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FURBEARERS

Mary V. Hicks, Editor

Ken Whitten

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Study 7.0
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CONTENTS

LOCATION

GAME MANAGEMENT UNITS: Unit 1A (5,000 mi^2)
Unit 2 (3,900 mi^2)

GEOGRAPHIC DESCRIPTION: Unit 1A - Unit 1 south of Lemesurier Point, including all areas draining into Behm and Portland Canals, and excluding areas draining into Ernest Sound.

Unit 2 - Prince of Wales and all adjacent islands bounded by a line drawn from Dixon Entrance in the center of Clarence Strait, Kashevarof Passage, and Sumner Strait to and including Warren Island.

BACKGROUND

Furbearer populations have remained at moderate to high population levels in Units 1A and 2 during the past decade. Trapping pressure and harvests fluctuate annually, primarily as a function of weather conditions and changes in fur prices.

Southeast Alaska provides excellent habitat for river otters, and fur buyers consider pelts to be high quality. Pelt prices were high during the late 1970s, declined during the 1980s and early 1990s, and increased during the past few seasons. Because otters are difficult to trap and pelt preparation is time consuming, prices must be high to substantially influence harvest levels.

Beaver prices have remained stable and low for several years. Trapper effort has similarly been low except along the roaded portions of Prince of Wales Island where easy access has enabled a few trappers to take several beavers. Beaver harvests can fluctuate dramatically from year to year because of the efforts of a few trappers.

More Southeast Alaska trappers are interested in martens than any other furbearer species. Martens are easy to trap, their pelts are easy to care for, and combined income from the pelts is generally greater than for any other furbearer species in southern Southeast Alaska. With the exception of the 1986/87 season when pelt prices jumped markedly, marten prices have remained consistent at moderate levels throughout the past decade. Easy access afforded by the extensive and expanding road system on Prince of Wales Island has increased martens' vulnerability in Unit 2. Extensive logging in much of Units 1A and 2 continues to remove uneven-aged old-growth habitat required by martens. As a result we believe the area's capacity to support marten populations will decline over time.

For at least the past decade mink pelt prices have remained low and stable. This has resulted in moderate to low interest among trappers.

Weasel populations fluctuate from year to year, independent of trapping. Harvest tends to be limited to incidental take while targeting other furbearers, primarily marten. Muskrats are absent from Unit 2 and very few inhabit Unit 1A. Harvests are very low and incidental to beaver trapping.

Wolverines occur only on the mainland portion of Unit 1A where very few are taken. Trappers do not generally target wolverines and harvests tend to be incidental to wolf trapping. Neither foxes nor coyotes occur in Units 1A and 2, and lynx are only occasionally taken from the 1A mainland.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- Regulate seasons and bag limits to maintain viewable and harvestable populations of furbearers.

- Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

- Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

METHODS

Our harvest data comes from mandatory sealing of marten, beaver, lynx, otter, and wolverine pelts. We obtained information about mink harvests from trappers who sealed marten pelts during 1990/91 and 1991/92 (Larsen 1993, ADF&G unpubl. data, Ketchikan), but we subsequently discontinued collecting this information. The status of mink populations is now assessed through staff observations and information obtained through our annual trapper surveys.

Beaver pelts have been sealed for over 20 years. Wolverines were first sealed in 1971/72 and river otters have been sealed since 1978/79. Marten sealing was initiated in 1984/85.

Fur export reports are sometimes referenced in estimating harvests of furbearers for which sealing is not required. Although mandatory these reports do not account for all the animals taken, because not all pelts from harvested animals are exported. Many that are exported are not reported, and some pelts exported from this unit may have been taken in other units.

We do not perform furbearer population surveys in Southeast Alaska. Some ecological information is available for mink and river otters from short-term research studies completed in Southeast (Harbo 1958, Home 1977, Larsen 1983, Woolington 1984, Johnson 1985). A study of marten ecology is presently ongoing on northeast Chichagof Island (Flynn and Schumacher 1994).

RESULTS AND DISCUSSION

POPULATION STATUS AND TRENDS

Beaver populations have generally remained at moderate levels in Units 1A and 2 (Tables 1 and 2). We issued 6 beaver depredation permits to communities and corporations during this report period. Beavers were removed from specified areas in Units 1A and 2 because of flooding and erosion problems created by their cutting and damming activities.

Konopacky Environmental (1994) completed a beaver population study on Black Bear Creek in Unit 2 during this report period. The study assessed impacts to beavers caused by the Black Bear

Lake hydroelectric project. Eighteen beaver dens were counted in the Black Bear Creek study area (13.8 dens/mi) along with 6 maintained beaver dams. Konopacky has proposed to use den counts as an index for detecting changes in beaver population numbers or trend over time.

Habitat changes can cause large fluctuations in beaver populations (Wood 1990). Although early successional second-growth habitat can support higher populations of beavers than old growth, when second-growth canopy closes (approximately 20 years post-cutting), beaver numbers drop to low levels. Current pelt prices do not seem high enough to foster much trapping pressure except in easily accessed areas.

Marten populations tend to fluctuate annually throughout Southeast Alaska. Fluctuations are likely related to changes in prey abundance. Trappers in Units 1A and 2 believe martens have remained at moderate to high levels during this report period (Tables 1 and 2). Discussions with trappers suggest that martens are concentrating in old-growth stands and avoiding clearcuts, thereby increasing trapper catch per unit effort. We anticipate that reductions in old-growth habitat will eventually result in reduced marten numbers.

Mink populations appear to have remained at extremely abundant levels the 2 units during this report period (Tables 1 and 2). Given the current limited interest in mink pelts, we do not expect this to change unless pelt prices increase substantially and result in additional trapping effort.

Otter populations were believed to be low in the late 1970s when prices were high (Wood 1990). Since then prices and trapper interest have dropped substantially. We believe that populations have steadily increased during the past decade and are presently at moderate to high levels. This is supported by information obtained from trappers (Tables 1 and 2).

MORTALITY

Harvest

Seasons and Bag Limits	Resident and Nonresidents	
Units 1A and 2		
Hunting		
Wolverine	Nov. 10–Feb. 15	1 Wolverine
Trapping		
Beaver	Dec. 1–May 15	No limit
Lynx, mink, marten,		
Otter, weasel, muskrat	Dec. 1–Feb. 15	No limit
Wolverine	Nov. 10–April 30	No limit

Board of Game Actions and Emergency Orders. The same furbearer seasons and bag limits have been in effect for the past 12 years. Season opening dates for most species have been established using a combination of pelt primeness and standardized dates for species that could be taken in the same types of trap sets. Martens are considered prime before 1 December, mink are not prime until late December, and otter and beaver are prime by 1 December. Therefore 1 December was selected as the best compromise as an opening date for these species. Closing dates are based on declining pelt quality and the desire to have a uniform closing date for mink, marten, and otter. Beaver seasons run late to allow trapping on major mainland river systems after breakup. Little beaver trapping occurs during the last month of the season because of low pelt prices.

Harvest. The 1994/95–1996/97 reported beaver harvests from Units 1A and 2 were similar to harvests reported previously (Tables 3 and 4). Trappers used highway vehicles and boats to access beaver habitat in Unit 1A, while highway vehicles were most used in Unit 2 during the past 3 seasons (Table 5). The average number of beavers caught per trapper in Unit 2 was substantially higher than the average in Unit 1A during 2 of the past 3 seasons (Table 6).

Marten harvests from Unit 1A averaged 166 during the past 3 seasons (Table 3). This was lower than the average of 260 noted during the previous 10 seasons. Unit 2 marten harvests averaged 1,072 during the past 3 seasons (Table 4). This was substantially higher than the average of 730 noted during the previous 10 seasons. Unit 1A trappers predominantly used boats to access marten trapping areas while Unit 2 trappers used both highway vehicles and boats (Table 5). The average number of martens caught per trapper varied in Unit 1A but remained relatively constant in Unit 2 (Table 6). We have made no effort to ascertain habitats in which martens were caught subsequent to the 1989/90 season (Larsen 1993). The long-range Unit 2 marten-trapping outlook is poor. Increased road access into interior portions of the island decreases the amount of available refugia. This can lead to the elimination of reservoirs of untrapped animals (Wood 1990). We expect that ongoing and scheduled logging will continue to reduce marten habitat in much of Unit 1A and 2.

Unit 1A otter harvests were among historical highs during the last 3 seasons, reaching a 13-year high of 129 in 1994/95 (Table 3). The Unit 2 otter harvest reached a 13-year high of 232 during 1994/95, and averaged 175 during the past 3 seasons (Table 4). Trapping rather than shooting remained the predominant method of take in both units. Otter trappers primarily used boats for transportation in both Units 1A and 2 during this report period (Table 5).

Eight male wolverines were trapped in Unit 1A during the past three seasons (Table 3). All successful wolverine trappers (Table 5) used boats for transportation.

HABITAT

Clearcut logging of uneven aged old-growth forest in Units 1A and 2 is affecting most furbearers. It is particularly harmful for martens and we expect that the conversion of old growth to second growth habitat will ultimately lead to substantially reduced marten numbers in southern Southeast. We further expect roads to eliminate marten refugia, particularly in Unit 2. Under current roading and logging practices these changes are permanent.

River otter habitat is primarily confined to a 20–30 meter strip of old-growth forest along the saltwater coast and adjacent to larger stream and lake systems (Larsen 1983, Woolington 1984). However Woolington (1984) found natal dens up to one-half mile inland from saltwater beaches. Old-growth forest is preferred otter habitat and little use is made of cutover areas. Clearcut logging may reduce otter populations.

Mink habitat appears to be similar to otter habitat. While impacts of beach logging would seem less detrimental to mink than otters, it is still believed that mink populations may decline after beach habitat is logged (Johnson 1985).

Beavers seem to reap short-term benefits from logging. Early clearcut stages produce abundant food and often support more beavers than does old growth. Canopy closure eventually reduces populations to levels below those supported in old-growth stands.

Wolverines are found only on the mainland portion of Unit 1A where most of the area has been legislatively designated as wilderness, thereby protected from logging. The lower Cleveland Peninsula is scheduled for intensive logging and road building, and these activities are expected to adversely impact wolverine populations.

CONCLUSIONS AND RECOMMENDATIONS

Furbearer populations in Units 1A and 2 appear stable at this time. We believe pelt prices would have to increase substantially for trapping effort to affect most furbearer populations.

The extensive road system and widely distributed human population in Unit 2 creates much greater trapping pressure than in Unit 1A. Along with high pelt prices this could lead to an overharvest of martens. Because marten seasons coincide with seasons for other furbearer species, the most acceptable solution would be to implement an access restriction on marten trapping.

Logging permanently removes uneven aged old-growth habitat, replacing it with even-aged, closed canopy habitat that does not meet the requirements of several furbearer species. It is therefore important to publicize impacts from land use decisions so that tradeoffs for wildlife can be recognized and understood.

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Table 1 Indices of abundance (I_A)[a] for furbearer species, Unit 1A, 1991–97. Values derived from responses to trapper questionnaires.

	Season					
Species	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Beaver	43	25	37	25	75	50
Marten	73	17	25	25	50	60
Mink	67	45	42	64	90	70
Otter	65	54	50	64	80	60

[a] Species are considered abundant when $I_A>50$; moderate when $20<I_A<50$; and scarce when $I_A<20$. From Brand and Keith (1979).

Table 2 Indices of abundance (I_A)[a] for furbearer species, Unit 2, 1991–97. Values derived from responses to trapper questionnaires.

	Season					
Species	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97
Beaver	62	50	12	50	33	37
Marten	44	39	12	25	83	50
Mink	67	45	42	75	100	75
Otter	67	45	50	67	83	50

[a] Species are considered abundant when $I_A>50$; moderate when $20<I_A<50$; and scarce when $I_A<20$. From Brand and Keith (1979).

Table 3 Reported harvests of beavers, martens, river otters, and wolverines, Unit 1A, 1984–1997

Species	Total take	% male	Method of take (%) Shot	Trapped or snared	Unk	Harvest chronology Dec	Jan	Feb	Mar	Apr	May	Unk
Beaver												
1984/85	39	--	0	100	0	1	11	8	5	11	3	0
1985/86	20	--	0	100	0	0	1	11	6	2	0	0
1986/87	52	--	0	100	0	15	8	12	9	4	4	0
1987/88	44	--	0	100	0	16	0	0	11	1	3	13
1988/89	24	--	0	100	0	12	4	0	8	0	0	0
1989/90	10	--	0	100	0	3	2	1	0	4	0	0
1990/91	7	--	0	100	0	0	0	4	3	0	0	0
1991/92	46	--	0	100	0	17	11	5	4	8	0	1[a]
1992/93	14	--	0	100	0	7	2	2	1	2	0	0
1993/94	28	--	0	100	0	10	5	3	6	4	0	0
1994/95	19	--	0	100	0	2	0	12	1	4	0	0
1995/96	46	--	--	0	100	0	0	7	3	16	12	8
1996/97	24	--	--	0	100	0	5	4	7	2	6	0
Marten												
1984/85	203	69	0	100	0	118	68	17	0	0	0	0
1985/86	156	63	0	100	0	107	5	2	0	0	0	42
1986/87	127	66	0	100	0	49	65	13	0	0	0	0
1987/88	313	69	0	100	0	61	74	7	0	0	0	171
1988/89	490	59	0	100	0	95	43	2	0	0	0	350
1989/90	246	70	0	100	0	73	80	75	0	0	0	18
1990/91	261	65	0	100	0	115	43	10	1	0	0	92
1991/92	654	62	0	100	0	215	111	149	0	0	0	179
1992/93	122	71	0	100	0	24	93	5	0	0	0	0
1993/94	42	74	0	100	0	15	14	1	0	0	0	12
1994/95	143	66	0	100	0	81	39	23	0	0	0	0
1995/96	134	64	0	100	0	15	34	7	0	0	0	78
1996/97	220	64	0	100	0	107	69	44	0	0	0	0

Table 3 Continued

Species	Total take	% male	Method of take (%) Shot	Trapped or snared	Unk	Harvest chronology Dec	Jan	Feb	Mar	Apr	May	Unk
<u>Otter</u>												
1984/85	65	63	1	99	0	24	37	2	0	0	0	2
1985/86	70	71	7	93	0	27	30	13	0	0	0	0
1986/87	63	62	11	89	0	29	26	8	0	0	0	0
1987/88	88	61	9	91	0	42	40	6	0	0	0	0
1988/89	45	78	40	60	0	8	20	17	0	0	0	0
1989/90	81	72	18	82	0	19	40	22	0	0	0	0
1990/91	80	59	10	90	0	36	34	10	0	0	0	0
1991/92	84	55	19	81	0	31	39	14	0	0	0	0
1992/93	61	57	13	87	0	27	27	6	0	1	0	0
1993/94	112	62	11	89	0	64	38	10	0	0	0	0
1994/95	129	51	18	82	0	78	37	13	0	0	0	1
1995/96	65	66	23	75	2	33	21	11	0	0	0	0
1996/97	104	55	20	80	0	35	28	41	0	0	0	0
<u>Wolverine</u>												
1984/85	1	100	100	0	0	1	0	0	0	0	0	0
1985/86	0	--	--	--	--	--	--	--	--	--	--	--
1986/87	2	100	0	100	0	0	2	0	0	0	0	0
1987/88	1	0	0	100	0	1	0	0	0	0	0	0
1988/89	0	--	--	--	--	--	--	--	--	--	--	--
1989/90	1	100	0	100	0	0	0	0	0	1	0	0
1990/91	7	71	14	86	0	1	5	0	1	0	0	0
1991/92	1	0	0	100	0	0	1	0	0	0	0	0
1992/93	2	0	0	100	0	0	1	0	0	1	0	0
1993/94	1	100	0	100	0	0	1	0	0	0	0	0
1994/95	5	100	0	100	0	0	0	2	1	2	0	0
1995/96	0	--	--	--	--	--	--	--	--	--	--	--
1996/97	3	100	0	100	0	0	0	0	2	1	0	0

[a] One beaver was taken by ADF&G during the month of August.

Table 4 Reported harvests of beavers, martens, and river otters, Unit 2, 1984–1997

			Method of take (%)			Harvest chronology						
Species	Total take	% male	Shot	Trapped or snared	Unk	Dec	Jan	Feb	Mar	Apr	May	Unk
Beaver												
1984/85	234	--	0	100[a]	0	52	54	38	40	32	18	0
1985/86	364	--	0	99	0	66	96	66	95	34	7	0
1986/87	411	--	0	100	0	120	66	96	74	26	29	0
1987/88	352	--	0	99	0	90	87	34	73	45	13	10
1988/89	103	--	0	100	0	31	4	7	2	48	11	0
1989/90	397	--	0	100[b]	0	199	79	6	76	26	9	2
1990/91	172	--	0	100	0	18	56	59	17	17	5	0
1991/92	257	--	0	99	1	120	46	17	46	12	11	5
1992/93	64	--	0	98	2	36	4	10	2	11	1	0
1993/94	204	--	0	100	0	109	27	10	26	25	7	0
1994/95	161	--	0	100	0	58	35	29	15	24	0	0
1995/96	281	--	0	100	0	55	31	37	67	25	6	60
1996/97	291	--	0	100	0	114	58	43	57	13	0	6
Marten												
1984/85	1,039	57	0	100	0	675	275	89	0	0	0	0
1985/86	571	56	0	100	0	300	175	27	0	0	0	69
1986/87	301	58	0	100	0	217	57	27	0	0	0	0
1987/88	1,149	60	0	100	0	643	338	44	0	0	0	124
1988/89	908	54	0	100	0	519	63	29	0	0	0	297
1989/90	907	58	0	100	0	613	258	33	0	0	0	3
1990/91	501	44	0	100	0	257	157	58	0	0	0	29
1991/92	700	53	0	100	0	475	127	66	0	0	0	32
1992/93	575	50	0	100	0	431	116	28	0	0	0	0
1993/94	656	58	0	100	0	510	104	42	0	0	0	0
1994/95	1,038	64	0	100	0	635	308	49	0	0	0	46
1995/96	1,126	58	0	100	0	692	163	26	0	0	0	245
1996/97	1,052	56	0	100	0	846	189	17	0	0	0	0

Table 4 Continued

Species	Total take	% male	Method of take (%) Shot	Trapped or snared	Unk	Harvest chronology Dec	Jan	Feb	Mar	Apr	May	Unk
<u>Otter</u>												
1984/85	192	50	8	85	7	55	93	44	0	0	0	0
1985/86	141	59	2	97	1	43	82	16	0	0	0	0
1986/87	62	70	3	82	15	35	23	4	0	0	0	0
1987/88	176	56	8	90	2	36	103	34	1	0	0	2
1988/89	92	61	2	98	0	60	21	11	0	0	0	0
1989/90	154	56	10	90	0	60	66	28	0	0	0	0
1990/91	40	53	20	78	2	6	19	12	0	0	0	3
1991/92	43	51	16	81	3	16	19	7	0	0	0	1
1992/93	66	56	23	74	0	18	26	21	1	0	0	0
1993/94	108	59	6	94	0	31	52	25	0	0	0	0
1994/95	232	62	4	96	0	106	90	36	0	0	0	0
1995/96	198	63	5	95	0	61	72	21	0	0	0	44
1996/97	94	47	1	99	0	53	38	3	0	0	0	0

[a]One beaver was hit and killed by a car.
[b]One beaver was shot.

Table 5 Transportation methods used by trappers, Units 1A and 2, 1984–1997

Species	Unit 1A Transportation used (%)					Unit 2 Transportation used (%)				
	Boat	Road	Air	Unk	Other[a]	Boat	Road	Air	Unk	Other[a]
Beaver										
1984/85	--	--	--	100	--	--	--	--	100	--
1985/86	95	5	0	0	0	37	63	0	0	0
1986/87	45	55	0	0	0	33	67	0	0	0
1987/88	27	48	0	25	0	14	82	0	4	0
1988/89	33	67	0	0	0	5	90	1	4	0
1989/90	60	40	0	0	0	12	88	0	0	0
1990/91	29	29	0	0	42	9	85	0	3	3
1991/92	39	39	0	2	20	25	75	0	0	0
1992/93	43	57	0	0	0	45	38	0	0	17
1993/94	46	54	0	0	0	13	87	0	0	0
1994/95	11	42	0	47	0	11	87	0	0	2
1995/96	7	93	0	0	0	9	89	0	0	2
1996/97	33	46	0	0	21	19	76	0	0	5
Marten										
1984/85	--	--	--	100	--	--	--	--	100	--
1985/86	--	--	--	100	--	--	--	--	100	00
1986/87	94	6	0	0	0	63	37	0	0	0
1987/88	84	16	0	0	0	51	49	0	0	0
1988/89	84	16	0	0	0	44	56	0	0	0
1989/90	89	11	0	0	0	34	54	0	12	0
1990/91	71	15	1	0	13	21	63	0	5	11
1991/92	91	9	0	0	0	54	44	2	0	0
1992/93	97	3	0	0	0	45	52	0	0	3
1993/94	95	5	0	0	0	24	76	0	0	0
1994/95	85	15	0	0	0	38	48	0	0	14
1995/96	98	2	0	0	0	59	34	0	1	6
1996/97	78	13	0	0	9	26	69	0	0	5

Table 5 Continued

	Unit 1A Transportation used (%)					Unit 2 Transportation used (%)				
Species	Boat	Road	Air	Unk	Other[a]	Boat	Road	Air	Unk	Other[a]
Otter										
1984/85	--	--	--	100	0	--	--	--	100	--
1985/86	63	0	0	37	0	62	10	0	28	0
1986/87	91	5	4	0	0	74	26	0	0	0
1987/88	81	5	4	10	0	76	22	0	2	0
1988/89	71	11	0	18	0	91	9	0	0	0
1989/90	90	10	0	0	0	85	15	0	0	0
1990/91	98	2	0	0	0	68	22	0	0	10
1991/92	89	11	0	0	0	70	23	2	3	2
1992/93	80	18	0	2	0	70	23	0	0	7
1993/94	97	3	0	0	0	50	50	0	0	0
1994/95	96	3	0	0	1	74	25	0	0	1
1995/96	77	11	0	0	12	76	20	0	0	4
1996/97	90	9	1	0	0	52	37	0	0	11
Wolverine[b]										
1984/85	100	0	0	0	0	--	--	--	--	--
1985/86	0	0	0	0	0	--	--	--	--	--
1986/87	100	0	0	0	0	--	--	--	--	--
1987/88	100	0	0	0	0	--	--	--	--	--
1988/89	0	0	0	0	0	--	--	--	--	--
1989/90	100	0	0	0	0	--	--	--	--	--
1990/91	29	0	0	0	71[c]	--	--	--	--	--
1991/92	100	0	0	0	0	--	--	--	--	--
1992/93	100	0	0	0	0	--	--	--	--	--
1993/94	100	0	0	0	0	--	--	--	--	--
1994/95	100	0	0	0	0	--	--	--	--	--
1995/96	0	0	0	0	0	--	--	--	--	--
1996/97	100	0	0	0	0	--	--	--	--	--

[a] Includes trappers who hike or use snowmachines.
[b] Wolverines do not occur in Unit 2.
[c] Trappers using snowmachines took five of 7 wolverines.

Table 6 Average furbearer takes per trapper, Units 1A and 2, 1986–1997

	Number of trappers		Average catch/trapper	
Species	1A	2	1A	2
Beaver				
1986/87	11	21	5	20
1987/88	11	29	4	12
1988/89	5	16	5	6
1989/90	5	22	2	18
1990/91	5	17	1	10
1991/92	9	17	2	15
1992/93	9	10	5	6
1993/94	7	20	4	10
1994/95	3	19	6	8
1995/96	8	18	6	16
1996/97	6	22	4	13
Marten				
1986/87	14	29	9	10
1987/88	15	63	21	18
1988/89	21	49	23	18
1989/90	16	53	15	17
1990/91	17	30	15	17
1991/92	22	33	30	21
1992/93	12	30	10	19
1993/94	7	37	6	18
1994/95	10	36	14	29
1995/96	10	35	13	32
1996/97	11	35	20	30
Otter				
1986/87	13	19	5	3
1987/88	14	27	6	6
1988/89	12	17	4	5
1989/90	12	29	7	5
1990/91	14	14	6	3
1991/92	14	19	6	2
1992/93	12	20	5	3
1993/94	15	25	7	4
1994/95	19	26	7	9
1995/96	14	23	5	9
1996/97	13	18	8	5
Wolverine				
1986/87	1	--	2	--
1987/88	1	--	1	--
1988/89	0	--	0	--
1989/90	1	--	1	--
1990/91	3	--	2	--
1991/92	1	--	1	--
1992/93	2	--	2	--
1993/94	1	--	1	--
1994/95	4	--	1	
1995/96	0	--	0	--

LOCATION

GAME MANAGEMENT UNITS: Unit 1B (3,000 mi^2)
Unit 3 (3,000 sq. mi^2)

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point and islands of Petersburg, Wrangell, and Kake areas

BACKGROUND

Furs, particularly those of the sea otter, attracted Russians to colonize Southeastern Alaska in the late 1700s and early 1800s. Ships from many nations came to the area to trade with natives for fur. In the early part of the twentieth century, fur farming was one of the biggest industries in Southeast. At one time there were 200 fur farms in operation, according to U.S. Forest Service archaeologist Larry Roberts. From the 1930s to the 1950s, between 5 and 9 fur farms operated on Kupreanof Island. Petersburg was the center for the blue fox industry, supporting 60 fur farms located on a nearby island in the mid 1930s (Roppel 1983). The University of Alaska experimental fur farm on Mitkof Island was in operation from 1936–1972. They raised mink, fox, and at one time martens. Several small islands had free roaming fox, a system unique to Alaska. Blue and silver fox and mink were the primary species raised, but attempts were made to raise raccoon, skunk, beaver, muskrat, and red fox (Burris, McKnight 1973).

Declines in some wild furbearer populations promoted regulations. In 1913 taking beaver was prohibited for 5 years with a renewal of the prohibition extending the closure another 5 years. Martens were protected for 5 years starting in 1915.

Today most furbearer trapping is used as a winter income supplement and as a form of recreation. Seasons and bag limits have remained stable in recent years.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1 Regulate seasons and bag limits to maintain viable and harvestable populations of furbearers.

2 Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

3 Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

4 Maintain sufficient habitat to provide viable furbearer populations and provide adequate refugia for dispersal of young animals.

5 Provide optimal harvest during peak primeness on the sustained yield principal.

METHODS

Harvest information is collected for beaver, lynx, marten, otter, and wolverine from mandatory sealing. Location, harvest date, trapping and transportation method, and sex of all species except beaver are recorded on sealing certificates. We measure pelt size on beavers and otters, which provides an indication of harvested animals' ages. Additional harvest information on these and other furbearer species are reported on fur export reports and fur acquisition reports.

Methods for estimating furbearer population abundance, trends, and distribution include Alaska trapper questionnaires which 50 local trappers received during the report period; interviews with trappers and fur buyers; and field observations by ADF&G and Forest Service personnel.

The video "Alaska Guide to Fur Handling" was distributed to local trappers in an effort to maximize the dollar value of their furs through proper skinning and pelt preparation techniques.

Monitoring logging operations, road construction, and other developments assesses potential habitat loss.

RESULTS AND DISCUSSION

POPULATION STATUS AND TRENDS

No surveys are conducted to determine furbearer population status or trends. Information from the *Trapper Questionnaire* and biologists' field observations provides our best indication of status and trends (Table 1).

Beavers appear abundant throughout Units 1B and 3 in available habitat. The populations have remained stable.

Lynx occur infrequently, perhaps as Gray (1915) and others believed, at times when snowshoe hares become scarce in the interior of British Columbia. No harvest was reported.

Trappers reported martens abundant and populations increasing in 1995. In 1996 they reported martens common with numbers down.

Mink and river otter populations are abundant. The mink population has remained stable while fewer river otter were reported in 1995.

Wolverines remain at a low but stable density.

Trappers reported on the trappers' questionnaire that rodent populations were abundant. The U. S. Forest Service has conducted small mammal surveys on Mitkof Island since 1993 (Table 2). They have established transects in clearcuts, old-growth habitats, and mixed conifer. All 3 habitats have shown similar densities of *Peromyscus* with a low in 1993, a high in 1994, and a declining population in 1996 and 1997.

MORTALITY

Season and Bag Limit	Resident and nonresident hunters	
Trapping		
Beaver Unit 1B and 3 (except Mitkof Is.)	Dec. 1–May 15	No Limit
Unit 3, Mitkof Is.	Dec. 1–Apr. 15	No Limit
Lynx, Marten, Mink, Otter Unit 1B and 3	Dec. 1–Feb. 15	No Limit
Wolverine Unit 1B and 3	Nov. 10–Apr. 30	No Limit
Hunting		
Wolverine	Nov. 10–Apr. 30	One Wolverine

Trapper Harvest. In recent years there has been almost no beaver trapping effort in Unit 1B until the 1996 season, when 40 beaver were harvested (Tables 3 & 4). One trapper accounted for 32 of the total, which he harvested in the Thomas Bay area. The number of beaver trappers in Unit 3 was low, with 5 or 6 successful trappers. They harvested 25, 26, and 44 beavers in the 1994, 1995, and 1996 seasons, respectively. In Unit 1B the marten harvest increased substantially to 235 in 1996, compared to 80 in 1994, and 74 in 1995 (Tables 5 & 6). The Unit 3 marten harvest was also high in 1996, with 262 being taken compared to 79 in 1994, and 190 in 1995. Twenty otters were harvested in 1994, 4 in 1995, and 24 in 1996 in Unit 1B (Tables 7 & 8). Unit 3 had an otter harvest of 46, 33, and 67 during the 1994, 1995, and 1996 seasons, respectively. The number of wolverine harvested in Unit 1B was 8 in 1994, but only 1 in 1995 (Tables 9 & 10). Ten wolverines were harvested in 1996, 5 caught by 1 trapper on the Stikine River. The Unit 3 wolverine harvest remained low.

Harvest level is directly related to fur prices. Mink and beaver pelt values have been low in recent years. According to fur buyer Dean Wilson, Southeast marten vary widely in quality and color and bring lower prices than interior martens. because of their larger size, good color, and silky fur, the fur market favors southeastern river otters. The Oriental market has been particularly interested in river otters in recent years and prices have increased.

Harvest Chronology. Most of the furbearer harvest takes place in December and January, except for beaver which are primarily harvested in February and March (Tables 11–18).

Transport Methods. Most trapping areas are accessed by boat (Tables 19–22). Highway vehicles generally reach beaver and marten trapping sites in Unit 3. A notable exception was the 1996/97 marten season, where trappers using snowmachines in Unit 1B took 112 martens.

CONCLUSIONS AND RECOMMENDATIONS

Furbearers appear to be abundant and populations stable in healthy habitat. Trapping effort is moderate, reflecting the current low to moderate fur prices. Harvest is well below sustained yield potentials. Large areas of non-coastal habitat on the mainland and islands remain untrapped and provide refuge for furbearers.

I recommend no regulation changes at this time. All land development plans should be reviewed and commented on regarding effects to furbearer populations and trappers. ADF&G can maximize the value of the resource by working with local trappers through the Hunter and Trapper Education Programs.

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Table 1 Results from Trappers Questionnaire, Units 1B and 3[1]

	1995/96 Petersburg, Wrangell, Kupreanof & Vicinity		1996/97 Petersburg, Wrangell, Kupreanof & Vicinity	
Furbearers	Relative abundance	Trend	Relative abundance	Trend
Beaver	abundant	same	abundant	same
Ermine	abundant	same	common	same
Marten	abundant	more	common	fewer
Mink	abundant	same	abundant	same
Muskrat	scarce	fewer	scarce	same
Red Squirrel	abundant	same	abundant	same
River Otter	abundant	fewer	abundant	same
Wolf	abundant	more	abundant	same
Wolverine	scarce	same	scarce	same
Prey				
Grouse	common	same	common	same
Ptarmigan	scarce	same	common	same
Mice/Rodents	abundant	same	abundant	same

[1]Data not available for 1994/95.

Table 2 Peromyscus/100 Trap Nights, Unit 3, 1993–1997[a]

Year	Twin Creek clearcut	Twin Creek old growth	Twin Creek mixed conifer
1993	4	8.0	4.0
1994	20.7	20.0	21.0
1996	18	18.7	16.7
1997	15.3	15.3	4.8

[a] Conducted by US Forest Service on Mitkof Island.

Table 3 Unit 1B beaver harvest, 1991–1996

		Method of Take		
Regulatory year	Reported harvest	Trap/snare	Unknown	Successful trappers
1991/92	0	0	0	0
1992/93	0	0	0	0
1993/94	3	3	0	3
1994/95	1	1	0	1
1995/96	1	0	1	1
1996/97	40	40	0	2

Table 4 Unit 3 beaver harvest, 1991–1996

		Method of Take			
Regulatory year	Reported harvest	Trap/snare	Shot	Unknown	Successful trappers
1991/92	80	80	0	0	18
1992/93	34	33	1	0	8
1993/94	55	55	0	0	18
1994/95	25	24	1	0	5
1995/96	26	26	0	0	5
1996/97	44	44	0	0	6

Table 5 Unit 1B marten harvest, 1991–1996

Regulatory year	Reported harvest						Successful trappers
	M	(%)	F	(%)	Unk.	Total	
1991/92	266	(73)	97	(27)	0	363	10
1992/93	31	(63)	18	(37)	0	49	2
1993/94	92	(61)	57	(38)	3	152	6
1994/95	59	(73)	21	(27)	0	80	5
1995/96	56	(76)	17	(23)	1	74	6
1996/97	137	(58)	65	(27)	33	235	7

Table 6 Unit 3 marten harvest, 1991–1996

Regulatory year	Reported harvest						Successful trappers
	M	(%)	F	(%)	Unk.	Total	
1991/92	129	(60)	87	(40)	0	216	20
1992/93	41	(57)	31	(43)	0	72	8
1993/94	118	(67)	58	(33)	1	177	12
1994/95	53	(67)	17	(21)	9	79	7
1995/96	66	(34)	39	(20)	85	190	16
1996/97	98	(37)	55	(20)	109	262	23

Table 7 Unit 1B otter harvest, 1991–1996

Regulatory year	Reported harvest						Method of take					
	M	%	F	%	Unk.	Total	Trap/snare	%	Shot	%	Unk.	Successful trappers
1991/92	0	(0)	0	(0)	0	20	0	(0)	0	(0)	0	0
1992/93	15	(88)	2	(12)	0	17	17	(0)	0	(0)	0	0
1993/94	14	(67)	7	(33)	0	21	19	(90)	2	(10)	0	6
1994/95	14	(54)	12	(46)	0	26	20	(77)	6	(23)	0	8
1995/96	2	(50)	2	(50)	0	4	4	(100)	0	(0)	0	2
1996/97	8	(33)	16	(67)	0	24	22	(91)	4	(9)	0	4

Table 8 Unit 3 otter harvest, 1991–1996

Regulatory year	Reported harvest						Method of take					
	M	%	F	%	Unk.	Total	Trap/snare	%	Shot	%	Unk.	Successful trappers
1991/92	20	(29)	37	(54)	12	69	69	(100)	0	(0)	0	12
1992/93	7	(54)	6	(46)	0	13	11	(85)	2	(15)	0	5
1993/94	53	(65)	29	(35)	0	82	82	(100)	0	(0)	0	17
1994/95	24	(63)	13	(27)	4	46	43	(94)	3	(6)	0	8
1995/96	17	(52)	16	(48)	0	33	31	(93)	2	(7)	0	9
1996/97	32	(47)	22	(32)	13	67	62	(92)	5	(8)	0	14

Table 9 Unit 1B wolverine harvest, 1991–1996

Regulatory year	Reported harvest						Method of take				Successful trappers
	M	%	F	%	Unk.	Total	Trap/Snare	%	Shot	%	
1991/92	4	(67)	2	(33)	0	6	6	(100)	0	0	3
1992/93	4	(57)	3	(43)	0	7	7	(100)	0	0	1
1993/94	6	(86)	1	(14)	0	7	7	(100)	0	0	4
1994/95	8	(100)	0	(0)	0	8	8	(100)	0	0	5
1995/96	1	(100)	0	(0)	0	1	1	(100)	0	0	1
1996/97	6	(60)	4	(40)	0	10	10	(100)	0	0	5

Table 10 Unit 3 wolverine harvest, 1991–1996

Regulatory year	Reported harvest						Method of take				Successful trappers
	M	%	F	%	Unk.	Total	Trap/Snare	%	Shot	%	
1991/92	2	(100)	0	(0)	0	2	2	(100)	0	(0)	2
1992/93	1	(100)	0	(0)	0	1	1	(100)	0	(0)	1
1993/94	0	(0)	0	(0)	0	0	0	(0)	0	(0)	0
1994/95	1	(100)	0	(0)	0	1	1	(100)	0	(0)	1
1995/96	1	(100)	0	(0)	0	1	1	(100)	0	(0)	1
1996/97	1	(50)	1	(50)	0	2	2	(100)	0	(0)	2

Table 11 Unit 1B beaver harvest chronology by month, 1991–1996

Regulatory year	Harvest periods							
	October[a]	November	December	January	February	March	April	May	*n*
1991/92	0	0	0	0	0	0	0	0	0
1992/93	0	0	0	0	0	0	0	0	0
1993/94	0	0	3	0	0	0	0	0	3
1994/95	0	0	0	0	0	1	0	0	1
1995/96	1	0	0	0	0	0	0	0	1
1996/97	0	0	8	0	8	24	0	0	40

[a] USFS took 1 beaver that was damming a fish ladder.

Table 12 Unit 3 beaver harvest chronology by month, 1991–1996

Regulatory	Harvest periods							
	November	December	January	February	March	April	May	*n*
1991/92	4	16	20	22	13	5	0	80
1992/93	7	19	2	0	0	6	0	34
1993/94	0	31	18	2	2	2	0	55
1994/95	12	0	1	1	9	0	1	25
1995/96	0	0	8	12	6	0	0	26
1996/97	0	12	5	18	9	0	0	44

Table 13 Unit 1B marten harvest chronology by month, 1991–1996

Regulatory year	Harvest periods			
	December	January	February	*n*
1991/92	117	185	61	363
1992/93	20	29	0	49
1993/94	98	54	0	152
1994/95	64	16	0	80
1995/96	50	21	3	74
1996/97	128	101	6	235

Table 14 Unit 3 marten harvest chronology by month, 1991–1996

Regulatory year	Harvest periods				
	December	January	February	Unknown	*n*
1991/92	139	56	21	0	216
1992/93	44	27	0	1	72
1993/94	68	73	36	152	177
1994/95	45	28	6	0	79
1995/96	132	95	33	2	262

Table 15 Unit 1B otter harvest chronology by month, 1991–1996

Regulatory year	Harvest periods				*n*
	December	January	February	Unk.	
1991/92	0	0	0	0	0
1992/93	4	5	8	0	17
1993/94	6	14	1	0	21
1994/95	9	9	4	4	26
1995/96	0	2	2	0	4
1996/97	12	2	10	0	24

Table 16 Unit 3 otter harvest chronology by month, 1991–1996

Regulatory year	Harvest periods					*n*
	July	Oct.	December	January	February	
1991/92	0	0	37	16	16	69
1992/93	0	0	10	2	1	13
1993/94	0	0	28	45	9	82
1994/95	3	1	19	13	10	46
1995/96	0	0	20	7	6	33
1996/97	0	0	18	31	18	67

Table 17 Unit 1B wolverine harvest chronology by month, 1991–1996

Regulatory year	Harvest periods						
	November	December	January	February	March	April	*n*
1991/92	0	0	3	3	0	0	6
1992/93	0	3	4	0	0	0	7
1993/94	1	3	3	0	0	0	7
1994/95	0	4	3	1	0	0	8
1995/96	0	0	0	1	0	0	1
1996/97	0	3	5	0	1	1	10

Table 18 Unit 3 wolverine harvest chronology by month, 1991–1996

Regulatory year	Harvest periods						
	November	December	January	February	March	April	*n*
1991/92	0	0	2	0	0	0	2
1992/93	0	1	0	0	0	0	1
1993/94	0	0	0	0	0	0	0
1994/95	0	0	0	0	0	1	1
1995/96	0	0	0	0	1	0	1
1996/97	0	0	1	1	0	0	2

Table 19 Unit 1B beaver method of transportation, 1991–1996

Regulatory year	Boat	3-wheeler	Highway	Skis/snowshoes	Unknown	Total
1991/92	0	0	0	0	0	0
1992/93	0	0	0	0	0	0
1993/94	0	3	0	0	0	3
1994/95	1	0	0	0	0	1
1995/96	0	0	0	0	1	1
1996/97	40	0	0	0	0	40

Table 20 Unit 3 beaver method of transportation, 1991–1996

Regulatory year	Airplane	Boat	3-wheeler	Highway	Skis/snowshoes	Snowmachine	Unknown	Total
1991/92	0	15	0	63	0	0	2	80
1992/93	0	5	0	29	0	0	0	34
1993/94	0	28	0	25	2	0	0	55
1994/95	8	10	0	7	0	0	0	25
1995/96	0	2	2	22	0	0	0	26
1996/97	0	12	0	26	5	1	0	44

Table 21 Unit 1B marten harvest method of transportation, 1991–1996

Regulatory year	Boat	3-wheeler	Snowmachine	Highway	Skis/snowshoes	Total
1991/92	202	0	140	0	21	363
1992/93	7	0	42	9	0	49
1993/94	75	68	0	0	30	152
1994/95	67	0	13	0	0	80
1995/96	74	0	0	0	0	74
1996/97	69	17	112	37	0	235

Table 22 Unit 3 marten harvest method of transportation, 1991–1996

Regulatory year	Boat	3-wheeler	Snowmachine	Highway	Skis/snowshoes	Unknown	Total
1991/92	104	0	0	57	21	34	216
1992/93	39	0	12	21	0	0	72
1993/94	131	3	0	43	0	0	177
1994/95	57	22	0	0	0	0	79
1995/96	76	76	0	38	0	0	190
1996/97	170	8	29	55	0	0	262

LOCATION

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

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

BACKGROUND

Marten, mink, otter, and beaver make up the majority of the furbearer harvest in Unit 1C. Smaller numbers of wolverine and weasels are taken each year.

Beaver exist at moderate levels in most drainages along the coastal mainland where habitat is suitable. There is limited natural or human-caused disturbance affecting beaver habitat in Unit 1C. Berners Bay, Taku River, Herbert-Eagle River system, St. James Bay, and Shelter Island contribute to the total harvest. Few beaver have been sighted on Douglas Island.

River otter are fairly common along the mainland coast and most large islands in Unit 1C. While little is known about otter populations, they are thought to be most abundant in sheltered waters provided by the many bays and inlets.

Marten harvests rebounded during the report period. Whether this was a reflection of changes in population level or trapping effort is not clear. Marten research elsewhere in northern Southeast Alaska during this period indicated fluctuations in marten numbers coincident with small mammal population levels. Judging from the number of trappers sealing furs, effort was higher than during the previous report period.

Little information exists for wolverine and mink in Unit 1C. Mink are not sealed and most harvest information is anecdotal. Wolverines occur in small numbers, and sealing information provides little insight into population status or distribution. While the wolverine is one of the more uncommon species in the subunit, the high pelt price encourages trappers to target them.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1. Regulate seasons and bag limits to maintain viewable and harvestable populations of furbearers.

2. Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

3. Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

METHODS

Mandatory sealing of marten, beaver, otter, wolverine, and lynx was the chief source of furbearer harvest data. For each species method and month of take, transportation means, and trap location were recorded. Sex and pelt size was determined for each beaver. The sex ratio of harvested marten was also noted. Trapper interviews provided additional insight into perceived population status and trapping pressure.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Furbearer populations in Unit 1C appear to be stable, based on trapper interviews and harvest data. Lynx remain uncommon, while otter, mink, and marten are common or moderately abundant. Lynx harvest declined to normal low levels compared to the previous period, when a decline of showshoe hares in Canada stimulated an influx of lynx into northern Southeast Alaska.

MORTALITY

Harvest

Hunting Seasons and Bag Limits:	Resident and nonresident hunters	
Marten, otter, mink, beaver	No Open Season	
Lynx	Dec. 1–Feb. 15	2
Wolverine	Nov. 10–Feb. 15	1

Trapping Seasons and Bag Limits:	Resident and nonresident trappers	
Marten, otter, mink, lynx	Dec. 1–Feb. 15	No Limit
Beaver	Dec. 1–May 15	No Limit
Wolverine	Nov. 10–April 30	No Limit

Trapper Harvest. The number of beaver harvested during the period ranged from 10 in 1994 to 26 in 1995. These harvest levels compare to an average harvest of 18 beaver for the five year period preceding 1994. These levels are well below harvests recorded in the mid-1980s. It is unknown whether beaver populations are smaller now than formerly, but differences in trapping effort are likely responsible for much of this change. Beavers are responsible for problems affecting residential areas built near wetlands, which indicates that the animals are not becoming less common. There is also some indication that a failure to present fur for sealing may be affecting our data.

The river otter harvest ranged from 16 to 26 during the period, well below harvests seen in the 1980's. There were no indications that otter were less abundant, so trapper effort may have been involved here also.

An average of 5.3 wolverines were taken each year during the 3-year period, identical to the previous report period yet somewhat lower than longer-term averages (e.g., 7.8/yr. from 1986–1990). Wolverines continue to be widely distributed and not uncommon.

Only a single lynx was reported harvested in Unit 1C during this period. This is normal unless unusual circumstances force lynx into the unit from interior habitats to the north and east.

The marten harvest increased throughout the period, from 190 in 1994 to 293 in 1996. This harvest level was characteristic of the unit through the late 1980's and early 1990's, and the low numbers in the previous report period should be considered indicative of a temporary slump in the local population level, trapping effort, or compliance with sealing requirements. The marten harvest ranged from 57% to 68% males during the period and there is no indication that the population is being over-harvested. Although a probable decline in small mammal numbers regionwide during the previous report period probably affected marten populations, the trapping effort during the period did not seem to surpass the population's capabilities.

Harvest Chronology. The chronology of the marten harvest for the report period is shown in Table 2. December continues to be the best time to trap this species. In both 1994 and 1995 56% of the season's marten were taken in December, increasing to 70% in 1996. The harvest during that month was dominated by males in all 3 years although that tendency was weaker in 1995

Transport Methods. Boat travel continues to be the predominant form of transportation for trappers in Unit 1C. Highway vehicles are also used along the road system around Juneau to reach trapping areas that can be accessed on foot or snowmachine.

CONCLUSIONS AND RECOMMENDATIONS

Marten harvests rebounded from the low levels seen during the previous report period due to some combination of increasing population density and/or increased trapper effort. Beaver trapping has rebounded somewhat from the levels seen in the early 1990's, and trapping levels may be higher than reported harvest indicates. The number of lynx in the harvest decreased to normal low levels. The number of otter sealed remained consistent with the previous period, and there is no indication that populations are declining. The wolverine harvest remained similar to that seen in previous years.

As far as can be seen using harvest trend and anecdotal input from trappers, furbearer populations seem stable in the unit. Staff will work with trappers and enforcement personnel to improve reporting.

Based on the status of habitat in the subunit and the relatively low number of trappers, I feel that population bases necessary to support harvest of these species continues to exist and that management objectives are being met.

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Table 1 Furbearer harvest in Unit 1C, 1986–1996

Year	Beaver	Lynx	Marten	Otter	Wolverine
1986	107	0	241	31	9
1987	47	0	314	55	8
1988	5	0	209	19	10
1989	35	0	256	31	7
1990	15	0	240	36	5
1991	11	0	193	12	8
1992	21	1	73	12	2
1993	25	5	44	13	6
1994	10	1	190	26	9
1995	26	0	262	16	4
1996	17	0	293	19	3

Table 2 Chronology of marten harvest by sex, Unit 1C, 1994–1996

	1994				1995				1996			
Month	Males	%	Females	%	Males	%	Females	%	Males	%	Females	%
November	0	0	0	0	1	100	0	100	0	0	0	0.0
December	76	72	30	28	78	53	69	47	129	63	76	37
January	41	66	21	34	69	62	42	38	55	71	22	29
February	13	59	8	36	1	50	1	50	5	45	5	45
Unknown	0	0	0	0	0	0	0	0	0	0	0	0.0
Total	130	68	59	31	149	57	112	43	189	65	103	35

LOCATION

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

Geographic Description: The Southeast Alaska mainland north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay

BACKGROUND

Trapping effort in Unit 1D may be limited by the relative scarcity of most furbearers. With limited marine shoreline compared to other Southeast Alaska units, little river otter habitat is available and otter harvests have been correspondingly small. Lynx harvests are generally low and probably depend upon population levels in Canada. Mountainous terrain in the subunit provides extensive wolverine habitat, and harvests have been good in recent years. Beaver remain uncommon in the subunit, and the season has been closed since 1976.

MANAGEMENT DIRECTION

Management Objectives

1 Regulate seasons and bag limits to maintain viewable and harvestable populations of furbearers.

2 Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

3 Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

METHODS

Mandatory sealing of marten, otters, wolverine, and lynx has provided the best source of data on furbearer harvests. For each species method and month of take and transportation means were recorded. Sex composition of the marten harvest was noted. Sex and pelt sizes were determined for otters and lynx. Trapper interviews provided additional insight into perceived population status and trapping pressure.

RESULTS AND DISCUSSION

Population Status and Trend

Marten harvests rebounded dramatically during the report period, reaching levels typical of the late 1980's. It is unclear whether this trend is due to a change in marten density, because increased effort and compliance with sealing regulations may be involved. The increase in harvest is coincident with increased harvests in other parts of the region, and research on Chichagof Island has shown that marten productivity is strongly dependent on small mammal populations. In both 1995 and 1996 the percent of males in the harvest was 74, figures that indicates no sign of over-harvesting.

Wolverine harvest increased through the period, but remained at levels typical of earlier years. Because of the extensive suitable habitat, the wolverine population is probably stable.

Lynx harvests declined levels seen during the previous report period to the low densities typical of the unit. These animals were relatively common and easy to catch in the early 1990's as the prey base in adjacent Canadian areas declined and lynx dispersed into coastal Alaska. As population levels in the Yukon Territory recover, fewer lynx should be found in Unit 1D.

River otter harvests remained similar to levels experienced during the previous five years. No known problem with the otter population exists.

Beavers are present in the subunit in low numbers and the trapping season has been closed for this species for many years. While it would be desirable from the standpoint of rehabilitating moose habitat to have more beaver in the subunit, Division of Wildlife Conservation staff have received complaints that the few present are responsible for road flooding.

MORTALITY

Harvest

Hunting Season and Bag Limits:	Resident and nonresident hunters	
Marten, otter, mink	No Open Season	
Lynx	Nov. 1–Mar. 31	2
Wolverine	Nov. 10–Feb. 15	1

Trapping Season and Bag Limits:	Resident and nonresident trappers	
Marten, otter	Dec. 1–Feb. 15	No limit
Mink, lynx, wolverine	Nov. 10–April 30	No limit

Trapper Harvest. Table 1 lists trapper harvest for the report period. Reported lynx harvest remained at zero in 1994 and 1995, with 4 being sealed in 1996. Two river otter were taken in each of the years during the period.

In 1994 no marten were trapped, but in the following 2 years marten harvest climbed to 99 in 1995 and 108 in 1996.

Harvest Chronology. The chronology of the marten harvest for the 3 years during the reporting period is depicted in Table 2. December and January continue to be the dominant months for harvesting marten.

Transport Methods. Trapper access relies much less on boats than in other parts of the region. Access by vehicle along the highway and logging road system is common, and is also used to support other types of access, such as snowmobiles and showshoes.

HABITAT

Some marten habitat may be lost as old-growth forests, particularly riparian areas, are converted to clearcuts. Many of the areas currently scheduled for timber harvest, such as those along the upper Chilkat and Klehini rivers, fall into this category. Most operable timber lands within the Haines State Forest support marten. While impacts to wildlife populations are considered in timber harvest plans, mitigation measures or habitat enhancement opportunities for marten are limited.

CONCLUSIONS AND RECOMMENDATIONS

Marten harvests during the report period rebounded from extremely low levels. This is probably a reflection of increasing population levels and a resulting surge of trapper effort. With males continuing to dominate the harvest, there is no indication that any season or bag limit changes are needed. Monitoring of sex ratios in the marten harvest should be continued and trapper interviews and questionnaires should be used to gather qualitative information about marten abundance. Harvests of other species are low and management objectives are apparently being met.

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Table 1 Furbearer harvest in Unit 1D, 1986–1996

Year	Lynx	Marten	Otter	Wolverine
1986	1	45	9	9
1987	0	108	1	3
1988	0	179	7	6
1989	0	114	1	2
1990	0	104	1	3
1991	11	51	6	1
1992	27	2	2	8
1993	8	17	3	10
1994	0	0	2	4
1995	0	99	2	7
1996	4	108	2	9

Table 2 Chronology of marten harvest by sex, Unit 1D, 1994–1996

	1994				1995				1996			
Month	Males	%	Females	%	Males	%	Females	%	Males	%	Females	%
November	0	0	0	0	10	83	2	17	0	0	0	0
December	0	0	0	0	36	92	3	8	12	60	8	40
January	0	0	0	0	24	73	9	27	68	77	20	23
February	0	0	0	0	3	20	12	80	0		0	0
Unknown	0	0	0	0	0	0.0	0	0.0	0	0	0	0
Total	0	---	0	---	73	74	2	26	80	74	28	26

LOCATION

GAME MANAGEMENT UNIT: UNIT 4 (5,800 mi^2)

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

BACKGROUND

Furbearer trapping in Game Management Unit 4 (Unit 4) was of greater importance in the past than it is today. Local Natives historically used furbearers for cultural and subsistence purposes by local natives. More recently trapping provides significant income during the winter when other cash generating opportunities are scarce. Fur prices and the relative strength of the local economy, rather than furbearer abundance, has always been the major factor influencing trapping effort. Today most trapping has a strong recreational aspect although income remains important. Because most trapping requires boat transportation, weather often affects the intensity of effort. Winter storms frequently preclude trapline access and, in extreme years, limits trapper activity. The use of motorized land vehicles is increasing in areas where logging roads remain open to public use.

Furbearers which occur in Unit 4 include marten (*Martes americana*), land otters (*Lutra canadensis*), minks (*Mustela vison*), short-tailed weasels (*M. erminea*), red squirrels (*Tamiasciurus hudsonicus*), and beavers (*Castor canadensis*).

MANAGEMENT DIRECTION

MANAGEMENT GOALS

None established.

MANAGEMENT OBJECTIVES

1. Regulate seasons and bag limits to maintain viewable and harvestable populations of furbearers.

2. Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

3. Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

METHODS

Trappers were required to submit otter and marten hides to authorized personnel for sealing. At that time each pelt was examined and sex was determined. Otters were sexed by the presence or absence of the preputial orifice. Marten pelts were sexed by the larger size of males (Strickland and Douglas 1987). After sorting the presence of a preputial orifice and/or the direction of the growth of the underfur at the posterior end of the abdominal gland was used to verify sex (Lensink 1953 in ibid). Width and length measurements were recorded for otters and beavers.

Trappers provided data on the method of take (trap, snare, or firearm); primary transport means; month of catch; and location of take.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

In 1990 the U.S. Forest Service (USFS) and the Alaska Department of Fish and Game (ADF&G) began a cooperative study on marten ecology on northeast Chichagof Island (Flynn 1993). Densities of martens in the study areas have been monitored since 1992 using mark-recapture techniques (Flynn and Schumacher, 1996). Marten numbers declined during the winter of 1991/92 and remained low into 1993. Marten numbers peaked in winter-fall 1996 and declined substantially by winter 1997. At the same time, numbers of small mammals, especially long-tailed voles (Microtus longicudus) showed a similar trend. Research has documented that martens prey primarily upon long-tailed voles when available. Minks occur throughout Unit 4. Populations are thought to be stable. No census techniques were employed.

Land otters occur throughout the islands of Unit 4. No census data is available, but populations are thought to be stable.

Admiralty Island beaver populations are thought to be stable. Beavers occur in low numbers on Baranof Island. The season is currently closed on both Chichagof and Baranof islands.

Population Composition

In 1994/95, trappers caught 25% female martens; in 1995/96, 32% females; and 37% females in 1996/97 (Table 1). In the ADF&G research program, 41% females were caught in 1991/92 (Flynn and Blundell 1992). In 1992/93 the ratio was 40% female (Flynn 1993). Because of possible sex-based differences in the vulnerability of martens to trapping, these ratios may not accurately reflect the sex ratio in the wild (Buskirk and Lindstedt 1989).

According to Flynn and Schumacher (1994), juvenile martens significantly increased in the population in 1993/94 from the low levels recorded the previous years. This increase coincided with a two-fold increase of mice and voles on their study areas. They concluded that marten numbers were recovering on northern Chichagof Island, but that recruitment to the south appeared to be lagging a year behind.

Sex ratios of land otters taken by trappers were 44% females in 1994/95, 49% females in 1995/96, and 36% females in 1996/97 (Table 1).

MORTALITY

Harvest

Hunting

Coyote	Sep. 1–Apr. 30	2 coyotes

Wolf	Aug. 1–Apr. 30	5 wolves
Wolverine	Nov. 10–Feb. 15	1 wolverine
Trapping		
Beaver (that portion east of Chatham Strait)	Dec. 1–May 15	No limit
Beaver (that portion west of Chatham Strait)	No open season	
Coyote, red fox, lynx, otter	Dec. 1–Feb. 15	No limit
Marten and Mink, that portion of Chichagof Island east of Idaho Inlet and north of Trail River and Tenakee Inlet and north of a line from the headwaters of Trail River to the head of Tenakee Inlet	Dec. 1–Dec. 31	No limit
Marten and mink	Dec. 1–Feb. 15	No limit

Board of Game Actions and Emergency Orders. No Board actions were taken and no emergency orders were issued during the period.

Trapper Harvest. Of 241 marten pelts sealed in 1994/95, 171 were males, 60 were females, and 10 were of unknown sex. In 1995/96, 767 were examined; 520 were males, 245 were females, and 2 were of unknown sex. In 1996/97 there were 962 males, 576 females, and 21 of undetermined sex, for a total of 1,559. Table 1 summarizes the sexes of martens in the harvest for the 1992–1996 regulatory years.

Eighty-two land otters were sealed in 1994/95; 32 were males, 36 females, and 14 of unknown sex. In 1995/96 there were 87 males, 91 females, and 9 sex unknown for a total of 187. The 1996/97 harvest was only 100 otters, 64 males and 36 females. Harvest sex ratios since 1992 are presented in Table 1.

Trappers took 8 beavers in 1994/95 and none in the other years in the report period. Beaver trapping remains prohibited in the area west of Chatham Strait.

Hunter Residency and Success. During the 1994/95 season, 26 trappers reported catching martens, 21 of which were residents of the unit. In 1995/96 there were 50 marten trappers reporting, 39 who listed residency in Unit 4. For 1996/97 there were 55 trappers, of which 43 were unit residents (Table 2).

Of the 19 trappers sealing Unit 4 otters, 13 claimed unit residency in 1994/95. In 1995/96 26 otter trappers reported catching otters, 19 claiming Unit 4 residency. For 1996/97 there were 22 trappers with 17 unit residents (Table 2).

The one trapper who sealed beavers in 1994/95 was a resident of Juneau.

Harvest Chronology. The greatest marten harvest occurred in the first month of the trapping season. A total of 174 (72%) of the 1994/95 martens were taken in December. In 1995, 607 (79%) martens were caught in December. In 1996 the December harvest was 1,192 (76%) (Table 3).

In 1994/95, 54 (66%) of trapped otters were taken in December. For the 1995/96 and 1996/97 seasons, 143 (76%) and 27 (27%), respectively, were taken in December (Table 3).

All eight beavers taken in 1994/95 were taken in December.

Transport Methods. Trappers using boats for transportation take most martens. In 1994/95, 59% of all martens were taken by trappers who used boats; in 1995/96, 66%; and in 1996/97, 69%. Other transportation means that may be important in any given year include snowmachines, 3-wheelers, highway vehicles, and walking. Weather conditions influence the degree to which these other transportation types were used in any given year.

The take of otters is almost entirely with the aide of boats. For the 1994/95, 1995/96, and 1996/97 seasons, respectively, boats were reportedly used for 79%, 94%, and 89% of the harvest.

All beavers taken in 1994/95 were taken using boats for transportation.

HABITAT

Assessment

The carrying capability for some furbearers is decreasing in many areas in Unit 4 because of clear cutting of the old-growth habitats. Martens have been documented to spend most their time in old-growth forest areas (Flynn 1991). Clearcutting may also be impacting otters; Larsen (1983) reported otters made little use of shorelines associated with clear cuts.

CONCLUSIONS AND RECOMMENDATIONS

Seasons for most species have remained the same for many years. Federal subsistence regulations supersede State regulations on federal lands under the terms of the Alaska National Interest Lands Claim Act (ANILCA). On Chichagof Island Federal lands were closed to mink, marten, and weasel trapping in 1994, and in 1995 and 1996 were open for a December only season. Nonfederal lands remained open under State regulations during the 3-year period. The discrepancy between State and Federal regulations confused the public and created management problems.

The decline of marten populations during this report period may have been affected by trapping, but probably correlates directly to the densities of small mammals. The high 1991/92 harvest was in part due to nutritionally stressed martens moving more and being more vulnerable to trappers. As pointed out by Strickland and Douglas (1987), it is impractical to set harvest levels by determining an absolute population level. Young and Schenck (1991) recommended that martens in the unit be managed by reducing or closing seasons during periods of low densities to conserve breeding individuals. Since the magnitude of the peaks and lows in marten cycles are readily evident, managers can generally respond to these changes without specific programs to monitor populations. Once a "crash" occurs conservative trapping regulations can be put into effect. The need for trapping restrictions can be supported by monitoring the sex ratio and the presence of juveniles in the harvest (Strickland and Douglas 1987, Young and Schenck 1991). Because the population is now increasing, existing trapping regulations are appropriate. With further population increase more liberal season dates may be appropriate. As martens are often captured in mink sets, the seasons for the two species should coincide to reduce the incidental take of martens at the low end of their cycle.

Otter populations appear to be healthy and trapping pressure is light. I do not recommend any change in trapping regulations at this time.

The beaver harvest remained low during the report period. This is likely because of a small demand for beavers and the dearth of habitat in the unit. Timber harvest in Chichagof Island valley bottoms appears to favor beaver habitat, but the absence of beavers in such areas may be keeping it from being utilized. Continued closure of beaver trapping west of Chatham Strait is recommended to encourage natural expansion of beavers into areas of re-growth.

Given the cyclic nature of marten populations and economic factors that affect trapping effort, management objectives based on some past harvest levels are not realistic. Further, reasonable means of monitoring population densities over such a large area are not available to establish appropriate yearly harvest objectives. Therefore the evaluation of population status will continue to be subjective. Examining harvest statistics and anecdotal information from trappers and local residents can enhance this. With reduced fur prices and decreasing interest in trapping, the possibility for over trapping most species appears low. Specific harvest or population objectives cannot be used as management standards without programs in place that document population status.

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Table 1 Unit 4 furbearer harvest data, 1992–1996

Season	Male	Female	Unknown	Total
Marten				
1992/93	325	172	0	497
1993/94	240	157	10	407
1994/95	171	60	10	241
1995/96	520	245	2	767
1996/97	962	576	21	1,559
Otter				
1992/93	95	54	0	149
1993/94	36	27	0	63
1994/95	32	36	14	82
1995/96	87	91	9	187
1996/97	64	36	0	100

Table 2 Trapper residency and success, 1992–1996

Season	Local[a]	Nonlocal	Nonresident	Total
Marten				
1992/93	28	5	0	33
1993/94	17	7	0	24
1994/95	21	5	0	26
1995/96	39	11	0	50
1996/97	43	12	0	55
Otter				
1992/93	16	3	0	19
1993/94	12	3	0	15
1994/95	13	6	0	19
1995/96	19	7	0	26
1996/97	17	5	0	22

[a]Unit 4 residents.

Table 3 Unit 4 furbearer harvest chronology, 1992–1996

Season	November	December	January	February	Seasonwide	Total
Marten						
1992/93	0	444	34	9	10	497
1993/94	0	302	96	9	0	407
1994/95	0	174	39	9	19	241
1995/96	0	607	155	5	0	767
1996/97[a]	9	1,192	303	51	4	1,559
Otter						
1992/93	0	93	46	10	0	149
1993/94	0	45	16	2	0	63
1994/95	0	54	22	6	0	82
1995/96	0	143	38	6	0	187
1996/97	0	27	61	12	0	100

[a]November kills are illegal kills.

