

Status of Wildlife Populations,
Fall 1989 and 1981-1988 Hunting
and Trapping Harvest Statistics

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future more comprehensive analysis and verification
being undertaken.

Status of Wildlife Populations, Fall 1989

and

1981-88 Hunting and Trapping Harvest Statistics

This is the 13th year the Wildlife Populations and Research Unit has published this booklet; it is primarily an administrative document intended for DNR personnel. (Since 1984 we have also published a companion volume containing annual summaries of findings/activities from each research project ongoing in the Unit).

For farmland and forest wildlife, most of the field work associated with collection of census and survey data is carried out by wildlife managers (conservation officers also participate in pheasant counts). The Farmland and Forest Wildlife Population and Research groups coordinate these activities, analyze and interpret data, and prepare recommendations for season setting meetings. For wetland species, much of the census and survey work is done by personnel in the Wetland Wildlife Populations and Research Group. Harvest statistics are calculated primarily by personnel in the St. Paul Office.

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FARMLAND WILDLIFE POPULATIONS

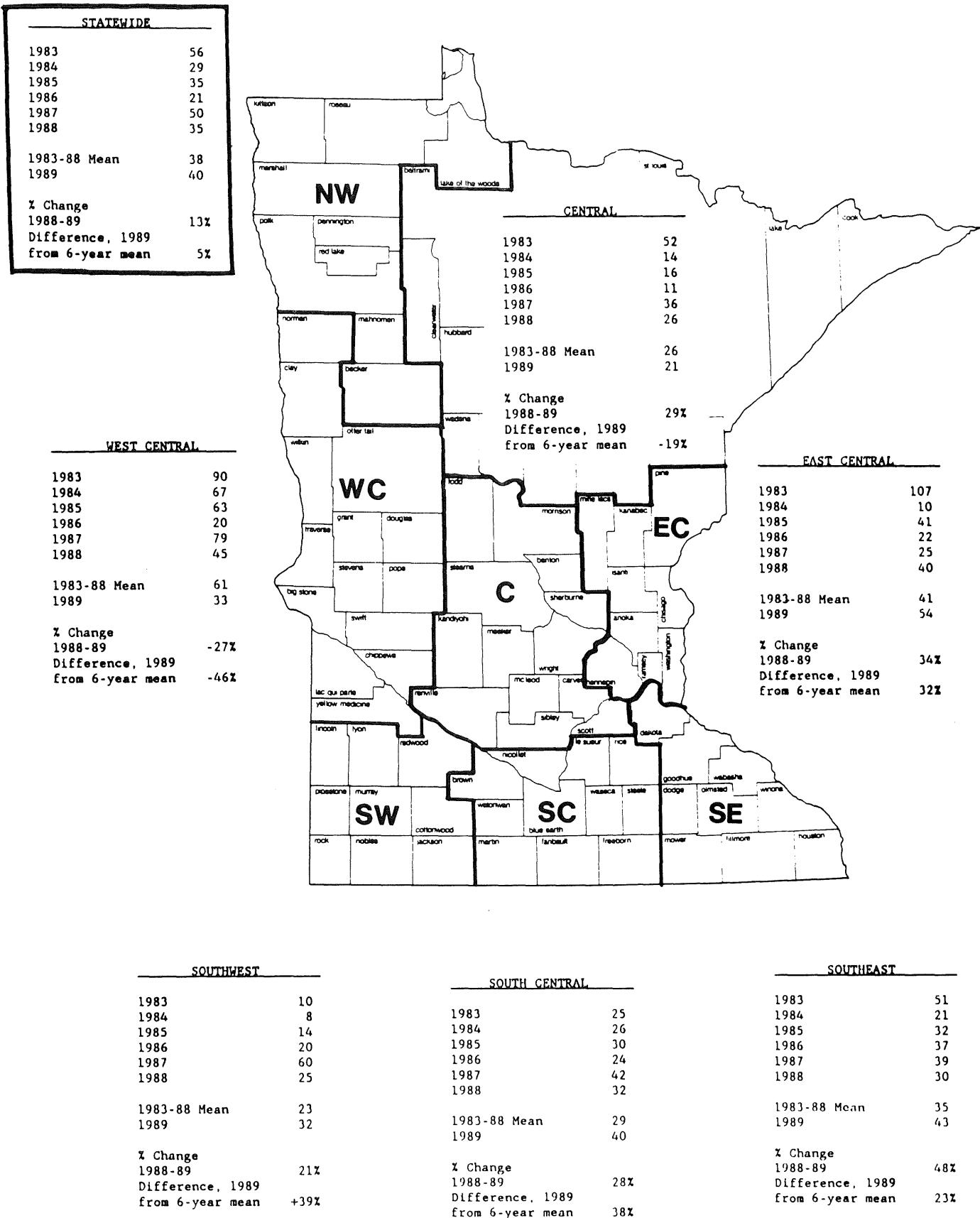


Figure 1. Pheasants observed per 100 miles of August roadside count route, 1983-89, and percent change 1988-89 for routes surveyed both years.

Table 1. County, regional and statewide August roadside count results for ring-necked pheasants, 1984-1989.

Region and County	Miles surveyed 1989	Pheasants observed per 100 miles						Percent ^a change 1988-89
		1984	1985	1986	1987	1988	1989 Mean	
West Central	925	66.5	62.9	19.6	79.5	45.3	33.1	54.8
Big Stone	75	257	283	21	339	96	36	
Chippewa	50	60	38	26	116	48	52	
Clay	75	25	1	0	0	9	11	
Douglas	50	16	2	2	14	14	0	
Grant	50	30	12	10	4	0	18	
Lac Qui Parle	75	137	40	24	107	200	73	
Norman	50	0	0	0	0	0	0	
Otter Tail	50	124	106	52	140	44	2	
Pope	75	63	97	40	67	61	49	
Stevens	75	84	61	33	113	29	97	
Swift	75	39	111	17	63	17	77	
Traverse	75	57	36	23	69	53	4	
Wilkin	75	3	3	1	0	0	0	
Yellow Medicine	75	1	39	21	40	21	12	
Central	750	13.6	16.3	10.7	36.4	31.2	43.1	21.3
Benton	50	10	60	8	104	28	74	
Carver	50	18	4	0	26	44	14	
Kandiyohi	75	9	25	3	8	60	71	
McLeod	50	0	16	14	--	20	166	
Meeker	75	28	8	5	21	28	65	
Morrison	50	0	0	22	8	2	28	
Renville	50	0	0	0	0	0	0	
Scott	50	6	38	14	72	48	42	
Sherburne	50	0	0	0	48	0	0	
Sibley	75	17	20	19	44	26	17	
Stearns	100	20	19	3	11	14	2	
Todd	25	30	0	44	26	80	100	
Wright	50	18	16	18	100	58	38	
East Central	425	10.1	41.3	22.4	24.5	40.0	53.7	27.5
Anoka	50	2	32	0	4	20	16	
Chisago	75	20	72	25	43	33	115	
Hennepin	25	0	--	0	4	120	44	
Isanti	75	12	27	23	9	57	48	
Kanabec	50	10	32	38	26	18	0	
Mille Lacs	50	26	52	70	42	18	138	
Pine	50	0	66	6	30	70	0	
Washington	50	0	0	4	26	18	36	
Southwest	475	8.4	14.3	19.8	60.4	24.7	32.0	25.5
Cottonwood	50	10	46	0	48	32	14	
Jackson	50	10	18	10	16	8	32	
Lincoln	50	0	4	4	76	0	18	
Lyon	50	0	0	16	22	28	48	
Murray	50	0	6	26	98	40	40	
Nobles	75	0	15	29	41	12	16	
Pipestone	50	28	18	20	46	40	20	
Redwood	50	28	6	16	6	22	0	
Rock	50	4	16	52	200	48	108	
South Central	800	25.8	29.6	23.5	41.7	31.6	39.6	30.4
Blue Earth	75	7	8	1	29	43	37	
Brown	75	33	24	28	24	35	52	
Faribault	75	8	24	12	49	13	21	
Freeborn	75	25	51	35	72	31	37	
LeSueur	75	40	80	24	83	47	32	
Martin	75	65	15	50	74	35	3	
Nicollet	75	1	12	0	43	7	52	
Rice	75	1	0	16	12	27	71	
Steele	50	98	2	2	68	34	12	
Waseca	75	4	23	81	3	96	73	
Watsonwan	75	17	59	11	21	4	36	

Table 1. Continued.

Region and County	Miles surveyed 1989	Pheasants observed per 100 miles						Percent ^a change 1988-89	
		1984	1985	1986	1987	1988	1989		
Southeast	500	20.6	31.6	37.4	39.0	30.1	43.4	31.8	+47.6 ^b
Dakota	50	4	--	62	4	0	14		
Dodge	50	20	56	12	66	48	94		
Fillmore	50	38	2	32	14	4	56		
Goodhue	50	0	2	0	4	12	10		
Houston	50	0	0	2	14	10	0		
Mower	75	45	64	72	71	44	65		
Olmsted	75	29	49	60	41	65	83		
Wabasha	50	0	16	54	6	22	20		
Winona	50	32	38	14	114	26	18		
Statewide	3,875	28.7	34.6	21.2	50.0	34.8	39.8	33.8	+12.9 ^b

^a Percent change 1988-89 calculated only for routes surveyed both years.^b No difference found between years using T-test, p > 0.30.

Table 2. Statewide pheasant population parameters calculated from August roadside count results, 1984-89.

Population Parameter	1984	1985	1986	1987	1988	1989	1984-88 Mean	Percent ^a change 1988-89
Cocks/100 Miles Driven	2.5	3.2	2.6	3.6	2.8	2.9	2.9	2.8
Hens/100 Miles Driven	3.6	4.5	2.5	4.9	3.9	4.6	3.8	17.5
Broods/100 Miles Driven	4.3	4.8	3.6	7.0	4.7	5.2	4.9	7.3
Mean Brood Size	5.3	5.6	4.5	5.9	6.0	6.3	5.6	5.6
Broods/100 Hens	120.4	108.4	147.4	141.2	122.3	113.0	127.0	-8.6

^a Percent change 1988-89 calculated only for routes surveyed both years.

Table 3. Regional and statewide August roadside count results for gray (Hungarian) partridge, 1984-89.

Region	Miles Surveyed 1989	Partridge observed per 100 miles						Percent ^{a/} change 1988-89	
		1984	1985	1986	1987	1988	1989		
Northwest	475	9.5	2.2	3.5	3.6	3.8	24.8	4.6	555.6
West Central	925	18.2	30.7	10.1	14.5	26.8	20.0	20.1	-25.4
Central	750	17.3	17.5	4.6	13.9	18.2	13.1	14.3	-43.2
East Central	425	0.0	0.0	0.0	0.0	3.1	0.0	0.6	-100.0
Southwest	475	49.7	94.9	59.6	98.3	110.7	93.5	82.3	-14.2
South Central	800	26.5	63.3	45.3	47.0	63.6	84.1	49.0	32.0
Southeast	500	16.2	42.2	20.8	66.6	40.4	42.0	37.1	9.4
Statewide ^{b/}	4350	20.0	37.0	20.6	33.0	37.5	39.7	29.6	4.5

^{a/} Percent change 1988-89 calculated only for routes surveyed both years.

^{b/} Statewide means include the Northwest agricultural region.

Table 4. Statewide gray (Hungarian) partridge population parameters calculated from August roadside count results, 1984-89.

Population Parameter							1984-88 Mean	Percent ^{a/} change 1988-89
	1984	1985	1986	1987	1988	1989		
Adults/100 Miles	4.8	8.1	5.6	6.7	7.6	9.9	6.6	26.6
Broods/100 Miles	2.5	1.7	3.3	1.9	2.7	3.3	2.5	6.9
Mean Brood Size	9.2	9.1	8.9	7.9	10.0	9.1	9.2	-7.4
Broods/100 Adults	34.5	40.1	33.9	39.9	40.1	33.3	38.2	-15.5

^{a/} Percent change 1988-89 calculated only for routes surveyed both years.

Table 5. August roadside count results for selected farmland wildlife species and percent change 1988-89 by agricultural region.

Agricultural Region	Miles Surveyed 1989	Animals observed per 100 miles													
		Cottontail				Jackrabbit				Mourning dove			White-tailed deer		
		1988	1989	Percent ^{a/} change	1988	1989	Percent ^{a/} change	1988	1989	Percent ^{a/} change	1988	1989	Percent ^{a/} change		
Northwest	475	1.3	1.3	0.0	0.6	1.1	66.7	184.4	165.9	-10.1	15.2	15.4	1.4		
West Central	925	2.7	3.6	37.5	0.6	2.6	242.9	385.7	501.4	30.0	3.0	8.3	175.0		
Central	750	3.2	5.5	81.0	0.4	1.1	166.7	203.9	242.5	16.0	3.1	1.9	-26.3		
East Central	425	6.4	8.9	40.7	0.0	0.0	NA	121.5	125.9	3.6	3.3	2.4	-28.6		
South West	475	6.4	6.7	10.3	2.0	2.1	11.1	300.0	329.7	3.6	5.1	11.2	121.7		
South Central	800	3.9	4.2	10.0	1.0	2.4	100.0	202.6	257.3	25.0	2.7	1.8	-33.3		
South East	500	5.9	9.2	6.4	0.4	0.6	50.0	210.2	180.0	-20.3	8.6	7.8	-4.9		
Statewide ^{b/}	4350	4.0	5.4	38.8	0.7	1.6	106.3	245.0	283.4	13.9	5.2	6.4	27.5		

a/ Percent change 1988-89 calculated only for routes surveyed both years.

b/ Statewide means include the Northwest agricultural region.

Table 6. Statewide August roadside count results for selected farmland wildlife species, 1985-89.

Species	Animals observed per 100 miles ^{a/}					Percent ^{b/} change 1988-89
	1985	1986	1987	1988	1989	
Ring-necked pheasant ^{c/}	34.6	21.2	50.0	34.8	39.8	12.9
Gray partridge (Hun)	37.0	20.6	33.0	37.5	39.7	4.5
Mourning dove	270.1	204.1	262.0	245.0	283.4	13.9
Eastern cottontail	4.4	4.0	7.0	4.0	5.4	38.8 ^{d/}
White-tailed jackrabbit	1.2	0.5	0.7	0.7	1.6	106.3 ^{e/}
White-tailed deer	5.4	3.9	5.4	5.2	6.4	27.5
Sharp-tailed grouse	0.13	0.00	0.00	0.36	0.00	-100.0
Greater prairie-chicken	0.00	0.00	0.00	0.00	0.00	NA
Sandhill crane	1.84	1.33	3.44	7.66	2.44	-66.9
Badger	0.00	0.00	0.05	0.00	0.03	NA
Gray & fox squirrel	0.86	1.29	1.19	1.62	1.20	-24.6
Gray & red fox	0.23	0.42	0.26	0.22	0.74	255.6 ^{e/}
Striped & spotted skunk	0.48	0.42	0.30	0.38	0.30	-18.8

^{a/} The mean number of animals per 100 miles is calculated using total miles surveyed and is not corrected for only routes surveyed both years.

^{b/} Percent change 1988-89 calculated only for routes surveyed both years.

^{c/} Pheasant means do not include the Northwest agricultural region.

^{d/} T-test shows significant difference between years, $p < 0.05$.

^{e/} T-test shows significant difference between years, $p < 0.01$.

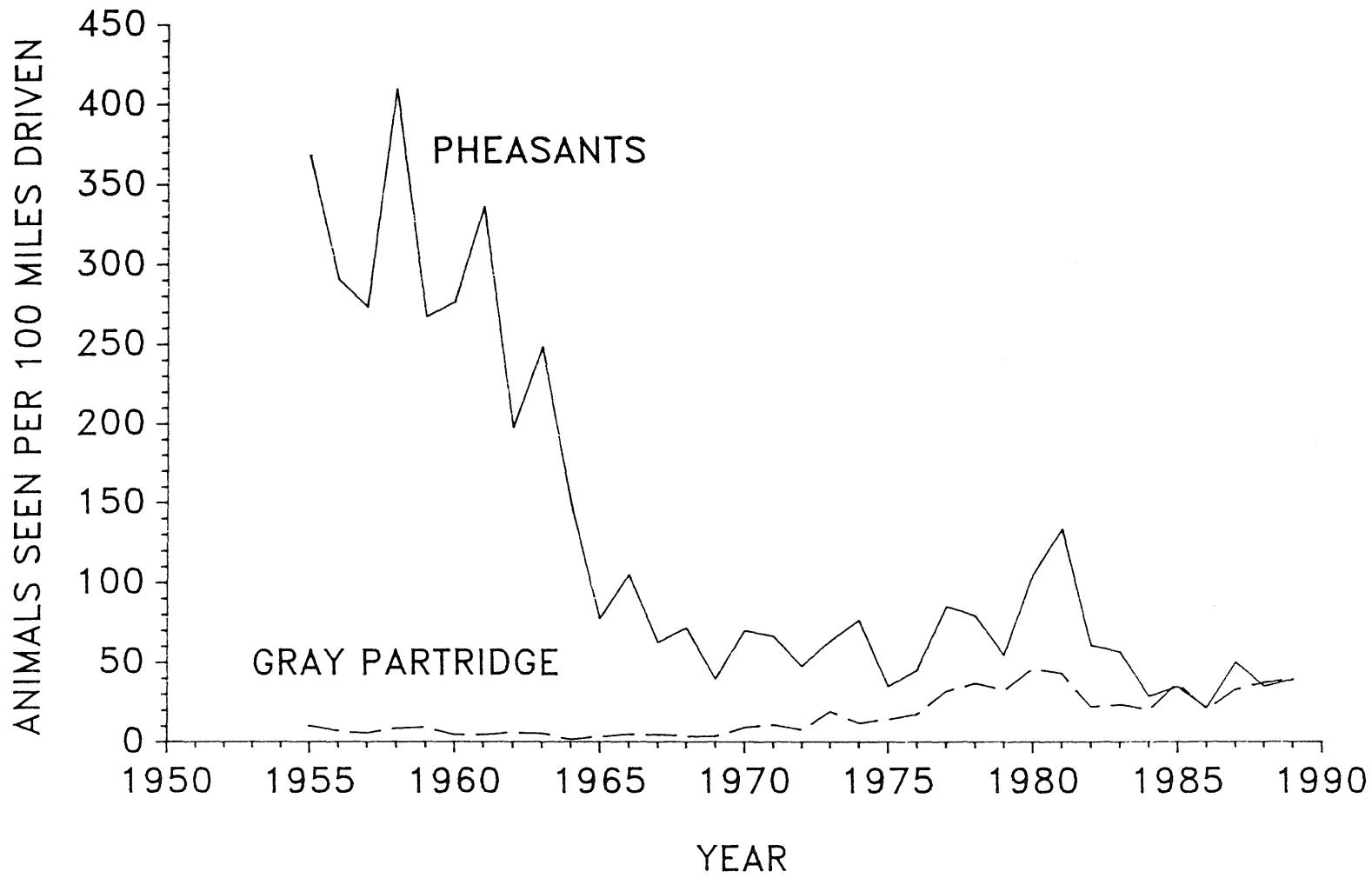


Figure 2. August roadside count indices (birds observed per 100 miles driven) for ring-necked pheasants and gray partridge, 1955-89.

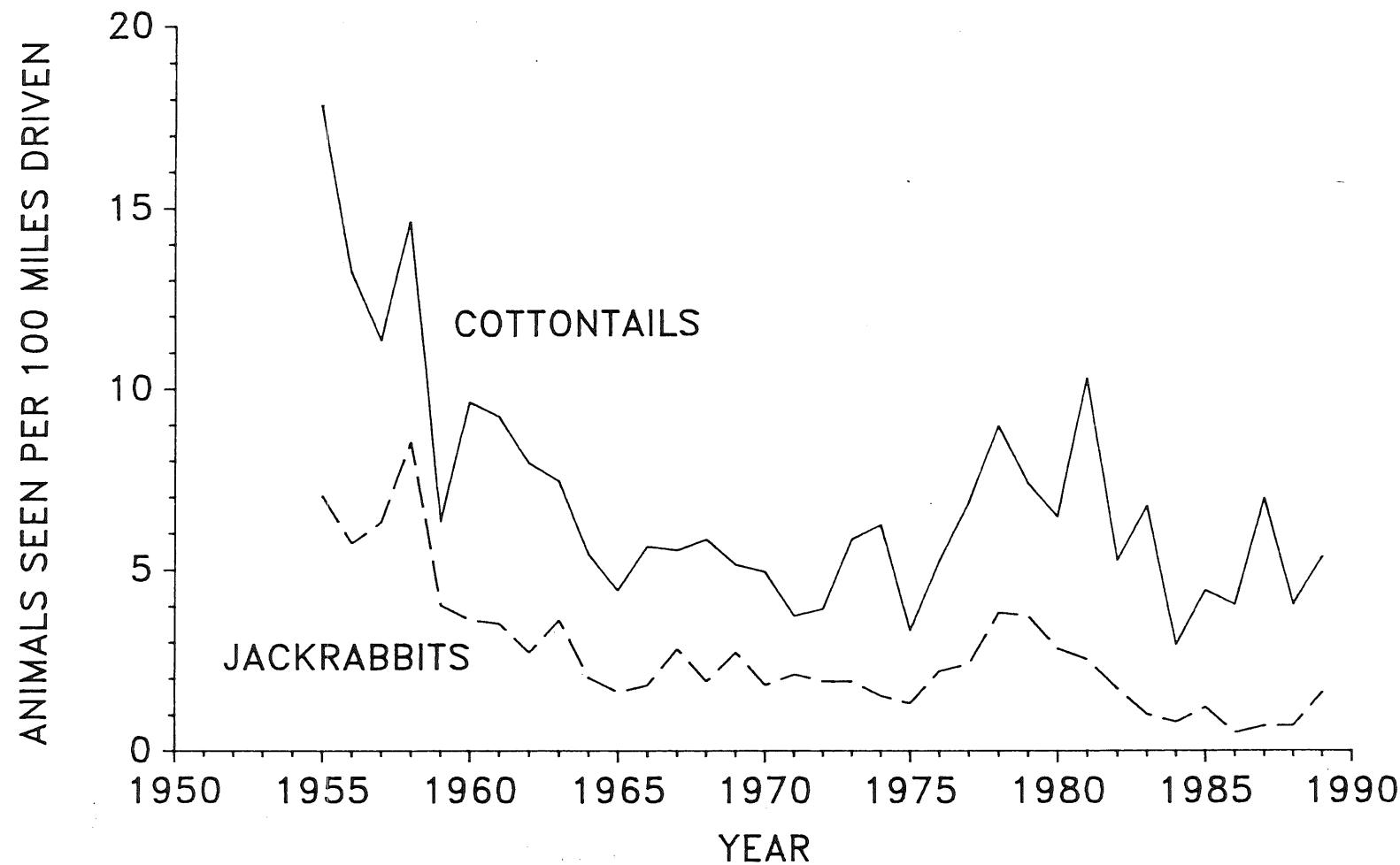


Figure 3. August roadside count indices (animals observed per 100 miles driven) for eastern cottontails and white-tailed jackrabbits, 1955-89.

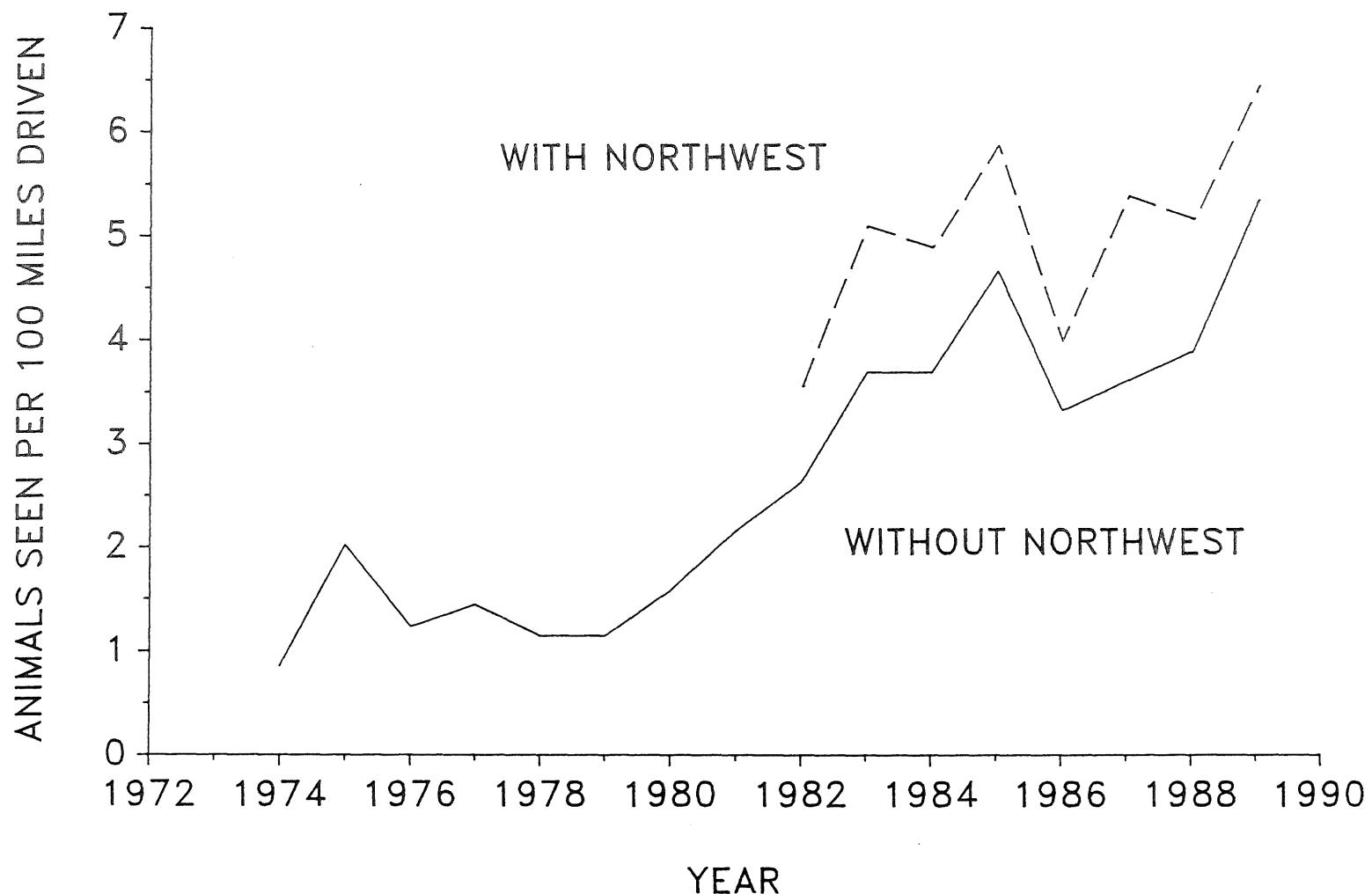


Figure 4. August roadside count indices (animals observed per 100 miles driven) for white-tailed deer, with and without the Northwest agricultural region, 1955-89.

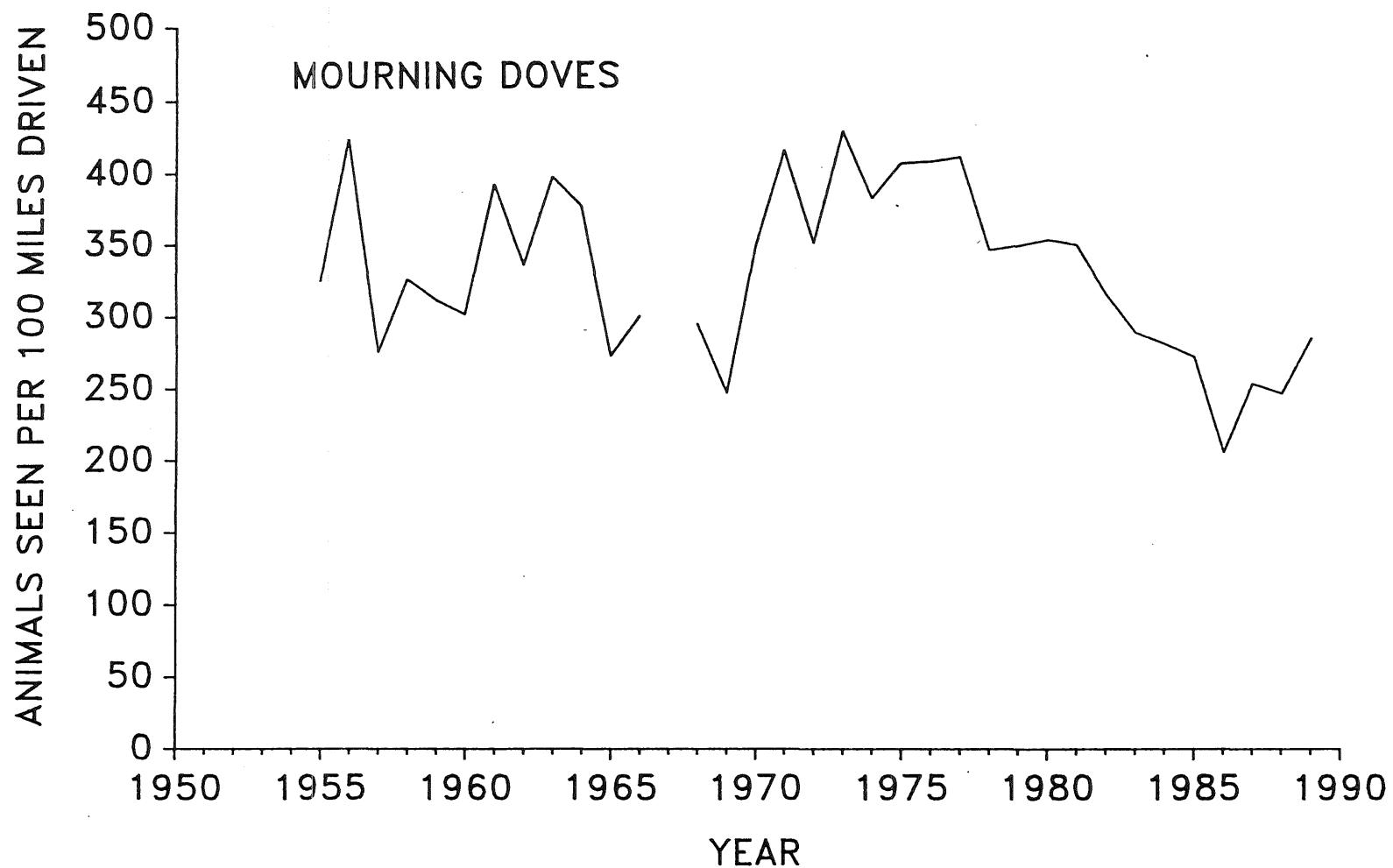


Figure 5. August roadside count indices (animals observed per 100 miles driven) for mourning doves, 1955-89.

August Roadside Survey Historical Summaries

Table 7. August roadside count results for 5 species, 1955-present.

Year	Animals observed per 100 miles ^{a/}				
	Ring-necked pheasant ^{b/}	Gray partridge	Cotton- tail	Jack- rabbit	Mourning dove
1955	368.1	9.9	17.8	7.0	324.5
1956	290.0	6.6	13.0	5.6	422.6
1957	272.6	5.5	11.2	6.3	274.5
1958	409.1	8.7	14.8	8.5	326.0
1959	266.8	9.3	6.2	4.0	311.4
1960	276.4	4.4	9.8	3.6	300.8
1961	336.0	4.5	9.4	3.5	392.4
1962	197.2	5.8	7.9	2.7	334.6
1963	248.1	5.1	7.4	3.6	396.5
1964	149.8	1.6	5.4	2.0	375.9
1965	77.2	3.6	4.4	1.6	271.6
1966	105.0	4.9	5.6	1.8	299.6
1967	62.2	4.6	5.5	2.8	
1968	71.4	3.5	5.8	1.9	293.5
1969	39.2	3.7	5.1	2.7	245.6
1970	69.6	9.1	4.9	1.8	348.3
1971	66.1	10.8	3.7	2.1	415.4
1972	47.3	7.5	3.9	1.9	349.8
1973	63.3	19.1	5.8	1.9	428.2
1974	76.3	12.0	6.2	1.5	380.8
1975	34.8	14.6	3.3	1.3	405.8
1976	44.8	17.6	5.2	2.2	407.4
1977	85.0	32.1	6.8	2.4	409.8
1978	79.0	37.0	8.9	3.8	344.5
1979	54.2	32.6	7.3	3.7	347.9
1980	104.9	46.0	6.4	2.8	352.2
1981	133.5	42.9	10.2	2.5	347.6
1982 ^{c/}	60.2	22.2	5.2	1.7	313.6
1983	56.2	23.4	6.7	1.0	286.6
1984	28.7	20.0	2.9	0.8	279.2
1985	34.6	37.0	4.4	1.2	270.1
1986	21.2	20.6	4.0	0.5	204.1
1987	50.0	33.0	6.9	0.7	252.4
1988	34.8	37.5	4.0	0.7	245.0
1989	39.8	39.7	5.4	1.6	283.4

^{a/} Gaps in data represent no survey.

^{b/} Pheasants observed per 100 miles do not include the Northwest agricultural region.

^{c/} Eight counties in the Northwest agricultural region added to roadside count for all species except pheasants, 1982-present.

Table 8. Pheasants observed per 100 miles of August roadside count,
summarized by agricultural region, 1955-present.

