

1988-89
MINNESOTA
Registered Furbearer
Harvest Statistics
and Population Status



Section of Wildlife

DEPARTMENT OF NATURAL RESOURCES

1988-89 Minnesota
Furbearer Registration Statistics
and Population Status

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PART I.

Registered Furbearer Harvest Statistics

1988-89 REGISTERED FURBEARER HARVESTS

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The attached tables and figures summarize harvest data for Minnesota bobcat, fisher, marten and otter for the 1988-89 seasons. Separate reports, also attached, have been prepared to summarize population status of these species.

Bobcat. The 1988-89 harvest of 140 represented a decline of approximately 35% from last year. Much of this decline is attributed to poor accessibility due to deep snows across much of the bobcat range early in the season, and to reduced trapper effort because of generally lower fur prices. Despite the overall decline, hunting harvest was the highest since registration began. Bobcat hunting is less affected by deep snows than trapping, and hunters are less sensitive to changes in pelt prices.

Fisher. The 1988 fisher harvest was 1025, a decline of 38% from 1987. Again, much of this decrease is attributed to deep snows and reduced trapper effort. Higher snowshoe hare densities and a hard winter for deer should have provided good food supplies for fisher overwinter. Of 4,419 people who requested fisher tags, 1025 (23.2%) took fisher.

Marten. The 1988 marten harvest of 2,072 represented an increase of 52% over 1987 and was the highest since the season was opened in 1985. This increase is attributed to the combined effects of an increased limit, expanded zone, and higher marten population. Also, preliminary results indicate that the marten was one species that showed a substantial increase in pelt value in 1988. Approximately 280 marten (13.5% of the total) were taken in the newly opened areas of the expanded trapping zone. Of 1,194 successful marten trappers, 878 (73.5%) took their limit of 2. Of 3,369 people who requested marten tags, 1,194 (35.4%) took marten.

Otter. The 1988 harvest of 922 was down 33% from 1987's record harvest of 1,386. As with bobcat and fisher, this decline is believed to reflect reduced trapper effort and access. Among successful otter trappers, 139 (26%) took their limit of 3, 116 (22%) took 2, and 273 (52%) took only one otter. Of 4,070 people who requested otter tags, 528 (13.0%) took otter.

June 16, 1989

Table 1. Registered furbearer harvests and total permits issued, 1985-88^a.

Year	Bobcats		Fisher		Marten		Otter	
	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1985	--	119	--	678	746	430	--	559
1986	--	160	3,302	1,067	2,171	798	3,198	777
1987	--	214	4,952	1,642	3,025	1,363	4,708	1,386
1988	--	140	4,419	1,025	3,369	2,072	4,070	922

^aPrior request tags and permits were required beginning in 1985 for marten and in 1986 for fisher and otter. No possession tags or permits are required for bobcat.

Table 1A. 1988-89 Registered furbearer harvests in the 1854 Treaty ceded territory and statewide.

Species	1854 Ceded Territory Harvest			Total State Registered	Total Statewide Harvest ^a
	Tri-Band	State	Total		
Bobcat	0	19	19	140	140
Fisher	15	349	364	1,025	1,040
Marten	169	1,527	1,696	2,072	2,241
Otter	0	182	182	922	922

^aState plus Tri-Band registered harvests (off-reservation harvests only)

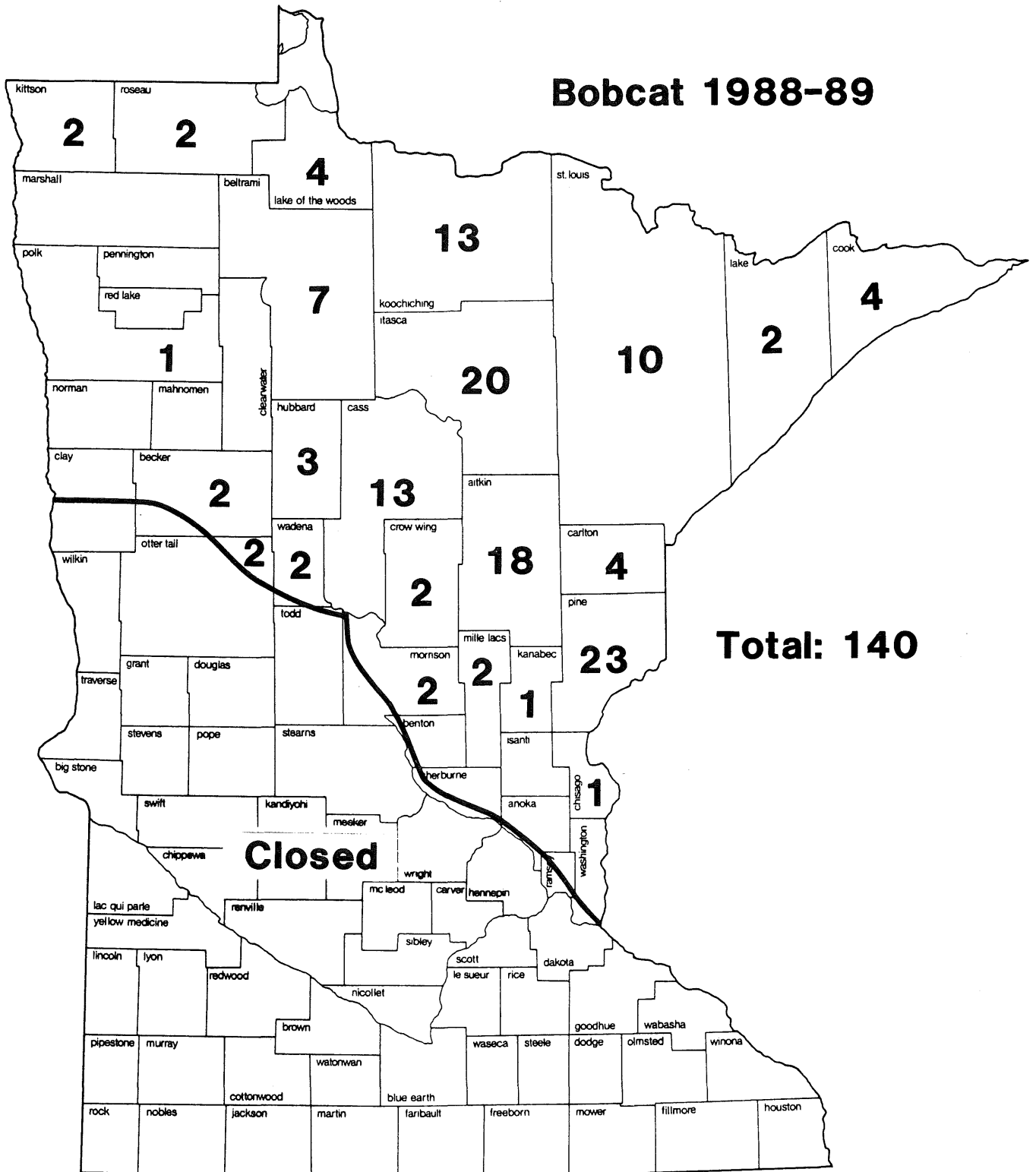


Fig. 1. Bobcat harvest by county, 1988-89.

