	0	11 (65)	6 (35)	8	25
1988-89													
Fall 88	4 (57)	3 (43)	0	7	0	0	0	4	0	4 (57)	3 (43)	4	11
Spring 89	5 (71)	2 (29)	0	7	0	0	0	4	0	5 (71)	2 (29)	4	11
Total	9 (64)	5 (36)	0	14	0	0	0	8	0	9 (64)	5 (36)	8	22
1989-90													
Fall 89	6 (75)	2 (25)	0	8	0	0	0	4	0	6 (75)	2 (25)	4	12
Spring 90	8 (89)	1 (11)	0	9	0	0	3	4	0	8 (89)	1 (11)	7	16
Total	14 (82)	3 (18)	0	17	0	0	3	8	0	14 (82)	3 (18)	11	28
1990-91													
Fall 90	2 (100)	0 (0)	0	2	0	0	1	4	0	2 (100)	0 (0)	5	7
Spring 91	5 (71)	2 (29)	0	7	0	0	0	4	0	5 (71)	2 (29)	4	11
Total	7 (78)	2 (22)	0	9	0	0	1	8	0	7 (78)	2 (22)	9	18
1991-92													
Fall 91	6 (100)	0 (0)	0	6	0	0	0	4	0	6 (100)	0 (0)	4	10
Spring 92	3 (100)	0 (0)	0	3	0	0	0	4	0	3 (100)	0 (0)	4	7
Total	9 (100)	0 (0)	0	9	0	0	0	8	0	9 (100)	0 (0)	8	17

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

Table 2. Location of kill north or south of the Tanana River for black bears harvested in Subunit 20D, 1987-92

Regulatory Year	% killed south of Tanana River	% killed north of Tanana River	n
1987-88	82	18	17
1988-89	67	33	14
1989-90	56	44	17
1990-91	45	56	9
1991-92	78	22	9

Table 3. Subunit 20D black bear successful hunter residency, 1987-92.

Regulatory Year	Local[a] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1987-88	13 (76)	3 (18)	1 (6)	17
1988-89	8 (57)	4 (29)	2 (14)	14
1989-90	10 (59)	6 (35)	1 (6)	17
1990-91	6 (67)	1 (11)	2 (22)	9
1991-92	8 (89)	1 (11)	0	9

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

Table 4. Subunit 20D black bear harvest chronology percent by time period, 1987-92.

Regulatory Year	Harvest periods								n
	July	August	September	October	November	April	May	June	
1987-88	12	18	29	0	0	6	24	12	17
1988-89	7	14	29	0	0	0	21	29	14
1989-90	0	18	29	0	0	0	41	12	17
1990-91	0	22	0	0	0	0	33	44	9
1991-92	33	0	0	0	0	0	33	33	9

Table 5. Subunit 20D black bear harvest percent by transport method, 1987-92.

Regulatory year	Percent of harvest									n
	Airplane	Horse	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Walk	Unknown	
1987-88	6	0	0	0	0	24	24	29	18	17
1988-89	21	0	29	7	0	7	14	7	14	14
1989-90	0	6	12	0	0	47	18	0	18	17
1990-91	0	0	11	22	0	33	22	0	11	9
1991-92	0	0	11	22	11	0	33	22	0	9

LOCATION

Game Management Subunit: 20E (10,680 mi^2)

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

BACKGROUND

Black bears can be found throughout forested habitat in Subunit 20E. Observations by long-term residents of the area indicate that black bears were more common during the 1960s and early 1970s than they are at present. In contrast, grizzly bear abundance was depressed during the 1960s and early 1970s, apparently related to federal predator control poisoning efforts of the 1950s, but grizzly abundance has since recovered to near natural densities. Competition with or predation by grizzly bears may have resulted in reduced black bear abundance.

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

MANAGEMENT DIRECTION

Management Goals

Management goals for Subunit 20E black bears are to: 1) protect, maintain, and enhance the black bear population and its habitat in concert with other components of the ecosystem, and 2) provide the greatest sustained opportunity to participate in hunting black bears.