Year	Agricultural region							State-a/ wide
	WC	C	EC	SW	SC	SE	NW	
1955	335	163	140	581	620	212	No Survey	368
1956	249	208	175	357	478	169		290
1957	260	130	135	337	522	180		273
1958	490	262	300	473	593	126		409
1959	307	187	73	510	413	55		267
1960	367	243	203	294	357	38		276
1961	494	267	255	366	381	115		336
1962	264	140	144	215	239	114		197
1963	444	192	157	252	227	135		248
1964	225	83	26	185	211	84		150
1965	121	38	9	90	98	69		77
1966	110	67	26	109	176	102		105
1967	56	30	10	54	126	81		62
1968	65	40	17	78	125	94		71
1969	13	22	20	33	68	102		39
1970	20	27	9	55	109	194		70
1971	40	44	12	59	77	175		66
1972	20	28	44	37	67	105		47
1973	38	35	53	36	75	168		63
1974	51	73	85	60	93	108		76
1975	13	34	75	7	25	79		35
1976	12	28	68	2	83	81		45
1977	46	85	101	6	145	126		85
1978	36	80	178	23	106	77		79
1979	45	62	101	13	53	55		54
1980	79	117	221	20	110	85		105
1981	124	139	268	76	126	95		134
1982	71	44	155	26	49	29	0	60
1983	90	52	107	10	25	51	0	56
1984	67	14	10	8	26	21	0	29
1985	63	16	41	14	30	32	3	35
1986	20	11	22	20	24	37	0	21
1987	79	36	25	60	42	39	0	50
1988	45	31	40	25	32	30	0	35
1989	33	43	54	32	40	43	0	40

a/ Statewide totals do not include the Northwest agricultural region.

Table 9. Gray partridge observed per 100 miles of August roadside count, summarized by agricultural region, 1955-present.

Year	Agricultural region							State-a/ wide
	WC	C	EC	SW	SC	SE	NW	
1955	16	8	0	11	10	9	No Survey	10
1956	3	8	0	15	6	8		7
1957	6	5	0	12	7	0		6
1958	20	9	0	10	0	6		9
1959	13	17	0	20	5	0		9
1960	4	7	0	12	1	5		4
1961	6	13	0	2	1	0		5
1962	3	10	0	3	0	22		6
1963	3	11	0	11	1	5		5
1964	1	3	0	2	2	2		2
1965	5	3	0	7	2	4		4
1966	2	4	0	18	0	11		5
1967	3	2	0	8	14	0		5
1968	4	3	0	10	0	5		4
1969	5	3	0	11	0	5		4
1970	7	8	0	33	4	4		9
1971	13	4	0	29	7	10		11
1972	7	3	0	18	2	18		8
1973	8	8	0	67	12	26		19
1974	7	10	0	27	8	20		12
1975	11	2	0	68	9	6		15
1976	11	9	0	59	15	22		18
1977	16	33	0	93	31	32		32
1978	26	23	0	144	31	15		37
1979	43	24	0	80	35	12		33
1980	58	49	0	99	41	28		46
1981	38	27	1	139	44	19		43
1982	24	23	1	70	17	16	4	22
1983	29	19	0	65	23	8	15	23
1984	18	17	0	50	27	16	10	20
1985	31	18	0	95	63	42	2	37
1986	10	5	0	60	45	21	4	21
1987	15	15	0	99	47	67	4	33
1988	27	18	3	111	64	40	4	38
1989	20	13	0	94	84	42	25	40

a/ Statewide totals include the Northwest agricultural region from 1982-present.

Table 10. Cottontails observed per 100 miles of August roadside count, summarized by agricultural region, 1955-present.

Year	Agricultural region							State-a/ wide
	WC	C	EC	SW	SC	SE	NW	
1955	8	15	15	20	20	32	No Survey	18
1956	10	16	12	16	13	13		13
1957	7	10	8	18	14	14		11
1958	13	14	16	22	17	7		15
1959	5	16	6	7	5	2		6
1960	6	14	6	16	12	5		10
1961	6	12	6	14	11	6		9
1962	6	7	4	13	10	8		8
1963	7	4	5	12	9	9		7
1964	5	3	1	12	7	5		5
1965	4	4	1	5	6	6		4
1966	5	3	2	10	8	6		6
1967	6	5	2	7	9	3		6
1968	5	3	4	9	9	6		6
1969	4	4	1	10	8	5		5
1970	4	5	2	7	6	6		5
1971	5	3	2	7	3	2		4
1972	4	5	4	5	4	4		4
1973	5	9	6	7	5	4		6
1974	3	7	14	7	6	6		6
1975	2	4	8	2	2	3		3
1976	4	6	7	2	6	8		5
1977	5	7	13	6	5	8		7
1978	5	9	21	12	7	5		9
1979	5	8	8	13	8	4		7
1980	4	7	10	7	7	4		6
1981	7	10	18	10	8	12		10
1982	5	7	8	3	7	5	2	5
1983	7	6	13	6	4	12	2	7
1984	2	2	4	4	4	5	0	3
1985	2	4	5	7	6	8	0	4
1986	2	5	6	6	5	5	0	4
1987	6	7	12	8	7	11	1	7
1988	3	3	6	6	4	6	1	4
1989	4	6	9	7	4	9	1	5

a/ Statewide totals include the Northwest agricultural region from 1982-present.

Table 11. Jackrabbits observed per 100 miles of August roadside count, summarized by agricultural region, 1955-present.

Year	Agricultural region							State-a/ wide
	WC	C	EC	SW	SC	SE	NW	
1955	9	3	2	13	11	2	No Survey	7
1956	6	4	2	10	8	2		6
1957	5	5	1	20	6	1		6
1958	7	6	1	20	12	1		9
1959	1	1	0	15	8	1		4
1960	4	5	0	10	3	0		4
1961	4	5	0	7	4	0		4
1962	4	2	0	5	3	1		3
1963	10	2	0	2	3	1		4
1964	3	1	0	4	2	1		2
1965	2	2	0	4	1	0		2
1966	2	2	0	5	1	1		2
1967	5	1	0	4	4	0		3
1968	2	1	0	7	2	1		2
1969	3	1	1	10	2	1		3
1970	4	2	0	2	1	0		2
1971	5	2	0	3	1	0		2
1972	4	1	0	2	2	1		2
1973	4	0	0	3	2	0		2
1974	4	2	0	2	1	0		2
1975	3	1	0	2	0	0		1
1976	4	1	0	5	2	1		2
1977	4	3	0	5	2	1		2
1978	3	3	1	13	3	1		4
1979	5	5	1	6	3	1		4
1980	4	1	1	8	2	3		3
1981	2	2	0	7	2	3		3
1982	3	1	1	5	1	1	2	2
1983	2	1	0	0	1	1	1	1
1984	2	1	0	2	0	1	0	1
1985	2	0	0	3	2	1	1	1
1986	0	0	0	1	1	0	1	1
1987	1	0	0	0	1	1	0	1
1988	1	0	0	2	1	0	1	1
1989	3	1	0	2	2	1	1	2

a/ Statewide totals include the Northwest agricultural region from 1982-present.

Table 12. Mourning doves observed per 100 miles of August roadside count, summarized by agricultural region, 1955-present.

Year	Agricultural region ^{a/}						State- ^{b/} wide
	WC	C	EC	SW	SC	SE	
1955	335	275	116	539	396	197	No Survey 325
1956	347	553	278	592	461	286	423
1957	303	246	168	243	383	200	275
1958	350	297	192	270	456	293	326
1959	377	307	221	358	447	94	311
1960	274	334	122	337	430	187	301
1961	377	373	136	481	563	317	392
1962	338	338	215	313	396	314	335
1963	636	273	212	506	435	313	397
1964	681	257	167	400	395	217	376
1965	312	245	185	460	217	271	272
1966	363	210	152	505	311	229	300
1967							
1968	411	208	125	261	254	385	294
1969	268	280	125	477	132	195	246
1970	601	218	113	527	204	274	348
1971	580	257	182	366	259	752	415
1972	600	234	169	308	230	314	350
1973	602	280	288	480	392	329	428
1974	588	321	242	352	269	382	381
1975	654	303	153	546	338	260	406
1976	600	373	224	536	367	282	407
1977	699	308	168	680	282	224	410
1978	502	326	174	431	276	282	345
1979	601	406	138	380	198	213	348
1980	696	302	140	422	235	182	352
1981	634	285	153	514	213	179	348
1982	557	243	175	304	278	213	225 314
1983	517	289	131	278	214	193	189 287
1984	531	233	129	267	183	269	176 279
1985	501	245	93	243	213	151	234 270
1986	325	180	115	204	161	180	177 204
1987	441	223	105	257	208	161	215 252
1988	386	204	122	300	203	210	184 245
1989	501	243	126	330	257	180	166 283

^{a/} Gaps in data represent no survey.

^{b/} Statewide totals include the Northwest agricultural region from 1982-present.

Table 13. Greater prairie-chicken spring booming ground counts for 14 northwestern counties, 1978-89 (counts coordinated and summarized by AWM Terry Wolfe, Crookston).

County	No. of booming males (No. of booming grounds)											
	1978	1979	1980	1981	1982	1983	1984 ^b	1985	1986	1987	1988	1989
Becker	26 (4)	102 (9)	156 (1)	159 (16)	133 (13)	174 (17)	96 (9)	41 (3)	99 (11)	53 (7)	19 (3)	18 (3)
Cass	9 (1)	14 (2) ^a	17 (6) ^a	63 (15) ^a	68 (16) ^a	65 (15)	54 (15) ^a	58 (14)	52 (14)	60 (15)	59 (13)	48 (9)
Chippewa	8 (1)	2 (1)	2 (1)	2 (1)	0	2 (1)	0	0	0	0	0	0
Clay	261 (21)	205 (17) ^a	186 (17) ^a	196 (16) ^a	216 (12) ^a	161 (15)	110 (7)	127 (7)	86 (9) ^a	87 (9)	0	83 (8)
Hubbard	0	0	0	4 (1)	3 (1)	3 (1)	5 (1)	16 (6) ^a	16 (4)	22 (5)	24 (4)	19 (5)
Mahnomen	71 (4)	81 (7)	203 (21)	223 (20)	294 (22)	316 (22)	149 (19)	134 (15)	102 (17)	63 (9)	29 (5)	0
Marshall	0	0	0	3 (1)	7 (2)	3 (1) ^a	2 (2)	0	0	0	0	0
Norman	130 (9)	213 (13)	230 (9)	210 (9)	273 (15)	194 (11) ^a	119 (8)	86 (7)	128 (10)	87 (9)	111 (9)	73 (7)
Ottertail	8 (2)	19 (5)	13 (2)	9 (2)	12 (1)	10 (3)	7 (1)	5 (1)	0 ^a	0	21 (3)	0
Pennington	0	8 (1)	0	2 (1)	6 (1)	5 (1)	4 (1)	3 (1)	0	0	0	0
Polk	140 (16)	192 (18) ^a	269 (27)	254 (26)	283 (29)	232 (26)	146 (22) ^a	162 (18)	96 (17) ^a	72 (8)	72 (10)	150 (17)
Red Lake	7 (1)	8 (1)	8 (1)	19 (2)	19 (2)	14 (2)	12 (2)	2 (1)	0	0	0	5 (1)
Wadena	0 (10) ^a	27 (3) ^a	10 (3)	60 (12) ^a	64 (11)	18 (6)	19 (2)	34 (9) ^a	17 (7) ^a	105 (20)	99 (16)	59 (13)
Wilkin	180 (14)	77 (4)	164 (14)	206 (23) ^a	269 (20)	223 (18)	60 (6)	149 (15) ^a	81 (9) ^a	99 (8)	58 (3)	100 (6)
Total males/ground	841 (74)	948 (81)	1,258(117)	1,410(144)	1,648(146)	1,420(139)	783 (95)	817 (97)	677 (98)	648 (90)	492 (66)	555 (69)
	11.4	11.7	10.8	9.8	11.2	10.2	8.2	8.4	6.9	7.2	7.4	8.0

^a Data include only grounds on which counts were conducted. In several counties booming grounds were located but counts were not made, they are not included in the data presented.

^b Part of the reason for the low number of chickens is incomplete counts of known grounds. This was the case for Polk County and a few others. However, even after allowing for uncounted grounds, chicken numbers were down.

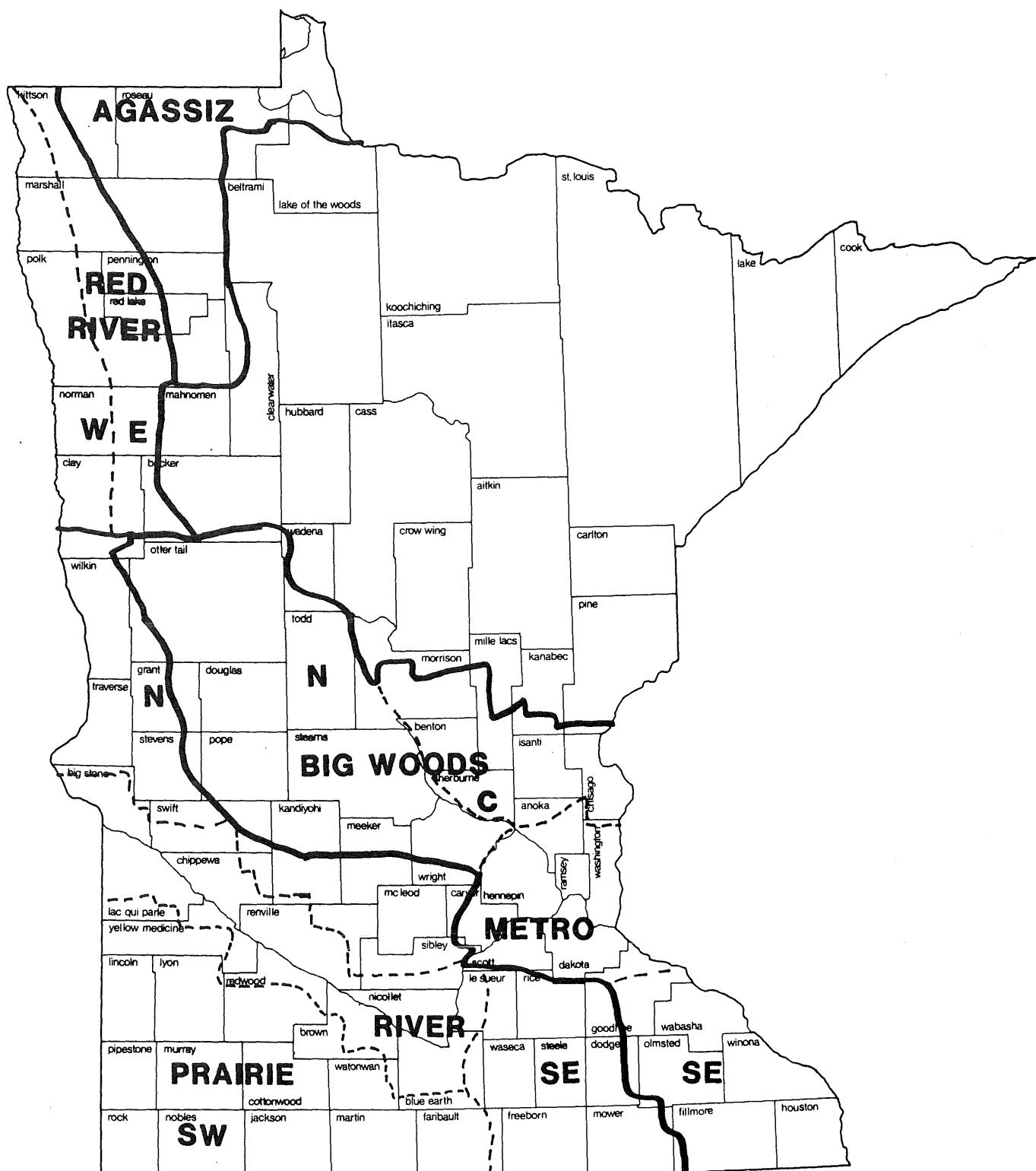


Figure 6. Deer management units and sub-units in the Farmland Zone.

Table 14. Number of car-killed deer reported in the Deer Management Units and sub-Units of Minnesota's farmland zone, 1980-1988. Data are adjusted for miles driven to the base year of 1972.

DMU Sub-DMU	1980	1981	1982	1983	1984	1985	1986	1987	1988	\bar{X} 1980's	% Chg. 1987-88
RED RIVER	206	281	344	333	323	339	366	226	207	292	-8.4%
AGASSIZ	172	272	287	335	261	281	246	165	123	238	-25.5%
BIG WOODS	3431	4186	4612	4939	5469	4958	5582	4792	3701	4630	-22.8%
North	1133	1399	1565	1715	1610	1502	1641	1417	1164	1461	-17.9%
Central	661	893	885	904	1065	934	961	775	540	846	-30.3%
Metro ^{a/}	1126	1219	1296	1391	1803	1692	2031	1762	1394	1524	-20.9%
SE	511	676	866	929	990	830	949	838	603	799	-28.0%
PRAIRIE	2577	2666	2990	3078	3268	2809	3146	3057	2796	2932	-8.5%
North	392	392	394	469	349	400	440	481	461	420	-4.2%
River	764	842	864	947	1021	829	865	793	714	849	-10.0%
SW	833	871	992	967	1009	851	915	966	783	910	-18.9%
SE	589	561	740	695	890	729	926	817	838	754	+2.6%
FARMLAND ZONE	6387	7405 ^{b/}	8232	8684	9321	8387 ^{b/}	9340 ^{b/}	8240	6827	8091 ^{b/}	-17.1%
FOREST ^{c/} ZONE	2072	4019	3192	3108	3494	3252	3163	2836	2852	3110	+0.6%
STATEWIDE	8459	11424	11424	11792	12815	11639	12503	11076	9679	11201	-12.6%

^{a/} Does not include Ramsey County.

^{b/} Does not equal sum of DMU's due to rounding error.

^{c/} Forest subtotals include Ramsey County.

Table 15. Comparison of 1989 FARMLAND deer productivity to 1978-1988 results.

	N	Fawns		Yearlings		Adults		% Male Fetuses
		% Preg(n)	Fet/ doe	% Preg.(n)	Fet/ doe	% Preg.(n)	Fet/ doe	
NW 1989	40	21 (14)	0.29	100 (4)	1.25	91 (22)	1.77	56
BW 1989	129	31 (51)	0.31	88 (24)	1.50	100 (54)	1.96	48
Pr 1989	85	38 (37)	0.38	80 (10)	1.30	92 (38)	1.71	46
*FARMLND89	254	32 (102)	0.33	87 (38)	1.42	96 (114)	1.84	49
78-88 MEAN		46	0.52	93	1.63	94	1.82	54
*FARMLND88	79	49 (37)	0.57	87 (15)	1.53	96 (27)	1.78	64
FARMLAND87	238	47 (72)	0.50	97 (59)	1.71	92 (107)	1.80	55
FARMLAND86	253	42 (107)	0.48	85 (59)	1.56	92 (87)	1.72	59
FARMLAND85	222	45 (87)	0.49	98 (41)	1.63	94 (94)	1.85	58
FARMLAND84	292	25 (117)	0.32	93 (69)	1.73	92 (106)	1.70	54
FARMLAND83	298	54 (142)	0.67	91 (64)	1.73	97 (92)	1.86	56
FARMLAND82	390	44 (154)	0.52	89 (63)	1.56	96 (173)	1.87	50
FARMLAND81	290	55 (142)	0.59	95 (55)	1.65	96 (93)	1.87	55
FARMLAND80	264	61 (147)	0.70	97 (39)	1.74	92 (78)	1.77	47
FARMLAND79	332	32 (171)	0.36	91 (43)	1.53	93 (118)	1.83	48
FARMLAND78	190	47 (100)	0.54	97 (37)	1.51	98 (53)	2.02	51

*Collection method changed. Conservation officers no longer responsible for roadkill collections.

Table 16. Spring deer densities estimated from population modeling in DMU's of Minnesota's farmland zone, 1980-89^a.

DMU	Deer per square mile										Goal ^b	1989 Percent of goal ^c
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989		
<u>Red River</u>	1.8	2.7	3.2	3.3	3.2	3.1	2.6	2.5	3.6	3.3	2.2	150%
<u>Agassiz</u>	3.6	5.3	6.2	6.6	6.5	6.2	5.7	5.0	7.3	6.8	5.5	124%
<u>Big Woods</u>												
North	3.3	4.2	5.0	5.4	5.3	5.0	4.7	4.2	5.4	5.1	4.4	116%
Central	4.3	5.4	6.2	6.7	7.0	7.0	6.8	6.0	6.8	6.7	7.4	91%
Metro	1.5	1.7	1.9	2.1	2.3	2.5	2.4	2.4	3.1	3.1	3.0	103%
SE	5.2	7.0	8.3	9.2	9.2	8.4	8.4	8.4	9.0	9.0	7.9	114%
<u>Prairie</u>												
North	1.6	1.7	1.9	2.0	1.9	1.9	1.7	1.7	2.3	2.1	1.8	117%
River	2.5	2.7	3.0	3.1	3.0	3.0	2.6	2.3	3.3	2.9	2.7	107%
SW	1.6	1.8	2.1	2.2	2.1	2.1	2.0	1.9	2.7	2.5	2.1	119%
SE	1.7	1.9	2.1	2.2	2.1	2.1	2.1	1.9	2.7	2.4	2.0	120%
<u>Farmland Zone</u>	2.6	3.4	3.8	4.0	4.0	3.9	3.7	3.4	4.1	3.9	3.4	115%

^a Historical density figures may differ from those previously published due to periodic recalculation as more accurate modeling information is available.

^b Goals reevaluated for 1989.

^c Percent = (1989/Goal) x 100.

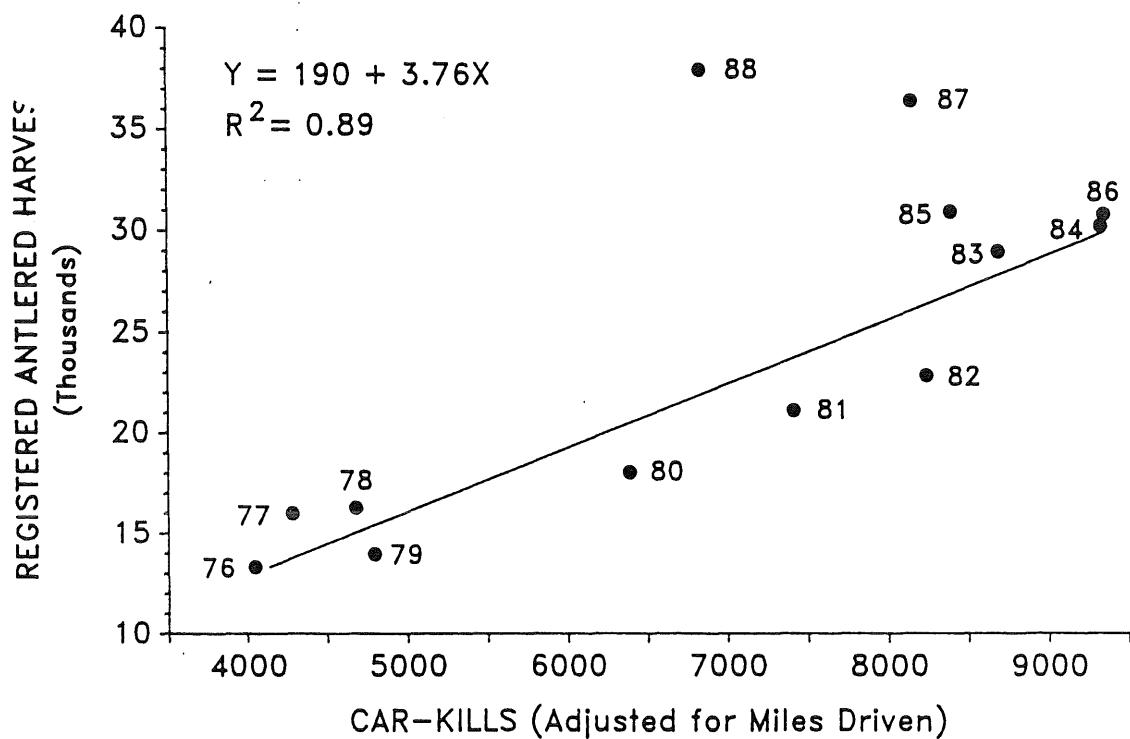


Figure 7. The relationship between annual car-kills and registered antlered deer harvest in the Farmland Zone, 1976 to present. 1987 and 1988 are not included in the regression calculation.

Predator Scent Post Survey

(Note: this survey is organized and coordinated by the Forest Wildlife Populations and Research Group, Grand Rapids. Results are presented at this location in the book because of the statewide nature of the data)

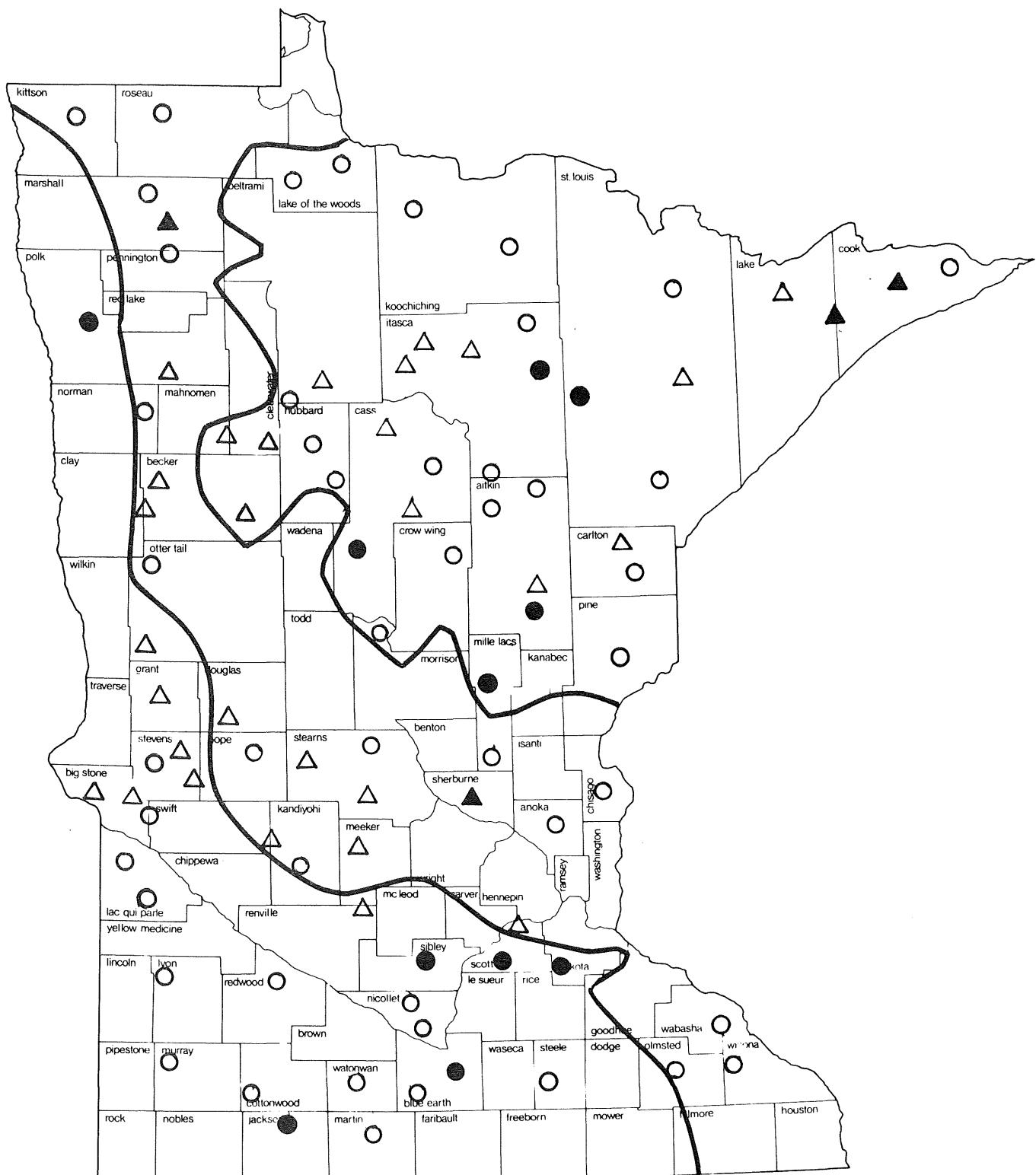
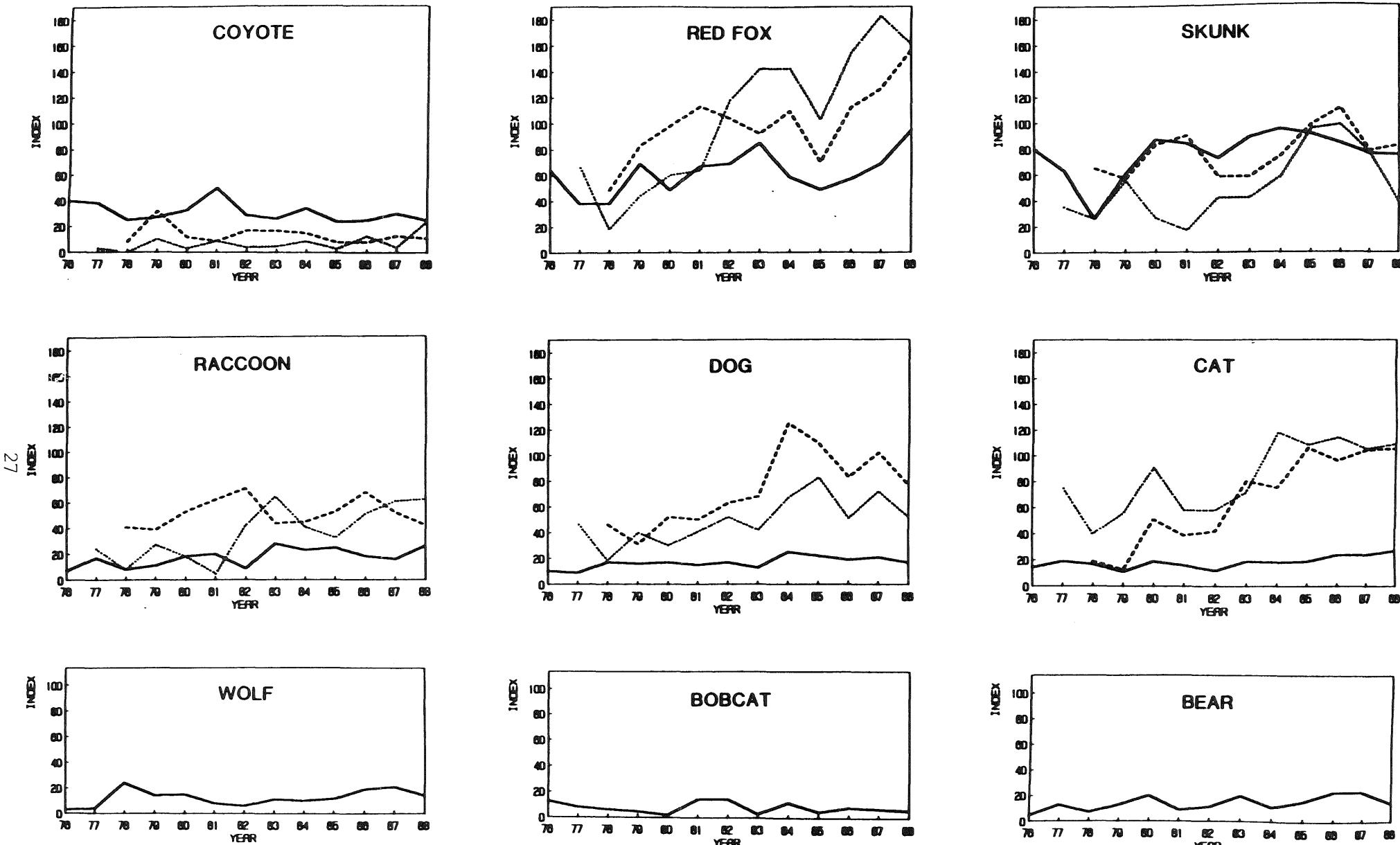


Figure 8. Approximate locations of predator scent post routes run by DNR (○) and non-DNR cooperators (Δ) in the Forest, Transition and Farmland survey zones, 1988. Shaded symbols indicate routes not completed in 1988.



FOREST —
TRANSITION ---
FARM ······

Figure 9. Scent post visitation indices for nine species in the Forest, Transition, and Farmland Survey Zones, 1976-1988.

FOREST WILDLIFE POPULATIONS

Table 17. Mean number of ruffed grouse drums per stop by census zone, 1964-89.