Table 2. Comparison of bobcat harvest by county, 1984-85 - 1988-89.

County	1984-85	1985-86	1986-87	1987-88	1988-89
Aitkin	25	14	12	25	18
Becker	9	1	1	3	2
Beltrami	24	5	7	15	7
Carlton	20	6	9	9	4
Cass	42	20	34	28	13
Chisago	0	1	0	0	1
Clearwater	0	0	3	2	-
Cook	1	0	1	2	4
Crow Wing	5	6	5	1	2
Hubbard	1	0	0	2	3
Isanti	0	0	1	0	-
Itasca	50	15	28	44	20
Kanabec	6	2	3	0	1
Kittson	0	0	3	6	2
Koochiching	8	8	6	9	13
Lake	1	1	1	3	2
Lake of the Woods	1	1	0	2	4
Marshall	1	1	3	4	-
Mille Lacs	0	4	3	8	2
Morrison	5	4	4	4	2
Ottertail	1	3	2	1	2
Pine	20	14	11	16	23
Polk	1	0	0	0	1
Red Lake	0	1	0	0	-
Renville	1	0	0	0	-
Roseau	14	2	2	2	2
St. Louis	43	8	19	26	10
Wadena	1	2	0	2	2
Unknown	1	0	2	0	-
Total	280	119	160	214	140

Table 3. Time distribution of bobcat harvest by 5-day increments, 1988-89 season.

Interval	Sex			Total	% of Known Total	Cumulative Percent
	M	F	U			
Nov. 26-30	6	7	0	13	9.6	9.6
Dec. 1-5	12	11	0	23	17.1	26.7
Dec. 6-10	9	11	1	21	15.6	42.3
Dec. 11-15	4	14	0	18	13.3	55.6
Dec. 16-20	8	13	1	22	16.3	71.9
Dec. 21-25	8	12	0	20	14.8	86.7
Dec. 26-30	7	8	0	15	11.1	97.8
Dec. 30-Jan. 1 ^a	0	3	0	3	2.2	100.0
Unknown	0	0	5	5	—	—
TOTAL	54	79	7	140	100.0	100.0

^a3-day interval

Table 4. Distribution of bobcat harvest among takers, 1981-82 thru 1988-89.

Number Taken	Number of Takers									Total (1981-88)
	<u>1981-82</u> # (%)	<u>1982-83</u> # (%)	<u>1983-84</u> # (%)	<u>1984-85</u> # (%)	<u>1985-86</u> # (%)	<u>1986-87</u> # (%)	<u>1987-88</u> # (%)	<u>1988-89</u> # (%)	# (%)	
1	123 (71.1)	111 (65.3)	108 (72.0)	116 (65.2)	70 (78.7)	92 (76.7)	104 (71.7)	88 (80.7)	812	(71.6)
2	29 (16.8)	30 (17.6)	32 (21.3)	39 (21.9)	11 (12.4)	18 (15.0)	23 (15.9)	11 (10.1)	193	(17.0)
3	10 (5.8)	16 (9.4)	6 (4.0)	13 (7.3)	6 (6.7)	9 (7.5)	10 (6.9)	8 (7.3)	78	(6.9)
4	5 (2.9)	10 (5.9)	4 (2.7)	9 (5.1)	1 (1.1)	0 (0.0)	6 (4.1)	1 (0.9)	36	(3.2)
5	6 (3.5)	3 (1.8)	0 (0.0)	1 (0.5)	1 (1.1)	1 (0.8)	2 (1.4)	1 (0.9)	15	(1.3)
TOTAL	173	170	150	178	89	120	145	109	1134	

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Table 5. Bobcat harvest by method of take, 1979-1988.

Year	Total Harvest	Trapping				Hunting			
		Harvest	(% of Total)	Takers	Average Take	Harvest	(% of Total)	Takers	Average Take
1979	291	253	(86.9)	—	—	38	(13.1)	—	—
1980	210	177	(84.3)	68	2.6	33	(15.7)	24	1.4
1981	260	219	(84.2)	143	1.5	41	(15.8)	30	1.4
1982	274	239	(87.2)	147	1.6	35	(12.8)	23	1.5
1983	208	168	(80.8)	118	1.4	40	(19.2)	32	1.3
1984	280	252	(90.0)	156	1.6	28	(10.0)	22	1.3
1985	119	83	(69.7)	62	1.3	36	(30.3)	27	1.3
1986	160	119	(74.4)	89	1.3	41	(25.6)	31	1.3
1987	214	177	(82.7)	118	1.5	37	(17.3)	26	1.4
1988	140	94	(67.1)	76	1.2	46	(32.9)	32	1.4

7.

Table 6. Fisher harvest by county and sex, 1988 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	7	7	0	14
Becker	2	2	0	4
Beltrami	31	37	0	68
Carlton	2	1	0	3
Cass	16	8	0	24
Clearwater	0	1	0	1
Cook	12	17	0	29
Crow Wing	1	2	0	3
Hubbard	4	2	0	6
Itasca	69	66	0	135
Kanabec	1	0	0	1
Kittson	1	1	0	2
Koochiching	61	67	0	128
Lake	37	41	0	78
Lake of the Woods	19	47	0	66
Mahnomen	1	4	0	5
Marshall	3	4	0	7
Pennington	0	1	0	1
Pine	1	0	0	1
Polk	1	0	0	1
Roseau	18	50	0	68
St. Louis	162	214	1	377
Unknown	0	0	3	3
TOTAL	449	572	4	1025

Table 7. Comparison of fisher harvest by county, 1984-1988.

