STATUS OF WILDLIFE POPULATIONS
FALL 2005

(INCLUDING 1994 – 2004 HUNTING AND TRAPPING HARVEST STATISTICS)

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
SAINT PAUL, MINNESOTA

STATUS OF WILDLIFE POPULATIONS FALL 2005

(Including 1994-2004 Hunting and Trapping Harvest Statistics)

edited by
Margaret H. Dexter

Minnesota Department of Natural Resources
Division of Fish and Wildlife
Research Unit
Saint Paul, Minnesota
1 (888) 646-6367
http://www.dnr.state.mn.us

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Note: Data in this report may change as a result of future verification and more comprehensive analysis.

Status of Wildlife Populations, Fall 2005

(Including 1994-2004 Hunting and Trapping Harvest Statistics)

This is the 29th year that the Research Unit has compiled this booklet; it is primarily an administrative document intended for DNR personnel. (Since 1984 we have also generated a companion volume containing annual summaries of activities and findings from ongoing research projects in the Unit). In an attempt to more fully grasp the technology of the 21st century, this will be the first year to put the book on the DNR website. It may also be the last year that we publish a paper version. Reports and surveys are now presented in their entirety instead of just the tables and figures. Also, as part of the leap to the future we now include links to the U.S. Fish and Wildlife Service Division of Migratory Bird Management to access their reports for Waterfowl Population Status; Migratory Bird Harvest Information Preliminary Estimates; American Woodcock Population Status; and Mourning Dove Population Status.

Most of the fieldwork associated with collection of census and survey data for farmland, and forest wildlife is performed by wildlife biologists and managers (conservation officers also participate in August roadside counts). The Farmland, and Forest Wildlife Population and Research groups coordinate these activities, analyze and interpret data, and prepare recommendations for harvest regulations and season setting.

Wetland Wildlife Populations and Research Group conduct much of the census and survey work for wetland species.

Most of the hunting and trapping harvest estimates are calculated and summarized by St. Paul central office personnel.

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CONTACT INFORMATION

Farmland Wildlife Populations & Research Group
Route 1, Box 181
Madelia, Minnesota 56062
(507) 642-8478

Forest Wildlife Populations & Research Group
1201 East Highway 2
Grand Rapids, Minnesota 55744
(218) 327-4432

Wetland Wildlife Populations & Research Group
102 – 23rd Street
Bemidji, Minnesota 56601
(218) 755-2973

DNR Division of Fish and Wildlife
Surveys and Statistical unit
500 Lafayette Road, Box 20
Saint Paul, Minnesota 55155-4020
(651) 259-5199

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FARMLAND WILDLIFE POPULATIONS

Wildlife Populations and Research Group
Route 1, Box 181
Madelia, MN 56062
(507) 642-8478

2005 Minnesota August Roadside Survey

Sharon L. Goetz
Farmland Wildlife Populations & Research Group

ABSTRACT

Population indices for ring-necked pheasants increased in 2005. Gray partridge, cottontail rabbit, white-tailed jackrabbit, and dove indices were similar to 2004, whereas counts of white tailed deer decreased slightly. The winter of 2004-05 was average to mild throughout Minnesota's agricultural zone, and spring weather was variable with cold weather in May and wet weather in June (the nesting period for pheasants in Minnesota). Wet spring weather appears to have impacted gray partridge nesting success more than pheasants. Overwinter survival of farmland wildlife in 2005 was probably above average, and reproductive success was moderate.

The pheasant index (birds/100 mi) increased 75% from last year, 68% from the 10-year mean, and was similar to the long-term average. The pheasant index remained 62% below the benchmark years of 1955-64 (soil-bank years with marginal cropland in long-term set-aside, a diversified agricultural landscape, more small grains and tame hay, and less pesticide use). Pheasant hen indices and average brood size increased from 2004, which reflects improved overwinter survival and reproductive success from last year. Overall, the size of the fall population will be close to 2003 levels. The best opportunity for harvesting pheasants appears to be in the Southwest and South Central regions, although good opportunities will likely also be available in the West Central and Central regions.