Year	Census Zone					Range-wide mean
	Northwest	North	Northeast	Central hardwoods	Southeast	
1964	0.4	0.7	0.9	0.3	1.3	0.6
1965	1.2	1.2	0.7	0.5	1.4	1.0
1966	1.4	1.4	0.6	0.7	1.9	1.0
1967	2.4	1.8	1.2	1.0	1.0	1.7
1968	3.2	2.3	1.6	1.0	1.3	2.0
1969	3.1	2.5	1.4	1.4	2.3	2.2
1970	1.9	3.1	0.9	1.6	2.1	2.2
1971	1.4	3.5	1.2	1.6	3.7	2.4
1972	2.1	3.7	1.0	2.0	3.1	2.6
1973	0.3	1.5	1.0	0.9	3.6	1.2
1974	0.8	1.1	0.6	0.7	3.0	1.0
1975	1.3	1.4	0.8	0.8	2.0	1.2
1976	0.8	1.5	0.4	0.9	1.8	1.1
1977	0.9	1.6	0.5	0.9	2.4	1.1
1978	2.0	2.4	0.8	1.4	2.5	1.8
1979	1.7	2.2	0.7	1.3	2.1	1.6
1980	1.9	2.2	0.7	1.9	2.7	1.7
1981	1.2	1.7	0.8	1.8	2.3	1.4
1982	0.9	1.1	0.3	0.9	1.1	0.8
1983	0.6	1.1	0.6	0.8	1.4	0.9
1984	1.0	1.1	0.6	0.5	1.4	0.8
1985	0.7	1.2	0.6	0.6	1.5	0.9
1986	1.7	1.1	0.5	0.6	2.5	1.0
1987	1.6	1.6	0.7	0.8	1.0	1.2
1988	1.3	2.0	1.0	1.0	1.1	1.4
1989	2.2	2.6	1.5	1.2	1.2	1.9

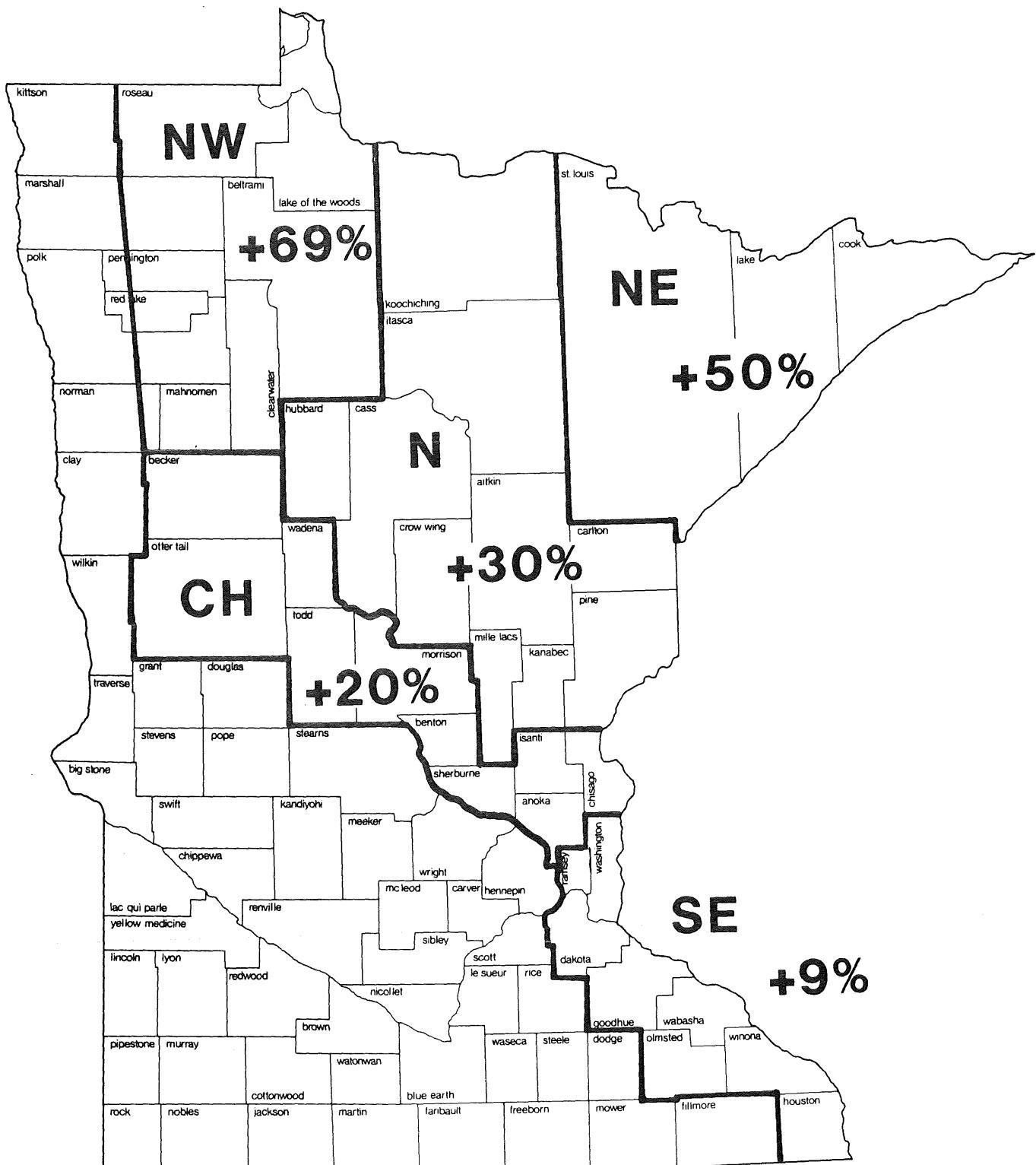


Figure 10. Changes from 1988-89 in average numbers of ruffed grouse drums per stop on roadside counts.

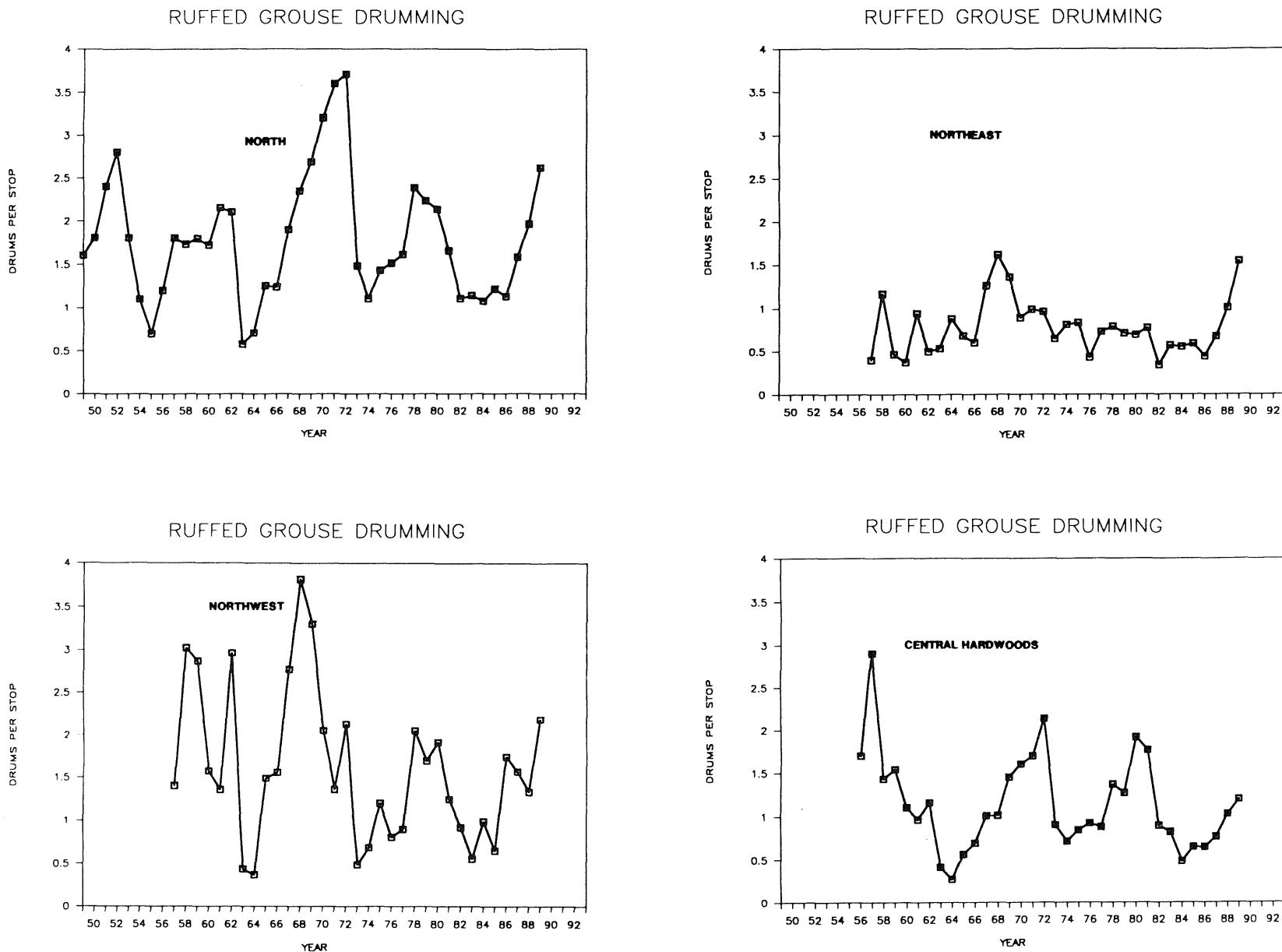


Figure 11. Ruffed grouse drumming trends in the Northwest, Northeast, North and Central Hardwoods survey zones, 1949-1989.

RUFFED GROUSE DRUMMING

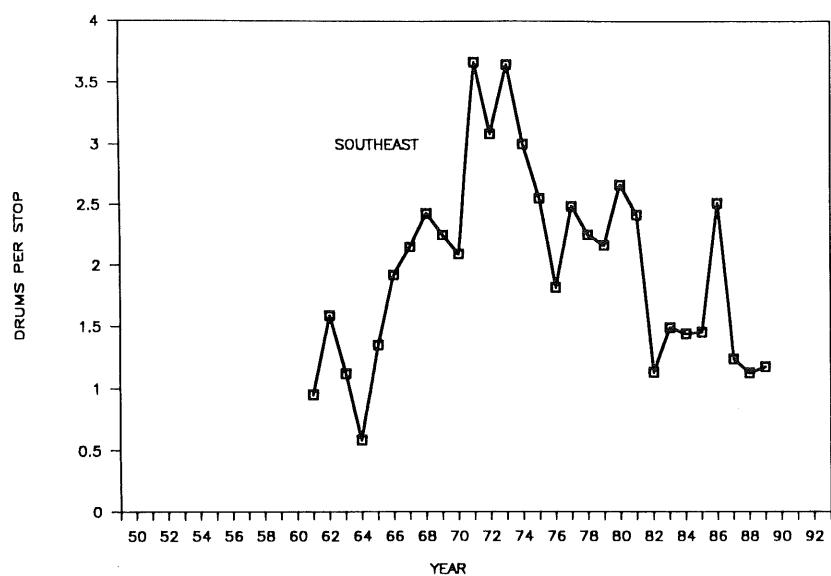


Figure 12. Ruffed grouse drumming trends in southeastern Minnesota, 1961–1989.

RUFFED GROUSE DRUMMING

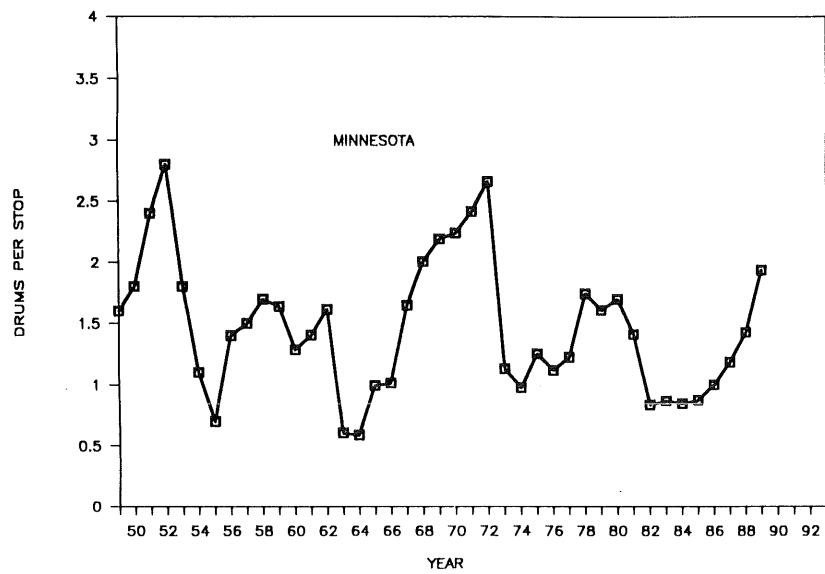


Figure 13. Ruffed grouse drumming trends range-wide 1949–1989.

NW +4

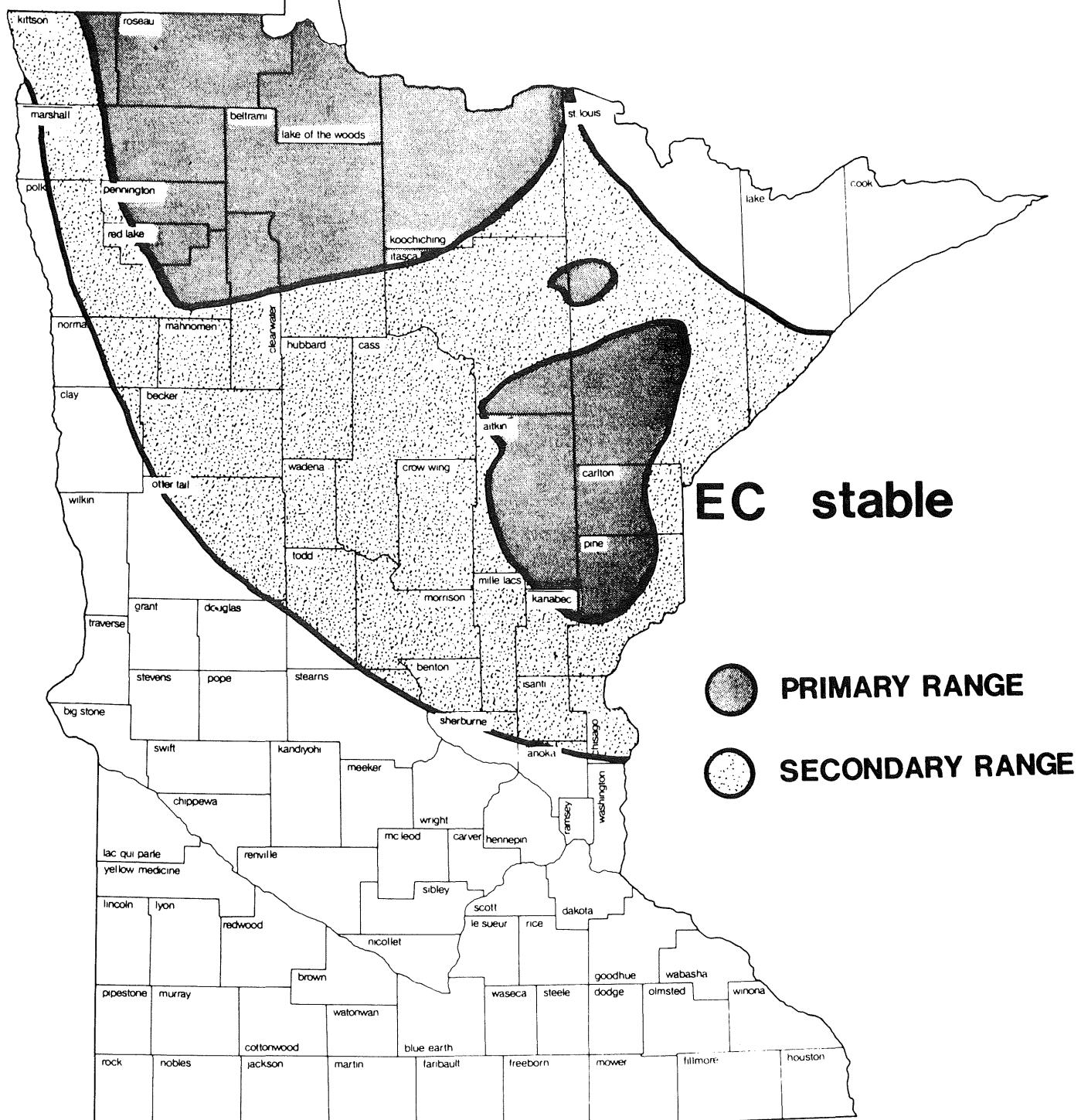


Figure 14. Changes in numbers of dancing male Sharp-tailed grouse on survey areas, 1988-89.

Table 18. Number of snowshoe hares seen per 100 km of ruffed grouse drumming route in the North, Northwest, and Northeast survey zones, 1974-89.

Year	Hares seen per 100 km
1974	0.4
1975	0.0
1976	2.0
1977	2.8
1978	9.0
1979	8.8
1980	14.1
1981	9.8
1982	1.8
1983	0.7
1984	0.2
1985	0.3
1986	0.2
1987	0.5
1988	0.9
1989	2.7

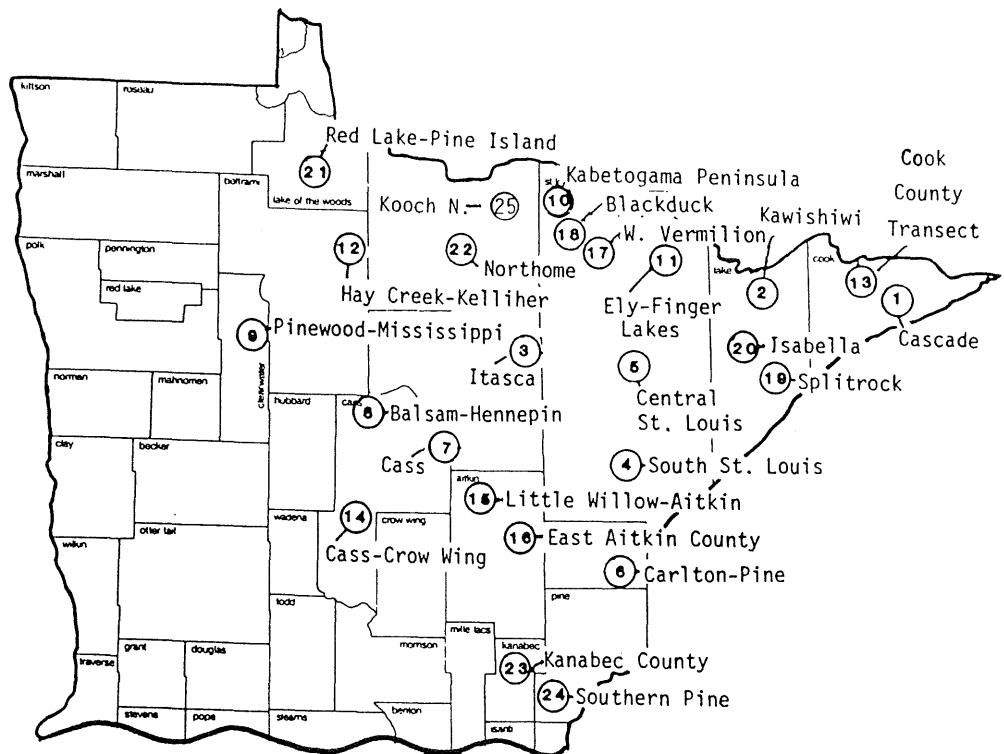


Figure 15. Location of beaver survey routes in Minnesota, 1988
Routes 5 and 20 were not flown in 1988.

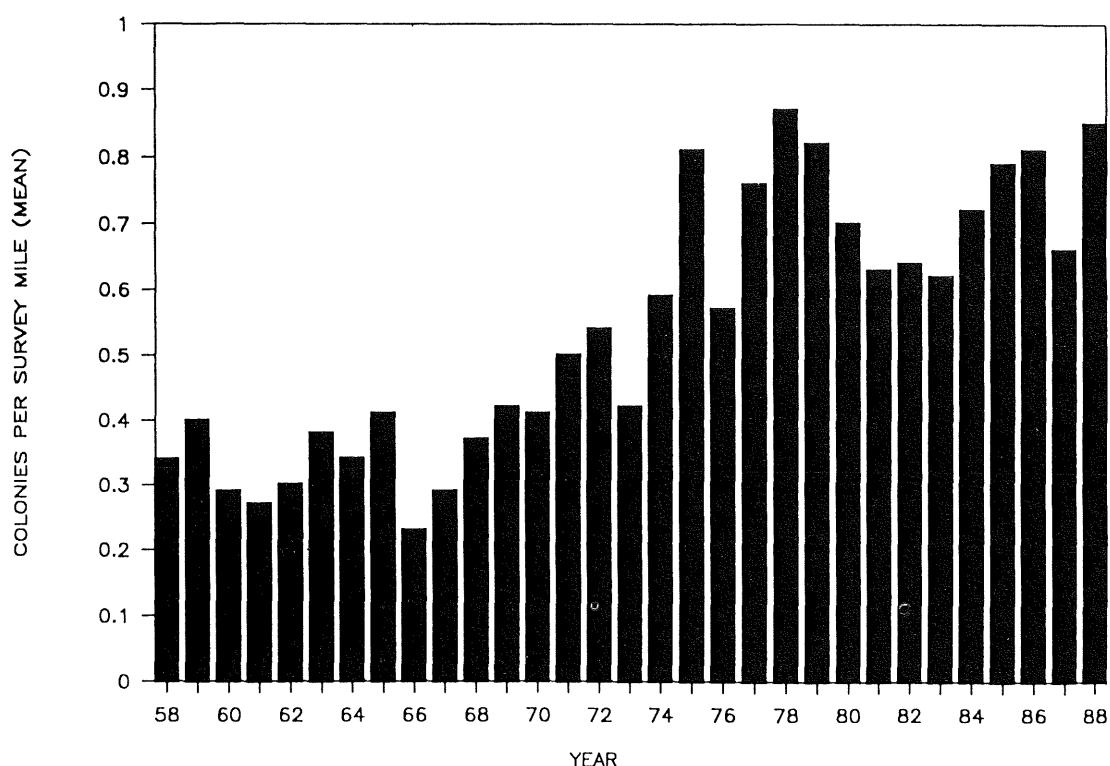


Figure 16. Number of beaver colonies per mile of survey route (range-wide means), 1958-1988.

Table 19. Live beaver colonies per mile of census route in northern Minnesota, 1978-88. Twenty routes were not flown in 1986 due to budget constraints.

Number	Route name	Year										1982-87 Mean	% Change 1988-mean	
		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988		
1	Cascade	1.07	-	0.42	0.43	0.40	0.35	0.44	0.46	-	0.37	0.40	0.40	0.0
2	Kawishiwi	0.97	0.68	0.75	0.50	0.72	0.65	0.70	0.78	-	1.03	0.72	0.78	-7.7
3	Itasca	1.04	0.66	0.63	0.48	0.43	0.57	0.51	0.67	-	0.22	0.48	0.48	0.0
4	South St. Louis	0.99	-	0.64	0.74	-	0.58	0.57	0.33	-	0.54	0.64	0.51	25.5
5	Central St. Louis	1.02	0.95	0.90	0.95	0.65	0.79	0.57	1.05	-	1.02	-	0.82	-
6	Carlton & Pine	0.89	0.60	0.83	0.67	0.22	0.56	0.65	0.45	-	0.49	1.04	0.47	121.3
7	Cass	1.03	1.00	0.95	0.53	0.63	0.89	0.99	1.23	-	0.59	0.77	0.87	-11.5
8	Balsam-Hennepin	0.39	0.55	0.44	0.43	0.60	0.58	0.54	-	-	0.74	0.57	0.62	-8.1
9	Pinewood-Mississippi	0.32	-	0.38	0.39	0.49	0.48	-	-	-	0.38	0.36	0.45	-20.0
10	Kabetogama Peninsula	2.91	3.05	2.52	3.55	2.66	2.89	3.30	2.93	2.92	2.98	2.93	2.95	-0.7
11	Ely-Finger Lakes	1.59	1.26	1.06	0.98	1.17	1.32	1.02	1.28	-	1.00	1.23	1.16	6.0
12	Hay Creek-Kelliher	0.44	-	0.43	0.48	0.70	0.55	-	-	-	0.49	0.49	0.58	-15.5
13	Cook County Transect	0.49	-	0.23	0.40	0.33	0.48	0.35	0.31	-	0.31	0.31	0.36	-13.9
14	Cass-Crow Wing	0.70	0.68	0.78	0.61	0.74	0.68	0.76	0.87	0.69	0.64	0.77	0.73	5.5
15	Little Willow-Aitkin	0.45	0.47	0.44	0.38	0.40	0.40	0.31	0.59	-	0.23	0.66	0.39	69.2
16	East Aitkin County	1.14	0.96	0.72	0.52	0.86	0.82	0.81	0.90	-	-	1.03	0.85	21.2
17	West Vermilion	1.25	1.12	0.96	1.05	0.86	0.34	1.07	0.73	0.95	0.80	0.87	0.79	10.1
18	Blackduck	1.54	1.31	1.09	1.22	0.91	0.71	1.21	1.53	-	0.84	1.20	1.04	15.4
19	Splitrock	1.45	-	1.07	-	-	0.55	0.65	0.56	-	1.15	1.18	0.73	61.6
20	Isabella	0.66	0.68	0.60	0.65	-	0.15	-	-	-	-	-	0.15	-
21	Red Lake-Pine Island	0.44	0.73	0.40	0.41	0.50	0.39	-	-	-	0.37	0.30	0.42	-28.6
22	Northome	0.75	0.85	0.86	0.91	0.97	1.06	1.37	0.95	0.80	0.75	0.77	0.98	-21.4
23	Kanabec County	0.59	0.55	0.70	0.48	0.55	0.65	0.53	0.76	-	0.52	1.29	0.60	115.0
24	Southern Pine	0.74	0.88	0.93	0.58	0.76	0.69	0.72	0.86	-	-	1.95	0.76	156.6
25	Koochiching North										1.29	1.39	1.29	7.8
	DNR Region I	0.40	0.64	0.41	0.43	0.57	0.50	0.54	-	-	0.50	0.43	0.53	-18.9
	DNR Region II	1.14	1.05	0.86	0.90	0.81	0.76	0.90	0.90	-	0.87	0.99	0.85	16.5
	DNR Region III	0.77	0.78	0.84	0.55	0.67	0.73	0.75	0.93	-	0.58	1.20	0.73	64.4

Registered furbearer population data

The following 4 tables and 4 figures are summaries of data compiled and analyzed by Bill Berg and Dave Kuehn on the four registered furbearers. This information was utilized by the Furbearer Management Committee in setting the 1989-90 seasons on these species.

BOBCAT, 1988-89

Bill Berg and Dave Kuehn, Forest Wildlife Populations and Research Group,
Minnesota Department of Natural Resources, Grand Rapids, MN 55744

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 20). 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 20).

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 (Fig. 17).

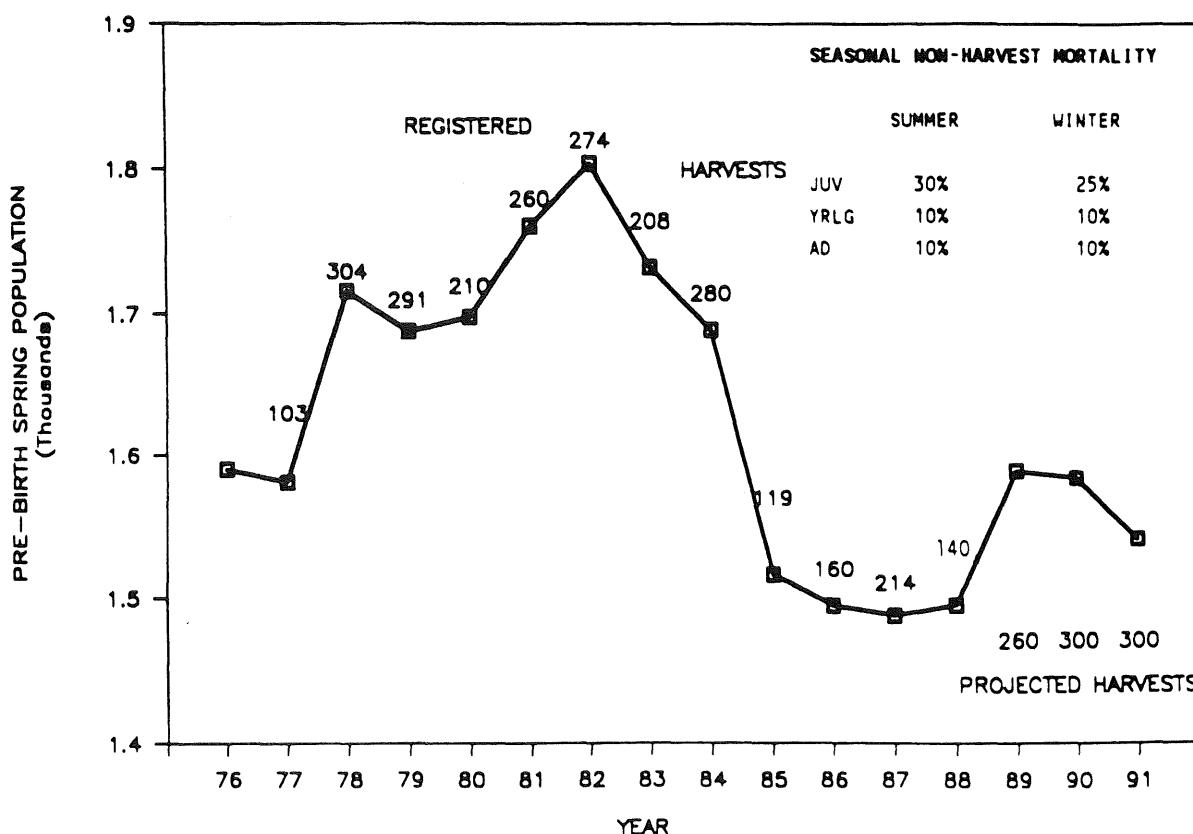


Figure 17. Bobcat population model, 1976-1992, with registered harvests to 1988 and projected harvests after 1988. Juvenile non-harvest mortality was increased 5%-15% above that in figure during 1982-1987 to compensate for reduced prey availability. Harvest mortality was increased 10% to compensate for illegal and accidental catches.

Table 20. Bobcat harvest, age structure, and population index data, 1978-79 to 1988-89.

	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Registered take	304	291	210	260	274	208	280	119	160	214	140
Mean pelt price	\$164	\$118	\$ 79	\$ 73	\$ 66	\$.61	\$ 76	\$ 70	\$120	\$101	\$ 68
Carcasses aged	113	75	48	230	261	205	288	99	132	163	114
% juveniles	54%	37%	31%	37%	35%	37%	37%	33%	26%	33%	39%
% male juveniles	61%	54%	80%	59%	47%	56%	52%	41%	53%	44%	58%
% 1.7 yrs. old	15%	12%	33%	23%	15%	18%	13%	19%	17%	16%	18%
% male 1.7 yrs.	53%	44%	69%	63%	49%	56%	66%	41%	32%	52%	62%
% > 2.7 yrs. old	31%	52%	35%	40%	50%	37%	50%	48%	58%	51%	46%
% male > 2.7 yrs.	60%	53%	56%	55%	47%	51%	44%	43%	51%	48%	42%
Overall % males	59%	52%	66%	58%	48%	45%	51%	42%	51%	48%	54%
Juv :: > 2.7 yr. females	4.4	1.6	1.9	2.1	1.3	1.5	1.4	1.2	0.9	1.4	1.7
% autumn population taken ¹	14%	14%	10%	12%	14%	10%	13%	6%	8%	11%	8%
Scent post index ²	6	5	2	14	14	3	12	5	8	7	5
Snowshoe hare index ³	8.8	14.1	9.8	1.8	0.7	0.2	0.3	0.2	0.5	0.9	2.7

¹ Includes registered harvests plus 10% unreported harvest.

² Index for autumn prior to harvest season.

³ Index for spring after harvest season.

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. 18). Projected registered harvests approximating 1050 otter stabilize the spring pre-birth population at about 5500.

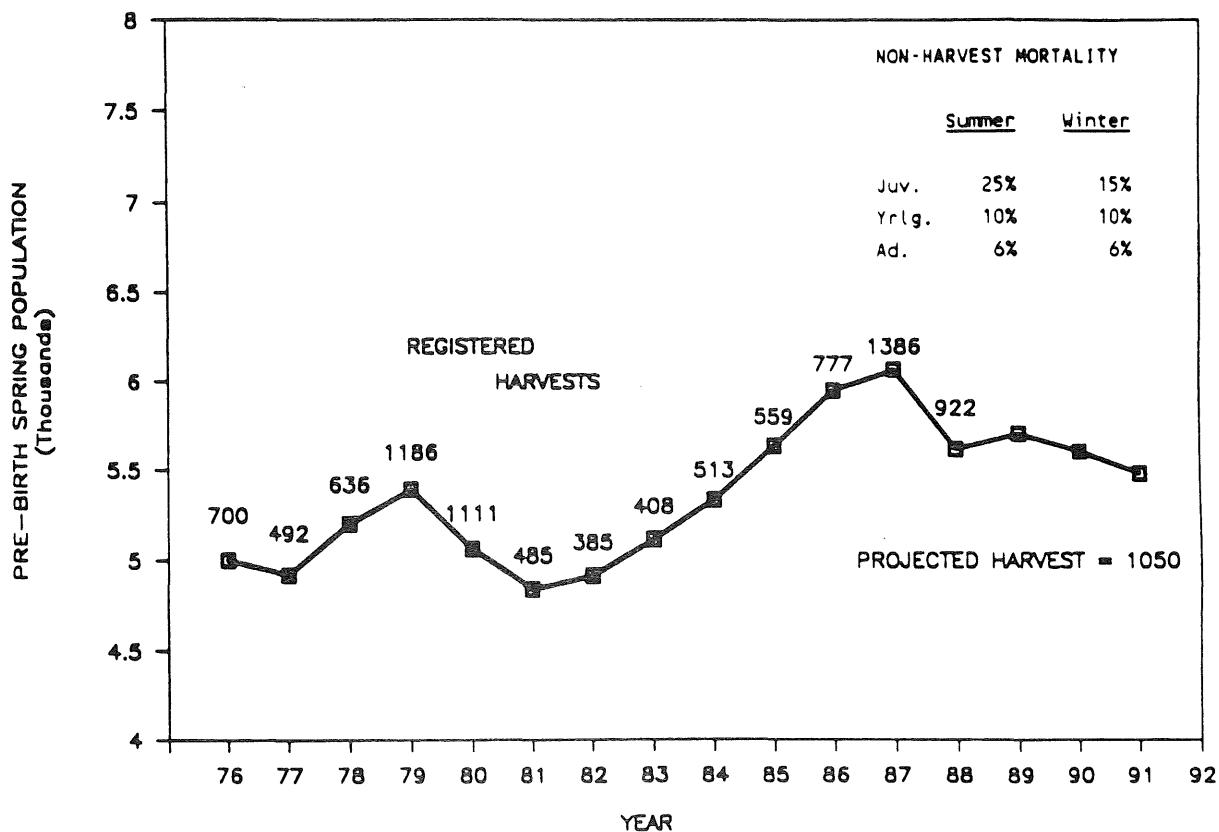


Figure 18. Otter population model, 1976-1991, showing registered harvests through 1988 and projected post-1988 harvests of 1050. For modeling purposes registered harvests are increased 20% to compensate for accidental take (10% in 1987-88).