Table 4 Successful trapper transport methods for marten and otter takes, Unit 4, 1992–1996

Season	Airplane	Horse/ dog team	Boat	Highway vehicle	4-wheeler/ snowmachine	Walked	Off-road vehicle	Unknown
Marten								
1992	3	0	258	132	47	6	0	51
1993	2	0	315	27	56	7	0	0
1994	4	2	142	15	2	49	0	27
1995	3	0	503	67	82	98	14	0
1996	24	0	1,068	312	59	96	0	0
Otter								
1992	1	0	140	4	0	4	0	0
1993	0	0	54	4	0	5	0	0
1994	0	0	65	9	0	3	5	0
1995	0	0	175	0	0	11	0	1
1996	1	0	89	0	0	10	0	0

LOCATION

GAME MANAGEMENT UNIT: 5 5,800 (mi^2)

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

BACKGROUND

Furbearing species probably gained access to the Yakutat Forelands via the Alsek/Tatshenshini corridor (Klein 1965). Beaver, land otter, and mink are the common water-associated species; muskrats are noticeably absent. Lynx are present in small numbers, while marten are found in fair abundance. Wolverines occur in low numbers over extensive areas of suitable habitat. Trapping pressure has historically been light throughout the Malaspina and Yakutat Forelands.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

1 Regulate seasons and bag limits to maintain viewable and harvestable populations of furbearers.

2 Seal harvested beaver, marten, otter, lynx, and wolverine pelts as they are presented for sealing.

3 Contact reliable observers for general information about the status and trends of furbearer populations, including the use of an annual trapper survey.

METHODS

Fish and Wildlife Protection and Commercial Fisheries Division staff in Yakutat and Wildlife Conservation Division staff in Douglas sealed furbearer hides. Hunters and trappers were interviewed for observations they made while in the field.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Trapping pressure is generally light within this unit and trends in harvest reflect several factors in addition to furbearer population levels. One or two trappers changing their trapping intensity can have substantial impact on harvests, as in the marten harvest during this period. Indications are that most furbearer populations are stable in Unit 5. The lynx harvest declined from the spike in the last year of the previous report period, which was probably related to immigration of lynx from interior habitats following a decline of hares in Canada. Little is known of marten abundance in Unit 5. Logging road proliferation in recent years has provided trappers easy access to old-growth forest habitats. River otter are more common in Unit 5 than the harvest would indicate. The low trapping effort in the unit accounts for the scarcity of these animals in harvest records. As with other furbearers, no population estimate exists for wolverine. It is believed that they occur at low densities in areas remote from habitation or roads.

MORTALITY

Harvest

Hunting Season and Bag Limits	Resident and nonresident hunters	
Beaver, marten, otter, mink	No Open Season	
Coyote	Sep. 1–Apr. 30	2
Red Fox	Nov. 1–Feb 15	2
Lynx	Dec. 1–Feb.15	2
Wolverine	Nov. 10–Feb. 15	1

Hunting Season and Bag Limits	Resident and nonresident hunters	
Beaver	Nov. 10–May 15	No limit
Coyote	Dec. 1–Feb. 15	No limit
Red Fox	Dec. 1–Feb. 15	No limit
Lynx	Dec. 1–Feb. 15	No limit
Marten, mink, weasel	Dec. 1–Feb. 15	No limit
Otter	Nov. 10–Feb. 15	No limit
Wolverine	Nov. 10–April 30	No limit

Trapper Harvest. Table 1 shows the harvest of furbearers since 1986. The beaver harvest fluctuated during the period, and was lower than the 11-year span during the 3-year report period. The lynx take fell from the dramatic high seen in 1993, although lynx were harvested throughout the period and the 3-year mean was identical to the 11-year average. The number of marten harvested increased markedly during the report period, almost solely as the result of one trapper's efforts. The harvest for otter declined from that of the previous period, but still exceeded the long terms average. Wolverine harvest increased from the level seen within the past decade; this, too was due to the activities of 1 or 2 trappers

Harvest Chronology. Most furbearers were caught in early to mid-winter, possibly because travel conditions became worse in late winter as rains affected the snowpack. Based on the number of animals caught with highway vehicles used for transportation, the closure of the Yakutat road system (by snow accumulation) may also affect the harvest timing. Most otter, lynx, and wolverine were taken in December, although several animals were caught in November and January.

Table 2 shows the chronology of the 3-year marten harvest. December accounted for the bulk of the harvest, although in 1996 January was also an important month.

Transport Methods. Highway vehicles were the most commonly used transport mode during this period, with airplanes a close second. Four-wheelers and boats were used to take smaller numbers of furbearers.

CONCLUSIONS AND RECOMMENDATIONS

Harvests were within sustainable limits during the report period. Therefore furbearer harvests management objectives were met. It is not possible to determine if the harvests indicate stable or increasing populations. One of the drawbacks of using harvest figures as management objectives without any accompanying data on population density or habitat condition is the inability to distinguish the cause for changes in harvests. For marten in particular, it will be important to obtain data, even if only qualitative, on the abundance of animals and the condition of their habitat. At a minimum trapper interviews and questionnaires should be employed to track perceived abundance.

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Table 1 Furbearer harvest in Subunit 5, 1986–1996

Year	Beaver	Lynx	Marten	Otter	Wolverine
1986	8	0	38	2	2
1987	7	0	111	1	1
1988	3	10	17	0	0
1989	4	6	22	0	0
1990	3	0	83	1	3
1991	8	0	47	1	0
1992	1	0	20	6	2
1993	9	14	76	7	0
1994	0	5	289	4	8
1995	4	5	116	2	4
1996	1	2	103	0	12

Table 2 Chronology of marten harvest by sex in Unit 5, 1994–1996

	1994				1995				1996			
Month	Males	%	Females	%	Males	%	Females	%	Males	%	Females	%
November	20	44	25	56	6	60	4	40	0	0	0	0
December	47	56	37	44	57	54	48	46	28	60	19	40
January	12	50	12	50	0	0	0	0	33	59	23	41
February	28	70	12	30	0	0	0	0	0	0	0	0
Unknown	64	67	32	33	0	0	1	100	0	0	0	0
Total	171	59	118	36.2	63	54	53	46	61	59	42	41

LOCATION

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

GEOGRAPHIC DESCRIPTION: Prince William Sound and north Gulf Coast

BACKGROUND

Beavers, coyotes, red foxes, lynx, marten, mink, muskrats, land otters and wolverines are all present in Unit 6. Density of individual species is variable, depending upon a variety of ecological factors and levels of harvest. Historical information on population status and trend is mostly anecdotal. Harvests of beavers, lynx, land otters and wolverines were monitored by sealing.

Beavers are abundant in Units 6A, 6B and 6C, where the deltas of the Copper and Bering Rivers and other freshwater streams provide suitable habitat. Density is lower in Unit 6D, Prince William Sound (PWS), where less habitat is available. Heller (1910) reported beavers in the Rude River drainage of eastern PWS, but he apparently did not find them on islands in PWS. J. Reynolds (ADF&G files 1976) documented occurrence on Hawkins and Hinchinbrook Islands, Simpson Bay, Rude River and Gravina River.

We have sealed beaver hides to monitor harvest since 1927 (Courtright 1968). Most of the take was from the Copper and Bering River deltas where total harvest has fluctuated widely. In 1938, C. Rhode (ADF&G files) reported a harvest of 700 from the deltas. By 1951, it declined to a low of 27, and then increased again to more than 300 in 1960 and 1963 (Griese 1990).

Coyotes are relatively new arrivals in Unit 6. Heller (1910) did not note their presence in 1908, and F. Robards (ADF&G files) suggested they became established as a dominant canid in 1938. However, recent observations by trappers and ADF&G personnel suggests they have declined in eastern Unit 6, while wolves have increased.

Red foxes are relatively scarce. They were common in the early 1900s but may have been displaced as coyote populations increased (Griese 1990). The last significant harvest of foxes was reported in 1972 in Unit 6C (Griese 1988*b*).

Lynx are also relatively scarce in Unit 6. Moreover, O. Koppen (ADF&G files) indicated in 1949 that numbers had always been low. Characteristics of the harvest suggest that Unit 6 may serve as a low-density refugia for lynx when populations decline in adjacent units (Griese 1988*b*). Harvest between 1969 and 1990 was generally less than 3 animals, it did not include juveniles, and harvest peaks coincided with population crashes in adjacent populations.

Density of marten is quite variable. In 1949, O. Koppen (ADF&G files) characterized populations as scattered. He felt the highest density occurred between Cape Suckling and Cape Yakataga. He also felt PWS and deltas of the Copper and Bering Rivers were frequently subjected to excessive trapping, resulting in low numbers. Populations in the 1980s increased, except in heavily trapped areas near Valdez and Cordova (Griese 1988*b*).

Mink are likely common in most of Unit 6. Observations made between 1931 and 1955 (ADF&G files) suggested a potential for high numbers that may not have been realized because of periodic overharvest. During the 1980s, trapping effort declined because of low pelt prices and numbers likely increased throughout the unit (L. Kritchen, pers. comm.). However, this increase may have been slowed or reversed in 1989 in western PWS because of mortality caused by the *Exxon Valdez* oil spill.

Muskrats are found in Unit 6 east of PWS. Heller (1910) did not report muskrats in PWS in 1908, and J. Reynolds (ADF&G files) confirmed their absence in 1976. On the Copper River Delta, muskrats were plentiful during the 1930s (G. Nelson, ADF&G files); however by 1935 icing and overflows had reduced numbers. O. Koppen (ADF&G files) also reported depressed numbers in 1948 due to predation. By 1955, the Copper River Delta population had recovered (F. Robards, ADF&G files) and that recovery appears to have persisted (Griese 1988*a*).

Land otters are likely common in most of Unit 6. Heller (1910) reported that land otters were the most common carnivore in PWS in 1908. However, trapping and hunting with dogs reduced them to low levels during the early 1930s (G. Nelson, ADF&G files). The population likely recovered during the 1940s (O. Koppen, ADF&G files) and became plentiful throughout the unit by 1951 (F. Robards, ADF&G files). The current exception may be western PWS, where the *Exxon Valdez* oil spill likely caused significant mortality.

Wolverines are present in most of the unit. In the late 1930s, they were plentiful and considered a nuisance (G. Nelson, ADF&G files). Bounties were placed on wolverines in 1954 that resulted in "undue" harvest pressure on the population, increasing the take 5-fold (F. Robards, ADF&G files). The bounty was removed in 1959. Harvest peaked between 1972 and 1978 because of both increased trapper access and effort or greater numbers of wolverines (Griese 1988b).

MANAGEMENT DIRECTION

Management Objectives

The management goal is to provide optimum harvests and maximum opportunities to participate in the hunting and trapping of furbearers (Rausch 1977). Management objectives have not been established.

METHODS

We sealed hides of beavers, land otters, lynx, and wolverines taken by trappers and hunters. We recorded location and date of harvest, method of take, and type of transportation for all species. Sex was recorded for otters and wolverines, and we measured length and width of beavers, lynx and otters. We also sent questionnaires to trappers to obtain information on relative abundance and trends in furbearer populations.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

I did not complete any furbearer surveys during this reporting period. However, I estimated relative abundance and trend using results of trapper questionnaires and incidental observations made by staff and the public. In 1994/95, questionnaires were sent to 50 trappers, and 11 responded. In 1995/96, we sent 55 questionnaires and received 17 responses. During 1996/97, we mailed out 64 questionnaires, receiving 10 responses. Numbers sent were relatively low because there were very few trappers in Unit 6.

Beavers were abundant during this reporting period in Units 6A, 6B, and 6C, particularly on the deltas of the Copper and Bering Rivers. On the Copper River Delta in Unit 6C, the population was likely high and stable. Cache surveys in 1988 and 1990 indicated 2400 and 3100 animals, respectively (Nowlin 1993).

Coyotes were abundant and most populations were probably stable. Griese (1990) estimated density at 0.1-1.0/mi^2 in suitable habitat. A possible exception was in eastern Unit 6 where they may have declined because of displacement by an increasing wolf population.

Red foxes and lynx were scarce and did not show signs of increasing. Marten density was probably moderate and unchanging, except near human population centers where trapping pressure may have reduced numbers.

Mink and land otters were both common, and numbers were probably stable in most of Unit 6. The exception was western PWS where oil-related mortality likely reduced numbers directly after the 1989 Exxon Valdez spill, and the population may not have recovered.

Muskrats were generally at low density and were stable. Wolverines were present at low to moderate density and were stable.

MORTALITY

Harvest

Seasons and Bag Limits. The beaver trapping season during this reporting period was 1 December to 31 March, and the bag limit was 20 beavers per season.

The coyote trapping season in Unit 6C, that portion south of the Copper River Highway and east of the Heney Range, was 10 November to 30 April; the trapping season in the remainder of Unit 6 was 10 November to 31 March. Trappers did not have a bag limit for coyotes. The coyote hunting season was 1 September to 30 April, and the bag limit was 2 coyotes.

The red fox trapping season was 10 November to 28 February and there was no bag limit.

There was no hunting season for red fox. The wolverine trapping season was 10 November to 28 February, and there was no bag limit. The wolverine hunting season was 1 September to 31 March, and the bag limit was 1 wolverine.

The lynx trapping season was closed during 1994/95 and 1995/96. It was 1 January to 31 January during 1996/97, with no bag limit. The hunting season for lynx was closed during the entire reporting period. The trapping season for marten, mink, and weasels was 10 November to 31 January, with no bag limit. Muskrat trapping season was 10 November to 10 June, and there was no bag limit. Land otter trapping season was 10 November to 31 March, with no bag limit.

Board of Game Actions and Emergency Orders. Beginning in 1994-95, the Board prohibited taking coyotes with the aid of an artificial light with a trapping license in Units 6B and 6C. Artificial lights were allowed previously because of concern about coyote predation on dusky Canada goose nests. This special regulation failed to increase harvest, reduce the coyote population and relieve nest predation. We, therefore, proposed removing it so Unit 6 would be consistent with the rest of the state.

We regulated the lynx trapping season each year by emergency order as part of our tracking harvest strategy. Emergency orders were issued to modify season lengths as lynx and prey populations varied, to ensure sustainable harvest.

Trapper Harvest. Beaver harvest increased to 91 during 1996/97 from 48 and 46 during the previous 2 years (Table 1). The 1996/97 harvest was the highest in 5 years. Traps or snares were the normal method of take, and the proportion of juveniles in the harvest varied widely. As in past years, 90%-100% of the harvest came from Unit 6C.

The only reported lynx harvest during the past 5 years was 4 animals taken during January and February 1993 from the Lowe River drainage near Valdez and 1 animal taken during January 1997 near Icy Bay. They may have dispersed southward from Units 13 and 11.

Land otter harvest was 78-106 during this reporting period (Table 2). Females were 32%-36% of the harvest, and most otter (96%-98%) were taken using traps or snares. The take of 106 otters in 1996/97 was the highest in the past 5 years. Higher pelt prices likely were an incentive for trappers to harvest more otters.

Wolverine harvest was 19–25 (Table 3). Males dominated the take, except in 1994/95, when slightly more females (63%) than males were taken. Most wolverines were trapped or snared. This was the pattern over the past 5 years.

Harvest Chronology. The most important month for beaver harvest varied during this reporting period (Table 4). It was highest during January in 1994/95 (50%), December in 1995/96 (31%), and March in 1996/97 (46%). This variability was also the pattern over the past 5 years.

Land otter harvest chronology was also variable during this reporting period (Table 5). It was greatest during January in 1994/95 (42%), December in 1995/96 (50%), and February in 1996/97 (39%). December has historically been an important month for harvest.

Most wolverine harvest occurred during December and January in this reporting period(Table 6). Historically, November and February have also been important months for harvest.

Transport Methods. Beaver trappers consistently used highway vehicles for transportation (Table 7). Heavy reliance on highway vehicles occurred because the Copper River Highway provided easy access to high beaver populations in Unit 6C. Land otter trappers used primarily boats for transportation during this reporting period and historically (Table 8). Wolverine trappers and hunters used mostly snow machines for transport (Table 9). The exception was increased use of highway vehicles in 1996/97.

Other Mortality

Significant mortality of mink and land otters apparently resulted from the 1989 *Exxon Valdez* oil spill in western PWS. Intertidal areas that were heavily oiled are important habitat for both species. The animals were likely killed by contact with highly toxic fresh oil directly after the spill and were affected by persistent oil contamination in the environment. However, no estimates of population changes were obtained.

Injury assessment studies indicated a variety of impacts on land otters from 1989 through 1991. Analysis of blood revealed elevated haptoglobin and interleukin-6 immunoreactive protein, indicating persistent toxic effects of oil, and male otters from oiled areas had significantly lower body mass than males from unoiled areas (Duffy et al. 1993). Otters also abandoned latrine sites more often in oiled than in unoiled areas (Duffey et al. 1994a). However, by spring 1992 differences in blood parameters and body mass between oiled and unoiled areas were not apparent, indicating recovery may have begun (Duffy et al. 1994b).

Preliminary results of studies during 1997 also suggested recovery. No significant differences were found for values of haptoglobin or endothelial P4501A1 between oiled an nonoiled areas, and no significant differences were found in body mass or age structure of populations in the two areas (Blundell and Bowyer 1997). However, results must be cautiously interpreted because the research is not complete, the nonoiled area is different from the nonoiled area used in earlier research, and some telemetered animals moved between the oiled and nonoiled areas.

CONCLUSIONS AND RECOMMENDATIONS

Quantifiable management objectives need to be established for beavers, lynx, land otters and wolverines. Harvest information is readily available for all these species from sealing records, and application of existing and emerging methodologies may provide opportunities to monitor population trends.

Harvests of most furbearers were likely within sustainable limits, and no changes in seasons or bag limits are recommended. However, river otter research and harvest in the oil impacted area of western PWS should be monitored. The trapping season should be reevaluated if conclusive evidence of continuing injury is found.

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Table 1 Unit 6 beaver harvest, 1992–97

Regulatory	Reported harvest				Method of take				Successful
year	Juv.[a] (%)	Adults	Unk.	Total	Trap/snare(%)	Shot	(L&S)	Unk.	trappers
1992/93	4 (21)	15	3	22	22 (100)	0	0	0	8
1993/94	13 (30)	30	1	44	44 (100)	0	0	9	7
1994/95	24 (52)	22	0	46	44 (96)	2	0	0	5
1995/96	5 (11)	39	4	48	48 (100)	0	0	0	10
1996/97	9 (13)	62	20	91	91 (100)	0	0	0	9

[a] Beavers ≤ 52"

Table 2 Unit 6 land otter harvest, 1992–97

Regulatory	Reported harvest				Method of take				Successful
year	M	F (%)	Unk.	Total	Trap/snare (%)	Shot	(L&S)	Unk.	trappers
1992/93	29	22 (43)	23	74	67 (92)	6	0	1	20
1993/94	21	10 (32)	12	43	38 (88)	5	0	0	11
1994/95	51	24 (32)	3	78	74 (96)	3	0	1	14
1995/96	73	29 (28)	1	103	101 (98)	2	0	0	13
1996/97	58	32 (36)	16	106	102 (96)	4	0	0	11

Table 3 Unit 6 wolverine harvest, 1992–97

Regulatory year	Reported harvest M	F (%)	Unk.	Total	Method of take Trap/snare (%)	Shot	(L&S)	Unk.	Successful trappers
1992/93	14	5 (26)	0	19	19 (100)	0	0	0	10
1993/94	10	5 (33)	1	16	14 (88)	2	0	0	7
1994/95	7	12 (63)	0	19	18 (95)	1	0	0	8
1995/96	15	4 (21)	0	19	18 (95)	1	0	0	9
1996/97	16	9 (36)	0	25	21 (95)	1	0	3	10

Table 4 Unit 6 beaver harvest chronology percent by time period, 1992–97

Regulatory year	Harvest periods December	January	February	March	*n*
1992/93	10	33	33	24	21
1993/94	42	21	5	33	43
1994/95	26	50	21	3	38[a]
1995/96	31	27	18	24	45
1996/97	14	14	25	46	91

[a] Eight additional beavers taken under beaver damage control permit in May.

Table 5 Unit 6 land otter harvest chronology percent by month, 1992–97

Regulatory year	Harvest periods October	November	December	January	February	March	n
1992/93	18	18	38	11	11	5	74
1993/94	0	12	31	14	14	29	42
1994/95	0	1	36	42	13	8	78
1995/96	0	1	50	11	34	5	103
1996/97	0	1	25	32	39	3	106

Table 6 Unit 6 wolverine harvest chronology percent by time period, 1992–97

Regulatory year	Harvest periods October	November	December	January	February	March	n
1992/93	0	41	19	22	19	0	27
1993/94	6	13	6	31	38	6	16
1994/95	5	21	26	26	21	0	19
1995/96	0	11	26	32	26	5	19
1996/97	4	32	12	48	4	0	25

Table 7 Unit 6 beaver harvest percent by transport method, 1992–97

Regulatory year	Percent of harvest						n
	Boat	3-or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1992/93	5	5	0	0	91	0	22
1993/94	0	0	0	0	100	0	44
1994/95	0	0	17	0	83	0	46
1995/96	0	0	0	0	98	2	48
1996/97	27	14	0	11	47	0	91

Table 8 Unit 6 land otter harvest percent by transport method, 1992–97

Regulatory year	Percent of harvest							n
	Dogsled skis snowshoes	Boat	3-or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1992/93	7	68	0	8	0	16	1	74
1993/94	7	47	0	16	19	9	2	43
1994/95	3	74	0	9	0	14	0	78
1995/96	0	81	1	3	0	16	0	103
1996/97	0	75	2	2	0	21	0	106

Table 9 Unit 6 wolverine harvest percent by transport method, 1992–97

	Percent of harvest							
Regulatory year	Airplane	Dogsled skis snowshoes	Boat	3-or 4-wheeler	Snowmachine	Highway vehicle	Unknown	*n*
1992/93	11	5	5	0	53	26	0	19
1993/94	13	0	6	0	50	31	0	16
1994/95	5	0	5	0	63	26	0	19
1995/96	26	11	0	5	32	26	0	19
1996/97	4	0	0	8	32	44	12	25

LOCATION

GAME MANAGEMENT UNITS: 7 and 15 (8,397 mi^2)

GEOGRAPHIC DESCRIPTION: Kenai Mountains

BACKGROUND

Historically, trapping was an important part of the Kenai Peninsula's culture and economy. Over the past two decades, trapping has evolved into primarily a recreational activity with few dedicated trappers remaining due to increased restrictions and reductions in pelt prices. Beaver, land otter, wolverine, lynx, coyote, mink and weasel are found throughout the Kenai Peninsula at varying density levels dependent upon habitat quality or prey abundance. The distribution and density of red fox and marten are limited. Red fox were abundant prior to 1930 according to long-time Kenai residents, however they quickly disappeared as coyotes established and rapidly increased during the 1930s. Unit 15C currently supports a small remnant population of red fox with an occasional observation reported from other areas of the Kenai Peninsula. Coyotes are widely distributed and abundant.

Marten are moderately abundant in Unit 7 but are rare in Unit 15 with the exception of the portion of 15B East north of Kenai River. A marten trapped in Unit 15C during this reporting period was the first ever recorded in this Unit. Because marten have never been common in Unit 15, I suspect that habitat rather than human induced mortality controls their distribution on the Kenai.

Beavers were common in suitable habitat on the Kenai Peninsula, however, population density and trends have not been measured and are poorly understood in most areas. Incidental observations and the trend in nuisance beaver complaints indicate that beaver populations peaked about 1984 and have remained relatively stable since.

Land otters are common in inland waters and sheltered coastal areas of the Kenai Peninsula. Little is known about the population dynamics of this species. Observations and harvest information indicate that otters are most abundant in drainages that support anadromous fish, stream connected lakes and in sheltered coastal waters such as the south shore of Kachemak Bay.

Wolverines are most commonly found in the Kenai Mountains, including the southern and eastern peninsula coastal areas, Caribou Hills, and the hilly terrain that forms the headwaters of the Deep Creek and Anchor River drainages. Wolverines are seldom observed in the northern lowlands or the western coastal fringes of the peninsula. The historical distribution of wolverines on Kenai Peninsula has not been documented, however, historical harvest records suggest a wider distribution during the late 1960s and early 1970s when moose densities were highest and wolf density low.

Lynx are cyclically abundant in the forest habitats of the Kenai Peninsula. Early-seral, mixed deciduous-spruce forests in Units 15A and 15B appear to have a higher carrying capacity for snowshoe hares and consequently, lynx numbers are usually higher in these areas than in the subclimax spruce forests of Unit 15C and Unit 7. Lynx density began to increase in about 1994/95 as the snowshoe density increased. Trapping season reopened in Unit 7 and Units 15B and C in 1996/97, with a Jan. 1 to 31 season. These Units were last opened in 1987/88. Unit 15A was not reopened, and has remained closed since 1984/85.

Mink and weasel are common throughout Units 7 and 15. Although their pelt value is generally low they are an important furbearer for recreational trappers and young trappers. Muskrats remained scarce throughout the units during this reporting period. Research has not been conducted to determine the controlling factors that regulate muskrat numbers, however, it is believed that mid-winter flooding of lakes and rivers because of over-flow is the reason survival is low.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Kenai Peninsula: A) maintain furbearer trapping seasons and bag limits consistent with population levels during periods of pelt primeness; B) maintain furbearer hunting seasons and bag limits consistent with population levels, but not necessarily limited to periods of pelt primeness; C) to obtain sufficient data to develop measurable population objectives.

MANAGEMENT OBJECTIVES

Beaver

To maintain beaver populations capable of sustaining an average annual harvest of 150 through 2000.

Land Otter

To maintain otter populations capable of sustaining an annual harvest of 35 through 2000.

Wolverine

To maintain wolverine populations capable of sustaining an annual harvest of 20 through 2000.

Lynx

To maintain populations capable of sustaining a harvest. Commensurate with the current population size, reproductive status and trend. Hunting and trapping seasons will be allowed only during years of lynx abundance.

Marten

To maintain a population of marten capable of sustaining an annual harvest of 35 through 2000.

METHODS

Monitor harvest through mandatory sealing program for lynx, land otter, wolverine, beaver and marten and reports from local trappers. Lynx population status and trend was monitored periodically using a track count census technique in Unit 15A. Fur acquisition reports provided additional harvest data for those species not required to be sealed.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

We have conducted no formal research to document the status and trend of furbearers in Units 7 and 15 except monitoring of lynx by the U.S. Fish and Wildlife Service. Preliminary results from their study indicated the population has recovered from a cyclic low period from 1987 to 1992. Distribution and abundance of other furbearers appears to be stable.

Population Size:

No Data Available

Population Composition:

No Data Available

MORTALITY:

Harvest:

Season and Bag Limit.

Beaver

Season was open from February 1 to March 31 in Units 7 and 15 until 1992-93 when it was extended to December 1 to March 31. The bag limit was 20 beaver per person.

Coyote and Red Fox

Seasons were open from November 10 to February 28 in Units 7 and 15. The bag limit for fox was one and no limit for coyote.

Wolverine

Season was open from November 10 to February 28 in Unit 7, Unit 15B and 15C. The number allowed was not limited. Unit 15A was closed to trapping wolverine beginning in 1987.

Lynx

Season was closed beginning in 1987 for trapping and 1988 for hunting. Trapping season was reopened from January 1 to 31 in 1996, in Unit 7 and Units 15B and 15C. Unit 15A and the hunting season for Units 7 and 15 remained closed.

Mink and Weasel

Seasons were open from November 10 to January 31 in Units 7 and 15. The number allowed was not limited.

Marten

Season in that portion of 15B east of Kenai River, Skilak Lake, and north of Skilak River was closed. The remainder of Unit 15 and Unit 7 were open from November 10 to January 31, with no bag limit.

Muskrat

Season was open from November 10 to May 15 for Units 7 and 15, with no bag limit.

Land Otter

Season was open from November 10 to January 31 in Units 15A and 15B and from November 10 to February 28 in Units 15C and Unit 7, with no bag limit.

Board of Game Actions and Emergency Orders. A thorough review of the trapping program on Kenai Peninsula was completed during the March 13 to 23, 1997 Board of Game meeting. The following actions were taken: the beaver trapping season was extended from December 1 to March 31 to November 10 to March 31. The bag limit of 20 beaver per person remained in place. Land otter seasons were extended in Units 15A and 15B to be consistent with the remainder of the peninsula. The season for trapping otters is now November 10 to February 28. Wolverine trapping season was reopened in Unit 15A with the same season, November 10 to February 28, as the remainder of the peninsula. Coyote and wolf trapping seasons were extended from November 10 to February 28 to November 10 to March 31 for the peninsula. The mandatory 5-day sealing for wolves taken in Unit 15A was repealed. Lynx season was extended from January 1 to 31 to January 1 to February 15, including Unit 15A. A season allowing hunting for lynx from November 10 to February 15 was also approved with a bag limit of 2 per season.

Hunter/Trapper Harvest. Since 1992/93, the annual beaver harvest has exceeded 150 in 3 of 5 years, averaged 153 and ranged from 87–209, according to sealing certificates (Table 1). Harvest declined from 173 in 1993/94 to 87 in 1994/95 then increased the next two years. The decline in 1994/95 was because of the severe winter where deep snow restricted trapper activity rather than a decline in beaver density. Doubling the season length beginning in 1993/94 did result in a slightly higher average harvest. The order of magnitude of harvest by Unit during the past 5 years has been 7> 15A> 15C> 15B. Historically, Unit 15A produced the highest harvest, however, with increased restrictions on trapping within the Kenai National Wildlife Refuge portions of 15A trapping effort has shifted to Unit 7. Recreational trappers are responsible for most of the beaver harvest; few trappers take more than 10 beavers annually.

Marten were added to the list of species requiring mandatory sealing during the 1988-89 trapping season. Table 2 shows the past five years of trapping data. All marten, except one trapped in Unit 15C, were trapped in Unit 7 the annual harvest averaged 67, ranging from 31–110. The harvest averaged 67 percent males. The lack harvest from Unit 15 is caused by unsuitable climatic conditions. Marten apparently are better suited to mountainous habitat with consistent weather patterns and deep snow found in Unit 7. Unit 15 commonly has inconsistent weather with frequent periods of rain during mid-winter. However, increased sightings of marten tracks in Units 15 B and C suggest marten range may be expanding.

Otter harvests have shown little variation in recent years with the exception of 1993-94 (Table 3). The mean annual, 5-year harvest was 55 otters with a range of 18-72. Males have consistently outnumbered females; the mean 5-year percentage of males in the harvest was 56 percent.

In the past 5 years, the reported wolverine harvest has increased (Table 4). The mean annual, 5-year harvest was 23 wolverines ranging from 16-34. Males have predominated in the harvests, with a 5-year mean of 65 percent.

Lynx population on Kenai Peninsula increased noticeably during the mid 1990s in response to an increase in the abundance of hares. The previous high in lynx density in Unit 15A and 15B appeared to peak in either 1985 or 1986 compared to a 1987 peak in Unit 15C according to harvests and reports from experienced trappers. Unit 7 has not demonstrated the extreme changes in density compared to Unit 15. The reason for a lower but more stable population in Unit 7 is the lack of widespread habitat to support snowshoe hares. Snowshoe hare populations seem to remain moderately abundant in Unit 7 compared to extreme cyclical density fluctuations in Unit 15.

Lynx trapping season was reopened in 1996/97 in Unit 7 and Units 15B and C, resulting in a harvest of 52 lynx (Table 5). Unit 15A was not opened because current lynx research conducted by Kenai National Wildlife Refuge staff indicated lynx density in this unit was lower than other areas. The 1996/97 harvest was comprised of 40 (77%) adults and 12 (23%) kittens. Because trapping and hunting was closed from 1987/88 to 1995/96, the reported mortality in the first four years of this reporting period was of incidental take. Incidental mortalities from 1992/93 to 1995/96 have averaged 3 animals per year with a range of 2 to 4.

Harvest Chronology. Tables 6 through 10 show the chronology for reported harvest by percent for beaver, marten, otter, wolverine and lynx. General analyses show most trapping success occurs early to mid-season with the exception of wolverine trapping. Because wolverine are generally found in remote, mountainous terrain where access is difficult, they are not readily available to trappers until late in the season when driven out of the mountains by deep snow. The majority of the harvest occurred in January and February in the past 5 years.

Transport Methods. Tables 11 through 15 show harvest percent by transport method for beaver, otter, wolverine and lynx. Reporting transport method used to harvest marten was not required until 1992/93. Because several (dogsled, skis and snowshoes) transport types are listed under one category the reported transport method used is misleading as shown in these tables. Generally, trappers in Units 7 and 15 use a highway vehicle to access their trap line then travel along their trap line using either snowshoes or a snowmachine. Aircraft and dogteams are used by less than 10 percent of the trappers. Trappers using these transport methods, however, are generally more successful.

CONCLUSIONS AND RECOMMENDATIONS

The increasing trend in harvest levels for beaver are not excessive, beaver populations are probably underutilized in portions of the Peninsula and in particular, Unit 15C. Trapping effort appears to have decreased in 1994-95 because of the severe winter with deep snow accumulation. Initiation of beaver cache surveys along several representative drainages is recommended to monitor population trends and to determine whether additional harvesting is warranted.

Because harvests of marten have only been documented through mandatory sealing since 1988/89 (nine years), data indicating long-term trends in harvests are unavailable. However, it was interesting to note that only 3 marten have been reported from Unit 15 in the past 2 decades, indicating marten are rare in this unit. Because historical records suggesting marten were trapped in Unit 15 are also rare, and controversial as to authenticity, this data probably supports the theory that Unit 15 is poor marten habitat compared to Unit 7. Harvest was distributed over most of Unit 7, however, was generally confined to near a road system due to the unit's remoteness.

Land otter harvests increased sharply in 1993–94. The sharp increase in interest was probably due to an increase in pelt price and the lack of alternate furbearers to trap because lynx season was closed and wolf pelts are generally worth little due to pelt damage caused by an infestation of lice. Reports from trappers and staff observation suggest land otter were as abundant during 1996-97 as the previous four years. The 1996–97 harvest of 72 matches the previous high in 1993/94.

Wolverine harvests have increased steadily over the past 4 years. Males predominated in the harvest in all years except 1994/95 when trappers reported a catch of 45 percent males and females, and 10 percent of unknown sex. Overall males composed an average of 65 percent of the harvest and I believe that by and large the impact to the wolverine population was minimal during the past 5 years. The increase in harvest can be attributed to increased effort. Wolf pelts are generally not marketable so trappers focus on other species, lynx trapping was reopened in 1996/97, deep snow allowed better snowmobile travel and, because wolverines are found at lower elevations during winters with deep snow, they were more vulnerable to trapping.

Lynx management on the Kenai Peninsula has followed the recommendations of Brand and Keith (1979). Their study indicated that, during a lynx population decline in Alberta, trapping mortality was additive to natural mortality. Using computer modeling, they showed that more lynx would be produced and greater long-term harvest would be achieved when trapping was curtailed for 3-4 years starting with the 2nd year after the peak in the lynx harvest. This harvest strategy is currently implemented on the Kenai Peninsula. Staff observations and reports from long time trappers suggest the hare cycle showed a slight increase beginning in 1993-94 were moderately high. Lynx density increased because of hunting and trapping closures and the increase in their primary prey, snowshoe hares. Spruce grouse numbers have been moderately high for the past five years.

Trapping for lynx was reopened in Unit 7 and Units 15B and C in 1996/97, following a 9-year closure. Hunting for lynx remained closed. Although reports from trappers and incidental observations from department staff suggested that lynx density in Unit 15A was higher than other areas on the Kenai and should be reopened, research from Refuge staff demonstrated lower numbers in Unit 15A. Fifty-two lynx were harvested during the January 1–31 trapping season, including 4 incidental mortalities (2 killed by highway vehicles and 2 capture related mortalities during the FWS study) in Unit 15A. Carcasses collected from 26 of the 52 taken revealed 11 males and 15 females. Age composition was 14 (54%) adults, 5 (19%) yearlings and 7 (27%) kittens. Seven of the 10 females, older than 1 year, exhibited placental scars, ranging from 2 to 5.

In accordance with our harvest tracking strategy, I recommend we increase the season length by 2 weeks to January 1 to February 15, and reopen Unit 15A. A hunting season with a limit of 2 lynx should also be approved for the entire peninsula from Nov. 10 to February 15, in 1997/98.

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Table 1 Summary of annual beaver harvests on Kenai Peninsula by game management unit, 1992–96

Regulatory year	Game Management Units 7	15A	15B	15C	All 15	Total
1992/93	38	63	3	26	92	130
1993/94	80	41	5	47	93	173
1994/95	56	18	0	13	31	87
1995/96	87	43	0	38	81	168
1996/97	102	50	4	53	107	209
Total	363	215	12	177	404	767
x	73	43	2	35	81	153

Table 2 Summary of annual marten harvests on Kenai Peninsula by game management unit, 1992–96

Regulatory year	Unit	Males (%)	Females (%)	Unk.	Total
1992/93	7	14 (74)	5 (26)	12	31
	15	--	--	--	--
1993/94	7	25(78)	7 (22)	1	33
	15	--	--	--	--
1994/95	7	72 (67)	36 (33)	2	110
	15	--	--	--	--
1995/96	7	68 (67)	34 (33)	--	102
	15	--	--	--	--
1996/97	7	34 (59)	21 (40)	3	58
	15	0	1	0	1
Total		213 (67)	104 (33)	18	335
x		43	21	4	67

Table 3 Summary of land otter harvest on Kenai Peninsula by game management unit, 1992–96

Regulatory year	Unit	Males (%)	Females (%)	Unk.	Total
1992/93	7	1	2	2	5
	15B	--	--	--	--
	15C	6	9	6	21
Subtotal		14 (47)	16 (53)	13	43
1993/94	7	11	9	1	21
	15A	6	2	--	8
	15B	2	1	--	3
	15C	24	16	--	40
	Subtotal	43 (61)	28 (39)	1	72
1994/95	7	3	2	--	5
	15A	--	2	--	2
	15B	1	1	1	3
	15C	5	3	--	8
	Subtotal	9 (53)	8 (47)	1	18
1995/96	7	10	4	2	16
	15A	9	13	--	22
	15B	--	1	--	1
	15C	15	13	2	30
	Subtotal	34 (52)	31 (48)	4	69

Table 3 Continued

Regulatory year	Unit	Males (%)	Females (%)	Unk.	Total
1996/97	7	10	8	0	18
	15A	17	8	1	26
	15B	1	1	0	2
	15C	14	12	0	26
Subtotal		42 (58)	29 (42)	1	72
Total		142(56)	112 (44)	20	274
x		28	22	4	55

Table 4 Summary of wolverine harvest on Kenai Peninsula by game management unit, 1992–96

Regulatory year	Unit	Males (%)	Females (%)	Unk.	Total
1992/93	7	6	5	--	11
	15A	--	--	--	--
	15B	2	1	--	3
	15C	2	--	--	2
Subtotal		10 (63)	6 (37)	--	16
1993/94	7	7	1	--	8
	15A	--	--	--	--
	15B	--	--	--	--
	15C	5	3	--	8
Subtotal		12 (75)	4 (25)	--	16
1994/95	7	6	2	2	10
	15A	--	--	--	--
	15B	1	2	--	3
	15C	3	6	--	9
Subtotal		10 (50)	10 (50)	2	22
1995/96	7	5	6	1	12
	15A	--	--	--	--
	15B	2	2	--	4
	15C	12	1	--	13
Subtotal		19 (66)	9 (33)	1	29

Table 4 Continued

Regulatory year	Unit	Males (%)	Females (%)	Unk.	Total
1996/97	7	11	7	0	18
	15A	1	0	0	1
	15B	4	1	0	5
	15C	6	3	1	10
Subtotal		22 (66)	11 (33)	1	34
Total		73 (65)	40 (35)	4	117
x		15	8	0	23

Table 5 Summary of lynx harvest on Kenai Peninsula by game management units, 1992–96

Regulatory		Adults			Kittens					
year	Unit	M	F	Unk.	M	F	Unk.	%	Unclass	Total
1992/93[a]	7	1	--	--	--	--	--		--	1
	15A	--	1	--	--	--	--		--	1
	15B	1	--	--	--	--	--		--	1
	15C	--	--	--	--	--	--		--	--
	Subtotal	2	1	--	--	--	--		--	3
1993/94[a]	7	--	--	--	--	--	--		--	--
	15A	--	1	--	--	--	--		--	1
	15B	1	--	--	--	1	--		--	2
	15C	--	--	--	--	--	--		--	--
	Subtotal	1	1	--	--	1	--	33%	--	3
1994/95[a]	7	--	--	--	--	--	--		--	--
	15A	2[b]	2[c]	--	--	--	--		--	4
	15B	--	--	--	--	--	--		--	--
	15C	--	--	--	--	--	--		--	--
	Subtotal	2	2	--	--	--	--		--	4
1995/96[a]	7	--	--	--	--	--	--		--	--
	15A	--	1[d]	--	--	--	--		--	1
	15B	--	--	--	--	--	--		--	--
	15C	--	1[e]	--	--	--	--		--	1
	Subtotal	--	2	--	--	--	--		--	2

Table 5 Continued

Regulatory year	Unit	Adults M	Adults F	Adults Unk.	Kittens M	Kittens F	Kittens Unk.	%	Unclass	Total
1996/97	7	5	5	5	--	--	3		--	18
	15A[a]	2[f,g]	1[f]	--	--	1[g]	--		--	4
	15B	6	6	--	2	4	--			18
	15C	6	6		--	--	--			12
	Subtotal	19	18	5	2	5	3			52
Total		24	24	5	2	6	3		--	64
$\bar{x}$		5	5	1	--	1	--		--	13

[a] Trapping and hunting season closed.
[b] One DLP and one USFWS tagging mortality.
[c] One DLP - incidental catch.
[d] Found dead - unknown cause
[e] Incidental catch
[f] One killed by highway vehicle
[g] One killed during FWS study

Table 6 Units 7 & 15 beaver harvest chronology percent by month, 1992–96

Regulatory year	Month					Unknown	Total
	November	December	January	February	March		
1992/93[a]	--	25	13	28	32	2	130
1993/94	--	29	24	24	23	1	173
1994/95	--	32	36	25	7	--	87
1995/96	--	4	33	38	16	9	168
1996/97	--	16	21	42	20	1	209

[a] Season extended to Dec. 1 - March 31 in 1992

Table 7 Units 7 & 15 marten harvest chronology percent by month, 1992–96

Regulatory year	Month					Unknown	Harvest
	November	December	January	February	March		
1992/93	3	23	74	--	--	--	31
1993/94	9	55	36	--	--	--	33
1994/95	6	35	58	--	--	--	110
1995/96	11	48	41	--	--	--	102
1996/97	17	46	25	0	0	12	59

Table 8 Units 7 & 15 otter harvest chronology percent by month, 1992–96

Regulatory year	Month: November	December	January	February	March	Unknown	Harvest
1992/93	2	51	33	12	2	--	43
1993/94	26	39	21	13	--	1	72
1994/95	6	50	28	17	--	--	18
1995/96	7	36	42	12	--	3	69
1996/97	14	36	39	11	--	--	70

Table 9 Units 7 & 15 wolverine harvest chronology percent by month, 1992–96

Regulatory year	Month: November	December	January	February	March	Unknown	Harvest
1992/93	--	6	38	38	6	13	16
1993/94	--	44	19	38	--	--	16
1994/95	5	23	27	46	--	--	22
1995/96	10	--	52	24	3	10	29
1996/97	4	32	43	21	--	--	28

Table 10 Units 7 & 15 lynx harvest chronology percent by month, 1992–96

Regulatory year	Month: November	December	January	February	March	Unknown	Harvest
1992/93	--	33	33	--	--	33	3
1993/94	--	--	--	67	33	--	3
1994/95	--	25	25	--	25	25	4
1995/96	--	50	50	--	--	--	2
1996/97	2	--	98	--	--	--	52

Table 11 Units 7 & 15 beaver harvest percent by transport method, 1992-96

Regulatory year	Percent of harvest: Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unk.	Total
1992/93	13	5	--	--	41	--	28	14	130
1993/94	5	--	2	1	23	--	48	22	173
1994/95	2	--	--	--	51	--	21	26	87
1995/96	--	--	--	--	20	8	61	12	168
1996/97	1	--	--	--	62	--	20	17	209

Table 12 Units 7 & 15 marten harvest percent by transport method, 1992–96

Regulatory year	Percent of harvest: Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unk.	Harvest
1992/93	--	--	--	--	77	--	10	13	31
1993/94	--	--	--	--	24	--	58	18	33
1994/95	--	--	--	--	36	--	39	26	110
1995/96	--	--	--	--	49	4	41	6	102
1996/97	--	--	--	--	29	--	47	24	59

Table 13 Units 7 & 15 otter harvest percent by transport method, 1992–96

Regulatory year	Percent of harvest: Airplane	Dogsled	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unk.	Harvest
1992/93	16	--	7	--	14	--	30	33	43
1993/94	22	4	8	--	3	--	33	29	72
1994/95	--	6	6	--	33	--	22	33	18
1995/96	19	1	13	--	7	1	38	20	69
1996/97	11	--	3	--	35	--	33	18	72

Table 14 Units 7 & 15 wolverine harvest percent by transport method, 1992–96

Regulatory year	Percent of harvest								
	Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unk.	Harvest
1992/93	6	6	--	6	38	--	6	38	16
1993/94	38	--	--	--	19	--	6	38	16
1994/95	--	9	--	--	73	--	--	18	22
1995/96	--	--	7	--	59	--	3	31	29
1996/97	--	6	--	--	71	--	6	18	34

Table 15 Units 7 & 15 lynx harvest percent by transport method, 1992–96

Regulatory year	Percent of harvest								
	Airplane	Dogsled	Boat	3 or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unk.	Harvest
1992/93	--	--	--	--	--	--	33	67	3
1993/94	--	--	--	--	--	--	--	100	3
1994/95	--	--	--	--	25	--	--	75	4
1995/96	--	--	--	--	--	--	50	50	2
1996/97	2	--	--	62	--	--	25	12	52

LOCATION

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

GEOGRAPHIC DESCRIPTION: Kodiak and Adjacent Islands

BACKGROUND

Archeological evidence indicates that the only furbearers indigenous to the Kodiak archipelago are red foxes, land otters, and short-tailed weasels. Skeletal remains of other species have been found in midden sites, but Native traders probably brought these into the area. Wildlife management agencies introduced beavers and muskrats in 1925 and 1929. Mink, marten, and red squirrels were introduced in 1952 (Burris and McKnight 1973). Healthy populations of all of these furbearers; except mink, now reside in the Unit. Raccoons were illegally introduced at various times, but sightings are now rare. Norway rats are common in the vicinity of Kodiak. Captive red and arctic foxes escaped or were released from the widespread fox farms in the early 1900s. Arctic foxes occur only on Chirikof Island. Feral dogs occur on the southwest end of Kodiak, where they occasionally form packs and hunt deer.

Red foxes, land otters, beavers, and short-tailed weasels are the most abundant furbearers on the archipelago. Marten occur only on Afognak Island. Trappers most commonly pursue red foxes and land otters. Furbearer populations and trapping pressure have been stable during the past decade. No major changes in regulations occurred during this report period.

Recreational trappers conduct most of the trapping in Unit 8, and effort is rarely affected by vagaries in the fur market. Little fur is exported for sale; most is kept on the island for personal use.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Management objectives for furbearers in Unit 8 are to: develop measurable objectives for all furbearer species; and collect harvest data on land otters and beavers through the mandatory sealing program and statewide trapper questionnaire.

METHODS

We monitored beaver and land otter harvests through a mandatory sealing program. We sent statewide trapper questionnaires to trappers each year and recorded the number of furs exported from the state.

RESULTS AND DISCUSSIONS

POPULATION STATUS AND TREND

Population Size

No objective estimates of furbearer populations have been done. Most trappers reported furbearer populations were high during this report period.

MORTALITY

Harvest

Season and Bag Limit. Beaver trapping season was open from 10 November to 30 April. The bag limit was 30 beavers per trapper.

The red fox trapping season was open from 10 November to 31 March with no limit on the number of animals a trapper could legally take. The red fox hunting season was from 1 September to 15 February and the bag limit was 2 foxes.

The marten, weasel, and land otter trapping season was from 10 November to 31 January with no limit on the number of these animals a trapper could legally catch. The muskrat trapping season was from 10 November to 10 June with no bag limit on muskrats. There was no closed hunting or trapping season on squirrels nor was there a bag limit on squirrels.

Board of Game Actions and Emergency Orders. The Board of Game made only 1 change in furbearer trapping and hunting regulations in this report period. The open season for red fox hunting was extended from 1 November–15 February to 1 September–15 February. This new season became effective in 1991–92.

Hunter/Trapper Harvest. Land otter harvests have fluctuated, with an increasing trend in the past several years. The annual harvest between 1991-92 and 1997-98 ranged from 68 to 148, with an average harvest of 115.3/year (Table 1). The number of otter trappers has fluctuated from 11–20, averaging 16.7/year. The average take per trapper ranged from 5.3 to 8.7, with an average of 6.8 otters/trapper per year.

Beaver harvests have also fluctuated, but no consistent trend was apparent. Annual harvests ranged from 29 to 78 and averaged 53.9/year (Table 2). The number of beaver trappers has fluctuated from 8 to 16, averaging 11.0/year. The average take per trapper ranged from 3.5 to 8.1, with an average of 4.9 otters/trapper per year.

Red foxes are the most commonly pursued furbearer in Unit 8, but current methods of monitoring harvest underestimate the take. The 1991-92–1997-98 fur export permit data indicated an average annual harvest of 34.8/year. The average annual harvest by trappers and hunters is estimated at 300 red foxes. Some foxes are home-tanned or dried for wall hangings, we suspect that hides are often shipped without fur export permits.

Harvests of marten, squirrels, weasels, and muskrats were negligible. Occasionally, trappers made sets for marten on Afognak Island, but little trapping effort occurred for the remaining species.

Harvest Chronology. December is typically the most active month for fur trapping in Unit 8, but harvest chronology for both land otters and beavers has been variable (Tables 3 and 4, respectively).

Transport Methods. Highway vehicles and boats are the most common modes of transport for otter and beaver trappers (Tables 5 and 6, respectively), however methods are variable with aircraft and 3 or 4 wheelers common in some years.

Other Mortality

None noted.

HABITAT

Logging on Afognak Island was the only major land use activity altering furbearer habitat. Clear-cut logging of old-growth timber was detrimental to marten populations in southeastern Alaska (Young 1990). Studies of the effects of logging on furbearers have not been conducted in Unit 8.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

A population trend estimation technique for land otters should be developed. The land otter is the furbearer most susceptible to overexploitation in Unit 8. During the 1980–81 season, the harvest exceeded 400 otters, and in local areas up to 1 otter/mile of coast was harvested. Recent annual harvests have been low, but should fur prices improve, the otter harvest could quickly become a concern.

Beavers caused occasional flooding of roads by plugging culverts. Approximately 1–5 nuisance beavers were removed adjacent to roads in northeastern Kodiak Island annually by trapping and shooting. The Department of Transportation was issued a beaver depredation permit in 1991 to allow them to control nuisance beavers along the highway. A few complaints were received from people concerned that beavers in ponds and reservoirs used for domestic water sources cause giardiasis. A local municipal water quality technician stated that most giardiasis in the Kodiak area has been linked to childcare facilities.

Ground squirrels are a chronic nuisance at the Kodiak State airport, where they undermine runway edges and damage runway lights. The Department of Transportation has a permit to shoot ground squirrels.

Some conflicts between trappers and other recreational users occur where trappers make visible sets near beaches and roadsides. Deer are occasionally caught in fox snares, and 1–2 deer per year are reported dead in snares. Typically, inexperienced trappers are responsible for the snared deer, and better trapper education could alleviate the problem.

CONCLUSION AND RECOMMENDATIONS

Harvests of all furbearer species were low and furbearer populations were high. Less than 20 trappers were active each year, and the average annual harvest of all species was estimated at 500 animals. Land otters were potentially susceptible to overharvest and a population trend estimation technique should be developed for that species.

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Table 1 Unit 8 land otter harvest 1991–1997

Regulatory Year	Reported Harvest M (%)	F (%)	Unk	Total	Method of Take Trap/Snare (%)	Shot (%)	Unk.	Successful Trappers
1991–92	73 (50)	60 (42)	11	144	117 (82)	8 (6)	5	20
1992–93	38 (42)	36 (40)	17	91	72 (80)	13 (14)	6	17
1993–94	37 (54)	20 (29)	11	68	67 (99)	1 (1)	0	11
1994–95	33 (36)	34 (37)	24	91	76 (83)	14 (15)	1	15
1995–96	71 (51)	48 (35)	20	139	138 (99)	1 (1)	0	19
1996–97	59 (47)	50 (40)	17	126	124 (98)	2 (2)	0	18
1997–98	70 (47)	53 (36)	25	148	142 (96)	6 (4)	0	17

Table 2 Unit 8 beaver harvest 1991–1997

Regulatory Year	Reported Harvest Juv.[a]	%	Adult	%	Total	Method of Take Trap/Snare	%	Shot	%	Unk.	Successful Trappers
1991–92	18	23	38	49	78	66	85	12	15	0	16
1992–93	13	20	49	75	65	60	92	9	14	0	8
1993–94	17	25	44	65	68	47	69	21	31	0	11
1994–95	2	7	22	76	29	21	72	3	10	5	8
1995–96	10	20	26	52	50	45	90	5	10	0	14
1996–97	9	24	28	74	38	37	97	1	3	0	8
1997–98	10	24	26	62	42	31	74	7	17	4	12

[a] Beavers ≤ 52"

Table 3 Unit 8 land otter harvest chronology percent by month, 1991–1997

Regulatory year	Harvest periods					
	November	December	January	February[a]	Unknown	*n*
1991–92	34	36	30	0	0	144
1992–93	44	35	14	0	7	91
1993–94	24	22	53	0	0	68
1994–95	40	30	27	2	1	91
1995–96	32	46	22	0	0	139
1996–97	44	21	35	0	0	126
1997–98	29	49	22	0	0	148

[a] Season closed 31 January

Table 4 Unit 8 beaver harvest chronology percent by month, 1991–1997

Regulatory year	Harvest periods								
	November	December	January	February	March	April	May	Unknown	*n*
1991–92	14	29	32	0	8	17	0	0	78
1992–93	15	31	6	29	18	0	0	0	65
1993–94	13	25	15	15	16	16	0	0	68
1994–95	38	7	28	0	0	10	0	17	29
1995–96	22	50	0	0	10	14	0	4	50
1996–97	71	21	0	3	3	3	0	0	38
1997–98	19	43	0	21	17	0	0	0	42

Table 5 Unit 8 land otter harvest percent by transport method, 1991–1997

Regulatory year	Airplane	Boat	3- or 4-wheeler	Snow machine	ORV	Highway vehicle	Foot	Unknown	*n*
	Percent of harvest								
1991–92	20	67	6	0	0	3	1	3	144
1992–93	23	44	8	0	0	13	0	12	91
1993–94	41	31	4	0	0	19	4	0	68
1994–95	3	54	0	5	0	34	0	3	91
1995–96	0	48	0	0	0	42	6	3	139
1996–97	5	66	5	0	0	17	0	8	126
1997–98	5	68	14	0	0	14	1	0	148

Table 6 Unit 8 beaver harvest percent by transport method, 1991–1997

Regulatory year	Airplane	Boat	3- or 4-wheeler	Snow machine	ORV	Highway vehicle	Foot	Unknown	*n*
	Percent of harvest								
1991–92	18	47	13	0	0	1	8	13	78
1992–93	8	17	29	0	0	8	0	28	65
1993–94	19	18	44	0	16	3	0	0	68
1994–95	3	28	0	24	0	28	0	5	29
1995–96	0	10	14	0	0	70	6	6	50
1996–97	0	0	37	0	0	61	0	3	38
1997–98	12	0	31	0	5	50	2	0	42

LOCATION

GAME MANAGEMENT UNITS: 9 (45,522 mi^2) and 10 (15,798 mi^2)

GEOGRAPHIC DESCRIPTION: Alaska Peninsula; Aleutian and Pribilof Islands

BACKGROUND

Furbearers in this area include beaver, coyote, red fox, lynx, marten, mink, muskrat, land otter and wolverine. All species are found on at least part of the mainland of Unit 9. There are fewer furbearer species on the islands in both units. On some islands furbearers are present because of past introductions for fur farming or from efforts to establish harvestable wild populations.

Beavers are found on the mainland north of Port Moller. The most productive beaver habitat has a dependable water supply with little fluctuation in stream flow and is adjacent to abundant and easily accessible willow, aspen, cottonwood, or birch vegetation. Beavers are found from sea level to elevations of 2,000 feet.

Coyotes apparently first arrived in Alaska about 1915 and rapidly expanded their range. Coyotes are restricted to the mainland of Unit 9, and were rare prior to 1980. Relatively few are trapped, usually incidentally to fox, lynx or wolf harvests. A few coyotes are killed by sport hunters.

Red foxes occur on the mainland, on some of the offshore Alaska Peninsula islands and on the larger islands of the eastern Aleutians. Red fox introductions to the Aleutians and Alaska Peninsula islands began during Russian occupancy and continued through 1932. Some earlier red fox introductions succeeded but foxes were later exterminated to facilitate introduction of arctic foxes. Rabies, mange and distemper epidemics occur periodically in fox populations, resulting in widespread mortality.

Arctic foxes occur in a narrow band along the marine coast, on open tundra, and on sea ice many miles from shore. Their natural distribution extends to the northwestern shore of Bristol Bay. Blue color-phase arctic foxes were introduced dating back to the Russian period. Arctic foxes are noted for their wide fluctuations in population levels with periodic peaks approximately every 4 years. Their population densities are linked to cyclic fluctuations in small rodent populations. Foxes also patrol beaches in search of carrion. Foxes are an efficient predator of nesting birds and the USFWS is attempting to eliminate them from many of the islands.

Lynx occur on the mainland north of Port Heiden. Primary a boreal species, when prey are scarce lynx venture onto the tundra in search of Arctic hares, lemmings and ptarmigan. The lynx-hare cycle is well known, and population highs can sometimes be predicted every 8 to 10 years. However, Unit 9 is on the fringe of the range for both lynx and snowshoe hare and the fluctuations for both species are less consistent than elsewhere in Alaska.

Marten occur regularly only in the northern parts of Units 9A and 9B. The distribution of marten is limited primarily to climax spruce forests from sea level to timberline.

Mink are found on the mainland of the Alaska Peninsula and on Unimak Island. Microtine populations typically fluctuate drastically and are a primary factor affecting mink abundance. An abundance of mice or hares in upland areas will sometimes prompt mink populations to expand inland in search of prey. In some areas spring flooding may reduce populations by drowning young mink in dens.

Land otters occur on the mainland, some adjacent islands east of the Alaska Peninsula, and Unimak Island. Otter populations are relatively stable, with coastal areas providing abundant marine food. Parasites and disease are not normally important mortality factors. Spring flooding occasionally drowns young otters in dens.

Wolverines live on the mainland and Unimak Island. Compared to other furbearers, wolverines never attain high densities, partially because of their large territorial requirements and low reproductive rate.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

Management objectives for furbearers in Units 9 and 10 have not been developed.

METHODS

We assessed population trends indirectly by monitoring harvests of sealed species, and by obtaining information from trappers on questionnaires. Field work for surveying furbearers was not funded this report period. We made incidental observations of furbearers during moose, caribou and brown bear surveys.

Pelt sealing is required for beaver, lynx, otter, and wolverine and provided the most accurate and complete harvest information. Because furs kept for personal use were sometimes not reported, actual harvest exceeded those obtained from this data source.

The harvest of unsealed furbearers (coyote, red fox, arctic fox, marten, mink, and muskrat) could not be estimated with any confidence. However, trapper questionnaires and other incidental information provided a rough, qualitative index to trends in populations of furbearers and key prey species. The trapper questionnaire population abundance index (AI) was calculated by assigning rank values of 1 for "low", 5 for "moderate" and 9 for "high". Similarly, the trend index (TI) used the same rank values for "fewer", "same" and "more" than present the previous year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Beaver. Beaver cache surveys have not been conducted since 1987. General observations during other survey flights, comments from trappers, and complaints from the public indicated beaver populations remained high north of Unit 9D. Prior to this reporting period, trappers consistently reported beavers as abundant (e.g., AI averaged 7.6 during 1991–93). However during the previous reporting period the trend index reported by trappers declined slightly 6.1, 5.9 and 5.0

for 1991-92, 1992-93 and 1993-94, respectively). The apparent decline in beavers continued into this reporting period as trappers scored the AI at 6.0 and 5.0 and the TI at 6.0 and 4.0 in 1994-95 and 1995-96, respectively. Both the AI and TI increased for 1996-97 to 7.9 and 5.6, despite extremely low water levels during 1996–97 causing some freeze-out mortality.

Coyote. Although trappers still rated the coyote population as being relatively low, both the AI (3.0, 4.2 and 5.6) and TI (5.7, 8.2, and 5.6) suggested an increase during 1994-96. Comments from hunters and observations by staff also indicate a slight increase in coyote numbers.

Red Fox. Trappers reported the red fox population remained high (AI = 7.1, 6.6, and 6.8 for 1991-92, 1992-93, and 1993-94, respectively). There was a moderate outbreak of rabies early in 1994, which may have been localized within the Naknek drainage.

Lynx. Trappers believed lynx abundance was low during 1994-96 (AI = 1.6, 1.0, and 3.3) but stable during the period (TI = 5.7, 5.0, and 5.0). Trappers reported that snowshoe hare abundance was low in 1994-96 (AI = 3.0, 1.0, and 3.3) but relatively stable (TI = 5.0, 3.4 and 5.0).

Lynx abundance within the Naknek River drainage reached a peak during 1992-96, which did not coincide with a noticeable increase in hare numbers. It was also notable that very few kittens were trapped during this period. These two circumstances indicate that most of the lynx increase was caused by emigration from Katmai National Park where the hare decline apparently began in 1991–92. With a relatively low prey base and apparent low productivity, it is unlikely that the lynx population could sustain itself, even without the recent high harvests.

Marten. So few trappers (≤2 per year) rated marten abundance that meaningful interpretation is precluded. Martin distribution is very limited within Unit 9 and changes in status are difficult to document.

Mink. Mink abundance was reported as moderate (AI = 3.3, 5.8 and 5.6 for 1994-96). No particular trend was evident (TI = 4.2, 6.0 and 5.7).

Otter. Otter abundance was slightly greater than moderate (AI = 6.7, 6.6 and 6.7) and relatively stable (TI = 4.3, 5.0, and 5.6) during the reporting period.

Wolverine. Trappers reported wolverine abundance as moderate (AI = 3.9, 5.0 and 5.0) but slightly below stable (TI = 3.0, 3.4, and 5.0) during the reporting period.

MORTALITY

Harvest

Season and Bag Limits. The beaver trapping season in Unit 9 was 1 January to 31 March. The bag limit was 40 beavers per trapper. Unit 10 was not open for beaver trapping.

The coyote trapping season in Units 9 and 10 was 10 November to 31 March with no trapping bag limit. The coyote hunting season in these units was from 1 September to 30 April with a bag limit of 2.

The red fox and arctic fox trapping season in Units 9 and 10 was open from 10 November to 28 February with no bag limit. The red fox hunting season in both Units was from 1 September to 15 February and the bag limit was 2 foxes. The arctic fox hunting season in Unit 9 was open from 1 September to 30 April with a 2 fox limit. In Unit 10 there was no closed hunting season and no bag limit for arctic fox.

The lynx and marten trapping season in Unit 9 was 10 November to 28 February with no trapping bag limit for either species. The lynx hunting season in Unit 9 ran concurrent with the trapping season but the bag limit was 2. Unit 10 was not open for lynx or marten trapping or hunting.

The mink trapping season was 10 November to 28 February in Units 9 and 10, with no bag limit.

The muskrat trapping season in Units 9 and 10 was 10 November to 10 June with no bag limit. The otter trapping season in Units 9 and 10 was from 10 November to 31 March with no bag limit.

The trapping season for wolverines in Units 9 and 10 was from 10 November to 28 February with no bag limit. The hunting season for wolverines in Units 9 and 10 was from 1 September to 31 March with a bag limit of 1 per hunter.

Board of Game Actions and Emergency Orders. Starting in 1994, a trapper had to be at least 300 feet (instead of 100 feet) from an aircraft to shoot fox and coyote on the same day he/she was airborne. A ballot initiative, effective 26 February 1997, prohibited all same-day-as-airborne shooting of fox, coyote, wolverine and lynx statewide. No other Board actions or emergency orders affected trapping or hunting of furbearers in Units 9 or 10 during this reporting period, except that

Hunter/Trapper Harvest. Beaver harvests were relatively stable during the past 5 years (range 83-258 per year, Table 1) and were low compared to 865 beavers taken in 1987-88. Both 1995-96 and 1996-97 were extremely mild and snow-free winters, which in combination with low prices, resulted in reduced beaver catches.