The gray partridge index was similar to last year, 32% below the 10-year mean, and 47% below the long-term average. Counts were variable in most regions, but a significant increase was observed in the Southwest. Similar to pheasants, mean brood size and broods/adult increased in 2005. Gray partridge counts were highest in the Southwest region.

The cottontail rabbit index was similar to last year, and the 10-year and long-term averages. Counts of cottontail rabbits were highest in the Southwest, East Central, South Central, and Southeast regions. The jackrabbit index also held steady in 2005. The statewide index was similar to last year and the 10-year average, but remained 82% below the long-term average. The range-wide jackrabbit population peaked in the late 1950's and declined to its lowest level in 1993, from which populations have not recovered. Counts of white-tailed jackrabbits were highest in the Northwest and West Central regions.

The number of mourning doves observed in 2005 was similar to last year and the 10-year average, but remained 23% below the long-term average. Counts decreased in 5 of 7 regions, but only the Central and East Central regions exhibited a statistically significant decrease in 2005.

INTRODUCTION

This report is a summary of the 2005 Minnesota August roadside survey. The annual survey is conducted during the first 2 weeks in August by Minnesota Department of Natural Resource (MNDNR) enforcement and wildlife personnel throughout the farmland region of Minnesota (Figure 1). The August roadside survey consists of 171 25-mile routes (1-4 routes/county); 152 routes are located in the ring-necked pheasant range. The 2 Sherburne County routes were dropped in 2005 for safety reasons; routes were almost 100% paved and had heavy traffic. A new route was added in northwest Sherburne County where more suitable road conditions were present.

Observers drove each route in the early morning at 15-20 miles/hr and recorded the number of pheasants, gray (Hungarian) partridge, cottontail rabbits, white-tailed jackrabbits, and other wildlife they saw. Counts conducted on cool, clear, calm mornings with heavy dew yield the most consistent results because wildlife, especially pheasants, gray partridge, and rabbits, move to warm, dry areas (e.g., gravel roads) during early-morning hours. The data provide an **index of relative abundance** and are used to monitor annual changes and long-term trends in regional and range-wide populations. Results were

reported by agricultural region and range-wide; however, population indices for species with low detection rates are imprecise and should be interpreted cautiously.

2004-2005 WEATHER SUMMARY

In Minnesota, the winter (Dec-Mar) of 2004-05 saw average precipitation with temperatures slightly above average (MCWG, http://climate.umn.edu/cawap/monsum/monsum.asp). Snow depth through most of December was <1 inch throughout the majority of Minnesota's pheasant range (MCWG, http://climate.umn.edu/doc/snowmap.htm). Storm events from mid-January to mid-February resulted in snow depths ≥6 inches over the northern pheasant range, but much of southern Minnesota experienced snow depths ≥6 inches for only short intervals. A late winter storm in mid-March resulted in snow depths topping 18 inches in south central and southeastern Minnesota, but again warm temperatures following the storm event left snow cover nonexistent by the end of the month. The winter of 2004-05 can be considered mild over most of the pheasant range (the fourth consecutive mild winter). Spring weather was a mixed bag. Precipitation was average statewide in April, and temperatures were above average, setting the stage for conditions conducive to good wildlife production. However, average temperatures in May were 2-4 degrees cooler than historical averages across Minnesota. June, although rainy, had above average temperatures (3-5° F above normal), and July was warmer and drier than average in the southern two-thirds of the state. Overwinter survival of farmland wildlife was probably above average; early reproductive success was likely moderated by cooler than average conditions in May and rainy weather in June, but later nesting and brood-rearing conditions were very good.