Table 21. Otter harvest, carcass collection, and pelt price data, 1978-88. Carcasses were not collected after 1986.

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Season dates	12/1- 12/5	11/15- 11/29	11/15- 11/29	11/14- 11/28	11/13- 11/27	11/12- 11/26	11/17- 12/01	11/16- 12/15	10/24- 11/29	10/24- 11/29	10/29- 11/27
Registered harvest	636	1,186	1,111	485	385	408	513	559	777	1,386	922
% of autumn population harvested ^a	11%	20%	20%	9%	7%	7%	8%	8%	11%	17%	15%
No. carcasses examined	49	36	88	471	389	433	549	572	745	---	---
% juveniles	61.2	69.4	54.5	55.0	50.6	42.3	47.9	43.4	45.2	---	---
% yearlings	26.5	19.4	14.7	19.7	25.6	30.9	23.3	22.9	23.3	---	---
% male juveniles	59.4	72.0	39.6	55.6	56.7	55.7	47.1	53.3	45.1	---	---
% males ≥ 1.7 yrs.	47.1	36.4	57.5	53.3	65.1	56.8	50.0	50.0	48.1	---	---
Mean pelt prices:											
otter	\$59	\$63	\$33	\$30	\$26	\$25	\$22	\$21	\$24	\$23	\$22
beaver (autumn)	\$18	\$33	\$18	\$14	\$11	\$12	\$12	\$15	\$20	\$17	\$14

^a From population modeling; includes an additional 20% accidental harvest over registered total.

FISHER, 1988-89

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During the 1988-89 November 26-December 11, 1988 trapping season, 1025 fisher were registered (Table 22). 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 22). 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. 19).

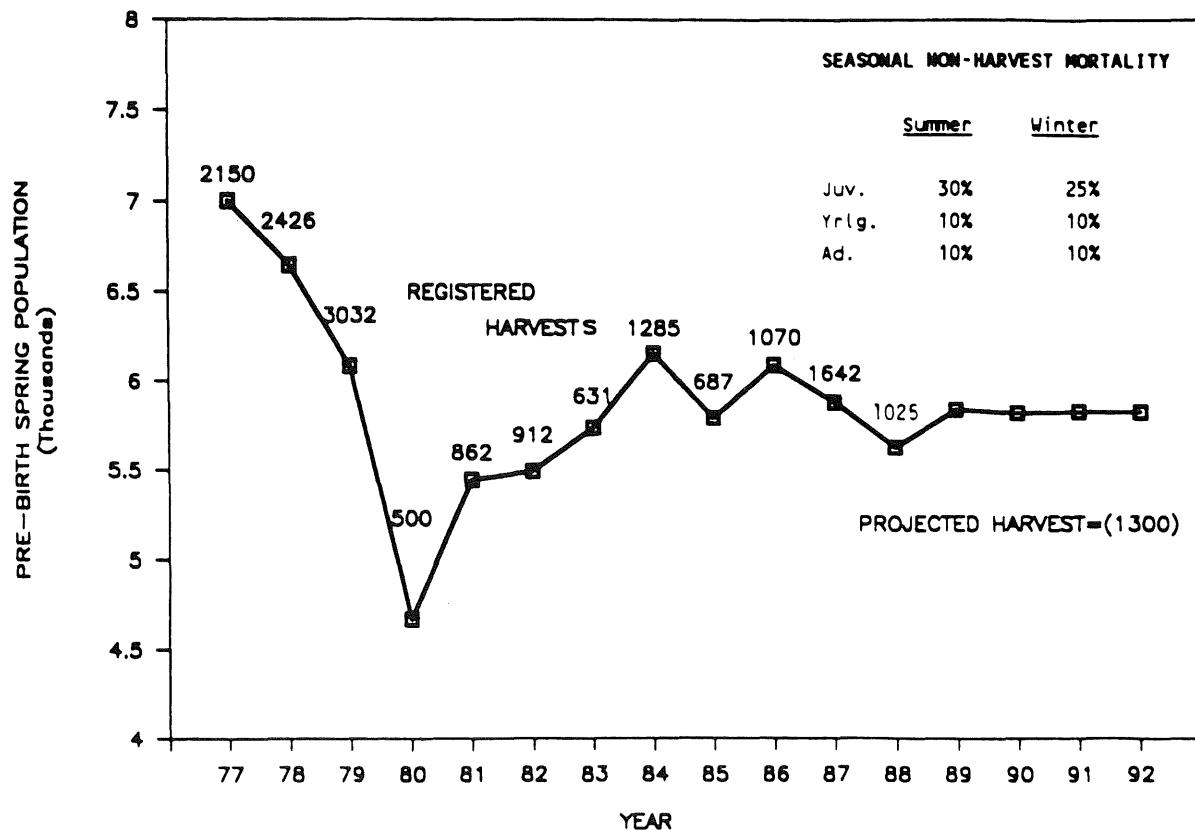


Figure 19. Fisher population model, 1977-1992, showing registered harvests through 1988 (1980 season was closed) and projected harvests of 1300 thereafter. Juvenile non-harvest mortality shown in figure was increased 5-10% in summer and winter, 1983-1987 to compensate for decreased snowshoe hare availability. For modeling purposes registered harvests were increased 22%, except in 1980 (26%), for accidental/illegal harvests.

Table 22. Harvest, carcass collection, and pelt price data for fisher seasons in Minnesota, 1978-79 to 1988.

	1978-79	1979-80	1980-81	1981	1982	1983	1984	1985	1986	1987	1988
Season	12/1-1/31	12/1-1/31	Closed	12/1-12/10	12/1-12/11	12/1-12/11	12/1-12/16	11/30-12/15	11/29-12/14	11/28-12/13	11/26-12/11
Limit	3	3	---	1	1	1	1	1	1	1	1
Registered take	2,426	3,032	(423)	862	912	631	1,289	678	1,068	1,642	1,025
% of available autumn population harvested ^a	30%	42%	9%	17%	17%	10%	18%	10%	14%	21%	16%
No. carcasses examined ^b	577	467	---	843	1,073	662	1,270	712	1,186	1,542	805
% juveniles	70%	65%	---	66%	66%	69%	63%	63%	59%	63%	70%
% 1.7 yr.	16%	15%	---	24%	19%	18%	20%	20%	24%	15%	15%
% ≥ 2.7 yrs.	14%	21%	---	10%	15%	13%	17%	18%	18%	22%	15%
Juv:ad. female ratio	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	44%	54%	---	48%	46%	45%	52%	46%	48%	46%	48%
% male 1.7 yrs.	35%	45%	---	43%	41%	40%	45%	40%	50%	40%	39%
% male ≥ 2.7 yrs.	28%	44%	---	37%	52%	40%	45%	34%	37%	37%	33%
Pelt price: males females	\$132 \$147	\$108 \$128	\$90 \$104	\$94 \$110	\$70 \$99	\$71 \$121	\$70 \$122	\$74 \$130	\$84 \$162	\$84 \$170	\$54 \$100
Snowshoe hare index ^c	8.8	14.1	9.8	1.8	0.7	0.2	0.3	0.2	0.5	0.5	2.7

^a Estimated from population model.^b May exceed registration totals due to accidental catches, etc.

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 23). 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 23). With projected post-1988 annual harvests approximating 2400, the spring modeled pre-birth population stabilizes at more than 9500 animals (Fig. 20).

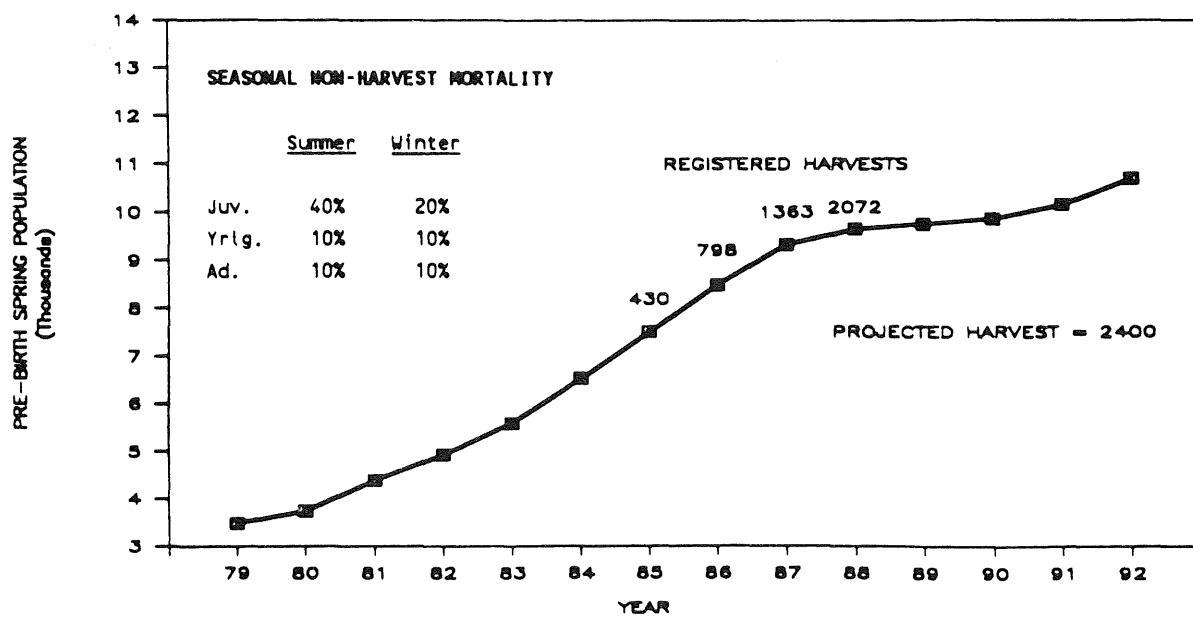


Figure 20. Pine marten population model, 1979-1992. Registered harvests shown for 1985-1988, followed by projected harvests of 2400. Accidental take is modeled at 50% of registered harvest through 1987, and 25% of registered harvests, 1988-1992.

Table 23. 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	1,363	2,072
% of available autumn population harvested	6%	9%	16%	20%
No. carcasses examined	507	884	1,754	1,977
% juveniles	73%	64%	66%	66%
% 1.7 yr.	18%	21%	18%	11%
% \geq 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 \geq 2.7 yrs.	82%	81%	75%	66%
% males overall	70%	69%	67%	59%
pelt price (male)	\$30	\$36	\$43	\$50
pelt price (female)	\$28	\$27	\$39	\$43

Table 24. Estimated pre-fawning deer density (deer/sq. mile) as determined by pellet counts, 1984-89. Estimates were not adjusted by dead deer correction factor and thus may differ from previous reports. Numbers in parentheses represent 95% confidence intervals.

Area	Year					
	1984	1985	1986	1987	1988	1989
Itasca DMU						
NW	21.8 (4.2)	30.8 (5.9)	13.2 (2.9)	19.1 (3.8)	16.8 (2.8)	18.3 (3.5)
SW	17.9 (3.8)	19.7 (5.0)	13.9 (3.7)	16.6 (4.8)	14.5 (2.8)	19.7 (4.7)
NE	12.7 (3.6)	16.5 (3.5)	16.0 (4.5)	18.3 (5.0)	18.7 (4.2)	21.7 (5.6)
SE	12.8 (4.0)	19.7 (5.2)	15.0 (3.8)	20.7 (5.8)	18.5 (4.3)	20.0 (5.6)
Bemidji	16.0 (3.8)	14.4 (4.0)	12.8 (3.3)	13.7 (3.7)	15.2 (3.9)	19.7 (5.1)
Leech Lake IR	12.6 (3.8)	12.3 (2.9)	9.1 (2.4)	8.8 (1.9)	13.2 (9.2)	14.6 (4.4)
Rainy River DMU						
West	14.1 (4.2)	-----	9.3 (3.7)	18.3 (5.5)	11.8 (2.6)	25.2 (8.0)
Central	11.9 (6.3)	12.4 (5.3)	13.4 (5.1)	-----	20.9 (6.3)	26.4(10.6)
East	16.0 (4.1)	17.8 (4.8)	16.9 (5.2)	14.8 (3.9)	19.4 (5.7)	18.3 (4.8)
Mille Lacs DMU						
West	14.1 (2.9)	17.0 (3.8)	16.2 (4.1)	11.7 (4.5)	18.7 (6.2)	24.1 (8.0)
Central	18.0 (4.6)	16.5 (3.7)	14.4 (4.0)	13.9 (4.1)	11.7 (3.2)	20.0 (5.9)
East	14.1 (3.2)	11.6 (2.7)	10.5 (2.7)	13.1 (2.9)	21.3 (4.1)	28.0 (5.9)
White Earth IR	11.7 (4.6)	17.6 (5.6)	9.2 (3.8)	10.2 (6.1)	6.5 (2.7)	18.6 (6.8)
Superior DMU^a						
West	19.4 (7.1)	24.6 (4.0)	23.7 (5.4)	17.3 (3.7)	26.7 (4.2)	28.6 (6.3)
Central	16.1 (5.3)	15.2 (3.2)	13.5 (6.0)	17.2 (5.5)	25.1 (7.5)	18.7 (4.6)
East	-----	-----	-----	-----	-----	15.3 (3.7)
Agassiz NWR	16.0 (3.8)	14.4 (4.0)	12.8 (3.3)	13.7 (3.7)	15.2 (3.9)	19.7 (5.1)
Aitkin County	-----	22.7 (6.1)	19.4 (6.1)	19.5 (4.2)	24.4 (5.8)	30.3 (8.7)
Aitkin SE1/4 T44, R22	-----	10.3 (2.7)	30.3 (8.8)	-----	-----	-----
Bearville Study Area	-----	42.9 (7.2)	21.1 (4.4)	-----	-----	-----
Camp Ripley	-----	41.5 (9.8)	30.8 (9.7)	39.1(11.7)	21.8 (4.9)	50.4(15.9)
Chippewa NF	-----	19.5 (3.4)	13.1 (2.2)	14.0 (2.1)	15.6 (2.6)	18.4 (2.9)
Elephant Lake	-----	-----	-----	-----	-----	-----
Fond du Lac IR	-----	-----	-----	-----	10.9 (5.8)	12.8 (7.8)
Garden Lake Deer Yard	-----	30.6 (7.5)	13.2 (4.0)	-----	-----	-----
Itasca County	-----	23.6 (3.9)	12.6 (2.4)	-----	-----	-----
Mille Lacs WMA	-----	10.5 (3.7)	15.6 (7.4)	17.2 (4.5)	35.6(10.9)	43.0 (9.8)
St. Croix State Park	-----	-----	-----	35.0 (9.3)	-----	73.4(14.0)
Tamarac NWR	-----	38.9(11.1)	41.8(12.1)	28.3 (8.2)	38.0(11.6)	-----
Voyageurs NP	-----	-----	-----	-----	-----	51.5(10.1)

^a No pellet counts were conducted in the Boundary Waters Canoe Area or the Voyageurs National Park.

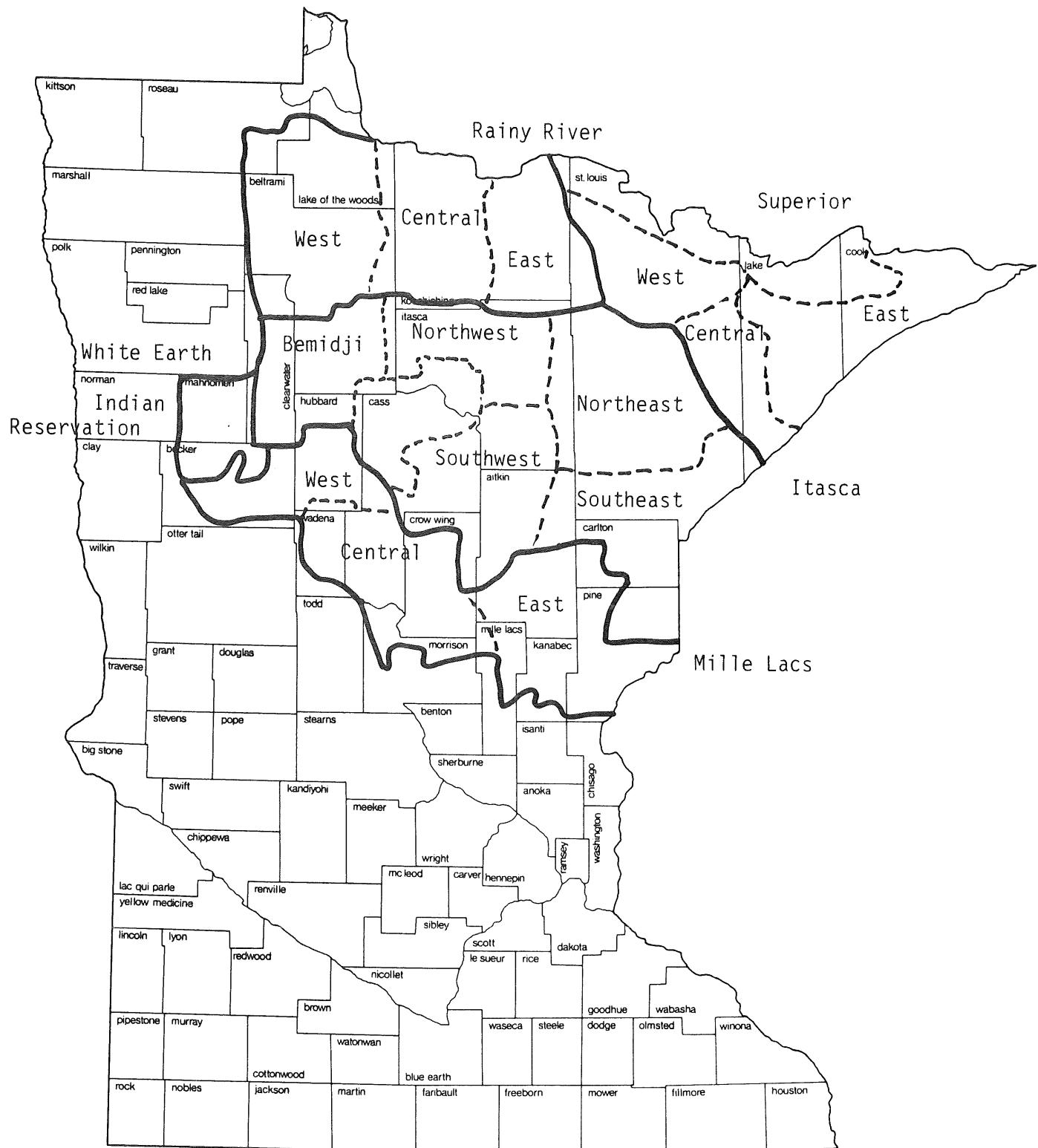


Figure 21. Deer management units and subunits in the Forest Zone.

Table 25. Spring densities estimated from population modeling in subunits of Minnesota's Forest zone, 1982-88.*

DMU and subunit	Deer per square mile						Goal
	1984	1985	1986	1987	1988	1989	
<u>Itasca</u>							
Northwest	18.0	18.8	16.2	18.1	19.7	18.4	15-20
Southwest	15.0	16.5	15.0	17.7	19.8	18.5	15-20
Northeast	12.7	15.2	15.1	18.5	21.3	20.4	15-20
Southeast	12.8	14.9	14.6	17.6	19.7	18.4	10-15
Leech Lake I.R.	12.6	13.7	12.8	14.4	15.1	13.6	10-15
Bemidji	16.0	15.9	13.8	15.3	15.8	13.6	10-15
<u>Mille Lacs</u>							
West	18.0	19.1	16.3	18.8	20.3	18.5	10-15
Central	18.0	19.0	16.8	18.8	20.4	19.1	10-15
East	14.1	16.3	15.9	20.6	24.4	23.5	10-15
White Earth I.R.	11.7	13.0	11.8	13.7	14.4	12.7	10-15
<u>Rainy River</u>							
West	14.1	14.6	13.1	15.4	16.6	15.2	10-15
Central	11.9	12.8	11.8	13.6	14.3	12.7	10-15
East	16.0	17.9	17.0	19.8	21.4	19.5	15-20
<u>Superior</u>							
West	19.4	22.6	21.2	24.7	26.8	24.1	15-20
Central	16.1	19.8	20.2	25.5	29.8	29.1	10-15
East	6.8	8.4	8.7	11.3	13.7	13.2	3-8

* Historical density figures may differ from those previously published because of annual recalculation as more accurate modeling data are available.

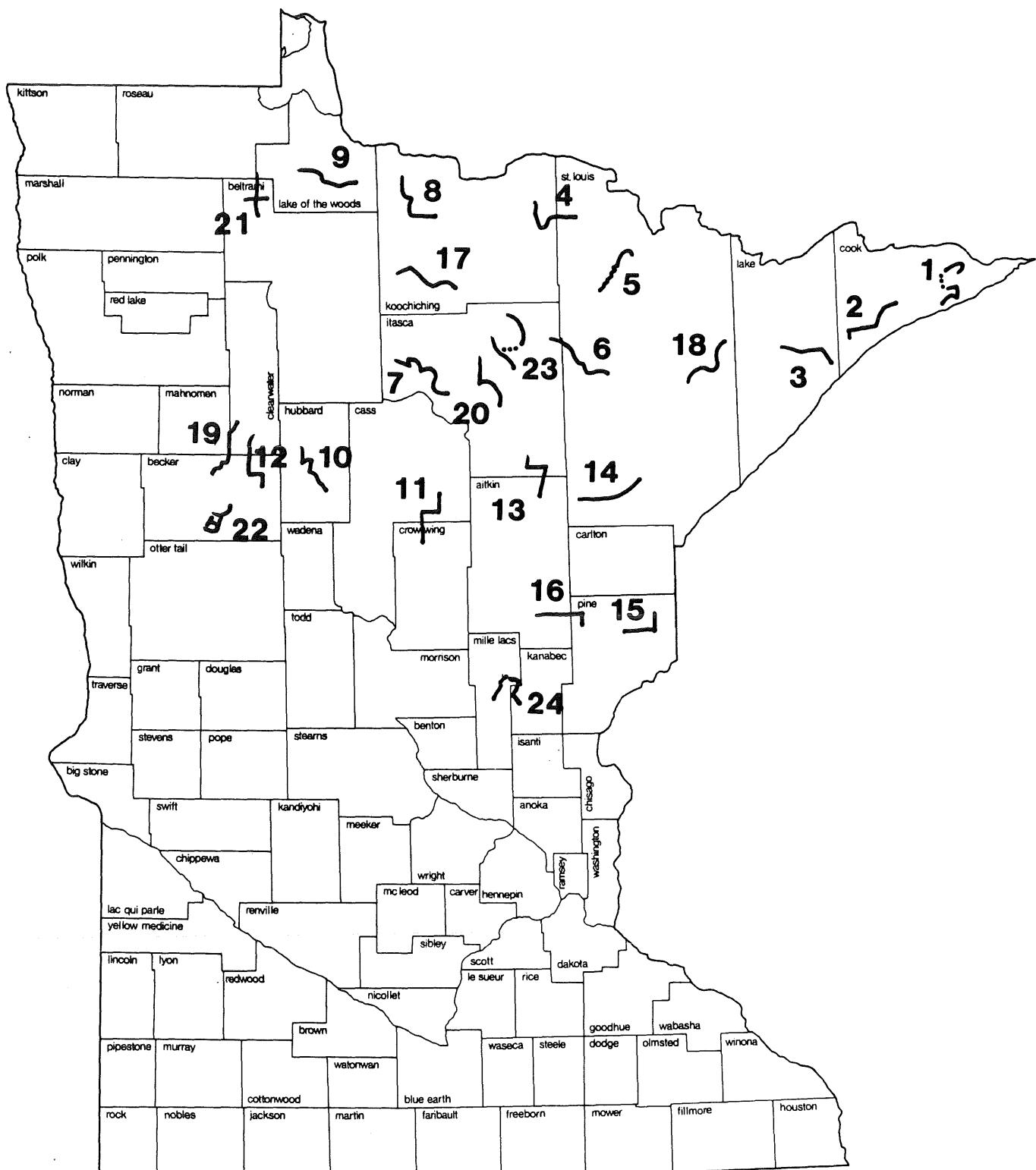


Figure 22. Approximate locations of 24 bear bait routes.

Table 26. Percentage of baits on each bait route taken by bears. All baits (50 per route) except those entirely removed by other animals were considered available to bears. Baits were set July 1-7 (and also during June 10-16 in 1988 and 1989); stations were checked for visitation 7 days later.

Route No.	1980 ^a	1981	1982	1983	1984	1985	1986	1987	1988		1989	
									Jun	Jul	Jun	Jul
1	16	33	22	41	38	22	10	17	9	20	7	14
2	32	22	14	15	10	30	22	38	19	30	15	23
3	10	2	37	44	14	26	38	38	21	48	35	33
4	24	60	22	54	33	47	45	49	24	30	22	13
5	26	54	31	44	28	29	45	28	16	18	32	-- ^b
6	21	27	17	18	30	44	37	26	19	23	14	-- ^b
7	23	45	19	43	18	26	47	22	38	58	35	44
8	16	14	8	10	44	46	69	41	42	69	49	49
9	20	40	16	27	20	30	15	10	29	44	42	15
10	6	23	26	44	24	31	22	15	18	25	31	49
11	4	22	12	31	21	39	38	22	28	53	43	41
12	11	44	22	65	37	27	21	21	31	55	27	43
13	12	40	24	40	30	33	34	26	26	36	7	48
14	10	4	16	14	4	18	11	27	6	14	13	16
15	6	36	24	22	24	35	30	34	34	61	31	35
16				36	24	19	38	23	15	58	20	35
17				19	49	66	24	28	25	40	40	36
18				8	20	42	20	43	10	32	21	-- ^b
19				28	10	18	25	15	25	27	18	18
20		48	69	66	35	45	40	20	24	35	21	40
21					6	6	2	19	15	15	18	23
22					20	8	14	11	19	41	18	29
23						28	40	36	44	40	23	34
24						20	35	54	63	68	39	70
Mean	16	32	24	33	24	31	30	28	25	39	26	33

^a Data for 1980 may not be directly comparable to other years because a different type of bait was used, and all routes except #1,2,3,6 & 14 were conducted after July 14.

^b Data forms lost in the mail.

Northwest Prairie Survey Area

Northwest Forest Survey Area

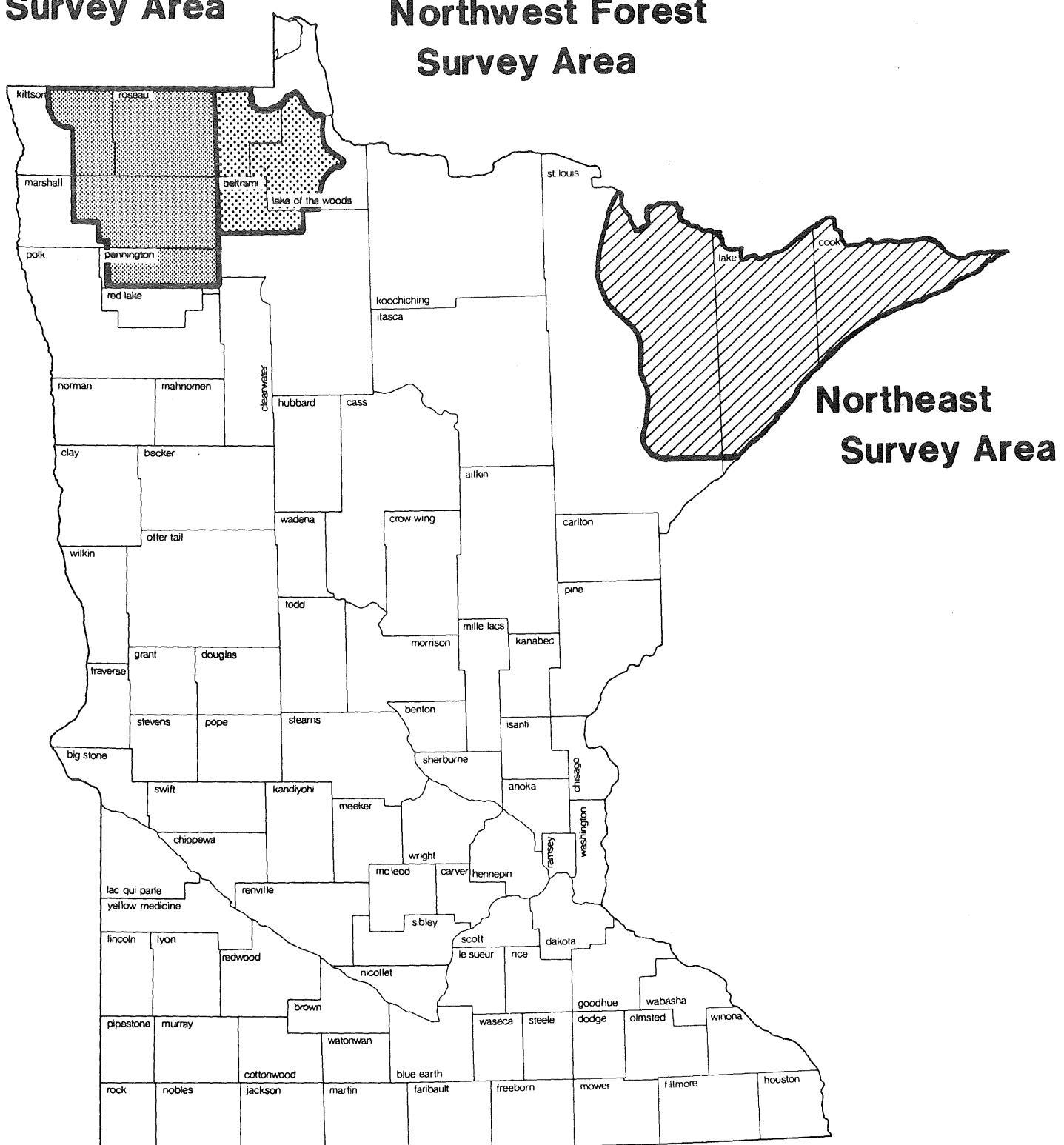


Figure 23. Approximate boundaries of aerial moose survey.

Table 27. Moose population estimates from serial moose survey in Minnesota (\pm 90% Confidence Interval).

Area	Sq. miles ^a	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	% change 1987-88 to 1988-89
Northeast	4809	4877 (999)	4274 (925)	5518 (1494)	4955 (1034)	6120 (1438)	5457 (1057)	6702 (2357)	+22.8
Northwest Forest	1779	370 (124)	446 (139)	578 (148)	433 (100)	307 (83)	no survey	419 (153)	-
Northwest Prairie	2126	3772 (930)	2784 (567)	4086 (518)	3415 (412)	3740 (747)	no survey	2328 (466)	-

^a Total land area within survey zone excluding agricultural areas. Does not include area of lakes more than 10 acres.

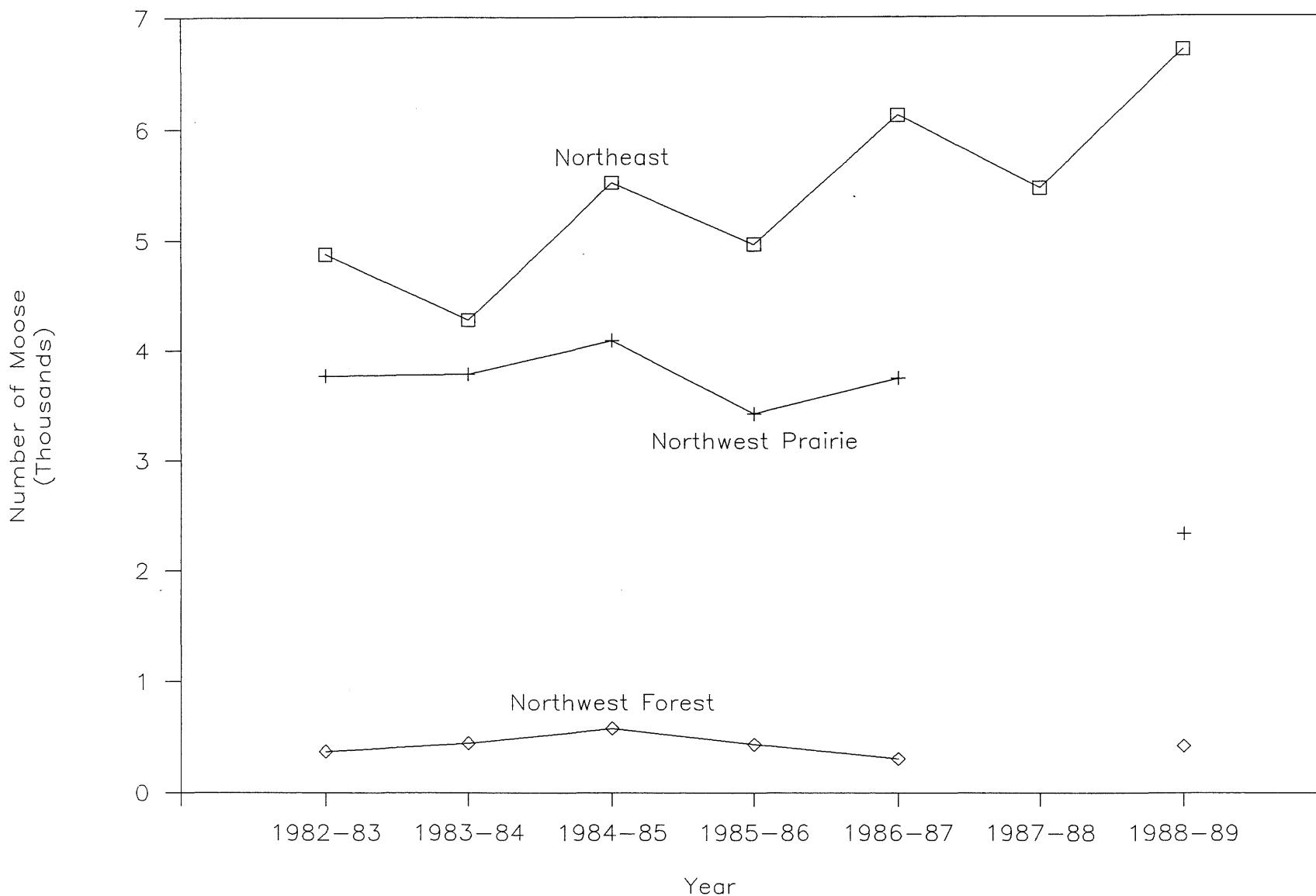


Figure 24. Moose population trends in northern Minnesota survey areas. No survey was conducted in either northwest survey area during the winter of 1987-88.