Lynx harvests remained relatively high during 1992-96 (Table 1) compared to previous years. Lynx remained unusually abundant in Unit 9C where 8, 17 32, and 33 lynx were taken in 1991-92, 1992-93, 1993-94, 1994-95 respectively. Harvests dropped to 6 in 1995-96 and 9 in 1996-97. During the 9 years prior to 1991, an average of only 1 lynx per year was taken in Unit 9C. Less than 20% of the lynx taken during 1992-96 were kittens, indicating that the increased harvest was due more to emigration than to growth in the resident population.

Otter harvests were relatively stable during the past 5 years, ranging from 57 to 120 (Table 1).

An average of 64 wolverines per year was taken from Unit 9 during 1974-94, but only 26 and 30 were taken in 1995 and 1996. Poor travel conditions and overall low fur prices reduced trapping effort. There has not been a reported harvest of wolverines from Unit 10 since 1980.

Permit Hunts. No special permits for trapping nuisance beavers were issued in Unit 9 during this reporting period.

Trapper Residency and Success. Data on trapper residency and success have not been specifically analyzed. Virtually all of the furbearers trapped in Unit 9 were taken by local residents from villages within the unit. A few trappers from outside the area have flown into units 9A and 9B to trap.

Harvest Chronology. The harvest chronology should be viewed cautiously because trappers do not always keep close track of when harvests occurred. Annual variations in chronology usually reflect weather and travel conditions, but January and February consistently are the most important months for trapping (Table 2).

Transport Methods. Snowmachines are the most common means of access for beaver, lynx, otter, and wolverine trappers (Table 3), but during 1995-96 and 1996-97, the lack of snow prevented use of snowmachines in much of Unit 9. ATVs were also an important means of access especially in parts of Unit 9 with unreliable or insufficient snowfall.

Other Mortality

Several red foxes were confirmed rabid within the Naknek drainage in spring 1994. Although speculative, this outbreak coincided with the record caribou harvest along the Naknek-King Salmon road system. The abundance of caribou carcasses and gut piles may have concentrated fox activity and contributed to transmission of the disease.

HABITAT

No formal habitat assessment programs were conducted in Unit 9. Habitat enhancement is not necessary or practical in this relatively inaccessible area.

CONCLUSIONS AND RECOMMENDATIONS

The furbearer harvests in Units 9 and 10 appeared to be low and relatively stable. Low fur prices, difficult travel conditions and large refugia in National Parks have reduced harvests of most species below historic levels. Even though information on population sizes was lacking, harvests of furbearers appeared below sustainable yield.

Harvest information was sufficient for management purposes for all species of furbearers requiring sealing in Unit 9. Harvest information for unsealed species, based on export and acquisition reports, was incomplete and potentially biased because of inaccurate unit coding by furbuyers and a lack of enforcement of fur export regulations. We have discontinued using these data.

Reports from trappers through both personal contact and trapper questionnaires provided a useful relative index to abundance and trend, but the number of responses per unit were generally inadequate to detect local trends.

We lacked adequate field observations to augment harvest data and trapper questionnaires in evaluating population sizes and trends. New methodology for assessing lynx and wolverine population densities are under development in interior Alaska, but may not be easily applied in Unit 9 because of typically poor snow conditions. Given the lack of techniques to assess population status for most species and the low level of trapping pressure in recent years, there is little impetus to intensify management or develop management objectives.

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Table 1 Unit 9 beaver, lynx, otter and wolverine harvests, 1992–96

Regulatory year	Reported harvest							Method of take			Total trappers
	M	F	Unk.	Juv.	Adults	Unk.	Total	Trap/snare	Shot	Unk.	
Beaver											
1992–93	0	0	258	50	115	93	258	238	0	20	29
1993–94	0	0	194	39	135	20	194	194	0	0	21
1994–95	0	0	183	52	114	17	183	160	0	23	18
1995–96	0	0	83	4	29	50	83	83	0	0	14
1996–97	0	0	127	17	67	43	127	127	0	0	29
Lynx											
1992–93	0	0	51	8	40	3	51	45	2	4	25
1993–94	0	0	54	9	38	7	54	41	10	3	29
1994–95	0	0	46	15	31	0	46	32	1	13	18
1995–96	0	0	23	4	16	3	23	17	3	3	12
1996–97	0	0	32	11	18	3	32	29	1	2	13
Otter											
1992–93	35	39	30	0	0	104	104	83	10	11	30
1993–94	28	29	8	0	0	65	65	64	1	0	21
1994–95	37	28	5	0	0	70	70	49	0	21	20
1995–96	29	19	9	0	0	57	57	48	1	8	15
1996–97	46	40	34	0	0	120	120	115	1	4	24
Wolverine											
1992–93	25	13	8	0	0	46	46	42	3	1	26
1993–94	36	18	4	0	0	58	58	49	9	0	32
1994–95	40	24	4	0	0	68	68	43	12	13	32
1995–96	18	7	1	0	0	26	26	11	10	5	11
1996–97	24	9	1	0	0	34	34	29	5	0	20

Table 2 Unit 9 beaver, lynx, otter and wolverine harvests percent[a] chronology by month, 1992–96

Regulatory year	Harvest periods					
	Sep/Oct	November	December	January	February	March
Beaver						
1992–93	0	0	0	51	23	26
1993–94	0	0	13	47	25	15
1994–95	0	0	8	37	54	1
1995–96	0	0	4	54	28	14
1996–97	0	0	2	63	30	4
Lynx						
1992–93	0	15	23	30	26	6
1993–94	0	9	28	43	20	0
1994–95	0	12	36	45	6	0
1995–96	0	5	30	45	20	0
1996–97	0	7	7	27	60	0
Otter						
1992–93	0	4	19	31	32	14
1993–94	0	3	23	48	23	3
1994–95	0	8	12	33	42	5
1995–96	0	8	18	31	35	8
1996–97	0	4	28	43	20	5
Wolverine						
1992–93	0	9	11	39	27	14
1993–94	7	0	19	40	25	9
1994–95	9	5	22	25	29	9
1995–96	14	5	24	24	33	0
1996–97	0	0	41	35	18	6

[a]Unknown not included.

Table 3 Unit 9 beaver, lynx, otter and wolverine harvests percent by transportation method, 1992–96

	Percent of harvest							
Regulatory year	Airplane	Dogsled Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk
Beaver								
1992–93	0	19	5	38	19	0	11	8
1993–94	0	7	0	24	60	2	1	0
1994–95	0	0	0	20	50	0	10	20
1995–96	0	0	16	12	18	1	29	24
1996–97	0	5	0	39	27	0	17	12
Lynx								
1992–93	0	9	0	19	49	0	13	11
1993–94	2	2	2	19	52	2	17	6
1994–95	0	0	0	15	26	2	20	37
1995–96	0	0	0	57	13	0	17	13
1996–97	3	0	0	28	9	0	16	47
Otter								
1992–93	0	6	3	25	45	0	11	11
1993–94	12	6	1	22	51	0	8	0
1994–95	4	0	0	26	30	0	4	0
1995–96	0	5	2	37	28	0	12	16
1996–97	1	0	0	27	52	0	13	7
Wolverine								
1992–93	2	3	0	7	78	0	7	0
1993–94	9	2	2	7	74	0	5	2
1994–95	15	0	4	1	46	1	7	26
1995–96	15	0	0	15	30	0	4	36
1996–97	6	0	0	18	59	0	12	5

LOCATION

GAME MANAGEMENT UNIT: 11 (13,257 mi^2) and 13 (22,857 mi^2)

GEOGRAPHIC DESCRIPTION: Nelchina and Upper Susitna Rivers, Wrangell Mountains

BACKGROUND

Historic harvest data are limited for furbearers in Units 11 and 13 prior to the initiation of sealing requirements. Wolverine and beaver sealing became mandatory in 1971, followed by lynx and land otter in 1977. Before sealing began, furbuyer reports gave minimal information on harvests, and bounty records provided harvest data only on wolverines. Little research on furbearer populations has been conducted in either unit until recently, and as a result, data pertaining to population densities, movements and distribution of furbearers are limited. Other than harvest records, reports by hunters and trappers and field observations by department personnel are the only historic sources of information concerning furbearer abundance.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

To develop measurable objectives for management of furbearer populations.

METHODS

Yearly trends in lynx abundance for both units were monitored by conducting track surveys within favorable lynx habitat. Twenty-six aerial transects (19 in Unit 13 and 7 in Unit 11) were established in 1988 for the purpose of conducting lynx track surveys on a yearly basis. Randomly selected aerial transects, each approximately 8 km long and 0.4 km wide, were flown in late winter.

Beaver, lynx, river otter, and wolverine pelts were sealed, and trappers interviewed at the time of sealing to obtain harvest statistics for these species. A trapper questionnaire survey provided additional harvest and relative abundance information on both sealed and unsealed furbearers.

In September 1995 small mammal trapping was initiated to develop a population abundance index in the Glennallen area. The objective is to develop a small mammal abundance index and determine if this information can be used to predict furbearer abundance based on prey abundance. A secondary objective is to participate in a statewide, multi-agency effort (coordinated through the University of Alaska, Fairbanks) to document small mammal population trends throughout the State. This work was continued in 1996 and 1997 and has been conducted between Mileposts 110 and 162 along the Richardson Highway and at Milepost 186 of the Glenn Highway. During all 3 years removal trapping was implemented using Museum Special traps baited with peanut butter. All trapping was conducted from mid to late September. Habitats trapped include spruce forests (1995-97), mid-successional fields (1995-97), mid-aged aspen (1995-97), spruce/birch association (1997), and alder thicket (1995). During the first 2 years (1995-96), 20–40 traps were set for 3 nights in each of the various habitat types. Trapping intensity was increased to 100 traps for 3 nights in each habitat type in 1997. During all years trap spacing was approximately 10 meters. Traps were checked daily and the catch was recorded.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Beavers are considered relatively abundant in both units. Although beaver cache surveys were not flown, frequent field observations of beaver ponds and food caches made during aerial big game surveys suggested beaver numbers were high. Trappers responding to the trapper questionnaire also considered beavers to be abundant on their lines and indicated that current population levels were similar to those reported in previous trappers' surveys.

Land otters are common in both units but are not considered abundant. Trapper questionnaire results also suggest most trappers consider river otter to be common but not abundant on their lines. Most trapper questionnaire responders reported river otter numbers had not changed in recent years.

Currently lynx are considered abundant within portions of both units having favorable habitat. The lynx population has increased in portions of Unit 11 and 13 during the last 3 years. Lynx track transects were not flown in 1994 but results from 1995 until 1998 also show lynx numbers have increased. The number of tracks counted on aerial lynx track survey transects increased in 1995 and 1996, while 1997 counts were stable at 1996 levels. This increase in lynx numbers was not expected since the historic 10-year cycle predicted a population low in 1997-98 after peaking in 1992. In fact, the lynx population in both units appeared to follow a traditional 10-year cycle, until this recent increase, peaking in 1972, 1982, and 1992. The lynx population did start to decline from 1993-95 based on harvest records. However, in 1994 the percent kittens in the harvest started to increase. By 1996 lynx harvests increased dramatically and lynx were considered more abundant than during the supposed population peak in 1992. In terms of lynx abundance within cycles, the lynx cycles in both units since the 1960's have been of lower amplitude based on declining harvest trends and trapper reports.

Wolverines are considered abundant in the more remote; mountainous regions of each unit but are relatively scarce at lower elevations for the Lake Louise Flats. Wolverines are the only furbearers having density estimates available for portions of Unit 13. A density estimate of 4.5 wolverine/1,000 km^2 was obtained during 1991 in the eastern Talkeetna Mountain portion of Subunit 13A (Gardner and Becker 1991) and 5.2 wolverines/1,000 km^2 by Golden 1996) five years later. These estimates were similar to the 5.2 wolverine/1,000 km^2 density obtained in the Chugach Mountains in Subunit 13D in 1987 (Becker and Van Daele 1988). These estimates were obtained in the spring after harvests and much of the overwinter mortality had occurred. Also, both were located in areas considered to be favorable wolverine habitat. Wolverine densities in less mountainous portions of the unit were considered much lower than the areas surveyed. Consequently, extrapolation of the observed densities did not provide an accurate unit-wide estimate unless adjustments were made for areas lacking in favorable habitat. Trappers responding to the trapper questionnaire also considered wolverine common on their lines but considered overall numbers stable. It appears that wolverine numbers may have increased slightly on some traplines located in favorable wolverine habitat, usually mountainous areas. Wolverine, however, remained scarce in the timbered areas at lower elevations.

Marten numbers increased in both Game Management Units 11 and 13 during the mid-1980s appeared to peak about 1988 and have been fluctuating yearly since. Abundance estimates are developed from the trapper questionnaire. Track transects, although a feasible method of evaluation abundance and trend, are not conducted for marten. Trappers with traplines located in favorable marten habitats reported marten to be abundant in 1995 and 1996 but in decline by 1997. Yearly fluctuations in marten numbers are thought to represent changes in production and/or survival of young due to food availability. Marten remained abundant enough in Unit 13 and 11 to make them the most economically important furbearer in these units during this reporting period.

Trappers reported coyotes to be common or abundant, depending on the habitat type trapped. Overall coyote numbers are considered stable at this time. High coyote numbers occur along the many rivers found throughout the units, river bottoms appear to be favorable habitat for them.

Trappers reported that fox were common and increasing in number on their lines. Fox are found in both units from forested lowlands to alpine tundra, but fox numbers appear to be more abundant in Unit 13 than 11.

Muskrat numbers are very low throughout both units. Results from the annual trapper questionnaire indicate trappers consider muskrats either not present or scarce on their lines. Muskrats were abundant during the early 1980s but their numbers declined dramatically during the mid-1980s and have not increased since. Reasons for both the dramatic decline in numbers and continued low density have not been determined.

Mink are reported common and the population stable on traplines of those individuals responding to the trapper questionnaire.

In Unit 13 and 11 hares have historically followed a 10-year cycle that varies in amplitude. Hare abundance within cycles has been lower each cycle since the 1972 high. The last predicted high was in 1992. In fact, after a low amplitude population peak in 1992, hare numbers did start to decline. However, in 1995 hare numbers started increasing again within pockets of favorable habitat. Results of snowshoe hare pellet transects conducted in Unit 11 and 12 by National Park Service biologists support this conclusion (Carl Mitchell, pers. commun.). Instead of a population low in 1997 or 1998 as predicted under a normal 10-year cycle, hare numbers are the highest they have been in 25 years in certain portions of Unit 13 and 11. Currently hares are abundant over much of Unit 13 and 11 but certainly not throughout the units. Reasons for the increase in hare abundance during a period of expected cyclic lows are unknown.

Small mammals are an important prey base for a number of furbearer species in Units 11 and 13. Determining abundance of small mammals may help in monitoring the yearly population trends of furbearers. Respective catch rates for 1995, 1996 and 1997 were 0.2 (n = 61), 0.05 (n = 11), 0.09 (n = 106) catches per trap night. During 1995 red-backed voles (Clethrionomys rutilus) accounted for 85% (n = 52), meadow voles (Microtis pennsylvanicus) 7% (n = 4), and shrews (Sorex spp.) 8% (n = 5). In 1996 red-backed voles represented 36% (n = 4) of the catch while meadow voles and shrews accounted for 9% (n = 1) and 55% (n = 6) respectively. The 1997 catch of 85% (n = 90) red-backed voles, 11% (n = 12) meadow voles, and 4% (n = 4) shrews was proportionally similar to the 1995 catch.

Specific statements about small mammal abundance based on these results are difficult because of variable trapping intensity. Trapping effort during 1995 and 1996 was minimal and used more as a feasibility study to determine if results from this type of effort would be useful. Initial examination of the available data suggests that small mammals were most abundant in 1995, declined in 1996, then increased from 1996 to 1997. This trend is similar to snow depth patterns during this time. It is possible small mammal survival over winter declines when snow depths are not adequate to provide insulation from cold temperatures. Now that an intensified effort (1997) has been established, I recommend that this work continue. For minimal cost and effort, data can be gathered that will potentially help us to better understand furbearer cycles in the Copper River Basin by focusing on their prey species. At the very least, this information will help to fill in gaps for the statewide small mammal population trend data base.

Distribution and Movements

Lynx distribution follows that of the spruce forest habitat in both units. During this reporting period lynx numbers were higher in Subunits 13C, B and A along the Copper, Gulkana, Gakona and Chistochina Rivers and in 13D along the Klutina and Tonsina River drainages. Lynx moved freely between units because the favorable habitat types are continuous. Dispersal of marked lynx from both the Kenai Peninsula and Yukon Territory into Unit 13 was observed. These movements suggest immigration could be an important component of the cyclic increase in lynx in Units 11 and 13, and may contribute a number of animals to the population.

Wolverines are most abundant in mountainous habitats of the Chugach, Talkeetna, and Alaska Ranges in Unit 13 and the Chugach and Wrangell Mountains in Unit 11. Prior to the late 1970s, wolverines were reportedly more numerous near settlements and on the Lake Louise Flats than today. Movement patterns for radio-collared wolverines in Unit 13 were reported by Gardner (1985). He observed that movements declined during the fall but increased again in February with the dispersal of juveniles into vacant habitat. Long distance dispersal of a radio-collared wolverine out of the unit has been reported by both Gardner (1985) and Golden (1977).

MORTALITY

Harvest

<u>Seasons and Bag Limits</u>. Beaver trapping season in Unit 13 was 10 October to 30 April during the 1994-95 season but closed on 15 May starting in 1995-96. The bag limit was 30 beavers in 1994-95, but the bag limit was dropped in Unit 13 for beaver beginning in 1995-96. In Unit 11 the season opened on 10 November and closed on 30 April, and the bag limit was 30 beavers per season throughout this reporting period.

The coyote and river otter trapping season in Units 11 and 13 was from 10 November to 31 March, with no bag limit. The coyote hunting season was from 1 September to 30 April, with a bag limit of 2 coyotes.

The red fox trapping season in Units 11 and 13 was from 10 November to 28 February with no bag limit. The red fox hunting season was from 1 September to 15 February with a bag limit of 2 foxes. Trapping season was 10 November - 31 January for weasels, mink, and wolverine. There was no bag limit for weasel or mink, but trappers were limited to 2 wolverine per season. Hunting season for wolverine was 1 September - 31 January with a bag limit of one wolverine. The marten season was 10 November – 10 December in 13E. The marten season in the remainder of Unit 13 and Unit 11 was 10 November - 31 January in 1994 but increased to 10 November - 28 February in 1995 and 1996. String sealing was required for marten caught in 13E, and there was no bag limit throughout Unit 11 and 13. The muskrat-trapping season was from 10 November to 10 June and there was not a bag limit. The lynx trapping season was 15 December - 10 January in 1995 and 1 December - 15 January in 1994 and 1996 with no bag limit. Hunting season for lynx was 10 November - 31 January with a bag limit of 2 lynx.

Board of Game Actions and Emergency Orders. The Board of Game, during its spring 1997 meeting, lengthened mink and weasel season in Unit 11 and 13 by 28 days, extending the closing date from 31 January to 28 February. The reason for this change was to allow for incidental take of these species in marten sets during February. The 2-wolverine bag limit was changed to no limit in both Units 11 and 13.

Hunter/Trapper Harvest. There were 24 beaver reported harvested in Unit 11 during the 1996-97 trapping season (Table 1). Historically, the highest harvest was 56 beaver taken in 1985 but harvests have fluctuated appreciably between years, with no trend evident.

Beaver harvest for Unit 13 is presented in Table 2. Harvests over this reporting period have been relatively stable and averaged 246 beaver per year. This is the highest reported 5-year average since sealing records have been maintained. However, current harvest levels are below the historic peak with reported catches of 333 and 300 beavers in 1986 and 1987. Prior to liberalizing seasons the beaver catch in Unit 13 averaged 92 (range 33-201) between 1972 and 1986. The percent kits in the harvest was 26% in 1996, but fluctuates yearly with no trend evident. Subunit 13E has the highest beaver harvest of any subunit with 45 percent of the unit-wide harvest coming from Subunit 13E during the past 5 years.

River otter harvests in Unit 11 varied from none taken to a high of 12 during the last 5 years (Table 3). River otter harvests in this unit have historically been low, averaging only 4 animals per year (range 0-11) between 1977 and 1993. In Unit 13 the 1996-97 reported take was 38 otters and has averaged 44 a year during the last 5 years (Table 4). From 1977, when sealing of otters became a requirement, through 1992, the annual harvest has averaged 25 otters (range 5-68) for Unit 13. Prior to 1993, annual harvests fluctuated with no overall trend apparent. However, the trend for this reporting period has been one of higher otter harvests. Otter harvests by subunit in Unit 13 have fluctuated annually, and no subunit has consistently produced a higher percent of the total take.

The lynx harvest for Unit 11 is presented in Table 5. During the current 10-year cycle lynx harvests peaked in 1991-92 with 107 lynx sealed, declined to 9 lynx in 1995-96, then increased to 37 lynx sealed in 1996-97. The percent kittens in the harvest also increased the last 2 years (Table 5). The total take of 221 lynx during the peak of the 10-year cycle, from 1990 through 1993, was 40% lower than the total cumulative harvest of 368 lynx reported during the top 4 years of the previous cyclical high, from 1980 through 1983. The lynx harvest in Unit 13 increased to 200 lynx in 1996 following three years of decline from a cyclic high harvest of 130 lynx in 1992 (Table 6). The percent kittens in the harvest has been high over the last three years (Table 6). This increase in reproduction and harvests does not follow the expected population composition and harvest data during a typical 10-year cycle. The predicted 10-year cyclic low was about 1997 or 1998. Also, the cycle peak in the early 1990's was lower than that observed in the 1980's based on a 28% decline in the harvest, from 611 lynx in 1980-83 to 442 from 1990 through 1993. Historically Subunit 13D provides over half the total unit lynx harvest but during this reporting period subunit 13C has the higher lynx harvests.

Wolverine harvests from Units 11 and 13 are presented in Tables 7 and 8, respectively. The wolverine harvest has been low in Unit 11 in 4 of the last 5 years. Except for a slight increase in 1996, the wolverine harvest in Unit 13 has remained relatively stable since 1989. Historically, wolverine harvests were much higher in the 1970s in both units than those currently observed. During the 1970s, the average yearly wolverine harvest in Unit 11 was 28 and in Unit 13 it was 86. The lowest wolverine harvest ever reported from Unit 11 has been 4 wolverines, which occurred during the 1995 and 1996 seasons. In Unit 13, the lowest take was 16 in 1988. Composition data showed males accounted for 65% (range - 25-91%) of the Unit 11 take during the past 5 years, and 60% (range = 43-68%) of the known sex harvest in Unit 13. Harvest locations indicate most wolverine harvests occurred in the mountainous portions of both units, especially from the Chugach Range in 13D and 11 and portions of the Talkeetna and Alaska Ranges in 13A and E.

Marten harvest figures are not obtained on a unit-wide basis. Sealing of marten has been required for 5 years in Subunit 13E and harvest figures are available. During this 5-year period the number of successful trappers averaged five (range = 3-7) and the annual harvest from Unit 13E averaged 29 marten (range = 12-41). Males predominated (range = 63-76%) in the harvest in all years. In the remainder of Unit 13 marten are the most important furbearers both in total harvest and value of furs sold, according to trapper survey responses. Individual catches that approach 200 marten have been reported by a few individuals, but most trappers take far fewer marten.

Hunter Residency and Trapper Success. Interest in beaver trapping in Unit 11 remains low, only 2-4 trappers reported taking beaver during this reporting period. The highest catch per trapper in the last 5 years was 9.0 beaver (Table 1), and in 1993-94 no one sealed a beaver. Most trappers sealing beaver from Unit 11 were local residents. The number of successful beaver trappers in Unit 13 is listed in Table 2. Trapping effort as reflected by the number of successful trappers fluctuates from year to year but is currently well below the 1986 figure of 55 successful trappers. However, the catch per trapper has been increasing in recent years with the 1996 catch of 9.3 beavers per trapper, the highest reported. It seems the trappers who do set for beavers are more successful.

The number of trappers taking otter in Unit 11 varied from zero to five trappers (Table 3). The highest catch per trapper was 3 otters. In Unit 13, an average (1992-96) of 19 trappers (range 11-26) reported an average yearly catch of 2.3 otters per trapper (Table 4). These figures represent the highest otter trapping effort and harvest per trapper to date. Trapping and snaring were the most important methods of take reported for otters taken in Units 11 and 13, although a few otter were reported shot in Unit 13.

In Unit 11 the number of lynx trappers dropped from 18, with an average catch of 5.9 in 1991 during the cyclic high, to only five, with an average catch of 1.8 lynx in 1995-96 (Table 5). In 1996 the trapping pressure on lynx increased slightly, nine trappers reported taking lynx; however, the average catch per trapper more than doubled to 4.1 lynx. In Unit 13, the number of trappers sealing lynx dropped (65%) from 61 in 1992 during the cyclic high to 21 in 1994; however, the catch per trapper increased from 2.1 to 3.7 lynx during this period (Table 6). Since 1994 the number of trappers taking lynx has doubled to 43, these trappers have taken an average of 4.6 lynx. Trapping and snaring are the most important harvest methods, but a few lynx are shot each year.

Four trappers in Unit 11 took an average of 1.0 wolverine during 1996-97 (Table 7). The number of trappers taking a wolverine in Unit 11 has been relatively stable, averaging five a year for the reporting period. The catch per trapper is low and fluctuates between one and two wolverine per trapper over the last 15 years. In Unit 13, 35 trappers took an average of 1.3 wolverines during the 1996 season. This represents a slight increase in trapping pressure in 1996 over previous years, but the catch per trapper has remained relatively stable throughout the reporting period (Table 8). All but one of the wolverine taken in Unit 11 were trapped or snared (Table 7). In Unit 13 trapping or snaring were also the most important methods of take; however, shooting accounted for 19% of the take during the reporting period (Table 8).

Response to the trapper questionnaire was good in 1995 and 1996, with 58% responding in 1995 and 73% in 1996. Response rates were similar to past years where 60-70% of those sent a survey replied. Trapping pressure declined in both years, respectively, as 33 and 37% of individuals responding to the survey reported they did not trap. As a group, trappers responding to the questionnaire are getting older, averaging 46 years of age in 1996, up from 43 in 1995. However, 50% reported bringing a youngster on the line this season. Trapping effort was similar both years; trappers reported an average of 12 weeks spent trapping. Those trappers who responded to the survey were, for the most part, very experienced with their area, having spent an average of 13 years trapping their current lines, which averaged 45 miles in length. Most trappers averaged about 50 sets on their line, but 9 (21%) trappers reported setting over 100 traps.

Harvest Chronology. The harvest chronology data for beaver in Unit 11 and 13 are presented in Tables 9 and 10, respectively. In Unit 11 harvests are very low and variable. In Unit 13 chronology data indicates most beaver are taken early or late in the season, few trappers expending much energy trying to take beaver during January or February. The early part of the season has been popular because the ice is thinner and beaver meat is sought for trap bait and sled dog food. High harvests in March and later reflected increased trapper activity associated with longer days, moderating temperatures, higher pelt quality, and trapping seasons for many other furbearers have closed.

Harvest chronology for otter in Unit 11 has not shown any particular pattern over the past 5 years, due to the small number taken (Table 11). The Unit 13 harvest chronology also fluctuated, but it appeared that overall more otters are taken in the first 3 months of the season (Table 12). This pattern generally reflected overall trapping pressure for other furbearers.

Harvest chronology data for lynx in Unit 11 and 13 are included in Tables 13 and 14, respectively. With such short seasons, chronology data probably reflects access and trapping conditions due to weather and snow depth more than differences in trapper preference. Most trappers start setting traps for lynx as soon as the season opens or whenever snow conditions and freeze-up allow travel to traplines after opening day.

Tables 15 and 16 present chronology data for Unit 11 and 13 wolverine harvest. Because the season is so short, the timing of the wolverine harvest, like lynx, is thought to reflect trapping conditions more than differences in trapping preference.

Transport Methods. The transportation methods most used by successful trappers were snow machines, dog sleds/snow shoes/skis and highway vehicles (Tables 17-24).

CONCLUSIONS AND RECOMMENDATIONS

Estimates of trapping pressure in Unit 11 and 13 are compiled from the trapper questionnaire, sealing data and staff contact with trappers. Questions pertaining to trapping effort in the trapper questionnaire suggest fewer individuals are trapping and those that are, as a group, are getting older with a substantial number of years trapping experience in Unit 11 and 13. The amount of effort expended by these individuals declined in the early 1990's but stabilized the last 2 years, as reflected by the number of sets made, length of traplines and weeks trapped. Although trapper questionnaire responses suggest the price paid for fur really wasn't a factor for those still trapping, the price paid is most likely the major underlying contributing factor to the decline in the number of trappers. There is no question trapping pressure is currently much lower than in the 1980s. Fur prices generally remained low despite predictions of increased value. The only species realizing an increase were beaver, otter, and muskrat. Only the highest quality fox and coyote have much value. The top price for lynx was $125 for taxidermy quality adults. Most lynx going to the fur market averaged $80-100, much lower than during the last cycle in the 1980s when lynx averaged over 300 dollars. Marten prices are well below $50 average, a decline of over 50 percent from the 100-dollar average in the late 1980's. Also, only top quality wolves have market value at this time.

Beaver and otter catches in both Unit 11 and 13 were higher during this reporting period than the last reflecting increased demand and prices for these fur items. The short hair furs - beaver, otter, and muskrat - were the only furs taken in Unit 11 and 13 that have posted price increases in recent years. Another reason beaver harvests have increased is the increased demand for meat. In addition, because beaver were considered underutilized, seasons and bag limits have been liberalized. Beaver and otter populations are considered healthy. Both species are harvested over larger portions of both units. Trapping is not concentrated, with the possible exception of some highly visible roadside beaver colonies. Current harvest rates are considered sustainable and no changes in beaver, otter, or muskrat trapping regulations are proposed at this time.

Current harvests of fox, coyote, mink and weasels are lower than in previous years because of reduced trapping pressure and effort. This conclusion is based on responses to trapper questionnaires, a number of individuals reported either not trapping last year, or expending less effort than in previous years. The reason for the decline in trapping pressure and effort is linked to a weak fur market for long-haired furs. There were no overall population trends detected other than yearly fluctuations in abundance for these species. Harvests of fox, coyote, mink and weasels are well within sustainable levels and no changes in trapping or hunting regulations are recommended.

Lynx numbers have increased in both Unit 11 and 13 the last two years. This increase followed a rapid build-up of hares within portions of these two units. Harvest data indicates increased lynx reproduction during the last two years, based on percent kittens in the take. Movement of lynx into Unit 13 in search of hares may have also contributed to the population build-up. This observed increase in lynx does not follow the expected population trend based on the traditional 10-year population cycle. If they followed the predicted population trend, lynx would be at the cyclic low this year (1998). The traditional lynx and hare cycles have been disrupted for unknown reasons.

In Unit 13 lynx are managed by a tracking harvest strategy (THS). Seasons lengths are adjusted during the various stages of the lynx cycle in an attempt to control the harvest. The lynx harvest objective under the THS is to reduce the catch of lynx after the beginning of the cyclic decline to keep the population from being pushed even lower by high harvests. When lynx are abundant and producing kittens, the season is lengthened. Reproduction is monitored by assessing the percent kittens in the harvest. Abundance is monitored by trapper questionnaires, harvest records and trend counts. A harvest summary and population trend estimate are completed by 15 March. Determination of season dates for the following year are completed by 20 April and included in the next year's trapping regulation book. The current recommendation is to maintain at least a 2-month season for lynx because track surveys, trapper reports, and harvest data all suggest continued high lynx numbers.

Wolverine numbers were stable in 13A during this report period. Wolverine censuses were not repeated in 13D. Trapper reports from those in favorable habitats suggest wolverine numbers have increased; however, numbers remain low in forested habitats at lower elevations in Unit 13. Management objectives included attempting to increase wolverine numbers, promoting increased use of lowland habitats. Management actions over the past 10 years include reducing the season and creating a bag limit of 2 wolverine. These were not successful in increasing wolverine numbers on the forested lowlands. Lack of food resources for wolverine on the Flats is the most likely limiting factor. Dispersing radio-collared wolverine have moved to other mountainous habitats and have not remained on the forested lowlands of the Lake Louise Flats. I believe the management objective to increase wolverine numbers on the Flats may not be biologically feasible. This conclusion is similar to that of Magoun concerning wolverine abundance on the lowland areas of the Kenai Peninsula (Golden 1996).

Wolverine harvests, although increasing slightly in 1996 in Unit 13, were stable over this reporting period and well below peak harvests of the early 1980s. Important harvest areas include the Chugach Range in Unit 13D along the Richardson Highway and the eastern Talkeetnas in Unit 13A. In heavily trapped portions of the eastern Talkeetnas in Unit 13A, marked wolverine had an average harvest rate of 8% over the last 4 years (Golden 1997). A sustainable harvest rate for Unit 13 is believed to be from 4-15% of the fall population (Gardner et al. 1993). Because current harvest rates appear to be sustainable, and the objective of increasing wolverine in lowland areas questionable, I recommend maintaining the current season length. The bag limit was eliminated for the 1997-98 season, because it was not considered an effective regulation, historically very few trappers take more than two wolverine per season.

Marten are considered the most important furbearer to individuals currently trapping in Units 11 and 13, though pelt prices dropped by over 50% from the 100-dollar averages of the late 1980s. Trapping effort for marten declined because marten averaged only $40 in 1996. Marten numbers increased in both units during the 1980s and probably peaked by 1988 or 1989. Responses to the trapper questionnaire suggest marten numbers were down because of normal fluctuations in the food supply or predation. Small mammal trapping results suggest small mammal numbers were also low. Current harvest levels for marten are considered to be sustainable. The decline in trapping effort, because of lower prices paid for marten over the last two years, has increased the size of refugia that should help the marten population to increase more rapidly once the prey base is sufficient. Because marten are such an important furbearer in Unit 13, management efforts should be maintained to monitor population trends and quantify the harvest. The trapper questionnaire should continue to ask how many marten each trapper takes every year. Although the questionnaire is voluntary and undoubtedly some trappers will avoid listing their catch, it appears enough comply to make these data worthwhile.

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Table 1 Unit 11 beaver harvest, 1992–96

Regulatory	Reported Harvest				Method of Take					Successful
Year	Adult	Juv.	(%)[a]	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	trappers
1992/93	5	0	(0%)	5	4	(80%)	1	0	0	3
1993/94	0	0	(0%)	0	0	(0%)	0	0	0	0
1994/95	10	2	(17%)	12	12	(100%)	0	0	0	2
1995/96	13	5	(28%)	18	18	(100%)	0	0	0	2
1996/97	22	2	(8%)	24	24	(100%)	0	0	0	4

[a] Beaver< 52"

Table 2 Unit 13 beaver harvest, 1992–96

Regulatory	Reported Harvest				Method of Take					Successful
Year	Adult	Juv.	(%)a	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	trappers
1992/93	164	63	(28%)	227	227	(100%)	0	0	0	38
1993/94	171	54	(24%)	225	213	(95%)	0	0	12	32
1994/95	215	59	(22%)	274	267	(97%)	0	0	7	40
1995/96	225	47	(17%)	272	270	(99%)	2	0	0	33
1996/97	173	60	(26%)	233	233	(100%)	0	0	0	25

[a] Beaver< 52"

Table 3 Unit 11 otter harvest, 1992–96

Regulatory	Reported Harvest					Method of Take					Successful
Year	Males	(%)	Females	Unk.	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	Trappers/hunters
1992/93	0	(0%)	0	1	1	1	(100%)	0	0	0	1
1993/94	0	(0%)	0	0	0	0	(0%)	0	0	0	0
1994/95	2	(67%)	1	0	3	3	(100%)	0	0	0	3
1995/96	8	(67%)	4	0	12	12	(100%)	0	0	0	5
1996/97	6	(67%)	3	0	9	9	(100%)	0	0	0	3

Table 4 Unit 13 otter harvest, 1992–96

Regulatory	Reported Harvest					Method of Take					Successful
year	Males	(%)	Female s	Unk.	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	Trappers/hunters
1992/93	6	(43%)	8	9	23	21	(91%)	0	0	2	11
1993/94	23	(68%)	11	8	42	37	(88%)	2	3	0	21
1994/95	34	(61%)	22	5	61	57	(93%)	4	0	0	26
1995/96	28	(61%)	18	12	58	55	(95%)	3	0	0	19
1996/97	12	(67%)	6	20	38	37	(97%)	1	0	0	18

Table 5 Unit 11 lynx harvest, 1992–96

Regulatory Year	Reported Harvest				Method of Take					Successful trappers
	Adult	Juv.	(%)[a]	Total	Trap/snare	(%)	Shot	(L&S)	Unk	
1992/93	52	2	(4%)	57	55	(96%)	2	0	0	16
1993/94	17	2	(11%)	19	19	(100%)	0	0	0	8
1994/95	15	1	(6%)	16	16	(100%)	0	0	0	6
1995/96	6	3	(33%)	9	9	(100%)	0	0	0	5
1996/97	29	8	(22%)	37	36	(97%)	1	0	0	9

[a] Lynx ≤ 34" in length.

Table 6 Unit 13 lynx harvest, 1992–96

Regulatory Year	Reported Harvest				Method of Take					Successful trappers
	Adult	Juv.	(%)[a]	Total	Trap/snare	(%)	Shot	(L&S)	Unk	
1992/93	107	15	(12%)	130	114	(88%)	12	0	4	61
1993/94	70	10	(13%)	80	77	(96%)	3	0	0	38
1994/95	59	19	(24%)	78	76	(97%)	2	0	0	21
1995/96	40	31	(44%)	71	67	(94%)	4	0	0	27
1996/97	133	63	(32%)	200	176	(88%)	6	0	18	43

[a] Lynx ≤ 34" in length.

Table 7 Unit 11 wolverine harvest, 1992–96

Regulatory	Reported Harvest						Method of Take					Successful
Year	Males	(%)	Females	(%)	Unk.	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	Trappers/hunters
1992/93	3	(60%)	2	(40%)	0	5	5	(100%)	0	0	0	4
1993/94	3	(43%)	4	(57%)	0	7	7	(100%)	0	0	0	5
1994/95	10	(91%)	1	(9%)	0	11	11	(100%)	0	0	0	7
1995/96	3	(75%)	1	(25%)	0	4	4	(100%)	0	0	0	3
1996/97	1	(25%)	3	(75%)	0	4	3	(75%)	1	0	0	4

Table 8 Unit 13 wolverine harvest, 1992–96

Regulatory	Reported Harvest						Method of Take					Successful
year	Males	(%)	Females	(%)	Unk.	Total	Trap/snare	(%)	Shot	(L&S)	Unk.	Trappers /hunters
1992/93	19	(59%)	10	(31%)	3	32	23	(72%)	8	0	1	25
1993/94	23	(68%)	11	(32%)	0	34	28	(82%)	6	0	0	28
1994/95	16	(43%)	20	(54%)	1	37	25	(68%)	10	0	2	24
1995/96	20	(65%)	10	(32%)	1	31	27	(87%)	4	0	0	26
1996/97	27	(61%)	17	(39%)	0	44	37	(84%)	7	0	0	35

Table 9 Unit 11 beaver harvest chronology percent by month, 1992–96

Regulatory	Harvest periods								
Year	October	November	December	January	February	March	April	Unknown	*n*
1992/93	--	20	40	0	40	0	0	0	5
1993/94	--	0	0	0	0	0	0	0	0
1994/95	--	0	0	0	100	0	0	0	12
1995/96	--	0	0	78	0	22	0	0	18
1996/97	--	13	16	13	54	4	0	0	24

Table 10 Unit 13 beaver harvest chronology percent by month, 1992–96

Regulatory	Harvest periods								
Year	October	November	December	January	February	March	April	Unknown	*n*
1992/93	9	13	27	3	5	29	13	1	227
1993/94	22	20	15	2	0	26	8	7	225
1994/95	44	10	10	12	1	16	4	2	274
1995/96	38	30	19	5	3	4	0	1	272
1996/97	15	27	17	1	9	17	12	2	233

Table 11 Unit 11 otter harvest chronology percent by month, 1992–96

Regulatory	Harvest periods							
Year	November	December	January	February	March	April	Unknown	*n*
1992/93	100	0	0	0	0	0	0	1
1993/94	0	0	0	0	0	0	0	0
1994/95	33	0	33	0	33	0	0	3
1995/96	0	17	25	42	17	0	0	12
1996/97	33	44	0	22	0	0	0	9

Table 12 Unit 13 otter harvest chronology percent by month, 1992–96

Regulatory	Harvest periods							
Year	November	December	January	February	March	April	Unknown	*n*
1992/93	17	30	4	0	48	0	0	23
1993/94	19	19	45	12	5	0	0	42
1994/95	13	28	31	11	11	0	5	61
1995/96	17	29	24	28	2	0	0	58
1996/97	11	47	16	16	11	0	0	38

Table 13 Unit 11 lynx harvest chronology percent by month, 1992–96

Regulatory	Harvest periods						
Year	October	November	December	January	February	March	*n*
1992/93	0	7	35	53	5	0	57
1993/94	5	10	32	53	0	0	19
1994/95	0	0	37	63	0	0	16
1995/96	0	0	33	56	11	0	9
1996/97	0	11	43	46	0	0	37

Table 14 Unit 13 lynx harvest chronology percent by month, 1992–96

Regulatory	Harvest Periods					
Year	November	December	January	February	March	*n*
1992/93	25	37	38	0	0	130
1993/94	11	48	40	1	0	80
1994/95	8	65	27	0	0	78
1995/96	1	56	41	0	1	71
1996/97	2	62	35	0	1	200

Table 15 Unit 11 wolverine harvest chronology percent by month, 1992–96

Regulatory	Harvest Periods						
Year	November	December	January	February	March	Unknown	*n*
1992/93	0	60	40	0	0	0	5
1993/94	0	71	29	0	0	0	7
1994/95	9	55	36	0	0	0	11
1995/96	0	50	50	0	0	0	4
1996/97	25	25	25	0	0	25	4

Table 16 Unit 13 wolverine harvest chronology percent by month, 1992–96

Regulatory	Harvest periods								
Year	September	October	November	December	January	February	March	Unknown	*n*
1992/93	3	0	6	41	44	6	0	0	32
1993/94	9	3	15	29	38	6	0	0	34
1994/95	8	5	8	16	54	0	3	5	37
1995/96	3	3	10	45	35	0	0	3	31
1996/97	2	0	18	45	23	9	0	2	44

Table 17 Unit 11 beaver harvest percent by transport method, 1992–96

	Percent of Harvest								
Regulatory Year	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	0	0	0	100	0	0	0	5
1993/94	0	0	0	0	0	0	0	0	0
1994/95	0	0	0	0	100	0	0	0	12
1995/96	0	0	0	0	100	0	0	0	18
1996/97	0	0	0	0	71	0	0	29	24

Table 18 Unit 13 beaver harvest percent by transport method, 1992–96

	Percent of Harvest								
Regulatory Year	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	8	2	2	71	0	13	4	227
1993/94	0	12	9	0	53	1	21	4	225
1994/95	1	1	19	16	45	0	10	9	274
1995/96	2	4	16	6	31	0	34	8	272
1996/97	0	11	5	3	56	0	18	7	233

Table 19 Unit 11 otter harvest percent by transport method, 1992–96

	Percent of Harvest								
Regulatory Year	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	0	0	0	100	0	0	0	1
1993/94	0	0	0	0	0	0	0	0	0
1994/95	0	0	0	0	100	0	0	0	3
1995/96	0	0	0	0	100	0	0	0	12
1996/97	0	0	0	0	100	0	0	0	9

Table 20 Unit 13 otter harvest percent by transport method, 1992–96

	Percent of Harvest								
Regulatory Year	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	4	0	0	83	0	4	9	23
1993/94	10	14	0	0	66	0	0	10	42
1994/95	0	8	0	2	82	0	2	7	61
1995/96	0	7	0	2	72	0	7	12	58
1996/97	0	13	0	0	76	0	11	0	37

Table 21 Unit 11 lynx harvest percent by transport method, 1992–96

Regulatory Year	Percent of Harvest								
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	12	0	0	74	0	2	12	57
1993/94	0	0	0	0	79	0	5	16	19
1994/95	0	12	0	0	69	0	0	19	16
1995/96	0	0	0	0	100	0	0	0	9
1996/97	0	0	0	0	97	3	0	0	37

Table 22 Unit 13 lynx harvest percent by transport method, 1992–96

Regulatory Year	Percent of Harvest								
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	1	1	0	0	55	1	17	25	130
1993/94	0	1	0	0	73	0	11	14	80
1994/95	0	0	0	1	72	0	8	19	77
1995/96	0	0	0	1	80	6	13	0	71
1996/97	0	0	0	1	85	1	2	11	200

Table 23 Unit 11 wolverine harvest percent by transport method, 1992–96

Regulatory Year	Percent of Harvest								
	Airplane	Dogsled Skis Snowshoes	Boat	4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	0	20	0	0	80	0	0	0	5
1993/94	0	29	0	0	71	0	0	0	7
1994/95	0	36	0	0	64	0	0	0	11
1995/96	0	0	0	0	100	0	0	0	4
1996/97	25	0	0	0	75	0	0	0	4

Table 24 Unit 13 wolverine harvest percent by transport method, 1992–96

Regulatory Year	Percent of Harvest								
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway Vehicle	Unknown	*n*
1992/93	9	0	0	0	69	0	6	16	32
1993/94	9	0	0	3	73	0	12	3	34
1994/95	5	0	0	3	78	3	0	11	37
1995/96	6	0	3	3	77	0	6	3	31
1996/97	5	0	0	0	84	2	5	5	44

LOCATION

GAME MANAGEMENT UNIT: 12 (10,000 mi^2) and 20E (11,000 mi^2)

GEOGRAPHIC DESCRIPTION: Upper Tanana, White, Fortymile, Ladue, and Charley River drainages

BACKGROUND

Historically, furbearer trapping has been an important part of the economy in eastern Interior Alaska. Between the early 1900s and 1920, trapping supplemented income of miners and Alaskan Natives. The Gold Rush ended during the 1920s and most of the miners moved out of the Fortymile area. However, trapping still augmented incomes for many area residents. Today, the economy of the area is primarily seasonal. Trapping continues to provide for subsistence use and additional income for many local residents.

Marten and lynx are the most economically important furbearers in Units 12 and 20E. During population highs, muskrats are also economically important in Unit 12. Beavers are an important subsistence resource to Northway residents but are lightly trapped in most of the area. Little trapping effort is expended on coyotes, red foxes, mink, river otters, ermine, red squirrels, or wolverines because of low pelt values, low abundance, or difficulty and expense of trapping.

Two decisions within the next 4 years may reduce trapping opportunity and income for Alaskan trappers. A ballot initiative to prohibit the use of snares for catching wolves may be decided by Alaskan voters in November 1998, and international decisions concerning acceptable methods and means will be made by 2001 or 2002, following a 3–4 year trap research program.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Provide an optimal harvest of furbearers.
- Provide the greatest opportunity to participate in hunting and trapping furbearers.

MANAGEMENT OBJECTIVES

- Maintain accurate annual harvest records based on sealing documents.
- As new research and management findings become available, develop specific population and harvest objectives for furbearers.

METHODS

We used several methods to obtain estimates of furbearer population abundance, trend, and distribution. These methods included: 1) trapper interviews, 2) a statewide trapper questionnaire, and 3) field observations by Fish and Game personnel. The best information about overall furbearer abundance and trapping pressure was collected by periodic interviews with long-term trappers and pilots. Since 1995, lynx and snowshoe hare population trends were monitored using an aerial survey technique (McNay, unpubl data). Lynx population trend was also assessed by evaluating age structure, pregnancy rate, and body condition of harvested lynx.

We obtained annual harvest estimates from sealing certificates. Information collected during the sealing process included location, date, method of take, sex, and age (young-of-the-year or adult). Sealing of pelts was mandatory for wolves, wolverines, lynx, river otters, and beavers. Annual harvest estimates for beaver and otter included a subjective estimate of unreported take because some pelts were used domestically and were not sealed. Harvest trend was also obtained from the Raw Fur Skin Export Report, which was a record of all furbearer pelts exported from Alaska.

We estimated the proportion of kits in the harvest for beavers and lynx by using pelt measurements from the sealing certificates. Beaver pelts <53 inches (length plus width) (Buckley and Libby 1953) and lynx pelts <35 inches long (Stephenson 1988) were accepted standards for kits. Some overlap exists between pelt lengths of lynx kits and yearlings.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Lynx

The lynx population in Units 12 and 20E was at its cyclic high between 1990 and 1992, based on track surveys, harvest data (Tables 1 and 2), and comments from area trappers. During this cycle, kitten production was first reflected in the harvest during 1986 in Unit 12 and during 1987 in Unit 20E. Kitten production remained high until 1991 and then declined substantially. According to local trappers, lynx remained uncommon during the 1989 trapping season but became common during 1990 and continued to increase. Lynx were abundant until 1992 and common during 1993. Based on movement data from a lynx project in the Yukon, a portion of the lynx population in 1993 was transient from other areas. The lynx population declined to a low level in 1994.

Kitten production began to increase in 1994 and ranged between 13 and 21% during 1994 through 1996. The 1997 preliminary harvest results indicated 32–34% of the harvest was kittens. Aerial survey results indicated that numbers of snowshoe hares increased in 1994 but distribution was localized. Lynx kitten production was primarily limited to those hare pockets.

Local trappers reported the 1994 lynx population to be low and reduced from 1993. Trappers reported increasing numbers of hares each year after 1994 but did not observe a substantial increase in the number of lynx until 1996. Aerial survey data were consistent with trapper observations. Based on current estimates of kitten production and snowshoe hare population trends, the lynx population in Units 12 and 20E is expected to remain high for 1–2 more years.

Wolverine

Wolverines were abundant in both units during the 1960s, corresponding to the period of high ungulate and wolf densities. According to the area's long-term trappers, wolverine numbers declined during the past 20 years coinciding with the decline in moose and caribou. The only area within the 2 units where wolverines are still common is in the mountainous habitats of Unit 12. Unlike Unit 20E, large populations of ground squirrels inhabit this area. Also, during the past 4 years all or part of the Nelchina and Mentasta caribou herds have spent portions of the winter in Unit 12, increasing the amount of carrion available to wolverines. Ungulate carrion and ground squirrels are important foods for wolverines in other areas of Alaska (Gardner 1985). Based on trapper questionnaires and incidental observations, the wolverine population was low and stable throughout the 2 units.

Marten

Marten populations declined after reaching a high in 1987 and remained lower through 1992. Beginning in 1993, trapper observations and incidental sightings by department personnel indicated the marten population increased in Units 12 and 20E. Marten were common in 1995 and 1996 but appeared to have declined in 1997. In 1997, they were common in localized areas but were uncommon in many areas of suitable habitat. Trappers who took most of the 1997 harvest reported taking few juveniles.

Factors that may have caused the decline included harvest, predation, and lack of prey. Marten harvest was high during 1996 because many trappers selected for marten due to higher pelt prices. Predation may have negatively impacted marten population dynamics. Observations by long-term trappers in eastern Alaska and the adjacent Yukon Territory indicate that marten numbers decline when numbers of hares, lynx, and raptors increase. Low availability of microtines may affect marten natality rates and kit survival.

In Units 12 and 20E, marten continued to contribute most of the income for area trappers during this report period. Competition among trappers for marten along the road system was high. Trappers used all accessible trails through marten habitat in both units. Lower marten populations and declining fur prices during 1992 and 1993 seemed to have caused a slight reduction in trapper effort. Marten trapping intensity increased in 1994 due to optimistic price projections and high marten numbers. Number of marten trappers and time spent afield declined in 1997 due to poor market conditions.

Red Fox

Trapper interviews, questionnaires, and incidental sightings by department personnel indicate fox numbers declined during 1993 and 1994 in both units. During those years, most of the foxes' main prey populations were depressed (i.e., grouse, ptarmigan, snowshoe hares and microtines). Fox numbers increased substantially since 1995 due to increased number of snowshoe hares, ptarmigan, and grouse. Presently, there is little trapper demand for foxes because of the low market value.

Muskrat

The Northway-Tetlin Flats has been one of the most productive trapping areas in Alaska for muskrats. Muskrat populations were high and were heavily trapped during the mid-1970s and again in the mid-1980s. Between 1990 and 1992, muskrats were at low levels in both units and there was little trapper effort. Based on observations by trappers in Northway, muskrats seemed to increase in 1993 in the Northway Flats, and there was an increase in trapping pressure by village residents. Extreme cold temperatures and lack of snow in 1995 and several years of drought conditions caused the muskrat population to decline to low levels. Muskrat numbers remained low throughout 1996.

Coyote

Coyotes increased in both units between the late 1980s and early 1990s and reached high numbers in certain areas, especially southeastern Unit 12. They declined following winter 1992 and have remained scarce throughout most of Units 12 and 20E. Based on trapper reports, coyote numbers may be increasing in southeastern Unit 12. There is little trapper demand for coyotes because of their low market value. Where coyotes are abundant, local residents have harvested high numbers.

Beaver

Beavers were scarce to common in both units in suitable, lowland habitats. Beaver numbers were lower in 1996 following severe freezing conditions during winter 1995. During late summer 1997, high water washed out many beaver houses located on area rivers. Impact on the beaver population was not known. There was little trapper demand for beavers in Unit 20E. In Unit 12, many Northway trappers selectively trap for beavers in the Northway Flats during spring.

Other Species

Trapper questionnaire results and sightings by area pilots and department personnel indicated that otters were uncommon in both Units 12 and 20E, ermine and red squirrel were common and stable and mink were scarce. Mink numbers seemed to have increased along the Tanana River in 1997. There was little trapper demand for these species. Respondents also listed hares, ptarmigan, and grouse as common and increasing. Microtines were reported as common and increasing. However, microtine populations may have declined during 1997.

MORTALITY

Harvest

Hunting Seasons and Bag Limits, Units 12 and 20E.

Coyote	1 Sep–30 Apr	2 coyotes
Red Fox	1 Sep–15 Mar	2 foxes
Lynx	1 Nov–31 Jan	2 lynx
Squirrel	No closed season	No limit
Wolverine	1 Sep–31 Mar	1 wolverine

Trapping Seasons and Bag Limits, Units 12 and 20E.

Beaver	1 Nov–15 Apr	15 beavers-Unit 12 25 beavers-Unit 20E
Coyote	15 Nov–28 Feb	No limit
Red Fox	1 Nov–28 Feb	No limit
Lynx	1 Dec–15 Feb	No limit
Marten	1 Nov–28 Feb	No limit
Mink/Weasel	1 Nov–28 Feb	No limit

Muskrat	20 Sep–10 Jun	No limit
River Otter	1 Nov–15 Apr	No limit
Squirrel/marmot	No closed season	No limit
Wolverine	1 Nov–28 Feb	No limit

Board of Game Actions and Emergency Orders. The Board of Game adopted a regulation during spring 1992 which allowed us to annually set the lynx season independent of the board process for Interior Units 12, 20, and 25C. This action enhanced the department's ability to apply the lynx tracking harvest strategy that was adopted as a board policy in 1987. That strategy was designed to protect lynx populations during the low part of the population cycle and, therefore, allow for a more rapid and larger growth phase. The next time the Board of Game will address furbearer proposals effecting Units 12 and 20E will be during the spring 1998 meeting.

Hunter/Trapper Harvest

Lynx — The lynx trapping season was 1 December to 15 January in 1994, 15 December to 15 January in 1995 and 1996, and 1 December to 15 February in 1997. Seasons were established after considering current lynx and snowshoe hare population trends.

The 1996 lynx harvest in Unit 12 was 164 (Table 1), substantially higher than the reported harvests in 1994 and 1995 and comparable to the high harvests during the early 1990s. Lynx pelt prices were higher in 1996 compared to recent years and more trappers selected for lynx. The percentage of kittens in the harvest was 24%, which was slightly higher than found during the peak growth phase of the last cycle between 1988–1990. By 8 March 1998 (7 days prior to the end of the sealing period), the reported 1997 harvest was 152 lynx, with 34% kittens. Thirty-two trappers reported harvesting lynx during 1996. This represents a catch rate of 5.1 lynx/trapper. During the past 3 seasons, lynx trapping has been restricted to parts of December and January and harvest was comparable between the 2 months (Table 3). Most trappers used snowmachines for transportation (94%; Table 5) and used leg-hold traps (66%) to catch lynx.

During 1996, 9 trappers reported taking 33 lynx (3.7 lynx/trapper) in Unit 20E (Table 2). Harvest slowly increased during the past 3 years. But, it was still far below 1991, when 14 trappers took 113 lynx. The percentage of kittens in the harvest was 21% compared to 13% and 14% in 1994 and 1995. Preliminary harvest results indicated that 32% of the 1997 harvest was kittens, which exceeded the 1988–1991 peak growth-phase average of 26%. Most lynx were harvested with traps (67%). During the past 3 seasons, lynx trapping has been restricted to parts of December and January. Lynx harvest was split between the 2 months (Table 4). The primary transportation method was snowmachines (91%; Table 6).

Local trappers supported reduced seasons during the lynx population lows but were less supportive of restricted seasons during the initial growth phases. Many trappers requested additional data that illustrated the effects of varying season lengths on lynx population dynamics and trapper harvest. To ensure future trapper support for the lynx harvest tracking strategy, we should study its effects.

Wolverine — The 1996 wolverine harvest in Units 12 and 20E was 11 and 6, respectively (Tables 1 and 2). The Unit 12 harvest was below the 5-year average of 15. Most of the harvest in

Unit 12 occurred in mountainous areas along the western and southern boundaries. Several area trappers believed the wolverine population in Unit 12 increased over the past 5 years due to the influx of 10,000 to 45,000 Nelchina and Mentasta caribou to the unit each winter since 1989. There were more wolverines harvested in the northern portion of the unit where most of the caribou wintered, but sample sizes were small. The wolverine harvest in Unit 20E during 1996 was equal to the 5-year average of 6 wolverines. Harvest was not concentrated in any specific geographic area, but a few wolverines were captured in most areas where trapping occurred. This indicated the wolverine population was distributed at low density across the area. Males composed 70% (range = 57–94%) and 69% (range = 57–100%) of the harvest since 1990 in Units 12 and 20E, respectively.

To estimate sustainable harvests for wolverines, we varied the harvest rate for a given set of natality and mortality rates that have been observed in other Alaskan and Yukon wolverine populations until the population growth rate stabilized near zero. Under these conditions, the sustainable harvest rate was 4 to 15% of the fall population. To evaluate the current harvest in Units 12 and 20E, I estimated the area's wolverine populations using a density range found in 2 areas with comparable habitats in Unit 13 (Gardner and Becker 1991). I estimated there are 50 to 82 wolverines in Unit 20E and the current harvest rate was 5 to 14%. Under this harvest intensity, harvest was high enough to limit population growth in Unit 20E, considering the low food base and probable low reproductive rate. In Unit 12, I estimated the harvest rate was 11 to 20%. Most of the harvest was concentrated in the mountains and primarily the harvest was males. I suspect that the resident population in that area was over exploited and most of the harvest was dispersing young males from adjacent areas.

Beaver — Interest in beaver trapping declined over the past 3 years in Unit 12 because of low pelt prices and reduced beaver numbers (Table 1). Most of the harvest was by Northway residents in the local area. The 1996 reported beaver harvest was 26, which was comparable to the 5-year average of 27. Beaver harvest in Unit 20E was historically low (Table 2). Most harvest was along the Yukon River by Eagle residents.

Otter — Otter populations in both Units 12 and 20E were low due to a lack of suitable habitat. Trappers seldom selected for otters due to the difficulty in catching them and to low fur price. During the past 11 years, an average of 5 otters have been taken annually in Unit 12 (Table 1), and only 3 otters have been trapped in Unit 20E (Table 2).

HABITAT

Assessment and Enhancement

Thirty years of strict fire suppression activities in Units 12 and 20E created an older, less diverse mosaic of habitats than would have existed under a natural fire regime. Lack of early to medium aged seral habitats may be limiting snowshoe hare and microtine numbers, and ultimately, lynx, marten, and other species. There are several large areas of medium aged seral habitats in Unit 20E because of wildfires. In these areas, the hare and lynx populations were much higher than in the rest of Unit 20E and in Unit 12. In Unit 12, 100,000 acres burned in 1990 creating early succession habitat along the Tok River. Snowshoe hare numbers are increasing in that area.

The *Alaska Interagency Fire Management Plan* for the Upper Tanana area became effective in 1984. This plan outlined areas that were afforded limited fire suppression. All land-managing agencies agreed to the plan. This approach was expected to restore a more natural fire regime and eventually improve habitat heterogeneity. Having a more diverse mosaic of habitats should benefit all furbearer species. Unfortunately, the plan was poorly followed and most fires regardless of the land status were attacked. Continued work with local people showing the benefits of fire is necessary before more acceptance and compliance with the plan will occur.

CONCLUSIONS AND RECOMMENDATIONS

Income from trapping is important to many local residents. Most of the local trappers have a long history of trapping in the area ($\bar{x}$ = 18.4 years) and have developed extensive lines ($\bar{x}$ = 50 miles) monitoring between 50 and 400 traps. The fur market primarily drives trapper effort. Trappers are able to conserve the furbearer populations along their lines because other trappers respect most of the established traplines. Furbearer populations are heavily exploited along the area road system, especially marten, lynx, and fox. Trappers consider public road corridors open lines, which has created intense competition and over exploitation in some areas.

Trapping effort was not directly measured. However, information collected from sealing data, trapper questionnaires, and discussions with area trappers indicated that trapping effort declined the past 3 years due to low pelt prices. However, marten and lynx trapping increased in 1996 in expectation of higher prices. Several area trappers also selected for wolves during 1995 and 1996 due higher prices offered by a privately funded incentive program. Trapping pressure was low on wolverine, beaver, otter, muskrat, and fox during this report period.

In most years marten were the most sought after furbearer in both units. Access to these units is limited. Thus, large refuge areas exist for marten. Based on marten distribution and abundance data, there is no need for any changes in the season length, bag limits, or methods and means of harvest.

Lynx were trapped intensively during periods of high fur price and population highs. Lynx numbers were high in both units and the fur price was below normal. Under the lynx harvest tracking strategy, trapping will not limit lynx population growth but season lengths may be shorter than necessary considering pelt prices and declining trapper participation. In areas that support primarily long liners or established traplines, lynx harvest could be adequately managed throughout the lynx cycle under 1 season length. Historically, area trappers managed their lines conservatively to provide for long-term benefits. Changing seasons may only be necessary along the roads during population lows or when the pelt prices become high.

Wolverines declined since the 1960s and were stable at low levels in both units (Kelleyhouse 1990). Ungulate food resources for wolverine were low, but increasing slightly, in Unit 20E. In Unit 12, potential food sources have increased during the past 10 years due to the Nelchina and Mentasta caribou herds wintering in the unit. Wolverine reproductive rate was dependent on food availability (Magoun 1985). I believe wolverine populations were food limited because of low ungulate densities in Unit 20E and in most of Unit 12 and because of lack of ground squirrels in Unit 20E. Area trappers do not select for wolverines but harvest was high enough to probably limit population growth and restrict any range expansion to the lowland habitats. Further restricting the wolverine trapping seasons would not substantially benefit population trend because the primary limiting factor is low prey availability.

All other furbearer populations were fluctuating within their historical levels and do not warrant changes in seasons and bag limits or methods and means.