County	1984	1985	1986	1987	1988
Aitkin	10	8	8	24	14
Becker	3	1	4	2	4
Beltrami	96	27	71	115	68
Carlton	3	0	3	6	3
Cass	19	17	32	60	24
Clearwater	6	4	4	3	1
Cook	16	9	15	29	29
Crow Wing	11	6	11	14	3
Hubbard	7	1	7	9	6
Itasca	228	84	183	247	135
Kanabec	0	0	0	0	1
Kittson	2	1	1	4	2
Koochiching	255	157	195	303	128
Lake	80	49	81	114	78
Lake of the Woods	85	46	58	91	66
Mahnomen	0	0	0	0	5
Marshall	10	5	2	19	7
Norman	0	0	1	1	0
Pennington	0	0	0	0	1
Pine	1	0	0	1	1
Polk	0	0	1	0	1
Red Lake	0	0	0	1	0
Roseau	111	68	75	90	68
St. Louis	345	195	316	509	377
Unknown	1	0	0	0	3
Total	1289	678	1068	1642	1025

Table 8. Fisher harvest by date and sex, 1988-89 season.

Date	Sex			Total	% of Known Total	Cumulative Percent
	Male	Female	Unknown			
11/26	3	4	0	7	0.7	0.7
11/27	20	26	0	46	4.6	5.3
11/28	19	35	0	54	5.4	10.7
11/29	20	27	0	47	4.7	15.4
11/30	22	43	0	65	6.5	21.9
12/01	27	29	0	56	5.6	27.5
12/02	20	39	0	59	5.9	33.4
12/03	51	67	0	118	11.9	45.3
12/04	41	58	0	99	10.0	55.3
12/05	29	36	0	65	6.6	61.9
12/06	29	25	0	54	5.4	67.3
12/07	35	56	0	91	9.2	76.5
12/08	25	24	0	49	4.9	81.4
12/09	17	28	0	45	4.5	85.9
12/10	45	42	1	88	8.9	94.8
12/11	29	23	0	52	5.2	100.0
Unknown	17	10	3	30	—	—
Total	449	572	4	1025	100.0	100.0

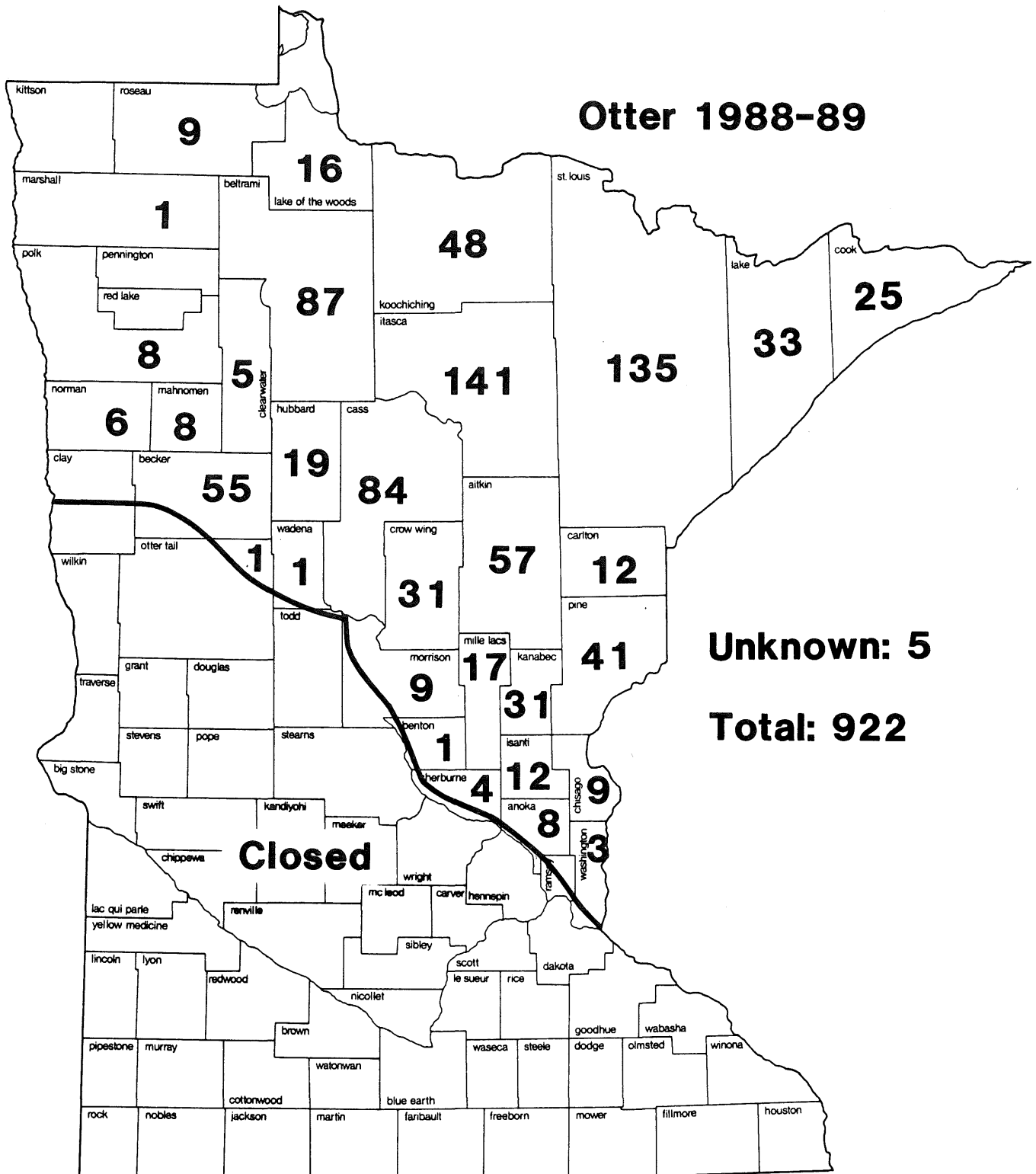


Fig. 3. Otter harvest by county, 1988-89.