MIGRATORY BIRD POPULATIONS

Table 28. Estimated spring duck populations of selected species in Minnesota, 1975-89¹.

Species	Year	Unadjusted population index	Visibility factor	Adjusted ² population estimate (thousands)
Mallard	1975	55,093	3.19	176
	1976	69,844	1.69	118
	1977	60,617	2.21	134
	1978	56,152	2.61	147
	1979	61,743	2.57	159
	1980	83,775	2.05	172
	1981	79,562	1.95	155
	1982	51,655	2.33	121
	1983	73,424	2.12	156
	1984	94,514	1.99	188
	1985	96,045	2.26	217
	1986	108,328	2.16	234
	1987	165,881	1.16	192
	1988	155,453	1.75	272
	1989	124,362	2.19	273
Blue-winged teal	1975	45,948	3.95	181
	1976	89,370	4.87	436
	1977	37,391	3.86	144
	1978	28,491	8.53	243
	1979	46,708	5.21	243
	1980	50,966	6.49	331
	1981	64,546	2.59	167
	1982	42,772	4.75	203
	1983	42,728	2.81	120
	1984	89,896	2.82	254
	1985	90,453	2.91	264
	1986	68,235	2.69	183
	1987	102,480	1.99	204
	1988	101,135	2.38	240
	1989	90,300	3.16	286

¹ A recent evaluation of Minnesota's waterfowl breeding population survey concluded that population estimates for ducks other than mallards and blue-winged teal are not valid (Maxson, S. J. and R. M. Pace. 1989. Summary and evaluation of Minnesota's waterfowl breeding population survey, 1972-1986. Minnesota Wildlife Report 7. 92pp). Therefore, only data on mallards and blue-winged teal are reported here.

² Adjusted population estimates are different from those published previously because of adjustments in visibility factors to standardize data for all years.

Table 29. Winter population estimates (post hunting season) of the Canada goose eastern prairie flock, 1963-88 (taken from : U.S. Fish and Wildlife Service/Canadian Wildlife Service. 1989. 1989 Status of waterfowl and fall flight forecast; July 1989. 42pp).

Year	Population
1963	110,000
1964	103,000
1965	104,000
1966	121,000
1967	145,000
1968	134,000
1969	107,000
1970	121,000
1971	152,000
1972	177,000
1973	187,000
1974	188,000
1975	199,000
1976	254,000
1977	270,000
1978	207,000
1979	172,000
1980	151,000
1981	175,000 ^a
1982	210,000
1983	163,000 ^b
1984	168,000
1985	169,000
1986	183,000
1987	228,000
1988	184,000

^a In 1983, U.S.F.W.S. revised a previously published estimate (145,000) due to supplemental information.

^b Supplemental information suggests that the 1983 population was 170,000 - 190,000 birds.

Table 30. Summary of the number of May ponds (adjusted for visibility) in Prairie Canada (portions of Alberta, Saskatchewan and Manitoba) 1961-89 and north-central U.S. (North Dakota, South Dakota and Montana) 1974-89. (from: U.S. Fish and Wildlife Service/Canadian Wildlife Service, 1989. 1989 Status of waterfowl and fall flight forecast. July 1989. 39 pp).

Year	Ponds (thousands)	
	Prairie Canada	North Central U.S. ^a
1961	2,006	--
1962	2,531	--
1963	2,499	--
1964	3,445	--
1965	4,415	--
1966	4,672	--
1967	4,732	--
1968	1,938	--
1969	3,530	--
1970	4,957	--
1971	4,096	--
1972	4,065	--
1973	2,937	--
1974	6,693	1,509
1975	6,267	1,911
1976	5,057	1,392
1977	2,278	771
1978	3,622	1,590
1979	4,859	1,522
1980	2,141	761
1981	1,443	683
1982	3,185	1,458
1983	3,906	1,259
1984	2,458	1,766
1985	4,283	1,327
1986	4,025	1,735
1987	2,598	1,348
1988	2,110	794
Average	3,598	1,322
1989	1,696	1,290
% Change in 1989 from:		
1988	-20	+63
Average	-53	-2

^a No comparable survey data available for the north-central U.S. during 1961-73.

Table 31. North American breeding population estimates for 10 species of ducks, 1955-89. (from: U.S. Fish and Wildlife Service/Canadian Service. 1989. 1989 Status of waterfowl and fall flight forecast; July 1989. 42 pp). In thousands.^a

Year	Mallard	Gadwall	American wigeon	Green-winged teal	Blue-winged teal	Northern shoveler	Northern Pintail	Redhead	Canvasback	Scaup
1955	10,345	1,106	3,333	2,076	6,436	1,965	9,251	733	595	7,100
1956	11,711	1,202	3,712	1,898	6,267	2,084	10,124	928	692	6,595
1957	10,946	1,102	3,208	1,293	5,449	1,744	6,856	684	600	6,535
1958	12,904	687	3,372	1,618	5,799	1,515	6,889	524	713	6,040
1959	10,292	683	3,779	3,153	5,300	1,649	7,228	641	481	8,220
1960	8,206	873	3,165	1,630	4,303	1,859	5,769	542	575	5,566
1961	8,290	1,422	3,219	2,216	4,833	1,625	4,860	437	396	6,764
1962	6,144	1,610	2,721	1,119	3,890	1,633	4,299	664	385	6,398
1963	7,360	1,578	2,209	1,754	4,587	1,435	4,361	396	523	6,564
1964	6,974	1,223	2,630	2,051	4,943	1,685	4,111	560	658	6,326
1965	5,948	1,692	2,695	1,526	4,628	1,607	4,301	568	505	5,383
1966	7,401	1,976	2,901	2,219	5,616	2,272	5,777	747	683	5,421
1967	8,205	1,638	2,637	1,944	4,715	2,244	5,870	846	556	5,877
1968	7,586	2,098	2,783	1,805	3,697	1,811	4,225	502	557	5,971
1969	8,065	1,837	3,192	1,991	4,514	2,150	6,390	759	530	6,338
1970	10,379	1,698	3,752	2,259	5,633	2,269	7,004	834	601	6,930
1971	9,843	1,733	3,425	2,352	5,426	2,052	6,291	693	441	6,149
1972	9,867	1,776	3,428	2,407	5,673	2,505	7,875	489	429	9,527
1973	8,781	1,198	3,665	2,444	4,866	1,657	5,114	754	696	7,535
1974	7,392	1,562	3,003	2,221	5,437	2,060	7,165	613	493	7,045
1975	8,109	1,672	2,862	2,038	6,441	1,994	6,387	974	706	7,846
1976	8,637	1,478	2,699	1,844	5,023	1,818	6,045	946	686	6,973
1977	8,226	1,546	2,678	1,952	4,626	1,616	4,971	688	702	7,490
1978	7,695	1,593	3,808	2,978	4,497	2,162	5,664	833	423	7,125
1979	8,444	1,889	3,388	2,920	5,278	2,555	6,070	774	606	9,135
1980	8,003	1,459	3,857	2,925	4,903	2,050	5,420	1,146	688	7,690
1981	6,757	1,479	3,555	2,515	4,076	2,403	4,227	825	594	7,253
1982	6,684	1,690	3,159	2,247	3,879	2,540	4,112	674	543	6,549
1983	7,107	1,536	2,923	2,574	3,381	2,237	4,086	866	528	8,788
1984	5,974	1,799	3,979	1,804	3,870	2,222	3,664	849	569	8,402
1985	5,475	1,410	2,506	1,873	3,756	1,925	2,935	701	411	6,235
1986	6,303	1,590	2,446	2,588	4,664	2,403	3,201	956	442	6,252
1987	6,691	1,705	2,734	3,041	3,618	2,229	3,137	767	478	6,261
1988	6,549	1,528	3,168	3,143	3,646	2,157	2,577	846	435	5,480
1989	6,119	1,423	2,577	2,697	3,199	1,636	2,471	628	488	5,299
Goals ^b	8,700	1,600	3,300	2,300	5,300	2,100	6,300	760	580	7,600

Continued

Table. 31. Continued.

1955-88										
Ave.	8,156	1,502	3,135	2,189	4,814	2,004	5,478	728	556	6,875
Percent Change in 1989 from:										
1988	-7	-7	-19	-14	-12	-24	-4	-26	+12	-3
1955-88										
Ave.	-25	-5	-18	+23	-34	-18	-55	-14	-12	-23

^a All duck indexes adjusted for visibility bias.

^b Breeding duck population goals, from North American Waterfowl Management Plan (FWS-CWS 1986).

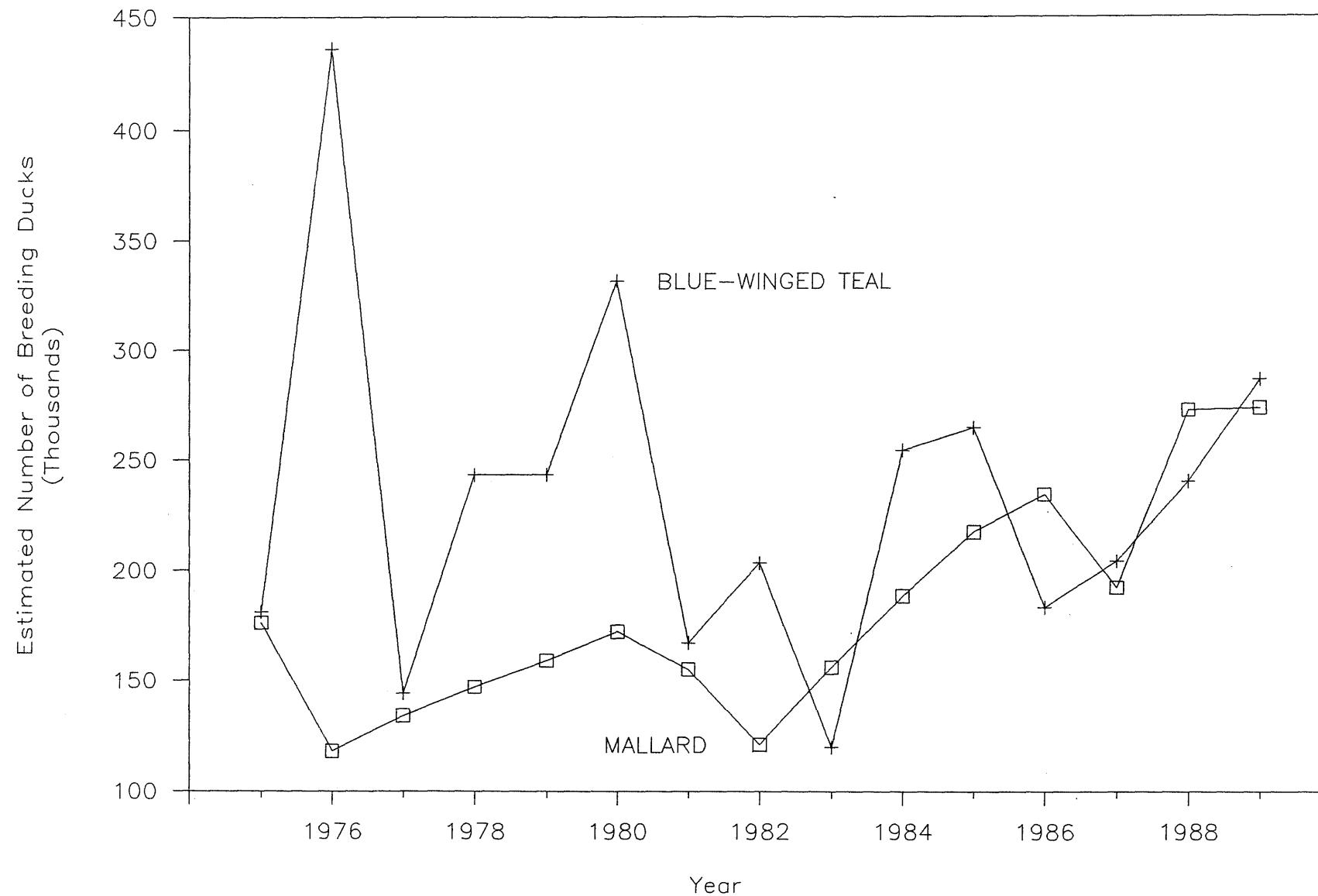


Figure 25. Estimated number of mallards and blue-winged teal breeding in Minnesota, 1975-89.

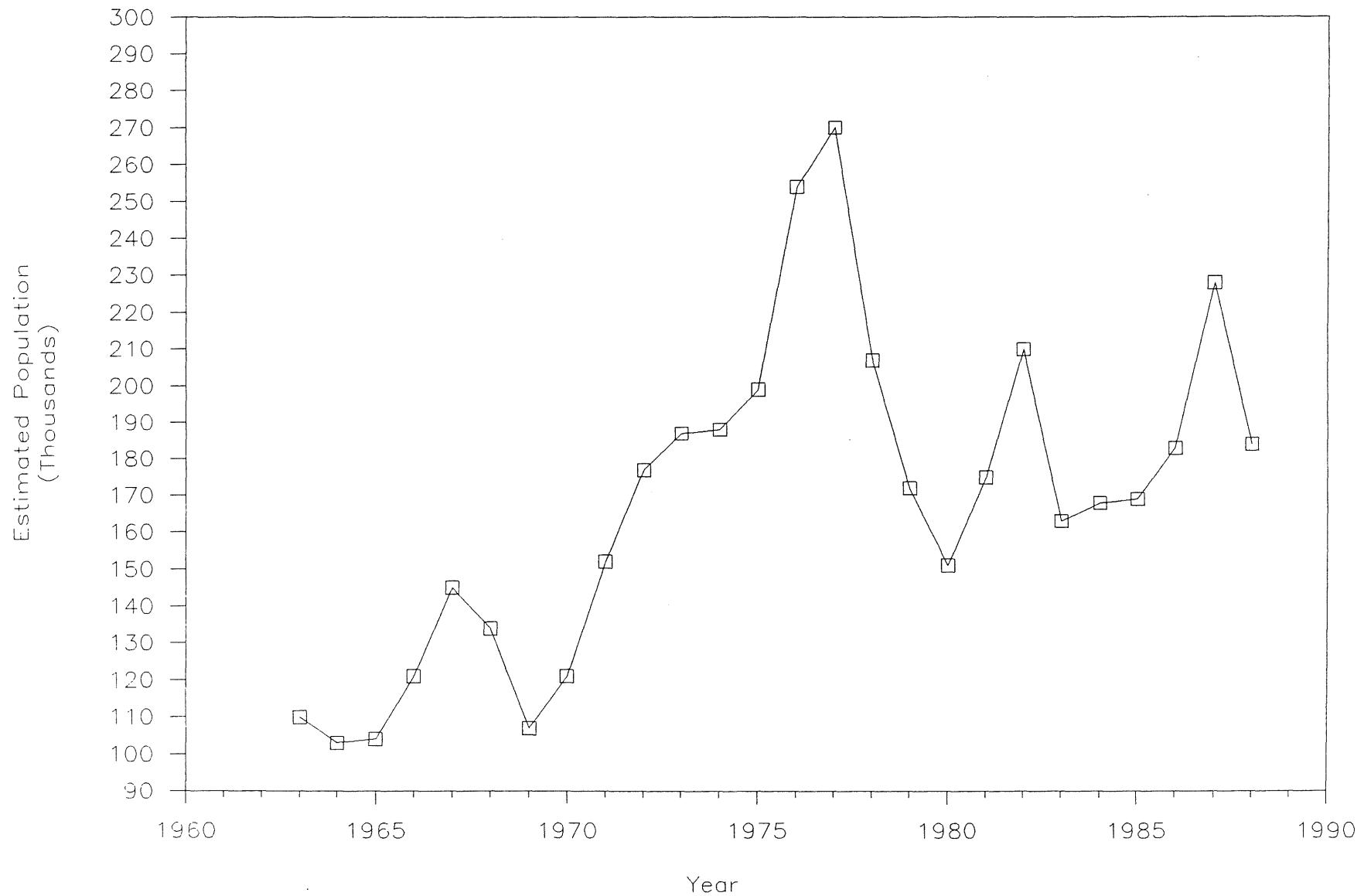


Figure 26. Winter population estimates of the Eastern Prairie Population of Canada geese, 1963-88.
(data from U.S. Fish and Wildlife Service/Canadian Wildlife Service reports on status
of waterfowl and fall flight forecasts).

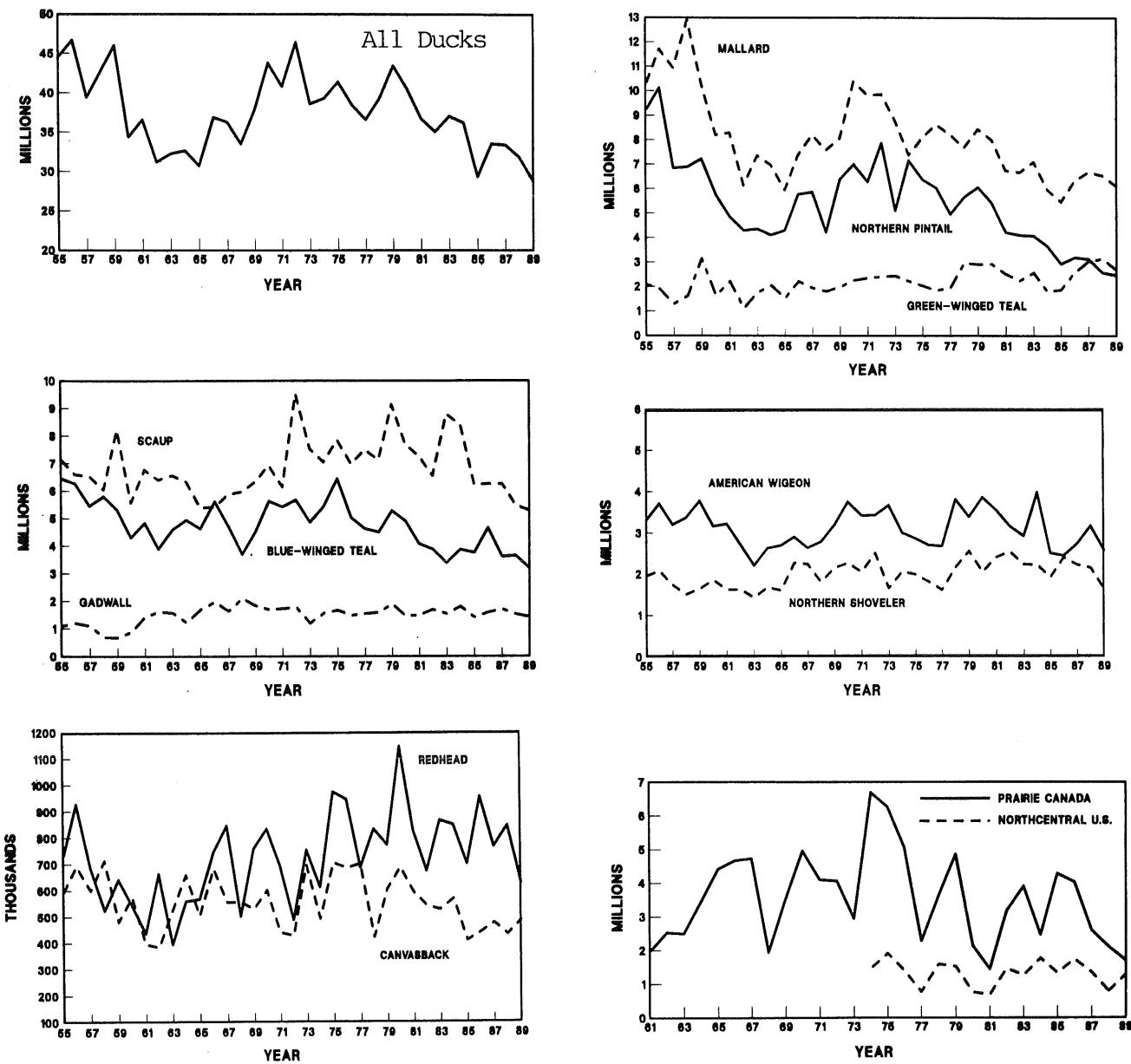


Figure 27. Estimates of North American breeding populations of selected ducks and number of water areas in May in Prairie Canada and northcentral U.S. (from: U.S. Fish and Wildlife Service/Canadian Wildlife Service 1989. 1989 Status of waterfowl and fall flight forecasts; July 1989. 39pp).

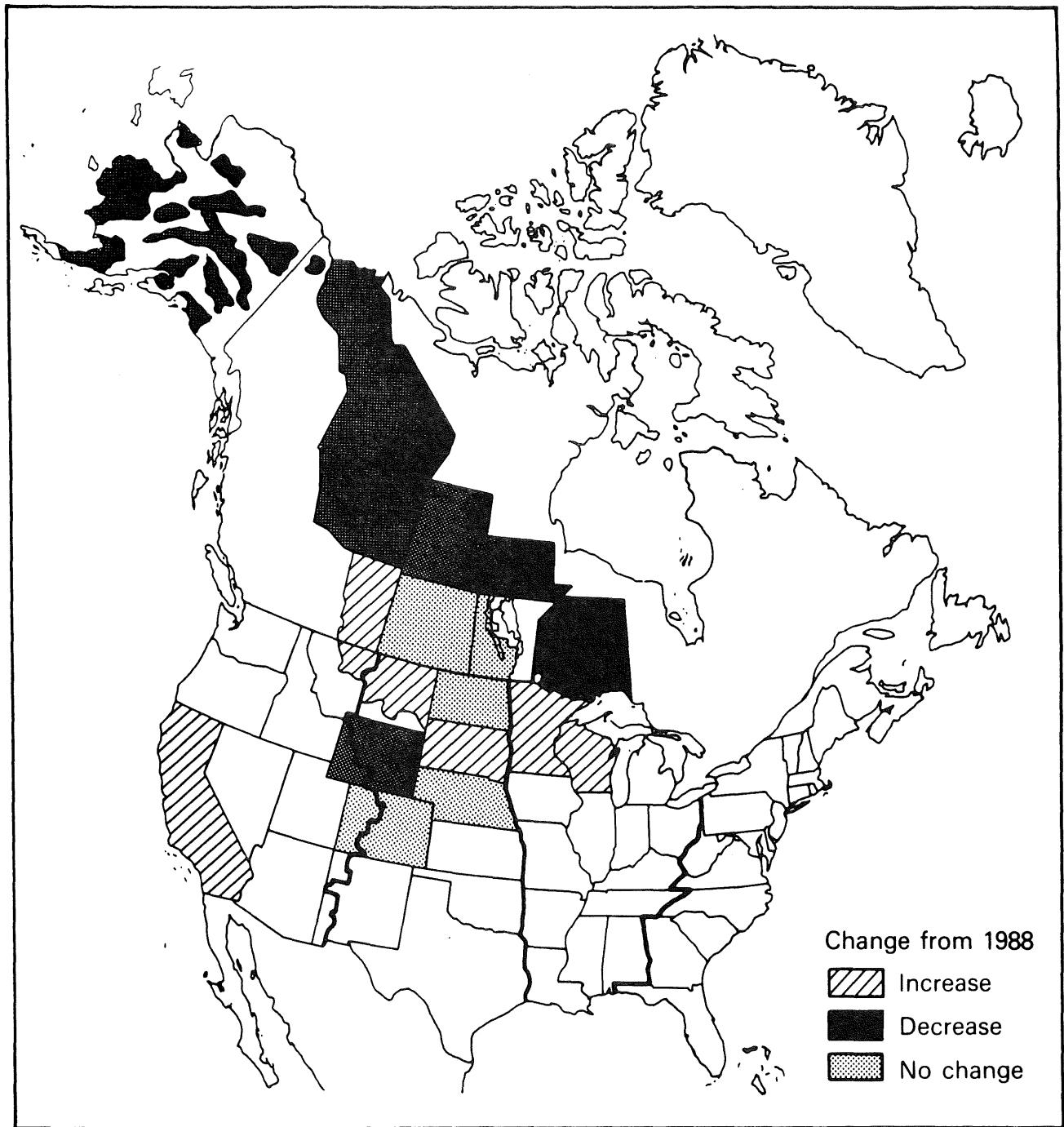


Figure 28. Fall 1989 duck flight forecast for Canada and the U.S., change from 1988: forecast: No Change. (from: U.S. Fish and Wildlife Service/Canadian Wildlife Service 1989. 1989 Status of waterfowl and fall flight forecasts; July 1989. 39pp).

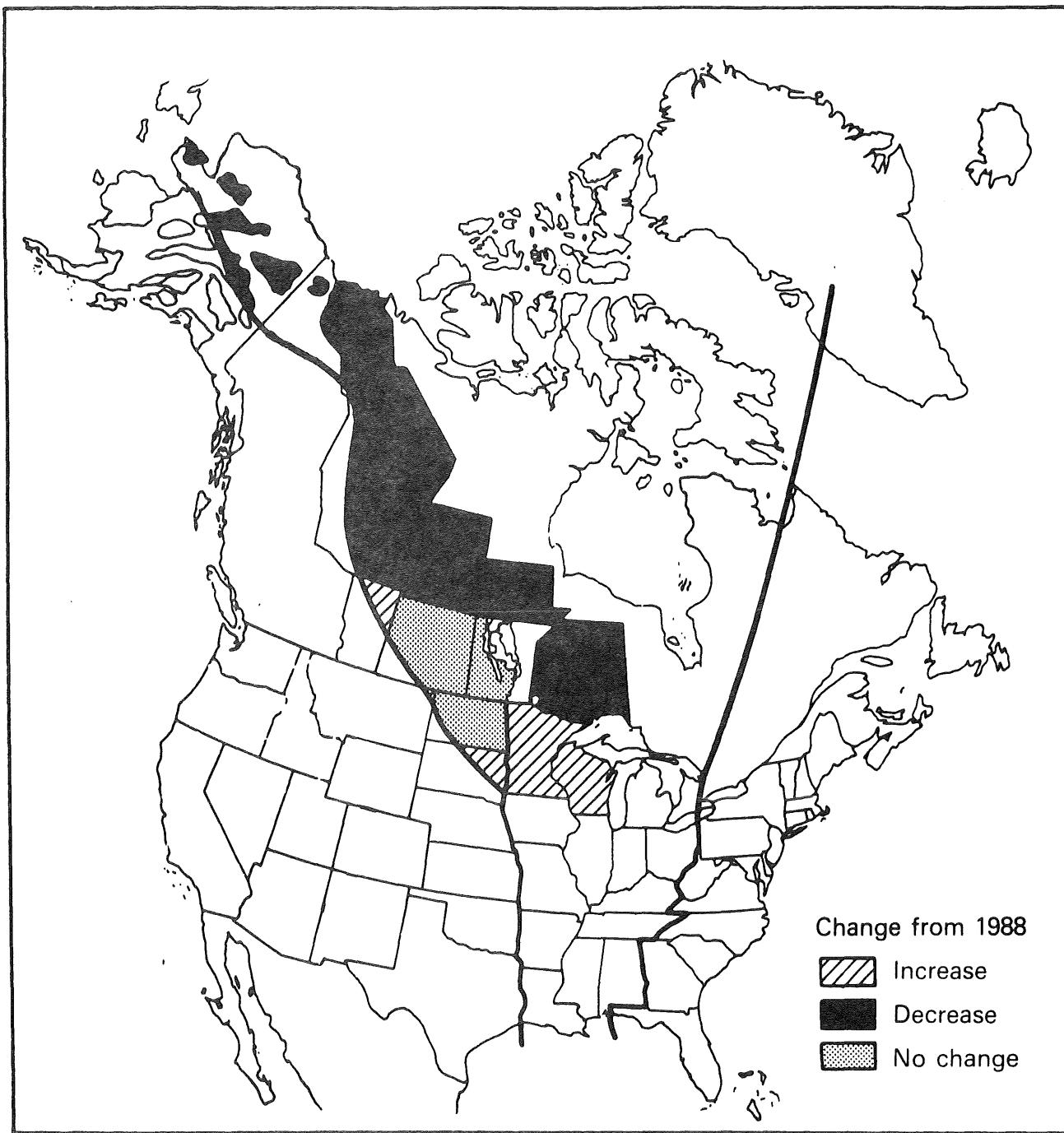


Figure 29. Fall 1989 duck flight forecast for the Mississippi Flyway, change from 1988; forecast: no change. (from: U.S. Fish and Wildlife Service/Canadian Wildlife Service 1989. 1989 Status of waterfowl and fall flight forecasts; July 1989. 39pp).

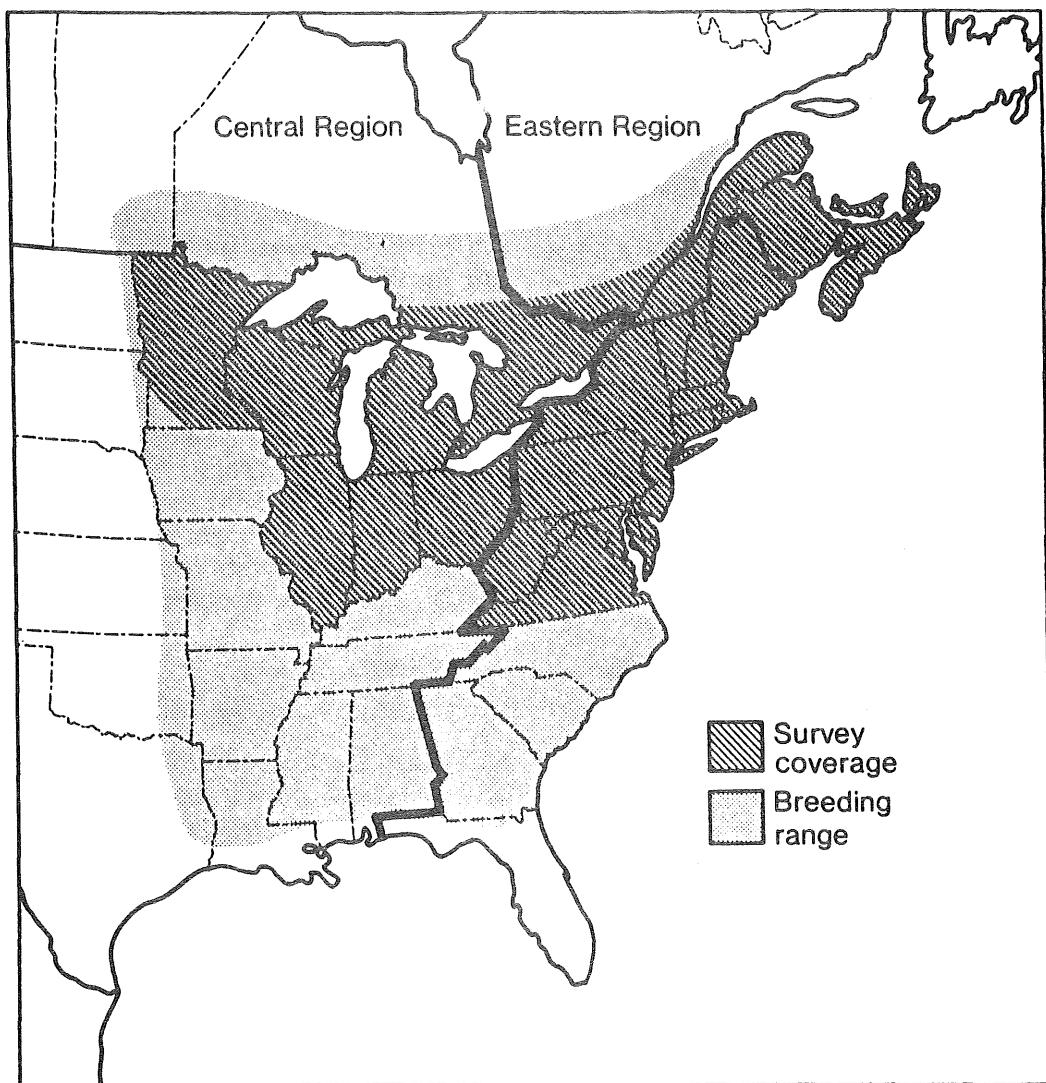


Figure 30. Approximate woodcock breeding range and states covered in singing ground survey. (from: Tautin, John. 1983. American woodcock 1983 status. June 1983. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 14pp).

Table 32. Trends (% change per year^a) as determined by linear regression in numbers of American woodcock heard by management region, state, and province. (from: Bortner, J.B. 1989. American woodcock harvest and breeding status, 1989. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 12pp).

Management Unit/State	N ^b	2 year (1988-89)			5 year (1985-89)			22 year (1968-89)		
		% Change	Routes Run ^c	N	% Change	N	% Change	N	% Change	
CENTRAL	270	-5.58	* ^d	462		428	0.35	634	-0.95***	
IL	3	199.48		21		9	-29.32	35	-3.39	
IN	8	-7.85		33		13	-4.89	50	-4.32 *	
MI	83	-1.93		118		121	1.46	136	-0.79	
MN	50	-10.57 **		84		73	-0.33	107	0.72	
OH	16	-29.03 ***		41		27	-8.40	*	69	-4.30 **
ON	62	-10.38 *		88		111	0.71	131	-0.19	
WIS	48	3.89		77		74	1.78	106	-1.64	

^a Mean of route trends weighted by land area and population diversity. The estimated count in the next year is (%/100+1) times the count in the current year where % is the annual change. NOTE: Extrapolating the estimated trend statistic (% change per year) over time (e.g., 22 years) may exaggerate the total change over the period.