Management Objectives

The management objective for Subunit 20E black bears is to maintain a black bear population in Subunit 20E capable of sustaining annual harvests of 14 bears/year.

METHODS

We obtained harvest data through mandatory sealing of black bears killed by hunters or in defense of life or property. Information collected included harvest location and date, sex of the bear, skull size, transportation used, number of days hunted, salvage of meat, and use of baits. A premolar tooth was extracted from each bear during the sealing process; however, black bear teeth have not been sectioned for determination of age for several years.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size:

We have not conducted any census or surveys in Subunit 20E to determine black bear population size and trend. Hunter reports and bear sighting data indicate that black bears inhabit all suitable habitat. Based on population data collected in Unit 12 during the early 1980s and recently in Subunit 20A, I estimated the Subunit 20E black bear population to be between 1,000 and 1,500 bears. The composition of the population is unknown. Based on hunter reports and incidental sightings of bears by the public and ADF&G personnel over the past 5 years, the population appears stable.

Distribution and Movements

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

Mortality

Harvest:

Season and Bag Limit. There is no closed season for black bears in Subunit 20E; the bag limit is three bears. The harvesting of cubs and females accompanied by cubs is prohibited.

Board of Game Actions and Emergency Orders. In 1988, the Board of Game restricted the use of black bear bait stations in Subunit 20E to the period from 15 April to 30 June. Each hunter was limited to two bait stations and was required to register each station with the Division of Wildlife Conservation. No other board actions or emergency orders concerning Subunit 20E black bears occurred during the report period.

Hunter Harvest. In 1991, hunters reported taking eight black bears (seven males, one female) and one bear was taken in defense of life or property in Subunit 20E (Table 1). This harvest is below the 5-year average of 13 bears. The harvest during the last 3 years has been substantially less than in 1987 (22) and 1988 (17). Causes for the lower harvest are not known, but I suspect the primary cause is declining hunter interest.

In 1991, the average skull size of the seven males taken was 17.4 inches, compared with the 5-year average of 16.3 inches. The percent males in the harvest was 88%, compared with the 5-year average of 72%. The consistently large skull sizes and the percent males in the harvest indicate that human-induced mortality is having minimal effect on this population.

Hunter Residency and Success. During 1991 all black bears harvested in Subunit 20E were taken by residents (Table 2). Since 1987 only one bear (2%) was killed by a nonresident. No measure of hunter success was available as nonsuccessful hunters are not required to report. In 1991 each successful hunter averaged 2.7 days afield, slightly below the 5-year average of 3.1 days. Baiting is not normally used to kill black bears in Subunit 20E; there are no records of any bears taken over bait within the last 5 years.

Harvest Chronology. During 1991, five (56%) black bears were taken during spring and four (44%) during fall (Table 3). This is typical of harvest chronology in past years.

Transport Methods. Highway vehicles were the most commonly used (63%) mode of transportation for successful black bear hunters in Subunit 20E during 1991 (Table 4). During the past 5 years, 39% of the reported harvested black bears were taken by hunters using highway vehicles to reach hunting area; boats and walking (presumably from cabins) were the next most commonly used methods.

Other Mortality:

The effects of natural mortality factors on the black bear population in Subunit 20E are not known.

Habitat

Assessment: Black bear habitat is extensive in Subunit 20E. Only treeless habitat, generally above elevations of 4,000 feet, is not considered to be black bear habitat. Blueberries and cranberries are widely available in Subunit 20E, but bearberries are available in a few areas.

Enhancement: The implementation of the Alaska Interagency Fire Management Plan has allowed wildfires to burn in more areas than was possible before 1984. Burned-over areas are generally expected to become more productive than mature forests of black or white spruce because of revegetation of plants preferred by bears.

CONCLUSIONS AND RECOMMENDATIONS

All management goals and objectives are being met. Black bears in Subunit 20E are lightly harvested and could withstand larger harvests. I recommend no changes in seasons or bag limits.