HABITAT CONDITIONS

Habitat conditions in the pheasant range continue to maintain their highest levels since the mid-1990s. Over 1 million acres of habitat are currently enrolled in farm programs (e.g., CRP, CREP, RIM, WRP), and another close to 600,000 acres of habitat are protected as Wildlife Management Areas (WMA) and Waterfowl Protection Areas. Within the pheasant range, protected grasslands account for about 6.0% of the landscape (range: 2.9-10.3%; Table 1). Farm programs make up the largest portion of protected grasslands in the state. Updates to rental rates for new CRP contracts announced this spring will continue to make farm programs attractive and economically feasible for Minnesota farmers. Sign-up for the Minnesota CREP II began June 2005 targeting enrollment of up to 120,000 new acres of environmentally sensitive acreage in the Red River Watershed in northwestern Minnesota, the Lower Mississippi Watershed in southeastern Minnesota and the Missouri/Des Moines River Watershed in southwestern Minnesota. Although progress continues on the new CRP and CREP II, the expiration of a large proportion of existing CRP contracts in 2007 is still a major concern for future wildlife populations. The MNDNR continues to expand the habitat base through accelerated WMA acquisition.

SURVEY CONDITIONS

Cooperators completed 169 routes in 2005; one route each in Scott and Carver Counties were not conducted this year due to unfavorable conditions. Weather conditions during the survey ranged from excellent (calm, heavy dew, clear sky) to poor (wind speeds ≥10 mph, light dew, and heavy overcast). Medium-to-heavy dew conditions were present at the start of 91% of the survey routes, which was worse than 2004 (97%), but equal to the 10-year average (91%). Clear skies (<30% cloud cover) were present at the start of 84% of routes, with wind speeds <4 mph recorded for 71% of routes. Surveys were extended to August 20th to accommodate poor weather conditions for some areas during August 1-15.

RING-NECKED PHEASANT

The average number of pheasants observed per 100 miles increased 75% (95% CI: 53-97%) from 2004 and 68% from the 10-year average (Table 2; Figure 1; Figure 2A). The pheasant index was similar to the long-term average (Table 2), but remained below the benchmark years of 1955-64 by 62%. Total pheasants observed per 100 miles ranged from 34.4 in the Southeast to 225.8 in the Southwest (Table 3, Figure 1; Figure 5). Increases from last year were significant in all regions except the East Central and the Southeast (Table 3; Figure 1; Figure 5).

A 34% increase (95% CI: 15-54%) in the range-wide hen index (hens/100 mi) was observed from last year (Table 2), and ranged from 4.6 hens/100 miles in the Southeast to 33.7 hens/100 miles in the Southwest. In contrast, the cock index was similar to last year (Table 2). The 2005 hen:cock ratio was 2.0, compared to 1.3 in 2004 and 1.7 in 2003. Given the average fall population in 2004 and likely above-average overwinter survival, the spring breeding population should have been higher than average. Data from spring pheasant surveys, conducted as part of a CRP/pheasant winter-cover research project, indicated unusually high breeding pheasant populations in Southwest Minnesota, but lower populations in the West Central and South Central regions (Kurt Haroldson, MNDNR, unpublished data). These surveys were conducted on 36 study areas located in Lincoln, Lyon, Cottonwood, and Jackson Counties in the Southwest; Pope County in the West Central; and LeSueur, and Rice Counties in the South Central region during April 20 – May 26. Nearly 300 pheasants/100 miles were counted on Southwest study areas with very good habitat.

The number of pheasant broods observed per 100 miles increased 70% from last year, 72% compared to the 10-year average, and 21% from the long-term average (Table 2). The brood index continues to remain below the benchmark years (1955-64). The region with the smallest number of broods sighted was the Southeast (4.8 broods/100 mi), with the highest index in the Southwest region (33.5 broods/100 mi). Average brood size in 2005 was back to 2003 levels (5.0 ± 0.1 [SE] chicks/brood). Mean brood size in 2005 increased from 2004 (4.2 ± 0.1 chicks/brood), but was similar to the 10-year mean (5.1 chicks/brood), and below the long-term average (5.6 chicks/brood; Table 2). The median hatch date for pheasants was June 8 (n = 593), one day later than last year and 2 days later than the 10-year average (Table 2). The distribution of estimated hatch dates for observed broods was unimodal and approximately normally distributed, which suggests that many early nesting attempts were successful (vs. wide-spread nest failure, which often leads to an extensive renesting effort and a bimodal peak in hatch dates). Average age of broods observed was 8.3 weeks (range: 1-16 wks).