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Table 1 Unit 12 beaver, lynx, otter, and wolverine harvest, regulatory years 1986–1996

Regulatory year	Reported harvest M	F	Unk sex	Juv[a]	Adults	Unk age	Estimated harvest Unreported	Illegal	Method of take Trap/snare	Shot	L&S[b]	Unk	Total harvest	Successful trappers/ hunters
Beaver														
1986–1987	0	0	55	5	50	0	20	0	44	3	0	8	75	16
1987–1988	0	0	18	5	13	0	20	0	18	0	0	0	38	6
1988–1989	0	0	15	2	13	0	20	0	15	0	0	0	35	7
1989–1990	0	0	14	3	11	0	20	0	13	0	0	1	34	5
1990–1991	0	0	18	6	12	1	20	0	18	0	0	1	39	7
1991–1992	0	0	40	10	30	0	20	0	36	0	0	4	60	11
1992–1993	0	0	34	1	33	0	20	0	34	0	0	0	54	6
1993–1994	0	0	35	2	32	1	20	0	34	0	0	1	55	11
1994–1995	0	0	26	0	26	0	20	0	26	0	0	0	46	6
1995–1996	0	0	14	7	7	0	20	0	14	0	0	0	34	4
1996–1997	0	0	27	6	20	1	20	0	26	0	0	1	47	6
Lynx														
1986–1987	0	0	80	11	69	0	0	0	78	0	0	2	80	32
1987–1988	0	0	74	21	53	0	0	0	72	2	0	0	74	35
1988–1989	0	0	70	13	57	0	0	0	65	5	0	0	70	29
1989–1990	0	0	78	18	60	0	0	0	74	3	0	1	78	28
1990–1991	0	0	133	23	110	0	0	0	131	2	0	0	133	40
1991–1992	0	0	174	6	163	5	0	0	170	4	0	0	174	49
1992–1993	0	0	232	5	227	0	0	0	218	6	0	8	232	43
1993–1994	0	0	121	2	117	2	0	0	103	3	0	15	121	28
1994–1995	0	0	89	12	75	2	0	0	85	3	0	1	89	23
1995–1996	0	0	42	11	31	0	0	0	40	2	0	0	42	10
1996–1997	0	0	164	40	121	3	0	0	158	2	0	4	164	32
Otter														
1986–1987	2	2	0	0	0	7	3	0	4	0	0	0	7	3
1987–1988	1	8	1	0	0	13	3	0	7	3	0	0	13	5
1988–1989	2	0	0	0	0	5	3	0	2	0	0	0	5	2
1989–1990	0	0	0	0	0	3	3	0	3	0	0	0	3	0
1990–1991	1	0	0	0	0	4	3	0	1	0	0	0	4	1
1991–1992	0	0	6	0	0	6	3	0	6	0	0	0	6	4
1992–1993	3	3	2	0	0	8	3	0	6	1	0	1	8	6
1993–1994	0	0	0	0	0	0	3	0	0	0	0	3	3	0
1994–1995	3	3	0	0	0	6	3	0	6	0	0	0	9	3

Table 1 Continued

Regulatory year	Reported harvest						Estimated harvest		Method of take				Total harvest	Successful trappers/ hunters
	M	F	Unk sex	Juv[a]	Adults	Unk age	Unreported	Illegal	Trap/snare	Shot	L&S[b]	Unk		
1995–1996	2	2	0	0	0	4	3	0	2	2	0	0	7	3
1996–1997	2	1	2	0	0	5	3	0	4	1	0	0	8	4
Wolverine														
1986–1987	18	14	0	0	0	32	0	0	27	2	0	3	32	15
1987–1988	13	5	1	0	0	19	0	0	18	0	1	0	19	12
1988–1989	9	5	0	0	0	14	0	0	10	4	0	0	14	8
1989–1990	8	4	0	0	0	12	0	0	10	0	0	2	12	11
1990–1991	13	1	0	0	0	14	0	0	14	0	0	0	14	8
1991–1992	16	10	1	0	0	27	0	0	25	2	0	0	27	16
1992–1993	9	5	0	0	0	14	0	0	14	0	0	0	14	10
1993–1994	15	3	3	0	0	21	0	0	19	2	0	0	21	15
1994–1995	12	9	0	0	0	21	0	0	21	0	0	0	21	12
1995–1996	4	3	0	0	0	7	0	0	6	1	0	0	7	7
1996–1997	8	2	1	0	0	11	0	0	11	0	0	0	11	8

[a] Beavers ≤52"; lynx ≤35" in length.

[b] L&S (land and shoot) refers to animals taken by hunters the same day hunters were airborne.

Table 2 Unit 20E beaver, lynx, otter, and wolverine harvest, regulatory years 1986–1996

Regulatory year	Reported harvest: M	F	Unk sex	Juv[a]	Adults	Unk age	Estimated harvest: Unreported	Illegal	Method of take: Trap/snare	Shot	L&S[b]	Unk	Total harvest	Successful trappers/ hunters
Beaver														
1986–1987	0			0	5	0	5	0	1	0	0	4	10	2
1987–1988	0			0	3	0	5	0	3	0	0	0	8	1
1988–1989	0			0	1	0	5	0	1	0	0	0	6	1
1989–1990	0	0	3	0	3	0	5	0	3	0	0	0	8	2
1990–1991	0	0	3	0	3	0	5	0	3	0	0	0	8	2
1991–1992	0	0	10	0	10	0	5	0	10	0	0	0	15	5
1992–1993	0	0	6	1	5	0	5	0	6	0	0	0	11	3
1993–1994	0	0	9	0	9	0	5	0	9	0	0	0	14	2
1994–1995	0	0	0	0	0	0	5	0	0	0	0	0	5	0
1995–1996	0	0	5	1	4	0	5	0	0	0	0	0	10	2
1996–1997	0	0	3	0	3	0	5	0	2	1	0	0	8	1
Lynx														
1986–1987	0			0	11	0	0	0	11	0	0	0	11	5
1987–1988	0			3	6	0	0	0	9	0	0	0	9	5
1988–1989	0			7	18	0	0	0	25	0	0	0	25	10
1989–1990	0	0	29	10	19	0	0	0	29	0	0	0	29	12
1990–1991	0	0	70	19	51	0	0	0	68	2	0	0	70	22
1991–1992	0	0	113	16	96	1	0	0	111	0	0	2	113	14
1992–1993	0	0	97	3	89	5	0	0	93	3	0	1	97	21
1993–1994	0	0	46	1	45	0	0	0	46	0	0	0	46	11
1994–1995	0	0	23	3	20	0	0	0	23	0	0	0	23	7
1995–1996	0	0	28	4	24	0	0	0	27	1	0	0	28	8
1996–1997	0	0	33	7	25	1	0	0	33	0	0	0	33	9
Otter														
1986[c]–1987														
1987[c]–1988														
1988[c]–1989														
1989[c]–1990														0
1990[c]–1991														0
1991–1992		1		0	0	0	0	0	1	0	0	0	1	0
1992[c]–1993														1
1993–1994	1	0		0	1	0	0	0	0	1	0	0	1	1
1994–1995	1	0	0	0	0	1	0	0	1	0	0	0	1	1

Table 2 Continued

Regulatory year	Reported harvest						Estimated harvest		Method of take					
	M	F	Unk sex	Juv[a]	Adults	Unk age	Unreported	Illegal	Trap/snare	Shot	L&S[b]	Unk	Total harvest	Successful trappers/ hunters
1995[c]–1996														
1996–1997[c]									4	1				
Wolverine														
1986–1987	5	5	0	0	0	10	0	0	8	0	0	2	10	9
1987–1988	5	2	0	0	0	7	0	0	5	0	0	2	7	6
1988–1989	1	0	0	0	0	1	0	0	1	0	0	0	1	1
1989–1990	10	4	0	0	0	14	0	0	14	0	0	0	14	11
1990–1991	3	1	0	0	0	4	0	0	4	0	0	0	4	4
1991–1992	5	4	0	0	0	9	0	0	8	0	0	1	9	7
1992–1993	3	2	0	0	0	5	0	0	5	0	0	0	5	5
1993–1994	7	3	0	0	0	10	0	0	10	0	0	0	10	5
1994–1995	4	3	0	0	0	7	0	0	7	0	0	0	7	5
1995–1996	3	1	0	0	0	4	0	0	4	0	0	0	4	4
1996–1997	6	0	0	0	0	6	0	0	5	1	0	0	6	6

[a] Beavers ≤52"; lynx ≤35" in length.

[b] L&S (land and shoot) refers to animals taken by hunters the same day hunters were airborne.

[c] No reported harvest.

Table 3 Unit 12 beaver, lynx, otter, and wolverine reported harvest[a] chronology by month, regulatory years 1986–1996

Regulatory year	Harvest periods						
	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr
Beaver							
1986–1987	0	7	7	2	7	26	6
1987–1988	0	9	0	0	0	7	2
1988–1989	0	6	2	0	2	5	0
1989–1990	0	9	1	0	0	4	0
1990–1991	0	1	0	1	9	6	1
1991–1992	0	4	4	0	1	9	18
1992–1993	0	7	6	1	0	10	5
1993–1994	0	13	4	0	3	3	5
1994–1995	0	0	0	2	2	17	5
1995–1996	0	0	2	0	1	7	0
1996–1997	0	2	4	3	7	11	0
Lynx							
1986–1987	0	7	46	27	0	0	0
1987–1988	0	0	34	34	1	0	0
1988–1989	0	2	34	25	2	0	0
1989–1990	0	3	51	23	0	0	0
1990–1991	0	4	36	90	0	0	0
1991–1992	0	33	58	79	4	0	0
1992–1993	0	45	78	71	32	0	0
1993–1994	0	1	47	56	2	0	0
1994–1995	0	0	49	37	0	0	0
1995–1996	0	0	12	30	0	0	0
1996–1997	0	1	87	73	0	0	0
Otter							
1986–1987	0	0	0	0	2	2	0
1987–1988	0	0	0	0	0	0	0
1988–1989	0	0	1	0	0	0	1
1989–1990	0	0	0	1	0	0	0
1990–1991	0	0	0	0	0	1	0
1991–1992	0	0	0	1	4	0	0
1992–1993	1	0	0	2	1	3	0
1993–1994	0	0	0	0	0	0	0
1994–1995	0	0	5	1	0	0	0
1995–1996	1	0	2	1	0	0	0
1996-1997	0	0	3	2	0	0	0
Wolverine							
1986–1987	0	1	2	5	9	4	0

Table 3 Continued

Regulatory year	Harvest periods						
	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr
1987–1988	4	1	1	4	4	0	0
1988–1989	0	1	1	4	4	0	0
1989–1990	0	1	3	6	0	0	0
1990–1991	0	1	3	4	6	0	0
1991–1992	1	2	6	8	10	0	0
1992–1993	0	2	4	3	5	0	0
1993–1994	1	1	2	7	10	0	0
1994–1995	0	2	2	10	7	0	0
1995–1996	0	1	1	1	3	1	0
1996–1997	0	0	1	1	8	1	0

[a] Unknown not included.

Table 4 Unit 20E beaver, lynx, otter, and wolverine reported harvest chronology by month, regulatory years 1986–1996

Regulatory	Harvest periods						
year	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr
Beaver							
1986–1987	0	0	0	0	1	2	2
1987–1988	0	1	2	0	0	0	0
1988–1989	0	0	0	0	0	1	0
1989–1990	0	0	2	0	0	1	0
1990–1991	0	0	2	0	0	1	0
1991–1992	0	2	6	0	0	2	0
1992–1993	0	0	0	0	2	2	2
1993–1994	0	2	2	0	0	0	0
1994–1995	0	0	0	0	0	0	0
1995–1996	0	0	0	0	0	2	0
1996–1997	0	0	0	0	0	2	1
Lynx							
1986–1987	0	0	7	4	0	0	0
1987–1988	0	0	5	4	0	0	0
1988–1989	0	0	11	12	0	0	0
1989–1990	0	0	19	9	1	0	0
1990–1991	0	18	23	29	0	0	0
1991–1992	0	20	55	37	0	0	0
1992–1993	1	15	26	32	22	0	0
1993–1994	0	0	24	22	0	0	0
1994–1995	0	0	16	7	0	0	0
1995–1996	0	0	5	22	1	0	0
1996–1997	0	0	15	18	0	0	0
Otter							
1986[a]–1987							
1987[a]–1988							
1988[a]–1989							
1989[a]–1990							
1990[a]–1991							
1991–1992	0	0	1	0	0	0	0
1992[a]–1993							
1993–1994	0	0	1	0	0	0	0
1994–1995	0	0	1	0	0	0	0
1995[a]–1996							
1996[a]–1997							
Wolverine							
1986–1987	1	3	2	3	1	0	0

Table 4 Continued

Regulatory year	Harvest periods						
	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr
1987–1988	0	0	0	4	2	0	0
1988–1989	0	0	0	0	1	0	0
1989–1990	0	1	6	7	0	0	0
1990–1991	0	0	1	2	1	0	0
1991–1992	0	1	3	4	1	0	0
1992–1993	0	1	0	0	5	0	0
1993–1994	0	0	1	6	3	0	0
1994–1995	0	0	3	3	1	0	0
1995–1996	0	0	3	0	1	0	0
1996–1997	0	0	1	1	4	0	0

[a] No reported harvest.

Table 5 Unit 12 harvest percent by transport method, regulatory years 1986–1996

Regulatory year	Harvest percent by transport method							
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown
Beaver								
1986–1987	0	20	0	0	56	0	7	16
1987–1988	0	28	0	0	56	0	17	0
1988–1989	0	0	0	0	73	0	27	0
1989–1990	0	0	0	0	93	0	0	7
1990–1991	0	0	0	0	47	0	5	47
1991–1992	0	3	0	0	68	0	0	30
1992–1993	0	0	38	0	62	0	0	0
1993–1994	0	0	14	0	49	0	20	17
1994–1995	0	15	19	0	65	0	0	0
1995–1996	0	21	0	0	14	0	29	36
1996–1997	0	26	0	0	70	0	0	4
Lynx								
1986–1987	0	1	0	0	85	0	10	4
1987–1988	3	5	0	0	74	0	7	11
1988–1989	1	1	0	0	86	0	11	0
1989–1990	4	10	0	0	82	0	0	4
1990–1991	2	5	0	0	89	0	2	3
1991–1992	0	1	0	0	83	1	12	3
1992–1993	0	1	0	0	88	0	8	4
1993–1994	0	4	0	0	84	0	3	8
1994–1995	1	4	0	0	81	0	7	6
1995–1996	2	2	0	0	93	0	2	0
1996–1997	1	4	0	0	94	0	3	3
Otter								
1986[a]–1987								
1987[a]–1988								
1988[a]–1989								
1989[a]–1990								
1990[a]–1991								
1991–1992	0	0	0	0	100	0	0	0
1992–1993	0	0	38	0	50	0	0	13
1993[a]–1994								

Table 5 Continued

Regulatory year	Harvest percent by transport method							
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown
1994–1995	0	0	0	0	100	0	0	0
1995–1996	0	0	0	25	75	0	0	0
1996–1997	0	0	0	0	100	0	0	0
Wolverine								
1986–1987	34	0	0	0	50	0	6	9
1987–1988	5	5	0	0	90	0	0	0
1988–1989	29	0	0	7	57	0	0	7
1989–1990	17	25	0	0	42	0	0	17
1990–1991	0	21	0	0	57	0	0	21
1991–1992	15	0	0	0	81	0	0	4
1992–1993	0	0	0	0	100	0	0	0
1993–1994	24	0	0	0	76	0	0	0
1994–1995	10	0	0	0	90	0	0	0
1995–1996	14	0	0	0	86	0	0	0
1996–1997	9	0	0	0	82	0	9	0

[a] No reported harvest.

Table 6 Unit 20E harvest percent by transport method, regulatory years 1986–1996

Regulatory year	Harvest percent by transport method							
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown
Beaver								
1986–1987	0	20	0	0	0	0	0	80
1987–1988	0	0	0	0	100	0	0	0
1988–1989	0	0	0	0	100	0	0	0
1989–1990	0	0	0	0	100	0	0	0
1990–1991	0	67	0	0	33	0	0	0
1991–1992	8	20	0	0	80	0	0	0
1992–1993	0	0	0	0	67	0	0	33
1993–1994	0	0	0	0	100	0	0	0
1994–1995	0	0	0	0	0	0	0	0
1995–1996	0	0	0	0	100	0	0	0
1996–1997	67	0	33	0	0	0	0	0
Lynx								
1986–1987	0	18	0	0	64	0	0	18
1987–1988	0	33	0	0	67	0	0	0
1988–1989	12	24	0	8	48	0	8	0
1989–1990	0	45	0	0	48	0	7	0
1990–1991	0	7	0	0	83	0	1	9
1991–1992	25	4	0	0	66	0	0	5
1992–1993	8	2	0	1	96	0	0	1
1993–1994	9	0	0	4	85	0	2	0
1994–1995	26	0	0	0	74	0	0	0
1995–1996	4	0	0	0	92	0	4	0
1996–1997	9	0	0	0	91	0	0	0
Otter								
1986[a]–1987								
1987[a]–1988								
1988[a]–1989								
1989[a]–1990								
1990[a]–1991								
1991–1992	0	0	0	0	100	0	0	0
1992[a]–1993								
1993–1994	0	0	0	0	100	0	0	0

Table 6 Continued

Regulatory year	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown
	Harvest percent by transport method							
1994–1995	0	0	0	0	100	0	0	0
1995[a]–1996								
1996[a]–1997								
Wolverine								
1986–1987	10	20	0	0	70	0	0	0
1987–1988	29	0	0	0	29	0	14	29
1988–1989	0	0	0	0	100	0	0	0
1989–1990	14	36	0	0	50	0	0	0
1990–1991	25	0	0	0	75	0	0	0
1991–1992	44	0	0	0	44	0	0	11
1992–1993	0	0	0	0	100	0	0	0
1993–1994	70	10	0	0	20	0	0	0
1994–1995	29	0	0	0	57	0	14	0
1995–1996	0	0	0	0	100	0	0	0
1996–1997	17	0	0	0	66	0	0	17

[a] No reported harvest.

LOCATION

GAME MANAGEMENT UNIT: 14 (6,625 mi^2)

GEOGRAPHIC DESCRIPTION: Eastern Upper Cook Inlet

BACKGROUND

Game Management Unit 14 is divided into 3 subunits, and contains more than half (about 313,000) of the people living in Alaska. The human populations in Anchorage and the Matanuska-Susitna valleys are the fastest growing in the state, with most development occurring in Subunits 14C and 14A. Fur populations are currently affected by natural limiting factors, habitat alteration, human density, and technological advances allowing trappers and hunters access to most parts of the unit. Currently, most fur trapping in Unit 14 is recreational, and many resource users do not go far from established roads or trails. Fur trapping and hunting is prohibited or severely restricted in the western half of Subunit 14C (the Anchorage bowl), therefore most consumptive use occurs in Subunits 14A and 14B.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

To maintain existing populations to provide 1) the opportunity to trap and hunt furbearers, and 2) for optimal harvest of furbearers.

MANAGEMENT OBJECTIVES

- Develop measurable population objectives for all fur species
- Meet or exceed minimum harvest objectives for those species for which sealing is required.

The annual harvest objectives are land otter, 20; lynx, 12 (when the season is open); wolverine, 10; and beaver, 250 (Masteller 1993).

METHODS

Information on trapping conditions, trapper effort and trends in fur abundance and distribution were collected using a trapper questionnaire sent to trappers sealing fur in Unit 14. Harvest data were collected for beaver, land otter, lynx, wolverine and marten by sealing all presented for examination. During sealing, data on age (for beaver and lynx) and sex (for land otter, lynx, marten and wolverine) were collected when practical. The month, method of take and mode of hunter/trapper transport were also recorded. Minimum harvest data for other species were collected from voluntary responses included with the trapper questionnaire.

To begin evaluating long-term trends in abundance, four furbearer track count trend lines were established in Subunits 14A and 14B during winter 1991-92 (Masteller 1995). The

Kings River and West Burma Road track trend lines were surveyed during winter 1995-96.

Ten muskrat pushup count areas (Masteller 1993) adjacent to the Glenn highway on and near the Palmer Hay Flats State Game Refuge (PHFSGR) were censused during late March or early April in 1996 and 1997. Changes in relative abundance were noted for each count area and for the entire area, to help assess the effects of mitigation efforts related to the expansion of the highway from 2 to 4 lanes (USDOT and DOT/PF 1988).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population trend information was collected primarily from questionnaires and track transects. Trappers reported relative abundance of lynx and wolverine as scarce. Marten, mink, muskrat, red fox and river otter were classified as common, and beaver, coyote, ermine and red squirrel were classified as abundant. Of these furbearers, trappers classified the population trend as stable for all species except lynx, which were classified as increasing. Relative abundance of all prey species (grouse, hare, ptarmigan and rodents) was classified as common. Most prey population trends were considered stable, with the exception of hare, which was increasing.

Due to poor weather and limited resources, track transects were completed only during 1995-96, and only on 2 of the 4 trend lines. Sign of marten, mink, weasel and squirrel increased on the West Burma Road transect, and sign of marten, weasel and hare increased on the Kings River transect (Table 1).

Heavy rains and flooding brought the water level in the PHFSGR mitigation area up to the desired level during September 1995. However, this was probably too late in the season for dispersing muskrats to take full advantage of the new habitat. Soon after, during winter 1995-96, an unusual lack of snowfall combined with extremely cold temperatures to produce record frost depths. The number of muskrat pushups near the Glenn highway declined significantly during 1996 and 1997, when compared with 1991-94 (Table 2). The water level subsequently decreased to the summer 1995 level.

Population Size and Composition

On 23 February 1995, surveys were conducted to estimate the density of wolverines in Subunit 14C (excluding Anchorage). The area was estimated to contain 17 wolverines (11-23 individuals at the 90% confidence interval); a density of 1.2 wolverines/100mi^2 (R. Sinnott, pers. comm.). During the reporting period, no other studies were conducted to determine population size or composition for any fur species in Unit 14.

Distribution and Movements

Beavers continue to colonize new areas of suitable habitat, often in conflict with the expanding human population. Marten, while not expanding their range, appear to be occupying more of the available habitat, probably due to healthy microtine populations. Hare numbers have increased notably during the past 2 years, with a concurrent increase in lynx sightings. Wolf numbers have increased in recent years as well, but trappers have not reported any declines in coyote or fox numbers.

MORTALITY

Harvest

Harvests of beaver and wolverine fluctuated near objective levels (250 for beaver, 10 for wolverine) (Masteller 1993). Otter harvest was substantially higher than the objective level (20), reflecting strong market demand. Lynx harvest was well below the objective level of 12 (when the season is open). This was probably because of the retirement of an experienced lynx trapper in the Knik River drainage, where most lynx are harvested in Unit 14.

Trapping Seasons and Bag Limits.

Species (Unit/Year)	Season	Bag Limit
Beaver (14A and B, 1994–95)	Nov. 10–Apr. 30	30 per season
(14A and B, 1995–96, 1996–97)	Nov. 10–May 15	No limit
(14C all years)	Dec. 1–Apr. 15	20 per season
Coyote (14A and B)	Nov. 10–Mar. 31	No limit
(14C)	Nov. 10–Feb. 28	No limit
Red Fox (14A and B)	Nov. 10–Feb. 28	No limit
(14C)	Nov. 10–Feb. 28	1 per season
Lynx (1994–95, 1995–96)	No open season	
(1996–97)	Dec. 15–Jan. 15	No limit
Marten	Nov. 10–Dec. 10	No limit
Mink/Weasels	Nov. 10–Jan. 31	No limit
Muskrat	Nov. 10–May 15	No limit
Land Otter (14A and 14B)	Nov. 10–Mar. 31	No limit
(14C)	Nov. 10–Feb. 28	No limit
Squirrels/Marmots	No closed season	No limit
Wolverine	Nov. 10–Jan. 31	2 per season

Hunting Seasons and Bag Limits.

Species (Unit/Year)	Season	Bag Limit
Coyote	Sep. 1–Apr. 30	2 per season
Red Fox	No open season	
Lynx	No open season	
Wolverine	Sep. 1–Jan. 31	1 per season

Board of Game Actions and Emergency Orders. During its January 1995 meeting the Board of Game lengthened the beaver trapping season to May 15 in Units 14A and 14B, and removed the bag limit. This change, justified by healthy beaver populations and increasing nuisance beaver complaints, was initiated to encourage more beaver harvest during open-water periods when trapping is easier.

During spring 1992 the Board of Game established a maximum lynx season, and allowed the department to set the actual season length based on the Tracking Harvest Strategy. This allowed the department the flexibility to restrict lynx harvest during 1994–95 and 1995–96, and open a 1-month season during 1996-97.

Hunter/Trapper Harvest. Prices for most furs increased during the reporting period, resulting in increased trapper interest and generally higher harvests. Still, most trappers are recreational trappers, working around jobs and other commitments. Variable weather can affect recreational trappers to a greater degree, since they have less opportunity to work around the weather. Harvests of many species were reduced by heavy snowfall during 1994–95, then by an almost complete lack of snow (until February) during 1995–96.

Beaver harvests during the reporting period were well above the 10-year average, except during the heavy-snow winter of 1994–95 (Table 3). Otter harvests have been increasing (Table 4), due primarily to a strong Asian market. A reflection of marginal habitat and low hare numbers, lynx season was closed during 1994–95 and 1995–96. A 1-month season was established when hare numbers began to increase region-wide, and lynx harvest was low during 1996-97 (Table 5). Wolverine harvests fluctuated around the 10-year average (Table 6). Marten harvests increased dramatically (Table 7), reflecting healthy microtine populations and a strong market. For all species, traps and snares were the most important methods of take (Tables 3-7).

Harvest of other species, for which sealing was not required, was reported on trapper questionnaires. During the reporting period, reported harvest ranges were: coyote, 14–29; red fox, 7–35; mink, 40–75; weasels, 21–56; muskrats, 36–221; and red squirrels, 4–11. These should be considered minimum harvests.

Harvest Chronology. Weather and season dates govern the timing of most fur harvest. For species other than beaver, small sample sizes should also be considered when interpreting harvest chronology. Trappers immediately took advantage of the extra 2 weeks of beaver trapping in May during 1995–96 and 1996–97. Spring trapping accounted for 39–46% of the beaver harvest (Table 8). Otter, lynx, wolverine and marten harvest occurred primarily in mid-winter (Tables 9–12).

Transport Methods. Most trappers used snow machines to access their trapping areas (Tables 13–17), though highway vehicles were also important for beaver and otter trappers. Aircraft use has become more significant for wolverine trappers (Table 16), though sample sizes are low. With little snow in 1995–96, many beaver, otter and marten trappers shifted to using highway vehicles instead of snowmachines (Tables 13, 14 and 17).

Other Mortality

During the reporting period nuisance beaver harvest ranged from 9 to 12 beavers per year. As in previous years, road or railroad maintenance personnel identified most problem areas. State and borough agencies are more likely to want our department to find a trapper than in the past, when often one of their own workers would get the nuisance beaver permit. One reason the department supported a longer spring trapping season for beaver was to reduce the number of beaver taken on nuisance permits, but this reduction has not happened.

HABITAT

Assessment

Approximately 37,000 acres of mature mixed birch/spruce forest burned in June 1996 during the "Miller's Reach" wildfire, north and east of Big Lake in Unit 14A. In the near term, this will probably be detrimental to marten, which typically prefer mature forest stands. However, the fire and resulting new vegetative growth will likely benefit most other species. Construction of new houses increased dramatically during the reporting period, undoubtedly displacing some individuals. On the population level, all species appear to have adequate habitat.

CONCLUSIONS AND RECOMMENDATIONS

There continues to be ample opportunity to trap and hunt furbearers in Unit 14. The fur populations in this area are used primarily by recreational trappers/hunters operating near established roads and snowmachine trails. While trapping pressure can be affected by market and weather conditions, recreational trappers often trap regardless of conditions. Without information on furbearer population density, composition and production, we have no way to determine if harvests are optimal. Given reproductive rates for fur species, and that large areas of unaltered habitat still exist, current harvest levels appear within sustainable limits.

Developing measurable population objectives for fur species, which requires direct-count techniques, is beyond the limit of our resources. Indirect survey techniques such as track transects can be used as an index of abundance, and are typically more affordable. To achieve adequate coverage of Unit 14, 2 additional track transects should be established in the Sheep Creek and Larson Lake areas of Subunit 14B. However, with highly variable weather and snow conditions, and limited personnel, it is difficult to complete the transects already established. Adding new transects is probably unrealistic at this time, because staff time and equipment budgets are limited.

Harvests fluctuated near objective levels for beaver and wolverine, and exceeded the minimum objective for otter. Lynx harvest was well below the objective level, but that is related to changes in trapping pressure and hare abundance. Harvests for all species will vary primarily with weather and market conditions (e. g., otter). At this time, no changes in seasons or bag limits are recommended.

With 5 years of sealing data, I would recommend the marten harvest objective set at 40 per year. This is probably a realistic number given the fluctuations in marten (and their prey) populations. With relatively short seasons, marten harvest will likely be governed by weather during the season.

I recommend we work with the local trapping organization to gauge interest in developing several radio spots to educate both trappers and the general public on trapping issues (such as trapping near subdivisions, use of trails and watercourses, local markets, and leash laws). As the human population, and trail use by recreational users other than trappers, has increased, so has the number of complaints about the compatibility of trapping near houses and trails. Proposals to close areas, mark traps and trapping sites, and institute mandatory trap checks should be expected.

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Table 1 Number of furbearer tracks crossed on trend count transects, Game Management subunits 14A and 14B, Matanuska-Susitna Valleys, Alaska, 1991–1996

		Tracks per Mile			
Species	Year	West Burma Rd. (14A-1)	Kings R. (14A-2)	Knik R. (14A-3)	Willow-Iron Ck. (14B-1)
Fox	1991–92	0.1	0.0	0.0	0.0
	1992–93	0.0	-	0.0	0.0
	1993–94	0.1	0.3	0.0	0.2
	1995–96	0.0	0.1	-	-
Coyote	1991–92	2.0	0.0	2.3	0.0
	1992–93	0.1	-	4.4	0.2
	1993–94	0.5	0.6	0.6	0.0
	1995–96	1.3	0.4	-	-
Lynx	1991–92	0.0	0.0	0.1	0.0
	1992–93	0.0	-	0.3	0.0
	1993–94	0.0	0.0	0.0	0.0
	1995–96	0.0	0.0	-	-
Marten	1991–92	0.0	0.1	0.0	1.2
	1992–93	0.2	-	0.0	1.5
	1993–94	0.2	0.2	0.0	0.0
	1995–96	1.4	1.4	-	-
Mink	1991–92	0.1	0.1	0.0	0.0
	1992–93	0.4	-	0.0	0.5
	1993–94	0.3	0.0	0.5	0.4
	1995–96	1.8	0.0	-	-
Weasel	1991–92	0.7	0.0	0.0	1.0
	1992–93	0.7	-	6.0	3.5
	1993–94	0.1	2.3	0.0	0.0
	1995–96	1.6	8.0	-	-
Wolverine	1991–92	0.0	0.0	0.0	0.0
	1992–93	0.0	-	0.0	0.0
	1993–94	0.0	0.0	0.0	0.0
	1995–96	0.0	0.0	-	-

Table 1 Continued

Species	Year	Tracks per Mile West Burma Rd. (14A-1)	Kings R. (14A-2)	Knik R. (14A-3)	Willow-Iron Ck. (14B-1)
Squirrel	1991–92	0.7	2.0	3.5	0.0
	1992–93	0.3	-	0.5	6.0
	1993–94	0.0	19.7	5.5	0.0
	1995–96	1.7	1.0	-	-
Hare	1991–92	1.7	3.0	51.5	0.0
	1992–93	0.3	-	107.0	5.0
	1993–94	0.2	2.6	55.5	1.3
	1995–96	1.0	15.5	-	-

Table 2 Number of muskrat pushups and houses seen in count areas along the Glenn highway on and near the Palmer Hay Flats State Game Refuge, 1991–1997

A.

	Number pushups counted					
Count Area	1991	1992	1993	1994	1996	1997
1	145	46	119	126	18	31
2	2	0	0	3	0	0
3	42	55	102	98	31	11
5	86	97	52	55	14	66
6	63	131	81	61	10	16
7	46	79	83	68	6	17
8	45	85	99	80	11	8
9	68	102	115	66	5	9
10	6	0	2	0	0	0
11	29	3	8	0	0	1
Total	532	598	661	557	95	159

B.

	Number	Percent Change from 1991				
Count Area	1991	1992	1993	1994	1996	1997
1	145	-68	-17	-13	-88	-79
2	2	-100	-100	50	-100	-100
3	42	30	142	133	-26	-74
5	86	12	-39	-36	-84	-23
6	63	107	28	-3	-84	-75
7	46	71	80	47	-87	-63
8	45	88	120	77	-76	-82
9	68	50	69	-2	-93	-87
10	6	-100	-66	-100	-100	-100
11	29	-89	-72	-100	-100	-97
Total	532	12	24	4	-82	-70

Table 3 Unit 14 beaver harvest, 1987–1996

	Reported harvest			Method of Take				Successful
Regulatory Year	Juv [a]	(%)	Adults	Trap/snare	Shot	Unk	Total	Trappers/hunters
1987–88	29	(11)	237	233	0	33	266	--
1988–89	30	(15)	166	175	0	21	196	--
1989–90	41	(27)	113	135	0	19	154	39
1990–91	44	(28)	111	149	4	2	155	34
1991–92	36	(16)	185	206	4	15	225	37
1992–93	70	(28)	183	241	1	11	253	50
1993–94	43	(19)	187	219	1	10	230	61
1994–95	31	(21)	113	149	0	11	160	38
1995–96	51	(20)	203	279	3	0	282	59
1996–97	53	(20)	207	256	5	19	280	56
Average	43	(20)	170	204	2	14	220	47

[a] Beaver measuring ≤ 52 inches (length plus width)

Table 4 Unit 14 land otter harvest, 1988–1996

Regulatory Year	Reported harvest			Method of Take			Total	Successful
	Male	Female	Unk	Trap/snare	Shot	Unk		Trappers/hunters
1988–89	3	4	1	8	0	0	8	8
1989–90	11	9	4	22	0	2	24	14
1990–91	1	7	2	8	2	0	10	7
1991–92	17	4	5	25	1	0	26	14
1992–93	5	3	5	9	0	4	13	7
1993–94	22	9	3	32	1	1	34	17
1994–95	16	12	2	29	0	1	30	14
1995–96	14	15	6	33	2	0	35	18
1996–97	14	13	12	39	0	0	39	14
Average	11	8	4	21	1	1	23	12

Table 5 Unit 14 lynx harvest, 1987–1996

Regulatory Year	Sex Composition				Age Composition				Method of Take				Total	Successful
	M	F	(%)	Unk	Juv[a]	(%)	Ad	Unk	Trap/ Snare	Shot	(L&S)[b]	Unk		Hunters/trappers
1987–88[c]	0	0	(0)	0	0	(0)	0	0	0	0	(0)	0	0	0
1988–89[c]	0	0	(0)	0	0	(0)	0	0	0	0	(0)	0	0	0
1989–90[c]	0	0	(0)	0	0	(0)	0	0	0	0	(0)	0	0	0
1990–91	8	5	(38)	0	7	(54)	6	0	11	2	(0)	0	13	8
1991–92	4	3	(43)	8	2	(17)	10	3	14	1	(0)	0	15	6
1992–93	7	2	(22)	2	3	(30)	7	1	10	1	(0)	0	11	9
1993–94	3	4	(57)	3	0	(0)	7	3	7	1	(0)	2	10	4
1994–95[c]	0	0	(0)	0	0	(0)	0	0	0	0	(0)	0	0	0
1995–96[c]	0	0	(0)	0	0	(0)	0	0	0	0	(0)	0	0	0
1996–97	0	0	(--)	3	1	(50)	1	1	3	0	(0)	0	3	2
Average[d]	4	3	(40)	3	3	(30)	6	2	9	1	(0)	0	10	6

[a] Lynx measuring ≤ 34 inches in length.
[b] L&S (land and shoot) refers to animals taken by hunters the same day hunters were airborne.
[c] Season closed.
[d] For years when season open

Table 6 Unit 14 wolverine harvest, 1987–1996

	Reported Harvest				Method of Take					Successful
Year	Male	Female	(%)	Unk	Trap/snare	Shot	(L&S)[a]	Unk	Total	Trappers/hunters
1987–88	4	3	(43)	0	5	1	(1)	1	7	6
1988–89	6	4	(40)	0	10	0	(0)	0	10	5
1989–90	5	3	(37)	0	6	2	(0)	0	8	6
1990–91	9	7	(44)	0	16	0	(0)	0	16	10
1991–92	5	2	(28)	1	7	1	(0)	0	8	8
1992–93	4	5	(56)	0	7	2	(0)	0	9	9
1993–94	9	4	(31)	0	13	0	(0)	0	13	10
1994–95	3	2	(40)	0	5	0	(0)	0	5	5
1995–96	5	2	(28)	3	10	0	(0)	0	10	7
1996–97	4	5	(55)	0	9	0	(0)	0	9	6
Average	5	4	(40)	<1	9	1	(<1)	<1	9	7

[a] L&S (land and shoot) refers to animals recorded as "ground shot" when transportation indicated was "aircraft.".

Table 7 Unit 14 marten harvest, 1992–1996

	Reported harvest			Method of Take				Successful
Regulatory Year	Male	Female	Unk	Trap/snare	Shot	Unk	Total	Trappers/hunters
1992–93[a]	5	1	0	6	0	0	6	2
1993–94	8	3	0	11	0	0	11	3
1994–95	10	8	10	18	0	10	28	5
1995–96	37	16	0	51	0	2	53	12
1996–97	70	32	0	102	0	0	102	12
Average	26	12	2	38	0	2	40	7

[a] Sealing not required prior to 1992–93 season.

Table 8 Unit 14 beaver harvest chronology by month, 1989–1996

Year[a]	Percent harvested										Unk	Harvest
	Jun–Aug[b]	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
1989–90	0	0	1	15	14	15	8	12	32	1	1	154
1990–91	0	2	1	8	4	4	27	26	19	1	6	155
1991–92	0	0	0	8	6	34	26	15	3	4	3	225
1992–93	0	1	9	11	13	9	6	32	14	0	3	253
1993–94	0	2	5	11	13	14	11	21	22	0	1	230
1994–95	4	1	0	4	12	14	19	7	32	0	4	160
1995–96	1	1	1	8	27	5	7	13	24	9	3	282
1996–97	2	2	1	4	12	4	20	19	19	8	9	280

[a] Information not collected prior to 1989

[b] These are beaver taken on damage control permits

Table 9 Unit 14 land otter harvest chronology by month, 1987–96

Regulatory Year	Percent of Harvest								Total Harvest
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Unk	
1987–88	0	12	12	25	25	25	12	0	8
1988–89	0	0	17	50	0	0	12	12	8
1989–90	0	0	20	25	8	42	8	0	24
1990–91	0	0	20	10	20	30	20	0	10
1991–92	4	0	4	15	31	19	27	0	26
1992–93	0	0	0	46	23	15	15	0	13
1993–94	0	0	9	12	50	18	12	0	34
1994–95	0	0	3	20	20	33	20	3	30
1995–96	0	6	17	37	14	14	11	0	35
1996–97	0	0	20	23	23	23	10	0	39

Table 10 Unit 14 lynx harvest chronology by month, 1987–1996

Regulatory Year	Percent of Harvest						Total Harvest
	Nov	Dec	Jan	Feb	Mar	Unk	
1987–88[a]	0	0	0	0	0	0	0
1988–89[a]	0	0	0	0	0	0	0
1989–90[a]	0	0	0	0	0	0	0
1990–91	0	38	62	0	0	0	13
1991–92	0	67	33	0	0	0	15
1992–93	0	73	27	0	0	0	11
1993–94	0	80	20	0	0	0	10
1994–95[a]	0	0	0	0	0	0	0
1995–96[a]	0	0	0	0	0	0	0
1996–97	0	0	100	0	0	0	3

[a] Season closed

Table 11 Unit 14 wolverine harvest chronology by month, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Unk	
1987–88	0	0	0	43	14	14	29	0	7
1988–89	0	0	0	10	10	80	0	0	10
1989–90	12	0	25	0	63	0	0	0	8
1990–91	0	0	12	31	6	50	0	0	16
1991–92	0	0	12	25	25	38	0	0	8
1992–93	11	0	0	22	67	0	0	0	9
1993–94	0	0	0	31	69	0	0	0	13
1994–95	0	0	20	20	60	0	0	0	5
1995–96	0	0	30	50	20	0	0	0	10
1996–97	0	0	0	33	67	0	0	0	9

Table 12 Unit 14 marten harvest chronology by month, 1992–96

	Percent of Harvest								
Year	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Unk	Harvest
1992–93[a]	0	0	50	50	0	0	0	0	6
1993–94	0	0	45	55	0	0	0	0	11
1994–95	0	0	64	32	4	0	0	0	28
1995–96	0	0	62	38	0	0	0	0	53
1996–97	0	0	70	30	0	0	0	0	102

[a] Sealing not required prior to 1992-93 season.

Table 13 Unit 14 beaver trapper transport methods, 1989–1996

Regulatory Year	Percent of Harvest: Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	Total Harvest
1989–90[a]	3	23	23	0	28	0	6	17	154
1990–91	0	32	0	1	43	0	17	6	155
1991–92	0	19	0	1	58	1	15	7	225
1992–93	0	1	8	5	47	0	20	19	253
1993–94	0	1	10	1	47	0	28	12	230
1994–95	0	9	25	5	21	0	24	16	160
1995–96	8	3	6	8	26	0	34	14	282
1996–97	1	1	5	6	49	0	25	12	280

[a] Information not collected before 1989

Table 14 Unit 14 land otter trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	
1987–88	0	88	0	0	12	0	0	0	8
1988–89	0	25	0	0	25	0	38	12	8
1989–90	0	71	0	0	8	0	13	8	24
1990–91	0	60	0	0	0	0	40	0	10
1991–92	0	19	0	0	69	0	8	4	26
1992–93	0	8	0	0	54	0	8	30	13
1993–94	0	6	0	0	62	0	6	26	34
1994–95	10	0	0	0	60	0	20	10	30
1995–96	9	14	0	3	26	0	31	17	35
1996–97	5	10	0	3	56	0	18	8	39

Table 15 Unit 14 lynx trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	
1987–88[a]	0	0	0	0	0	0	0	0	0
1988–89[a]	0	0	0	0	0	0	0	0	0
1989–90[a]	0	0	0	0	0	0	0	0	0
1990–91	0	15	0	0	31	0	8	46	13
1991–92	0	0	0	27	47	0	27	0	15
1992–93	0	9	0	36	45	0	0	9	11
1993–94	0	10	0	50	20	0	0	20	10
1994–95[a]	0	0	0	0	0	0	0	0	0
1995–96[a]	0	0	0	0	0	0	0	0	0
1996–97	0	0	0	67	33	0	0	0	3

[a] Lynx season closed

Table 16 Unit 14 wolverine trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	
1987–88	57	14	0	0	14	0	14	0	7
1988–89	10	30	0	0	60	0	0	0	10
1989–90	12	38	0	12	0	0	38	0	8
1990–91	19	44	0	0	12	0	0	25	16
1991–92	38	0	0	12	25	0	0	25	8
1992–93	33	11	0	0	33	0	0	22	9
1993–94	31	0	0	8	54	0	0	8	13
1994–95	20	20	0	0	40	0	0	20	5
1995–96	40	0	0	10	40	0	0	10	10
1996–97	67	0	0	0	22	0	0	11	9

Table 17 Unit 14 marten trapper transport methods, 1992–1996

Regulatory Year	Percent of Harvest: Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	Total Harvest
1992–93[a]	0	0	0	0	50	0	0	50	6
1993–94	0	0	0	0	91	0	9	0	11
1994–95	0	28	0	0	36	0	0	36	28
1995–96	0	7	0	15	11	0	26	40	53
1996–97	1	10	0	0	80	0	0	9	102

[a] Sealing not required prior to 1992–93 season

LOCATION

GAME MANAGEMENT UNIT: 16 (12,225 mi^2)

GEOGRAPHIC DESCRIPTION: West side of Cook Inlet

BACKGROUND

Game Management Unit 16, lying west of the lower Susitna River and upper Cook Inlet, contains large areas of unaltered wildlife habitat. There have been no major wildfires since the 1950s (D. Harkness, pers. commun.), but in recent years hundreds of acres of white spruce have been killed by spruce bark beetle infestation. Fishing and hunting lodges are scattered throughout the unit, many of which have winter caretakers who hunt and trap furbearers. There are maintained roads in the eastern and northern portions of subunit 16A, and near the settlements of Tyonek and Beluga in subunit 16B. There are few permanent residents, most of whom live along the Parks Highway and the Petersville Road, and in the settlements of Skwentna, Beluga and Tyonek. Because of its proximity to Alaska's largest population centers, the area receives a large amount of year-round recreational use. A few local residents still actively trap to generate income, primarily from marten and beaver. Many other people utilize the area's fur species on a recreational basis.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

The management goals for this area are to maintain existing populations to provide 1) for optimal harvest of furbearers, and 2) the greatest opportunity to participate in trapping and hunting furbearers.

MANAGEMENT OBJECTIVES

The management objectives for this area are to 1) develop measurable population objectives for all species, and 2) meet minimum harvest objectives for those species (except lynx) for which sealing is required. The annual harvest objectives are: land otter, 40; wolverine, 20; and beaver, 350 (Masteller 1993).

METHODS

Information on trapping conditions, trapper effort and trends in fur abundance and distribution were collected using a trapper questionnaire sent to trappers sealing fur in Unit 16. Harvest data were collected for beaver, land otter, lynx, wolverine and marten by sealing all skins presented for examination. During sealing, data on age (for beaver and lynx) and sex (for land otter, lynx, marten and wolverine) were collected when practical. The month, method of take and mode of hunter/trapper transport were also recorded. Minimum harvest data for other species were collected from voluntary responses included with the trapper questionnaire.

To begin evaluating long-term trends in abundance, 2 track count transects were established in subunit 16A during winter 1991–92 (Masteller 1995).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population abundance and trend information was collected from questionnaires. These data were summarized for the 1995–96 and 1996–97 seasons only. During both years trappers reported relative abundance of lynx and wolverine as scarce; mink, muskrat, red fox and otter as common; and beaver and red squirrel as abundant. Trappers rated marten as common in 1995–96 and abundant in 1996–97, and rated both coyote and ermine abundant in 1995–96 and common in 1996–97. Abundance of prey species was rated as common for hare and ptarmigan during both years, and rated common for grouse and mice/rodents during 1995–96 and abundant during 1996–97.

Trappers classified population trends as stable, during both 1995–96 and 1996–97, for beaver, coyote, ermine, mink, muskrat, red fox, red squirrel and wolverine. The trend for marten was characterized as stable for 1995–96 and increasing for 1996-97. Otter numbers were rated increasing during 1995–96 and stable during 1996–97. Trends in preys species were similar for both years, with grouse, ptarmigan and microtine populations characterized as stable, and hare numbers rated as increasing.

No specific studies on furbearer population size or composition were conducted. Due to weather and other commitments, neither of the 2 track transects in subunit 16A were surveyed during the reporting period.

MORTALITY

Harvest

Fur harvest fluctuates with trapping and market conditions. In general, markets for fur improved during the reporting period, but travel and trapping conditions were extremely variable. Heavy snow fell during 1994–95, making travel and trapping conditions difficult. Also, warm temperatures kept rivers open later than normal, preventing some early-season (especially marten) trapping. During 1995–96 little snow fell until February, preventing trappers from accessing many parts of Unit 16. In addition, temperatures were well below normal, resulting in record frost depths, which likely increased natural mortality of beavers and muskrats. During 1996–97 travel and trapping conditions were closer to "normal," and market conditions had improved.

<u>Trapping Seasons and Bag Limits</u>.

Species	Season	Bag Limit
Beaver (1994-95)	Nov. 10–Apr. 30	30 per season
(1995-96, 1996-97)	Nov. 10–May 15	No limit
Coyote	Nov. 10–Mar. 31	No limit
Red Fox	Nov. 10–Feb. 28	No limit
Lynx (1994-95, 1995-96)	No open season	

	(1996-97)	Dec. 15–Jan. 15	No limit
Marten	(all Unit 16, 1994-95)	Nov. 10–Dec. 10	No limit
Marten	(1995-96, 1996-97)		
Unit 16A		Nov. 10–Dec. 10	No limit
Unit 16B north Beluga River		Nov. 10–Dec. 31	No limit
Unit 16B south Beluga River		Nov. 10–Jan. 31	No limit
Mink/Weasels		Nov. 10–Jan. 31	No limit
Muskrat		Nov. 10–June 10	No limit
Land Otter		Nov. 10–Mar. 31	No limit
Squirrels/Marmots		No closed season	No limit
Wolverine	(16A)	Nov. 10–Jan. 31	2 per season
	(16B)	Nov. 10–Feb. 28	No limit

Hunting Seasons and Bag Limits.

Species		Season	Bag Limit
Coyote		Sep. 1–Apr. 30	2 per season
Red Fox		Sep. 1–Feb. 15	2 per season
Lynx		No open season	
Wolverine	(16A)	Sep. 1–Jan. 31	1 per season
	(16B)	Sep. 1–Mar. 31	1 per season

Board of Game Actions and Emergency Orders. During January 1995 the Board of Game extended the marten trapping season in subunit 16B, adding 3 weeks north of the Beluga River and 7 weeks south of the Beluga River. Trappers reported increasing marten sign and frustration with the 1-month season during several years when weather made travel and trapping conditions very difficult. The Board also discussed the differences, in climactic conditions and human use patterns, between portions of 16B north and south of the Beluga River. Because snowfall patterns are more variable, and human density and recreational use is lower, in southern 16B, the Board felt the area warranted a longer season than the northern portion of 16B.

During March 1997 the Board again extended marten seasons; by 3 weeks in 16A, and by 4 weeks in the northern portion of 16B. These changes take effect on 1 July 1997.

Hunter/Trapper Harvest. Beaver and otter harvests increased during the reporting period, reaching 167 and 27, respectively (Tables 1 and 2), but remained well below historical levels. The previous peak in harvest occurred during 1986-87 when trappers took 651 beavers and 68 otters in Unit 16 (Masteller 1993). Lynx season was closed during 1994-95 and 1995-96, and no lynx were taken during 1996-97 (Table 3). Historically, lynx harvest has been low in Unit 16, probably reflecting a lack of good hare habitat. Wolverine harvest, which peaked at 18 during

1994-95, was above the 10-year average, except during the low-snow year of 1995-96 (Table 4). Marten harvest increased dramatically (Table 5), reflecting increases in market value, season length and microtine populations.

Harvests of species for which sealing is not required are unknown, but minimum numbers are available from voluntary reports included with the trapper questionnaire. Responses indicate that during the reporting period the minimum harvest ranges were: coyotes, 5-16; red fox, 5-9; mink, 2-13; weasels, 26-71; muskrats, 0-3; and squirrels, 22-30.

Harvest Chronology. Weather and season dates govern the timing of most fur harvest. For species other than beaver and marten, small sample sizes should also be considered when interpreting harvest chronology. Historically, most beaver harvest occurred between February and April (Table 6), but trappers immediately took advantage of the extra 2 weeks of beaver trapping in May 1996, especially since trapping had been difficult earlier in that season. Most otter harvest took place in February and March, but during the low-snow winter of 1995-96 trappers were able to get otters much earlier in the season (Table 7). Wolverine harvest typically occurred in January and February (Table 8). Marten seasons were relatively short, confining reported harvest primarily to November and December (Table 9), but trappers took advantage of longer seasons during 1995-96 and 1996-97.

Transport Methods. Most Unit 16 trappers use snowmachines to access their trapping areas (Tables 10-13). During the low-snow winter 1995-96, however, many beaver trappers (Table 10) used boats (probably during the new May season) and many marten trappers switched to using 4-wheelers (Table 13).

Other Mortality

During the reporting period 3-12 beavers were taken annually under nuisance beaver damage control permits. Typically, these are areas where beavers have plugged culverts and flooded roadbeds. Two common problem areas are Oilwell Road in subunit 16A and the road system near Tyonek and Beluga in subunit 16B. With healthy beaver populations, relatively low prices and relatively little trapping, nuisance complaints can be expected to continue.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Recently, a lodge-owner on Sucker Creek, a tributary of Alexander Creek in subunit 16B, has become concerned that healthy beaver populations are creating habitat for non-indigenous northern pike, which in turn endanger naturally occurring salmon populations. He requested nuisance beaver permits to take beaver out of season, when it was "easier" than trapping through the ice. We denied this request and suggested he trap those areas during the legal season, which has been extended recently to include a period when (hopefully) more open water is available.

CONCLUSIONS AND RECOMMENDATIONS

Currently, adequate opportunity is available to trap and hunt furbearers in Unit 16. Lacking population data, it is impossible to say whether harvests are optimal. The number of trappers/hunters working to derive income from trapping has declined, probably as the trapping public ages and more people trap strictly for recreational purposes.

It is unrealistic to expect funding levels to ever allow direct measurement of population parameters for furbearing species, thus developing direct population objectives is also unrealistic. We should seek instead to develop indirect methods, such as track count trend lines, to provide an index to changes in abundance. I recommend we establish 8 aerial transects in subunit 16B, and attempt each year to gather data on these and the 2 ground transects in subunit 16A (Masteller 1995). After several years, it may be possible to establish indirect population objectives (e.g., tracks per mile).

During the reporting period harvests were well below objective levels for beaver and otter, and slightly above the objective level for wolverine (in 2 of 3 years). Although interest in trapping is largely driven by markets and weather, it may be possible to encourage more beaver trapping by extending the beaver season into October, similar to Unit 13. This may help reduce nuisance beaver complaints, as well. If this change is considered, I recommend only submerged sets be allowed prior to November 10.

Now that we have 5 years of sealing data, I recommend a harvest objective of 200 marten per year. In the future it may be necessary to incorporate some averaging mechanism into this objective (e.g. a 3-yr average harvest of 200), since marten populations and harvest can fluctuate rapidly with changes in prey density and trapping conditions. It may also be appropriate to consider a harvest tracking strategy for marten, similar to that currently used to optimize lynx harvest.

Beavers should not be held responsible for the deleterious effects on salmon populations caused by introduced northern pike. Any extensive control program outside of normal trapping interests should go through a public process and be supported by conclusive scientific evidence. Managers with Sport Fish division concede it is not possible to remove pike from areas pike have colonized (C. Whitmore, pers. comm.). However, if some people believe that reducing beaver populations will help protect salmon, we should encourage them to take beaver during established seasons. We should also encourage them to focus fishing pressure on pike in flowing waters (vs. lakes), since at present most pike anglers concentrate their efforts on established lakes (D. Rutz, pers. commun.)

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Table 1 Unit 16 beaver harvest, 1987–1996

Regulatory Year	Reported harvest Juv [a]	(%)	Adults	Unk	Method of Take Trap/snare	Shot	Unk	Total	Successful Trappers/hunters
1987–88	0	--	0	394	0	0	394	394	---
1988–89	0	--	0	370	370	0	0	370	---
1989–90	22	(15)	123	0	145	0	0	145	16
1990–91	30	(17)	146	0	171	0	5	176	20
1991–92	32	(14)	192	4	209	5	14	228	30
1992–93	19	(21)	61	10	85	2	3	90	19
1993–94	16	(18)	71	0	87	0	0	87	15
1994–95	10	(15)	56	0	66	0	0	66	9
1995–96	7	(11)	56	2	65	0	0	65	9
1996–97	38	(24)	122	7	152	2	13	167	26
Average[b]	22	(17)	103	3	150	1	4	179	18

[a] Beaver measuring ≤ 52 inches (length plus width).

[b] For years when data available.

Table 2 Unit 16 land otter harvest, 1987–1996

	Reported harvest				Method of Take				Successful
Regulatory Year	Male	Female	(%)	Unk	Trap/snare	Shot	Unk	Total	Trappers/hunters
1987–88	0	0	(--)	51	0	0	51	51	---
1988–89	25	13	(34)	9	43	0	4	47	---
1989–90	5	4	(44)	11	18	1	1	20	8
1990–91	6	3	(33)	6	15	0	0	15	7
1991–92	9	7	(44)	3	15	3	1	19	10
1992–93	1	2	(--)	11	13	1	0	14	8
1993–94	13	16	(55)	2	30	1	0	31	12
1994–95	6	1	(14)	0	7	0	0	7	4
1995–96	6	7	(54)	3	14	2	0	16	5
1996–97	10	11	(48)	6	27	0	0	27	8
Average[a]	9	7	(41)	6	20	1	1	25	8

[a] For years when data available.

Table 3 Unit 16 lynx harvest, 1984–1996

Regulatory Year[a]	Reported Harvest M	F	(%)	Unk	Juv[b]	(%)	Ad	Unk	Method of Take Trap/ Snare	Shot	(L&S)[c]	Unk	Total	Successful Hunters/trappers
1984–85	0	0	--	1	0	--	0	1	0	0	(0)	1	1	---
1985–86	0	0	--	2	0	--	0	2	2	0	(0)	0	2	1
1986–87	0	6	(100)	0	0	--	0	6	0	0	(0)	6	6	---

1990–91	0	0	--	0	0	--	0	0	0	0	(0)	0	0	0
1991–92	0	0	--	1	0	(0)	0	1	1	0	(0)	0	1	1
1992–93	1	1	(50)	1	0	(0)	2	1	3	0	(0)	0	3	2
1993–94	1	2	(67)	1	0	(0)	4	0	2	1	(0)	1	4	3

1996–97	0	0	--	0	0	--	0	0	0	0	(0)	0	0	0
Average[d]	<1	1	(72)	1					1	<1	(0)	1	2	1

[a] Season closed during 1987–88, 1988–89, 1989–90, 1994–95 and 1995–96.
[b] Lynx measuring ≤ 34 inches in length.
[c] L&S (land and shoot) refers to animals recorded as "ground shot" when transportation indicated was "aircraft."
[d] For years when season open; some columns not averaged due to low sample sizes.

Table 4 Unit 16 wolverine harvest, 1987–1996

	Reported Harvest				Method of Take					Successful
Year	Male	Female	(%)	Unk	Trap/snare	Shot	(L&S)[a]	Unk	Total	Trappers/hunters
1987–88	0	0	--	25	0	0	--	25	25	--
1988–89	5	9	(64)	1	11	1	--	3	15	--
1989–90	7	6	(46)	0	12	1	(0)	0	13	7
1990–91	5	2	(29)	1	4	4	(0)	0	8	6
1991–92	15	5	(25)	1	14	7	(0)	0	21	11
1992–93	10	3	(23)	0	10	3	(0)	0	13	11
1993–94	8	3	(27)	1	8	4	(2)	0	12	12
1994–95	14	11	(44)	0	18	7	(0)	0	25	18
1995–96	7	2	(22)	0	7	2	(0)	0	9	7
1996–97	11	10	(48)	1	19	3	(1)	0	22	14
Average[b]	9	6	(36)	1	11	3	(<1)	0	16	11

[a] L&S (land and shoot) refers to animals recorded as "ground shot" when transportation indicated was "aircraft).
[b] Data from 1987-88 not used in calculations.

Table 5 Unit 16 marten harvest, 1992–1996

	Reported Harvest				Method of Take					Successful
Year[a]	Male	Female	(%)[b]	Unk	Trap/snare	Shot	(L&S)[c]	Unk	Total	Trappers/hunters
1992–93	34	11	--	85	130	0	(0)	0	130	11
1993–94	71	27	(27)	5	103	0	(0)	0	103	11
1994–95	28	22	--	47	71	0	(0)	26	97	14
1995–96	138	63	(31)	28	186	0	(0)	43	229	18
1996–97	253	149	(37)	178	570	0	(0)	10	580	34
Average	105	54	(32)	69	212	0	(0)	16	228	18

[a] Sealing not required until 1992–93

[b] Not calculated in years when a large proportion were of unknown sex.

[c] L&S (land and shoot) refers to animals recorded as "ground shot" when transportation indicated was "aircraft).

Table 6 Unit 16 beaver harvest chronology, 1989–1996

Year[a]	Percent harvested											Harvest
	Jun–Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Unk	
1989–90	0	0	0	11	24	14	5	9	36	0	1	145
1990–91	0	0	0	4	1	9	31	22	27	0	6	176
1991–92	0	0	0	31	7	3	34	12	12	0	1	228
1992–93	0	0	0	9	5	10	17	44	11	0	3	90
1993–94	0	0	2	24	9	20	0	34	10	0	0	87
1994–95	0	0	0	11	12	0	20	27	30	0	0	66
1995–96[b]	0	0	0	0	6	0	14	32	6	41	0	65
1996–97[b]	2	0	5	1	4	21	13	38	7	1	7	167

[a] Data not collected prior to 1989

[b] Season lengthened to include first 2 weeks of May

Table 7 Unit 16 land otter harvest chronology, 1989–96

	Percent of Harvest								
Year[a]	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Unk	Harvest
1989–90	0	20	45	20	0	15	0	0	20
1990–91	0	7	7	40	13	26	7	0	15
1991–92	0	10	5	42	21	16	0	5	19
1992–93	0	0	36	21	29	7	0	7	14
1993–94	10	16	39	23	3	10	0	0	31
1994–95	0	14	0	0	57	29	0	0	7
1995–96	0	12	38	38	6	6	0	0	16
1996–97	0	11	18	4	44	22	0	0	27

[a] Data not collected before 1989

Table 8 Unit 16 wolverine harvest chronology, 1989–1996

Year[a]	Percent of Harvest								Harvest
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Unk	
1989–90	0	0	15	8	38	31	8	0	13
1990–91	0	0	0	0	12	50	38	0	8
1991–92	5	0	5	0	57	24	10	0	21
1992–93[b]	8	0	0	15	15	54	8	0	13
1993–94[b]	8	8	0	25	34	8	16	0	12
1994–95[b]	0	0	4	8	48	32	8	0	25
1995–96[b]	0	0	0	11	22	67	0	0	9
1996–97[b]	4	0	9	23	14	45	4	0	22

[a] Data not collected before 1989

[b] Season length different for subunits 16A (Nov. 10–Jan. 31) and 16B (Nov 10–Feb. 28).

Table 9 Unit 16 marten harvest chronology, 1992–1996

Year[a]	Percent of Harvest								Harvest
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Unk	
1992–93	0	0	72	26	0	2	0	0	130
1993–94	0	0	49	35	11	5	0	0	103
1994–95	0	0	47	37	0	0	0	16	97
1995–96	0	0	55	44	1	0	0	0	229
1996–97	0	0	41	51	8	0	0	0	580

[a] Sealing not required before 1992–93.

Table 10 Unit 16 beaver trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	
1987–88	0	0	0	0	0	0	0	100	394
1988–89	9	22	0	0	58	0	0	11	370
1989–90	12	28	0	0	57	0	1	1	145
1990–91	3	17	3	0	74	0	0	3	176
1991–92	6	2	1	0	79	0	3	9	228
1992–93	1	9	0	0	65	0	10	14	90
1993–94	1	0	0	5	77	0	7	10	87
1994–95	9	8	6	0	70	0	1	6	66
1995–96	0	0	42	0	42	0	0	17	65
1996–97	13	0	1	0	69	0	7	9	167

Table 11 Unit 16 land otter trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest: Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	Total Harvest
1987–88	0	0	0	0	0	0	0	100	51
1988–89	17	47	0	0	34	0	0	2	47
1989–90	15	55	0	0	25	0	0	5	20
1990–91	7	40	0	0	53	0	0	0	15
1991–92	0	5	0	0	90	0	0	5	19
1992–93	29	0	0	0	43	0	0	28	14
1993–94	16	0	0	16	65	0	0	3	31
1994–95	0	0	0	0	86	0	0	14	7
1995–96	19	0	0	0	44	0	0	37	16
1996–97	15	0	0	0	85	0	0	0	27

Table 12 Unit 16 wolverine trapper transport methods, 1987–1996

Regulatory Year	Percent of Harvest								Total Harvest
	Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	
1987–88	0	0	0	0	0	0	0	100	25
1988–89	33	13	0	0	27	0	0	27	15
1989–90	38	16	0	0	38	0	0	8	13
1990–91	50	12	0	0	38	0	0	0	8
1991–92	33	0	0	0	52	5	5	5	21
1992–93	31	0	0	0	54	0	8	8	13
1993—94	50	0	0	0	50	0	0	0	12
1994–95	24	0	0	0	60	0	0	16	25
1995–96	11	0	0	0	78	0	0	11	9
1996–97	27	0	0	0	68	4	0	0	22

Table 13 Unit 16 marten trapper transport methods, 1992–1996

Regulatory Year[a]	Percent of Harvest: Airplane	Dogsled Skis Snowshoes	Boat	3- or 4-wheeler	Snow-machine	ORV	Highway Vehicle	Unk	Total Harvest
1992–93	2	6	0	8	82	0	0	2	130
1993–94	23	0	0	6	65	0	6	0	103
1994–95	23	5	0	0	33	0	6	33	97
1995–96	25	3	0	29	24	0	2	17	229
1996–97	15	1	0	0	79	0	2	2	580

[a] Sealing not required before 1992–93.

LOCATION

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

GEOGRAPHIC DESCRIPTION: Northern Bristol Bay

BACKGROUND

Trapping is an important part of the culture and economy of the residents of northern Bristol Bay. Trapping was one of the main sources of cash income prior to the increase in prices paid for commercially caught salmon during the past 30 years. Each year in early March trappers still come to Dillingham from around the region to seal and sell pelts at the annual "Beaver Round-up". In most years, furbuyers purchase thousands of pelts during the weeklong rendezvous and celebration.

Beavers have historically been the most important furbearer in Unit 17. They are currently abundant throughout most portions of unit, occurring in all major drainages and in many of the smaller tributaries. Beaver dams and the resulting reservoirs enhance waterfowl nesting habitat and are frequented by otters. In some portions of the unit, particularly in the Wood–Tikchik lake system, beaver dams impede the movement of migrating salmon, and siltation caused by the dams can destroy spawning habitat. Trapping and adverse weather conditions in winter are the most significant mortality factors for beavers in Unit 17. Season closures in portions of the unit have been imposed on several occasions since 1900 to allow populations to recover. Pelt prices are a significant factor in the annual beaver harvest. Commercial salmon prices also affect beaver trapping effort in the Bristol Bay area; as salmon prices rise, fur trapping effort declines. However, the importance of beaver as food for local residents assures a base level of harvest regardless of other factors.