Table 9. Otter harvest by county and sex, 1987-88 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	33	24	0	57
Anoka	3	4	1	8
Becker	30	25	0	55
Beltrami	42	45	0	87
Benton	1	0	0	1
Carlton	8	4	0	12
Cass	49	35	0	84
Chisago	6	3	0	9
Clearwater	2	3	0	5
Cook	11	14	0	25
Crow Wing	15	16	0	31
Hubbard	13	6	0	19
Isanti	5	7	0	12
Itasca	77	61	3	141
Kanabec	15	16	0	31
Koochiching	23	25	0	48
Lake	19	14	0	33
Lake of the Woods	11	5	0	16
Mahnomen	4	4	0	8
Marshall	1	0	0	1
Mille Lacs	10	7	0	17
Morrison	6	3	0	9
Norman	4	2	0	6
Ottertail	0	1	0	1
Pine	22	19	0	41
Polk	6	2	0	8
Roseau	6	3	0	9
St. Louis	67	67	1	135
Sherburne	3	1	0	4
Wadena	1	0	0	1
Washington	2	1	0	3
Unknown	0	0	5	5
Total	495	417	10	922

Table 10. Comparison of otter harvest by county, 1984-1988.

County	1984	1985	1986	1987	1988
Aitkin	34	17	43	55	57
Anoka	0	0	4	2	8
Becker	18	24	34	41	55
Beltrami	33	46	66	125	87
Carlton	13	10	13	24	12
Benton	—	—	—	—	1
Cass	49	59	67	147	84
Chisago	0	0	4	11	9
Clearwater	11	6	17	19	5
Cook	16	5	20	33	25
Crow Wing	15	26	27	57	31
Hubbard	22	25	27	36	19
Isanti	0	0	12	24	12
Itasca	94	96	123	199	141
Kanabec	9	4	14	28	31
Kittson	0	0	1	0	0
Koochiching	34	38	45	77	48
Lake	18	25	47	61	33
Lake of the Woods	13	5	9	39	16
Mahnomen	3	14	6	5	8
Marshall	0	1	0	1	1
Mille Lacs	7	4	9	28	17
Morrison	0	0	3	17	9
Norman	0	0	0	1	6
Ottertail	1	1	4	1	1
Pennington	0	1	0	1	0
Pine	29	20	21	70	41
Polk	5	6	5	7	8
Red Lake	0	0	0	1	0
Roseau	5	5	7	12	9
St. Louis	96	119	145	256	135
Sherburne	0	0	1	1	4
Wadena	2	2	1	4	1
Washington	0	0	0	3	3
Unknown	2	0	2	0	5
Total	529	559	777	1386	922

Table 11. Otter harvest by date and sex, 1988-89 season.

Date	Sex			Total	% of known Total	Cumulative Percent
	Male	Female	Unknown			
10/29	3	5	1	9	1.0	1.0
10/30	20	12	1	33	3.7	4.7
10/31	11	6	0	17	1.9	6.6
11/01	17	25	1	43	4.9	11.5
11/02	19	22	0	41	4.6	16.1
11/03	17	13	0	30	3.4	19.5
11/04	25	22	0	47	5.3	24.8
11/05	16	12	1	29	3.3	28.1
11/06	9	9	0	18	2.0	30.1
11/07	20	15	0	35	4.0	34.1
11/08	13	11	0	24	2.7	36.8
11/09	15	9	0	24	2.7	39.5
11/10	28	23	0	51	5.7	45.2
11/11	10	8	0	18	2.0	47.2
11/12	12	12	0	24	2.7	49.9
11/13	17	9	0	26	2.9	52.8
11/14	17	14	1	32	3.6	56.4
11/15	22	26	0	48	5.4	61.8
11/16	15	9	0	24	2.7	64.5
11/17	9	12	0	21	2.4	66.9
11/18	14	12	0	26	2.9	69.8
11/19	12	12	0	24	2.7	72.5
11/20	18	18	0	36	4.1	76.6
11/21	14	10	0	24	2.7	79.3
11/22	15	14	0	29	3.3	82.6
11/23	24	19	0	43	4.9	87.5
11/24	12	14	0	26	2.9	90.4
11/25	14	12	0	26	2.9	93.3
11/26	28	13	0	41	4.6	97.9
11/27	13	6	0	19	2.1	100.0
Unknown	16	15	3	34	—	—
Total	495	419	8	922	100.0	100.0