^b Routes run in both 1988 and 1989 with comparable observers and densities greater than zero.

^c Actual routes run in 1989.

^d * P ≤ 0.1; ** P ≤ 0.05; *** P ≤ 0.01.

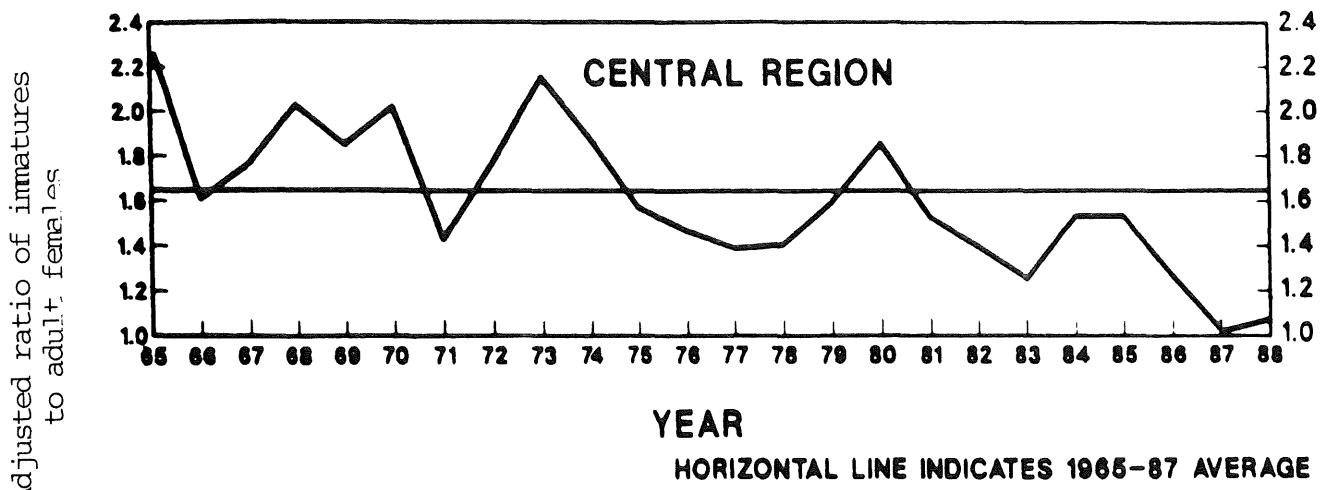


Figure 31. Adjusted index of American woodcock recruitment, 1965-88, base year 1969. (from: Bortner, James B. 1989. American woodcock harvest and breeding population status, 1989. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 12pp).

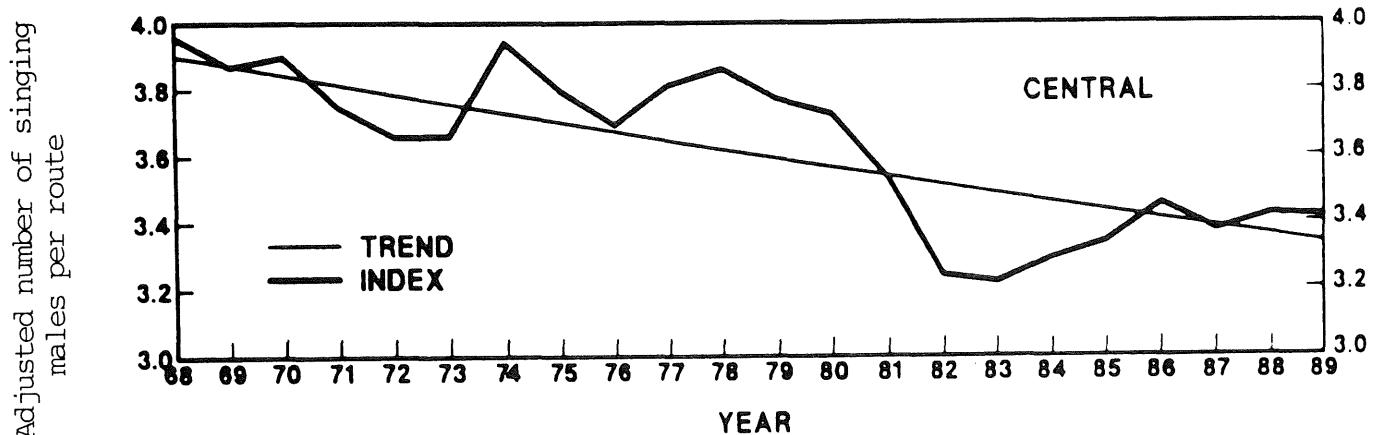
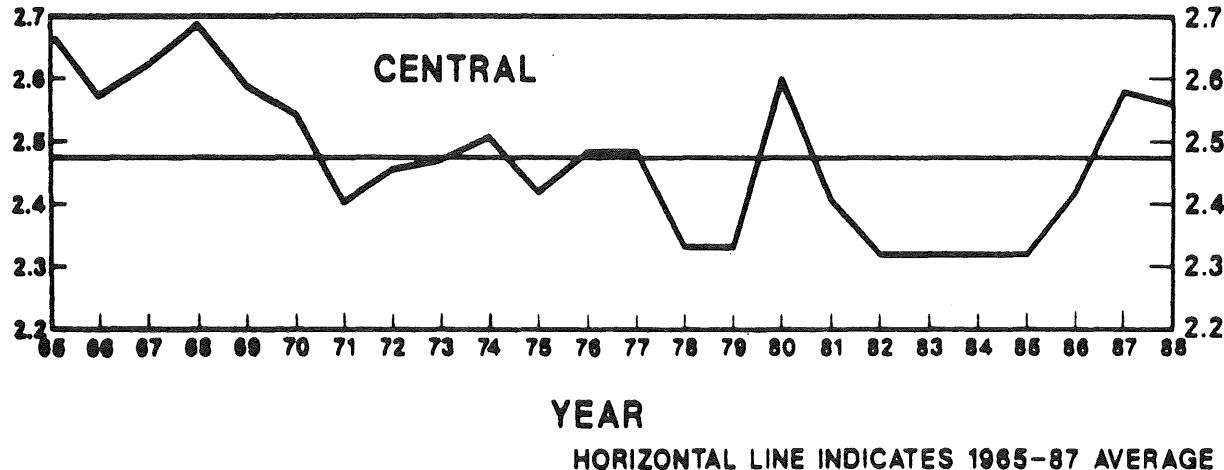


Figure 32. American woodcock breeding population trend and annual index, 1968-89; route regression analysis. (from: Bortner, James B. 1989. American woodcock harvest and breeding population status, 1989. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 12pp).

Adjusted Average Daily Bag



Adjusted Average Seasonal Bag

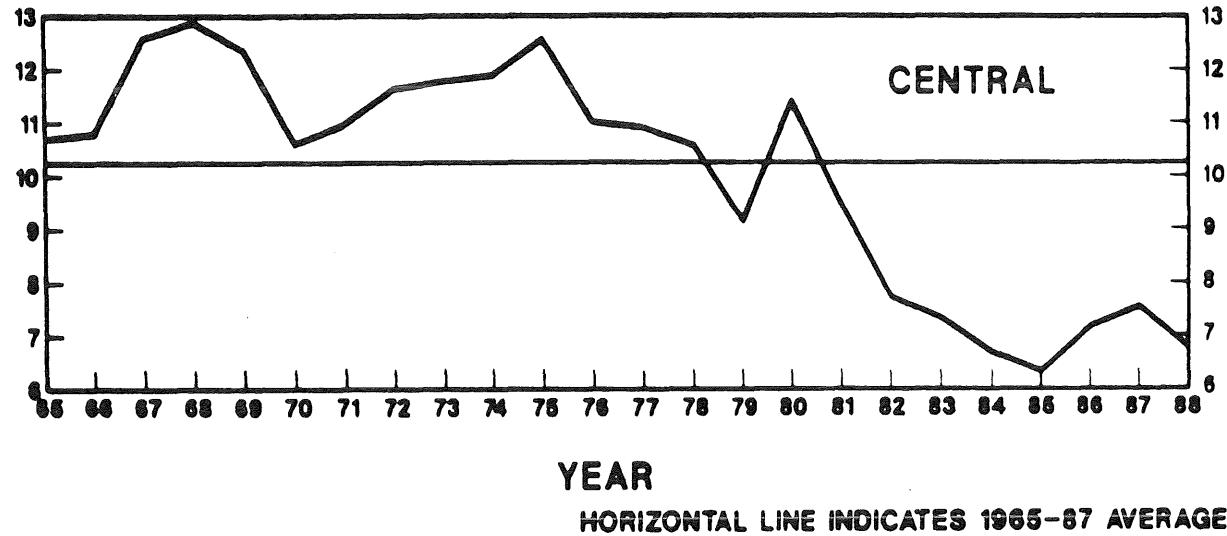


Figure 33. Adjusted indices of daily and seasonal hunting success of American woodcock, 1965-88, base year 1969. (from: Bortner, James B. 1989. American woodcock harvest and breeding population status, 1989. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 12pp).

NONGAME WILDLIFE

Table 33. Minnesota Bald Eagle Nesting Activity in Four Survey Areas, 1988.

Survey Area	Observed Breeding Areas	Occupied ^a Breeding Areas	Successful Breeding Areas	Percent Successful	Number of Young	Young/Occupied Breeding Area	Average Brood Size
Chippewa NF	152	135	91	67	146	1.08	1.6
Superior NF	81	65	50	77	76	1.17	1.5
Voyageurs NP ^b	28	25	12	48	18	.72	1.5
"Other Areas"	169	128	97	76	172	1.34	1.8
Minnesota Total	430	353	250	71	412	1.17	1.6

^a Occupied breeding areas with known outcome.

^b Includes 8 occupied nesting areas (3 successful with 4 young) outside of the park boundary whose nesting areas extend into Voyageurs NP.

Table 34. Minnesota Bald Eagle Nesting Data, 1973-1988.

Year	<u>Breeding Areas</u>		<u>Young</u>			Brood size	
	Occupied ^a	Number	<u>Successful</u>		Average Per Occupied Breeding Area		
			% Occupied	Total			
1973	115	71	62	113	1.09	1.59	
1974	127	77	61	96	0.76	1.25	
1975	120	87	73	145	1.21	1.67	
1976	122	93	76	163	1.11	1.75	
1977	156	114	73	179	1.15	1.57	
1978	168	115	68	188	1.12	1.22	
1979	159	111	70	196	1.20	1.80	
1980	181	133	73	239	1.32	1.79	
1981	190	132	69	242	1.27	1.83	
1982	207	145	70	245	1.17	1.69	
1983	229	170	74	321	1.40	1.89	
1984	245	165	67	274	1.12	1.66	
1985	250	161 ^b	71 ^b	275 ^b	1.21 ^b	1.71 ^b	
1986	266	187 ^c	72 ^c	312 ^c	1.21 ^c	1.66 ^c	
1987	326						
1988	372	250	67	412	1.18	1.64	

^a Number of occupied breeding areas regardless of outcome.

^b These figures do not include data from 23 occupied nesting areas of unknown outcome in the Boundary Waters Canoe Area.

^c These figures do not include data from 9 occupied nesting areas of unknown outcome in the Boundary Waters Canoe Area.

HUNTING

HARVEST STATISTICS

Table 35. Resident small game hunter^a response to mail surveys, 1979-80 through 1988-89.

Year	Number mailed	Number not delivered	<u>Delivered questionnaires completed and returned</u>	
			Number	Percent
1979-80	5,696	443	4,504	85.7
1980-81	6,434	385	4,963	82.0
1981-82	6,656	399	5,419	86.6
1982-83	5,963	266	4,792	84.1
1983-84	4,551	269	3,325	77.7 ^b
1984-85	4,096	127	3,280	82.6
1985-86	3,370	157	2,574	80.1
1986-87	4,668	208	3,623	81.2
1987-88	5,513	248	4,191	79.6
1988-89	15,388	857	11,431	78.7

^a Includes individual and combination sportsman, regular small game, and senior licensees, and excludes duplicate licenses.

^b Includes only those survey returns received by 25 April 1984.

Table 36. Use of resident small game hunter licenses^a, 1979-80 through 1988-89.

	Returns from mail survey	Projections from license sales
1979-80		
Hunted	3,964 (88.0%)	296,766
Did not hunt	<u>540</u> (12.0%)	<u>40,468</u>
	<u>4,504</u> (100.0%)	<u>337,234</u>
1980-81		
Hunted	4,288 (86.4%)	311,717
Did not hunt	<u>675</u> (13.6%)	<u>49,066</u>
	<u>4,963</u> (100.0%)	<u>360,783</u>
1981-82		
Hunted	4,461 (82.3%)	306,843
Did not hunt	<u>958</u> (17.7%)	<u>65,992</u>
	<u>5,419</u> (100.0%)	<u>372,835</u>
1982-83		
Hunted	3,908 (81.6%)	257,546
Did not hunt	<u>884</u> (18.4%)	<u>58,258</u>
	<u>4,792</u> (100.0%)	<u>315,804</u>
1983-84		
Hunted	2,805 (84.4%)	232,973
Did not hunt	<u>520</u> (15.6%)	<u>43,061</u>
	<u>3,325</u> (100.0%)	<u>276,034</u>
1984-85		
Hunted	2,663 (81.2%)	211,740
Did not hunt	<u>617</u> (18.8%)	<u>49,024</u>
	<u>3,280</u> (100.0%)	<u>260,764</u>
1985-86		
Hunted	2,132 (82.8%)	213,883
Did not hunt	<u>442</u> (17.2%)	<u>44,342</u>
	<u>2,574</u> (100.0%)	<u>258,225</u>
1986-87		
Hunted	3,006 (83.0%)	217,504
Did not hunt	<u>617</u> (17.0%)	<u>44,549</u>
	<u>3,623</u> (100.0%)	<u>262,053</u>
1987-88		
Hunted	3,554 (84.8%)	242,875
Did not hunt	<u>635</u> (15.2%)	<u>43,395</u>
	<u>4,189</u> (100.0%)	<u>286,270</u>
1988-89		
Hunted	9,391 (82.2%)	234,833
Did not hunt	<u>2,040</u> (17.8%)	<u>50,852</u>
	<u>11,431</u> (100.0%)	<u>285,685</u>

^a Includes individual and combination sportsman, regular small game, and senior licenses. Excludes duplicates.

Table 37. Estimated number of hunters and estimated take per hunter for various species, 1981-82 through 1988-89.

Species	Estimated number of hunters (thousands)								Estimated take per hunter							
	1981- 82	1982- 83	1983- 84	1984- 85	1985- 86	1986- 87	1987- 88	1988- 89	1981- 82	1982- 83	1983- 84	1984- 85	1985- 86	1986- 87	1987- 88	1988- 89
Ducks	138	134	117	134	122	132	114	77	8.4	8.1	10.6	10.8	9.1	9.0	8.2	6.9
Canada goose	47	52	41	51	55	58	56	47	1.4	1.6	1.6	1.6	1.9	1.8	1.9	2.4
Other geese	15	11	10	9	9	7	9	5	1.0	0.7	0.7	0.8	1.2	0.5	1.1	0.9
American coot	13	11	12	9	11	11	8	3	4.0	4.3	4.7	4.9	4.4	5.3	3.6	2.6
Common snipe	7	4	6	5	5	5	6	4	2.9	3.2	2.8	4.0	3.2	3.9	3.4	3.3
Rails/gallinules	1	1	2	1	1	1	1	1	1.6	3.1	1.2	1.4	2.3	1.1	3.6	1.8
American woodcock	23	20	16	17	19	21	27	26	2.8	2.7	3.9	4.3	4.3	4.3	4.5	4.0
Ring-necked pheasant	173	125	86	65	72	62	86	84	3.3	2.1	3.5	2.3	3.0	2.6	3.2	3.9
Ruffed grouse	145	115	78	87	94	107	132	139	3.9	2.6	2.4	3.7	3.8	4.2	6.3	6.6
Spruce grouse	15	13	9	12	12	12	16	15	1.7	1.1	1.1	1.7	2.1	1.7	2.3	2.6
Sharp-tailed grouse	16	14	9	9	10	9	10	12	2.2	1.2	1.1	0.8	1.9	1.5	2.4	2.5
Gray partridge (Hun)	32	21	21	15	20	17	23	25	3.4	2.5	3.6	2.1	4.3	3.3	3.1	3.8
Gray squirrel	70	53	38	39	38	41	40	37	5.9	5.1	5.3	5.3	5.2	5.7	5.6	5.8
Fox squirrel	48	39	28	26	29	29	26	26	4.6	4.2	4.5	4.1	5.0	5.1	4.7	5.2
Eastern cottontail	60	36	29	22	22	24	26	27	4.4	3.8	3.4	2.8	3.8	4.2	4.0	4.3
White-tailed jack rabbit	17	11	7	6	6	4	5	5	2.7	2.6	1.9	1.9	3.0	3.4	2.2	1.8
Snowshoe hare	25	15	9	7	7	8	10	9	4.4	4.2	2.3	2.3	2.3	3.2	2.6	3.7
Raccoon	19	13	11	12	10	11	13	9	7.0	6.3	8.0	9.4	9.4	10.9	13.1	11.4
Red fox	19	12	11	11	12	11	13	13	1.9	1.5	2.0	2.3	4.2	1.5	2.5	3.3
Gray fox	4	3	2	3	2	2	3	3	1.0	0.9	0.9	1.4	2.0	0.8	1.3	0.9
Coyote	4	3	3	3	5	4	5	6	0.9	0.8	0.8	1.8	3.1	1.6	1.1	1.2
Badger	7	1	1	1	1	1	1	1	1.1	1.9	0.3	3.9	1.8	1.0	1.6	1.5

Table 38. Resident small game hunting license sales and estimated hunter harvest, 1981-82 through 1988-89.

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Small game license sales ^a	372,835	314,477	276,034	260,764	258,225	262,053	286,270	285,685
Federal duck stamp sales ^a	142,345	134,803	138,161	138,820	134,594	139,391	125,831	93,695
State duck stamp sales ^b	129,546	123,834	125,212	131,394	125,559	146,747	120,235	89,228
Pheasant stamp sales ^b	-	-	114,189	81,587	85,252	81,027	102,944	100,478
Estimated harvest ^c (thousands)								
Ducks ^d	1,167	1,071	1,235	1,443	1,029	1,172	928	531
Canada geese ^d	71	81	62	82	86	101	106	114
Other geese ^d	16	7	8	8	9	3	11	5
American coot ^d	49	49	55	48	41	59	29	9
Common snipe	21	14	17	20	16	21	19	13
Rails/gallinules	2	3	2	1	2	1	5	1
American woodcock	63	54	58	70	70	87	113	104
Ring-necked pheasant	573	265	299	148	179	159	277	332
Ruffed grouse	576	302	183	320	315	442	817	917
Spruce grouse	24	14	10	21	21	20	36	39
Sharp-tailed grouse	34	17	10	7	14	13	24	29
Gray partridge (hun)	110	52	74	31	77	54	69	95
Gray squirrel	409	271	199	208	186	235	222	217
Fox squirrel	216	162	126	107	140	145	122	134
Eastern cottontail	263	135	98	61	75	102	102	118
White-tailed jack rabbit	45	27	13	11	17	14	12	10
Snowshoe hare	109	61	21	16	12	25	26	32
Raccoon	136	80	87	114	85	122	170	102
Red fox	37	19	21	26	44	15	33	43
Gray fox	4	2	2	4	4	2	4	2
Coyote (brush wolf)	4	2	3	5	11	7	6	7
Badger	2	2	<1	2	2	<1	2	1

Harvest estimates in this table, and the number of hunters and mean take per hunter in Table 37, are calculated from different questions on the survey form. The sample used in calculations differs from one estimator to the next. This is because some respondents give specific answers to one question but not to a related one. A formula is used to calculate the total estimated take for each species which appears in this table. In most years the formula produces results rather close to those obtained by multiplying the average take per hunter times the number of hunters. However, in other years (e.g., 1985) results of the two methods are quite divergent, perhaps as a result of an unusual sample. This is being investigated further, and as a result, numbers may change somewhat in future reports. The most current report of survey findings will have the best data available at that time.

^a Duplicate licenses not included.

^b Excluded stamps sold with an issuing fee, many of which probably were purchased by collectors.

^c Estimates based upon response of hunters to questionnaires.

^d U.S. Fish and Wildlife Service harvest estimates for 1988 are:

Ducks 247,719 Other geese 2,671
 Canada geese 80,792 American coot 4,169

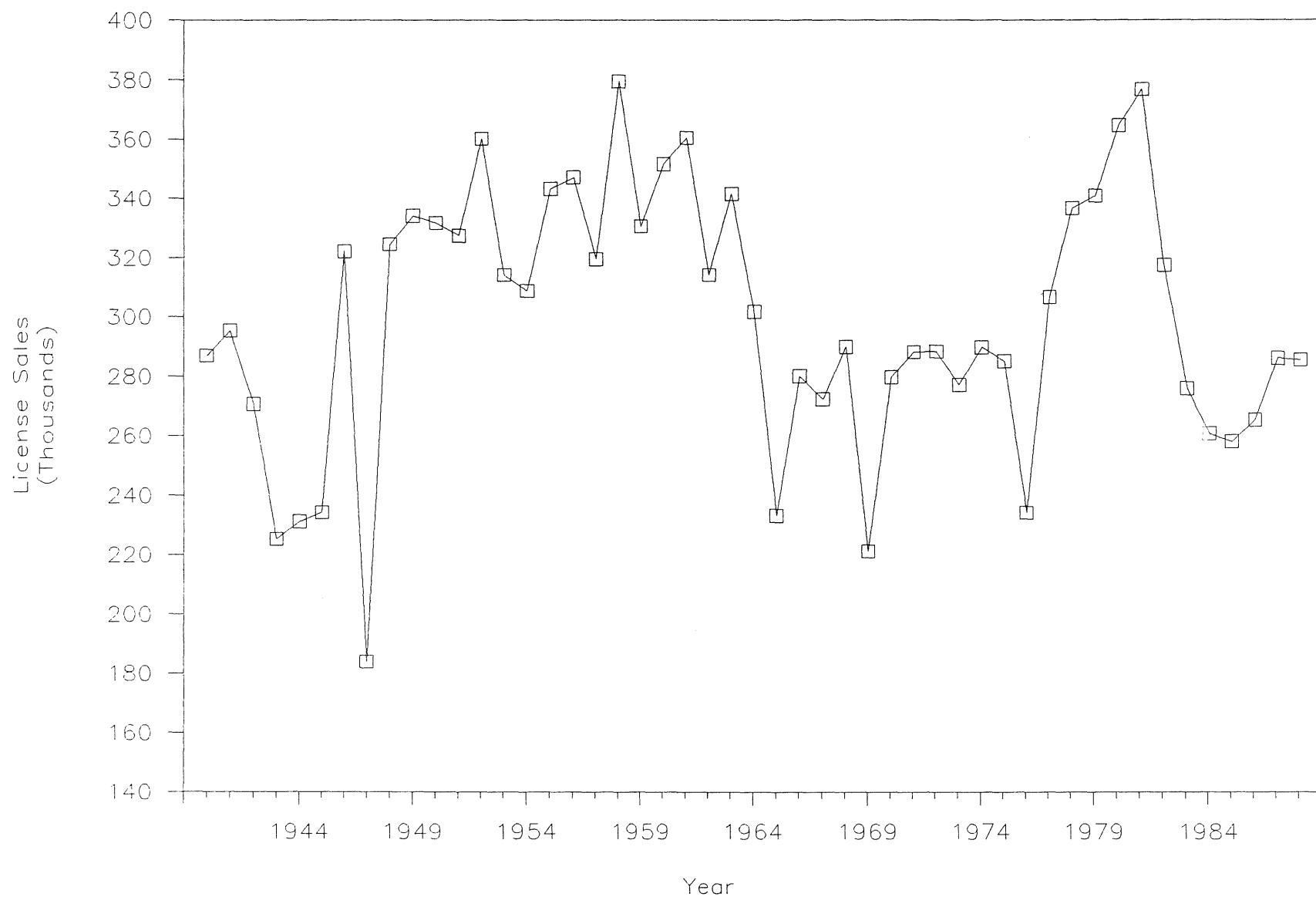


Figure 34. Minnesota small game license sales, 1940-88.

Table 39. Mail survey results of nonresident small game hunters, 1981-82 through 1987-88.

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Nonresident licenses issued ^a	4,271	3,187	2,911	3,060	3,271	3,078	3,596	3,463
Questionnaires								
Number mailed	280	361	384	237	338	406	429	436
Number not delivered	21	21	25	13	25	42	19	33
Number (percent) returned	214 (82.6)	281 (82.6)	280 (78.0) ^b	192 (86.0)	246 (78.6)	290 (79.7)	328 (80.0)	327 (81.1)
Total nonresidents and percent (in parenst) of all nonresidents hunting:								
Ducks	2,055 (48)	1,840 (58)	1,500 (52)	2,090 (68)	1,900 (58)	1,810 (59)	990 (28)	1,130 (33)
Canada goose	718 (17)	830 (26)	580 (20)	820 (27)	800 (24)	850 (28)	515 (14)	700 (20)
Ruffed grouse	1,656 (39)	960 (30)	620 (21)	1,000 (33)	1,090 (33)	1,000 (32)	1,000 (28)	1,960 (57)
Ring-necked pheasant	1,436 (34)	680 (21)	500 (17)	390 (13)	720 (22)	510 (17)	400 (11)	690 (20)
Raccoon ^c	125 (3)	100 (3)	170 (6)	130 (4)	70 (2)	85 (3)	80 (2)	42 (1)
Total nonresident take:								
Ducks	19,000	15,000	17,500	24,000	14,400	14,600	6,300	8,000
Canada goose	2,000	1,500	1,300	1,300	1,400	1,400	900	1,500
Ruffed grouse	7,000	3,000	1,700	4,200	3,500	3,800	6,100	12,300
Ring-necked pheasant	5,000	1,500	2,200	1,500	1,900	1,100	1,100	2,600
Raccoon	1,000	700	1,400	1,100	1,400	600	1,200	700

^a Excludes duplicate licenses and nonresident shooting preserve licenses.

^b Includes only those survey returns received by 25 April 1984.

^c Nonresident raccoon hunters were required to purchase a nonresident raccoon hunting license for the first time in 1979 in addition to the nonresident small game license. The initial season bag limit of 8 was increased to 12 in 1983 and to 20 in 1985.

	<u>Resident</u>	<u>Nonresident</u>	Raccoon take per hunter Number of nonresident raccoon licenses
1978	6	14	0
1979	6	6	404
1980	4	5	93
1981	7	7	121
1982	6	7	95
1983	8	8	102
1984	9	8	111
1985	9	20	108
1986	11	7	86
1987	13	15	145
1988	11	17	73

Table 40. Species composition of the Minnesota waterfowl harvest, 1987 and 1988 (taken from: Martin, E.M., A.N. Novara, P.H. Geissler, and S.M. Carney. 1989. Preliminary estimates of waterfowl harvest and hunter activity in the United States during the 1988 hunting season. U.S. Fish and Wildlife Service Adm. Rep., Office of Migratory Bird Management, Laurel, Maryland. July 1989. 23 pp.).

Species	1987		1988		Percent change
	Harvest	Pct of harvest	Harvest	Pct of harvest	
Mallard	181,000	31.71	79,500	32.08	-56
Domestic mallard	600	0.11	0	0.00	0
American black duck	600	0.11	700	0.30	+17
Black x mallard	0	0.00	0	0.00	0
Gadwall	8,800	1.55	2,700	1.08	-69
American wigeon	22,600	3.96	7,600	3.07	-66
Green-winged teal	58,700	10.28	28,200	11.40	-52
Blue-winged/cinnamon teal	24,800	4.34	9,700	3.92	-61
Northern shoveler	6,900	1.21	600	0.23	-91
Northern pintail	4,200	0.73	6,700	2.69	+60
Wood duck	106,900	18.73	35,900	14.51	-66
Redhead	18,300	3.20	3,100	1.26	-83
Canvasback	0	0.00	0	0.00	0
Greater scaup	2,100	0.36	600	0.23	-71
Lesser scaup	28,300	4.95	34,800	14.03	+23
Ring-necked duck	82,600	14.47	20,400	8.22	-75
Goldeneyes	5,800	1.01	3,900	1.59	-33
Bufflehead	13,600	2.39	8,700	3.53	-36
Ruddy duck	1,300	0.23	500	0.21	-62
Scoters	1,300	0.23	600	0.24	-54
Hooded merganser	2,100	0.36	3,100	1.26	+48
Other mergansers	300	0.05	400	0.17	+33
Other ducks	0	0.00	0	0.00	0
Total	570,800	100.00	247,700	100.00	-57

Table 41. Top 10 states in number of adult waterfowl hunters, 1988, and number of hunter-days and retrieved duck kill, in each (taken from: Martin, E.M., A.N. Novara, P.H. Geissler, and S.M. Carney. 1989. Preliminary estimates of waterfowl harvest and hunter activity in the United States during the 1988 hunting season. U.S. Fish and Wildlife Service Adm. Rep. Office of Migratory Bird Management, Laurel, Maryland. July 1989. 23 pp.).

State	Number of adult waterfowl hunters	Number of hunter-days	Retrieved duck kill	Ducks retrieved per hunter-day
Minnesota	83,070	493,218	247,719	0.50
Texas	67,788	361,202	255,092	0.71
Wisconsin	66,975	374,594	176,578	0.47
Louisiana	63,536	433,920	463,183	1.07
California	60,284	443,811	464,640	1.05
Michigan	44,359	319,317	138,510	0.43
Pennsylvania	43,050	209,397	59,494	0.28
New York	41,075	202,701	123,750	0.61
Maryland	33,443	248,330	111,186	0.45
Illinois	32,736	248,270	99,215	0.40
Mississippi Flyway	448,083	3,054,917	1,833,363	0.60
United States	1,129,706	7,149,622	4,637,522	0.65

Table 42. Turkey hunting summary, 1978-89.

Year	Area of open hunt zone (mi ²)	Number of permit applicants	Number of permits available	Odds of drawing a permit ^a	Number of permits given ^b	Number of persons hunting ^b	Registered turkey harvest ^c	% success ^c
1978	389	10,740	420	25.6:1	411	398	94	23.6
1979	673	11,116	840	13.2:1	827	794	116	14.6
1980	858	9,613	1,200	8.0:1	1,191	1,072	98	9.1
1981	1,242	8,398	1,500	5.6:1	1,556	1,292	113	8.7
1982	1,490	7,223	2,000	3.6:1	1,992	1,625	106	6.5
1983	1,807	8,153	2,100	3.9:1	2,079	1,663	116	7.0
1984	2,061	7,123	3,000	2.4:1	2,837	2,270	178	7.8
1985	2,118	5,662	2,750	2.1:1	2,449	1,959	323	16.5
1986	1,897	5,715	2,500	2.3:1	2,251	1,801	333	18.5
1987	1,747	6,361	2,700	2.4:1	2,520	2,016	520	25.8
1988	1,781	8,402	3,000	2.8:1	2,994	2,395	674	28.1
1989	2,341	13,007	4,000	3.3:1	3,821	3,057	930	30.4

^a Calculated with total permits available to be given, and not adjusting for undersubscribed zones and time periods.

^b For 1978-82, based on a post-hunt mail survey. Number actually hunting in 1983-89 was estimated at 80% (from last year survey results were tabulated).

^c Registered turkey harvest divided by number actually hunting, expressed as %.

Table 43. Deer hunting license sales, 1957-88*.

Year	Firearms License Sales			Archery Licenses			Grand Total
	Resident	Non-resident	Total	Resident	Non-resident	Total	
1957	180,028	488	180,516	10,033	119	10,152	190,668
1958	203,430	552	203,982	10,968	118	11,086	215,068
1959	200,102	530	200,632	11,768	101	11,869	212,501
1960	233,593	621	234,214	11,834	122	11,956	246,170
1961	250,031	632	250,663	13,229	141	13,370	264,033
1962	244,166	676	244,842	11,776	150	11,926	256,768
1963	257,333	771	258,104	11,724	165	11,889	269,993
1964	278,032	1,021	279,053	13,472	193	13,665	292,718
1965	289,918	1,128	291,046	15,628	265	15,893	306,939
1966	284,195	1,287	285,482	17,203	277	17,480	302,962
1967	305,717	1,311	307,028	18,405	289	18,694	325,722
1968	302,216	1,442	303,658	20,188	292	20,480	324,138
1969	253,891	1,168	255,059	15,658	256	15,914	270,973
1970	188,166	334	188,500	12,277	220	12,497	200,997
1971	no firearms season			17,360	111	17,471	17,471
1972	257,998	959	258,957	21,985	326	22,311	281,268
1973	294,349	1,342	295,691	29,169	545	29,714	325,405
1974	296,248	1,747	297,995	30,701	644	31,345	329,340
1975	327,596	1,921	329,517	31,836	804	32,640	362,157
1976	263,868	1,029	264,897	21,773	263	22,036	286,933
1977	287,271	1,430	288,701	29,404	402	29,806	318,507
1978	307,910	1,776	309,686	32,546	476	33,022	342,708
1979	312,754	1,910	314,664	35,657	447	36,104	350,768
1980	344,516	2,378	346,894	41,328	634	41,962	388,856
1981	369,425	2,973	372,398	50,063	906	50,969	423,367
1982	369,018	3,038	372,056	54,084	848	54,932	426,988
1983	391,099	3,611	394,710	55,822	478	56,300	451,010
1984	396,074	4,307	400,381	61,576	583	62,159	462,540
1985 ^a	416,464	4,984	421,448	66,716	589	67,305	488,753
1986 ^a	413,542	4,476	418,018	68,689	547	69,236	487,254
1987 ^a	414,747	4,931	419,658	70,243	604	70,847	490,505
1988 ^a	407,861	5,626	413,487	68,255	717	68,972	482,459

* Duplicate licenses not included. Leech Lake licenses are included during years they were issued.