Red foxes are another commonly trapped furbearer in Unit 17. They occur throughout the unit, preying primarily on ptarmigan and microtines. Fox populations fluctuate widely, apparently because of periodic rabies outbreaks.

Land otter populations increased steadily during the 1980's, and appeared to be stabilize during the 1990s. Increases in otter prices have resulted in more trappers targeting otters rather than catching them incidentally while trapping for beaver.

Lynx are uncommon in Unit 17. The lynx population fluctuates, but they are generally found in low-to-moderate densities even during peaks. Much of the fluctuation is probably due to local hare abundance, and lynx dispersal from adjacent units. Most of the lynx harvested are caught within the Mulchatna River drainage and the mountains near Manokotak.

Wolverines occur throughout Unit 17, ranging from ridgetops to river mouths. Although no data have been collected on the wolverine population in the unit, incidental observations and trapper reports suggest it is stable. Harvest levels fluctuate annually, but they have remained relatively constant since 1976.

Marten were uncommon in most of Unit 17 prior to 1970, but recent reports suggest they are becoming more widespread. Most of their habitat occurs along the Wood-Tikchik Lake system and the spruce forests along the Nushagak and Mulchatna Rivers. Marten were reported in moderate numbers during the reporting period.

Mink occur in most of the riparian areas of Unit 17, but the size of the population and its relative trend are unknown. Pelt sizes are smaller than mink found in the Kuskokwim River drainage, and prices paid for Unit 17 mink are much lower. Consequently, there is little trapping effort targeted toward mink in this area.

Other furbearers in the unit include coyote, arctic fox, short-tailed weasels, and muskrats. Coyotes are becoming more common throughout Unit 17 as they expand their range westward from the Alaska Range. Arctic foxes are uncommon visitors to the unit, probably dispersing from the lower Kuskokwim River drainages during peaks in their population cycles. Weasels are common throughout the unit, but there is little trapping effort targeting the species. Long-term residents of unit 17 report that muskrats were common along the lower Nushagak River and Togiak Rivers, and on the Nushagak Peninsula during the first half of this century. They are currently rare throughout Unit 17, mainly occupying the Igushik and Snake River drainages.

POPULATION OBJECTIVE

Beaver: To maintain beaver populations in Unit 17A at an average stream density index of 1.0 cache per river mile. To maintain beaver populations throughout Units 17B and 17C at a level sufficient to sustain an average stream density of 1.2 caches per river mile.

Otter: To maintain a population of land otters in Unit 17 capable of sustaining an average annual harvest of 200 otters.

Red Fox: To maintain a population of red foxes in Unit 17 capable of sustaining a 5 year average annual harvest of 400 foxes.

Wolverine: To maintain a population of wolverines in Unit 17 capable of sustaining an average annual harvest of 50 wolverines.

METHODS

Harvest data were collected when beavers, wolverines, lynx, and otters were presented for sealing. Fur acquisition reports provided additional harvest data for those species not required to be sealed. A trapper questionnaire designed to provide an index of populations status of various furbearer species was sent to a sample of trappers throughout the unit each spring. Beaver trapping pressure was accessed by periodic aerial surveys during the trapping season. Aerial cache surveys were flown most years between 1968 to 1986 to provide an index of abundance in the more heavily trapped portions of the unit. No cache counts were conducted during this reporting period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Beaver populations in the unit appeared to be stable to increasing during this reporting period. Most trappers report high beaver densities along their lines, but low prices kept harvests low during this reporting period. Low beaver densities typically occur near villages and along portions of major winter trails. Reports of nuisance beavers, particularly on salmon spawning streams and along roads, have remained constant over the past several years.

Otter and wolverine populations appeared to be stable. Both species occur throughout the unit with the highest populations occurring in Units 17B and 17C. No objective population data have ever been collected on these species in Unit 17.

Lynx populations apparently peaked in 1994–95. Although never common in the unit, lynx populations increased in the early 1990s and declined in recent years. Population data for lynx are derived from incidental observations and harvest records. Snowshoe hare populations appeared to be moderate in Units 17B and 17C during this reporting period.

Red fox populations appeared to have peaked during this reporting period, probably in 1995–96. In 1996/96 ptarmigan and microtine populations were at moderate levels and appeared to be increasing.

Coyotes were becoming more common in the unit, as their numbers and range continued to increase. Highest densities appeared to be along the lower Nushagak River.

No data were available to assess marten, mink or weasel population trends. Trapper reports indicate that these species are common in suitable habitat and that marten populations have expanded their range in recent years.

Muskrats remained scarce throughout the unit during this reporting period. In spite of intensive human use of area waterways, observations of muskrats are rare. The only portions of the unit with viable populations appeared to be the Weary and Igushik River drainages.

MORTALITY

Harvest

Season and Bag Limit.

Beaver season was open from January 1 to 31 in Unit 17A, and from January 1 to February 28 in Units 17B and 17C. The bag limit was 20 beavers per trapper.

Wolverine, fox (red and arctic), lynx, marten, mink, and weasel seasons were open from November 10 to February 28. There was no bag limit on these animals.

Land otter and coyote seasons were open from November 10 to March 31. There was no limit on these animals.

Muskrat season was open from November 10 to June 10. There was no bag limit on muskrats.

Board of Game Actions and Emergency Orders. During their spring 1997 meeting, the Board of Game worked with the Department and the Nushagak Advisory Committee to simplify trapping seasons throughout Unit 17. The result of their efforts was to align the lynx and canid seasons (Nov 10 to March 31), and align all other furbearers (Nov 10 to Feb 28).

Beaver season was lengthened and the bag limit was doubled. An additional spring "meat" season was also added. The new season is Nov. 10 to Feb. 28 with a bag limit of 40 beavers per trapper. Starting in 1998, the spring season will be from April 15 to May 31. Beavers may be shot during that time, but only two per day may be taken and they must be used for human food. ADF&G must seal pelts, and beavers taken in the spring season are included in the 40 beaver bag limit. A trapping license is required to participate in this season.

Otter season was shortened. The new season is Nov. 10 to Feb. 28 (old season was Nov. 10 to March 31). Muskrat season was also shortened and the bag limit was reduced to two muskrats per trapper (there used to be no limit). The new muskrat season is Nov. 10 to Feb 28 (old season was Nov. 10 to June 10).

Fox and lynx seasons were lengthened. The new seasons are Nov. 10 to March 31 (old season was Nov. 10 to Feb. 28).

Human-Induced Mortality. Beaver harvests during this reporting period (1994/95) totaled 1091; in 1995/96, harvest was 439, and during 1996/97, the harvest was 869, somewhat lower than the mean annual harvest for the previous 5 years (1989/90–93/94, $\bar{x}$ = 930) (Table 1). Trappers indicated that the main reasons for the reduced harvest were low prices and unfavorable weather conditions during the trapping season. The number of trappers afield was also affected by these factors (Table 2). The percentage of kits in the harvest has remained relatively consistent during the last 5 years in spite of dramatic fluctuations in the number of beavers harvested (Table 1). Snares and conibear traps are equally important methods of trapping beavers in Unit 17 in recent years (Table 2). This shift away from the more traditional method of snaring is due in part to the increased value of otter pelts. Prices paid by local furbuyers during this reporting period averaged $25 per pelt. Super blankets went for a high of $55.

The number of lynx caught peaked at 28 during this reporting period (1994/95), the highest reported harvest since 1984–85. The average annual harvest from the previous 5 years (1989/90–93/94) was 8 lynx (Table 1). Most lynx caught in the past 5 years have been taken by a trap or snare (Table 3). Higher lynx harvests are a reflection of increasing lynx densities in the unit. Prices for lynx pelts ranged from $40 to $80.

Otter harvests during this reporting period were higher (137) than the average annual harvest for the previous 5 years (1989/90–93/94), which was 109 (Table 1). During the past 5 years the sex ratio of the harvest has remained near 50:50 (Table 4). Traps (conibears) are the most common method used by successful trappers, followed by snares and firearms (Table 4). Prices paid for otter pelts during this reporting period ranged from $35 to $70 per pelt.

Wolverine harvests averaged 47 per year during this reporting period, considerably higher than the average annual harvest during the previous 5 years (1989/90–93/94) was 32 (Table 1). There was no obvious reason for the increase in the harvest. Traps were the most common method of harvest, followed by firearms and snares (Table 5). Prices paid by local furbuyers were lower during this reporting period, averaging about $200 for a prime pelt.

Harvest data on furbearers that are not sealed are sketchy at best. Fur export and acquisition reports provide only minimum harvest levels because many furs are used locally during periods of low fur prices. The average price paid during this reporting period for marten was $45, and the average annual reported harvest was 124. The average price paid for mink during this reporting period was $10, and the average annual reported harvest was 40. Red fox pelts averaged $20 for a prime pelt during this reporting period and trappers reported selling an annual average of 103 fox pelts.

Permit Hunts. No special permits for trapping nuisance beavers were issued during this reporting period.

Hunter Residency and Success. Data on trapper residency and success have not been specifically analyzed. Most of the furbearers trapped in Unit 17 are taken by local residents. Individuals from villages within the unit account for most of the harvest. Trappers residing in adjacent units (Nondalton, Iliamna, and Kuskokwim River villages) also take some furbearers in Unit 17. A few trappers from outside of the area have flown into Unit 17B to harvest wolverine.

Harvest Chronology. Beaver harvest chronology is dependent on weather conditions. Fluctuations noted on Table 10 should be viewed with caution. Many trappers did not keep close track of when they individual beavers were trapped during the coarse of the season. Most lynx harvested during this reporting period were taken in February (Table 11). Otters were caught throughout the trapping season with most of the harvest occurring during the beaver trapping season (January and February)(Table 12). Wolverine harvests were highest in February during most years (Table 13).

Transport Methods. Snowmachines were the most common means of access used by successful trappers in Unit 17 (Tables 6–9). During most years snowmachines allow reliable access to most of the unit from late December to March.

Other Mortality

Beaver, and occasionally otter, are sometimes caught in gill nets during the summer fishing season. The total number caught unitwide is probably less than 50 per year. These incidental catches are rarely reported and carcasses are either used for food or discarded.

Natural mortality of beavers can be high in the Bristol Bay area during winters of low temperatures and low snowfall, when beaver caches in shallow areas become ice-bound. High mortality rates can also occur for beavers along major rivers during severe spring break-up periods. During the winter of 1996/97 there were several reports of higher than normal natural mortality because of ice conditions.

There were no reported cases of rabid foxes in Unit 17 during this reporting period, however, confirmed cases were reported in the Naknek/King Salmon area of Unit 9C in 1993/94. In previous years, rabies outbreaks on the Alaska Peninsula preceded outbreaks in northern Bristol Bay drainages.

HABITAT

Assessment

No formal habitat monitoring programs were conducted in Unit 17. Furbearer habitat along the Nushagak and Mulchatna Rivers, and along the lower reaches of the major tributaries to those rivers, appeared to be in very good to excellent condition. Although there was evidence of heavy browsing, willow stands on gravel bars were abundant.

Enhancement

No man-caused habitat enhancement activities have been documented in Unit 17. Because of the relative inaccessibility of most of the unit, and the occurrence of natural enhancement, man-caused habitat enhancement is not practical or necessary at this time.

NONREGULATORY PROBLEMS/NEEDS:

Commercial Fisheries biologists reported conflicts with beavers and spawning salmon along streams flowing into the north shore of Lake Nerka and along streams at the south end of Nunavaugalik Lake (J. Browning, ADF&G, pers. commun.).

RESULTS AND CONCLUSIONS

Most furbearer populations in Unit 17 appear to be healthy and stable. Low prices paid for pelts coupled with high fuel prices have reduced trapping pressure on beavers and otters in many areas. Local trappers are generally satisfied with current beaver and otter seasons and bag limits. Existing bag limits for beaver are often circumvented as trappers claim other family members took excess beavers. Some residents of Nushagak River villages have expressed a desire to extend or shift the beaver trapping season in Unit 17B to close on 15 March, as it did prior to the 1988/89 trapping season. Many trappers in that area do not go afield during the portion of the current season that overlaps the Russian Orthodox Christmas and New Year holiday season (Slavi) in early January. Trappers in unit 17A would like to see the state beaver trapping season in their area include the month of February so that it conforms to the rest of the unit and with the federal subsistence season.

Wolverine harvests have been relatively consistent for the past several years and populations seemed to be stable. Prohibition of same-day-airborne hunting and elimination of the March portion of the trapping season have not reduced the harvest. Most wolverine pelts are used by local fur sewers and prices have remained consistently high in spite of lower prices for wolverine outside of the local area.

Lynx populations have rebounded from the low levels first noted in 1987/88 and peaked in 1994/95. Liberal seasons have probably had little effect on the recovery of the lynx population because most trappers in the unit catch lynx incidentally in marten sets.

Red fox populations also peaked during this reporting period. If this cycle is driven by periodic endemic rabies outbreaks, there are probably few practical measures the department can implement to achieve the population objective of maintaining a population that will support a harvest of 400 foxes per year.

Reasons for the low muskrat population in Unit 17 remain a mystery. More research into the historic abundance and distribution of this species in the Bristol Bay area is needed. If suitable habitat is found within the historic range, a transplant into the area should be considered. If the department elects to consider such a transplant, a complete closure of muskrat trapping seasons in the transplant areas will be necessary.

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Table 1 Reported harvest of furbearers in Unit 17, 1956/57–1996/97 (sealing record data)

Regulatory	Beaver		Lynx		Land Otter				Wolverine			
year	% Kits	Total	% Kits	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1956/57	22.9	367	---	---	---	---	---	---	---	---	---	---
1957/58	19.1	3165	---	---	---	---	---	---	---	---	---	---
1958/59	19.6	3245	---	---	---	---	---	---	---	---	---	---
1959/60	24.3	3721	---	---	---	---	---	---	---	---	---	---
1960/61	23.1	2849	---	---	---	---	---	---	---	---	---	---
1961/62	29.5	1903	---	---	---	---	---	---	---	---	---	---
1962/63	23.3	2172	---	---	---	---	---	---	---	---	---	---
1963/64	28.4	1766	---	---	---	---	---	---	---	---	---	---
1964/65	22.1	957	---	---	---	---	---	---	---	---	---	---
1965/66	25.2	1424	---	---	---	---	---	---	---	---	---	---
1966/67	25.3	2711	---	---	---	---	---	---	---	---	---	---
1967/68	25.7	3158	---	---	---	---	---	---	---	---	---	---
1968/69	N/A	1750[a]	---	---	---	---	---	---	---	---	---	---
1969/70	22.6	1190	---	---	---	---	---	---	---	---	---	---

Table 1 Continued

Regulatory year	Beaver		Lynx		Land Otter				Wolverine			
	% Kits	Total	% Kits	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1970/71	27.5	824	---	---	---	---	---	---	---	---	---	---
1971/72	20.5	762	---	---	---	---	---	---	---	---	---	---
1972/73	23.9	1849	---	---	---	---	---	---	10	5	6	21
1973/74	23.9	1681	---	---	---	---	---	---	27	18	0	45
1974/75	15.8	929[b]	---	---	---	---	---	---	14	7	1	22
1975/76	22.2	637[b]	---	---	---	---	---	---	50	25	3	78
1976/77	17.7	766[b]	---	---	---	---	---	---	37	12	2	51
1977/78	23.5	802[b]	11.1	36	52	49	7	108	32	14	3	49
1978/79	20.5	959	26.7	30	70	54	9	133	26	14	3	43
1979/80	27.7	1478	32.0	25	68	62	9	140	28	19	0	47
1980/81	20.0	1673	37.5	40	82	80	0	160	30	10	0	40
1981/82	20.9	1693	11.8	17	94	83	1	179	28	10	0	38
1982/83	12.8	1824	12.0	25	100	72	31	204	34	17	1	52
1983/84	18.7	1360	8.3	12	94	63	3	165	10	4	0	14
1984/85	22.9	1661	27.6	29	105	94	20	219	39	16	2	57

Table 1 Continued

Regulatory	Beaver		Lynx		Land Otter				Wolverine			
Year	% Kits	Total	% Kits	Total	Male	Female	Unk	Total	Male	Female	Unk	Total
1985/86	15.9	1452	12.5	8	49	46	6	101	13	8	2	23
1986/87	20.1	2817	21.4	14	87	90	11	188	31	9	0	40
1987/88	21.8	3048	---	1	133	133	1	267	22	20	2	44
1988/89	18.8	965	---	1	66	57	19	142	21	16	7	44
1989/90	19.7	1245	---	1	67	46	3	116	14	7	5	26
1990/91	20.2	1092	50.0	2	68	71	10	149	19	19	8	46
1991/92	21.8	1183	---	5	40	45	18	103	25	23	3	51
1992/93	29.9	455	13.3	15	38	36	9	83	8	2	0	10
1993/94	20.0	676[c]	13.3	15	46	40	10	96	18	10	1	29
1994/95	23.3	1091	14.3	28	63	50	21	134	32	21	5	58
1995/96	26.2	439	---	7	43	40	0	83	22	12	0	34
1996/97	20.0	869	14.3	7	75	95	24	194	28	14	8	50

[a] no harvest records available, estimates only

[b] beaver trapping season closed in units 17A and 17C.

[c] beaver trapping season in unit 17A extended by one month by emergency regulation.

Table 2 Unit 17 beaver harvest, 1992/93–1996/97

Regulatory year[a]	Reported harvest Kits[b](%)	Adults (%)	Total	Method of take Trap (%)	Snare (%)	Unk.	Successful Trappers
1992/93	136 (29.9)	319 (70.1)	455	218 (47.9)	213 (46.8)	24	45
1993/94	135 (20.0)	541 (80.0)	676	345 (51.0)	320 (47.3)	11	57
1994/95	254 (23.3)	837 (76.7)	1091	564 (51.7)	517 (47.4)	10	90
1995/96	115 (26.2)	324 (73.8)	439	244 (55.6)	195 (44.4)	0	44
1996/97	174 (20.0)	695 (80.0)	869	311 (35.8)	558 (64.2)	0	65

[a] Season dates: 1992/93–96/97 Unit 17A: Jan. 1–Jan. 31 20 per season
Units 17B & 17C: Jan. 1–Feb. 28 20 per season
1993/94 - Unit 17A season extended to Jan. 1–Feb. 28 by emergency regulation.

[b] juveniles < 52"

Table 3 Unit 17 lynx harvest, 1992/93–1996/97

Regulatory year[a]	Reported harvest Males (%)	Females (%)	Unk.	Juveniles [b](%)	Adults (%)	Total	Method of take Trap/Snare (%)	Shot (%)	Unk.	Successful Trappers
1992/93	5 (33.3)	4 (26.7)	6	2 (13.3)	13 (86.7)	15	13 (86.7)	2 (13.3)	0	4
1993/94	5 (33.3)	7 (46.7)	3	2 (13.3)	13 (86.7)	15	14 (93.3)	1 (6.7)	0	11
1994/95	10 (35.7)	15 (53.6)	3	4 (14.3)	24 (85.7)	28	28 (100)	0 (---)	0	14
1995/96	2 (28.6)	5 (71.4)	0	0 (---)	7 (100)	7	6 (85.7)	1 (14.3)	0	6
1996/97	1 (14.3)	4 (57.1)	2	1 (14.3)	5 (71.4)	7	6 (85.7)	0 (---)	1	7

[a] Trapping season dates: 1992/93–1996/97 Unit 17 Nov. 10–Feb. 28 No limit
Hunting season dates: 1992/93–1996/97 Unit 17 Nov. 10–Feb. 28 2 lynx

[b] juveniles < 34" in length

Table 4 Unit 17 otter harvest, 1992/93–1996/97

Regulatory year[a]	Reported harvest				Method of take				Successful Trappers
	Males (%)	Females (%)	Unk.	Total	Trap (%)	Snare (%)	Shot (%)	Unk.	
1992/93	38 (45.8)	36 (43.4)	9	83	60 (72.3)	20 (24.1)	1 (1.2)	2	29
1993/94	46 (47.9)	40 (41.6)	10	96	62 (64.6)	21 (21.9)	6 (6.3)	7	33
1994/95	63 (47.0)	50 (37.3)	21	134	122 (91.0)	12 (9.0)	0 (---)	0	41
1995/96	43 (51.8)	40 (48.2)	0	83	68 (81.9)	8 (9.6)	3 (3.6)	4	24
1996/97	75 (38.7)	95 (49.0)	24	194	118 (60.8)	64 (33.0)	6 (3.1)	6	51

[a] Season dates: 1992/93–1996/97 Unit 17 Nov. 10–Mar. 31 No limit

Table 5 Unit 17 wolverine harvest, 1992/93–1996/97

Regulatory Year[a]	Reported harvest				Method of take				Successful Trappers
	Males (%)	Females (%)	Unk.	Total	Trap (%)	Snare (%)	Shot (%)	Unk.	
1992/93	8 (80.0)	2 (20.0)	0	10	8 (80.0)	0 (------)	2 (20.0)	0	10
1993/94	18 (62.1)	10 (34.5)	1	29	7 (24.1)	1 (3.4)	21 (72.4)	0	20
1994/95	32 (55.2)	21 (36.2)	5	58	44 (75.9)	1 (1.7)	13 (22.4)	0	29
1995/96	22 (64.7)	12 (35.3)	0	34	25 (73.5)	1 (2.9)	8 (23.5)	0	17
1996/97	28 (56.0)	14 (28.0)	8	50	36 (72.0)	1 (2.0)	13 (26.0)	0	24

[a] Trapping season dates: 1992/93–1996/97 Unit 17 Nov. 10–Feb. 28 No limit
Hunting season dates: 1992/93–1996/97 Unit 17 Sep. 1–Mar. 31 1 wolverine

Table 6 Unit 17 beaver harvest percentage by transport method, 1992/93–1996/97

Regulatory year	Percent of harvest								Total
	Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1992/93	---	---	---	---	96.3	---	---	3.7	455
1993/94	1.3	---	---	---	96.4	---	---	2.2	676
1994/95	0.4	1.3	---	---	98.2	---	0.2	---	1091
1995/96	0.9	2.7	---	---	96.4	---	---	---	439
1996/97	1.5	---	---	---	98.4	0.1	---	---	869

Table 7 Unit 17 lynx harvest percent by transport method, 1992/93–1996/97

Regulatory year	Percent of harvest								Total
	Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	
1992/93	---	---	---	---	100.0	---	---	---	15
1993/94	---	---	6.7	---	80.0	---	---	13.3	15
1994/95	3.6	---	---	---	96.4	---	---	---	28
1995/96	42.9	---	---	---	57.1	---	---	---	7
1996/97	---	---	---	---	85.7	---	---	14.3	7

Table 8 Unit 17 otter harvest percentage by transport method, 1992/93–1996/97

Regulatory year	Percent of harvest								
	Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	Total
1992/93	---	---	6.0	---	91.6	---	---	2.4	83
1993/94	---	---	10.4	---	80.2	---	---	9.4	96
1994/95	---	---	---	---	99.3	---	---	0.7	134
1995/96	---	---	---	---	86.7	---	1.2	12.0	83
1996/97	---	---	---	---	94.8	---	---	5.2	194

Table 9 Unit 17 wolverine harvest percentage by transport method, 1989/90–1993/94

Regulatory year	Percent of harvest								
	Airplane	Dogsled	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Unknown	Total
1992/93	---	---	---	---	100.0	---	---	---	10
1993/94	17.2	---	---	---	79.3	---	---	3.4	29
1994/95	13.8	---	---	---	86.2	---	---	---	58
1995/96	52.9	---	---	---	41.2	---	---	5.9	34
1996/97	38.0	---	---	---	62.0	---	---	---	50

Table 10 Unit 17 beaver harvest chronology percentage by month, 1992/93–1996/97

Regulatory Year	Month: November	December	January	February	March	April	Other/Unk	Total
1992/93	---	---	71.2	27.9	---	---	0.9	455
1993/94	---	---	45.4	51.6	---	---	3.0	676
1994/95	---	---	43.9	51.6	3.0	---	1.5	1091
1995/96	---	0.5	43.3	56.0	---	---	0.2	439
1996/97	---	0.1	55.5	44.4	---	---	---	869

Table 11 Unit 17 lynx harvest chronology percentage by month, 1992/93–1996/97

Regulatory year	Month: November	December	January	February	March	Other/Unknown	Total
1992/93	13.3	46.7	---	40.0	---	---	15
1993/94	8.3	33.3	13.3	53.3	---	---	15
1994/95	---	25.0	35.7	35.7	3.6	---	28
1995/96	---	28.6	57.1	14.3	---	---	7
1996/97	---	14.3	28.6	42.9	---	14.3	7

Table 12 Unit 17 otter harvest chronology percent by month, 1992/93–1996/97

Regulatory year	Month						Total
	November	December	January	February	March	Other/Unknown	
1992/93	8.4	10.8	59.0	20.5	---	1.2	83
1993/94	14.6	24.0	34.4	18.8	1.0	7.3	96
1994/95	5.2	18.7	47.0	24.6	3.0	1.4	134
1995/96	1.2	10.8	32.5	55.4	---	---	83
1996/97	1.0	2.6	46.9	43.3	3.6	2.6	194

Table 13 Unit 17 wolverine harvest chronology percentage by month, 1992/93–1996/97

Regulatory year	Month						Total
	November	December	January	February	March	Other/Unknown	
1992/93	---	10.0	40.0	50.0	---	---	10
1993/94	---	10.3	13.8	51.7	3.4	20.7	29
1994/95	---	13.8	36.2	41.4	5.2	3.4	58
1995/96	14.7	8.8	20.6	38.2	---	17.6	34
1996/97	---	20.0	42.0	28.0	8.0	2.0	50

LOCATION

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

GEOGRAPHIC DESCRIPTION: Yukon–Kuskokwim Delta

BACKGROUND

Furbearers are abundant in all areas of suitable habitat in Unit 18. The area produces large numbers of aquatic species such as beaver, otter, mink and muskrat and terrestrial species such as red fox. In some years approximately one-third of the fur sealed in the State comes from Unit 18. Production of unsealed furbearers such as mink, muskrat, and red fox has remained high, although well below historic levels of the 1930s. Boreal forest species such as lynx and marten have limited distribution in this area since most of the Yukon–Kuskokwim (Y–K) Delta is lowland tundra and aquatic habitats. The continuing population growth and range expansion of the Mulchatna caribou herd into Unit 18 will likely influence human use patterns and will affect the harvest of furbearers accordingly.

MANAGEMENT DIRECTION

MANAGEMENT GOALS AND OBJECTIVES

Management goals for furbearers in Unit 18 include facilitating harvest through long seasons and liberal bag limits. Within the past decade, furbearers have become a severely underutilized resource. Public education about trapping needs to be emphasized as a management objective, as well as support for fur sealers and assistance for trappers. Another management goal for Unit 18 is to attain better harvest assessment. Population status of all furbearers in Unit 18 fluctuates independently of present trapping pressure and the management system is designed to encourage the trapping industry. Trapping is an important source of income to some local residents, but trapping has declined in economic value in Unit 18 in recent years.

METHODS

We collected information about furbearers in Unit 18 by interviewing local residents, trappers, fur buyers, and agency biologists. For our harvest statistics, we used sealing certificates and fur acquisition reports. Public notices were sent out to all village post offices and fur sealers, informing hunters and trappers that all harvests of beaver, lynx, otter, wolves, and wolverines must be sealed. Additional notices were sent explaining the use of fur export permits and the importance of reporting all furbearer harvests. All fur sealers were contacted about proper procedures for sealing pelts and using fur acquisition reports. Incidental observations of furbearer species were compiled during fieldwork directed at other species, primarily caribou. Aerial beaver cache counts conducted in previous years were not done 1994–1997 because of budget constraints, weather, and the death of the previous area biologist.

RESULTS AND DISCUSSION

POPULATION STATUS, TREND AND MORTALITY

Harvest

Seasons and Bag Limit.

Trapping and hunting seasons and bag limits for Unit 18 furbearers were as follows:

Species	Trapping season	Trapping bag limit	Hunting season	Hunting bag limit
Beaver	1 Nov–10 Jun	No limit	N/A	N/A
Coyote	10 Nov–31 Mar	No limit	1 Sep–30 Apr	2
Lynx	10 Nov–31 Mar	No limit	10 Nov–31 Mar	2
Marten	10 Nov–31 Mar	No limit	N/A	N/A
Mink & Weasel	10 Nov–31 Jan	No limit	N/A	N/A
Muskrat	10 Nov–10 Jun	No limit	N/A	N/A
Arctic Fox	10 Nov–31 Mar	No limit	1 Sep–30 Apr	2
Red Fox	10 Nov–31 Mar	No limit	1 Nov–15 Feb	10[a]
River Otter	10 Nov–31 Mar	No limit	N/A	N/A
Wolverine	10 Nov–31 Mar	No limit	1 Sep–30 Apr	1

[a] However, no more than 2 may be taken before 1 Oct.

Board of Game Actions and Emergency Orders. There were no changes to the regulations affecting furbearers by the Board of Game during this reporting period.

Hunter/Trapper Harvest.

Beaver — Beavers continue to expand and colonize new habitats in coastal regions of Unit 18. Beaver densities remain very high throughout Unit 18. Beaver densities are increasing even in treeless expanses of Delta lowlands adjacent to the Bering Sea, including on Nelson Island, where low willow shrubs provide the major food source. Fur buyers report increasing incidence of bite scars and fleas on beaver pelts, suggesting increased intraspecific strife and pressure within the beaver population throughout the unit. Further, local residents have complained that beaver dams regularly restrict boat traffic and have contributed to a decline in whitefish as a result of blocked fish passage.

Based on furbearer sealing certificates, beaver harvest in Unit 18 has declined substantially during the last decade; from a high of 4686 sealed during 1988–1989 to recent harvests of 500–850 animals per year. Beaver trapping effort has decreased as a result of declining prices for pelts, which have reduced from an average of $75 per pelt to $50 per pelt (33% reduction in pelt prices). Beaver pelt damage has exerted pressure to move prices downward.

Harvest of beaver in the Kuskokwim drainage of Unit 18 has decreased since the late 1980s to 300–500 pelts sealed per year during 1994–1997. Harvest on the Yukon declined from 1614 pelts sealed in 1987–1988 to approximately 300 pelts sealed per season during 1994–1997. The Fog and Kisaralik River drainages were the leading beaver pelt producer in the unit during the reporting period. This is likely a function of where trappers choose to trap rather than a response to biological parameters. The Upper and Lower Johnson River produced much of the remaining unit-wide harvest in 1994–1997. The Gweek and the Johnson River systems were the third and fourth most productive drainages in the Kuskokwim for beaver harvest in 1994–1997.

Beaver harvest in the Yukon drainage was more evenly distributed than in the Kuskokwim in 1994–1997. The Black River, the immediate area of the Yukon River between Marshall and Mountain Village, and the Kokechik River were the most important drainages for beaver harvest in the Yukon area of Unit 18 in 1994–1997.

Over the past several years there has been a widening discrepancy between prices paid for large size and small size beaver. An estimated 50% of small-size beaver and 30–40% of large-size beaver taken in Unit 18 may not reach the commercial market and are thus not sealed. This may be due to several factors: the sudden and rapid increase in beaver populations in the unit during the last two decades, a lack of local knowledge and experience in handling beaver (especially in coastal regions) leading to a lower price, the popularity of beaver hats in the region and a general interest in skin sewing. Thus, the number of beaver sealed does not represent the actual harvest but excludes an estimated 40% of pelts retained for domestic use.

The current low beaver harvest in Unit 18 is certainly not indicative of low population levels. Rather, it reflects low pelt prices and lack of participation by a major fur buyer during 1995–1996. Sales at Canadian fur auction houses show that beaver pelt prices reached a low point in 1996 and began to slowly recover thereafter. Reported beaver harvest from Unit 18 in 1997 reached 1000 individuals, but still remained well below harvest levels achieved during the previous decade.

A significant proportion of beavers harvested in Unit 18 are taken by local subsistence-based residents for human food. Such pelts may not be salvaged or sealed.

Coyote — The coyote population in Unit 18 is found mostly in the southern Kuskokwim Mountains, but some coyotes have reached the Yukon and Johnson River drainages. The coyote population is expanding from Unit 17 into Unit 18. To expand into other areas of Unit 18, coyotes pass through a "screen" of increasing numbers of wolves in eastern portions of the unit, and this may influence the rate of population expansion in the unit. Coyotes are now reported in the Fog, Little Kasigluk, Kwethluk, Kisaralik, and Quartz River drainages in eastern Unit 18.

Arctic Fox — Very few white foxes were taken in Unit 18 during this reporting period. Typically, they are taken opportunistically by trappers. They are not common in Unit 18, except along the coast, and the usual take is only a few each year. When they are taken, they are often used domestically and are not recorded using present harvest assessment techniques.

Red Fox — Red foxes remain abundant in Unit 18. Habitat for red foxes is excellent in Unit 18 and includes boreal forest, riparian, and tundra habitats. Red foxes in the tundra regions of Unit 18 are much larger than foxes in the boreal forest. Even though the fox population is high, low pelt prices during the past years ($17.10) have resulted in low fox harvests. The estimated mean annual harvest has been 400 red foxes (including cross and silver color phases) in this reporting period. This is far below peak harvest level of 2500 foxes achieved during the 1980s.

Lynx — Lynx populations in Unit 18 during the reporting period continue to increase while recovering from a previous low. Sealed lynx harvest in Unit 18 increased during the last three years from 9 to 13 to 38 individuals. In 1996 the snowshoe hare population, the main prey species for lynx, was increasing and about 6 years into a 10-year cycle. Unit 18 supports relatively few lynx in brushy riparian habitats and on isolated rock outcroppings such as Kusilvak Mountain between Mountain Village and Scammon Bay. Sightings of these cats and their tracks are becoming more common although pelt prices remain relatively low ($120) compared to the previous decade ($800). Lynx are most common in eastern Unit 18.

Although lynx are currently being caught in proximity to communities where they have been rarely seen, lynx have probably never been abundant in Unit 18. Some forested drainages, especially along the Yukon and Kuskokwim rivers, contain snowshoe hare populations capable of sustaining limited lynx populations. Most lynx harvests continue to originate from those areas. Sale of lynx pelts during the past 5 years has contributed a minor portion of the total income realized from the sale of wild fur pelts in Unit 18. Trappers responding to the Unit 18 trapper questionnaire indicate that lynx populations are increasing but barely worth the effort. Lynx are a species of opportunity, not a target species, for trappers in Unit 18.

Marten — Marten are not common in Unit 18, but are reportedly increasing in their limited riparian forest habitats in Unit 18. Marten are associated with the boreal forest environment, which is restricted in Unit 18, and which is mostly lowland and mountain tundra and wetlands.

Marten pelt prices increased dramatically in the mid-1980s, and trapper interest coincidentally increased. At the same time, marten populations apparently declined in the unit. Marten populations increased in subsequent years and were high for Unit 18 during this reporting period. Marten prices during this reporting period were in the $40 range for male marten.

The number of marten reaching fur buyers in Unit 18 in 1996 was 25 individuals, a very low figure. By comparison, the number of marten originating in Unit 18 and purchased by fur buyers was approximately 75 individuals in 1988–1989. This was also considered to be a very low figure. About 10% of marten skins are used as hat trim and may not reach the market.

Mink — Mink are abundant throughout Unit 18, particularly in the delta lowlands north and west of the Kuskokwim River. Mink have remained the premier species of economic value in Unit 18 and are occasionally utilized for food. Some trappers indicated lower mink harvest in the 1995–1996 season because of late freeze-up on the Y-K Delta and lack of snow for travel to trapping areas.

Mink harvest has averaged several thousand skins per year in the past, but the mink harvest in the reporting period was not exceptional (300–400 mink in 1996). This reflects the poor winter travel conditions, the lack of activity by a major fur buyer in 1995–1996, and low prices paid for mink furs, not mink population status. These Unit 18 harvest figures for mink are well below average historical low harvests of 6000 mink. Peak harvests were achieved during the 1940s when up to 60,000 mink were taken during one season. Average harvests at the time were 16,000 mink. Fur buyers estimate 98% of mink taken in Unit 18 reach the market, since the cash value of the world-class Kuskokwim mink compared to other wild mink is high. However, with alternative sources of income, the number of trappers active on the Y–K Delta is far less than 50 years ago, when trapping was the only source of cash income. The Unit 18 mink resource in particular is very substantially underutilized.

Muskrat — Muskrat extend across the entire unit from eastern riparian habitats to coastal marshes. Currently, poor pelt prices make muskrats one of the least valuable furbearer species in Unit 18. While most other furbearers in Unit 18 produce pelts superior to those of other regions, this is not true for muskrat, consequently the market price is relatively low. Some harvest by shooting occurs during spring in scattered locations, but most pelts are probably used domestically in production of hats. Some trappers also use muskrat meat.

River Otter — River otter remain abundant throughout Unit 18, particularly in the delta lowlands north and west of the Kuskokwim River. They are taken primarily for their fur, and the meat is regularly eaten.

Although observations throughout the area suggest river otters are widely distributed, sealing records show harvests were very low during the reporting period. The 1994–1995, 1995–1996, and 1996–1997 harvests of 256, 333, and 351 otters, respectively, were among the lowest in the unit since mandatory sealing began. The 700 otters reported sealed per year in Unit 18 in the early 1980s reflected the density of otters, the high number of active trappers, and an active fur buyer. The number of trappers taking otters has been declining, but the number of otters taken per trapper has been increasing.

There is a strong correlation between annual beaver harvests and river otter harvests in Unit 18. At the present time, otters are generally a nontarget species, and their take is largely incidental to the harvest of beaver and mink, especially in *taluyaq* (funnel-type) traps set for mink, as well as in snares set for beaver.

Otter from Unit 18 produce exceptionally high quality pelts and until the 1994–1997 seasons, pelt prices for river otter were good. Mean pelt prices were in excess of $50 during the 1994–1995 regulatory year.

Wolverine — Wolverine populations are probably increasing in Unit 18, particularly in response to the rapid growth and expansion of the Mulchatna caribou herd into Unit 18. Wolverines were formerly uncommon in Unit 18 because of a lack of a suitable food base. Natural caribou mortality and scavenging of wolf-killed caribou are providing wolverines with an increasing food source and we expect wolverine harvests will increase in the future as the population grows.

Mandatory sealing of wolverine pelts provides only a minimum record of reported harvests. In 1994–1995, 1995–1996 and 1996–1997 there were 4, 7, and 5 wolverines sealed from Unit 18, respectively. Untanned wolverine hides are in very high demand in Unit 18 as parka ruffs, and a substantial portion of the harvest is not marketed commercially and thus not sealed. Numerous other factors undoubtedly affect annual wolverine harvest, i.e., weather, access, pelt prices, other hunting opportunities which put trappers in the field, and value of alternate species.

During the 20-year period from 1971 to 1990, wolverine harvest in Unit 18 averaged less than 10 animals annually. Wolverines are currently most often found in montane regions in the eastern portion of the unit, but are expanding from the Kuskokwim Mountains onto lowland tundra, following the growing caribou population. Wolverines are also a fur species of opportunity, not a target species, in Unit 18. Prices for wolverine pelts have remained steady at $300–400 for years.

Other furbearers — Red squirrels, arctic ground squirrels, and marmots are occasionally taken in Unit 18. These species may have been important in the past. At one time, arctic ground squirrels were pursued in the spring expressly for meat and skins. There are still sufficient women's winter parkas made of ground squirrel pelts in the Y-K Delta area that harvest must still take place regularly at a very low level, *viz* "parky squirrels," their colloquial name.

Trapper Residency and Success. Virtually all trappers in Unit 18 are local residents. There are no data on catch per unit effort. However, a gross estimation of success rates can be obtained from the number of beavers harvested by each trapper who seals at least 1 beaver. Since 1970 the general trend of this ratio has increased, and currently, is about 40–50 beavers per trapper. The numbers of trappers in Unit 18 has been declining, but the catch per active trapper has been increasing.

Transport Methods. The method of transport listed on fur sealing certificates has remained nearly 100% snowmachines in Unit 18 during the reporting period. Method of take has not changed during the last 10 years. Snaring, trapping and shooting are the predominant methods of take, respectively. (i.e., more snares than traps).

Other mortality

The abundance of furbearers in Unit 18 appears more related to weather, disease factors and availability of prey species than to trapping mortality. Muskrat and beaver populations in marginal habitats are subject to heavy winter mortality in conditions of thick ice, cold temperatures, and little snow. Fox, marten, muskrat and lynx numbers in Unit 18 are highly variable. Fox populations in particular are subject to epizootics of distemper and rabies.

No data exist concerning the sources of beaver mortality in Unit 18. However, overwinter mortality from starvation does affect specific colonies. During some winters, early freeze-up does not allow beavers enough time to accumulate sufficient caches for overwinter forage, and starvation undoubtedly results. Additionally, kit production and/or survival may decrease in portions of the population where densities are high or saturated in eastern Unit 18.

HABITAT

Unit 18 contains vast amounts of lowland tundra, ponds, streams, sloughs, and rivers, allowing tremendous production in aquatic furbearers. Boreal, montane and interior habitats are limited and species inhabiting those areas are relatively uncommon. All habitats in Unit 18 remain largely intact.

CONCLUSIONS AND RECOMMENDATIONS

Furbearers are abundant in areas of suitable habitat in Unit 18. Production of aquatic species such as mink, beaver, otter, and muskrat is immense, supported by vast amounts of lowland tundra ponds, sloughs, rivers, and marshes. Forested, boreal or interior brushy habitat is limited in Unit 18 and far fewer lynx, wolverine and marten are taken. All Unit 18 furbearer habitats are largely undisturbed. Trapping pressure does not affect furbearer populations. Furbearer populations fluctuate in response to natural cycles, weather, disease, and changes in prey species availability, not trapping.

Fall trapping camps have declined in number in Unit 18. Trapping effort has been low.

Otter pelts from Unit 18 are of exceptional quality. Yet, Unit 18 river otter harvest is most influenced by trapper effort on beaver and mink, and secondarily by fall and winter weather conditions and trapper access, not otter population status.

Mink pelts become prime much earlier than most other species, beginning mid to late October. On the other hand, pelts become "singed" in early to mid January, and their market value declines. In the face of a large underutilized mink population we should encourage a higher harvest prior to freeze-up. An earlier trapping season should be encouraged.

The 1994–1997 muskrat harvest has been low, mostly because muskrats are harvested largely through incidental take during mink season, and mink-trapping effort has been low. Fur buyers purchased over 400–500 muskrats per year in Unit 18 during the 1994–1997 reporting period.

The red fox harvest in Unit 18 is very low. Red fox prices were low but foxes were abundant and easy to catch. White fox prices were very low in the reporting period and as a result these foxes were used as parka lining or sold to tourists and others not reporting purchases. White fox remain largely an incidental take.

Although the harvest of lynx increased somewhat, lynx prices remained very low. Domestic use of lynx pelts is low in Unit 18 and most pelts probably reach the market. Lynx harvest will increase in Unit 18 during the next few years as the lynx population climbs, following the number of snowshoe hares, but lynx have largely been targets of opportunity during other outdoor activities.

The documented average annual take of wolverine in Unit 18 is low and has exhibited little variation. Prices remained high and stable through this reporting period. More than any other species, wolverine continued to be used as parka trim and thus the pelts remain unsealed. Fur buyers believe at best one-quarter of wolverine pelts are sealed.

There are no concerns related to low populations of any furbearer species in Unit 18. In fact, the emphasis in future management should be to encourage increased trapping participation through education efforts and regulation changes. The following recommendations should be considered:

- Mink are underutilized and a portion of the skins are becoming prime as early as October 15 according to the largest fur buyer in the area. Without a doubt, some mink are already taken before the season opens. The mink season could open earlier than November 10 without harming the population.

- River otter are also underutilized. Most otter are taken while trappers are targeting beaver. The otter season could be changed to coincide with beaver season. This would accomplish 3 goals: 1) greater utilization of the otter resource, 2) prevent beaver trappers from inadvertently violating the closed season for otter, and 3) allow more time for otter pelts to be sealed (since furs must be sealed within 30 days of the close of the season). This would result in better harvest assessment.

- Beaver is abundant and underutilized. Consideration should be given to increasing harvest opportunities to allow beaver to be better utilized for meat. In particular, beaver could be taken during the September moose hunting season without a noticeable impact on the population.

- Consideration should be given to extending the fursealing period. Many isolated villages do not have local sealers and even the villages with fur sealers have village politics, which may effectively make the local sealer inaccessible. Travel is expensive for villagers on the Y-K delta often eliminating the option of getting to a fur sealer. This suggestion would increase participation of trappers in the management system, decrease the fear of penalties, and would result in better information gathering.

- Align hunting and trapping seasons and bag limits for furbearers and fur animals where appropriate. There are no concerns of overharvest if this were to take place and it would result in simplified regulations and better participation in the management system, including better harvest reporting.

- A furbearer working group to include trappers, agency biologists, and fur buyers should be considered. The function of this group would be to encourage the exchange of information, promote better management of our furbearer resources, increase participation by trappers – especially new trappers, extend education efforts regarding the reasons for seasons and sealing requirements, promote better fur handling, and enhance the image of fur as a renewable resource.

PREPARED BY:

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SUBMITTED BY:

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LOCATION

GAME MANAGEMENT UNIT: 19 (36,490 mi^2)

GEOGRAPHIC DESCRIPTION: All drainages into the Kuskokwim River upstream from Lower Kalskag

BACKGROUND

As long as humans have existed in western Interior Alaska, furbearers have played an important part in the subsistence lifestyle and have contributed to the economic base. Native people relied on furbearers for garments, food, and trading goods. The quest for wild pelts prompted early Russian settlement in the area. During the middle part of the twentieth century, miners in the area were largely unemployed during winter, and they supplemented their income by trapping and selling fur. Local economies are still influenced by the sale of various furs. Unit 19 produces between a quarter and a half million dollars worth of fur annually. Most income realized from the sale of wild pelts is cycled through the local economy several times. Furbearer populations are probably as healthy now as they have ever been in the area. Despite the fact that transportation methods and means have recently enabled longer traplines, international markets for wild fur have decreased, and the economic incentive for harvesting fur has diminished to the point that many former trappers have neglected their traditional traplines for more lucrative pursuits.

Seasons and bag limits have varied dramatically since original regulations were adopted in the early twentieth century. Recently, management has necessarily become more intensive. Dynamic season dates and bag limits for several species are designed to maintain or enhance furbearer populations.

Several factors now influence the harvest level of any particular furbearer species during any year. These factors include species population levels, snow conditions, pelt prices, alternate species abundance, availability of alternate income, fuel prices, and regulations.

MANAGEMENT DIRECTION

Furbearer management is designed to annually assess populations, design regulations to encourage harvests, and maintain or enhance those populations. Specific management goals and objectives have undergone major changes during the past 10 years.

MANAGEMENT GOALS AND OBJECTIVES

Management goals and objectives are to: 1) annually determine both current status and trend of the various subpopulations for each furbearer species and their primary prey species; 2) obtain estimates of harvest for all furbearer species; 3) assess trapper effort and distribution; and 4) maintain open communications with area trappers.

Beaver

- Manage the various subpopulations to maintain a mean pelt size >50 inches, while maintaining <25% kits in the annual harvest.

- Manage the population to maintain a mean density of not less than 1 active colony per 3.2 km of suitable waterway, or 0.2 active colonies per square kilometer in suitable habitat, as determined during periodic fall cache surveys.

Marten

- Obtain estimates of annual harvests through comparisons of fur acquisition reports, fur export reports, and trapper questionnaires.

- Manage the population to maintain >50% males in the annual harvest and a ratio of not more than 1 adult female per 2.0 juveniles in the annual harvest.

Lynx, River Otter, and Wolverine

- Maintain accurate harvest records based on sealing documents and trapper questionnaires.

- For wolverine, manage the population to maintain >50% males in the annual harvest.

Muskrat, Mink, Red Fox, Coyote, Ermine, and Squirrel

- Annually estimate numbers harvested, as well as trends in the respective populations.

METHODS

We gathered harvest statistics for beavers, river otters, lynx, and wolverines from sealing documents. During the course of sealing, we obtained location of harvest, and sex and age of the animal. Crude harvest trends of 7 additional furbearer species were gathered from fur acquisition reports and fur export reports. I adjusted and corrected these estimates by comparing them with trapper questionnaire responses.

I annually distributed a questionnaire that I designed to area trappers. Names of trappers were obtained from sealing documents. Following each trapping seasons, questionnaires were mailed to approximately 100 trappers. Trappers were asked to list the number of animals of each species they harvested, as well as their assessments of the population trend (decreasing, stable, or increasing) and current population level (low, moderate, or high). Increasing, stable, and declining population trends were assigned values of 9, 5, and 1, respectively. Identical values were assigned to high, moderate, and low population levels. A mean value was calculated for each species. These mean values are referred to as the Trend Index and Abundance Index. In analyzing the Trend Index, mean values between 4.51 and 5.49 were assumed to represent stable trends. Values ≤4.50 and ≥5.50 represented decreasing and increasing trends, respectively. For the Abundance Index, values ≤4.50 were assumed to represent low populations. Mean values between 4.51 and 5.49 were moderate. Those ≥5.50 represented relatively high population levels.

During October or November, beaver cache trend areas were surveyed along the middle Kuskokwim River drainages using aircraft. I analyzed data based on number of colonies per kilometer of river or on the basis of active colonies per square kilometer, depending on habitat.

Because of concerns regarding marten populations in the area, I collected and analyzed carcasses to obtain sex and age estimates of the harvested segment of the marten population. A gross examination of digestive tracts was conducted to determine incidence of particular macroparasites. Skulls, femurs, bacula, and uteri were collected for research on aging techniques. Several adult canines were extracted from cleaned skulls for aging (based on counts of cementum annuli).

We evaluated various criteria for determining sex and age classes of martens: sagittal muscle closure method (Whitman 1978) for distinguishing juveniles from adults, cleaned femurs (<72 mm for females and >72 mm for males), and presence of the suprasesamoid tubercle for adults and the absence for young-of-the-year. During 1994–1997, we focused on baculum morphology and mass for determining ages.

Pelt prices were based on the listed average prices paid at North American Fur Auction sales. The average prices listed for the December, February, and March sales were averaged to produce a single average index price for each year for each species.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Beaver

Optimal beaver habitat was aerially surveyed during October or November 1995–1997. Beaver populations remained relatively high. A 5% decline in density of active colonies, which occurred between 1991 and 1994 (Table 1), seemed to have stabilized. With little interest in beaver snaring because of the lower pelt prices, beaver in high-density populations were eating tree species that contain little nutritional value. Nutritious foods (birch, willow, quaking aspen) are preferred, but some stands of these species were declining due to harvesting by beavers. Trappers were encouraged to harvest beavers from these declining areas to allow regeneration of favored food supplies.

As during previous reporting periods (Whitman 1990*a*,*b*; 1993, 1995), fewer active colonies were seen along mainstem Kuskokwim drainages than in associated side sloughs. Decreased visibility of bank lodges and caches contributed to lower counts in the main channels, but lower densities were probably the rule because seasonal water fluctuations and fast flow results in lower habitat quality. Despite declines noted in the early 1990s, I believe the density in suitable habitats was about 0.65 colonies/km^2.

Questionnaire results supported the findings of cache surveys. Beaver abundance indices were relatively high during regulatory years 1987–1997 (Table 2). Also, trappers generally rated beavers as more abundant than other furbearer species.

Beaver pelts <52 inches (length plus width) are considered kits. Measurements recorded when pelts are sealed indicates the age class composition of the harvested segment of the population, and can also be used as an indication of the population at large. The proportion of kits in the annual Unit 19 harvest declined (Fig 1). There appeared to be a relationship between total beaver harvested (Fig 2) and percent kits in the harvest. As harvest increased, the percent kits in the harvest increased (Whitman 1995).

Sex of the harvested proportion of the beaver population appeared to slightly favor females. However, sample sizes were low because sex was unknown from beaver pelts presented for sealing and must be determined from carcasses of trapped animals.

Viable beaver populations occurred throughout Unit 19. Suitable habitat was less common in Units 19B and 19C, than in 19A and 19D. Beaver populations in the various units reflected these habitat differences. However, even marginal habitat was generally occupied. No movement data were available. However, I suspected that annual dispersal of 2-year-old beavers into new and marginal habitats was probably high, leading to relatively high mortality.

River Otter

River otter abundance was stable or slightly increasing, based on analyses of questionnaires returned by area trappers (Fig 3; Table 3).

Lynx

Lynx have probably never been abundant in Unit 19. However, some drainages in the foothills of the Alaska Range and along the Unit 19B/17B border contain snowshoe hare populations capable of sustaining limited lynx populations.

Wolverine

Trapper questionnaire results from the past 10 years indicated a moderate wolverine population, with a slightly increasing trend (Whitman 1995). Winters 1989–1990, 1990–1991, and 1994–1995 were severe, resulting in abundant food resources for wolverines in the form of moose, caribou, and sheep winter kills and wolf kills. Wolverine population increases were notable during the 1991–1992 through 1994–1995 trapping seasons. Since that time, wolverine populations appeared stable in most of the unit. The exception was in Unit 19D-East, where carrion was less available during winter, simply due to the lack of moose. In that area, wolverine populations have probably declined.

Marten

During the last 3 years, marten populations were relatively high (Fig 4). However, trappers reported slightly lower marten numbers.

Mink

It was difficult to determine trends in mink populations. Trappers indicated populations were relatively stable at moderate densities (Fig 5). Catches and amount of sign encountered undoubtedly influenced variation in trapper assessments of population status. I believe that vagaries in ice and snow formations that allow (or deny) subnivean travel networks was largely responsible for differences in sign and susceptibility to traps.

Muskrat

One of the greatest mysteries in furbearer management in Alaska is muskrat population dynamics. Historically, muskrat populations were high throughout Unit 19 in suitable habitat, and spring shooting was a valued pursuit. It's difficult to ascertain precisely when, but by about 1975, populations declined. Since that time, populations have not rebounded. Founder populations still exist, but production and/or survival of kits has not been sufficient to enable population rebounds. Perhaps predation (by northern pike, in particular), disease, parasitism, or changing weather/habitat are factors which, singularly or in combination, act to keep populations low.

Coyote

Viable coyote populations in Unit 19 were restricted to areas in or near the Alaska Range. Populations expanded sporadically into other areas of the unit, but will probably never be high as long as wolf populations remain viable.

Red Fox

Red fox populations appeared healthy throughout suitable habitats. Trapper questionnaire results indicated fox populations cycle in western Interior Alaska (Table 4; Fig 6). These cycles were probably on a 10–12 year rotation, but never apparently reached the magnitude of population lows and highs experienced in coastal areas of the state. Trappers felt red fox populations were relatively low through the mid-1980s, peaking about 1990. Incidental observations of red foxes in early winter 1997 indicated that their populations were rebounding.

MORTALITY

Harvest

Trapping Seasons and Bag Limits.

Species	Season	Bag limit
Beaver	1 Nov–10 Jun	No limit
Coyote	1 Nov–31 Mar	No limit
Lynx	1 Nov–28 Feb	No limit
Marten	1 Nov–28 Feb	No limit
Mink & Weasel	1 Nov–28 Feb	No limit
Muskrat	1 Nov–10 Jun	No limit
Red Fox	1 Nov–31 Mar	No limit
River Otter	1 Nov–15 Apr	No limit
Wolverine	1 Nov–31 Mar	No limit

Hunting Seasons and Bag Limits.

Species	Season	Bag limit
Coyote	1 Sep–30 Apr	2
Red Fox	1 Sep–15 Mar	10
Lynx	1 Nov–28 Feb	2
Wolverine	1 Sep–31 Mar	1

Board of Game Actions and Emergency Orders. Beginning in spring 1997, the board enacted regulations in Unit 19 to encourage additional harvest of beavers, both for pelts and for meat.

Seasons were extended until 10 June, to align with current muskrat trapping seasons in Unit 19D. Additionally, the board adopted regulations allowing the use of firearms during spring, with a daily bag limit of 2 beavers (by shooting), with the stipulation that meat was to be salvaged for human consumption. Few trappers/hunters took advantage of this extended season, and pelt quality was low.

Hunter/Trapper Harvest.

Beaver — Beaver harvests have fluctuated widely since record-keeping began in 1956. Since the mid-1960s those fluctuations have been in a low range, with harvests generally declining (Fig 2). This low harvest reflects low pelt prices, not low population levels. Trappers have little incentive to concentrate their efforts on beaver. A significant portion of the beaver harvest was motivated by recreation, rather than by economics.

Illegal and unreported harvest probably increased. A significant proportion of the beaver harvest from Unit 19 was by local subsistence-based residents for human food or dog food. Often, pelts were not salvaged. There may also be increased local use of pelts for garments. Such pelts were often not presented for sealing, thus, no records exist documenting their harvest.

Virtually all beaver trappers in Unit 19 were area residents. Data concerning catch per unit effort are not available, but a gross estimate of trapper success can be gathered from other sources. Since 1970, the catch per successful beaver trapper (trappers who sealed at least 1 beaver during a season) increased, and reached about 9 beavers/successful trapper during this reporting period.

Most beavers were taken in spring. February and March harvests generally accounted for >75% of the annual harvest.

No data exist concerning other sources of beaver mortality. However, overwinter mortality due to starvation did affect specific colonies. During some winters, early freeze-up did not allow beavers to accumulate sufficient caches for overwinter sustenance, and starvation undoubtedly occurred.

Wolf predation during summer and autumn probably contributed to beaver mortality. With a decline in primary prey (moose), wolves turned to smaller food items. Additionally, kit production and/or survival possibly decreased in habitat at or near the saturation point.

River Otter — Although observations throughout the area suggested that river otters were widespread and were moderately abundant, harvests continued to decline. The harvest of 6 during 1995–1996 was the lowest in the unit since mandatory sealing began. Unit 19A continued to produce more otter pelts (43%) than other subunits, followed by Unit 19B (32%), 19D (22%), and 19C (4%). When harvest density from Unit 19 was compared with other harvest densities statewide, it appeared to be moderate, probably reflecting both the density of otters and the density of trappers.

River otter harvest trend declined during recent years (Table 3; Fig 7). The 5-year mean annual harvest was below any previous level since sealing began (1979–1980 through 1983–1984, $\bar{x}$ = 67; 1984–1985 through 1988–1989, $\bar{x}$ = 73; 1989–1990 through 1996–1997, $\bar{x}$ = 31).

The 5-year average of 52% males in the reported harvest during 1991–1992 to 1996–1997 decreased from the previous 5-year mean of 68% (Fig 8). I assume that this shift to a greater proportion of females was simply related to inadequate sample size, and did not reflect a change in the population. Higher proportion of males in mustelid harvests is common, probably reflecting the male's propensity to travel greater distances than females, thus increasing their chances of encountering traps. The recent drop during 1996–1997 to 45% males in the harvest was probably meaningless because sample size was minimal.

Because of differences in individual pelt handling techniques, measuring techniques, and otter physiological growth characteristics, it is impossible to consistently distinguish between adults and juveniles based on measurements listed on sealing documents. However, it may be useful to document those changes in pelt measurements, making the assumption that pelts <42 inches (length plus width) are juveniles, while those ≥42 inches are adults. During the 10-year period from 1984–1985 to 1993–1994, 16% of the sealed otters were assumed to be juveniles. When the 1984–1996 mean reported pelt size was compared with total annual harvest figures, a weak-negative correlation existed (n = 13, y = 46.6-0.015x, r = -0.497), indicating that, when harvest pressures were extremely light, a higher proportion of adults were captured (Fig 9). Pelt sizes during 1996–1997 ($\bar{x}$ = 44.5 inches) were not statistically different from previous years' measurements. However, in general, mean pelt size increased between 1984 and 1993. Since that time, mean pelt size declined (Fig 10).

Harvest chronology by month was relatively consistent throughout the season, with 15–24% of the harvest during each month between November and March. Harvests in April were light (1984–1985 through 1993–1994, $\bar{x}$ = 4%).

The number of trappers taking otters declined, while numbers of otters taken per trapper increased. During the 1996–1997 regulatory year, the number of otters per trapper was the second highest ever recorded (3.4, Fig 11).

The method of transport listed on fur sealing certificates shifted from a preponderance of snowshoes, skis, or dog teams during the mid-1980s to mechanized vehicles. During the period 1984–1985 through 1988–1989, only 1% of trappers used aircraft, 45% used snowshoes, skis, or dog teams, and 54% used snowmachines. In the subsequent 5 years (1989–1990 through 1993–1994), 12% used aircraft, 21% used snowshoes, skis, or dog teams, and 67% used snowmachines. Method of take did not change during the same 10-year period. Trapping, snaring, and shooting consistently accounted for about 56%, 41%, and 3% of the reported harvest, respectively.

In Montana (Zackheim 1982), Minnesota (Berg and Kuehn 1984), and various southeastern states (Hill 1978), high correlations exist between beaver and river otter harvests. An analysis of 16 years of data from 1977–1978 to 1992–1993 showed a weak correlation (y = 35.92+0.03x, r = 0.543) between harvest levels of the 2 species. Likewise, little correlation existed (n = 10, y = 56.22-0.26x, r^2 = -0.39) between average river otter pelt prices and annual harvests (Fig 12). Thus it appears that otters are generally a nontargeted species, and their harvest is somewhat incidental to the harvest of other species.

Until the 1993–1994 season, pelt prices for Interior Alaska river otter were poor, providing little incentive for trappers to target them (Fig 13). Mean pelt prices were in excess of $78.00 during 1993–1994, more than doubling the previous 5-year average of $37.00. The estimated value of otters in the unit during 1993–1994 was $2440, ranking them fifth in economic importance among the 12 furbearer species. Otters accounted for only 2% of the estimated fur receipts from Unit 19 during 1993–1994. Otter pelt prices remained relatively stable at about $50.00 during the past 3 regulatory years.

Lynx — The number of trappers targeting lynx declined, with declining pelt prices. Sale of lynx pelts contributed little to trapper income (Table 5). Trappers responding to questionnaires indicated that lynx populations were low, but rising slightly.

Wolverine — Wolverine population data are lacking for Unit 19. However, mandatory sealing of pelts has provided reasonably accurate harvest estimates since 1971 (Whitman 1993). During 1971–1990, reported wolverine harvest averaged 53 animals annually. The lowest harvest on record was 26 animals, harvested during the 1988–1989 season. This low harvest reflects a change in legal methods and means and decreased pelt prices rather than a decline in wolverine populations.

Marten — Marten are the most sought-after and valuable furbearer species in the unit. A recent history of regulation changes, population changes, abundance and trend indices, and other biological considerations appears in previous furbearer management reports (Whitman 1990*a,b*, 1993, 1995).

During the last 3 regulatory years, marten populations were relatively high (Fig 4). Despite these high densities, catches were relatively low (Fig 14) due to reduced trapper effort that was a response to low pelt prices.

Sampled carcasses indicated a relatively low young:adult female ratio in the harvest (Fig 15). Because demand was low, the decline in the young:adult female ratio was not cause for concern. If pelt prices increase significantly, however, this ratio should be scrutinized, and season adjustments made if effort increases and abundance indices remain low or continue to decline.

Comparing young:adult female ratios with proportion of males in the harvest showed that the 2 indices were positively correlated (Fig 16). Because it was more difficult to accurately determine age classes from skinned carcasses than to determine sex, future monitoring should attempt to maintain a database of sex ratios in the harvest. I suggest if harvest ratios decline below 55% males, season adjustments should be made. Since females are slightly more vulnerable to trapping in late winter, seasons should be curtailed during February or late January, in an effort to protect pregnant adult females.

Age data for young-of-the-year harvest during 1996–1997 contained a disproportionate number of females (Fig 17). Also, males were slightly more common than females in older age classes (1.5 to 14.5-year-olds). Additional data should be collected to determine if this pattern is common during other harvest years.

Research into alternate sexing and aging techniques for marten indicated a slight separation between sexes when total skull length and zygomatic width are plotted (Fig 18). This method, however, requires an inordinate amount of time to clean and prepare skulls for measuring.

Zygomatic width increased with age of marten, being more predictable for males (Fig 19, $r^2 = 0.72$) than for females (Fig 20, $r^2 = 0.34$) in the 1996–1997 sample. Although calculated means of zygoma measurements increased with age, they were not discreet between age classes, and thus, cannot be used to reliably age carcasses. Conversely, post-orbital constriction widths generally decline with advancing age of marten. This negative correlation (males, $r = -0.61$, Fig 21; females, $r = -0.60$, Fig 22), in conjunction with zygomatic widths, may be a reliable tool to determine marten ages without resorting to expensive cementum analyses.

I discussed marten aging and sexing techniques based on bacula and femur morphology in Whitman (1995).

Mink — Market demand for wild-caught mink was low. Consequently, few Unit 19 trappers targeted them and harvest was low. Trappers felt populations were higher during 1996–1997 than at any time in the previous 11-year period (Table 6).

Mink harvests generally declined (Fig 23). Mink trapping was largely incidental to marten trapping efforts, and, therefore, lower prices for marten dramatically affected the amount of effort put forth by trappers.