An increase in the range-wide pheasant index was expected given the mild winter and moderate weather during reproductive season. However, the magnitude of the increase was surprising. Although cool, wet spring weather is typically associated with reduced recruitment, the cool May was apparently moderated by below-normal precipitation, and the wet June was apparently moderated by above-normal temperatures. The combination of relatively high hen numbers and average reproductive success led to an increase in the pheasant index for 2005. Overall, the size of the fall population will be close to 2003 levels. The best opportunity for harvesting pheasants appears to be in the Southwest and South Central regions, although good opportunities will likely also be available in the West Central and Central regions.

GRAY PARTRIDGE

Rangewide, the gray partridge index (7.7 partridge/100 miles) was similar to last year. However, the 2005 index was 32% below the 10-year average and 47% below the long-term average (Table 2, Figure 2B). Within regions, the partridge index ranged from 0.0/100 miles in the East Central and Northwest to 42.5/100 miles in the Southwest (Table 3, Figure 6). The only significant regional change occurred in the Southwest, where the partridge index increased 126% from last year (Table 3).

The number of adults observed per 100 miles was also similar to last year, but 21% below the 10-year mean and 35% below the long-term average (Table 2). The proportion of adult partridge observed with broods (32%) increased from 2004 (24%), but was similar to the 10-year average (34%) and long-term average (33%). Average brood size in 2005 (7.0 chicks/brood) was larger than in 2004 (5.7 chicks/brood), but smaller than the 10-year average (8.0 chicks/brood) and the long-term average (9.0

chicks/brood). Total broods observed per 100 miles was similar to 2004 and the 10-year average, but 38% below the long-term average (Table 2). The median hatch date was June 10 (n = 32), which was 13 days earlier compared to 2004 and 9 days earlier than the 10-year average.

Gray partridge in their native range (southeastern Europe and northern Asia) are associated with arid climates and only produce well in the Midwest during dry or drought years. Consequently, gray partridge are more strongly affected by weather conditions during nesting and brood rearing than are pheasants. Wet weather in June appears to have impacted gray partridge more strongly than Minnesota's pheasant population. The Southwest region offers the best opportunity for harvesting gray partridge in 2005.

COTTONTAIL RABBIT and WHITE-TAILED JACKRABBIT

The eastern cottontail rabbit index (6.9 rabbits/100 mi) was similar to last year, and the 10-year and long-term averages (Table 2, Figure 3A). There continues to be high variability in counts and percent change by region (Table 3). The cottontail rabbit index ranged from 0.8 rabbits/100 mi in the Northwest to 12.6 rabbits/100 mi in the Southwest (Figure 7). The best opportunities for harvesting cottontail rabbits are in the Southwest, East Central, South Central, and Southeast regions.

The index of white-tailed jackrabbits held steady in 2005. The statewide index (0.5 rabbits/100 mi) was similar to the 10-year average (0.5), but remained 82% (95% CI: 66-98%) below the long-term average (2.0; Table 2, Figure 3B). The range-wide jackrabbit population peaked in the late 1950's and declined to its lowest level (0.2 rabbits/100 mi) in 1993, from which populations have not recovered (Figure 3B). The long-term decline in jackrabbits probably reflects the loss of their preferred habitats (i.e., small grains, pasture, and hayfields). The greatest potential for white-tailed jackrabbit hunting is likely in the Northwest and West Central regions (Table 3, Figure 8). Indices of relative abundance and annual percent change should be interpreted cautiously because estimates are based on low numbers of sightings.