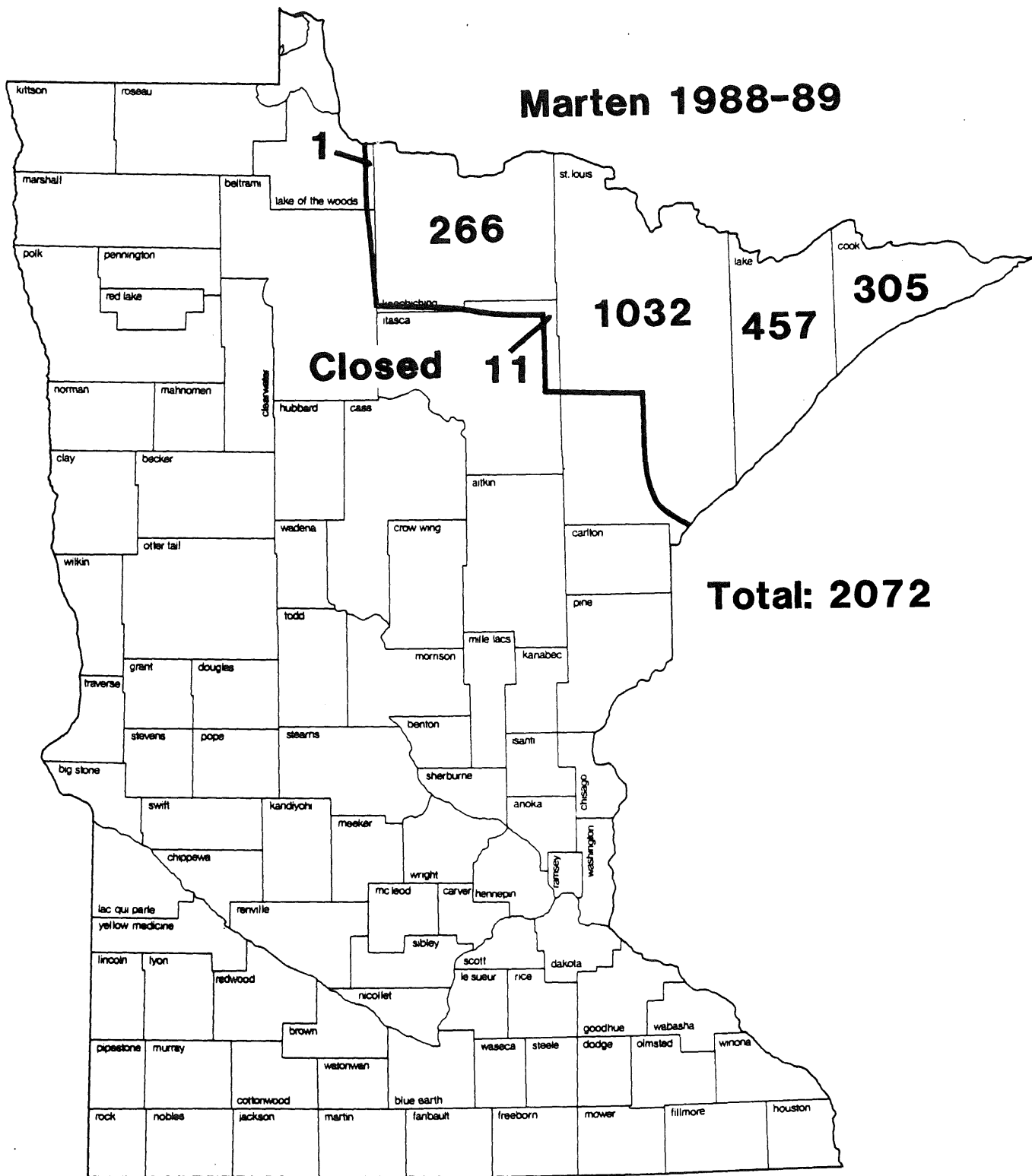


Fig. 4. Marten harvest by county, 1988-89.

Table 12. Marten harvest by county and sex, 1988-89.

County	Sex			Total
	Male	Female	Unknown	
Cook	205	99	1	305
Itasca	11	0	0	11
Koochiching	139	127	0	266
Lake	310	147	0	457
Lake of the Woods	1	0	0	1
St. Louis	615	415	2	1032
Total	1281	788	3	2072

Table 13. Comparison of marten harvest by county, 1985-88

County	1985	1986	1987	1988
Cook	51	75	143	305
Itasca	closed	closed	closed	11
Koochiching	72	159	275	266
Lake	119	160	270	457
Lake of the Woods	closed	closed	closed	1
St. Louis	188	401	675	1032
Unknown	0	3	0	0
Total	430	798	1363	2072

Table 14. Marten harvest by date and sex, 1988-89.

Date	Male	Female	Unknown	Total	% of known Total	Cumulative Percent
11/26	6	3	0	9	0.4	0.4
11/27	83	66	0	149	7.3	7.7
11/28	80	53	0	133	6.5	14.2
11/29	65	43	0	108	5.3	19.5
11/30	99	57	1	156	7.6	27.1
12/01	79	37	0	116	5.7	32.8
12/02	77	38	0	115	5.6	38.4
12/03	160	98	0	258	12.6	51.0
12/04	135	72	2	209	10.2	61.2
12/05	99	44	0	143	7.0	68.2
12/06	63	51	0	114	5.6	73.8
12/07	102	64	0	166	8.1	81.9
12/08	68	45	0	113	5.5	87.4
12/09	47	38	0	85	4.1	91.5
12/10	65	40	1	106	5.2	96.7
12/11	34	33	0	67	3.3	100.0
Unknown	19	6	3	28	—	—
Total	1281	788	6	2075	100.0	100.0

PART II.

Bobcat, Fisher, Marten, and Otter
Population Status

BOBCAT, 1988-89

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Registrations for the November 26, 1988 to January 1, 1989 bobcat trapping and hunting season totaled 140; this represented a decline of 35% from 1987-88. This decline, similar to that recorded for fisher and otter, was likely due to deep snows that restricted access.

A total of 114 (82% of the registered take) carcasses were collected under the mandatory carcass surrender system. Juveniles comprised 39% of the harvest, second only to 1978 (Table 1). Fifty-four percent of the overall harvest consisted of males, with only the adult cohort leaning slightly toward females. The juvenile:ad. female (>2.7 years) ratio was 1.7:1, the highest since 1980 and 1981 (1.9:1 and 2.2:1, respectively) (Table 1).

The 1988 harvest took a modest 8% of the modeled available population. With projected post-1988 harvests of 260-300, the modeled spring pre-birth population stabilizes at 1500-1600. Continued harvests approximating 300 combined with low hare abundance will likely cause the bobcat population to decline.