^a Numbers include the following bonus deer licenses:

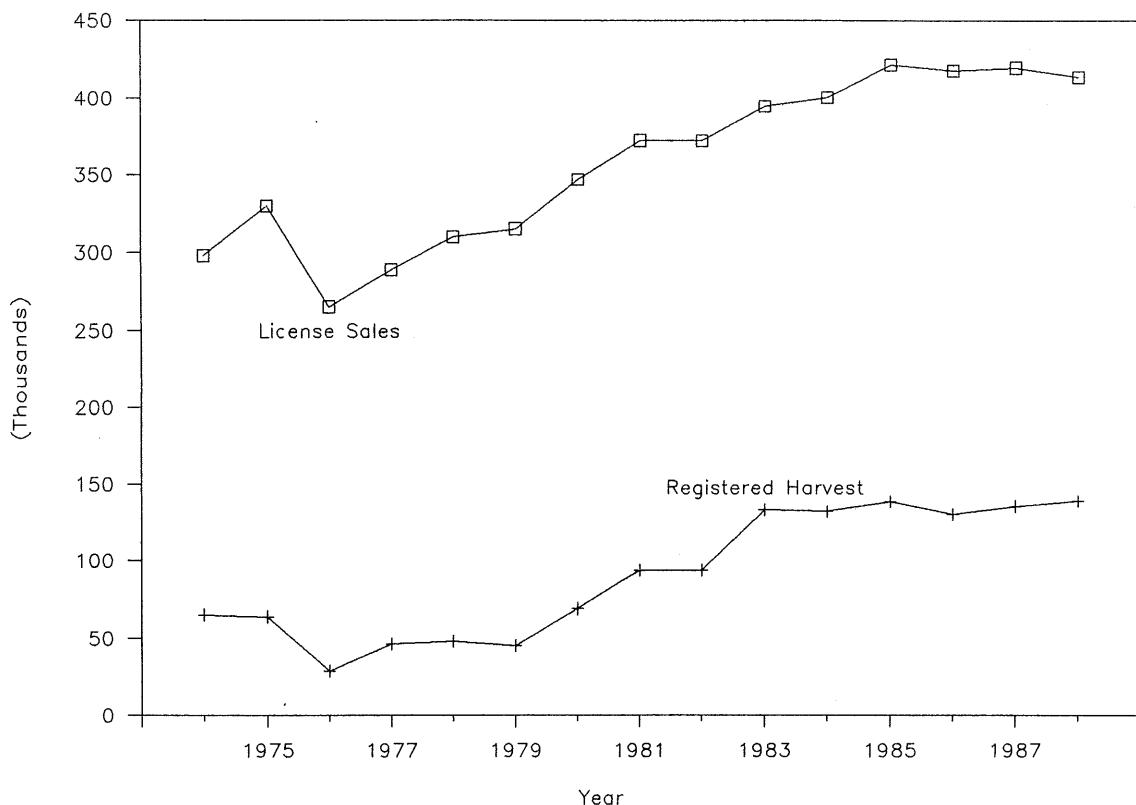
	1985	1986	1987	1988
Resident firearms (regular quota areas)	8,418	1,192	2,044	721
Resident firearms (state parks)	-	271	254	107
Non-resident firearms (regular quota area)	23	3	1	1
Resident archery (state parks)	-	27	-	-
Resident archery (metro)	-	917	1,380	1,013
Resident archery (orchard zone)	-	-	54	-
Totals	8,441	2,410	3,733	1,842

Table 44. Registered deer harvest and success rates, 1974-88.

	Registered Harvest				Percent Success	
	Regular firearms	Archery	Special Muzzleloader season	Total	Regular firearms and special muzzleloader seasons	Archery
1974	64,997	2,176	-	67,173	21.8	6.9
1975	63,604	2,265	-	65,869	19.3	6.9
1976	28,613	1,167	-	29,780	10.8	5.3
1977	45,918	2,609	32*	48,559	15.9	8.8
1978	47,372	2,608	346	50,326	15.4	7.9
1979	44,340	2,577	318	47,235	14.2	7.1
1980	68,539	3,641	294	72,474	19.8	8.7
1981	93,027	5,535	385	98,947	25.1	10.9
1982	93,045	5,566	441	99,052	25.1	10.1
1983	132,457	5,977	652	139,086	33.7	10.6
1984	132,042	6,390	532	138,964	33.1	10.3
1985	138,065	7,575	563	146,203	32.9	11.3
1986	129,770	7,610	593	137,973	31.2	11.0
1987	135,003	7,535	535	143,073	32.3	10.6
1988	138,260	8,762	686	147,708	33.6	12.7

* No special muzzleloader seasons were held before 1977.

Firearms



Archery

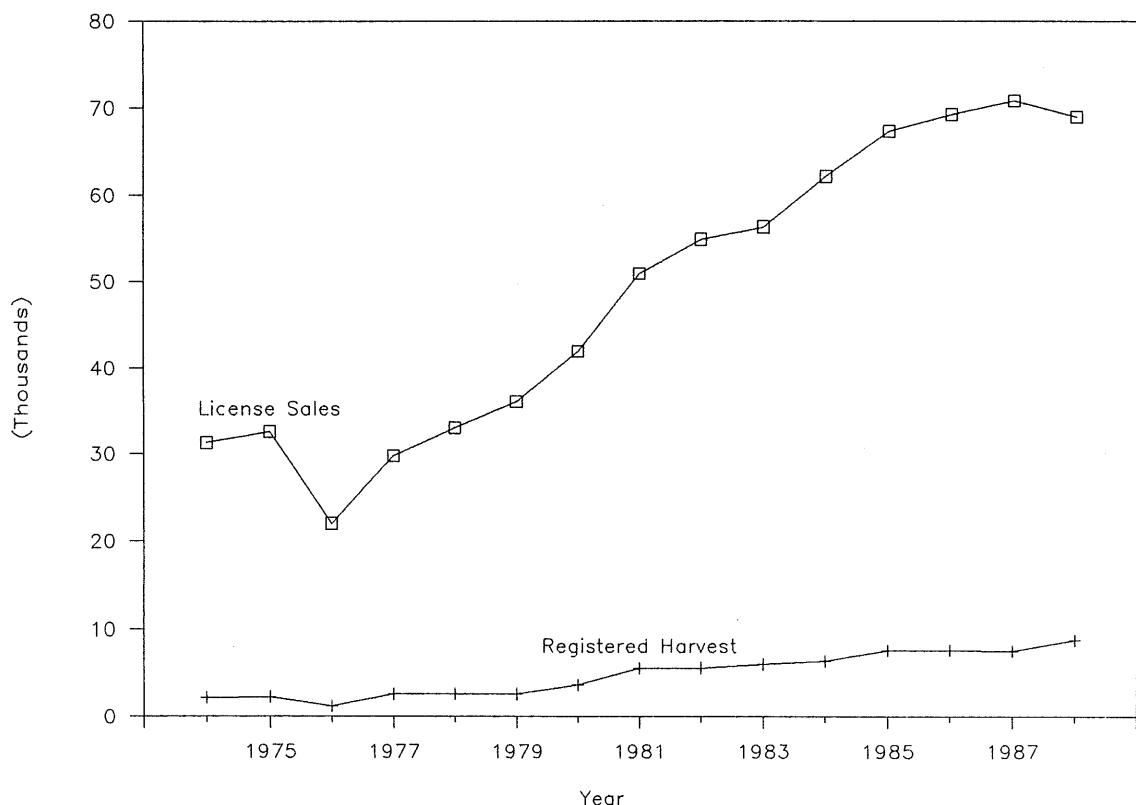


Figure 35. Resident, nonresident, and bonus deer hunting license sales and registered harvest for firearms (above) and archery (below) seasons, 1974-88.

Table 45. Harvest and success rates by DMU and Sub-DMU, 1988.

Unit	Permits Issued	Antlerless Registered	Permit ¹ Success	Bucks Registered	Total Reg. Kill
Red River West	1,000	419	41.9%	499	918
Red River East	7,100	3,369	47.5%	2,275	5,644
RED RIVER Total	8,100	3,788	46.8%	2,774	6,562
ACASSIZ Total	9,300	4,600	49.5%	4,322	8,922
Rainy River West	1,000	566	56.6%	1,530	2,096
Rainy River Central	1,000	568	56.8%	1,567	2,135
Rainy River East	2,000	1,029	51.5%	1,622	2,651
RAINY RIVER Total	4,000	2,163	54.1%	4,719	6,882
Superior West	3,500	1,476	42.2%	1,590	3,066
Superior Wilderness	0	3	0.0%	145	148
Superior Central	1,300	643	49.5%	1,272	1,915
Grand Portage I.R.	0	0	0.0%	3	3
Superior East	750	388	51.7%	975	1,363
SUPERIOR Total	5,550	2,510	45.2%	3,985	6,495
Itasca NW	1,750	1,003	57.3%	2,765	3,768
Itasca SW	2,250	1,526	67.8%	4,482	6,008
Itasca NE	4,000	1,939	48.5%	3,521	5,460
Itasca SE	5,000	2,799	56.0%	3,911	6,710
Leech Lake Ind. Res.	750	349	46.5%	826	1,175
Bemidji	4,300	2,452	57.0%	3,152	5,604
ITASCA Total	18,050	10,068	55.8%	18,657	28,725
Mille Lacs West	3,200	1,827	57.1%	2,605	4,432
Mille Lacs Central	2,800	1,811	64.7%	4,195	6,006
Mille Lacs East	2,600	1,800	69.2%	6,281	8,081
White Earth Ind. Res.	300	172	57.3%	800	972
MILLE LACS Total	8,900	5,610	63.0%	13,881	19,491
Big Woods North	18,350	9,685	52.8%	7,919	17,604
Big Woods Central	4,250	2,500	58.8%	3,404	5,904
Big Woods Metro	1,150	369	32.1%	468	837
Big Woods Metro	1,700	813	47.8%	864	1,677
Big Woods SE	13,200	6,580	49.8%	6,089	12,669
BIG WOODS Total	38,650	19,947	51.6%	18,744	38,691
Prairie North	3,750	2,107	56.2%	2,331	4,438
Prairie River	3,950	2,457	62.2%	2,846	5,303
Prairie Southwest	6,325	4,159	65.8%	4,391	8,550
Prairie Southeast	3,000	1,794	59.8%	1,981	3,775
PRAIRIE Total	17,025	10,517	61.8%	11,549	22,066
Unknown UNID	-	183	-	158	341 85
Total	109,575	59,386	54.2%	78,789	138,260

¹ This assumes that bonus licenses make up for undersubscribed permits.

Table 46. Archery deer harvest by county, 1977-88.

County	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Aitkin	30	34	68	110	107	94	88	140	130	137	146
Anoka	45	74	105	169	147	156	168	258	247	278	288
Becker	14	10	33	46	52	65	63	67	62	55	88
Beltrami	35	29	63	97	130	109	108	126	101	135	141
Benton	1	6	7	18	28	29	25	35	36	36	54
Big Stone	9	10	25	38	38	42	56	49	39	32	44
Blue Earth	48	35	73	80	78	116	94	116	95	123	147
Brown	25	27	36	46	48	47	50	38	66	60	74
Carlton	6	6	24	30	31	20	30	45	22	26	38
Carver	6	9	24	30	34	49	50	65	53	77	111
Cass	17	30	48	108	131	118	147	141	151	125	132
Chippewa	76	71	114	138	78	92	90	92	82	84	128
Chisago	26	31	38	68	78	95	103	142	135	121	140
Clay	21	19	44	75	84	94	123	111	132	109	135
Clearwater	8	3	17	21	21	27	20	22	29	30	40
Cook	2	0	1	12	7	5	9	29	12	8	14
Cottonwood	79	60	71	87	73	99	54	90	75	70	82
Crow Wing	19	32	47	123	105	99	156	177	159	165	180
Dakota	13	21	20	46	51	64	99	124	167	174	173
Dodge	14	17	19	26	22	45	76	52	63	77	80
Douglas	40	31	32	64	53	77	68	86	79	72	87
Faribault	30	31	51	46	49	57	47	58	73	53	78
Fillmore	49	22	46	50	64	75	81	108	83	109	143
Freeborn	40	38	37	47	34	69	60	61	67	87	99
Goodhue	37	34	57	63	69	71	69	113	112	111	120
Grant	8	10	19	18	22	27	27	33	26	19	33
Hennepin	19	35	78	69	44	97	78	105	156	176	138
Houston	36	25	46	55	70	58	67	79	75	92	89
Hubbard	32	42	56	97	130	102	98	126	138	127	129
Isanti	25	32	46	83	83	82	83	97	102	82	116
Itasca	59	36	98	171	146	113	127	155	169	140	175
Jackson	28	34	26	47	44	46	42	59	54	61	74
Kanabec	13	7	11	35	66	51	49	76	61	76	80
Kandiyohi	57	41	41	95	96	111	116	108	111	127	168
Kittson	13	1	8	12	10	28	32	24	23	47	40
Koochiching	19	23	28	33	18	21	29	20	29	27	31
Lac Qui Parle	28	38	53	87	82	78	108	141	107	96	122
Lake	8	8	18	40	46	30	39	50	40	40	54
Lake of the Woods	6	9	12	13	13	14	22	24	22	21	30
LeSueur	9	13	27	38	31	39	52	37	62	42	77
Lincoln	32	57	50	72	56	74	35	68	54	44	69
Lyon	57	36	84	94	74	110	72	104	104	82	113
McLeod	15	63	32	40	28	2	33	35	55	45	72
Mahnomen	0	1	5	4	7	5	6	9	8	4	2
Marshall	15	18	38	39	45	66	82	79	75	75	70
Martin	36	25	40	35	38	56	33	41	55	64	64
Meeker	25	37	43	44	43	37	54	59	61	76	102
Mille Lacs	10	8	21	40	57	35	63	51	40	64	55
Morrison ^a	18	19	30	66	158	127	108	114	66	388	118
Mower	35	27	46	55	42	80	64	113	121	105	123
Murray	48	49	81	130	83	61	39	90	71	86	88
Nicollet	28	40	61	80	67	65	52	64	88	50	75
Nobles	51	34	43	79	33	54	18	43	48	55	55
Norman	10	11	15	20	34	35	45	43	39	51	47
Olmsted	20	25	24	55	51	85	84	86	108	96	109
Ottertail	54	60	98	133	153	175	178	234	223	237	237
Pennington	1	3	9	12	18	15	19	12	19	15	6
Pine	45	73	123	166	171	134	166	229	186	201	262
Pipestone	21	34	32	40	30	67	1	42	53	55	57
Polk	24	32	42	50	78	70	102	98	102	110	136

Table 46. Continued.

County	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Pope	24	31	49	49	64	57	56	63	70	67	96
Ramsey	3	0	1	2	1	0	21	14	33	2	6
Red Lake	0	4	2	1	3	4	13	8	6	7	6
Redwood	38	38	50	81	63	82	63	72	68	63	75
Renville	20	20	35	55	63	59	32	62	60	66	61
Rice	19	31	38	45	51	39	54	56	59	93	77
Rock	34	16	14	38	31	14	22	51	39	51	44
Roseau	22	32	62	77	90	112	98	94	86	81	95
St. Louis	77	42	87	180	149	120	127	180	209	159	197
Scott	15	41	44	50	37	50	72	87	136	192	134
Sherburne	47	60	89	128	116	113	115	131	128	116	86
Sibley	15	22	33	41	30	32	43	43	44	46	46
Stearns	52	49	81	134	143	122	159	241	239	226	268
Steele	20	7	14	19	27	29	30	41	41	46	65
Stevens	10	13	9	11	21	27	26	25	20	26	28
Swift	25	23	42	67	49	67	59	68	67	84	94
Todd	33	45	52	95	109	103	126	169	141	127	147
Traverse	9	7	12	21	13	21	32	22	19	33	32
Wabasha	19	20	15	18	30	61	57	50	61	50	64
Wadena	10	14	21	45	69	70	64	43	62	43	60
Waseca	21	20	26	46	35	55	42	27	36	42	46
Washington	20	15	39	75	91	88	154	174	196	189	283
Watonwan	16	16	31	34	30	35	20	39	39	45	39
Wilkin	2	2	15	26	34	39	34	34	32	29	38
Winona	76	72	96	116	138	117	151	234	196	224	221
Wright	26	29	45	71	78	83	95	92	115	112	140
Yellow Medicine	32	34	35	47	38	54	47	47	44	49	70
Unknown	10	40	20	25	63	23	34	37	70	17	22
Camp Ripley	190	148	b	153	129	237	387	278	257	284	241
St. Croix St. Pk.	128	b	b	b	b	b	b	b	b	b	b
Totals	2608	2577	3641	5535	5566	5977	6390	7575	7610	7715	8759

^a Camp Ripley not included.^b No archery hunt.

Table 47. 1988 Special Muzzleloader Season harvest by block*.

Block Number	Adult		Fawns		Total Deer
	Male	Female	Male	Female	
152	3	13	5	7	28
157	2	11	5	5	23
159	0	5	3	0	8
169	0	7	4	0	11
179	1	1	0	0	2
180	0	1	1	0	2
182	2	1	1	0	4
183	0	2	1	0	3
201	2	0	1	0	3
202	2	1	0	0	3
203	2	1	0	0	3
211	4	11	5	5	25
222	0	1	0	0	1
226	2	5	1	2	10
235	8	17	5	7	37
236	4	0	0	0	4
245	7	16	4	4	31
246	0	1	1	0	2
286	0	1	0	1	2
292	0	0	0	1	1
339	0	1	1	1	3
341	0	0	1	0	1
342	0	4	0	1	5
344	13	53	26	29	121
348	1	0	0	2	3
349	0	1	0	0	1
416	2	8	6	2	18
424	3	0	1	0	4
431	4	9	2	6	21
432	30	74	43	19	166
433	2	8	3	3	16
455	5	13	12	15	45
495	5	15	10	4	34
497	8	21	7	9	45
Totals	112	302	149	123	686

* Includes Permit Area data. See Table 48 for Permit Area detail.

Table 48. 1988 Muzzleloader Permit Area Information.

Area	Dates	Permits Issued	Number of Applications	<u>Harvest (Bonus Deer)</u>		
				Buck	Antlerless	Total
Carlos Avery (Sanctuary)	26-02	20	48	0	6	6
	03-11	20	36	2	6	8
Danvers WMA	26-02	3	3	1	1	2
	03-11	13*	2	2	0	2
Glacial Lakes SP	07-11	30	?	2	16	18
Lac qui Parle WMA	26-02	106	106	8	30	38
and						
Big Stone NWR	03-11	273	273	31	126	157
Lake Bronson SP	07-11	7	7	0	1	1
Lake Shetek SP	26-02	40	76	5	29	34
Nerstrand Woods	26-29	52	162	8	10 (27)	45
Talcot Lake WMA	26-02	31	31	2	18	20
	03-11	38	38	3	22	25
Walnut Lake WMA	26-02	19	17	0	6	6
	03-11	10	8	2	2	4

* Additional hunters from oversubscribed areas.

Table 49. Special Muzzleloader Season Harvests, 1981-1988.

	1981	1982	1983	1984	1985	1986	1987	1988
Carlos Avery WMA	53	31	57	22	23	41	31	57
Carlos Avery WMA (Sanctuary)	--	--	--	--	16	6		
Chengwatana SF	--	--	1	1	4	5	5	8
Cloquet Valley SF	--	--	--	2	1	0	2	4
Danvers WMA	--	3	1	7	7	9	3	4
Elm Lake & Eckvoll WMA	--	4	--	0	--	2	--	3
Forestville SP	--	--	--	--	--	--	10	--
Fort Snelling SP	--	--	--	--	--	--	4	--
Frontenac SP	--	--	--	--	3	--	--	--
George Washington SF	--	--	5	14	16	17	4	11
Glacial Lake SP	--	9	--	--	--	14	--	18
Gores Pool WMA	--	--	5	5	1	2	3	3
Helmer Myre SP	--	--	--	--	18	26	--	--
Lac qui Parle WMA and Big Stone NWR	91	130	168	151	199	146	112	185
Lake Bronson SP	--	--	--	--	--	--	--	1
Lake Louise SP	--	--	--	--	--	36	--	--
Lake Shetak SP	19	36	35	30	25	28	25	34
McCarthy Lake WMA	1	0	1	0	0	2	5	6
Meadowbrook WMA	3	4	11	6	6	1	4	2
Mille Lacs WMA	54	25	5	14	13	13	21	28
Moose-Willow WMA	16	5	--	--	--	--	--	--
Nemadji SF	--	--	1	1	0	3	2	3
Nerstrand Woods SP	--	--	--	--	13	--	--	45
Paul Bunyan Game Refuge	--	--	19	33	27	28	27	38
Red Lake WMA and Beltrami Island SF	14	14	29	11	21	27	14	25
R.J. Dorer Memorial SF	7	32	10	6	1	2	0	1
Roseau River WMA	4	1	3	5	3	4	2	3
Rum River SF	--	--	3	11	7	5	6	24
Savanna SF	--	--	2	2	6	6	0	4
Talcot Lake WMA	16	61	137	13	43	19	29	45
Thief Lake WMA	12	6	5	7	8	2	6	3
Whitewater WMA	90	80	150	139	97	143	117	121
Whitewater Sanctuary	--	--	--	45	--	--	96	--
Walnut Lake WMA	5	0	4	6	5	6	7	10
 Totals	385	441	652	532	563	593	535	686

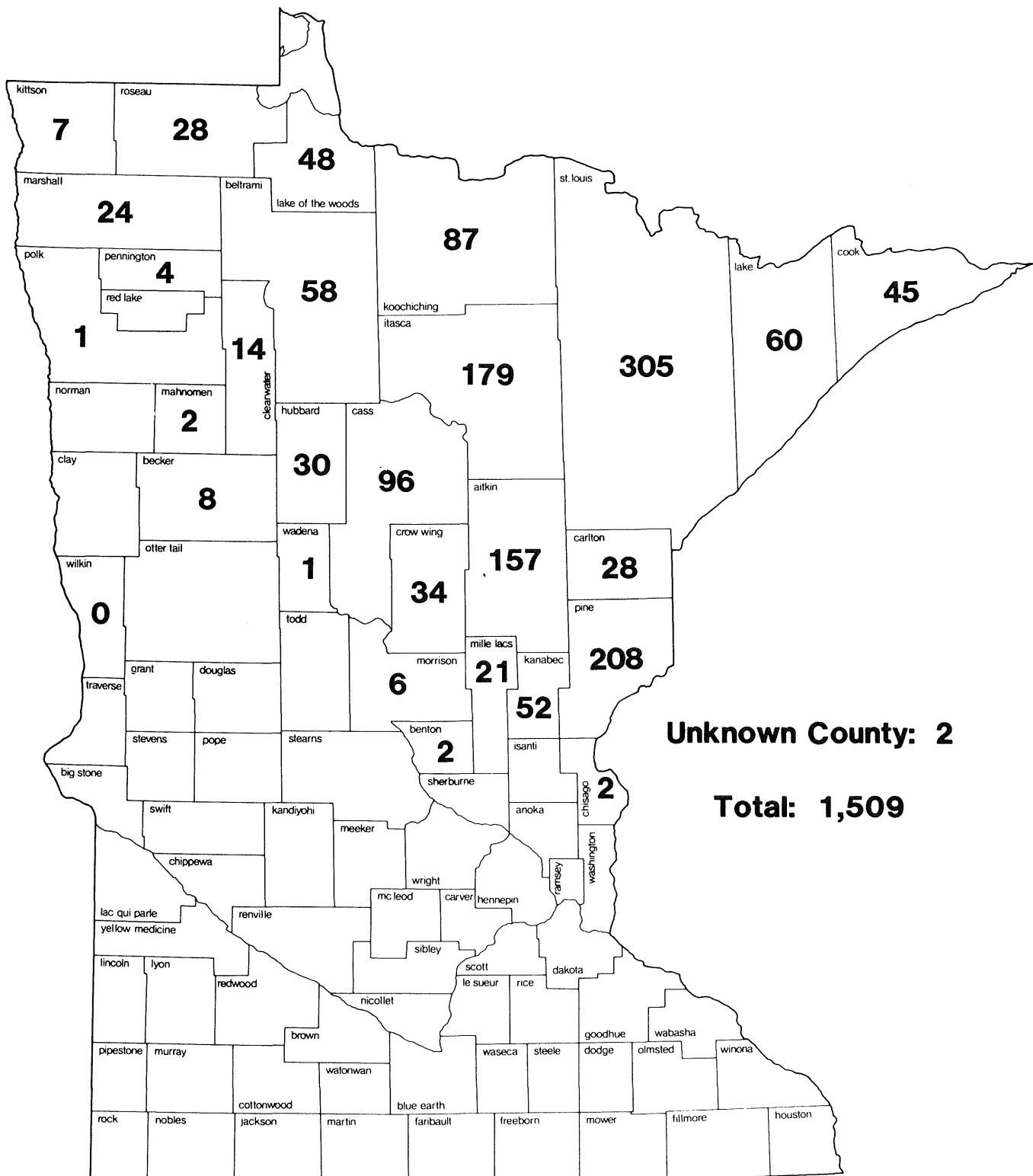


Figure 36. Black bear registered harvest by county, 1988 season.

Table 50. Registered bear harvest by county, 1978-1988.

County	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Total
Aitkin	103	55	92	128	39	102	96	118	153	149	157	1,192
Anoka	0	0	0	0	0	0	0	0	0	1	0	1
Becker	12	13	7	9	1	14	9	10	3	9	8	95
Beltrami	44	42	28	79	24	78	60	58	53	55	58	579
Benton	0	0	0	0	0	0	0	0	0	1	2	3
Carlton	14	7	17	18	3	9	19	34	39	21	28	209
Cass	51	57	69	110	29	93	73	114	89	134	96	915
Chisago	0	0	0	1	0	0	0	0	1	2	2	6
Clearwater	2	12	3	18	4	8	7	17	12	22	14	119
Cook	98	72	148	79	7	46	30	62	65	98	45	750
Crow Wing	9	12	9	33	8	26	21	36	22	37	34	247
Hubbard	23	16	15	19	11	25	45	41	36	37	30	298
Isanti	0	0	1	3	0	0	0	1	2	1	0	8
Itasca	158	108	212	172	50	121	128	170	183	242	179	1,723
Kanabec	28	10	12	18	8	19	19	18	36	34	52	254
Kittson	0	1	0	0	0	1	8	0	2	2	7	21
Koochiching	91	89	137	149	66	105	89	95	113	126	87	1,147
Lake	78	40	74	80	17	42	28	60	79	83	60	641
Lake of the Woods	16	12	30	43	25	32	41	29	32	27	48	335
Mahnomen	3	0	0	1	2	2	5	1	4	2	2	22
Marshall	0	1	2	3	1	9	17	12	5	14	24	88
Mille Lacs	7	5	5	12	3	11	11	28	14	16	21	133
Morrison	4	3	1	1	1	10	5	4	8	11	6	54
Norman	1	0	0	0	0	0	0	0	0	0	0	1
Pennington	0	0	0	1	0	3	2	1	1	12	4	24
Pine	58	31	62	73	20	55	52	98	113	115	208	885
Polk	0	0	1	0	0	0	0	1	0	0	1	3
Red Lake	0	0	3	2	0	0	0	0	0	1	0	6
Rice	0	0	0	0	0	0	0	0	0	1	0	1
Roseau	8	4	18	18	7	23	32	19	28	29	28	214
St. Louis	210	148	289	284	64	197	122	302	317	290	305	2,528
Wadena	1	0	0	1	0	0	0	0	0	0	1	3
Wilkin	0	1	0	0	0	0	0	0	0	0	0	1
Unknown	9	4	13	4	22	7	0	11	6	5	2	83
Total	1,028	743	1,248	1,359	412	1,038	919	1,340	1,416	1,577	1,509	12,589

Table 51. Numbers of bear permits, licenses, hunters, and hunter-days, 1980-88.

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Permit applications	-- ^a	-- ^a	9260	13617	17886	22954	20694	19687	25879
Permits available	--	--	1960	3550	3880	4290	4730	4810	5310
Licenses purchased:									
Quota areas	--	--	1921	3471	3489	3948	4188	4213	4297
No-quota areas	8678	11429	--	--	--	--	--	1789	1297
% Permit-holders buying license	--	--	98.0	97.8	89.9	92.0	88.5	87.6	80.9
% License-holders hunting	94.6	94.3	91.9	90.6	90.4	92.9	93.5	91.8	91.5
Estimated no. hunters	8090	10663	1769	3138	3143	3667	3911	5471	5060
Mean hunting-days per hunter	5.9	5.4	6.8	6.3	6.1	5.9	5.8	6.1	6.3
Estimated total hunting-days	48097	57931	12036	19755	19241	21636	22613	33364	31798

^a License sales not limited by permit in 1980 and 1981.

Table 52. Percent hunting success of those Minnesota bear hunters that hunted.^a

Area	1980	1981	1982	1983	1984	1985	1986	1987	1988
11 ^b	c	c	10	36	54	21	46	29	30
12	13	19	14	38	42	32	25	32	37
13	19	27	30	29	35	45	33	48	41
21	24	22	34	42	28	43	46	45	39
22	42	19	44	36	25	13	18	19	8
31	23	16	33	44	20	52	46	40	33
40	13	11	16	31	34	37	37	44	39
51	14	16	28	29	30	39	40	30	35
52 ^b	10	18	25	28	34	33	41	12	30
Statewide	17	17	24	35	31	40	40	31	34

^a From a bear hunter survey conducted by the Forest Wildlife Populations and Research Group

^b Area numbers not officially recognized, but used herein to designate no-quota hunting areas established in 1987 (see figure below). Hunting licenses were controlled by a quota within these areas during 1980-86.

^c Few hunters in this area in 1980 and 1981.

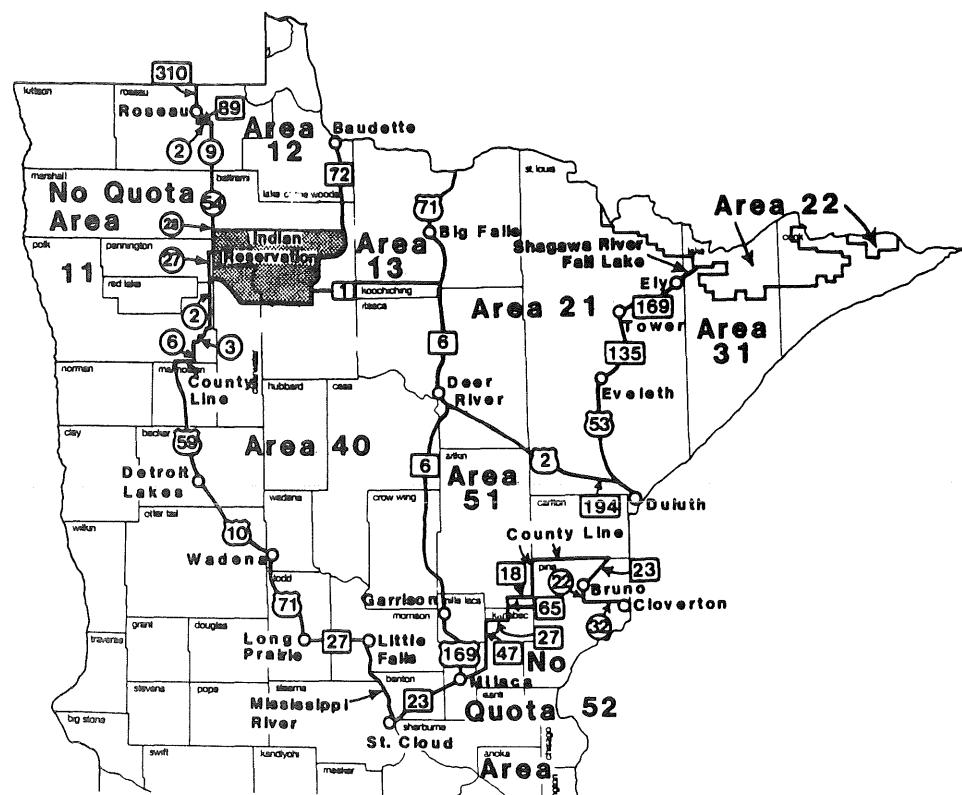


Figure 37. Boundaries of bear management units, 1988.

Table 53. Percent of Minnesota bear hunters using bows, baits, and guides^a.

Method	1980	1981	1982	1983	1984	1985	1986	1987
Bow	b	17	14	19	21	16	19	23
Bait	b	53	55	62	61	66	69	75
Guide	5	7	6	5	6	5	6	6

^a From a bear hunter survey conducted by the Forest Wildlife Populations and Research Group.

^b Not recorded in this survey.

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Table 54. Percent hunting success of Minnesota bear hunters by method of hunt^a.

Method	1980	1981	1982	1983	1984	1985	1986	1987	1988
Firearm		15	23	36	32	39	41	32	34
Bow only		22	19	34	27	42	33	31	33
Bait		21	25	37	33	42	42	32	37
No bait		11	21	32	26	34	33	30	25
Guide	50	19	33	50	57	36	48	56	51
No guide	17	16	22	34	30	39	39	30	33

^a From a bear hunter survey conducted by the Forest Wildlife Populations and Research Group.

Table 55. Moose hunt quota and harvest statistics 1971-87.