WHITE-TAILED DEER

The index of white-tailed deer (14.4 deer/100 mi) decreased 22% from last year, was comparable to the 10-year average and was 58% above the long-term average (1974-04; Table 2, Figure 4A). The South Central and East Central regions saw the only significant decreases from 2004, although counts within regions were highly variable. The farmland deer population index shows an increasing long-term trend since 1979 (Figure 4A). Modeling projections based on independent data also indicate an increasing trend for deer populations in the farmland zone.

MOURNING DOVE

The number of mourning doves observed per 100 miles in 2005 was similar to last year and the 10-year average, but remained 23% below the long-term average (Table 2, Figure 4B). The mourning dove index ranged from 57.7 doves/100 mi in the Northwest region to 322.9 doves/100 mi in the Southwest. Significant decreases in dove counts were detected only in the Central and East Central regions (Table 3). The number of mourning doves heard along U.S. Fish and Wildlife Service call-count survey (CCS) routes (n = 7) in Minnesota were also similar to last year. Trend analyses indicated the number of mourning doves heard along the CCS routes declined 4.8% per year (90% CI: -9.2 to –0.3%) during 1996-2005 and 1.7% per year (90% CI: -3.1 to -0.2%) during 1966-2005 (Dolton and Rau 2005). In fall 2004, Minnesota held its first modern dove hunting season.

OTHER SPECIES

Notable incidental sightings: 1 bald eagle (Wabasha County), 2 black bear (Marshall and Polk Counties), 1 Cooper's hawk (Steele County), 7 coyote (Rice, Swift, Waseca, and Winona Counties), 1 moose (Wilkin County), 1 moose cow with 2 calves (Marshall County), 5 mink (Martin County), 1 peregrine falcon (Wabasha County), 3 prairie chickens (Ottertail and Norman Counties), 2 red fox (Roseau and Stevens Counties), 265 sandhill cranes (14 counties), 10 sharptail grouse (Kittson, Marshall,

and Pennington Counties), 2 short-eared owls (Roseau County), 12 skunk (7 counties), 11 trumpeter swan (Brown and Isanti Counties), and 144 wild turkeys and 42 turkey poults (19 counties).

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I thank all cooperators for their efforts in completing routes in 2005, without their help the survey would not be possible. Tim Koppelman provided assistance with data entry. As the former survey coordinator, John Giudice provided advice on general procedures and statistical analysis. Kurt Haroldson reviewed and provided comments on drafts of this report. Tabor Hoek of the Minnesota Board of Water & Soil Resources (BWSR) provided enrollment data on cropland-retirement programs in Minnesota.

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Table 1. Abundance (total acres) and density (acres/mi^2) of undisturbed grassland habitat within pheasant range, 2005[a].

	Cropland Retirement									Density
AGREG	CRP	CREP	RIM	RIM-WRP	WRP	USFWS[c]	MNDNR[d]	Total	%	(ac/mi^2)
WC[b]	362,510	37,379	17,075	822	14,015	168,404	99,175	699,380	10.3	65.9
SW	123,567	22,040	12,203	579	766	14,332	50,814	224,302	5.9	37.9
C	135,122	14,490	17,097	714	2,815	82,176	44,142	296,557	4.9	31.4
SC	90,345	26,557	11,767	3,730	8,075	7,111	29,079	176,663	4.4	28.0
SE	89,301	0	5,554	554	481	18,438	45,127	159,454	4.3	27.5
EC	5,182	0	1,265	0	4	4,548	83,042	94,041	2.9	18.8
Total	806,028	100,465	64,961	6,398	26,156	295,010	351,378	1,650,396	6.0	38.3

[a] Unpublished data, Tabor Hoek, BWSR, 22 August 2005.

[b] Does not include Norman County.

[c] Includes Waterfowl Production Areas (WPA), USFWS easements, and USFWS refuges.

[d] MNDNR Wildlife Management Areas (WMA).

Table 2. Statewide trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2005.