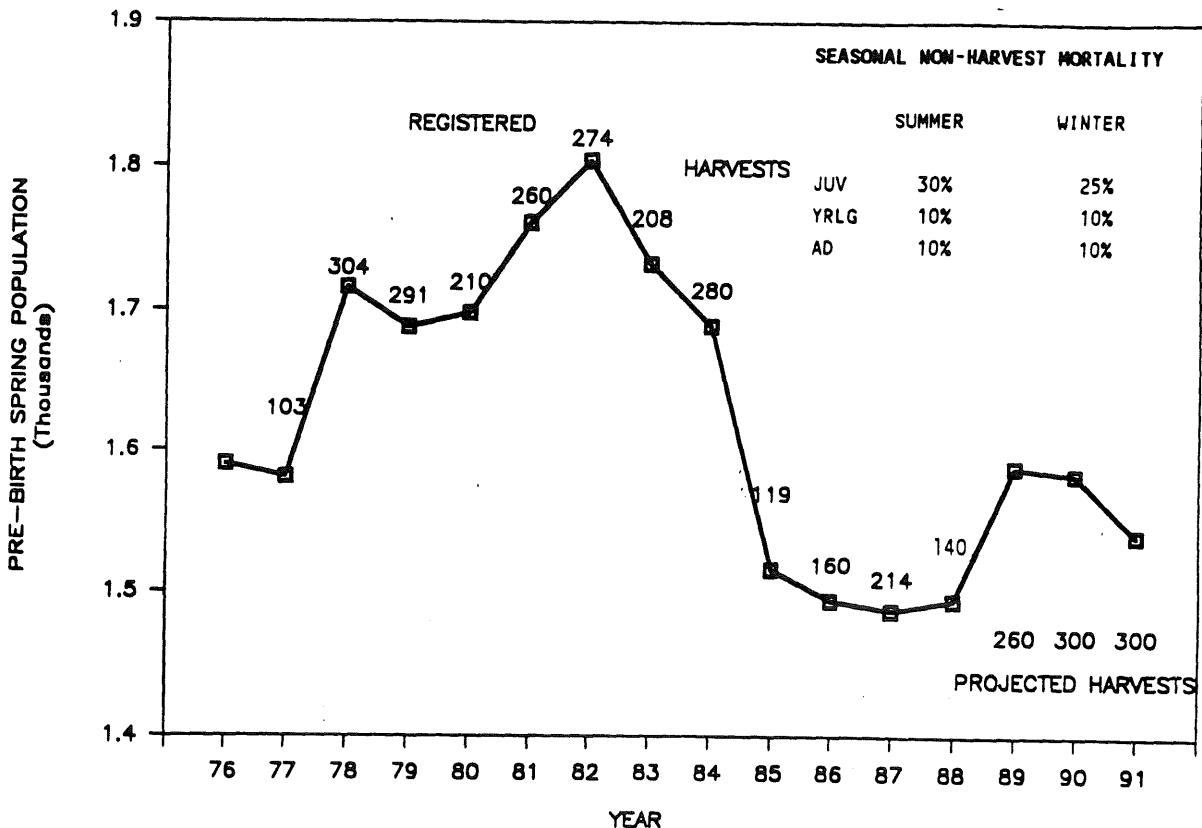


Figure 1. Bobcat population model, 1976-1992, with registered harvests to 1988 and projected harvests after 1988. Juvenile non-harvest mortality was increased 5%-15% above that in figure during 1982-1987 to compensate for reduced prey availability. Harvest mortality was increased 10% to compensate for illegal and accidental catches.

Table 1. Bobcat harvest, age structure, and population index data, 1977-78 to 1988-89.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Registered take	103	304	291	210	260	274	208	280	119	160	214	140
Mean pelt price	\$74	\$164	\$118	\$79	\$73	\$66	\$61	\$76	\$70	\$120	\$101	---
Carcasses aged	34	113	75	48	230	261	205	288	99	132	163	114
% juveniles	35%	54%	37%	31%	37%	35%	37%	37%	33%	26%	33%	39%
% male juveniles	50%	61%	54%	80%	59%	47%	56%	52%	41%	53%	44%	58%
% 1.7 yrs. old	18%	15%	12%	33%	23%	15%	18%	13%	19%	17%	16%	18%
% male 1.7 yrs.	33%	53%	44%	69%	63%	49%	56%	66%	41%	32%	52%	62%
% >2.7 yrs. old	47%	31%	52%	35%	40%	50%	37%	50%	48%	58%	51%	46%
% male >2.7 yrs.	41%	60%	53%	56%	55%	47%	51%	44%	43%	51%	48%	42%
Overall % males	41%	59%	52%	66%	58%	48%	45%	51%	42%	51%	48%	54%
Juv :: > 2.7 yr. females	1.2	4.4	1.6	1.9	2.1	1.3	1.5	1.4	1.2	0.9	1.4	1.7
% autumn pop. taken ¹	5%	14%	14%	10%	12%	14%	10%	13%	6%	8%	11%	8%
Scent post index ²	8	6	5	2	14	14	3	12	5	8	7	5
Snowshoe hare index ³	9.0	8.8	14.1	9.8	1.8	0.7	0.2	0.3	0.2	0.5	0.5	---

¹ includes registered harvests plus 10% unreported harvest

² index for autumn prior to harvest season

³ index for spring after harvest season

FISHER, 1988-89

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During the 1988-89 November 26-December 11, 1988 trapping season, 1025 fisher were registered (Table 1). The decline of 38% from the 1987 total was due in part to the deep snow which reduced trapper access. As in 1987, mandibles (rather than carcasses) were collected for age and sex data; 805 were collected in 1988.

Most age and sex parameters approximated those of previous harvests, with juvenile sex ratios approximating 50:50, and yearling and adult (≥ 2.7 yrs) sex ratios each approximating 60% males (Table 1). Seventy percent of the 1988 harvest was comprised of juveniles. The juvenile to mother (females ≥ 2.7 yrs) ratio was 6.8:1, the highest since 1985 and the first increase since this ratio began declining after the 1981 season.

Sixteen percent of the available modeled autumn population was harvested in 1988, compared to an excessive 21% in 1987. The spring pre-birth population will likely stabilize at approximately 6000 fisher, given projected harvests approximating 1300 and average prey availability (Fig. 1).