Year	Area	Number of	Number of	Chances	Harvest	Party Success (%)	Sex of Moose	
		4-person licenses issued	4-person license applications				M	F
1971	NW	250	9,264	1:23	240	96.0	159 (66%)	81 (34%)
	NE	150			134	89.3	87 (65%)	47 (35%)
1973	NW	335	13,560	1:26	306	91.3	213 (76%)	91 (24%)
	NE	185			159	86.0	131 (83%)	24 (13%)
1975	NW	475	15,792	1:20	449	94.5	259 (58%)	188 (42%)
	NE	275			227	82.5	147 (65%)	80 (35%)
1977	NW	630	16,586	1:18	598	94.9	348 (58%)	250 (42%)
	NE	300			243	81.0	172 (71%)	71 (29%)
1979	NW	395	19,023	1:28	330	83.5	196 (59%)	134 (41%)
	NE	290			236	81.4	158 (67%)	78 (33%)
1981	NW	505	20,521	1:23	455	90.1	283 (62%)	172 (38%)
	NE	375			309	82.4	218 (71%)	91 (29%)
1983	NW	780	17,754	1:14	737	94.5	493 (67%)	244 (33%)
	NE	523			442	84.5	273 (62%)	169 (38%)
1985	NW	768	20,553	1:19	718	93.5	419 (58%)	299 (42%)
	NE	300			250	83.3	165 (66%)	85 (34%)
1987	NW	772	17,087	1:13	727	94.2	505 (69%)	222 (31%)
	NE	528			436	82.6	292 (67%)	144 (33%)

TRAPPING

HARVEST STATISTICS

Table 56. Trapper response to mail surveys, 1979-80 through 1988-89.

Year	Number mailed	Number not delivered	Delivered questionnaires <u>completed and returned</u>	
			Number	Percent
1979-80	1,011	29	888	90.4
1980-81	1,345	110	1,072	86.8
1981-82	1,345	36	1,167	89.2
1982-83	925	28	794	88.5
1983-84	770	10	663 ^a	87.2 ^a
1984-85	556	9	495	90.5
1985-86	581	13	506	89.1
1986-87	582	8	514	89.5
1987-88	721	11	607	85.5
1988-89	852	25	727	87.9

^a Includes only those surveys returned by 25 April 1984.

Table 57. Use of trapper licenses, 1979-80 through 1988-89.

	Return from mail survey	Projections from license sales
1979-80		
Trapped	760 (85.6%)	15,512
Did not trap	<u>128</u> (14.4%)	<u>2,609</u>
	888 (100.0%)	18,121
1980-81		
Trapped	918 (85.6%)	20,548
Did not trap	<u>154</u> (14.4%)	<u>3,457</u>
	1,072 (100.0%)	24,005
1981-82		
Trapped	972 (83.3%)	19,725
Did not trap	<u>195</u> (16.7%)	<u>3,954</u>
	1,167 (100.0%)	23,679
1982-83		
Trapped	688 (86.6%)	17,526
Did not trap	<u>106</u> (13.4%)	<u>2,700</u>
	794 (100.0%)	20,226
1983-84		
Trapped	549 (82.8%)	13,862
Did not trap	<u>114</u> (17.2%)	<u>2,879</u>
	663 (100.0%)	16,741
1984-85		
Trapped	445 (89.9%)	15,136
Did not trap	<u>50</u> (10.1%)	<u>1,700</u>
	495 (100.0%)	16,836
1985-86		
Trapped	420 (83.0%)	12,201
Did not trap	<u>86</u> (17.0%)	<u>2,498</u>
	506 (100.0%)	14,699
1986-87		
Trapped	442 (86.0%)	13,240
Did not trap	<u>72</u> (14.0%)	<u>2,155</u>
	514 (100.0%)	5,395
1987-88		
Trapped	512 (84.6%)	15,777
Did not trap	<u>93</u> (15.4%)	<u>2,866</u>
	605 (100.0%)	18,643
1988-89		
Trapped	582 (80.1%)	9,789
Did not trap	<u>145</u> (19.9%)	<u>2,432</u>
	727 (100.0%)	12,221

Table 58. Estimated number of trappers and estimated take per trapper of various furbearers, 1981-82 through 1988-89.

	Estimated number of trappers (thousands)								Estimated take per trapper reporting that species							
	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Muskrat	16	12	11	13	9	11	15	7	62.5	48.4	75.8	75.1	51.8	72.9	68.7	28.3
Mink	13	10	8	9	8	9	13	7	5.7	5.6	6.8	8.0	7.6	8.7	8.5	8.9
Ermine	1 ^a	1	<1	1	<1	1	1	1	3.2	2.2	4.6	3.5	2.6	4.2	4.7	4.2
Long-tailed weasel	1	1	<1	1	<1	1	2	1	2.8	1.6	4.0	2.1	2.0	5.2	4.4	5.0
Raccoon	12	9	9	9	8	8	11	6	6.2	6.4	7.8	8.3	11.3	11.4	11.9	12.8
Striped skunk	7	5	4	5	4	4	5	3	8.1	6.4	8.5	9.4	10.3	10.2	10.2	10.1
Eastern spotted skunk (civet)	<1	<1	2	<1	<1	<1	<1	<1	1.6	6.7	2.5	1.4	2.5	2.5	1.8	2.0
Badger	2	1	1	1	1	1	1	1	1.8	1.7	2.1	1.6	2.1	1.7	1.9	2.0
Opossum	<1	<1	<1	<1	1	1	2	1	2.1	1.8	3.1	2.8	8.7	13.8	6.7	8.2
Red fox	8	6	6	6	5	5	6	4	6.8	6.3	6.9	9.2	6.1	7.5	8.7	13.3
Gray fox	2	2	2	2	2	2	2	1	2.7	2.7	2.5	2.9	3.5	2.9	2.6	4.1
Coyote (brush wolf)	1	2	2	2	1	2	2	1	2.4	3.2	4.8	5.3	4.5	3.8	3.3	3.7
Beaver (fall)	4	2	4	5	4	6	8	4	7.5	4.4	7.3	10.0	9.8	11.5	16.3	11.2
Beaver (spring)	1	3	4	3	4	4	4	2	12.6	25.5	25.4	30.3	21.7	21.7	22.7	14.1

^a 1 is any number which rounds to 1.

<1 is <0.5.

Table 59. Minnesota trapper license sales and estimated annual harvest, 1981-82 through 1987-88a.

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Trapper license sales ^b	23,679	20,196	16,741	16,836	14,699	15,395	18,643	12,221
Beaver license sales ^c	6,602	1,971	-	-	-	-	-	-
Estimated harvest ^d (thousands)								
Muskrat	989	570	865	963	477	826	1,007	185
Mink	76	57	58	75	57	77	110	59
Ermine	3	1 ^e	2	3	1	3	5	3
Long-tailed weasel	4	1	1	1	1	3	7	3
Raccoon	72	60	69	78	89	95	134	74
Striped skunk	54	34	36	47	41	42	54	31
Eastern spotted skunk (civet)	<1	1	<1	<1	<1	<1	<1	<1
Badger	3	2	2	2	2	2	3	2
Opossum	1	<1	2	1	7	14	10	9
Red fox	53	41	42	58	29	40	57	53
Gray fox	5	5	5	5	6	6	5	5
Coyote (brush wolf)	3	5	9	10	7	7	7	3
Beaver (fall season)	30	24	30	51	43	71	132	47
Beaver (spring season)	10	76	101	103	92	101	26	-
Registered harvest ^f								
Otter	485	385	408	529	559	777	1,386	922
Lynx ^g	17	28	9	closed	closed	closed	closed	closed
Bobcat ^g	260	274	208	280	119	160	214	140
Fisher	862	912	631	1,289	678	1,067	1,642	1,040
Marten	closed	closed	closed	closed	430	798	1,363	2,241

^a Includes data for all seasons from October through April of years indicated.^b Separate licenses were issued for juveniles (13-17 years old) and adults (18 and older), beginning in 1982. Of 12,221 trapping licenses sold in 1988, 1,919 (15.7%) were juvenile licenses and 10,302 (84.3%) were adult licenses. Duplicate licenses excluded.^c Beginning in fall 1982, beaver could be trapped with only a general trapping license; the separate beaver trapping license was dropped.^d Based upon trappers' responses to mail surveys.^e 1 is any number which rounds to 1.

<1 is <0.5.

^f Beginning in 1988-89 registered harvests include off-reservation Indian harvests in the 1854 ceded territory.^g Registered harvest for lynx and bobcat includes animals taken by hunting.

Table 60. Average price per pelt paid to hunters and trappers in Minnesota, 1977-78 through 1988-89.

Species	Average pelt prices paid hunters and trappers in Minnesota (dollars)											
	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Muskrat	4.25	4.56	5.90	5.62	3.47	2.19	2.24	2.81	1.85	2.89	3.12	2.07
Mink (male)	22.15	36.69	42.83	37.55	34.35	24.43	30.33	28.40	25.29	35.75	40.54	39.76
Mink (female)	8.86	14.80	18.61	16.04	17.22	10.63	14.55	14.04	13.37	18.43	20.25	22.70
Ermine (S.T. Weasel)	0.44	0.47	0.56	0.64	0.59	0.56	0.56	0.77	0.98	0.98	0.89	1.11
L.T. Weasel	0.85	1.01	0.94	0.84	0.96	0.80	0.93	1.10	1.06	1.28	1.02	1.04
Raccoon	22.30	45.83	36.42	27.44	32.35	17.95	12.66	19.91	15.51	21.81	16.67	7.53
Striped Skunk	2.78	4.13	4.14	4.74	3.46	2.58	2.77	2.74	1.58	2.06	2.47	1.90
Eastern Spotted Skunk	5.42	7.37	3.48	6.06	2.58	1.75	N.A.	3.00	6.17	N.A.	N.A.	N.A.
Badger	21.07	39.55	24.02	18.39	18.14	9.04	10.96	9.18	6.45	5.43	5.74	2.99
Opossum	2.11	2.10	2.12	2.52	1.58	0.87	0.71	1.14	0.62	0.97	0.91	0.62
Red Fox	52.97	72.21	55.43	50.81	51.48	31.10	32.81	29.07	17.51	22.07	16.69	9.89
Gray Fox	25.51	45.44	42.51	37.87	26.74	23.48	22.95	21.58	15.00	22.60	22.56	11.45
Coyote	34.03	56.62	39.76	31.37	41.28	25.41	18.79	19.06	18.19	22.03	18.35	8.43
Lynx	137.86	269.44	199.19	94.91	180.33	94.17	125.00	-	-	-	-	-
Bobcat	73.98	163.76	117.74	78.55	73.35	66.40	61.40	75.81	70.00	120.15	101.10	68.31
Beaver ^a (fall-winter)	13.45	17.64	32.74	17.88	14.48	10.69	9.52	12.51	15.03	20.32	16.75	13.84
Beaver (spring)	17.64	28.71	19.58	16.52	12.55	11.60	12.24	16.11	17.90	-	17.12	12.62
Otter	41.23	58.85	63.37	32.78	29.80	25.65	24.79	21.56	20.81	24.15	22.85	22.02
Fisher ^a (male)		131.89	107.67	89.51	94.42	69.91	70.59	70.26	73.55	84.32	84.36	53.83
Fisher ^a (female)	(71.23)	147.23	127.79	104.29	110.08	99.08	121.08	121.76	130.47	162.29	170.31	99.63
Marten (male)	No Open Season								30.29	35.68	43.13	50.08
Marten (female)									27.61	26.58	39.20	43.46

^a Differences in pelt prices were not calculated before 1979 for beaver, and 1978 for fisher.

FURBEARER REGISTRATION STATISTICS

Table 61. Registered furbearer harvests and total permits issued, 1985-88^a.

Year	Bobcat		Fisher		Marten		Otter	
	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1985	--	119	--	678	746	430	--	559
1986	--	160	3,302	1,607	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

^a Prior 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.

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Table 62. 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 Registered	State Registered	Total Registered		
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

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

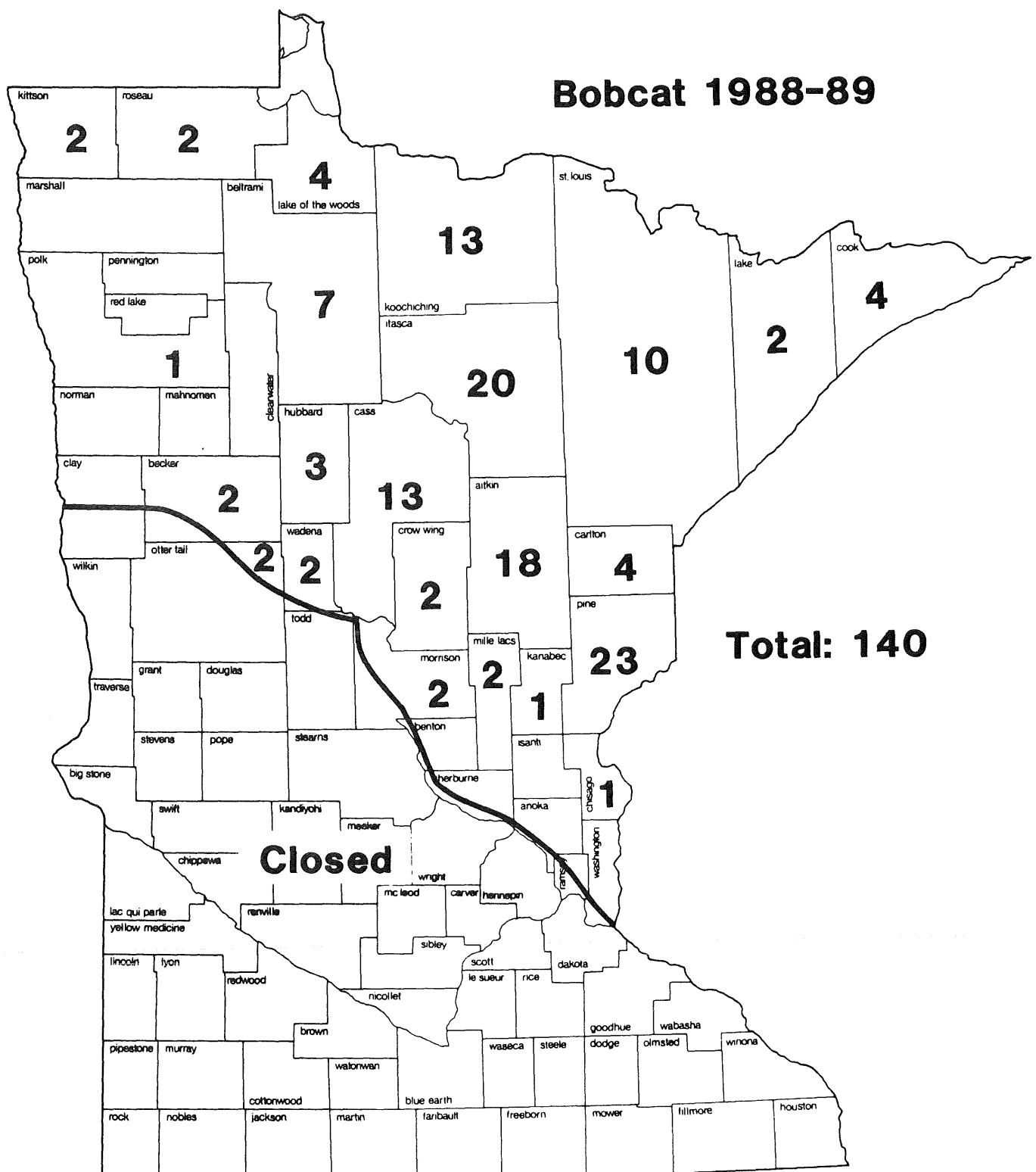


Fig. 38. Bobcat harvest by county, 1988-89.

Table 63. 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

^a 3-day interval

Table 64. Distribution of bobcat harvest among takers, 1981-82 thru 1988-89.

Number Taken	Number of Takers								Total (1981-88) # (%)
	1981-82 # (%)	1982-83 # (%)	1983-84 # (%)	1984-85 # (%)	1985-86 # (%)	1986-87 # (%)	1987-88 # (%)	1988-89 # (%)	
1	123 (71.1)	111 (65.3)	108 (72.0)	116 (65.2)	70 (78.7)	92 (76.7)	104 (71.7)	88 (81.5)	812 (71.7)
2	29 (16.8)	30 (17.6)	32 (21.3)	39 (21.9)	11 (12.4)	18 (15.0)	23 (15.9)	11 (10.2)	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)	7 (6.5)	77 (6.8)
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	108	1,133

Table 65. 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

Table 66. Comparison of bobcat harvest by county, 1981-82 through 1988-89.

County	1981-82 ^a	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89
Aitkin	45	28	20	25	14	12	25	18
Becker	1	6	8	9	1	1	3	2
Beltrami	2	18	17	24	5	7	15	7
Carlton	15	15	4	20	6	9	9	4
Cass	26	30	13	42	20	34	28	13
Chisago	0	1	0	0	1	0	0	1
Clearwater	0	1	1	0	0	3	2	0
Cook	Closed	2	0	1	0	1	2	4
Crow Wing	2	4	4	5	6	5	1	2
Douglas	1	0	0	0	0	Closed	Closed	Closed
Hubbard	3	4	1	1	0	0	2	3
Isanti	0	0	0	0	0	1	0	0
Itasca	32	46	36	50	15	28	44	20
Kanabec	2	2	2	6	2	3	0	1
Kittson	5	5	3	0	0	3	6	2
Koochiching	0	3	12	8	8	6	9	13
Lake	4	8	3	1	1	3	4	2
Lake of the Woods	3	3	1	1	1	0	2	4
Marshall	6	2	3	1	1	3	4	0
Mille Lacs	4	0	6	0	4	3	8	2
Morrison	0	5	7	5	4	4	4	2
Ottertail	3	2	1	1	3	2	1	2
Pennington	1	0	0	0	0	0	0	0
Pine	21	20	24	20	14	11	16	23
Polk	0	0	0	1	0	0	0	1
Red Lake	0	0	0	0	1	0	0	0
Renville	0	0	0	1	0	Closed	Closed	Closed
Roseau	4	9	9	14	2	2	2	2
St. Louis	78	59	32	43	8	19	26	10
Wadena	2	0	1	1	2	0	2	2
Unknown	0	1	0	1	0	2	0	0
Total	260	274	208	280	119	160	214	140

^a Northeast zone closed to taking of bobcat and lynx included: Cook County; most of Koochiching and Lake Counties; and portions of Beltrami, Itasca, Lake of the Woods, and St. Louis Counties.

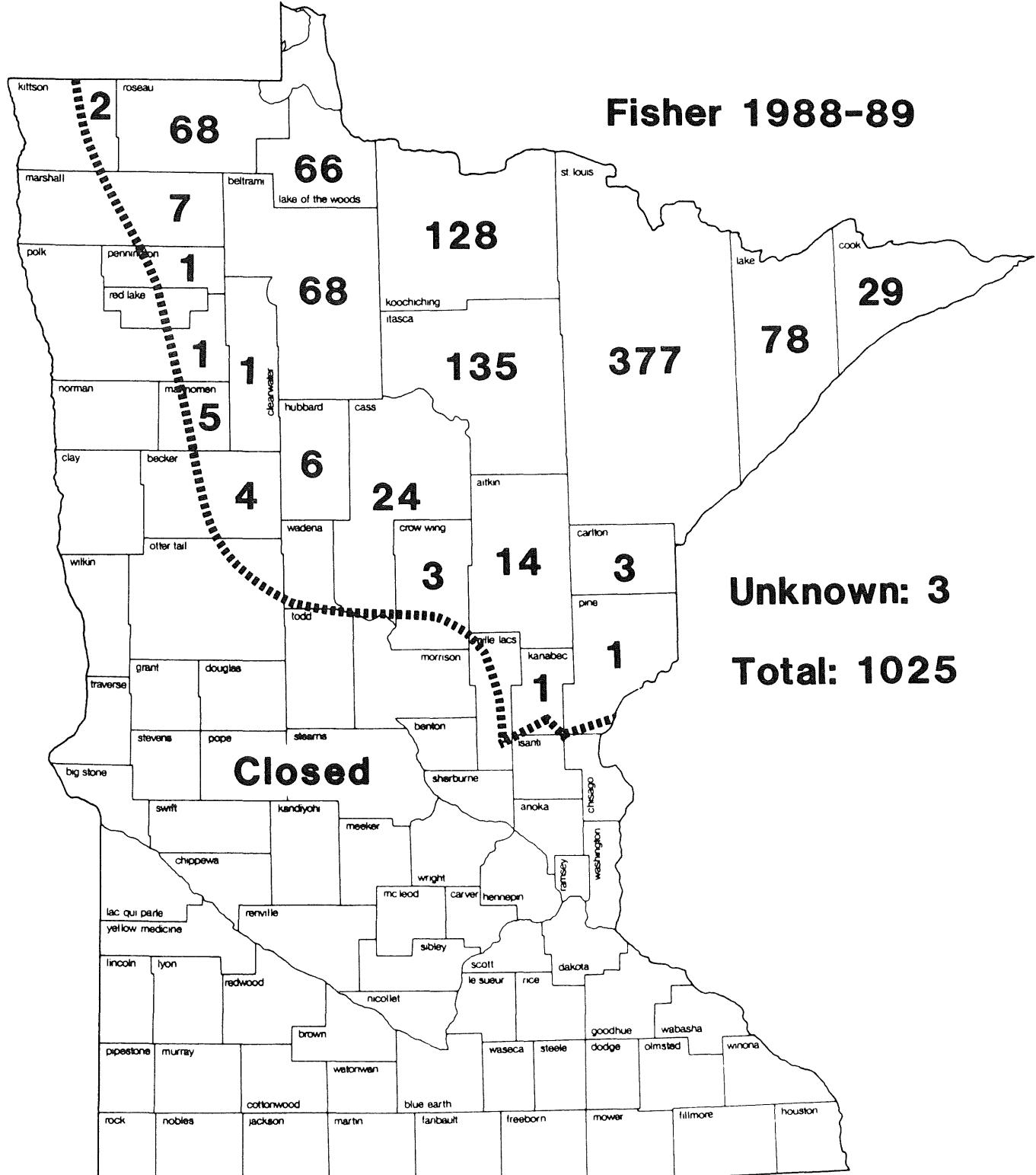


Fig. 39. Fisher harvest by county, 1988-89.

Table 67. 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	1,025	100.0	100.0

Table 68. Fisher harvest by county and sex, 1988-89 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	1,025

Table 69. Comparison of fisher harvest by county, 1981-88.

County	1981	1982	1983	1984	1985	1986	1987	1988
Aitkin	9	15	5	10	8	8	24	14
Becker	3	2	4	3	1	4	2	4
Beltrami	44	41	25	96	27	71	115	68
Carlton	0	4	4	3	0	3	6	3
Cass	6	6	3	19	17	32	60	24
Clearwater	3	1	3	6	4	4	3	1
Cook	36	21	18	16	9	15	29	29
Crow Wing	8	6	2	11	6	11	14	3
Hubbard	1	0	0	7	1	7	9	6
Itasca	64	139	72	228	84	183	247	135
Kanabec	0	0	0	0	0	0	0	1
Kittson	0	0	6	2	1	1	4	2
Koochiching	142	182	123	255	157	195	303	128
Lake	121	115	37	80	49	81	114	78
Lake of the Woods	41	52	32	85	46	58	91	66
Mahnomen	1	0	0	0	0	0	0	5
Marshall	3	6	13	10	5	2	19	7
Norman	-----closed-----					1 ^a	1 ^a	closed
Pennington	0	0	0	0	0	0	0	1
Pine	0	0	1	1	0	0	1	1
Polk	0	0	0	0	0	1	0	1
Red Lake	0	0	0	0	0	0	1	0
Roseau	32	36	86	111	68	75	90	68
St. Louis	258	286	197	345	195	316	509	377
Unknown	90	0	0	1	0	0	0	3
Total	862	912	631	1,289	678	1,068	1,642	1,025

^a The reported harvest is accidental take - Norman County is closed to fisher trapping.

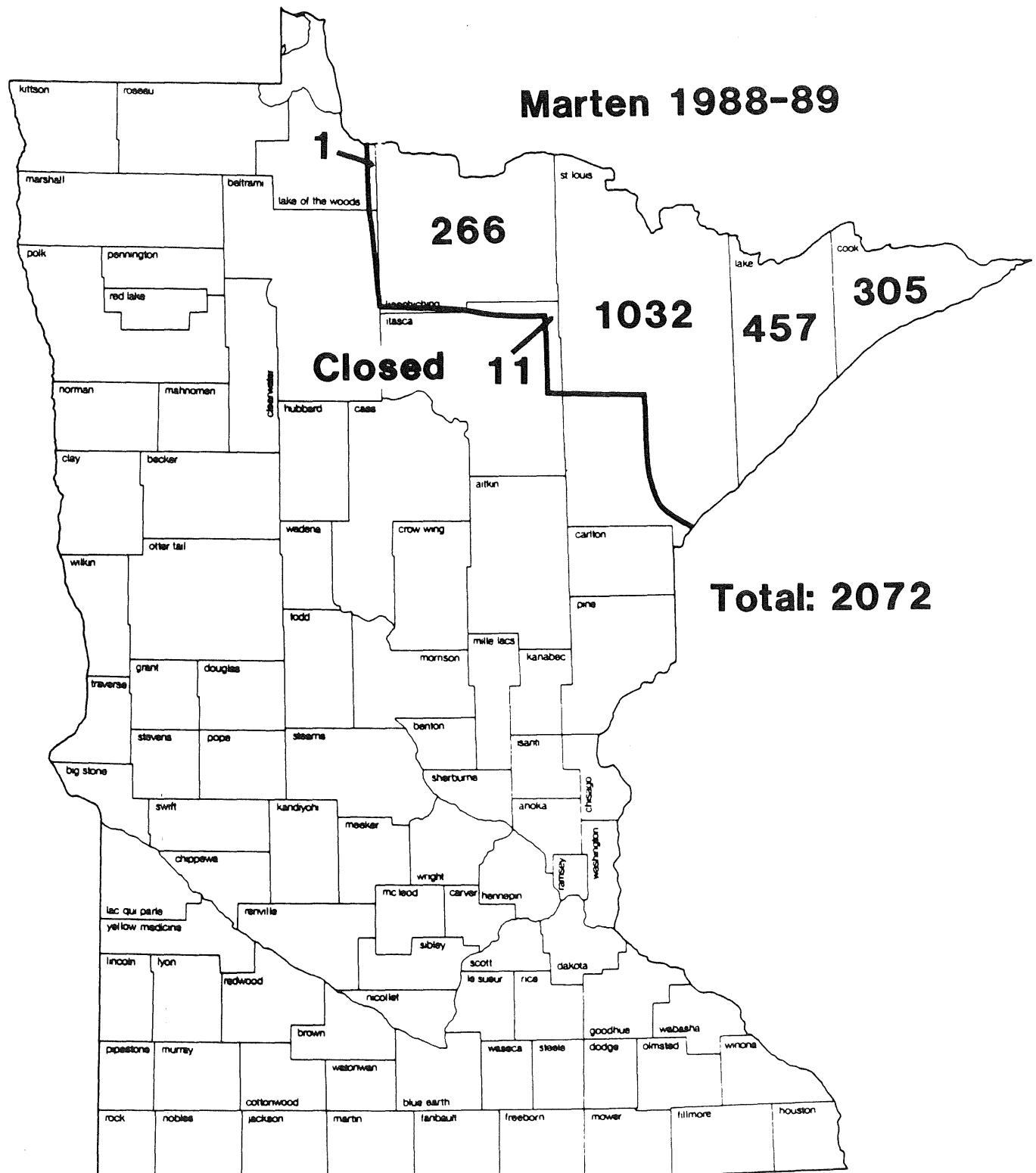


Fig. 40. Marten harvest by county, 1988-89.

Table 70. Marten harvest by date and sex, 1988-89 season.

Date	Sex			Total	% of Known Total	Cumulative Percent
	Male	Female	Unknown			
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	1,281	788	6	2,075	100.0	100.0

Table 71. Marten harvest by county and sex, 1988-89 season.

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	1,032
Total	1,281	788	3	2,072

Table 72. Comparison of marten harvest by county, 1985-88^a.

County	1985	1986	1987	1988
Cook	51	75	143	305
Itasca	-----closed-----			11
Koochiching	72	159	275	266
Lake	119	160	270	457
Lake of the Woods	-----closed-----			1
St. Louis	188	401	675	1,032
Unknown	0	3	0	0
Total	430	798	1,363	2,072

^a No open season on marten prior to 1985.

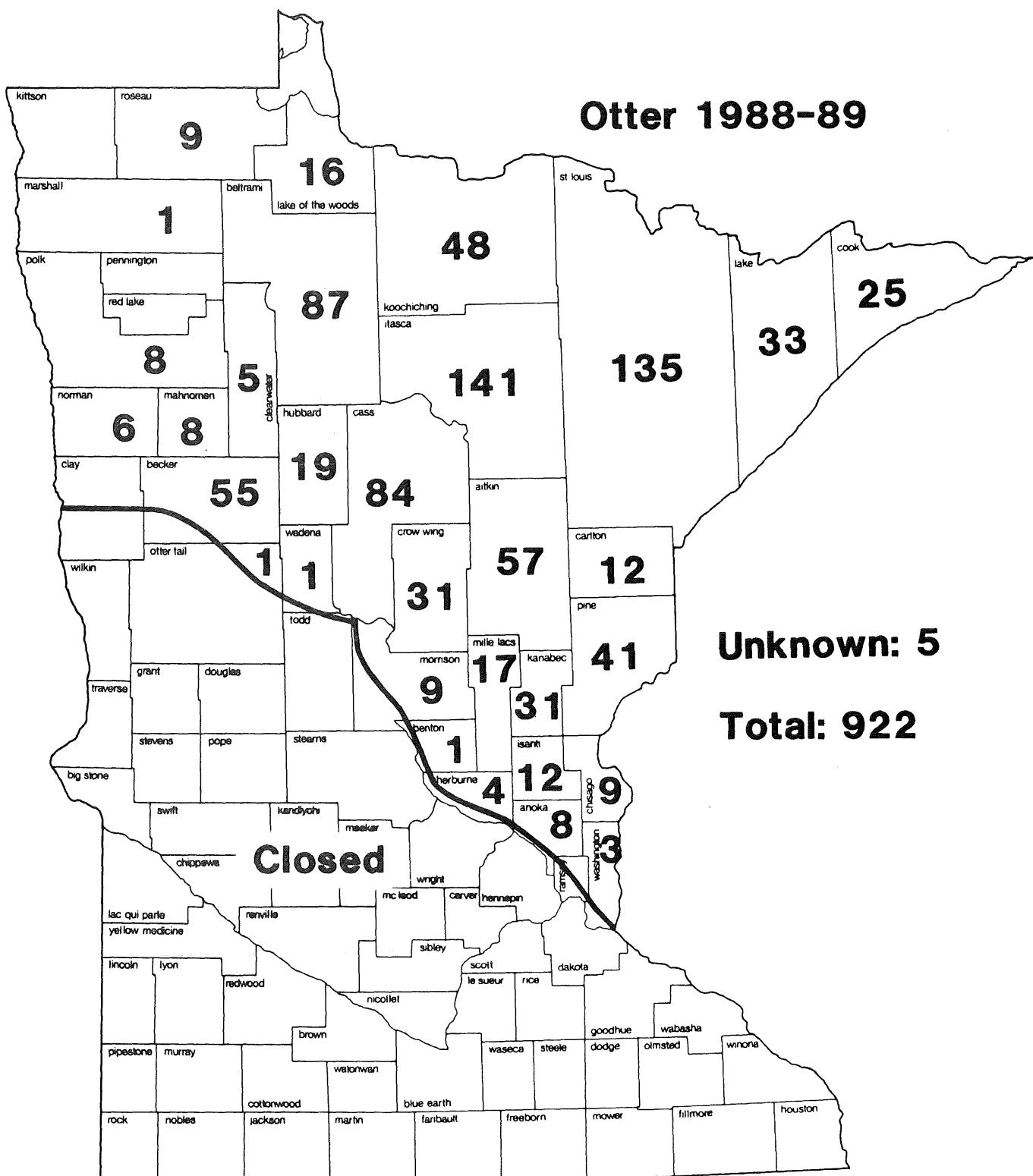


Fig. 41. Otter harvest by county, 1988-89.

Table 73. 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

Table 74. Otter harvest by county and sex, 1988-89 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 75. Comparison of otter harvest by county, 1981-88.

County	1981	1982	1983	1984	1985	1986	1987	1988
Aitkin	21	20	25	34	17	43	55	57
Anoka			-----closed-----			4	2	8
Becker	12	8	15	18	24	34	41	55
Beltrami	28	39	23	33	46	66	125	87
Benton			-----closed-----			0	0	1
Carlton	11	4	5	13	10	13	24	12
Cass	41	36	33	49	59	67	147	84
Chisago			-----closed-----			4	11	9
Clearwater	12	9	6	11	6	17	19	5
Cook	15	17	4	16	5	20	33	25
Crow Wing	18	15	13	15	26	27	57	31
Hubbard	28	21	15	22	25	27	36	19
Isanti			-----closed-----			12	24	12
Itasca	48	56	69	94	96	123	199	141
Kanabec	13	4	9	9	4	14	28	31
Kittson	0	0	0	0	0	1	0	0
Koochiching	32	23	26	34	38	45	77	48
Lake	13	15	20	18	25	47	61	33
Lake of the Woods	8	9	11	13	5	9	39	16
Mahnomen	2	2	2	3	14	6	5	8
Marshall	0	0	2	0	1	0	1	1
Mille Lacs	8	2	8	8	4	0	28	17
Morrison			-----closed-----			3	17	9
Norman			-----closed-----			0	1	6
Ottertail	0	1	1	1	1	4	1	1
Pennington	1	0	0	0	1	0	1	0
Pine	17	21	14	29	20	21	70	41
Polk	5	3	4	5	6	5	7	8
Red Lake	1	3	0	0	0	0	1	0
Roseau	7	3	3	5	5	7	12	9
St. Louis	125	69	96	96	119	145	256	135
Sherburne			-----closed-----			1	1	4
Wadena	4	4	4	2	2	1	4	1
Washington			-----closed-----			0	3	3
Unknown	15	1	1	2	0	2	0	5
Total	471	385	408	529	559	777	1,386	922