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Table 1. Subunit 20E black bear harvest[a], 1987-91.

Regulatory year	Reported: Hunter kill M	F	Unk.	Total	Baited	Reported: Non-hunting kill M	F	Unk.	Estimated kill: Unreported	Illegal	Total estimated kill: M (%)	F (%)	Unk.	Total
1987														
Fall 87	7	6	1	14	0[b]	0	0	0	0	0	7 (54)	6 (46)	1	14
Spring 88	6	2	0	8	0[b]	0	0	0	0	0	6 (75)	2 (25)	0	8
Total	13	8	1	22	0[b]	0	0	0	0	0	13 (62)	8 (38)	1	22
1988														
Fall 88	7	2	0	9	0[b]	0	0	0	0	0	7 (78)	2 (22)	0	9
Spring 89	6	2	0	8	0[b]	0	0	0	0	0	6 (75)	2 (25)	0	8
Total	13	4	0	17	0[b]	0	0	0	0	0	13 (77)	4 (23)	0	17
1989														
Fall 89	5	0	0	5	0	0	0	0	0	0	5 (100)	0	0	5
Spring 90	1	0	0	1	0	0	0	0	0	0	1 (100)	0	0	1
Total	6	0	0	6	0	0	0	0	0	0	6 (100)	0	0	6
1990														
Fall 90	2	4	0	6	0	0	0	0	0	0	2 (33)	4 (67)	0	6
Spring 91	3	2	0	5	0	0	0	0	0	0	3 (60)	4 (40)	0	5
Total	5	6	0	11	0	0	0	0	0	0	5 (45)	6 (55)	0	11
1991														
Fall 91	2	1	0	3	0	1	0	0	0	0	2 (67)	1 (33)	0	3
Spring 92	5	0	0	5	0	0	0	0	0	0	5 (100)	0	0	5
Total	7	1	0	8	0	1	0	0	0	0	8 (89)	1 (11)	0	9

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

[b] May not be accurate; notes on baiting were not consistently collected during these years.

Table 2. Subunit 20E black bear successful hunter residency, 1987-91.

Regulatory year	Local[a] resident (%)	Nonlocal resident (%)	Nonresident (%)	Total successful hunters
1987-88	17[b]		1 (6)	18[c,d]
1988-89	7 (70)	3 (30)	0	10[d]
1989-90	2 (33)	4 (67)	0	6
1990-91	7 (64)	4 (36)	0	11
1991-92	3 (43)	4 (57)	0	7

[a] Local residents reside within Units 12 and 20E.
[b] Local and nonlocal residents combined.
[c] Does not include hunters of unknown residency.
[d] Does not include state residents who could be local residents.

Table 3. Subunit 20E black bear harvest chronology percent by time period, 1987-91.

Regulatory year	Harvest periods								
	July	August	September	October	November	April	May	June	n
1987-88	32	9	23	0	0	0	36	0	22
1988-89	12	18	24	0	0	0	35	12	17
1989-90	17	50	17	0	0	0	17	0	6
1990-91	0	100	0	0	0	0	0	0	3
1991-92	11[a]	22	11	0	0	0	11	44	9