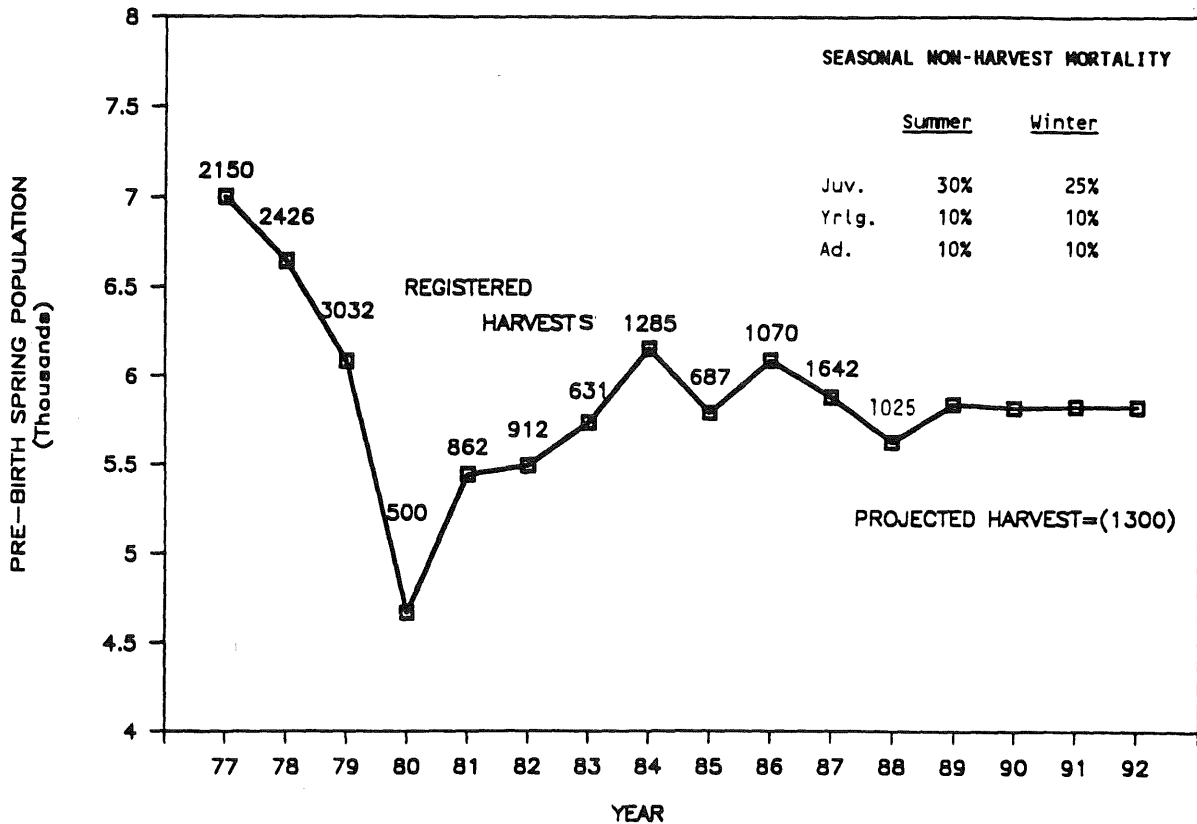


Figure 1. Fisher population model, 1977-1992, showing registered harvests through 1988 (1980 season was closed) and projected harvests of 1300 thereafter. Juvenile non-harvest mortality shown in figure was increased 5-10% in summer and winter, 1983-1987 to compensate for decreased snowshoe hare availability. For modeling purposes registered harvests were increased 22%, except in 1980 (26%), for accidental/illegal harvests.

Table 1. Harvest, carcass collection, and pelt price data for fisher seasons in Minnesota, 1977 to 1988. Fisher taken in 1980-81 were on Indian Reservations.

	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Season	12/1- 1/31	12/1- 1/31	12/1- 1/31	closed	12/1- 12/10	12/1- 12/10	12/1- 12/11	12/1- 12/16	11/30- 12/15	11/29- 12/4	11/28- 12/13	11/26- 12/11
Limit	3	3	3	----	1	1	1	1	1	1	1	1
Registered take	2150	2426	3032	(423)	862	912	631	1285	678	1068	1642	1025
% of available autumn population harvested ¹	26%	30%	42%	9%	17%	17%	10%	18%	10%	14%	21%	16%
No. carcasses examined ²	562	577	467	----	843	1073	662	1270	712	1186	1534	805
% juveniles	69%	70%	65%	----	66%	66%	69%	63%	63%	59%	63%	70%
% 1.7 yrs.	16%	16%	15%	----	24%	19%	18%	20%	20%	24%	15%	15%
% ≥ 2.7 yrs.	14%	14%	21%	----	10%	15%	13%	17%	18%	18%	22%	15%
Juv:ad. female ratio	8.4:1	7.1:1	5.6:1	----	10.5:1	9.4:1	8.8:1	7.2:1	5.4:1	5.3:1	4.7:1	6.8:1
% male juveniles	54%	44%	54%	----	48%	46%	45%	52%	46%	48%	46%	48%
% male 1.7 yrs.	28%	35%	46%	----	43%	41%	40%	45%	40%	50%	40%	39%
% male ≥ 2.7 yrs.	43%	28%	44%	----	37%	52%	40%	45%	34%	37%	37%	33%
Pelt price: males		\$132	\$108	\$90	\$94	\$70	\$71	\$70	\$74	\$84	\$84	----
females	\$71	\$147	\$128	\$104	\$110	\$99	\$121	\$122	\$130	\$162	\$170	----
Snowshoe hare index ³	9.0	8.8	14.1	9.8	1.8	0.7	0.2	0.3	0.2	0.5	0.5	----

¹ estimated from population model

² may exceed registration totals due to accidental catches, etc.

³ number of snowshoe hares seen per 100 km of ruffed grouse drumming route during the spring after fisher season

PINE MARTEN, 1988-89

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The 1988 pine marten trapping season was from November 26 to December 11. It differed from the previous three seasons in that the limit was increased to two, and the open zone was expanded to include most of northeastern Minnesota. A total of 2072 marten was registered under this framework, 52% above the 1987 harvest.

A total of 1982 carcasses collected under the mandatory carcass surrender could be aged. The juvenile, yearling, and adult cohorts were 66%, 11%, and 23%, respectively (Table 1). The proportions of males in the respective cohorts was 58%, 50%, and 66%. The overall sex ratio (59% males), and the juvenile to mother (ad. females $\geq 2^{1/2}$ yrs.) ratio (8.6:1), were the lowest since collections began. Conversely, the proportion of adults harvested (23%) was the highest.

Refinements in aging techniques for yearling and adult teeth in 1988 allowed slight revisions to be made in harvest age structures for all years. Although this resulted in a 63%-76% reduction in yearlings, and a 35%-41% increase in adults, the population model was unaffected. Twenty percent of the available population was harvested in 1988, compared to 16% in 1987 (Table 1). With projected post-1988 annual harvests approximating 2400, the spring modeled pre-birth population stabilizes at more than 9500 animals (Fig. 1).