Mink pelts are probably prime in early to mid-October, which is earlier in the winter than most other species. Conversely, pelts become "singed" in late January or early February, and their market value declines. To encourage a higher use at a time when pelts are prime, earlier trapping seasons should be considered. Opening a mink season on 1 October rather than 1 November should be encouraged, with the stipulation that sets be made only under water. This would allow trappers to take mink, while minimizing the incidental harvest of marten at a time when marten pelts are not yet prime. The season should remain open through 28 February allowing animals incidentally caught in marten sets to be legally sold.

During the 1996–1997, 42 mink carcasses were obtained from 4 area trappers. Twenty-nine (67.4%) were male and 14 were female. This sex ratio probably did not reflect actual proportions of mink in the population, but rather, indicated the greater susceptibility of males to trapping. Skulls, bacula, and femurs were collected from males. Skulls and femurs were obtained from females. All bones were cleaned, bleached, measured, catalogued, and individually packaged before storage.

I took standard measurements on the bones I collected, and I analyzed the measurements to develop an aging technique based on bone morphology and growth patterns. Unfortunately, assigning age classes to mink based on morphology was largely speculative because teeth have not been submitted for cementum aging. However, it was clear that bacula weights could be used to accurately separate males into young-of-the-year and older age classes. Suture closure, especially those bisecting the nasals and those bisecting the zygoma, could be used to separate age classes in both sexes. Sagittal crest formation, useful in separating age classes in marten, did not seem to provide adequate separation in wild-caught mink. Using femurs, the presence of the suprasesamoid tubercle denoted specimens older than 1 year, and, with practice, could be used with a high degree of certainty.

Muskrat — Poor pelt prices and very low muskrat densities combined to make muskrat one of the least valuable furbearer species in the area (Table 5). Some harvest by shooting during spring occurred in scattered locations, and most pelts were probably used domestically for production of hats.

Ermine and Red Squirrel — These two species contributed very little recreationally or economically to the region. Most of the harvest was incidental to marten trapping. Pelt prices were extremely depressed for both ermine and red squirrel, and most hides were not salvaged. Populations of both were secure, and no changes are recommended in their management.

Coyote — Estimated unit harvest of coyotes was less than 20 animals annually.

Red Fox — Red fox were generally captured incidentally to other species. Very little effort was expended specifically for them, except for use in garments and craft items. Market prices were relatively low during the past 10 years, with an average selling price of $16.50. Since trapper effort was generally low, it was clear that current harvest levels have no impact on red fox populations.

CONCLUSIONS AND RECOMMENDATIONS

Beaver populations were high, but indications in saturated populations were that natural density regulation factors may be limiting populations. Catches will continue to fluctuate with pelt prices. Current prices are low and harvest will remain minimal. Harvests increased only minimally following the board's decision to allow shooting of beaver in an extended spring (open water) season. Low beaver pelt prices resulted in minor otter harvests. Lynx harvest also remained low. Recent increases in hare abundance may stimulate higher lynx populations, and I suspect their harvest will increase in coming years.

Wolverine populations remain stable throughout most of Unit 19. Moose density declines in Unit 19D have resulted in very little carrion upon which wolverines depend for winter sustenance, and their populations seem to have declined somewhat. Wolverine populations would undoubtedly increase in response to higher moose and wolf populations in this subunit, but the lack of predator management (wolf control) will probably result in low wolverine populations.

Marten pelt prices declined significantly, resulting in fewer trappers expending effort to harvest large numbers. Until pelt prices increase, marten harvests will probably remain low. Mink populations were moderate and stable.

Ermine and red fox were widespread and common. Red fox numbers increased during this reporting period, probably due to natural cyclic fluctuations rather than to any major changes in habitat quality. Low pelt prices did not encourage intensive trapping effort, but nonetheless, the 1996–1997 fox harvest was the highest in at least a decade. Coyote populations will probably remain stable, unless wolf populations in Unit 19D continue to decline, allowing coyote populations to expand.

I recommend no additional changes to furbearer regulations.

ACKNOWLEDGMENTS

Many Unit 19 trappers deserve special recognition for their efforts to supply information on the status and trend of furbearer populations. Their efforts and willingness to assist in the management of Interior Alaska furbearers should be recognized. In addition, several area trappers have willingly provided carcasses for necropsy to maintain a database on furbearer population health. In particular, thanks go to Sonny Holmberg, Tom Coyle, Dennis Parent, Mike Fleagle, John Burns, Mark Cox, Eep Anderson, Ken Deardorff, Doug Bue, and Gary Egrass. Additional thanks to Ken and Barb Deardorff for their collections and interest in cleaning hundreds of marten skulls. Thanks also go to innumerable unnamed other trappers for their efforts.

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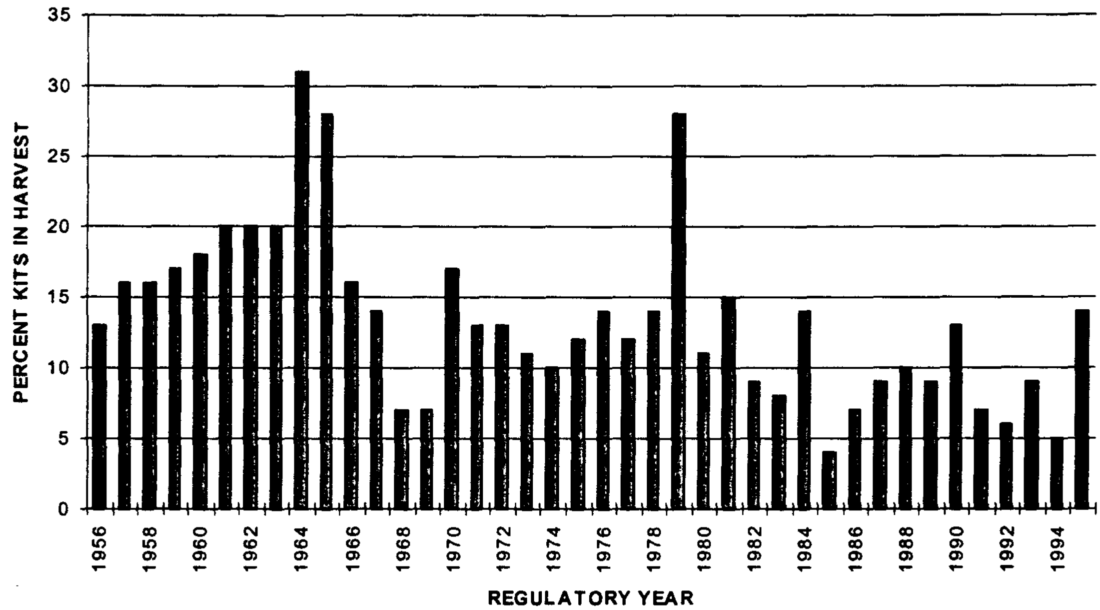


Fig 1 Unit 19 beaver harvest percent kits, regulatory years 1956–1995

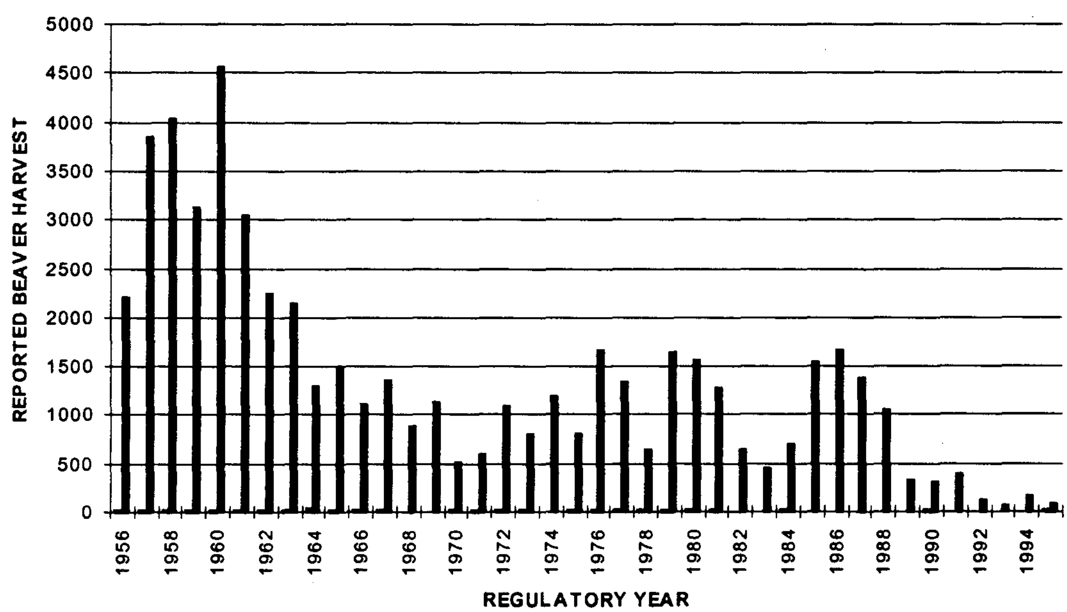


Fig 2 Unit 19 beavers sealed, regulatory years 1956–1995

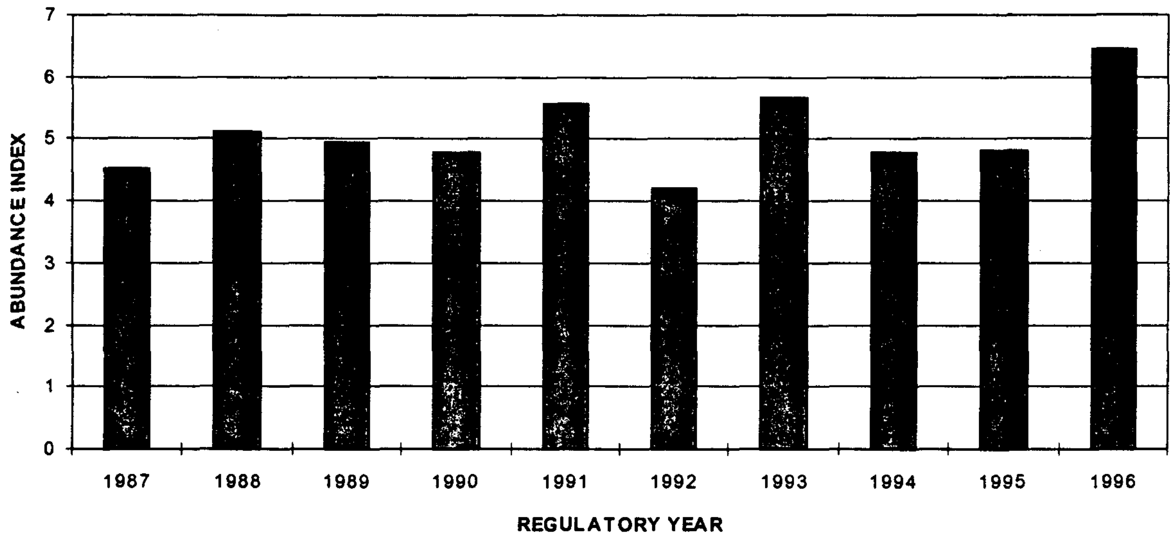


Fig 3 Unit 19 river otter abundance index, regulatory years 1987–1996

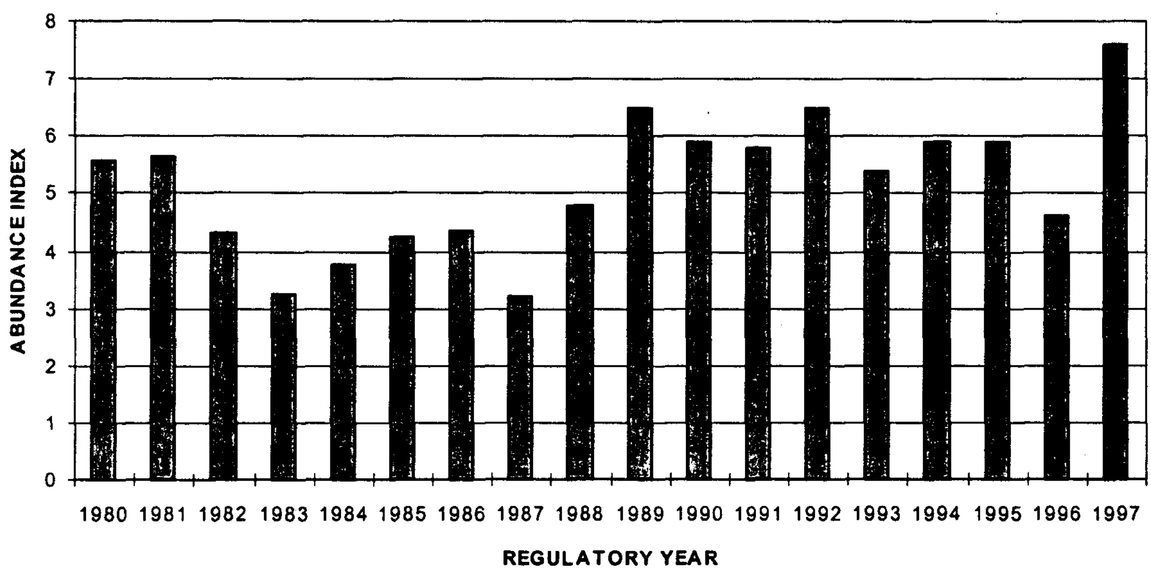


Fig 4 Unit 19 marten abundance index, regulatory years 1980–1997

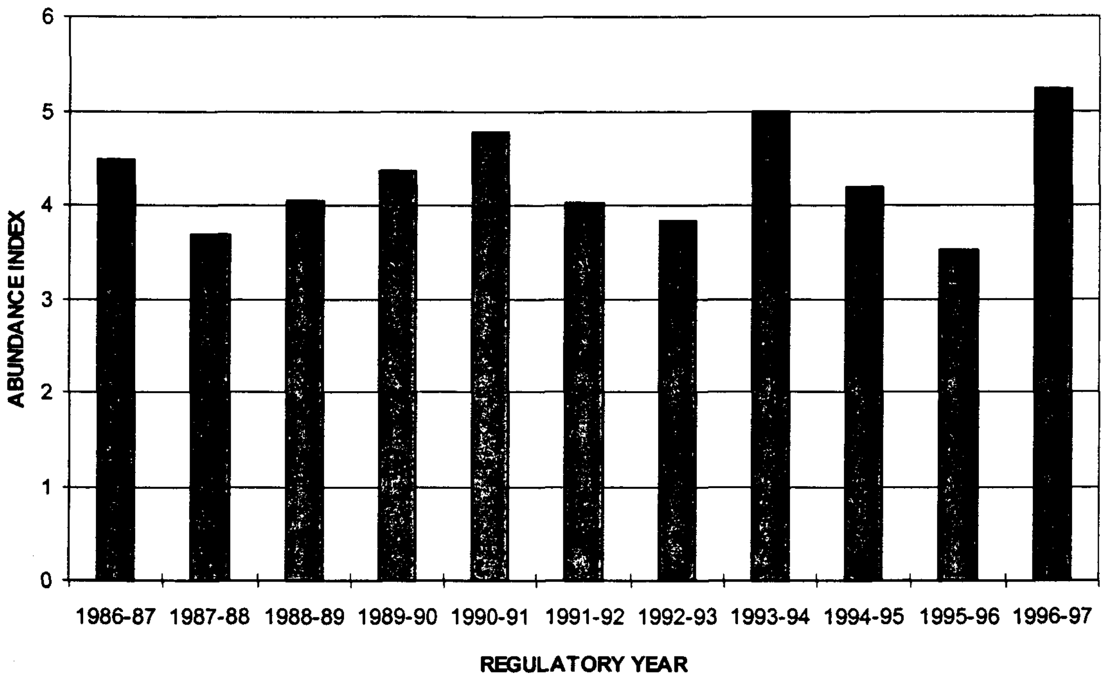


Fig 5 Unit 19 mink abundance indices, regulatory years 1986–1996

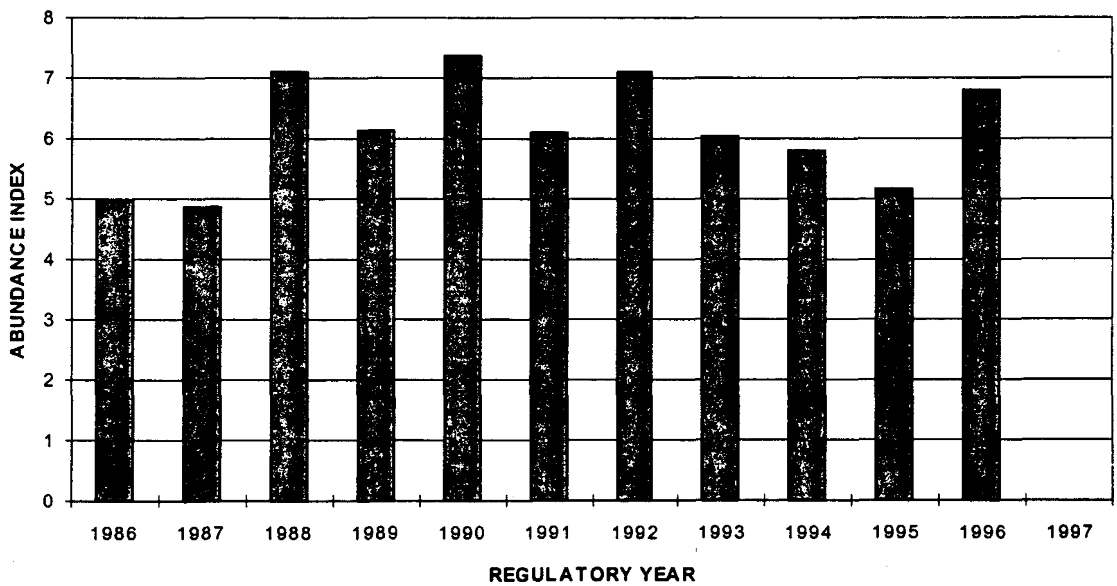


Fig 6 Unit 19 red fox abundance indices, regulatory years 1986–1996

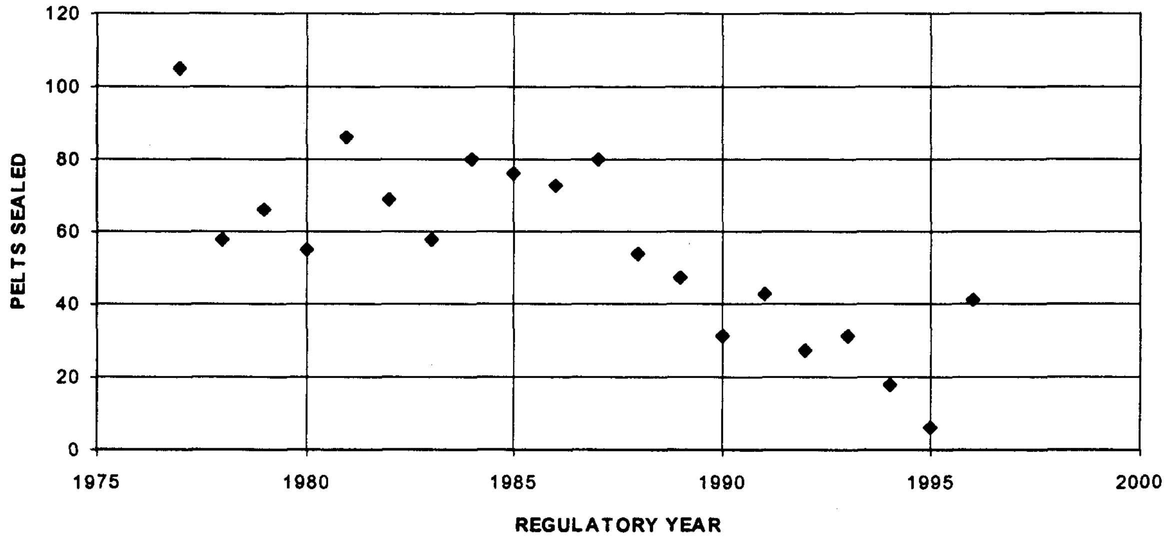


Fig 7 Unit 19 river otter harvest trend, regulatory years 1976–1996

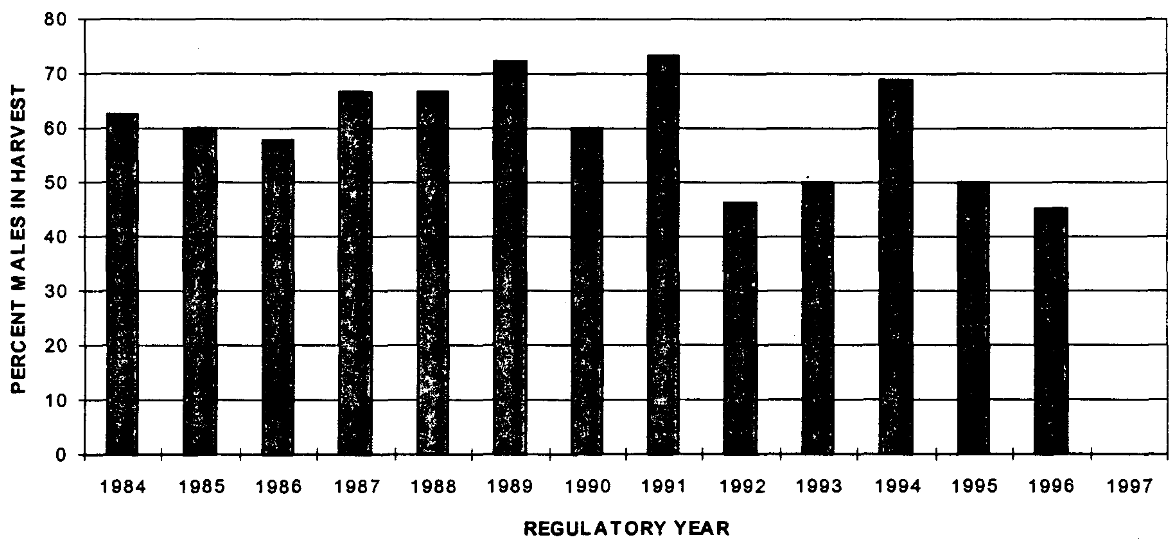


Fig 8 Unit 19 river otter harvest percent males, regulatory years 1984–1996

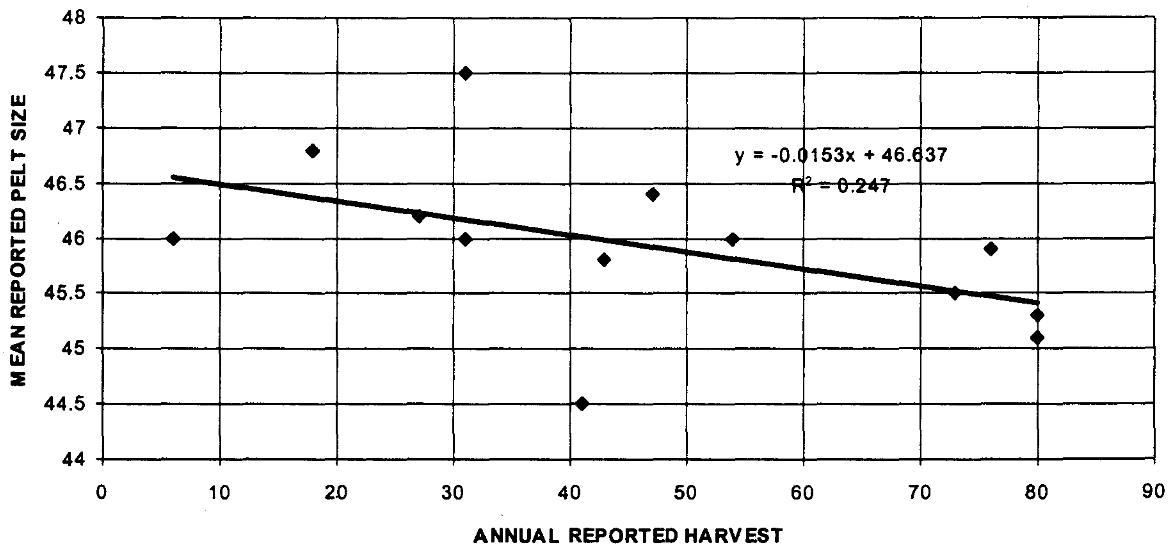


Fig 9 Unit 19 river otter harvest and pelt size, regulatory years 1984–1996

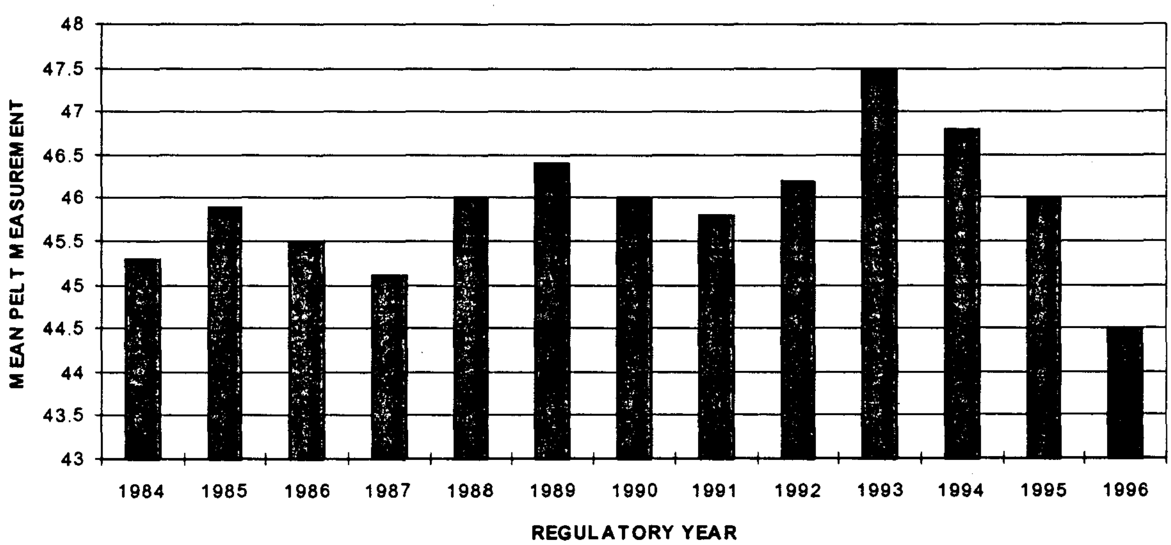


Fig 10 Unit 19 river otter pelt size, regulatory years 1984–1996

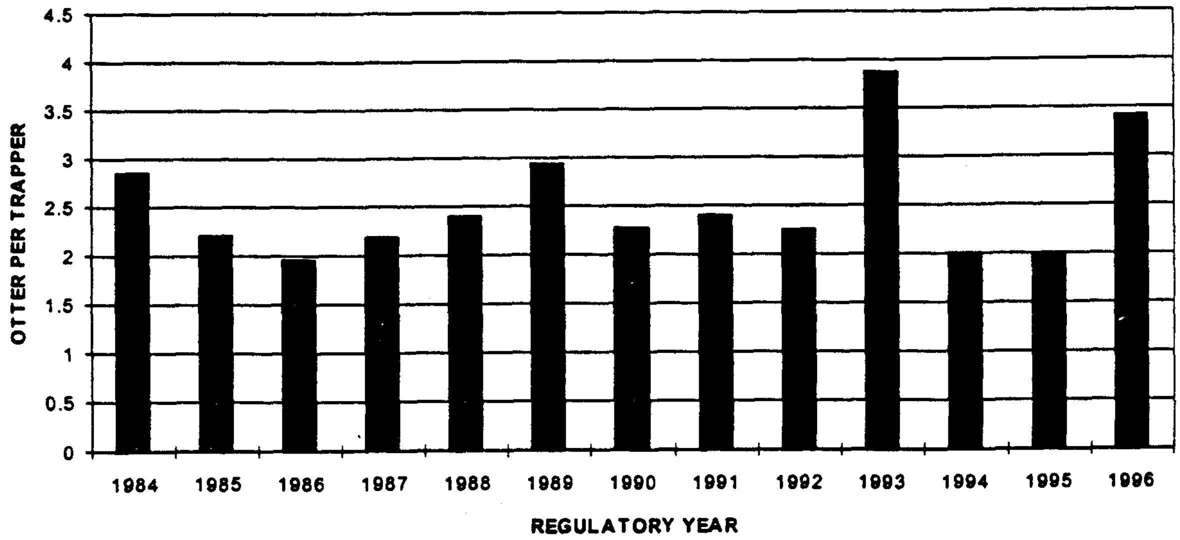


Fig 11 Unit 19 river otter captured per successful trapper, regulatory years 1984–1996

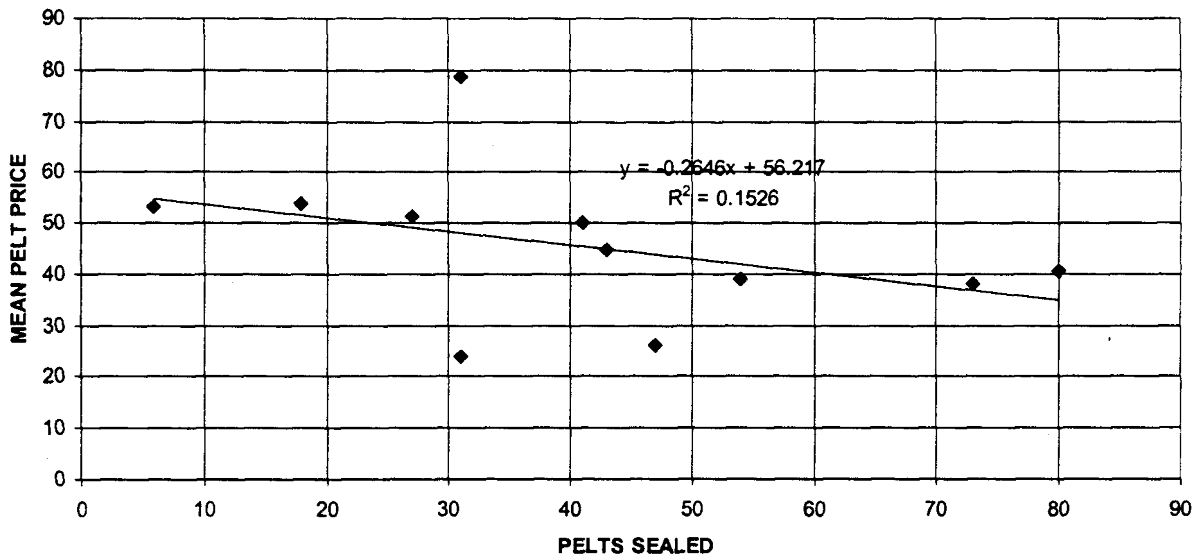


Fig 12 Unit 19 river otter mean pelt price and harvest, regulatory years 1986–1996

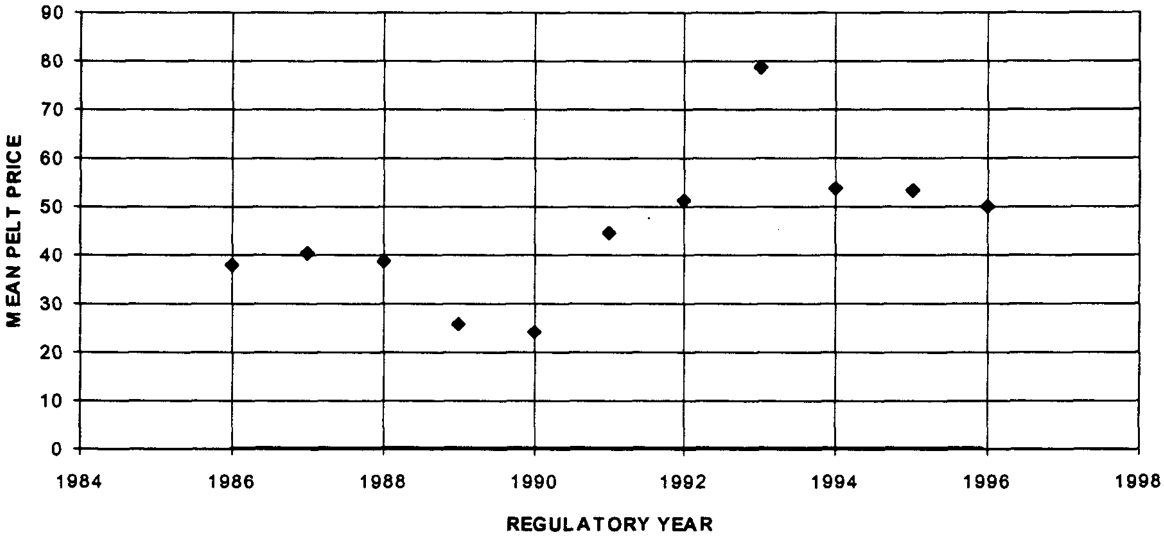


Fig 13 Unit 19 river otter mean pelt prices, regulatory years 1987–1996

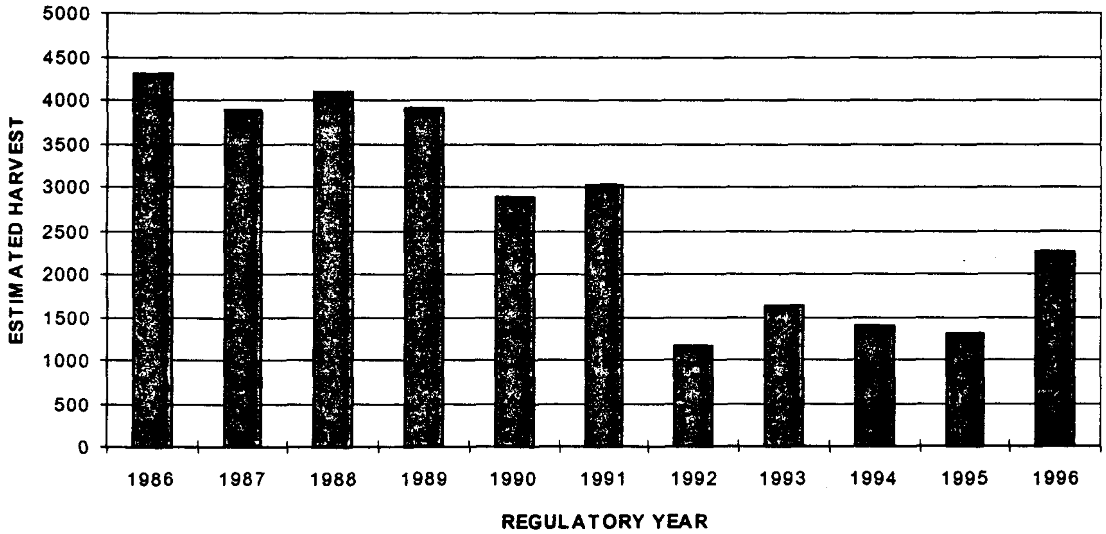


Fig 14 Unit 19 estimated marten harvest, regulatory years 1986–1996

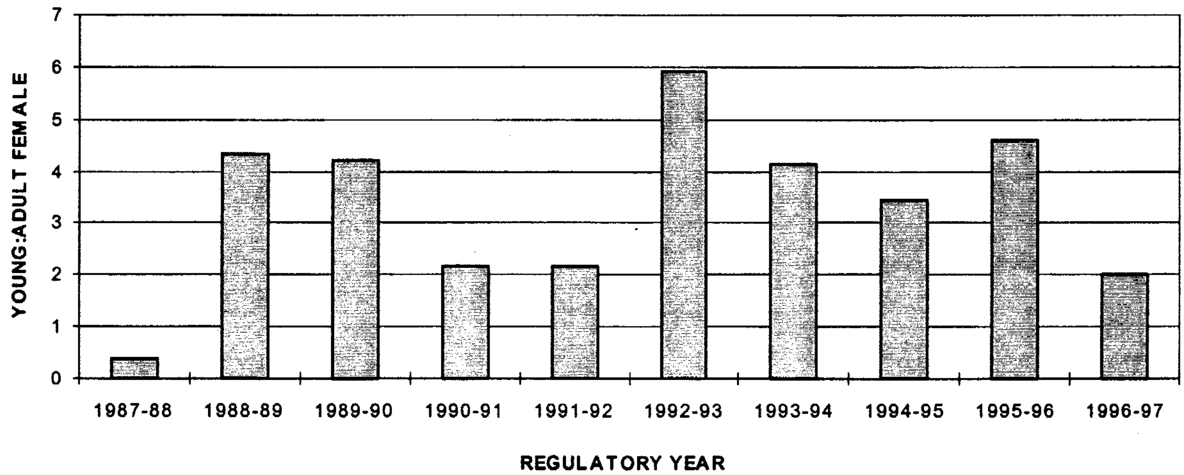
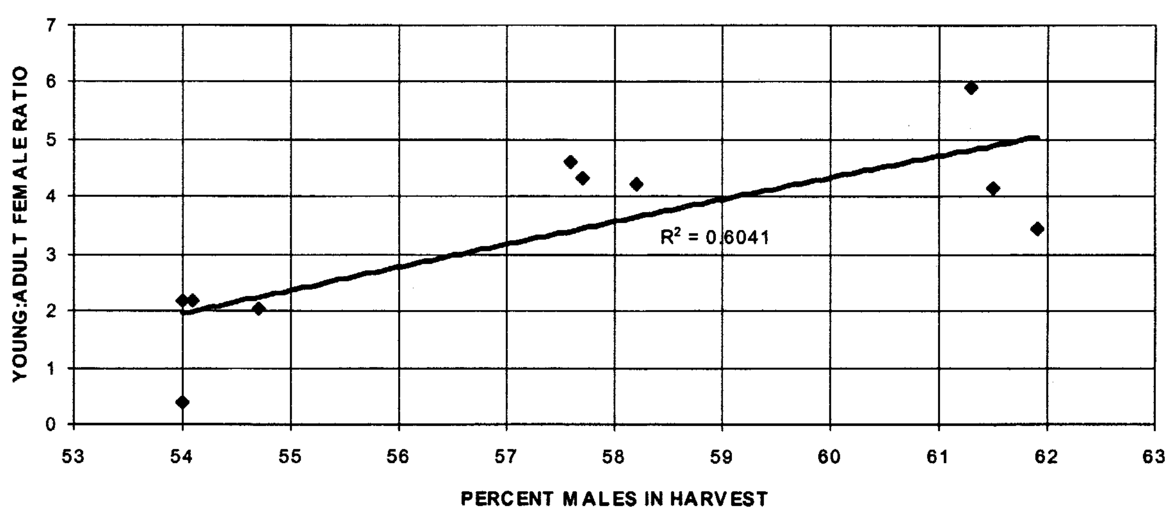


Fig 15 Unit 19 marten harvest young:adult female ratio, regulatory years 1987–1996

Fig 16 Unit 19 marten harvest young:adult female ratio and percent males, regulatory years



1987–1996

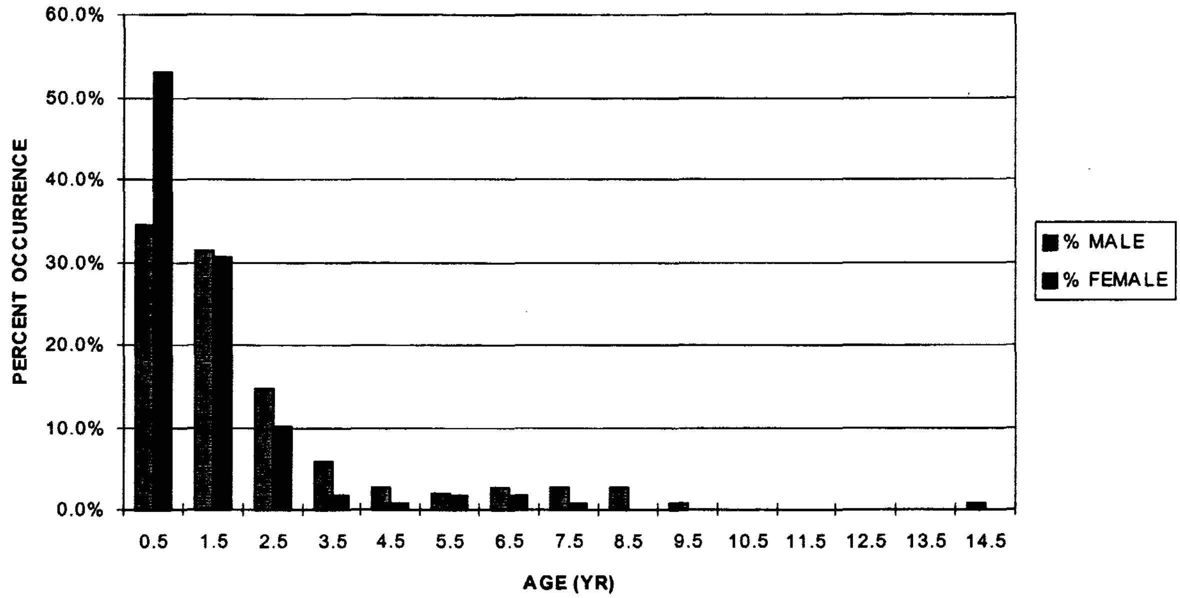


Fig 17 Unit 19 marten harvest cementum age, regulatory years 1996–1997

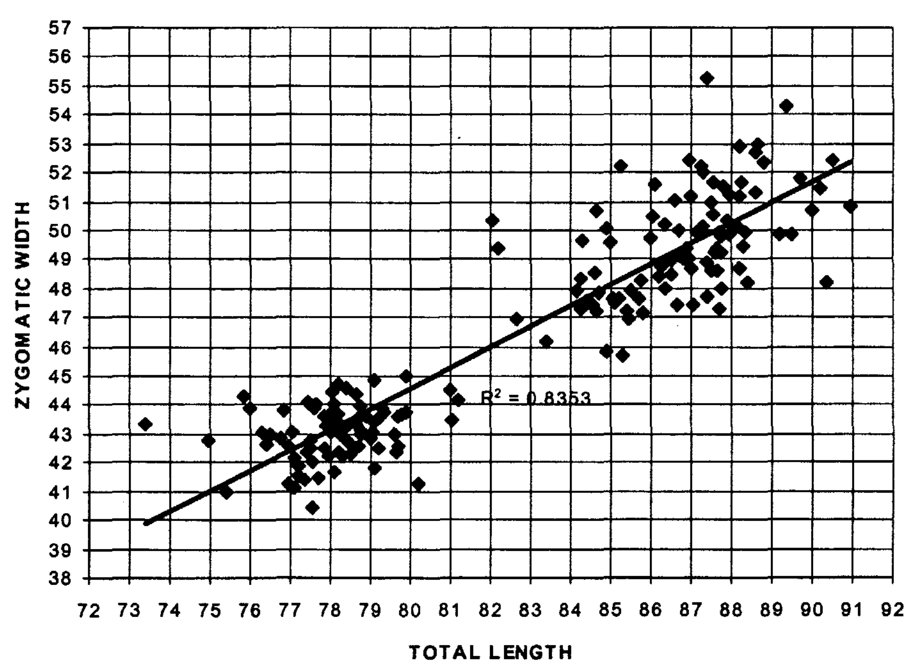


Fig 18 Unit 19 marten skull zygomatic width and total length, regulatory year 1996

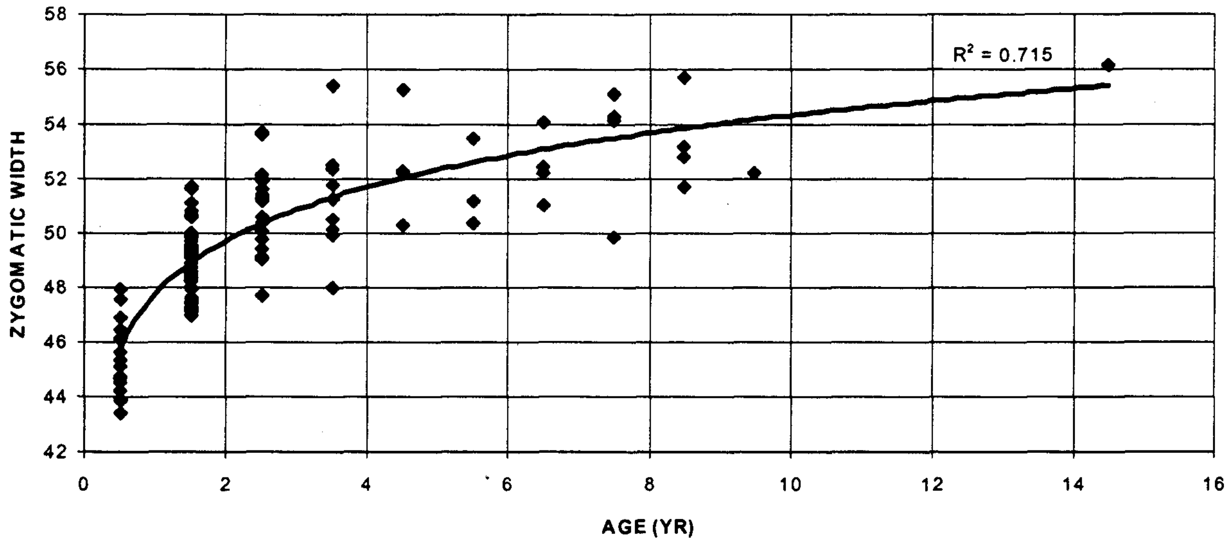


Fig 19 Unit 19 male marten zygomatic width by age, regulatory year 1996

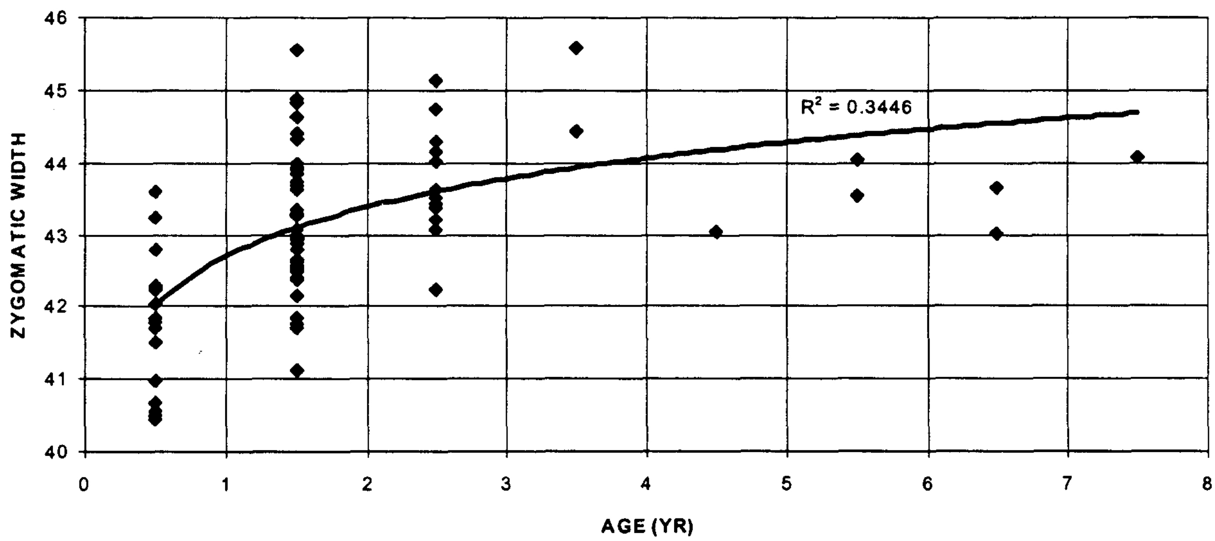


Fig 20 Unit 19 female marten zygomatic width by age, regulatory year 1996

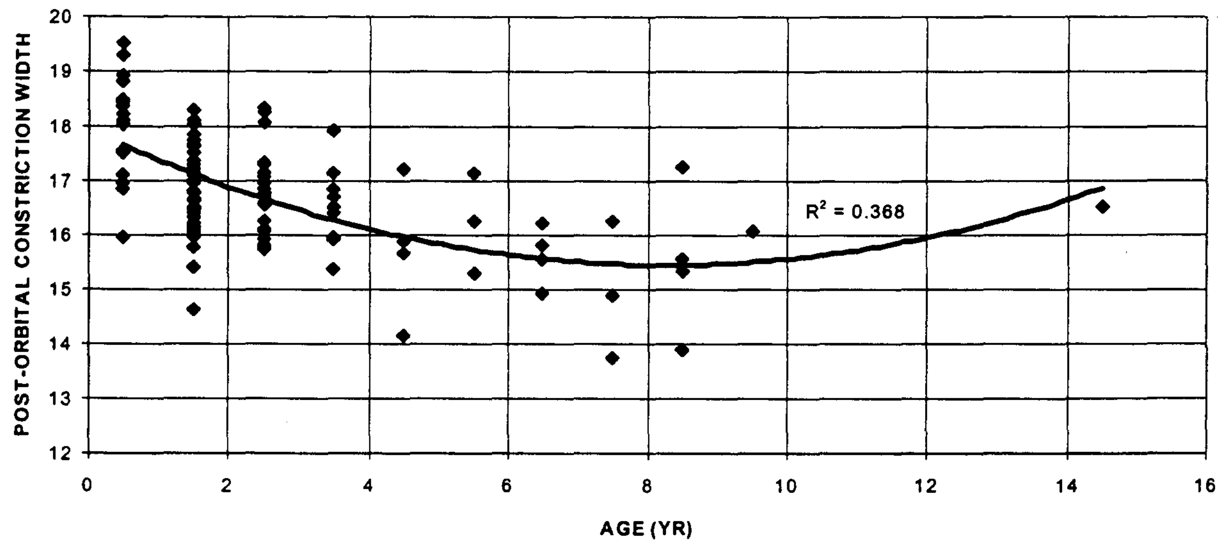


Fig 21 Unit 19 male marten post-orbital constriction width by age, regulatory year 1996

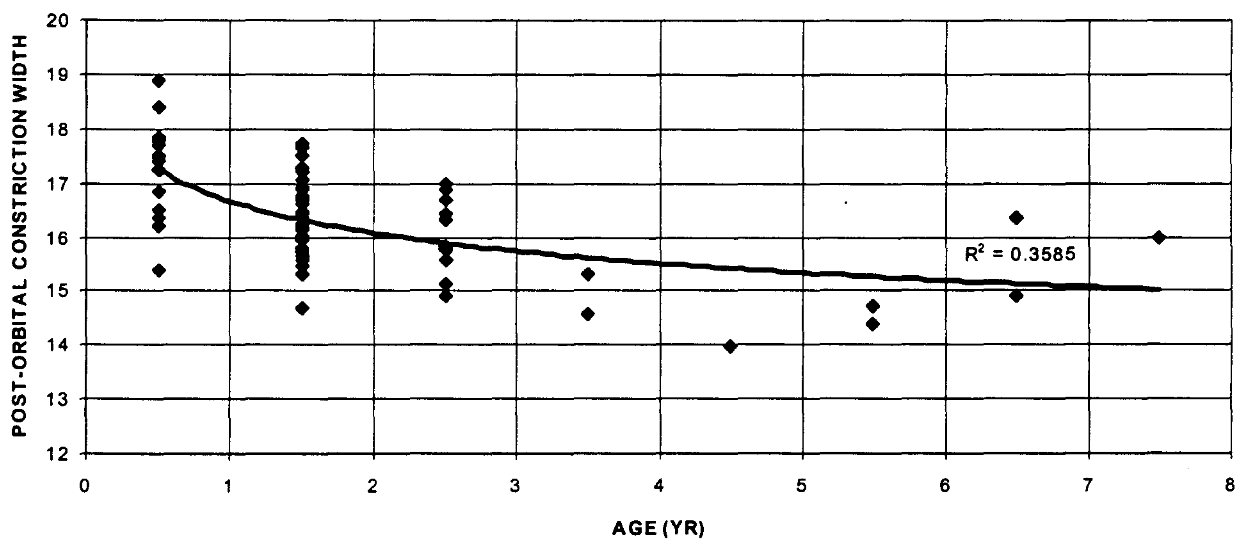


Fig 22 Unit 19 female marten post-orbital constriction width by age, regulatory year 1996

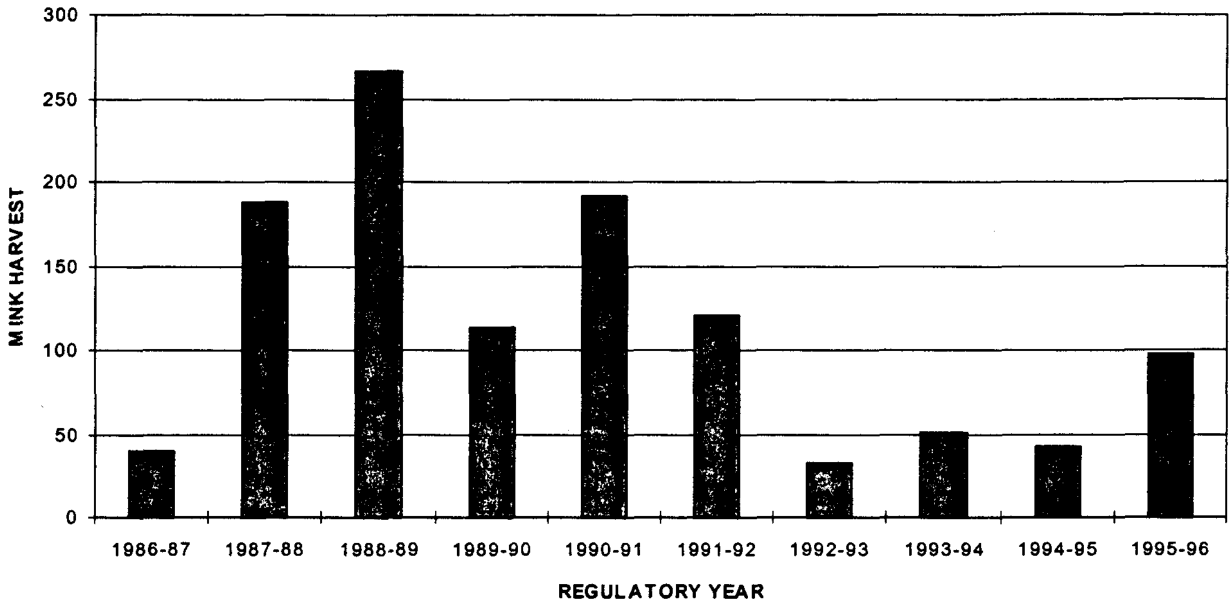


Fig 23 Unit 19 mink harvest, regulatory years 1986–1996

Table 1 Unit 19D beaver cache counts, regulatory years 1991–1997

Trend area	Size (km^2)	Active lodges (autumn caches)						
		1991	1992	1993	1994	1995	1996	1997
Middle Fork	33.4	22				16	23	22
Big River A	41.0	12		14	19	12	12	13
Big River B	33.5	10		10	11	6	6	4
North Fork A	27.8	22			7			
North Fork B	19.8	18						
North Fork C	26.5	11						
North Fork D	35.1	24						
North Fork E	17.9	16						
Wilson's	15.6		11	10	9	11	28	27
Stewart's Bend	79.3		23		21	22	43	35
Mark's Lake	31.2		6		6	10	11	9
Vinasale	52.0				21	20	22	22
Lower Takotna	18.2		10	11	9	12		10
Total	431.3	135	50	45	103	109	145	142

Table 2 Unit 19 beaver abundance and trend, regulatory years 1987–1996

Regulatory year	Abundance index	*n*	Trend index	*n*
1987–1988	7.47	43	6.07	30
1988–1989	7.05	39	6.38	29
1989–1990	7.00	40	5.75	32
1990–1991	7.26	23	6.00	16
1991–1992	6.94	31	5.96	25
1992–1993	6.09	22	6.00	16
1993–1994	7.44	18	6.25	16
1994–1995	6.81	32	--	--
1995–1996	6.74	23	--	--
1996–1997	7.49	37	--	--

Table 3 Unit 19 river otter harvest and abundance, regulatory years 1984–1996

Regulatory year	Trappers	Harvest	Otters per trapper	Abundance index
1984–1985	28	80	2.86	--
1985–1986	29	64	2.21	--
1986–1987	39	76	1.95	--
1987–1988	36	79	2.19	4.53
1988–1989	23	55	2.39	5.11
1989–1990	16	47	2.94	4.95
1990–1991	11	25	2.27	4.80
1991–1992	18	43	2.39	5.58
1992–1993	8	18	2.25	4.20
1993–1994	8	31	3.88	5.67
1994–1995	9	18	2.00	4.87
1995–1996	3	6	2.00	4.82
1996–1997	12	41	3.41	6.18
10-year $\bar{x}$	14.4	6.3	2.52	n/a

Table 4 Unit 19 red fox abundance indices, mean pelt prices, estimated harvest, net worth, and ranking, regulatory years 1986–1996

Year	Abundance index	$\bar{x}$ price ($)	Estimated harvest	Net worth ($)	Ranking[a]
1986–1987	4.96	28	111	3108	6
1987–1988	4.88	27	144	3881	7
1988–1989	7.11	13	275	3537	7
1989–1990	6.15	9	252	2228	7
1990–1991	7.36	11	98	1120	7
1991–1992	6.09	16	167	2707	6
1992–1993	7.10	15	68	1036	7
1993–1994	6.05	18	90	1580	6
1994–1995	5.81	19	133	2523	6
1995–1996	5.16	21	152	3192	--
1996–1997	6.79	16	490	7840	--

[a] Rank refers to the relative worth of red fox pelts in relation to all other furbearers taken in Unit 19. There are typically 12 species considered.

Table 5 Unit 19 furbearer harvest, pelt price, net worth, and rank, regulatory years 1994–1995

Species	Estimated harvest	$\bar{x}$ price	Net worth ($)	Ranking[a]
Beaver	164	22.70	3723	4
Coyote	12	24.76	297	9
Red fox	133	18.97	2523	6
Lynx	45	65.92	2966	5
Marten	2391	35.13	83,996	1
River otter	18	53.90	970	7
Muskrat	24	2.16	52	12
Mink	42	13.76	578	8
Red squirrel	180	0.84	151	10
Ermine	26	2.62	68	11
Wolf	172	111.08	19,106	2
Wolverine	101	130.13	13,143	3

[a] Rank refers to the relative worth of red fox pelts in relation to all other furbearers taken in Unit 19. There are typically 12 species considered.

Table 6 Unit 19 mink abundance index, mean pelt price, estimated harvest, net worth, and ranking, regulatory years 1986–1996

Year	Abundance index	$\bar{x}$ price ($)	Estimated harvest	Net worth ($)	Ranking[a]
1986	4.47	27	40	1080	8
1987	3.68	48	188	9058	6
1988	4.06	42	266	11076	4
1989	4.37	33	113	3757	5
1990	4.76	34	191	6542	4
1991	4.03	26	121	3179	5
1992	3.82	21	32	659	8
1993	5.00	22	51	1122	5
1994	4.20	14	42	578	8
1995	3.52	19	98	1862	5
1996	5.24	16	--	--	--

[a] Rank refers to the relative worth of red fox pelts in relation to all other furbearers taken in Unit 19. There are typically 12 species considered.

LOCATION

GAME MANAGEMENT UNIT: 20A, 20B, 20C, 20F, and 25C (44,760 mi^2)

GEOGRAPHIC DESCRIPTION: Central and lower Tanana Valley and middle Yukon River drainage

BACKGROUND

The fur trade is one of Alaska's oldest industries. Trapping can be significant to the economies of rural areas because alternative sources of income are limited. Furbearers provide food and clothing for personal use and cash income. Nonconsumptive use of furbearers is also important, because many people enjoy watching furbearers or finding evidence of their activities.

Little is known about factors limiting furbearer populations. Most furbearers are difficult to study because of their secretive habits. Information has come primarily from harvest data. Trapper questionnaires have been used annually since 1965 to collect information on trapper activities and the relative abundance of furbearers. Furbearer investigations in the last 25 years in Interior Alaska have included research on: 1) lynx population dynamics (Nava 1970; Berrie 1973; O'Connor 1984; Stephenson 1988), 2) beaver population ecology (Boyce 1974, 1981), 3) the effects of fire on furbearers (Stephenson 1984; Magoun and Vernam 1986), and 4) development of techniques to survey furbearer populations using track counts (Golden 1987; Schwartz et al. 1988; Stephenson 1988).

MANAGEMENT DIRECTION

MANAGEMENT GOALS AND OBJECTIVES

Beaver

- Manage beaver in the lower Chena River portion of Unit 20B for an annual fall beaver colony density of <0.5 colonies/km^2 of river and mitigate problems arising from beaver activities.

    - Conduct annual fall beaver cache surveys in the lower Chena River and Badger Slough. Open a limited registration trapping season if densities are ≥ 0.5 colonies/km^2.

    - Issue nuisance beaver permits to remove problem animals.

    - Coordinate with Department of Transportation and Public Facilities (DOT/PF) to minimize dammed culverts and flooded roads.

- Manage beaver in Units 20A, 20C, 20F, 25C and the remainder of 20B for an annual unit harvest that includes $<20\%$ kits when the harvest for that unit exceeds 50 beaver.

Lynx

- Manage lynx with a tracking harvest strategy whereby seasons are most liberal when lynx are abundant and most conservative when lynx are scarce.

    - Estimate the annual sex and age of harvested lynx by examining carcasses from Units 20A and 20B.

    - Develop and implement aerial track surveys in Units 20A and 20B to provide indices to trend in lynx and hare populations.

    - Determine whether lynx pelt measurements can be used to index the number of kittens in the harvest.

    - Develop maps of trapline distribution through interviews with successful trappers.

Wolverine

- Manage wolverine harvests in Unit 20A based on estimates of sustainable yield derived from density estimates and modeling.

    - During winter 1997–1998, complete aerial surveys to estimate density of wolverine in Unit 20A.

    - Use the model of Gardner et al. (1993) to estimate sustainable wolverine harvests in Unit 20A.

METHODS

We conducted beaver cache surveys from a riverboat in late September/early October to determine fall beaver colony density in the lower Chena River (downstream from the confluence with the Little Chena River, including Badger Slough downstream from Plack Road). We did not conduct a cache survey during fall 1992 because of unseasonably cold temperatures that froze the Chena River early. In 1993, we began subjectively categorizing cache sizes relative to the 18' boat used to conduct the surveys (<18' = small, 18' = medium, >18' = large). We mitigated problems arising from beaver activity by issuing nuisance or registration permits to trappers, and by coordinating with the public and DOT/PF highway crews to minimize dammed culverts and flooded property.

We maintained accurate records of harvest by compiling data from the required sealing documents for beavers, lynx, otters, and wolverines. A Uniform Coding Unit was assigned to each pelt sealed to monitor distribution of harvest. Sealing data provided minimum harvest estimates because some pelts were used domestically and were not reported. We estimated the proportion of beaver kits in the harvest by classifying pelt measurements (length plus width) from sealing certificates as kits (≤53 inches) or adults (>53 inches). Additional harvest data on these and other species were available from fur export reports and fur acquisition reports. Fur prices were compiled from data provided by North American Fur Exchange. Prices were the averages from December and February sales. They were based on high quality standards for each species.

We sent questionnaires to 100–150 trappers to get information regarding their trapping activities. In previous reports, trapper questionnaires were used to get trapper opinions on furbearer population levels and trends. During 1994–1995 and 1995–1996 the format for the report and the compiling of the information collected from trappers was changed. The new format focused mainly on effort and methods and did not address trapper impressions of local furbearer populations. The format for the 1996–1997 questionnaire was changed again to focus on species abundance, but with a more subjective basis than in the pre-1994 trapper questionnaire reports. Due to the changes in trapper questionnaire formats, none of the data for 1994–1996 will be reported in this document.

The term "regulatory year" means 1 July through 30 June of the following calendar year, and unless otherwise noted all years refer to the regulatory year.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Cache surveys indicated beaver colony density in the lower Chena River did not change substantially between 1986 and 1997 (Table 1). Densities ranged from 0.5 to 0.7 colonies/km^2 in the Chena River survey area. Density was highest in the Fort Wainwright area of the Chena River survey area. I estimate that approximately 300 beaver inhabit the lower Chena drainage, using a mean of 5 beavers/colony (Boyce 1974) and considering gravel pits and other waterways.

Boyce (1981) concluded that 0.5 colonies/km^2 was a saturation density for beaver in Interior Alaska. During fall 1994–1996, colony densities observed in the lower Chena River (0.5–0.7 colonies/km^2) exceeded our objective of 0.2 to 0.5 colonies/km^2 (Table 1).

MORTALITY

Harvest

Seasons and Bag Limits. Seasons and bag limits varied among subunits over time (Tables 2–5).

Board of Game Actions and Emergency Orders. The board took no actions during this reporting period and no emergency orders were issued.

Hunter/Trapper Harvest.

Beaver — The reported beaver harvest in 1994 (825) decreased from 1993 (930; Table 6). The low to moderate harvest probably reflected lower beaver trapping effort because of depressed prices. The average pelt price was $25 (Table 7).