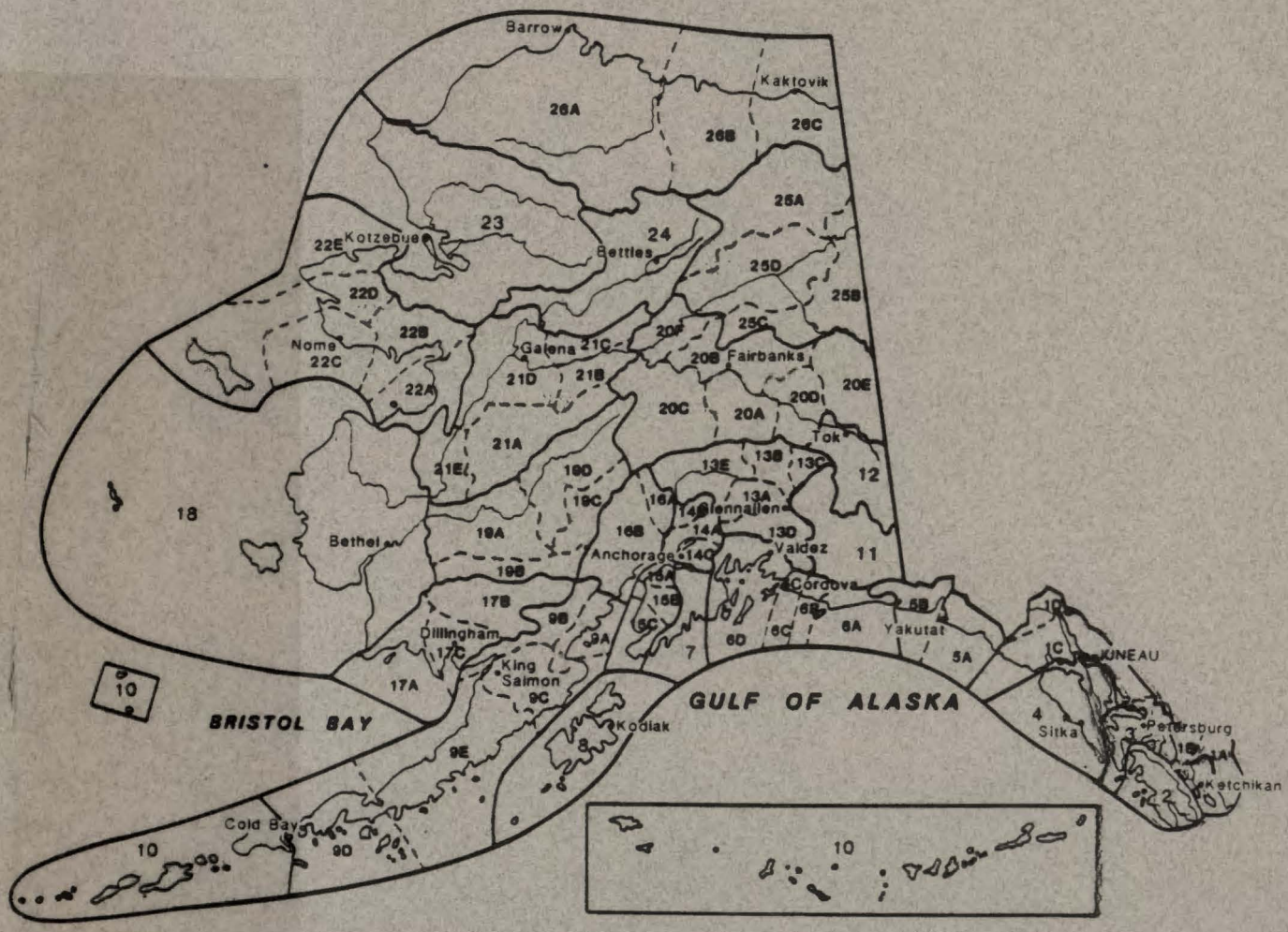
[a] Includes one defense of life or property kill.

Table 4. Subunit 20E black bear harvest percent by transport method, 1987-91.

Regulatory year	Percent of harvest								
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown[a]	n
1987	0	0	14	0	0	9	32	45	22
1988	6	0	18	0	0	12	29	35	17
1989	0	0	17	0	0	17	33	33	6
1990	0	0	0	0	0	0	100	0	3
1991	13	0	0	0	0	0	62	25	8

[a] Includes hunters who listed walking.

Alaska's Game Management Units



Federal Aid in Wildlife Restoration

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 then allots the funds back to states through a formula based on each state's geographic area and the number of paid hunting license holders in the state. Alaska receives 5% of the revenues collected each year, the maximum allowed. The Alaska Department of Fish and Game uses the funds to help restore, conserve, manage, and enhance wild birds and mammals for the public benefit. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes necessary to be reponsible hunters. Seventy-five percent of the funds for this project are from Federal Aid.