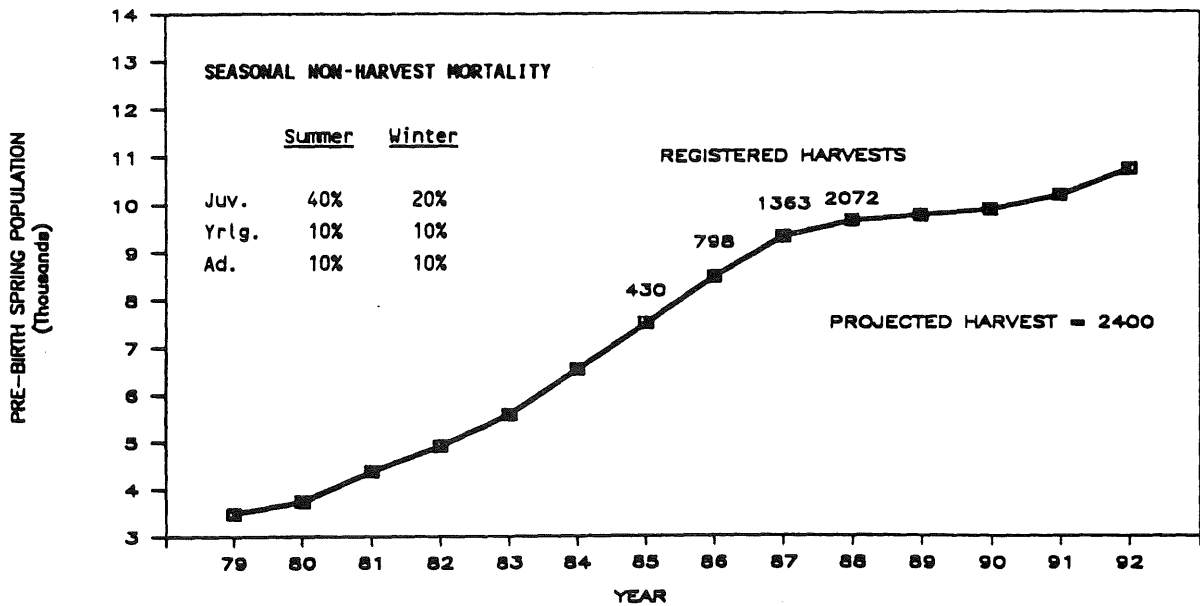


Figure 1. Pine marten population model, 1979-1992. Registered harvests shown for 1985-1988, followed by projected harvests of 2400. Accidental take is modeled at 50% of registered harvest through 1987, and 25% of registered harvests, 1988-1992.

Table 1. Harvest, carcass collection, and pelt price data for pine marten seasons in Minnesota, 1985 to 1988.

	1985	1986	1987	1988
Season	11/30-12/15	11/29-12/14	11/28-12/13	11/26-12/11
Limit	1	1	1	2
Registered take	430	798	1363	2072
% of available autumn population harvested	6%	9%	16%	20%
No. carcasses examined	507	884	1754	1977
% juveniles	73%	64%	66%	66%
% 1.7 yr.	18%	21%	18%	11%
% ≥ 2.7 yrs.	9%	15%	16%	23%
juv:ad. female ratio	17.2:1	12.3:1	11.2:1	8.6:1
% male juveniles	69%	65%	65%	58%
% male 1.7 yrs.	68%	71%	67%	50%
% male ≥ 2.7 yrs.	82%	81%	75%	66%
% males overall	70%	69%	67%	59%
pelt price (male)	\$30	\$36	\$43	----
pelt price (female)	\$28	\$27	\$39	----

OTTER, 1988-89

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The otter harvest during the October 29-November 27, 1988 season was 922, down 33% from 1987. Like other species, the harvest decline was likely due to low pelt prices and deep snow which restricted access. As in 1987 otter carcasses were not collected, and inputs for the model were based on projections derived from pre-1987 age, sex, and productivity data.

In 1988 approximately 15% of the modeled available autumn population was harvested, compared to 17% in 1987 and a range of 7%-20% from 1978-1986. Population declines are indicated in the model when harvests exceed 1100 for 1-2 years (Fig. 1). Projected registered harvests approximating 1050 otter stabilize the spring pre-birth population at about 5500.

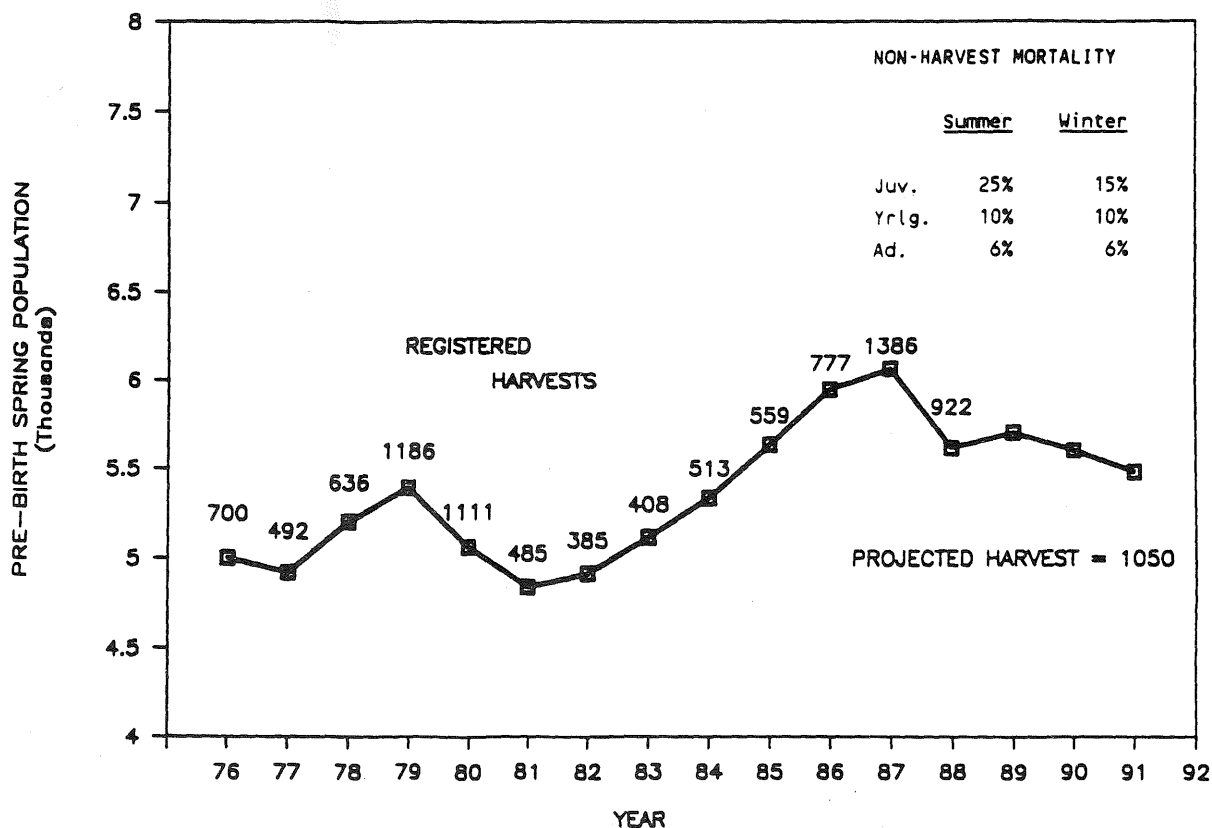


Figure 1. Otter population model, 1976-1991, showing registered harvests through 1988 and projected post-1988 harvests of 1050. For modeling purposes registered harvests are increased 20% to compensate for accidental take (10% in 1987-88).