Reported beaver harvest in 1995 (436) decreased from 1994 (825). This lower harvest could be attributed to the record low snowfall and its affect on trapper access. The average pelt price dropped to $22 during 1995.

Reported beaver harvest from 1996 (1049) increased from 1995 (436). The increase was probably influenced by relatively mild weather and by an increase in the average pelt price to $33.

Since the 1994 registration trapping season, combined Chena River and Badger Slough harvests fluctuated from 7 to 25 beaver/year (only 1 of which was a kit). Trapper success was affected by weather, including deep snow, cold temperatures, which directly affect the amount of overflow on the Chena. No lodges were "trapped out" and few conflicts occurred with people (Table 8).

In 1994, 1995, and 1996, we met the management objective to maintain <20% kits in the beaver harvest in subunits where more than 50 beaver were harvested (Table 9).

Lynx — The reported lynx harvest in 1994 was 108, a decrease from the 1993 harvest of 258 (Table 6). The lynx harvest decreased because the population was at the low point in the cycle. Average pelt prices were stable at $104 in 1993 to $100 in 1994 (Table 7). In 1994, most lynx (92%) were taken in Units 20A, 20B, or, 20C.

The reported lynx harvest during 1995 was 77, a decrease from the previous year. The lynx population was at the bottom of the cycle, and trappers saw more snowshoe hare sign on their lines. Shallow snow depths made snowmobile travel difficult during the lynx season contributing to the low harvest. The average pelt price decreased slightly from $100 in 1994 to $82 in 1995.

The reported lynx harvest in 1996 was 280, an increase from the 1995 harvest of 77 lynx. The increase was probably related to an increasing lynx population. The average pelt price was $90 in 1996.

Substantive changes in the lynx harvest probably reflected changes in the lynx population. However other factors that influenced lynx harvests include: 1) changes in season lengths, 2) publicity encouraging trappers to restrict their harvest of lynx during the low phase of the cycle, 3) environmental conditions affecting trapping effort, and 4) pelt prices.

River Otter — The reported harvest of otters ranged from 26 to 59 between 1993 and 1996 (Table 6). Average otter pelt prices ranged from $88–$103 (Table 7).

I believe weather and trapping conditions influence otter harvests. Price increases may also create increased effort by trappers who normally do not set traps for otters.

Wolverine — Wolverine harvests ranged from 16–43 wolverine between 1993 and 1996 (Table 6). The average pelt price ranged from $135–$175 (Table 7).

The reported wolverine harvest of 16 during 1995 was probably due to the shallow snow depths that made access and trapping difficult. The average pelt price increased from $135 in 1994 to $170 in 1995.

The percentage of males in the harvest was 51–75% during the last 3 years (Table 10). Male wolverines have larger home ranges than females (Gardner 1985; Magoun 1985) and are more susceptible to trapping. Long-term trends of <50% male wolverines in harvests could indicate unsustainable harvests and should trigger more in-depth analysis of the population. This should include utilizing the model developed by Gardner et al. (1993).

Magoun (1985) stated that factors responsible for long-term wolverine population declines could include: 1) widespread declines in food resources, particularly the demise or shift in range of large ungulate populations; 2) widespread habitat destruction; and 3) heavy harvests over large areas.

Marten — In Unit 20, more marten are reported sold to fur buyers or exported from Alaska than all other furbearers combined (Tables 11–13). The reported acquisition or export of marten ranged from 1769–4025 from 1993–1996. There is no sealing requirement for marten pelts. The harvest estimate, using reports from fur dealer acquisitions and fur exports, represents a minimum estimate of harvest because many marten pelts are traded in local markets or used by trappers for personal use.

Other Furbearers — The harvest for red fox, coyote, mink and weasel increased during the period 1994 to 1996, based on export and acquisition data. During the years 1994 to 1996, 84, 68, and 217 red foxes, 38, 37, and 72 coyotes; 86, 109, and 237 mink; and 20, 28, and 43 weasels were sold or exported from the state.

Method of Take and Transportation. During the 3-year reporting period 1994 through 1996, snares were the most common method of harvesting beavers (Table 14). Traps were the most common method of harvesting lynx, wolverines, and river otter. Snowmachines were the most commonly used method of transportation for harvesting all 4 species over the last 3 seasons.

CONCLUSIONS AND RECOMMENDATIONS

Management objectives for the Chena River beaver populations were met, utilizing registration and nuisance permits. Beaver harvests in the rest of the area met our management objective of <20% kits in the harvest when the subunit harvest exceeded 50 beaver. Further efforts to reduce the number of nuisance permits issued should be investigated. One possibility would be to solicit local residents to trap beaver during the regular season in chronic nuisance areas.

Lynx management objectives were partially met. We managed lynx seasons using the Tracking Harvest Strategy. We estimated sex and age of the harvest through carcass collection and worked on the aerial track survey technique. We did not meet the objective of using pelt length to estimate the kitten proportion of the harvest nor did we develop a comprehensive trapline distribution map.

Wolverine management objectives were not met. Specific planned activities were not conducted during this reporting period. Weather conditions were the primary factor influencing our ability to complete wolverine surveys. Wolverine harvest modeling was also not accomplished during this reporting period. Population estimates must be done before the modeling exercise can be completed.

For other furbearer species, we did not detect any problems requiring management changes. Trappers will continue to be an important source of information. Communication with the trappers should be improved by: 1) expanding the trapper questionnaire, 2) visiting traplines, 3) writing articles about furbearer research and management projects for the Alaska Trapper's Association magazine, 4) soliciting input regarding management issues, and 5) trying to keep trappers informed about issues affecting them. I recommend no regulatory changes at this time.

Prey species populations, including snowshoe hare and ptarmigan, were increasing. All species of furbearers should benefit from this increasing prey base. Lynx populations especially should continue to expand until the turn of the century. Recent mild winters have also helped populations of prey species and furbearers.

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Table 1 Fall beaver cache surveys in the lower Chena River, Badger Slough, and Noyes Slough, Unit 20B, 1986–1994

Date	Location[a]	Caches	Stream distance (km^2)	Density ($caches/km^2$)
1986				
unknown	Chena River	25	40	0.6
2 Oct	Noyes Slough	8	9	0.9
1987				
21 Oct	Chena River	25	40	0.6
1988				
5 Oct	Chena River	28	40	0.7
16 Oct	Noyes Slough	6	9	0.7
unknown[b]	Badger Slough	7	13	0.5
1989				
29 Sep	Chena River	24	40	0.6
12 Oct[c]	Badger Slough	5	13	0.4
1990				
26 Sep	Chena River	26	40	0.6
2 Oct[b]	Badger Slough	5	13	0.4
1991				
2 Oct	Chena River	22	40	0.6
1992[d]				
1993				
22 Sep	Chena River	18	40	0.5
23 Sep	Badger Slough	3	13	0.2
1994				
29 Sep	Chena River	22	40	0.6
1995				
27 Sep	Chena River	26	40	0.7
1996				
2 Oct	Chena River	21	40	0.5
1997				
2 Oct	Chena River	28	40	0.7

[a] Chena River downstream from confluence with Little Chena River, Badger Slough downstream from Plack Road.

[b] Per Terry Anderson, local resident.

[c] From PA-18 aircraft.

[d] No survey.

Table 2 Trapping seasons and bag limits for selected furbearers within the Fairbanks Area (Units 20A, 20B, 20C, 20F, and 25C), 1983–1997

Species	Season dates	Season length	Year(s)	Bag limit
River otter	1 Nov–15 Apr	167	1983–1997	No limit
Wolverine	1 Nov–31 Mar	152	1983–1986	No limit
	1 Nov–28 Feb	121	1987–1997	No limit
Coyote	1 Nov–31 Mar	152	1983–1997	No limit
Marten, Mink Weasel, Fox	1 Nov–28 Feb		1983–1997	No limit
Muskrat	1 Nov–20 Jun	223	1983–1997	No limit

Table 3 Hunting seasons and bag limits for selected furbearers within the Fairbanks Area (Units 20A, 20B, 20C, 20F, and 25C), 1983–1997

Species	Season dates	Season length	Year(s)	Bag limit
Lynx	1 Nov–31 Mar	152	1983–1986	2
	1 Nov–31 Dec	61 (Unit 20A)	1987	2
	1 Nov–15 Jan	76 (Units 20B, 20C, 20F, and 25C)	1987	2
	15 Dec–15 Jan	31	1988–1989	2
	1 Dec–31 Jan	62	1990–1997	2
Wolverine	1 Sep–31 Mar	213	1983–1997	1
Red Fox	1 Nov–15 Feb	117	1983–1990	2
	1 Sep–15 Mar	197	1991–1997	10
Coyote	1 Sep–30 Apr	243	1983–1997	2
Squirrel	No closed season		1983–1997	No limit

Table 4 Trapping seasons and bag limits for beaver within the Fairbanks Area (Units 20A, 20B, 20C, 20F, and 25C), 1983–1997

Unit	Season dates	Season length	Year(s)	Bag limit
20A	1 Feb–15 Apr	75	1983–1991	25
	1 Nov–15 Apr	167	1992–1997	
20B[a]	1 Feb–15 Apr	75	1983–1984	25
	1 Nov–15 Apr	167	1985–1997	25
20C	1 Nov–15 Apr	167	1983–1997	25
20F	1 Nov–15 Apr	167	1983–1997	50[b]
25C	1 Nov–15 Apr	167	1983–1997	25

[a] A portion of the lower Chena River and Badger Slough has been either closed to trapping without a permit since 1983.

[b] Bag limit in Unit 20F was 25 from 1983–1987 and has been 50 since.

Table 5 Trapping seasons and bag limits for lynx within the Fairbanks Area (Units 20A, 20B, 20C, 20F, and 25C), 1983–1997

Season dates	Season length	Year(s)	Bag limit
1 Nov–15 Mar	136	1983–1984	No limit
1 Dec–31 Jan	62	1985–1986	No limit
1 Dec–15 Jan	46 (Unit 20A)	1987	No limit
1 Dec–31 Dec	31 (Units 20B, 20C, 20F, and 25C)	1987	No limit
15 Dec–15 Jan	31	1988–1989	No limit
1 Dec–31 Jan	62	1990–1991	No limit
1 Nov–31 Jan	92	1992	No limit
1 Dec–31 Jan	62	1993	No limit
1 Dec–15 Jan	46	1994	No limit
15 Dec–15 Jan	31 (Units 20A, 20B, and 20C east of Teklanika)	1995	No limit
1 Dec–31 Jan	(Units 20F, 25C, and remainder of 20C)	1995	No limit
15 Dec–15 Jan	31 (Units 20A, 20B, and 20C east of Teklanika)	1996	No limit
1 Dec–31 Jan	62 (Units 20F, 25C, and remainder of 20C)	1996	No limit
1 Dec–15 Feb	77 (Units 20A, 20B, and 20C east of Teklanika)	1997	No limit
1 Nov–28 Feb	121 (Units 20F, 25C, and remainder of 20C)	1997	No limit

Table 6 Number of pelts sealed[a] from selected furbearers in portions of Units 20 and 25C, regulatory years 1991–1992 through 1996–1997

Species	Unit	Regulatory year					
		1991–1992	1992–1993	1993–1994	1994–1995	1995–1996	1996–1997
Beaver	20A	43	68	83	99	61	125
	20B	587	294	650	533	217	647
	20C	241	76	183	167	103	239
	20F	16	10	14	25	0	29
	25C	4	6	0	1	1	9
Total		891	454	930	825	436	1049
Lynx	20A	185	75	95	26	16	42
	20B	131	94	117	46	34	104
	20C	176	53	27	27	20	89
	20F	47	25	13	4	2	8
	25C	9	8	6	5	5	37
Total		548	255	258	108	77	280
River Otter	20A	8	6	8	4	10	9
	20B	20	14	21	14	32	40
	20C	8	3	7	8	5	8
	20F	1	0	0	0	0	1
	25C	0	0	0	0	0	1
Total		37	23	36	26	47	59
Wolverine	20A	15	8	16	14	5	7
	20B	8	5	13	5	2	13
	20C	16	2	4	7	5	11
	20F	2	3	3	4	0	1
	25C	3	2	7	3	4	6
Total		44	20	43	33	16	38

[a] Includes only sealed beavers that were dried and stretched.

Table 7 Average North American furbearer pelt prices (US dollars), regulatory years 1992–1993 through 1997–1998

Species	Regulatory year					
	1992–1993[a]	1993–1994[a]	1994–1995[a]	1995–1996	1996–1997	1997–1998
Beaver	21	26	25	22	33	35
Good quality large brown						
Marten	60	68	55	66	66	66
Large I-II dark brown						
Mink	32	24	26	19	26	23
Large-medium I-II dark brown North						
Red fox	26	31	35	27	38	34
XL-large I-II Northwest						
Lynx	100	104	100	82	90	95
Large-medium I-II first color						
Otter	66	88	103	90	74	86
XL-large I-II dark brown						
Wolverine	113	175	135	170	160	249[b]
XL I-II brown						

[a] Data compiled by T Boudreau from North American Fur Exchange Prices only.

[b] Not graded. Only 198 offered for sale with 85% sold.

Table 8 Summary by year of the results of the registration beaver trapping season in the lower Chena River portion of Unit 20B, 1989–1993

Year	Season dates	Trappers	Caches available	Lodges trapped	Total available limit	Beavers trapped		
						Adults	Kits	Total
1989	16 Feb 1989 15 Mar 1989	7	16	10	35	14	0	14
1990	16 Feb 1990 15 Mar 1990	6	17+	9	30	15	0	15
1990	1 Dec 1990 31 Jan 1991	8	26	16+	40	21+	0	21+
1991	1 Dec 1991 31 Jan 1992	8	17+	16	40	30	1	31
1992	1 Dec 1992 31 Jan 1993	10	unk	19	50	14	1	15
1993	1 Dec 1993 31 Jan 1994	8	21	14	40	21	0	21
1994	1 Dec 1994 31 Jan 1995	7	26	12	35	24	1	25
1995	1 Dec 1995 31 Jan 1996	7	26	10	35	21	0	21
1996	1 Dec 1996 31 Jan 1997	5	21	6	25	7	0	7

Table 9 Number of beaver sealed and percentage of kits in the harvest in Units 20A, 20B, 20C, 20F, and 25C, regulatory years 1991–1992 through 1996–1997

	Unit 20A			Unit 20B			Unit 20C			Unit 20F			Unit 25C		
Regulatory year	Beaver sealed[a]	Kits[b]	% kits[c]	Beaver sealed[a]	Kits[b]	% kits[c]	Beaver sealed	Kits[b]	% kits[c]	Beaver sealed[a]	Kits[b]	% kits[c]	Beaver sealed[a]	Kits[b]	% kits[c]
1991–1992	42	6	14	566	61	11	229	8	3	16	1	6	4	0	0
1992–1993	66	4	6	248	38	15	68	1	1	10	0	0	6	2	33
1993–1994	64	5	8	589	70	12	174	11	6	16	3	19	3	2	66
1994–1995	99	8	8	533	58	1	167	9	5	25	0	0	1	0	0
1995–1996	61	12	19	217	21	10	103	7	7	0	0	0	1	0	0
1996–1997	125	6	5	647	68	11	239	21	9	29	2	1	9	5	55

[a] Includes only sealed beavers that were dried and stretched.
[b] Pelt <53 inches.
[c] The management objective for <20% kits in the harvest only applied to units with harvests >50.

Table 10 Wolverine harvest (number of pelts sealed) and percentage of males in the harvest, Units 20A, 20B, 20C, 20F, and 25C, regulatory years 1989–1990 through 1996–1997

Regulatory year	Sealed[a]	Males	% males[a]
1989–1990	19	10	53
1990–1991	22	13	59
1991–1992	44	26	59
1992–1993	20	15	75
1993–1994	43	35	81
1994–1995	33	17	51
1995–1996	16	12	75
1996–1997	38	21	55

[a] Excludes wolverines of unknown sex.

Table 11 Unit 20[a], number of furs that were sealed, reported sold to fur dealers[a], or exported[b] from Alaska, regulatory year 1994–1995

Species	Pelts sealed	Pelts sold to fur dealers: Pelts	Pelts sold to fur dealers: % sealed	Pelts exported by trappers: Pelts	Pelts exported by trappers: % sealed	Total sold or exported: Pelts	Total sold or exported: % sealed
Beaver	824	396	48	82	10	478	58
Coyote		20		18		38	
Cross Fox		22		6		28	
Red Fox		60		24		84	
Silver Fox		0		1		1	
Lynx	103	68	66	21	20	89	86
Marten		1849		140		1989	
Mink		70		16		86	
Muskrat		38		9		47	
Otter	26	11	42	2	8	13	50
Red Squirrel		97		0		97	
Weasel		16		4		20	
Wolf	135	15	11	15	11	30	22
Wolverine	30	15	50	5	16	20	66
Total	1118	2677		343		3020	

[a] All subunits of Unit 20, including Units 20D and 20E which are not within the Fairbanks Area.

[b] From fur acquisition forms.

[c] From fur export reports from trappers.

Table 12 Unit 20, number of furs sealed, reported sold to fur dealers[a], or exported[b] from Alaska in regulatory year 1995–1996

Species	Pelts sealed	Pelts sold to fur dealers		Pelts exported by trappers		Total sold or exported	
		Pelts	% sealed	Pelts	% sealed	Pelts	% sealed
Beaver	381	168	44	120	31	288	76
Coyote		14		23		37	
Cross Fox		20		11		31	
Red Fox		36		32		68	
Silver Fox		1		2		3	
Lynx	72	62	86	9	13	71	99
Marten		1178		591		1769	
Mink		84		25		109	
Muskrat		1		35		36	
Otter	47	34	72	5	11	39	83
Red Squirrel		13		16		29	
Weasel		24		4		28	
Wolf	125	47	38	15	12	62	50
Wolverine	12	6	50	3	25	9	75
Total	637	1688		891		2579	

[a] From fur acquisition forms.

[b] From fur export reports from trappers.

Table 13 Unit 20, number of furs sealed, reported sold to fur dealers[a], or exported[b] from Alaska in regulatory year 1996–1997

Species	Pelts sealed	Pelts sold to fur dealers		Pelts exported by trappers		Total sold or exported	
		Pelts	% sealed	Pelts	% sealed	Pelts	% sealed
Beaver	1040	459	44	148	14	607	58
Coyote		65		7		72	
Cross Fox		55		29		84	
Red Fox		154		63		217	
Silver Fox		71		1		8	
Lynx	243	189	77	11	5	200	82
Marten		3433		592		4025	
Mink		213		24		237	
Muskrat		79		3		82	
Otter	58	21	36	3		24	
Red Squirrel		78		345		423	
Weasel		23		20		43	
Wolf	192	47	24	36	19	83	43
Wolverine	32	12	38	13	41	25	78
Total	1565	4835		1295		6130	

[a] From fur acquisition forms.

[b] From fur export reports from trappers.

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Table 14 Percent method of take and transportation used to harvest furbearers from Units 20A, 20B, 20C, 20F, and 25C, regulatory years 1994–1995 through 1996–1997

	Method of take				Method of transportation			
Regulatory year/Species	Ground shooting	Trapping	Snaring	Other/ unk	Airplane	Dogsled/ snowshoe/skis	Snowmachine	Other/Unk/ Highway
1994–1995								
Beaver	8	112	680	3	0	116	544	106
Otter	0	16	9	0	0	3	19	1
Lynx	6	89	12	0	0	20	84	3
Wolverine	0	26	7	0	2	8	20	0
1995–1996								
Beaver	4	85	269	0	2	40	270	34
Otter	0	62	14	0	1	1	40	4
Lynx	0	40	7	0	8	19	45	2
Wolverine	0	15	1	0	1	1	13	1
1996–1997								
Beaver	13	148	881	1	20	78	789	87
Otter	0	52	7	0	0	8	47	3
Lynx	4	205	48	1	0	15	212	27
Wolverine	0	30	8	0	1	0	37	0

LOCATION

GAME MANAGEMENT UNIT: 20D (5633 mi^2)

GEOGRAPHIC DESCRIPTION: Central Tanana Valley near Delta Junction

BACKGROUND

Furbearers are an important natural resource in Unit 20D. Species include beaver, coyote, lynx, marten, mink, muskrat, otter, red fox, red squirrel, weasel, wolverine, and wolf. Wolves will be discussed in a separate management report. Both recreational and commercial trappers use the area. Competition for traplines and furbearers is intense. Much of the area is easily accessible from the road system and/or major rivers.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Provide for an optimal harvest of furbearers.
- Provide the greatest opportunity to participate in hunting and trapping furbearers.

MANAGEMENT OBJECTIVES

Monitor furbearer population trends and annual harvests of furbearers using sealing documents, fur acquisition reports, fur export reports, trapper questionnaires, and trapper interviews.

- Seal furs as they are harvested and presented for sealing and analyze harvest patterns.
- Conduct trapper questionnaires and interviews as a basis for determining the status of various furbearer populations.

Monitor trends in abundance of furbearer prey species by establishing snowshoe hare and small mammal trend surveys.

- Conduct snowshoe hare surveys and small mammal trap line surveys to monitor prey abundance.

Determine lynx reproductive status by purchasing and examining lynx carcasses and reproductive tracts as needed.

- Purchase lynx carcasses from trappers and examine them for reproductive status as needed.

METHODS

We collected harvest data for beaver, lynx, otter, and wolverine by requiring trappers to have their furs sealed. Additional information collected at the time of sealing included: name of trapper; location of harvest; date of harvest; pelt measurements for beaver, lynx, and otter; sex of the furbearer except for beaver; method of take; and method of transportation used.

We mailed questionnaires to trappers in Unit 20D through the Statewide Furbearer Management Program. Trappers were asked to rate species abundance as scarce, common, or abundant. They were also asked to rate species population trends as fewer, same, or more than the previous year.

We purchased lynx carcasses from trappers for $10 each. Carcasses were kept frozen until they could be examined to determine age, sex, and reproductive status of females.

A snowshoe hare population index was completed in conjunction with a nongame breeding bird survey (BBS). The BBS was conducted by surveying the Richardson Highway from Milepost 256.2 to 230.4. It required the surveyor to stop at one-half mile intervals for 3 minutes at each stop. The survey was begun at one-half hour before sunrise (approximately 3:00 a.m.) in late June or early July. All hares seen during the survey were counted.

We conducted an experimental lynx and hare aerial survey in western Unit 20D. PA18 aircraft were flown at an altitude of 200–300 feet above ground level along predetermined east-west GPS transect lines. We flew on sunny days approximately 36–48 hours after a 3 inch snowfall. Lynx and hare tracks were counted and their location recorded if they were within approximately 50 feet of the transect line. Surveys were generally flown in the lowland portions of western Unit 20D from the base of the Granite Mountains northward to include the Shaw Creek flats.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Eight, 10, and zero carcasses were purchased from Unit 20D trappers during regulatory years 1994–1996, respectively. Those sample sizes are too small to provide meaningful information, therefore inferences about population performance in Unit 20D were drawn from carcass samples collected in the entire Tanana River basin. During 1994–1996, 77, 72, and 124 carcasses were purchased from Units 12 and 20. Percent kittens among the necropsy samples increased from 18% in 1994, to 32% in 1995, and 33% in 1996, indicating increased reproductive performance and population levels among lynx in the Tanana River basin. Counts of snowshoe hares, obtained during the Breeding Bird Survey, also increased from 4 in 1995, to 24 in 1996, and 46 in 1997. With increasing hare numbers and high lynx reproductive success, lynx populations are expected to continue to increase. The peak in lynx population and harvest levels is expected to occur between 1999 and 2001.

Furbearer and prey population abundance and trends based on responses to trapper questionnaires were reviewed for 1996–1997. Relative abundance and trend of populations that differed from 1993–1994 included lynx, marten, and wolverine which increased in abundance, and beaver and coyote which decreased in abundance. Prey that increased included hares and grouse.

Population Size

Population size was unknown for furbearers in Unit 20D.

Lynx and hare aerial transects were flown in western Unit 20D on 14 February 1996. Six transects were flown with a combined length of 132 miles. Nineteen lynx tracks were observed (0.14 tracks/mi). Three hundred ninety hare tracks were observed (2.96 tracks/mi). It was not possible to compare this data to previous surveys because this was the first such survey flown in Unit 20D.

Population Composition

Population composition was unknown for furbearers in Unit 20D, except from harvest data (Table 1).

Distribution and Movements

No work was performed to determine furbearer distribution and movements during this report period.

MORTALITY

Harvest

Season and Bag Limit. Unit 20D furbearer seasons and bag limits varied between species and years (Table 2).

Board of Game Actions and Emergency Orders. No actions by the Alaska Board of Game were implemented during this reporting period. The lynx trapping season was adjusted by emergency orders issued by the department as part of a lynx tracking harvest system.

Hunter/Trapper Harvest. Estimates of Unit 20D harvest were available for species that were sealed.

The 1994–1995 through 1996–1997 beaver harvest averaged 23 beaver/year (range = 15–37). The trend in reported beaver harvest increased from a low of only 6 beaver harvested in 1992–1993 (Table 1). However, harvest was still lower than the high harvest reported in 1987–1988. The proportion of juveniles in the harvest averaged 23% during this reporting period.

Reported lynx harvest continued to decline during 1994–1995 and 1995–1996 to only 26 in 1995–1996, from the recent 1992–1993 high harvest of 96 (Table 1). Lynx harvest increased to 47 in 1996–1997.

Otter harvest during this reporting period was typically low, with 5 otters harvested in 1994–1995 and 2 each in 1995–1996 and 1996–1997 (Table 1).

Wolverine harvest during this reporting period was highly variable and did not vary significantly from previous years. Harvest ranged from a high of 12 in 1994–1995 to a low of only 2 in 1995–1996 (Table 1).

Harvest Chronology. The majority of beavers were harvested in March (45%), with December having the second highest harvest (20%) during this reporting period (Table 3).

Lynx were only captured during the legal trapping season, which included portions of December and January during 1994–1995 through 1996–1997 (Table 3). Most lynx (55%) were caught in December.

There was no clear pattern in otter or wolverine harvest, with both species being captured throughout the season (Table 3).

Method of Take. Traps and snares were the most commonly used method for capturing all furbearers in Unit 20D from 1994–1995 through 1996–1997 (Table 1).

Transport Methods. Snowmachines continued to be the most commonly used means of transportation for beaver, lynx, otter, and wolverine trappers in Unit 20D (Table 4).

Other Mortality

Rates of natural mortality were unknown for furbearers in Unit 20D.

HABITAT

Assessment and Enhancement

No habitat assessment or enhancement was accomplished during this report period.

CONCLUSIONS AND RECOMMENDATIONS

Furbearer management objectives were met by monitoring population trends and harvest through sealing selected furs and conducting trapper questionnaires. The trend in beaver harvest was increasing but was still below the high harvest of 1986–1987. Lynx harvest was below the most recent high harvest in 1992–1993 but populations were increasing and harvest is expected to increase. Reported harvest of otter and wolverine was variable. Hare populations increased during this reporting period. No changes in furbearer trapping or hunting regulations are recommended at this time.

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Table 1 Unit 20D beaver, lynx, otter, and wolverine harvest, regulatory years 1986–1987 through 1996–1997

Species/Regulatory	Reported harvest						Method of take				Total
year	M	F	Unk	Juv[a]	Adults	Unk	Trap/snare	Shot	(L&S)[b]	Unk	harvest
Beaver											
1986–1987			70	13	57	0	64	0	0	6	70
1987–1988			85	21	64	0	75	3	0	7	85
1988–1989			34	2	22	10	25	0	0	9	34
1989–1990			18	1	17	0	18	0	0	0	18
1990–1991			23	1	22	0	21	0	0	2	23
1991–1992			35	2	33	0	35	0	0	0	35
1992–1993			6	0	6	0	6	0	0	0	6
1993–1994			12	2	10	0	12	0	0	0	12
1994–1995			37	8	24	5	34	3	0	0	37
1995–1996			15	2	13	0	15	0	0	0	15
1996–1997			18	6	12	0	18	0	0	0	18
Lynx											
1986–1987				4	16	0	20	0	0	0	20
1987–1988				4	13	0	17	0	0	0	17
1988–1989				1	9	0	8	2	0	0	10
1989–1990				0	4	0	4	0	0	0	4
1990–1991				3	19	1	23	0	0	0	23
1991–1992				9	38	1	45	1	0	2	48
1992–1993				16	79	1	85	6	0	9	96
1993–1994				5	35	0	40	0	0	0	40
1994–1995				7	26	2	33	0	0	2	35
1995–1996				12	14	0	26	0	0	0	26
1996–1997				6	37	4	46	0	0	1	47
Otter											
1986–1987	3	2	1				6	0	0	0	6
1987–1988	2	1	0				2	1	0	0	3
1988–1989	2	0	4				6	0	0	0	6
1989–1990	0	0	0				0	0	0	0	0
1990–1991	0	1	0				1	0	0	0	1
1991–1992	2	1	0				3	0	0	0	3
1992–1993	0	0	0				0	0	0	0	0
1993–1994	1	0	2				1	0	0	2	3
1994–1995	2	1	2				5	0	0	0	5
1995–1996	0	2	0				2	0	0	0	2

Table 1 Continued

Species/Regulatory year	Reported harvest						Method of take				Total harvest
	M	F	Unk	Juv[a]	Adults	Unk	Trap/snare	Shot	(L&S)[b]	Unk	
1996–1997	0	1	1				2	0	0	0	2
Wolverine											
1986–1987	5	0	1				5	1	0	0	6
1987–1988	3	3	0				6	0	0	0	6
1988–1989	8	6	1				15	0	0	0	15
1989–1990	3	2	2				6	1	0	0	7
1990–1991	5	1	1				7	0	0	0	7
1992–1992	9	3	0				12	0	0	0	12
1992–1993	3	3	0				6	0	0	0	6
1993–1994	2	2	5				9	0	0	0	9
1994–1995	5	7	0				12	0	0	0	12
1995–1996	0	2	0				2	0	0	0	2
1996–1997	3	2	1				6	0	0	0	6

[a] Beavers ≤52"; lynx ≤35" in length.

[b] L&S (land and shoot) refers to animals taken by hunters the same day hunters were airborne.

Table 2 Furbearer trapping and hunting seasons in Unit 20D, regulatory years 1994–1995 through 1996–1997

Species	Trapping season	Bag limit	Hunting season	Bag limit
Beaver				
1994–1995	1 Nov–15 Apr[a]	25	No open season	
	1 Feb–15 Apr[b]	15		
1995–1996	1 Nov–15 Apr	25	No open season	
1996–1997	1 Nov–15 Apr	25	No open season	
Coyote	1 Nov–31 Mar	No limit	1 Sep–30 Apr	2
Lynx				
1994–1995	1 Dec–15 Jan	No limit	1 Dec–31 Jan	2
1995–1996	15 Dec–15 Jan	No limit	1 Dec–31 Jan	2
1996–1997	15 Dec–15 Jan	No limit	1 Dec–31 Jan	2
Marten	1 Nov–28 Feb	No limit	No open season	
Mink	1 Nov–28 Feb	No limit	No open season	
Muskrat	1 Nov–10 Jun	No limit	No open season	
Otter	1 Nov–15 Apr	No limit	No open season	
Red Fox	1 Nov–28 Feb	No limit	1 Sep–15 Mar	10, but not more than 2 before 1 Oct
Red Squirrel	No closed season	No limit	No closed season	No limit
Weasel	1 Nov–28 Feb	No limit	No open season	
Wolverine	1 Nov–28 Feb	No limit	1 Sep–31 Mar	1

[a] Unit 20D draining into the north bank of the Tanana River, including the islands in the Tanana River.
[b] Remainder of Unit 20D.

Table 3 Unit 20D beaver, lynx, otter, and wolverine harvest chronology percent[a], regulatory years 1986–1997

Species/	Harvest periods							
Regulatory year	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr	Unk
Beaver								
1986–1987	0	1	11	6	16	56	9	0
1987–1988	2	2	28	1	4	45	15	0
1988–1989	0	0	12	0	18	47	9	0
1989–1990	0	11	6	0	33	39	11	0
1990–1991	0	9	9	0	0	74	0	0
1991–1992	0	0	3	0	6	49	43	0
1992–1993	0	33	0	17	17	33	0	0
1993–1994	0	17	0	8	0	42	33	0
1994–1995	8	0	5	14	5	32	35	0
1995–1996	0	20	27	7	0	47	0	0
1996–1997	0	11	28	0	6	56	0	0
Lynx								
1986–1987	0	0	50	50	0	0	0	0
1987–1988	0	0	71	29	0	0	0	0
1988–1989	0	0	40	40	10	10	0	0
1989–1990	0	0	25	75	0	0	0	0
1990–1991	0	4	21	71	4	0	0	0
1991–1992	0	4	48	46	0	0	0	0
1992–1993	0	4	42	42	7	0	0	0
1993–1994	0	0	53	48	0	0	0	0
1994–1995	0	0	54	46	0	0	0	0
1995–1996	0	0	50	50	0	0	0	0
1996–1997	0	6	53	34	0	0	0	6
Otter								
1986–1987	0	0	0	60	40	0	0	0
1987–1988	0	0	33	0	0	67	0	0
1988–1989	0	0	0	67	17	17	0	0
1989–1990	0	0	0	0	0	0	0	0
1990–1991	0	0	0	0	100	0	0	0
1991–1992	0	0	0	100	0	0	0	0
1992–1993[b]	0	0	0	0	0	0	0	0
1993–1994	0	0	0	33	67	0	0	0
1994–1995	0	0	40	40	0	0	20	0
1995–1996	0	0	0	0	100	0	0	0
1996–1997	0	0	50	0	50	0	0	0
Wolverine								
1986–1987	17	0	17	33	17	17	0	0
1987–1988	0	0	17	83	0	0	0	0
1988–1989	0	7	33	47	7	0	0	0
1989–1990	0	0	0	14	29	57	0	0
1990–1991	0	0	14	29	57	0	0	0
1991–1992	17	25	17	42	0	0	0	0
1992–1993	17	33	17	33	0	0	0	0
1993–1994	11	67	22	0	0	0	0	0
1994–1995	0	0	17	42	42	0	0	0
1995–1996	0	0	0	33	67	0	0	0
1996–1997	0	0	17	0	67	17	0	0

[a] Percentage of unknown not included.

[b] No harvest.

Table 4 Unit 20D harvest percentage by transport method[a], regulatory years 1986–1987 through 1996–1997

Species/Regulatory year	Harvest percent by transport method								
	Airplane	Dogsled	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Skis, Snowshoes	Unk
Beaver									
1986–1987	0	19	6	19	43	0	6	9	0
1987–1988	0	2	6	0	51	0	33	8	0
1988–1989	0	0	26	0	59	0	12	3	0
1989–1990	0	0	0	0	0	0	17	83[a]	0
1990–1991	0	26	0	0	65	0	0	9	0
1991–1992	0	0	9	0	91	0	0	0	0
1992–1993	0	0	0	0	100	0	0	0	0
1993–1994	0	0	58	0	33	0	8	0	0
1994–1995	3	0	35	0	54	0	8	0	0
1995–1996	0	0	0	0	60	0	40	0	0
1996–1997	0	6	0	0	72	0	22	0	0
Lynx									
1986–1987	10	0	0	5	85	0	0	0	0
1987–1988	6	6	0	0	78	0	12	0	0
1988–1989	0	0	0	0	80	0	20	0	0
1989–1990	0	0	0	0	100	0	0	0	0
1990–1991	0	0	0	0	100	0	0	0	0
1991–1992	0	2	0	0	71	0	17	6	4
1992–1993	0	1	0	4	66	4	10	6	9
1993–1994	0	0	0	0	73	5	23	0	0
1994–1995	0	0	0	0	63	0	26	9	3
1995–1996	0	4	0	0	92	0	0	4	0
1996–1997	0	2	0	2	64	0	28	4	0
Otter									
1986–1987	0	0	0	0	83	17	0	0	0
1987–1988	0	0	0	0	100	0	0	0	0
1988–1989	0	0	0	0	100	0	0	0	0
1989–1990	0	0	0	0	100	0	0	0	0
1990–1991	0	0	0	0	0	0	0	0	1
1991–1992	0	0	0	0	67	0	0	33	0
1992–1993[b]	0	0	0	0	0	0	0	0	0
1993–1994	0	0	0	0	33	0	0	0	67
1994–1995	0	0	200	80	0	0	0	0	

Table 4 Continued

Species/Regulatory year	Harvest percent by transport method: Airplane	Dogsled	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Skis, Snowshoes	Unk
1995–1996	0	0	0	0	100	0	0		
1996–1997	0	0	0	0	100	0	0		
<u>Wolverine</u>									
1986–1987	17	33	0	0	33	17	0	0	0
1987–1988	0	0	0	0	100	0	0	0	0
1988–1989	0	0	0	0	87	0	0	13	0
1989–1990	0	29	0	0	43	0	0	29	0
1990–1991	14	0	0	0	57	0	0	29	0
1991–1992	33	0	0	0	58	0	8	0	0
1992–1993	17	0	0	0	83	0	0	0	0
1993–1994	0	0	0	0	78	0	0	22	0
1994–1995	17	8	0	0	75	0	0	0	0
1995–1996	0	0	0	0	100	0	0	0	0
1996–1997	0	0	0	0	100	0	0	0	0

[a] Transportation codes were revised in 1989, however, some errors may exist due to use of some old sealing certificates.

[b] No harvest.

LOCATION

GAME MANAGEMENT UNIT: 21 (43,925 mi^2)

GEOGRAPHIC DESCRIPTION: Yukon River drainage above Paimuit to Tozitna River including Koyukuk River to Dulbi Slough

BACKGROUND

Furbearers have traditionally been an important resource in Unit 21. They supply food, clothing, and trade items. With the arrival of Europeans, furbearers also became an item of commerce. Fur populations have always been sufficient to meet local demand but have been subject to cycles of abundance. The following species found in Unit 21 are listed in order of their economic importance: marten, beaver, lynx, red fox, wolverine, wolf, mink, river otter, and muskrat. Coyotes are rare. Weasels and red squirrels are common but not usually target species for trappers.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Protect, maintain, and enhance the furbearer populations and their habitats in concert with other components of the ecosystem.
- Provide for continued use of furbearers by local Alaskan residents who have customarily and traditionally used the population.
- Provide an opportunity to view and photograph furbearers.
- Provide for scientific and educational use of furbearers.

MANAGEMENT OBJECTIVES

No detailed management objectives have been established for the unit. The general objective is to maintain populations at high enough levels to provide for maximum consumptive and nonconsumptive uses.

METHODS

We monitored harvest through sealing records, fur export reports, fur acquisition reports, and personal interviews. We used a mail-out questionnaire in Units 21A and 21E and analyzed responses. Throughout the rest of Unit 21, we interviewed some trappers about furbearer abundance, and gathered incidental data during surveys of other species. We estimated small mammal abundance using snap and pitfall traps on annual census lines.

RESULTS AND DISCUSSION

Population Status and Trend

Population Size

Beavers and river otters were found throughout the unit in suitable habitat. Their populations were high and increasing. Muskrats were on a long-term decline. Numerous hypotheses were suggested for this decline, ranging from of loss of habitat resulting from pond succession to predation by pike. Lynx were last in the high phase of their 10-year cycle during the 1991–1992 season. Red foxes were numerous throughout the unit, but appeared stable.

Marten populations were moderate throughout most of the northern half of the unit. Local pockets of lower or higher marten numbers occurred but the population trend appeared stable. Most trappers reported that martens were absent at various times during the trapping season. These apparent absences were temporary and were caused either by local migrations or by restricted movement of the animals.

In Unit 21B the FWS trapped in post-fire forest stands (Johnson et al. 1995). They found highest densities of voles and shrews in a new burn (1985) followed by the mature forest and old burn (1966). Hare populations were increasing throughout the unit, based on observed increases in track density. Willow ptarmigan and grouse populations, which apparently last peaked in 1991, declined and then increased.

Distribution and Movements

All furbearer species were found throughout the unit. The US Fish and Wildlife Service (FWS) radiotagged martens in the Nowitna River drainage in Unit 21B from 1991 through 1994 (Johnson et al. 1995). Results of this study, indicated marten were most abundant in a 1985 burn and least abundant in a 1966 burn. The upland area of the unburned mature forest was preferred to drainage areas.

Mortality

Harvest

Trapping Seasons and Bag Limits.

Species	Season	Bag limit
Beaver	1 Nov–10 Jun	No limit
Coyote	1 Nov–31 Mar	No limit
Lynx	1 Nov–28 Feb	No limit
Marten	1 Nov–28 Feb	No limit
Mink & Weasel	1 Nov–28 Feb	No limit
Muskrat	1 Nov–28 Jun	No limit
Red Fox	1 Nov–28 Feb	No limit
River Otter	1 Nov–15 Apr	No limit
Wolverine	1 Nov–31 Mar	No limit

Hunting Seasons and Bag Limits.

Species	Season	Bag limit
Coyote	1 Sep–30 Apr	2
Red Fox	1 Sep–15 Mar	10
Lynx	1 Nov–28 Feb	2
Wolverine	1 Sep–31 Mar	1

Board of Game Actions and Emergency Orders. In 1997 the Board of Game standardized the season and bag limit for beaver in all for Unit 21 to 1 November through 10 June with no limit. During the past 10 years trapping seasons and bag limits remained the same for marten, coyote, lynx, fox, mink, muskrat, otter, and wolverine.

Trapper Harvest.

Beaver — During the report period, harvest of beavers from the unit was low (Table 1), compared with a harvest of over 1000 during the late 1980s. Harvest increased slightly toward the end of the period. The overall catch was only a fraction of the harvestable population, mostly attributable to low pelt prices.

The low kit harvest was mainly because of trapping techniques employed by local trappers (Table 2). They used snares with large diameter openings and placed their sets outside food caches, away from lodges. Trapper effort was greatest during spring (Table 3).

Lynx — Lynx populations reached the low point of their 10-year cycle during the mid-1980s. Populations peaked during the 1991–1992 season, then declined. Though lynx numbers were increasing toward the end of this reporting period, harvest remained low (Tables 1 and 2). We believe this low harvest was due to decreased trapper effort because of low pelt prices. If pelt prices increase, trapper effort and harvest are expected to increase.

Otter — Although otters were abundant in the unit, harvest remained relatively low and stable (Tables 1 and 2). Pelt prices for Interior otters were low, and trapping effort was minimal. A major portion of the harvest occurred when otters were incidentally taken in beaver sets.

Wolverine — Trapper harvests were stable (Tables 1 and 2). Numerous wolverine tracks were seen in Unit 21B during aerial wolf surveys in March 1996. These observations indicate harvests are not affecting population levels.

Other Species — Marten numbers were moderate in the northern part of the unit. Harvest during the mid1990s was greatly reduced due to low trapping effort and low prices. Increased pelt prices for the 1996–1997 season resulted in a more than 5-fold increase in harvest (Table 4). Fox populations were high; however, pelt prices were low and trappers had little incentive to pursue this species. Coyotes were scarce, but a few were caught each year. Wolves were abundant in the unit. Interspecific strife between wolves and coyotes may have kept coyote numbers low. Mink were a minor furbearer in the unit. Pelt price for wild-caught, Interior mink was low, therefore few trappers set for them.

Trapping Conditions — Weather varied over the past 4 years, with some extensive periods of heavier than normal snowfall that hampered access. Overall, trapping conditions were adequate for most trappers.

CONCLUSIONS AND RECOMMENDATIONS

With the exception of coyotes and muskrats, furbearer populations throughout the unit were stable or increasing and were at moderate to high levels. We were not aware of any areas with excessive harvest. I recommend continuing the present seasons and bag limits. Marten seasons should be reviewed annually. Data on population density can be gathered from trapper questionnaire results, discussions with local fish and game advisory committees, and incidental trapper interviews.

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Table 1 Unit 21 reported harvest of sealed furbearer species 1989–1996

Regulatory year	Species			
	Beaver	Lynx	Otter	Wolverine
1989–1990	279	13	17	15
1990–1991	365	12	32	23
1991–1992	319	69	26	29
1992–1993	218	26	10	8
1993–1994	270	40	17	39
1994–1995	417	22	36	27
1995–1996	218	4	22	11
1996–1997	564	35	49	31

Table 2 Unit 21 beaver, lynx, otter, and wolverine harvest 1989–1996

Regulatory	Reported harvest						Estimated harvest		Method of take					Successful
year	M	F	Unk	Juv[a]	Adults	Unk	Unreported	Illegal	Trap/snare	Shot	(L&S)	Unk	Total	Trappers/hunters
Beaver														
1989–1990	--	--	--	23	279	0	0	0	265	0	--	14	279	33
1990–1991	--	--	--	38	365	0	0	0	345	20	--	0	365	32
1991–1992	--	--	--	46	269	0	0	0	315	0	--	4	319	25
1992–1993	--	--	--	79	139	0	0	0	218	0	--	0	218	16
1993–1994	--	--	--	38	232	0	0	0	270	0	--	0	270	30
1994–1995	--	--	--	55	362	0	0	0	388	0	--	29	417	29
1995–1996	--	--	--	10	207	11	0	0	176	31	--	21	228	23
1996–1997	--	--	--	26	537	1	0	0	564	0	--	0	564	45
Lynx														
1989–1990	--	--	--	1	12	0	0	0	13	0	--	0	13	6
1990–1991	--	--	--	5	7	0	0	0	10	0	--	2	12	7
1991–1992	--	--	--	7	62	0	0	0	69	0	--	0	69	15
1992–1993	--	--	--	2	24	0	0	0	26	0	--	0	26	16
1993–1994	--	--	--	0	40	0	0	0	40	0	--	0	40	12
1994–1995	--	--	--	1	21	0	0	0	21	1	--	0	22	12
1995–1996	--	--	--	0	3	1	0	0	4	0	--	0	4	6
1996–1997	--	--	--	6	27	2	0	0	34	1	--	0	35	13
Otter														
1989–1990	4	4	9	--	--	--	0	0	15	1	--	1	17	8
1990–1991	15	13	4	--	--	--	0	0	28	4	--	0	32	11
1991–1992	9	12	5	--	--	--	0	0	26	0	--	0	26	13
1992–1993	2	1	7	--	--	--	0	0	18	0	--	2	10	7
1993–1994	6	2	9	--	--	--	0	0	15	2	--	0	17	6
1994–1995	15	11	10	--	--	--	0	0	36	0	--	0	36	11
1995–1996	5	4	10	--	--	--	0	0	19	0	--	0	19	15
1996–1997	24	13	12	--	--	--	0	0	44	0	--	5	49	24
Wolverine														
1989–1990	10	4	1	--	--	--	10	0	15	0	--	0	25	11
1990–1991	12	9	2	--	--	--	10	0	22	1	--	0	33	21
1991–1992	16	8	5	--	--	--	10	0	26	3	--	0	39	24
1992–1993	3	3	2	--	--	--	10	0	8	0	--	0	18	7
1993–1994	14	23	2	--	--	--	10	0	36	2	--	1	49	18
1994–1995	13	11	3	--	--	--	10	0	24	2	--	1	27	8

Table 2 Continued

Regulatory year	Reported harvest M	F	Unk	Juv[a]	Adults	Unk	Estimated harvest Unreported	Illegal	Method of take Trap/snare	Shot	(L&S)	Unk	Total	Successful Trappers/hunters
1995–1996	7	4	0	--	--	--	10	0	6	5	--	0	11	15
1996–1997	21	9	1	--	--	--	10	0	20	3	--	8	31	17

[a] Juveniles: Beavers <52" (length + width); lynx <34" in length.

Table 3 Unit 21 beaver, lynx, otter, and wolverine harvest chronology by time period, 1989–1996

Regulatory year	Harvest periods							
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Beaver								
1989–1990	13	45	20	48	126	27	--	--
1990–1991	17	22	68	68	210	5	--	--
1991–1992	44	15	17	102	110	27	--	--
1992–1993	5	42	11	45	102	2	--	--
1993–1994	14	27	57	89	74	9	0	0
1994–1995	8	86	54	156	113	0	0	0
1995–1996	10	4	1	36	79	44	34	0
1996–1997	0	39	45	121	346	13	0	0
Lynx								
1989–1990	0	3	4	6	--	--	--	
1990–1991	5	1	3	3	--	--	--	
1991–1992	2	17	17	32	--	--	--	--
1992–1993	5	7	10	3	--	--	--	--
1993–1994	0	12	14	14	--	--	--	--
1994–1995	1	1	15	5	--	--	--	--
1995–1996	0	3	1	0	--	--	--	--
1996–1997	0	15	0	17	3	--	--	--
Otter								
1989–1990	2	10	0	1	4	0	--	--
1990–1991	3	7	12	9	1	0	--	--
1991–1992	7	3	4	7	4	0	--	--
1992–1993	3	2	0	0	2	1	--	--
1993–1994	0	2	4	5	3	2	--	--
1994–1995	0	15	11	5	4	0	--	--
1995–1996	1	8	0	3	6	1	--	--
1996–1997	2	17	9	7	11	0	--	--
Wolverine								
1989–1990	0	8	4	1	2	--	--	--
1990–1991	3	6	6	3	4	--	--	--
1991–1992	5	5	14	6	3	--	--	--
1992–1993	1	0	1	3	3	--	--	--
1993–1994	6	7	11	1	1	--	--	--
1994–1995	0	2	5	15	15	--	--	--
1995–1996	2	3	1	5	5	--	--	--
1996–1997	4	9	1	7	10	--	--	--

Table 4 Unit 21 estimated harvest[a] of unsealed furbearer species 1989–1996

Regulatory year	Species				
	Coyote	Marten	Mink	Muskrat	Red Fox
1989–1990	0	2591	20	0	55
1990–1991	1	1608	27	0	15
1991–1992	0	1502	45	0	21
1992–1993	0	559	50	0	1
1993–1994	1	997	17	4	25
1994–1995	0	461	6	0	12
1995–1996	0	385	7	0	4
1996–1997	1	2072	100	33	37

[a] Estimates derived from Fur Acquisition Reports and Fur Export Permits.

LOCATION

GAME MANAGEMENT UNIT: 22 (25,230 mi^2)

GEOGRAPHIC DESCRIPTION: Seward Peninsula and the adjacent mainland drained by all streams flowing into Norton Sound.

BACKGROUND

Furbearers found in Unit 22 include beaver, red fox, arctic fox, lynx, marten, mink, muskrat, river (land) otter, wolverine and wolves. Wolves are discussed in a separate Survey and Inventory report.

Furbearers are most abundant in the eastern portion of Unit 22, which is characterized by extensive spruce forests and riparian willow habitat. Densities of furbearers have fluctuated widely over the years, generally in response to natural factors. Hunting and trapping activity has at times reduced furbearer densities in close proximity to Unit 22 villages.

Harvest activity is usually directly related to densities of furbearers and fur prices. When fur prices and population densities are high the number of hunters and trappers increases. Most of the furbearer harvest in Unit 22 is by subsistence and recreational users or is done opportunistically by local residents while engaged in other activities. Very few individuals in Unit 22 trap as their sole winter occupation.

MANAGEMENT DIRECTION

The following management goals and objectives have been established for furbearers in Unit 22:

- Maintain viable numbers of furbearers, recognizing that populations will fluctuate in response to environmental factors.
- Assess harvest, interview hunter/trappers, and seal all furs presented for sealing.
- Maintain license vendors and sealing agents in all Unit 22 villages.
- Improve compliance with current sealing requirements through public communication and education.
- Minimize conflicts between furbearers and the public.
- Develop updated population management objectives in consultation with the public and other agencies.

METHODS

Information regarding distribution and abundance of furbearers is obtained from observations reported by the staff and the public. Harvest information for beaver, lynx, river otter and wolverines is collected annually from fur sealing certificates.

RESULTS AND DISCUSSION

Population Status and Trend

Information was collected regarding the status of Unit 22 furbearer populations from observations made while conducting surveys of other species, and from information provided by interested local residents.

Beaver

Beaver continued to expand their range westward and now are present in all Unit 22 subunits. Densities are moderate to high in some drainages of Unit 22A and 22B and are increasing dramatically in Units 22C and 22D. Beaver moved into the Serpentine River drainage in Unit 22E during the last several years. Harvest pressure throughout the Unit has been minimal in recent years.

As beaver become more abundant there are an increasing number of complaints about beavers from unit residents, particularly in the Nome area. For example: beaver have blocked culverts along the road system, forcing Department of Transportation to destroy a number of dams and kill nuisance beavers; recreational boaters complain about the blockage of waterways; there are increased reports of giardia among local residents; and, there is concern that beaver dams are preventing salmon from returning to their spawning grounds.

Lynx

Lynx are found primarily in forested areas of Unit 22A and 22B. Since the mid 1980s lynx densities have remained low unit-wide, and presumably will remain low until prey densities increase. Hares, their primary food source, are currently few but may have increased slightly during the reporting period.

River Otters

Otters are found throughout most of the major drainages of the unit, although they appear to be more common in Unit 22A, 22B and 22C. Their numbers appear to be moderate and stable.

Wolverine

Wolverines are present in all subunits and numbers are reported to be stable to increasing throughout the unit. During the 1996–1997 season reports from hunter/trappers in western 22B and eastern 22C indicate that wolverine numbers there are increasing. The availability of suitable habitat and food resources are thought to be the primary factors determining population density in Unit 22. In Unit 22C hunting pressure is often an important factor regulating population density, but reported harvest during this reporting period was low.

Fox

Red fox numbers increased during the reporting period and during the 1996–1997 season were quite high. In June 1997, a rabies outbreak occurred among red and arctic foxes in Units 22B and 22C. Public service announcements were made warning people to avoid suspicious animals and to vaccinate their pets against rabies.

Mink/Marten

Most of the suitable martin and mink habitat occurs in Units 22A and 22B. Little is known about the status of mink and marten populations in Unit 22.

MORTALITY

Harvest

Hunting Seasons and Bag Limits. The seasons and bag limits for furbearers in Unit 22 were the same for the entire reporting period and there were no differences between resident and nonresident seasons.

Species	Season	Bag Limit
Fox, Arctic	1 Sep–30 Apr	2 foxes
Fox, Red	1 Sep–15 Mar	10 foxes, only 2 before 1 Oct
Lynx	1 Nov–15 Apr	2 lynx
Wolverine	1 Sep–31 Mar	1 wolverine

Trapping Seasons and Bag Limits.

Species	Season	Bag Limit
Beaver Unit 22A and 22B	1 Nov–10 Jun	50 per season
Beaver Remainder of Unit 22	1 Nov–15 Apr	50 per season
Fox, Arctic	1 Nov–15 Apr	No limit
Fox, Red	1 Nov–15 Apr	No limit
Lynx	1 Nov–15 Apr	No limit
Marten	1 Nov–15 Apr	No limit
Mink	1 Nov–31 Jan	No limit
Muskrat	1 Nov–10 Jun	No limit
Otter	1 Nov–15 Apr	No limit
Wolverine	1 Nov–15 Apr	No limit

Hunter/Trapper Harvest. Fur prices and trapping effort remained low throughout the reporting period. Accurate harvest data are lacking for all furbearer species found in Unit 22, even for those species that are sealed. Many furs from the unit are home tanned and used locally for clothing so there is little incentive to have them sealed. The fur sealing data provides only minimum estimates of harvest.

Beaver — During the 1994–1996 reporting period the Unit 22 beaver harvest ranged from a high of 70 beaver harvested by 9 hunter/trappers in 1996–1997 to a low of 14 beaver harvested by 4 individuals in 1995–1996 (Table 1). In 1994–1995, 20 beaver were harvested by 9 hunter/trappers. Although the beaver population and range have increased dramatically in Units 22C and 22D, the majority of the harvest still occurs in Units 22A and 22B. There have never been harvest reports from Unit 22E. The majority of the beaver harvest is taken with traps or snares during winter months, however in 1996–1997, 23 of 25 beaver harvested in Unit 22B were trapped or shot in the Fish and Niukluk Rivers from a boat after breakup. In 1996, Department of Transportation road crews killed 5 beaver that blocked culverts along Nome's road system.

Lynx — The reported lynx harvest remained low in Unit 22 during the reporting period; 2 hunter/trappers sealed 4 lynx in 1994–1995, 1 was sealed in 1995–1996 and 2 hunter/trappers sealed 5 lynx in 1996–1997 (Table 1). All of the lynx were taken in Units 22A and 22B.

River Otter — The average yearly reported otter harvest in Unit 22 during the reporting period was 6 otter. Harvest varied from a high of 11 in 1994–1995, which was the highest reported harvest in the last 10 years, to a low of 1 otter taken in 1995–1996 (Table 2.) The 1996–1997 harvest was 6. The average reported harvest over the last 10 years was 4 otter in Unit 22. Otter were harvested in all subunits, with the most reports from Units 22A and 22C.

Wolverine — The annual reported wolverine harvest during the reporting period ranged from 9 in 1995–1996 to 24 the following year (Table 2). The reported sex composition was 54% males, 35% females and 11% unknown. Wolverines were reported taken from all subunits with a distribution as follows: Unit 22A, 17%; Unit 22B, 53%; Unit 22C, 11%; Unit 22D, 6%; Unit 22E, 9%, and Unit unknown, 2%. Ground shooting accounted for 70% of the wolverine taken, trapping or snaring accounted for 28%, and 2% is unknown.

Hunter Residency and Success. Hunter/trappers who harvested furbearers within Unit 22 were primarily local residents although the number of non-unit residents harvesting furbearers did increase since the 1989–1994 reporting period. During the 1994–1996 reporting period 5 wolverines and 2 lynx were taken by non-unit residents. Success is difficult to accurately measure because most individuals take furbearers on an opportunistic basis. Frequently, they are out doing other things and not specifically hunting or trapping furbearers.

Transport Methods. Snowmachines were the primary means of transportation for hunter/trappers taking furbearers within Unit 22. Sealing certificate data from the 1994–1996 reporting period indicate that 75% of all furbearers sealed were taken using snow machines for transportation, 12% were harvested from a boat, 6% by highway vehicle and 7% unknown. Beaver harvest accounted for 91% of the harvest by boat and 90% of the harvest by highway vehicle. Snowfall was light throughout much of the Unit during the winters of 1995–1996 and 1996–1997 and snow machine traveling conditions were not favorable for large parts of the trapping season. This may have reduced trapping effort in some areas, particularly early in the season.

CONCLUSIONS AND RECOMMENDATIONS

We lack quantitative data on furbearer population status in Unit 22. However, our observations and reports from unit residents indicate that furbearer populations are stable or increasing. Much of the harvest goes unreported and the actual size of the harvest and its impact on furbearer populations is unknown. Although at times our current regulations may affect species in close proximity to villages, it is unlikely that these impacts are significant unit-wide.

The expanding number and range of beaver has raised public concerns about giardia and about stream blockages affecting boating and fish migration. Now that beaver are well established in all Unit 22 subunits it is time to consider a regulatory change making the season uniform in all subunits by extending the closure of beaver season from April 15 to June 10 in Units 22C, 22D and 22E.

The accuracy of furbearer harvest data needs to be improved. Although fursealing agents are available in all Unit 22 villages, a significant portion of the harvest is never sealed. Many furs are kept, bartered or sold locally for clothing or handicrafts. Increased contact between local hunter/trappers and biologists is desirable to encourage harvest reporting and to gain information about harvest and furbearer abundance. It might be helpful to reinstate trapper surveys, which were discontinued in 1989.

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Table 1 Unit 22 beaver and lynx harvest reported on sealing certificates, 1986–1996

Beaver	Harvest	22A harvest	22B harvest	22C harvest	22D harvest	22E harvest	Unit unk.	Male	Female	Sex unk.	Shot	Trap/ snare	Method unk.	Hunter/ trappers
1986–1987	9	9	0	0	0	0	0	0%	0%	100%	0%	100%	0%	2
1987–1988	58	54	4	0	0	0	0	19%	17%	64%	0%	97%	3%	14
1988–1989	20	5	11	2	2	0	0	0%	0%	20%	40%	60%	0%	6
1989–1990	31	23	8	0	0	0	0	16%	10%	74%	3%	71%	26%	8
1990–1991	9	2	7	0	0	0	0	33%	11%	56%	0%	100%	0%	3
1991–1992	45	18	23	3	1	0	0	2%	4%	94%	47%	53%	0%	8
1992–1993	16	10	5	1	0	0	0	0%	0%	16%	63%	37%	0%	7
1993–1994	41	11	4	25	1	0	0	2%	2%	96%	3%	90%	7%	9
1994–1995	20	3	10	5	2	0	0	20%	30%	50%	50%	25%	25%	5
1995–1996	14	11	0	1	2	0	0	14%	0%	86%	7%	93%	0%	4
1996–1997	70	34	25	5	1	0	5	18%	19%	63%	12%	51%	37%	9
Lynx														
1986–1987	18	9	8	0	1	0	0	56%	38%	6%	0%	100%	0%	9
1987–1988	3	0	3	0	0	0	0	67%	33%	0%	0%	100%	0%	2
1988–1989	4	1	2	0	1	0	0	50%	25%	25%	50%	50%	0%	4
1989–1990	3	0	2	1	0	0	0	33%	33%	33%	67%	33%	0%	3
1990–1991	2	2	0	0	0	0	0	0%	0%	100%	0%	100%	0%	1
1991–1992	5	4	0	0	0	1	0	40%	60%	0%	40%	0%	60%	4
1992–1993	10	4	2	4	0	0	0	0%	10%	90%	10%	80%	10%	4
1993–1994	2	2	0	0	0	0	0	0%	0%	100%	50%	50%	0%	1
1994–1995	4	3	1	0	0	0	0	0%	25%	75%	25%	75%	0%	2
1995–1996	1	0	1	0	0	0	0	0%	100%	0%	100%	0%	0%	1
1996–1997	5	5	0	0	0	0	0	0%	100%	0%	40%	60%	0%	2

Table 2 Unit 22 river otter and wolverine harvest reported on sealing certificates, 1986–1996

Species/year	Unit 22 harvest	22A harvest	22B harvest	22C harvest	22D harvest	22E harvest	Unit unk.	Male	Female	Sex unk.	Shot	Trap/ snare	Method unk.	Hunter/ trappers
River otter														
1986–1987	5	4	1	0	0	0	0	40%	60%	0%	0%	100%	0%	4
1987–1988	1	0	1	0	0	0	0	100%	0%	0%	0%	100%	0%	1
1988–1989	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0
1989–1990	1	1	0	0	0	0	0	0%	100%	0%	100%	0%	0%	1
1990–1991	2	1	0	1	0	0	0	50%	0%	50%	0%	100%	0%	2
1991–1992	2	0	2	0	0	0	0	0%	50%	50%	0%	100%	0%	2
1992–1993	6	1	0	4	1	0	0	17%	50%	33%	50%	50%	0%	5
1993–1994	9	0	4	4	0	1	0	33%	22%	45%	22%	78%	0%	6
1994–1995	11	8	0	2	1	0	0	27%	64%	9%	9%	82%	9%	4
1995–1996	1	0	0	0	0	1	0	0%	0%	100%	100%	0%	0%	1
1996–1997	6	0	1	3	2	0	0	33%	17%	50%	83%	17%	0%	4
Wolverine														
1986–1987	27	19	6	1	0	1	0	59%	37%	4%	30%	70%	0%	13
1987–1988	30	11	15	4	0	0	0	47%	50%	3%	33%	67%	0%	14
1988–1989	16	3	6	4	3	0	0	56%	38%	6%	63%	37%	0%	13
1989–1990	23	9	4	2	8	0	0	44%	30%	26%	30%	70%	0%	14
1990–1991	33	6	14	9	4	0	0	52%	21%	27%	64%	36%	0%	23
1991–1992	31	10	9	8	4	0	0	65%	29%	6%	58%	42%	0%	17
1992–1993	26	3	14	6	2	1	0	65%	31%	4%	62%	35%	4%	17
1993–1994	24	4	9	3	4	4	0	63%	17%	20%	71%	29%	0%	20
1994–1995	13	7	5	1	0	0	0	77%	23%	0%	77%	23%	0%	13
1995–1996	9	0	8	0	1	0	0	67%	33%	0%	78%	22%	0%	7
1996–1997	24	1	12	4	2	4	1	42%	50%	8%	63%	33%	4%	22

LOCATION

GAME MANAGEMENT UNIT: 23

GEOGRAPHIC DESCRIPTION: Kotzebue Sound and Western Brooks Range

BACKGROUND

Furbearers inhabiting Unit 23 include beaver, lynx, marten, mink, muskrat, river (land) otter, red fox, white (Arctic) fox, wolverine, and wolf. We report the status of wolves in a separate Survey and Inventory report, all other species are reported in this report. The Inupiat traditionally harvested furbearers for subsistence in Unit 23, trading inland furs for coastal products (Anderson 1977). Unlike interior regions, trappers had no set individual territories within community hunting areas. This reflected the need for trappers to be mobile like the resource they sought. Communities with the longest and most consistent history of trapping are found along the upper Kobuk River where an interior environment exists. Participation in the harvest of furbearers was highest in the 1940s and 1950s. The demand and price of furs were high. The sale of furs was one of the few sources of cash available to the region's residents during this time. Today, furbearer harvest in Unit 23 is by subsistence and recreational users, and a few professional trappers. Furbearer harvest provides materials for locally manufactured fur garments and generates limited income. Most pelts remain in the region. Harvest of many furbearers occurs on an opportunistic basis by local residents while engaged in other activities.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Management goals for furbearers are to maintain populations levels capable of sustaining the harvests experienced in the period 1986–1997, recognizing that populations fluctuate in response to environmental factors, trapper effort, and fur market conditions.

MANAGEMENT OBJECTIVES

Management objectives for furbearers are to:

- Seal furs and maintain accurate harvest records to evaluate harvest patterns.
- Acknowledge and provide for traditional uses of furbearers.
- Monitor the distribution and abundance of lynx and hare. When interest in lynx trapping increases over 1970 though 1980 levels, staff should begin a cooperative population monitoring and harvest-tracking program. Trappers, other agencies and local advisory committees should be encouraged to participate in the process.

METHODS

We gathered information regarding the population status of beaver, lynx, marten, river otters, and wolverines from fur sealing certificates, conversations with residents of the unit, and opportunistic observations of furbearers and their tracks during other wildlife surveys.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Beaver — Beaver numbers remain high in southern portions of Unit 23. Residents of Selawik continue to report high beaver numbers and widespread distribution. In many areas we find beaver in marginal habitat, indicating they have saturated prime habitat. Beavers have not significantly expanded their range during this reporting period. We continue to find a few beavers as far north as the lower Noatak drainage. Their numbers in these northern areas have not increased, suggesting they may have reached the limit of their range.

Fox — The red fox population appeared to be high during this reporting period. Both rabies and possibly distemper may be causing a decline. Sightings of Arctic foxes by residents remain uncommon. Arctic foxes are occasionally seen along the coast in the northern portion of Unit 23.

Lynx — Snowshoe hare (*Lepus americanus*) are returning to areas previously inhabited and slowly increasing in the Buckland, Selawik, and upper Noatak drainages. There have been sightings of lynx in these areas, but their numbers are low. We have not documented the presence of any breeding pairs. The last lynx-hare population peak occurred in 1982. A rapid population decline of both followed (Table 1). Local residents and past biologists in the region noted that hare density was extremely high and had unusually severe impact on vegetation. The typical cycle period for northern lynx populations is 9 to 11 years.

Mink and Marten — Localized fluctuations are typical of mink and marten populations making it difficult to generalize about trends for Unit 23. Forest habitat in Unit 23 is structurally simple, dominated by white and black spruce. In many ways it is similar to late succession forests that are not very productive for these furbearers. Small mammal numbers and snow cover are important influences on mink and marten numbers. The most abundant small mammals in forested areas are red back voles (*Clethrionomys rutilus*) and tundra voles (*Microtus oeconomus*). Although snow characteristics are suitable for mink and marten in forested areas, snow conditions in the majority of Unit 23 consist of wind scoured tundra or hard packed snow. We have been receiving reports of marten sightings in the lower Noatak drainage for several years. These observations have been of solitary animals and not of any breeding pairs. Trappers in the Kobuk reported locally abundant populations of marten during this reporting period. Little information is available on mink populations.

Wolverine — Opportunistic sightings by staff and residents suggest wolverine populations in Unit 23 are high and increasing. We have no quantitative data to support or refute these observations. Residents in the upper Kobuk drainage reported high numbers consistently through this reporting period. The reported harvest of wolverine was highest in the lower Kobuk River.

The pattern of harvest in the lower Kobuk and Noatak drainages suggests wolverines are immigrating into these areas.

MORTALITY

Harvest

<u>Hunting Season and Bag Limits</u>.

Species	Season	Bag Limit
Fox, Arctic	1 Sep–30 Apr	2 foxes
Fox, Red	1 Sep–31 Mar	10 foxes, only 2 before 1 Oct
Lynx	1 Dec–15 Jan	2 lynx
Wolverine	1 Sep–31 Mar	1 wolverine

<u>Trapping Seasons and Bag Limits</u>.

Species	Season	Bag Limit
Beaver	1 Nov–10 Jun	30 per season*
Fox, Arctic	1 Nov–15 Apr	No limit
Fox, Red	1 Nov–15 Apr	No limit
Lynx	1 Dec–15 Jan	3 lynx
Marten	1 Nov–15 Apr	No limit
Mink	1 Nov–31 Jan	No limit
Muskrat	1 Nov–10 Jun	No limit
River Otter	1 Nov–15 Apr	No limit
Wolverine	1 Nov–15 Apr	No limit

*50 beaver per person may be taken from the Kobuk and Selawik River drainages

<u>Board of Game Actions and Emergency Orders</u>. Beginning in 1994–1995, the Board of Game adopted regulations requiring trappers using planes to be 300 feet from their aircraft before shooting animals. Prior to this, trapping regulations required a distance of 100 feet. In the 1995–1996 regulatory year, the 300 feet distance was applied to hunting regulations. The Board adopted this regulation as a modification of a proposal seeking to eliminate same day hunting for lynx, red fox, and arctic fox.

<u>Hunter/Trapper Harvest</u>.

Beaver — Two trappers sealed 28 beavers in 1994–1995. All were taken from the upper Kobuk River drainage, 19 by trapping and 9 by shooting. Harvest occurred in both winter and spring. One trapper was a local resident the other was a resident of Unit 22, temporarily residing in Unit 23.

In 1995–1996, 5 local hunters and trappers sealed 48 beavers. Residents trapped 23, shot 22, snared 2, and took 1 by an unknown method. Similar to 1994–1995, one trapper used an airplane during the winter while the other hunters and trappers used either snow machines or boats during the spring.

In 1996–1997, 2 trappers sealed 40 beavers. One trapper using a boat in the spring harvested the 37 of these in the upper Kobuk River drainage. A hunter using a snow machine to access tributaries draining into Kobuk Lake harvested the remaining 3. Of the 40 beavers sealed, 24 were taken with traps and 16 were taken by shooting.

Lynx — Sealing records show hunters and trappers used snow machines for transport to take lynx in the Buckland River drainage. As in previous years, 1 or 2 lynx have also been harvested from the upper Kobuk. A Unit 23 resident sealed 1 lynx in 1994–1995 (Table 1). In 1995–1996, hunters, all residents of the unit, reported harvesting 3 lynx. Hunters shot 2 and trapped 1 of these 3 lynx. No lynx were reported harvested in 1996–1997.

River Otter — In 1994–1995, 3 local residents trapped 6 river otters (Table 2). Hunters and trappers did not report harvesting any otters in 1995–1996. Trappers sealed 7 otters in 1996 – 1997. Residents trapped 5, snared 1 and shot 1 of the 7 otters reported. During this reporting period, trappers harvested otters from the Kobuk and Selawik River drainages, as well as tributaries draining into Kobuk Lake.

Wolverine — In the 1994–1995 regulatory year 6 Unit residents sealed 15 wolverines (10 males, 4 females, 1 unknown sex): 7 by trapping and 8 by shooting (Table 3). Over 50% of the reported harvest occurred in the Kobuk Valley with animals also reported from the Selawik and Kukpuk River drainages.

During 1995–1996, 12 hunters (and trappers) sealed 29 wolverines (19 males, 8 females, and 2 unknown sex). Unit residents also harvested 12 additional wolverines from the Kobuk River and northern Seward Peninsula and sold the carcasses to federal staff who are conducting a wolverine study. Alaska Department of Fish and Game did not seal these carcasses.

In 1996–1997, 14 hunters (and trappers) sealed 40 wolverines (19 males, 11 females, and 10 unknown). Over half the wolverines harvested came from the lower Kobuk and Eli River drainages. They trapped 21 wolverine and shot 19.

Transport Methods. Snow machines are the primary form of transport by hunters and trappers to harvest furbearers in Unit 23 (Table 4). Residents typically shoot furbearers. Much of the region is tundra with good visibility and travel conditions, making shooting a common method of harvest for unit residents.

Other Mortality

Rabies is significant source of mortality for foxes and wolves (Ballard 1993). Each year residents in the region report seeing or dispatching red foxes that demonstrate classic symptoms of rabies. During this reporting period, we tested 6 Arctic and 10 red foxes for the rabies virus. Two Arctic foxes and 9 red foxes tested positive for the virus. A rabies epizootic, similar to that documented in wolves in 1989–1990, most likely occurred during this reporting period.

An outbreak of canine distemper occurred in the winter of 1996–1997 killing approximately 200–300 dogs in the region. Symptoms were first reported in sled dogs kept outside Kotzebue. An aggressive vaccination program began and contained the outbreak to the Kotzebue vicinity. The village of Noatak did not receive vaccine and experienced no distemper outbreak during the winter months when mortality was highest in Kotzebue, but did have several cases 5 months later (June). Canine distemper is a highly contagious virus (Zarnke 1981). Natural transmission occurs primarily through direct contact of body fluid. Known hosts include; dogs, foxes, wolves, weasels, mink, marten, otter, and bear. Stephenson (1982) documented the presence of distemper in wolves in arctic regions. The suspected mortality rate for wolves exposed to the disease is over 50%. Distemper can be transmitted between foxes and domestic dogs (Don Ritter, Alaska State Public Health Lab, pers. commun.). We do not know if the disease originated in foxes or domestic dogs.

HABITAT

Assessment

We did no habitat assessment or enhancement projects.

CONCLUSIONS AND RECOMMENDATIONS

Pursue regulatory changes that will simplify regulations where possible.

- Several furbearer species receive such low harvest pressure that the need for bag limits is unnecessary. In Unit 23 residents take many furbearers under hunting licenses and by shooting rather than trapping them. We should standardize hunting and trapping regulations to simplify regulations overall. Given the varied uses of furbearers from hides to food it may be best to rely on people's judgment rather than trying to establish seasons to accommodate all uses.

- Evaluate the need for a lynx management program in Unit 23.

- The last peak in lynx occurred over 14 years ago. There is little institutional knowledge surrounding lynx harvest other than sealing records. Several changes have occurred in communities since that time. The transition to a cash economy has progressed. Along with jobs and improved snow machines have come ties to town that make operating remote trapping camps difficult. As lynx numbers increase, the level of interest in lynx trapping is difficult to predict. It will be very important for staff to monitor trapper interest and effort and respond in the appropriate manner. Increasing lynx numbers will be an opportunity for staff to interact with local trappers and support public education efforts focused on trapping and fur handling.

- Improve communication with local health organization (Maniilaq Association, Kotzebue) as it becomes more active in vaccinating dogs and receiving wildlife specimens for rabies testing. We need to improve our communication and coordination with them. A better understanding of our respective roles would further agency effectiveness. Given the potential impact of disease on furbearer populations, especially wolves and foxes, we should consider testing for other disease agents in addition to rabies.

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Table 1 Sex composition and method of take for lynx sealed in Unit 23, 1977–1997

Year	Total harvest	Males (%)	Method of take			
			Shot	Trapped	Snared	Unknown
1977–1978	230	55	0	223	5	2
1978–1979	385	53	2	341	3	39
1979–1980	407	54	14	378	3	12
1980–1981	306	60	3	254	1	41
1981–1982	483	54	7	444	0	32
1982–1983	277	–	6	265	1	5
1983–1984	98	–	3	93	0	2
1984–1985	26	61	3	23	0	0
1985–1986	45	51	7	37	0	0
1986–1987	16	62	2	13	1	0
1987–1988	0	0	0	0	0	0
1988–1989	0	0	0	0	0	0
1989–1990	0	0	0	0	0	0
1990–1991	0	0	0	0	0	0
1991–1992	1	–	0	1	0	0
1992–1993	0	0	0	0	0	0
1993–1994	5	20	0	5	0	0
1994–1995	1	0	–	1	0	0
1995–1996	3	0	2	1	0	0
1996–1997	4	–	–	0	0	0

Table 2 Sex composition and method of take for river otters sealed in Unit 23, 1977–1997

Year	Total harvest	Males (%)	Method of take: Shot	Trapped	Snared	Unknown
1977–1978	12	–	1	11	0	0
1978–1979	15	–	2	13	0	0
1979–1980	19	–	10	9	0	0
1980–1981	29	–	0	27	2	0
1981–1982	9	–	0	9	0	0
1982–1983	7	–	1	5	0	1
1983–1984	8	–	1	7	0	0
1984–1985	5	–	0	5	0	0
1985–1986	5	–	1	4	0	0
1986–1987	12	–	0	12	0	0
1987–1988	24	–	1	12	0	0
1988–1989	7	–	0	7	0	0
1989–1990	16	50	1	4	0	11
1990–1991	11	–	1	6	0	4
1991–1992	3	100	1	2	0	0
1992–1993	2	100	2	0	0	0
1993–1994	1	–	0	0	0	1
1994–1995	6	40	0	6	0	0
1995–1996	0	–	0	0	0	0
1996–1997	7	33	1	5	1	0

Table 3 Sex composition and method of take for wolverine sealed in Unit 23, 1977–1997

Year	Total harvest	Males (%)	Method of take			
			Shot	Trapped	Snared	Unknown
1977–1978	75	67	26	49	0	0
1978–1979	45	73	9	34	0	0
1979–1980	26	63	12	14	0	0
1980–1981	18	76	11	7	0	0
1981–1982	48	75	13	35	0	0
1982–1983	37	67	16	20	1	0
1983–1984	46	59	17	27	1	1
1984–1985	37	61	19	15	2	2
1985–1986	35	77	7	27	1	0
1986–1987	64	56	28	28	1	7
1987–1988	40	72	11	28	1	0
1988–1989	39	56	8	31	0	0
1989–1990	18	82	3	13	1	1
1990–1991	27	65	14	11	0	2
1991–1992	37	68	14	23	0	0
1992–1993	36	69	16	20	0	0
1993–1994	19	58	14	4	0	0
1994–1995	15	71	7	8	0	1
1995–1996	29	70	12	13	1	3
1996–1997	40	63	19	21	0	0

Table 4 Type of transportation used to harvest furbearers in Unit 23, 1994–1997

		Method of transportation				
Species/year	Harvest	Snowmachine	Boat	Airplane	Other	Unknown
Beaver						
1994–1995	28	0	11	17	0	0
1995–1996	48	2	21	24	0	1
1996–1997	40	3	37	0	0	0
Lynx						
1994–1995	1	1	0	0	0	0
1995–1996	3	3	0	0	0	0
1996–1997	0	0	0	0	0	0
Otter						
1994–1995	6	6	0	0	0	0
1995–1996	0	0	0	0	0	0
1996–1997	7	7	0	0	0	0
Wolverine						
1994–1995	15	15	0	0	0	0
1995–1996	29	28	0	1	0	0
1996–1997	40	37	0	1	2	0

LOCATION

GAME MANAGEMENT UNIT: 24 (26,055 mi^2)

GEOGRAPHIC DESCRIPTION: Koyukuk River drainage above the Dulbi River

BACKGROUND

Furbearers have been an important resource in Unit 24, supplying food, clothing, and trade items. With the arrival of Euro-Americans, furbearers also became a commercial item. Although furbearer populations have been abundant enough to meet local demands, they have been subject to fluctuations in abundance. The order of their economic importance is marten, beavers, lynx, wolves, wolverines, red foxes, mink, river otters, and muskrats. Coyotes are rare; weasels and squirrels are common but not often sold.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Protect, maintain, and enhance furbearer populations and their habitats in concert with other components of the ecosystem.
- Provide for continued use of furbearers by local Alaskan residents who have customarily and traditionally used the populations.
- Provide an opportunity to view and photograph furbearers.
- Provide for scientific and educational use of furbearers.

MANAGEMENT OBJECTIVES

No detailed furbearer management objectives have been established for the unit. The general objective is to maintain populations at levels sufficient to provide people with sustained consumptive and nonconsumptive uses.

METHODS

We monitored harvests through sealing records, fur export reports, fur acquisition reports, and personal interviews. Trappers were interviewed about furbearer abundance. Incidental data were gathered during surveys of other species. Small mammals were monitored by Koyokuk National Wildlife Refuge staff, who set out snap traps on grids.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Marten and red fox populations were moderately high throughout the unit and increasing in some areas. Wolverine abundance was moderate and stable. Beavers and river otters were increasing in the southern portion of the unit and were high and increasing in the northern portions. Muskrats were on a long-term decline. One factor in this decline may be habitat loss. Large areas of habitat dried up because of natural succession. Lynx were probably increasing in many parts of the unit. The last peak of the lynx cycle was in 1991–1992.

Small mammal prey populations in the southwestern part of the unit are abundant, based on the snap-trap collections by Koyukuk National Wildlife Refuge staff. Hare populations built up to a peak in 1991–1992 and then declined, except in a few isolated willow communities along major rivers. Hare populations were increasing to moderate in some parts of the unit. The grouse and ptarmigan densities were moderate.

Distribution and Movements

Most species were found in the unit. Some reach the northern limits of their ranges in the southern Brooks Range. No radiotagging studies of furbearers were conducted in Unit 24. Trappers in the Wiseman area reported that lynx moved in from the eastern portions of Unit 25 after population peaks in that unit.

MORTALITY

Harvest

<u>Trapping Seasons and Bag Limits</u>.

Species	Season	Bag limit
Beaver	1 Nov–10 Jun	No limit
Coyote	1 Nov–31 Mar	No limit
Red Fox	1 Nov–28 Feb	No limit
Marten	1 Nov–28 Feb	No limit
Mink & Weasel	1 Nov–28 Feb	No limit
Muskrat	1 Nov–10 Jun	No limit
Lynx	1 Nov–28 Feb	No limit
River Otter	1 Nov–15 Apr	No limit
Wolverine	1 Nov–31 Mar	No limit

<u>Hunting Seasons and Bag Limits</u>

Species	Season	Bag limit
Coyote	1 Sep–30 Apr	2
Red Fox	1 Sep–15 Mar	10
Lynx	1 Nov–28 Feb	2
Wolverine	1 Sep–31 Mar	1

Board of Game Actions and Emergency Orders. In 1992, the Board of Game changed the bag limit for beaver from 50 per year to no limit. In 1996, the beaver season was extended to 10 June. During the past 10 years, trapping seasons and bag limits remained the same for marten, coyote, lynx, fox, mink, muskrat, otter, and wolverine.

Trapper Harvest. Beaver harvest declined to low levels in the early 1990s, but increased to 654 in 1996 (Table 1). Prices have always determined the harvest more than bag limits. Low harvest of kits (Table 2) was mainly because of techniques employed by local trappers. They used snares with large-diameter openings and placed their sets outside food caches away from lodges. Most beaver harvest occurred in the spring (Table 3).

Harvest data indicated that lynx reached the high point in their 10-year cycle during 1991, yet lynx harvests did not dramatically decline until 1994 (Table 1). Percent kittens in the harvest (Table 2) was moderate to high from 1989 through 1991 (12–24%), and declined to low levels since then. Failure of the lynx harvest to drop sharply following the decline in the percent kittens was possibly a function of increased lynx movements caused by the decline in hare numbers (Poole 1994). Increased movement can increase vulnerability to trapping, and in eastern Unit 24, may have resulted in significant immigration of lynx from Unit 25. Despite the relatively stable harvest rates, resident lynx densities were probably declining because of low kitten production and/or survival. However, comments by trappers and incidental observations indicated the lynx population was increasing in some areas. Low harvests over the entire unit could also be attributed to low pelt price and trapper effort.

Trapping pressure for lynx was relatively light. During 1989–1996, 13–43 trappers/year reported they were successful. No trends were evident in harvest chronology (Table 3).

A tracking harvest strategy that dictates reduced seasons during the low phase of the lynx cycle was adopted for intensively trapped areas of Interior Alaska. However, that strategy was not necessary in Unit 24, where low harvests and low trapper density do not have the potential to significantly affect lynx population cycles.

Otters were abundant. However, the harvest throughout the 1990s was very low, compared to abundance (Table 1). Trapping effort was minimal (Table 2). Otters were usually taken in late season beaver sets (Table 3).

Wolverine harvest varied during the period (Table 1). Actual harvest may be higher by 10 per year because furs used for subsistence purposes were seldom sealed (Table 2). No harvest chronology pattern was readily discernible (Table 3). Swanson (1994) found a 2 male:1 female sex ratio in 44 wolverine carcasses she examined from 1988 through 1993. The unit population was probably moderate based on the frequency of track observations.

Fox populations were high, but low prices elicited little trapper interest (Table 4). Martens were in moderate numbers in the southern and central parts of the unit. The 1996–1997 marten harvest increased tremendously compared to the previous 4 years. This increase was probably due as much to population increase as trapper effort, because marten prices remained low.

The weather was mild for most of the trapping seasons. Winter 1996–1997 saw moderate to low snow accumulation, enabling trappers to travel freely.

CONCLUSIONS AND RECOMMENDATIONS

Furbearer populations were in good condition throughout the unit. The distribution of trappers indicated trapping pressure was light and was compatible with furbearer population levels. The harvest of furbearers was well below sustainable harvest levels and the situation is not likely to change significantly given the density of trappers, their conscientious efforts, and their access to suitable areas. I recommend continuing the present seasons and bag limits.

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Table 1 Unit 24 estimated harvest of sealed furbearer species, regulatory years 1989–1996

	Species			
Regulatory year	Beaver	Lynx	Otter	Wolverine
1989–1990	281	128	7	22
1990–1991	380	126	5	14
1991–1992	120	158	1	30
1992–1993	78	111	6	8
1993–1994	320	123	19	29
1994–1995	140	35	11	29
1995–1996	234	30	18	26
1996–1997	654	25	41	27

Table 2 Unit 24 beaver, lynx, otter, and wolverine harvest, 1989–1996

Regulatory	Reported harvest						Estimated harvest		Method of take				Successful	
year	M	F	Unk	Juv[a]	Adults	Unk	Unreported	Illegal	Trap/snare	Shot	(L&S)	Unk	Total	Trappers/hunters
Beaver														
1989–1990	--	--	--	6	275	0	0	0	281	0	--	0	281	42
1990–1991	--	--	--	39	341	0	0	0	379	0	--	1	380	20
1991–1992	--	--	--	8	112	0	0	0	120	0	--	0	120	16
1992–1993	--	--	--	13	65	0	0	0	76	0	--	2	78	10
1993–1994	--	--	--	22	298	0	0	0	320	0	--	0	320	30
1994–1995	--	--	--	5	135	0	0	0	136	0	--	4	140	11
1995–1996	--	--	--	32	202	0	0	0	234	0	--	0	234	19
1996–1997	--	--	--	14	634	6	0	0	654	0	--	0	654	42
Lynx														
1989–1990	--	--	--	16	112	0	0	0	88	0	--	40	128	36
1990–1991	--	--	--	24	102	0	0	0	100	10	--	16	126	27
1991–1992	--	--	--	12	146	0	0	0	152	3	--	3	158	43
1992–1993	--	--	--	1	110	0	0	0	111	0	--	0	111	22
1993–1994	--	--	--	6	117	0	0	0	123	0	--	0	123	35
1994–1995	--	--	--	1	33	1	0	0	34	1	--	0	35	13
1995–1996	--	--	--	1	29	0	0	0	29	1	--	0	30	18
1996–1997	--	--	--	0	24	1	0	0	22	1	--	2	25	14
Otter														
1989–1990	1	0	6	--	--	--	0	0	4	0	--	3	7	4
1990–1991	2	2	1	--	--	--	0	0	5	0	--	0	5	2
1991–1992	1	0	0	--	--	--	0	0	1	0	--	0	1	1
1992–1993	0	3	3	--	--	--	0	0	6	0	--	0	6	4
1993–1994	2	2	15	--	--	--	0	0	5	0	--	14	19	9
1994–1995	2	1	8	--	--	--	0	0	11	0	--	0	11	5
1995–1996	5	3	10	--	--	--	0	0	17	1	--	0	18	8
1996–1997	11	26	4	--	--	--	0	0	40	0	--	1	41	15
Wolverine														

Regulatory	Reported harvest						Estimated harvest		Method of take				Successful	
year	M	F	Unk	Juv[a]	Adults	Unk	Unreported	Illegal	Trap/snare	Shot	(L&S)	Unk	Total	Trappers/hunters
1989–1990	14	5	3	--	--	--	10	0	21	0	--	1	22	12
1990–1991	8	2	4	--	--	--	10	0	12	1	--	1	14	9
1991–1992	21	8	0	--	--	--	10	0	29	1	--	0	30	16
1992–1993	3	5	0	--	--	--	10	0	7	1	--	0	8	5
1993–1994	16	9	4	--	--	--	10	0	27	0	--	2	29	15
1994–1995	17	12	0	--	--	--	10	0	26	2	--	1	29	14
1995–1996	17	7	2	--	--	--	10	0	22	4	--	0	26	15
1996–1997	17	10	0	--	--	--	10	0	25	2	--	0	27	19

[a] Juveniles: Beavers <52" (length+width); lynx <34" in length.

Table 3 Unit 24 beaver, lynx, otter, and wolverine harvest chronology by time period, 1989–1996

Regulatory	Harvest periods							
year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Beaver								
1989–1990	0	15	23	3	125	31	--	--
1990–1991	10	4	31	153	177	5	--	--
1991–1992	0	4	5	15	80	2	--	--
1992–1993	8	12	0	20	31	0	--	--
1993–1994	2	7	56	88	167	0	--	--
1994–1995	3	1	27	17	85	0	--	--
1995–1996	11	0	3	51	153	0	--	--
1996–1997	13	24	63	219	305	8	0	0
Lynx								
1989–1990	7	32	30	38	--	--	--	--
1990–1991	4	30	26	66	--	--	--	--
1991–1992	22	35	48	52	1	--	--	--
1992–1993	28	32	24	25	--	--	--	--
1993–1994	12	28	45	37	1	--	--	--
1994–1995	6	8	12	9	0	--	--	--
1995–1996	3	7	8	12	0	--	--	--
1996–1997	3	7	8	6	0	--	--	--
Otter								
1989–1990	1	1	2	0	0	0	--	--
1990–1991	1	0	0	4	0	2	--	--
1991–1992	0	0	0	1	0	0	--	--
1992–1993	0	1	0	2	3	0	--	--
1993–1994	8	0	1	8	2	0	--	--
1994–1995	0	0	0	1	2	0	--	--
1995–1996	2	3	2	2	9	0	--	--
1996–1997	6	3	6	14	12	0	--	--
Wolverine								
1989–1990	0	7	6	9	0	--	--	--
1990–1991	2	6	2	3	1	--	--	--
1991–1992	7	7	6	9	1	--	--	--
1992–1993	3	1	0	2	1	--	--	--
1993–1994	2	3	7	10	6	--	--	--
1994–1995	1	7	7	5	8	--	--	--
1995–1996	3	5	5	4	5	--	--	--
1996–1997	3	6	5	8	4	--	--	--

Table 4 Unit 24 estimated harvest[a] of unsealed furbearer species, regulatory years 1989–1996

Regulatory year	Species				
	Coyote	Marten	Mink	Muskrat	Red Fox
1989–1990	0	1489	6	0	18
1990–1991	0	756	9	0	9
1991–1992	0	945	14	0	23
1992–1993	0	252	6	2	2
1993–1994	0	609	3	1	6
1994–1995	0	97	1	0	4
1995–1996	0	161	16	0	3
1996–1997	0	1339	93	14	148

[a] Estimates derived from Fur Acquisition Reports and Fur Export Permits.

LOCATION

GAME MANAGEMENT UNITS: 25A, 25B, 25D, 26B, and 26C (75,000 mi^2)

GEOGRAPHIC DESCRIPTION: Eastern Interior, Eastern Brooks Range, and Central and Eastern Arctic Slope

BACKGROUND

The upper Yukon River valley in eastern Interior Alaska has long been known as one of Alaska's most productive furbearer habitats. Diverse and abundant habitats include wetlands, riparian, and upland seral vegetation communities. The area supports extensive populations of a variety of furbearers, especially beaver, lynx, and fox. Furbearer abundance and species composition on the arctic slope are comparatively limited. Wolves, wolverines, and foxes are the most important species for trappers in this area.

Information on furbearers comes from pelt sealing records for beavers, lynx, river otters, and wolverines; fur acquisition reports; export reports; and trapper questionnaires. Beaver populations have been surveyed periodically in the Yukon Flats National Wildlife Refuge (YFNWR) since 1982 (McLean 1986). Limited surveys of other furbearers were conducted in the 1980s (Golden 1987).

MANAGEMENT DIRECTION

MANAGEMENT GOALS

- Protect, maintain, and enhance furbearer populations in concert with other components of the ecosystem and to assure their capability of providing sustained opportunities for commercial use of furbearers.

- Provide people with sustained opportunities to participate in hunting, subsistence use, viewing, and photographing furbearers.

MANAGEMENT OBJECTIVES

The management objective for furbearers is to maintain accurate annual harvest records and indices of population trends based on sealing documents and trapper questionnaires.

- Seal furs as they are harvested and presented for sealing and analyze harvest patterns.

- Conduct trapper questionnaire and interviews as a basis for determining the status of various furbearer populations.

METHODS

We analyzed harvest data from sealing certificates, fur acquisition reports, and fur export reports. Reports from trappers were evaluated. The only population surveys conducted were beaver lodge and food cache surveys done by YFNWR biologists in 1987 and 1991.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Beavers, martens, and red foxes occurred in high numbers on the Yukon Flats. Aerial surveys of beaver lodges and food caches indicated that beaver activity fluctuated from year to year (FWS-YFNWR, unpubl data). Beaver populations have been generally stable or slightly increasing since 1982. The possible limiting effects of beaver dams on migratory whitefish populations have become a concern among some local residents. Trapper reports and harvest data indicated that lynx numbers were high during the late 1980s and early 1990s, and were again at high levels in the late 1990s. Lynx numbers and harvest declined substantially in 1992–1993, but increased somewhat in 1993–1994 and were relatively high through the 1997–1998 season. Trappers reported that mink, muskrats, weasels, and wolverines were moderately abundant. High water during spring 1992 reestablished water levels in a number of sloughs and lakes on the Yukon Flats. Many trappers reported a subsequent increase in muskrat and mink populations. However, muskrats appeared to decline following cold winters and dry summers in the mid-1990s, and were scarce during this reporting period. River otters and coyotes were generally scarce.

In Units 26B and 26C, red and arctic foxes continue to be common, and wolverines are still at low density throughout the area.

MORTALITY

Harvest

<u>Hunting Seasons and Bag Limits</u>.

Unit/Species	Bag Limit	Resident Season	Nonresident Season
<u>Unit 25</u>:			
Coyote	2 coyotes	1 Sep–30 Apr	1 Sep–30 Apr
Arctic Fox		No season	No season
Red Fox	2 foxes	1 Sep–15 Mar	1 Sep–15 Mar
Lynx	2 lynx	1 Nov–28 Feb	1 Nov–28 Feb
Wolverine	1 wolverine	1 Sep–31 Mar	1 Sep–31 Mar
<u>Unit 26</u>:			
Coyote	2 coyotes	1 Sep–30 Apr	1 Sep–30 Apr
Arctic Fox	2 foxes	1 Sep–30 Apr	1 Sep–30 Apr
Red Fox	2 foxes	1 Sep–15 Mar	1 Sep–15 Mar
Lynx	2 lynx	1 Nov–28 Feb	1 Nov–28 Feb
Wolverine	1 wolverine	1 Sep–31 Mar	1 Sep–31 Mar

Trapping Seasons and Bag Limits.

Unit 25:

Beaver	50 beavers	1 Nov–15 Apr
	2 beavers/day by shooting	16 Apr–1 Jun
Coyote	No limit	1 Nov–31 Mar
Arctic Fox	No season	No season
Red Fox	No limit	1 Nov–28 Feb
Lynx	No limit	1 Nov–28 Feb
Marten	No limit	1 Nov–28 Feb
Mink & Weasel	No limit	1 Nov–28 Feb
Muskrat	No limit	1 Nov–10 Jun
River Otter	No limit	1 Nov–15 Apr
Wolverine	No limit	1 Nov–15 Apr

Unit 26:

Beaver	No season	No season
Coyote	No limit	1 Nov–15 Apr
Arctic Fox	No limit	1 Nov–15 Apr
Red Fox	No limit	1 Nov–15 Apr
Lynx	No limit	1 Nov–15 Apr
Marten	No limit	1 Nov–15 Apr
Mink & Weasel	No limit	1 Nov–31 Jan
Muskrat	No limit	1 Nov–10 Jun
River Otter	No limit	1 Nov–15 Apr
Wolverine	No limit	1 Nov–15 Apr

Board of Game Actions and Emergency Orders. Lynx trapping seasons were changed. There was concern about the effects of trapping during the low phase of the lynx population cycle. The Board of Game reduced the season in Units 25A, 25B, and 25D. Before 1985, the season dates were 1 November–15 March. For the 1985–1986 season, this was reduced to 1 November–28 February. The following season was further reduced to 1 December–31 January. As lynx numbers began to recover, the season was again lengthened to 1 November–28 February in 1988–1989. This season remained in place through 1996–1997. In contrast to more populated areas, trapping pressure was relatively light, especially following recent declines in fur prices. A "tracking" harvest strategy does not appear to be necessary in this area under present conditions. Beaver trapping regulations were changed in 1995–1996 to allow beaver to be taken in Units 25A, B, and D by shooting during 16 April–1 June, with a bag limit of 1 per day. The bag limit was changed to a 2 per day in 1996. The meat of beavers taken by shooting must be salvaged for human consumption.

Hunter/Trapper Harvest.

Beaver — Beavers were most commonly taken in and near major drainages such as the Black, Little Black, Coleen, Hodzana, Chandalar, and Christian rivers, and Birch and Beaver creeks. The trend in beaver harvest in Unit 25 was generally downward, although harvest increased somewhat after 1993 (Table 1). The proportion of kits in the harvest increased from 4 to 24% during the report period (Table 2). The harvest decline was probably related to lower pelt values and consequent reduction in trapper effort.

Lynx — Lynx harvest increased from about 500 annually in 1986–1987 and 1987–1988 to nearly 700 annually in 1988–1989 and 1989–1990. Harvest declined abruptly from 635 in 1991–1992 to 195 in 1992–1993, before increasing to 766 in 1996–1997 (Table 1). The recent increase reflected the increase in snowshoe hares and lynx in the last few years.

Snowshoe hares are the primary prey of lynx. Production and survival of lynx kittens is highly dependent on the abundance of this cyclic prey species. The mean proportion of kittens in the harvest declined from 20% in 1986 through 1990 to 6% in 1991 and 1992. During 1993 through 1996, the proportion of kittens in the harvest ranged from 14–23%, $\bar{x}$ = 19% (Table 2). These observations agreed with trapper reports indicating that snowshoe hares were abundant in most areas near the end of this reporting period. During the low phase of the hare cycle, the proportion of kits in the harvest may be as low as 3% (Stephenson and Karczmarczyk 1989).

The harvest of lynx occurred over an extensive area, but was greatest in the Chandalar, Christian, Black, Little Black, Salmon Fork, Porcupine, and Sheenjek drainages. The largest harvests occurred in eastern Unit 25D and in Unit 25B.

River Otter and Wolverine — Otter harvest was low, probably because of lower fur prices and generally low trapping effort. Harvests ranged from 1 to 9 between 1992 and 1996 (Table 1). The modest increase in otter harvest was probably associated with increased trapping effort for beaver during the last few years.

Most of the wolverine harvest came from Unit 25 (Table 1). Harvest was relatively stable, ranging from 12 to 52, during the past 5 years. The only area where wolverine harvest increased in the last decade was in Unit 26B (Table 1). This was probably a result of improved access from the Dalton Highway. The number of animals taken was still small relative to the area's size.

Unsealed species — The estimated harvest of most species of unsealed furbearers declined in Unit 25 during the late 1980s (Table 3). Fur prices declined to low levels for most species during this period. A resulting decline in trapping effort probably accounted for much of the decline in harvest. Temporary declines in furbearer population numbers may have also contributed to an unknown degree. Muskrats were historically taken in large numbers. The dramatic decline in harvest was attributed to a drying trend. Many lakes and ponds diminished in size or disappeared and muskrat habitat decreased. A dramatic long-term decline in mink populations was probably also related to the drying trend. Unusually cold winters and low snowfall, resulting in thick ice, also contributed to declines in muskrat populations. A flood in 1992 restored water levels in some areas allowing some increase in muskrat and mink populations. Muskrat harvests increased somewhat in 1994 and 1995 before declining in 1996.

Marten harvest increased in 1996, but was still below the levels observed in the late 1980s. Reasons for the long-term decline in marten harvest probably included the general decline in fur prices during the early 1990s. Some observers speculate that marten populations decline during the high phase of the lynx-hare cycle. The general decline in fur prices probably reduced trapper effort and furbearer harvests.

Trapper Success. Among sealed species, beaver and lynx were the most commonly taken animals (Table 1). The average number taken by each reporting trapper ranged from 5 to 8 (Table 2). The number of marten taken by individual trappers was unknown. Numerically and economically, martens were the most important furbearer for most trappers in recent years. Comments on trapper questionnaires indicated furbearer populations were generally high and the major deterrents to higher harvests were reduced pelt values and severe weather.

Harvest Chronology. The harvest of beavers in Unit 25 was greatest during February and March, when 50% to 70% of the harvest occurred (Table 4). Lynx were harvested primarily in December and January, when 60% to 97% of the harvest took place. This corresponded to the period of peak primeness for lynx pelts. The harvest of otters and wolverines were distributed over a broader period. Most were harvested in December, January, and February when trapping activity for other species was greatest. The small harvest of wolverines in Units 26B and 26C occurred primarily in late winter (Table 5).

Harvest and Transport Methods. Traps and snares were the predominant method for harvesting furbearers in Unit 25 (Table 2). Firearms were used to take only a few lynx and wolverines. Snowmachines were the most common method of transportation. They were used for taking more than 80% of the furbearers in most years. A few were taken with the aid of aircraft, dogsled, skis, snowshoes, or highway vehicles (Table 6). In Unit 26B, highway vehicles were used by trappers on the Dalton Highway and were used in connection with most of the reported harvest of wolverines (Table 7).

CONCLUSIONS AND RECOMMENDATIONS

We lack quantitative data on furbearer population status in the upper Yukon and eastern Arctic. However, harvest data and anecdotal reports from trappers indicate that furbearer populations were not adversely affected by current harvest. Present seasons and bag limits appear reasonable for providing trapping and hunting opportunity and for conservation of furbearer populations. Recent declines in fur prices reduced trapping activity, which further indicated that existing regulations are adequate.

We should establish a program of annual track counts that would provide information on furbearer population trends, particularly for lynx, martens, and wolverines. If funding limitations make such a program impossible, I recommend we focus our efforts on increasing communication between local trappers and state and federal biologists. This program would include increased personal contact with trappers, expanded efforts to communicate through the trapper questionnaire, and efforts to help local residents understand that reporting furbearer harvests (by sealing fur and using fur export reports) is in their best interest. Continued involvement in trapper education programs is also important.

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Table 1 Units 25A, 25B, 25D, 26B, and 26C furbearer harvest, regulatory years 1986–1996

Species/Year	Unit 25A	25B	25D	26B	26C	Unk	Total
Beaver							
1986	24	171	333	0	0	0	528
1987	23	136	287	0	0	0	446
1988	9	175	129	0	0	0	313
1989	5	51	67	0	0	0	123
1990	7	26	128	0	0	0	161
1991	6	38	71	0	0	0	115
1992	7	15	12	0	0	0	34
1993	8	3	68	0	0	0	79
1994	14	38	70	0	0	0	122
1995	2	20	66	0	0	0	88
1996	14	10	152	0	0	0	176
Lynx							
1986	77	124	282	0	0	0	484
1987	117	127	278	0	0	0	522
1988	59	298	329	0	0	0	686
1989	41	430	214	0	0	0	685
1990	25	232	208	0	4	0	465
1991	34	267	334	0	0	0	635
1992	13	51	128	3	0	0	195
1993	8	89	262	4	0	0	363
1994	6	50	173	3	0	0	232
1995	1	62	155	0	0	0	218
1996	0	227	522	0	0	17	766
River Otter							
1986	3	1	6	0	0	3	13
1987	3	0	2	0	0	0	5
1988	0	2	2	0	0	0	4
1989	1	0	0	0	1	0	3
1990	0	1	0	0	0	0	1
1991	0	1	5	0	0	0	6
1992	0	1	4	0	0	0	5
1993	0	0	1	0	0	0	1
1994	1	4	1	0	0	0	6
1995	1	2	6	0	0	0	9
1996	1	1	4	0	0	0	6
Wolverine							
1986	16	19	19	0	0	0	54

Table 1 Continued

Species/Year	Unit 25A	25B	25D	26B	26C	Unk	Total
1987	13	11	14	1	1	0	40
1988	13	10	21	4	1	0	49
1989	17	14	21	4	0	0	56
1990	15	14	18	5	0	0	52
1991	25	19	7	2	1	0	54
1992	16	17	6	3	1	0	43
1993	17	14	13	11	1	0	56
1994	25	18	9	8	0	0	60
1995	7	5	5	6	1	0	24
1996	14	14	7	9	0	0	44

Table 2 Units 25A, 25B, 25D, 26B, and 26C beaver, lynx, otter, and wolverine harvest, regulatory years 1986–1996

Species/Regulatory year	Reported harvest						Method of take				Total harvest	Successful trappers and hunters
	M	F	Unk	Juv[a]	Adults	Unk	Trap/snare	Shot	(L&S)[b]	Unk		
Units 25A, 25B, and 25D:												
Beaver												
1986–1987			528	79	409	40	520	0	0	8	528	unk
1987–1988			446	66	380	0	444	0	0	2	446	58
1988–1989			313	67	246	0	313	0	0	0	313	29
1989–1990			123	18	104	1	121	1	0	1	123	29
1990–1991			161	34	122	5	159	2	0	0	161	26
1991–1992			115	19	96	0	111	4	0	0	115	18
1992–1993			34	7	26	1	34	0	0	0	34	8
1993–1994			79	11	59	9	79	0	0	0	79	15
1994–1995			122	26	96	0	114	0	0	8	122	18
1995–1996			88	25	62	1	88	0	0	0	88	15
1996–1997			188	51	137	0	168	20	0	0	188	18
Lynx												
1986–1987			484	100	380	4	481	1	0	2	484	unk
1987–1988			522	110	412	0	510	2	0	10	522	119
1988–1989			686	128	569	0	673	0	4	9	686	126
1989–1990			685	136	549	0	648	5	0	32	685	90
1990–1991			465	82	381	2	463	1	0	1	465	72
1991–1992			635	52	582	1	589	0	0	45	635	84
1992–1993			192	7	185	0	190	2	0	0	192	55
1993–1994			363	53	304	6	350	3	0	10	363	85
1994–1995			251	34	211	6	246	0	3	2	251	61
1995–1996			218	48	169	1	216	2	0	0	218	44
1996–1997			751	177	574	0	744	0	0	7	751	83
Otter												
1986–1987	unk	unk	unk	0	0	13	12	0	0	1	13	unk
1987–1988	unk	unk	unk	0	0	5	5	0	0	0	5	5
1988–1989	1	1	2	0	0	4	4	0	0	0	4	4
1989–1990	1	0	2	0	0	2	2	0	0	1	3	3
1990–1991	1	0	0	0	0	1	1	0	0	0	1	1
1991–1992	0	3	0	0	0	3	6	0	0	0	6	4
1992–1993	4	1	0	0	0	5	5	0	0	0	5	4
1993–1994	1	0	0	0	0	1	1	0	0	0	1	1
1994–1995	1	2	3	--	--	6	6	0	0	2	6	4
1995–1996	4	4	1	--	--	9	9	0	0	0	9	8

Table 2 Continued

Species/Regulatory year	Reported harvest						Method of take				Total harvest	Successful trappers and hunters
	M	F	Unk	Juv[a]	Adults	Unk	Trap/snare	Shot	(L&S)[b]	Unk		
1996–1997	3	1	1	--	--	5	5	0	0	0	5	5
Wolverine												
1986–1987	unk	unk	unk	0	0	54	48	0	1	5	54	unk
1987–1988	unk	unk	unk	0	0	40	36	0	4	0	40	29
1988–1989	31	12	1	0	0	44	42	0	1	1	44	30
1989–1990	29	19	4	0	0	52	52	0	0	0	52	31
1990–1991	27	13	7	0	0	54	45	2	0	0	47	28
1991–1992	32	18	1	0	0	51	46	5	0	0	51	27
1992–1993	28	11	0	0	0	39	36	3	0	0	39	15
1993–1994	24	9	10	0	0	43	40	2	0	1	43	10
1994–1995	25	23	4	--	--	52	51	0	0	1	52	24
1995–1996	11	6	0	--	--	17	15	2	0	0	17	11
1996–1997	23	10	2	--	--	35	33	2	0	0	35	19
Units 26B and 26C:												
Lynx												
1990–1991			4	0	0	4	4	0	0	0	4	1
1991–1992			0	0	0	0	0	0	0	0	0	0
1992–1993			3	0	3	0	3	0	0	0	3	2
1993–1994			4	0	4	0	4	0	0	0	4	1
1994–1995			3	0	3	0	3	0	0	0	3	1
1995–1996			0	0	0	0	0	0	0	0	0	0
1996–1997			0	0	0	0	0	0	0	0	0	0
Wolverine												
1988–1989	2	2	1	0	0	5	2	1	1	1	5	5
1989–1990	3	1	0	0	0	4	0	4	0	0	4	4
1990–1991	3	2	0	0	0	5	0	5	0	0	5	4
1991–1992	2	0	1	0	0	3	2	1	0	0	3	3
1992–1993	3	1	0	0	0	4	2	2	0	0	4	4
1993–1994	9	3	0	0	0	12	7	4	0	1	12	10
1994–1995	6	2	0	--	--	8	5	3	0	0	8	6
1995–1996	4	3	0	--	--	7	1	6	0	0	7	7
1996–1997	6	3	0	--	--	9	8	0	1	0	9	5

[a] Beavers ≤52"; lynx ≤34" in length.

[b] L&S (land-and-shoot) refers to animals taken by hunters the same day hunters were airborne.

Table 3 Unit 25 estimated harvest[a] of unsealed furbearer species, regulatory years 1986–1996

Species	Year										
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Coyote	0	0	0	0	0	1	1	2	1	0	1
Arctic Fox	0	2	0	0	0	1	2	5	7	0	0
Red Fox	464	286	198	47	171	187	41	115	85	43	108
Marten	5707	5086	3476	2357	2070	2769	883	1234	1422	748	2233
Mink	211	80	72	32	42	46	17	34	54	81	232
Muskrat	2360	1141	657	0	23	299	167	92	784	558	126
Weasel	60	55	87	9	6	17	5	11	19	31	13
Squirrel	6	31	53	0	25	54	24	4	55	13	43

[a] Estimates calculated by combining Fur Acquisition Reports and Fur Export Permits.

Table 4 Units 25A, 25B, and 25D beaver, lynx, otter, and wolverine harvest chronology by time period, regulatory years 1986–1996

Species/	Harvest periods							
Regulatory year	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Beaver								
1986–1987	0	44	37	51	84	286	13	
1987–1988	0	32	23	50	55	234	52	
1988–1989	0	33	27	6	60	165	16	
1989–1990	0	16	12	12	22	52	0	
1990–1991	0	4	21	52	45	38	1	
1991–1992	0	13	10	6	18	63	5	
1992–1993	0	6	5	11	0	10	2	
1993–1994	0	0	12	5	8	35	8	
1994–1995	0	13	6	7	57	19	15	
1995–1996	0	3	13	0	25	35	12	
1996–1997	0	0	15	1	31	100	15	14
Lynx								
1986–1987	0	1	273	196	2	1	0	
1987–1988	0	1	267	247	2	2	0	
1988–1989	0	77	268	137	184	0	0	
1989–1990	0	55	328	184	102	1	0	
1990–1991	0	20	200	102	93	28	0	
1991–1992	0	56	260	213	86	2	0	
1992–1993	0	27	83	30	29	2	0	
1993–1994	0	34	162	111	55	1	0	
1994–1995	1	20	112	52	44	0	0	
1995–1996	0	5	86	55	69	0	0	
1996–1997	0	13	231	302	218	2	0	
River Otter								
1986–1987	0	0	6	3	1	1	0	
1987–1988	0	1	1	3	0	0	0	
1988–1989	0	0	3	0	1	0	0	
1989–1990	0	1	1	0	0	0	0	
1990–1991	0	0	0	1	0	0	0	
1991–1992	0	1	2	2	1	0	0	
1992–1993	0	0	4	0	1	0	0	
1993–1994	0	1	0	0	0	0	0	
1994–1995	0	1	0	1	2	0	0	
1995–1996	0	1	4	0	4	0	0	
1996–1997	0	0	1	2	1	0	1	

Table 4 Continued

Species/ Regulatory year	Harvest periods							
	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Wolverine								
1986–1987	0	4	16	20	5	9	0	
1987–1988	0	2	14	15	5	3	1	
1988–1989	0	5	14	6	15	4	0	
1989–1990	0	6	18	9	16	3	0	
1990–1991	1	11	13	5	16	0	0	
1991–1992	0	9	16	10	13	3	0	
1992–1993	0	4	14	3	9	9	0	
1993–1994	1	5	10	10	11	2	0	
1994–1995	0	4	13	13	13	9	0	
1995–1996	0	2	6	1	7	1	0	
1996–1997	2	1	5	9	11	7	0	

Table 5 Units 26B and 26C lynx and wolverine harvest chronology by time period, regulatory years 1986–1996

Species/	Harvest periods						
Regulatory year	Sep/Oct	Nov	Dec	Jan	Feb	Mar	Apr
Lynx							
1990–1991	0	0	0	0	4	0	0
1991–1992	0	0	0	0	0	0	0
1992–1993	0	0	0	2	1	0	0
1993–1994	0	0	0	0	4	0	0
1994–1995	0	1	2	0	0	0	0
1995–1996	0	0	0	0	0	0	0
1996–1997	0	0	0	0	0	0	0
Wolverine							
1986–1987	unk	unk	unk	unk	unk	unk	unk
1987–1988	unk	unk	unk	unk	unk	unk	unk
1988–1989	0	0	1	2	1	1	0
1989–1990	1	1	0	0	1	0	1
1990–1991	3	2	1	2	0	0	0
1991–1992	0	2	1	0	0	0	0
1992–1993	1	0	0	0	0	2	1
1993–1994	0	0	1	2	3	4	1
1994–1995	1	0	0	0	0	4	3
1995–1996	1	0	0	0	0	3	3
1996–1997	1	2	0	0	5	1	0

Table 6 Units 25A, 25B, and 25D beaver, lynx, otter, and wolverine harvest percent by transport method, regulatory years 1986–1996

Species/Regulatory year	Harvest percent by transport method: Airplane	Dogsled, Skis, or Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown
Beaver								
1986–1987	1	8	0	0	92	0	0	0
1987–1988	6	4	0	0	90	0	0	0
1988–1989	0	8	0	0	92	0	0	0
1989–1990	0	2	0	0	98	0	0	0
1990–1991	21	3	0	0	76	0	1	0
1991–1992	0	0	0	0	98	0	0	2
1992–1993	0	0	0	0	94	0	0	6
1993–1994	0	0	0	0	100	0	0	0
1994–1995	2	0	0	0	88	0	0	10
1995–1996	0	9	0	0	89	0	0	2
1996–1997	0	1	11	0	88	0	0	0
Lynx								
1986–1987	3	8	0	0	89	0	0	0
1987–1988	3	10	0	0	86	0	0	0
1988–1989	13	7	1	0	80	0	0	0
1989–1990	2	8	0	0	88	0	1	0
1990–1991	2	7	0	0	91	0	0	0
1991–1992	1	9	3	0	82	0	0	5
1992–1993	3	4	0	0	88	0	1	4
1993–1994	1	5	0	0	92	0	1	1
1994–1995	1	6	0	0	91	0	0	2
1995–1996	4	4	0	0	90	0	0	3
1996–1997	4	7	1	0	87	0	0	1
River Otter								
1986–1987	0	9	0	0	91	0	0	0
1987–1988	0	20	0	0	80	0	0	0
1988–1989	0	25	0	0	75	0	0	0
1989–1990	0	0	0	0	100	0	0	0
1990–1991	0	100	0	0	0	0	0	0
1991–1992	0	0	0	0	100	0	0	0
1992–1993	0	0	0	0	100	0	0	0
1993–1994	0	0	0	0	100	0	0	0

Table 6 Continued

Species/Regulatory year	Harvest percent by transport method: Airplane	Dogsled, Skis, or Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown
1994–1995	0	0	0	0	50	0	0	50
1995–1996	0	0	0	0	100	0	0	0
1996–1997	0	0	0	0	100	0	0	0
Wolverine								
1986–1987	12	16	0	0	71	0	0	0
1987–1988	10	18	0	0	69	0	3	0
1988–1989	8	10	0	0	82	0	0	0
1989–1990	2	17	0	0	81	0	0	0
1990–1991	2	20	0	0	77	0	0	0
1991–1992	2	14	0	0	80	0	0	4
1992–1993	5	10	0	0	64	0	0	21
1993–1994	7	7	7	0	77	0	0	2
1994–1995	4	4	0	0	81	0	0	11
1995–1996	0	0	14	0	71	0	14	0
1996–1997	14	0	3	0	71	0	0	11

Table 7 Units 26B and 26C lynx and wolverine harvest percent by transport method, regulatory years 1986–1996

	Harvest percent by transport method							
Species/Regulatory year	Airplane	Dogsled, Skis, or Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unknown
Lynx								
1990–1991	100	0	0	0	0	0	0	0
1991–1992	0	0	0	0	0	0	0	0
1992–1993	0	0	0	0	0	0	67	33
1993–1994	0	0	0	0	0	0	100	0
1994–1995	0	0	0	0	0	0	100	0
1995–1996								
1996–1997								
Wolverine								
1986–1987	unk	unk	unk	unk	unk	unk	unk	unk
1987–1988	unk	unk	unk	unk	unk	unk	unk	unk
1988–1989	0	0	0	0	25	0	75	0
1989–1990	0	0	0	0	0	0	0	0
1990–1991	25	25	0	0	0	0	50	0
1991–1992	0	33	0	0	33	0	33	0
1992–1993	33	0	0	0	33	0	0	33
1993–1994	0	0	0	0	45	0	54	0
1994–1995	13	0	0	0	25	0	38	25
1995–1996	0	0	14	0	71	0	14	0
1996–1997	0	0	0	0	33	0	67	0

LOCATION

GAME MANAGEMENT UNIT: 26A (56,000 mi^2)

GEOGRAPHIC DESCRIPTION: Western North Slope

BACKGROUND

Red fox, arctic fox, and wolverine are the only furbearer species commonly found in Unit 26A. Because of limited habitat, boreal forest species such as lynx, marten, and coyote are rare and found only in the southern portion of the unit. Furbearers are harvested on the North Slope primarily for the domestic manufacture of garments. In addition, some furs are used to produce handicrafts and some are sold on the commercial fur market.

Rabid furbearers, particularly arctic foxes, continue to be a problem around human settlements. We work with the North Slope Borough to educate people on dealing with rabid animals and having their pets immunized. Arctic foxes that appear to be rabid are killed and tested for rabies when they are reported near villages.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population management objectives established for furbearers in Unit 26A are to:

- Maintain productive populations and to allow harvest opportunities within sustained yield limits.

- Minimize adverse interactions between furbearers and the public.

METHODS

We did not conduct specific furbearer population surveys, however we did record incidental furbearer observations during surveys conducted for other species. We summarized harvest data from sealing certificate records.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size, Composition, and Distribution

No quantitative population information is available for lynx, red foxes, arctic foxes, or coyotes in Unit 26A. Lynx were at low density only in the southern portion of the unit. Red foxes were fairly abundant in interior regions of Unit 26A. Arctic foxes were abundant along the coastal plain in Unit 26A. Coyotes were occasionally seen along the southern border of Unit 26A.

The current population status of wolverines in Unit 26A is not very well known. Magoun (1984) estimated a fall population size of 821 wolverines for Unit 26A, assuming an overall density of 1 wolverine/54 mi^2 for the entire unit. While conducting moose counts in Unit 26A, 11 wolverines were seen during 35 hours of flight in 1984, 12 wolverines during 39 hours of flying in 1991, 5 during 32 hours in 1994, and 6 during 34 hours in 1995.

MORTALITY

Harvest

Hunting Seasons and Bag Limits.

Unit 26A

Species	*Season*	*Bag Limit*
Coyote	1 Sep–30 Apr	2 coyotes
Fox, Arctic	1 Sep–30 Apr	2 foxes
Fox, Red	1 Sep–15 Mar	2 foxes
Lynx	1 Nov–15 Apr	2 lynx
Wolverine	1 Sep–31 Mar	1 wolverine

Trapping Seasons and Bag Limits.

Species	*Season*	*Bag Limit*
Coyote	1 Nov–15 Apr	No limit
Fox, Arctic	1 Nov–15 Apr	No limit
Fox, Red	1 Nov–15 Apr	No limit
Lynx	1 Nov–15 Apr	No limit
Wolverine	1 Sep–31 Mar	No limit

Board of Game Actions and Emergency Orders. There were no Game Board actions or emergency orders during the reporting period.

Hunter/Trapper Harvest.

Lynx — No lynx were sealed in Unit 26A during the reporting period. Because lynx occur at low density only in the southern portion of the unit and most residents live along the coast in the northern portion of the unit, only residents from Anaktuvuk Pass occasionally have opportunity to harvest lynx.

Arctic and red foxes — Local hunters and trappers harvested Arctic and red foxes. Because there is no sealing requirement for these species, harvest information was not obtained. Low fur prices resulted in relatively few foxes being trapped.

Coyote — No coyote harvests were reported during the reporting period. There is no sealing requirement for coyotes, so harvest information was not obtained. Because coyotes only occur in the southern portion of the unit, only residents from Anaktuvuk Pass have opportunity to harvest them.

Wolverine — Sixteen wolverines were sealed during 1994–1995. Six were females and 10 were males. Twelve were ground shot, 2 were trapped, 1 was snared, and 1 was unknown. Snowmachines were used for transportation for 10, airplanes for 4, skis for 1, and 1 was unknown. Four were taken during September, 3 during November, 2 during December, 1 during

January, 3 during February, 2 during March, and 1 was unknown. Twelve hunters were residents of the unit and 4 were nonresidents.

Sixteen wolverines were sealed during 1995–1996. Three were females and 12 were males. Fifteen were ground shot, and 1 was trapped. Trappers used snowmachines as transportation for 10, airplanes for 4, skis for 1, and 1 was unknown. Four were taken during September, 3 during November, 2 during December, 1 during January, 3 during February, 2 during March, and 1 was unknown. Fifteen hunters were residents of the unit and 1 was a nonresident.

Eleven wolverines were sealed during 1996–1997. Four were females, and 7 were males. Five were ground shot and 6 were trapped. Trappers used snowmachines for transportation for all 11 wolverines. Four were taken during November, 2 during December, 1 during January, 2 during February, 1 during March, and 1 during April. Seven hunters were residents of the unit and 2 were non-local residents.

CONCLUSIONS AND RECOMMENDATIONS

It would be useful to obtain more accurate population and harvest information for furbearers, particularly wolverines. Few people comply with sealing requirements for the following reasons: 1) there are no sealing agents in most of the villages because there is little financial incentive for anyone to act as a fur sealer; 2) many residents are not aware of sealing requirements; 3) many people are reluctant to comply with state regulations; and, 4) most hides are used locally. Most rural residents have their hides sealed only if they are selling them to fur buyers or sending them out for commercial tanning.

In order to obtain more accurate harvest information on North Slope animals we are working with the North Slope Borough to develop and implement a village harvest monitor program. Village residents have been hired to interview hunters and document harvest for several species of animals. According to results obtained from a North Slope census, at least 42 wolverines were harvested in Unit 26A during calendar year 1992 (George and Fuller, 1997). This compares to 2 wolverines sealed during 1991–1992 and 11 sealed during 1992–1993. According to the North Slope Borough Harvest Documentation study, 8, 10, 7, and 3 wolverines were harvested in Nuiqsut, Atqasuk, Barrow, and Anaktuvuk Pass during 1994–1995 (Brower and Opie, 1996 and 1997; Hepa and Brower, 1997). Eight of these animals were sealed.

The population status of wolverines needs closer monitoring. A track intercept technique has been used to estimate wolverine density in other areas of Alaska (Becker 1991), and may be useful for evaluating population trends in portions of Unit 26A.

To minimize adverse interactions between furbearers and the public, we work with the North Slope Borough Public Health Department to educate people on dealing with rabid animals and having their pets immunized. We also destroy foxes that appear to be rabid and collect specimens so they can be tested for rabies.

Magoun (1984) estimated that Unit 26A could sustain an annual harvest of 300 wolverines if less than 90 females were harvested, and the reproductive rate observed at the Driftwood study area was applicable to the entire Unit. If Magoun's estimate of population size and productivity are still valid, overharvesting is probably not occurring. I recommend no changes in seasons and bag limits at this time.

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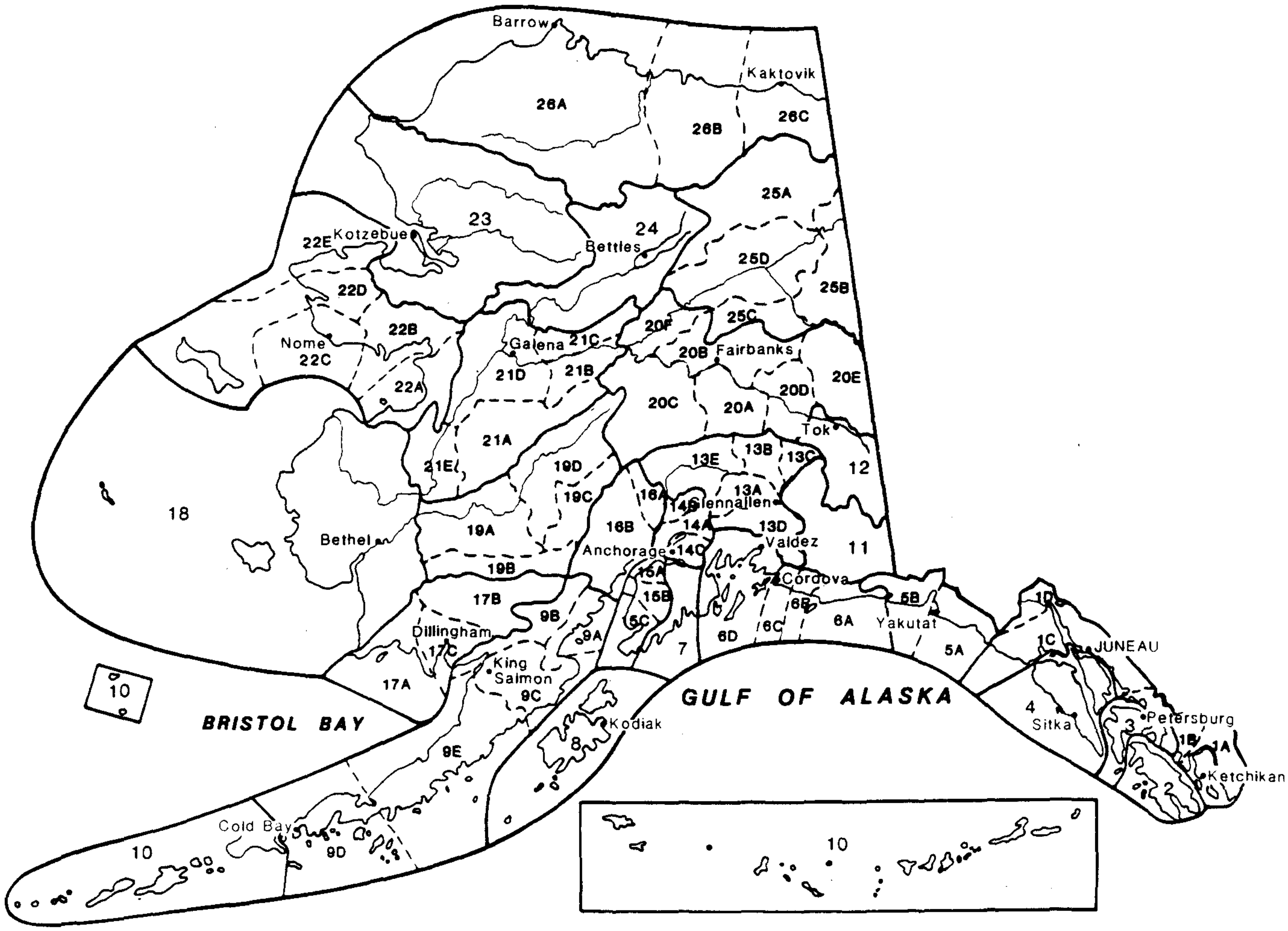
Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.

Ken Whitten