Species	Change from 2004[a]					Change from 10-year average[b]				Change from long-term average[c]			
Subgroup	*n*	2004	2005	%	95% CI	*n*	1995-04	%	95% CI	*n*	LTA	%	95% CI
Ring-necked pheasant													
Total pheasants	148	58.3	101.9	75	±22	146	61.3	68	±23	140	105.7	-1	±16
Cocks		8.5	7.3	-14	±15		5.6	34	±20		12.1	-39	±12
Hens		10.9	14.6	34	±19		8.7	70	±25		15.3	-1	±16
Broods		9.4	15.9	70	±20		9.4	72	±23		13.6	21	±18
Chicks per brood		4.2	5.0	21			5.1	-1			5.6	-11	
Broods per 100 hens		86.5	109.0	26			109.6	-1			101.4	8	
Median hatch date		Jun 07	Jun 08				Jun 06						
Gray partridge													
Total partridge	167	5.4	7.7	42	±69	165	11.4	-32	±29	140	17.3	-47	±21
Adults		2.3	2.4	3	±39		3.0	-21	±21		4.4	-35	±18
Broods		0.5	0.8	40	±74		1.1	-27	±33		1.5	-38	±26
Chicks per brood		5.7	7.0	22			8.0	-12			9.0	-22	
Broods per 100 adults		23.7	32.0	35			34.2	-6			33	-4	
Median hatch date		Jun 23	Jun 10				Jun 19						
Eastern cottontail	167	6.6	6.9	6	±26	165	5.9	19	±21	140	6.9	16	±21
White-tailed jackrabbit	167	0.3	0.5	54	±92	165	0.5	6	±56	140	2.0	-82	±16
White-tailed deer	167	18.6	14.4	-22	±15	165	12.8	13.3	±23	145	6.1	58	±33
Mourning dove	167	208.7	194.9	-7	±16	165	212.2	-8	±13	140	279.1	-23	±13

[a] Includes Northwest region, except for pheasants. Estimates based on routes (*n*) surveyed in both years.

[b] Includes Northwest region, except for pheasants. Estimates based on routes (*n*) surveyed at least 9 of 10 years.

[c] LTA = 1955-2004, except for deer = 1974-2004. Does not include Northwest region (8 counties in Northwest were added to survey in 1982). Estimates for all species except deer based on routes (*n*) surveyed ≥40 years; estimates for deer based on routes surveyed ≥25 years.

Table 3. Regional trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2005.

Region / Species	Change from 2004[a]					Change from 10-year average[b]				Change from long-term average[c]			
	n	2004	2005	%	95% CI	*n*	1995-04	%	95% CI	*n*	LTA	%	95% CI
Northwest[d]													
Gray partridge	19	0.2	0.0	-100	±210	19	0.0	-100	±210	19	4.5	-100	±72
Eastern cottontail		2.9	0.8	-71	±140		0.9	-4	±121		0.9	-9	±132
White-tailed jackrabbit		0.2	1.1	402	±654		0.5	118	±265		0.7	42	±171
White-tailed deer		53.1	52.8	0	±32		33.4	58	±61		24.6	115	±91
Mourning dove		60.5	57.7	-5	±56		84.0	-31	±35		133.6	-57	±28
West Central													
Ring-necked pheasant	37	45.1	94.4	109	±64	35	40.3	147	±69	33	114.1	-7	±32
Gray partridge		1.3	0.6	-50	±148		3.0	-81	±64		11.4	-94	±25
Eastern cottontail		3.2	4.2	30	±62		2.7	53	±74		4.5	-3	±50
White-tailed jackrabbit		0.5	1.0	80	±152		0.7	38	±110		2.8	-70	±25
White-tailed deer		14.4	9.8	-32	±40		12.4	-20	±28		7.9	29	±45
Mourning dove		259.8	211.4	-19	±24		317.8	-32	±14		412.9	-47	±12
Central													
Ring-necked pheasant	27	42.9	86.1	101	±54	27	49.3	74	±54	24	76.9	12	±47
Gray partridge		1.5	4.1	180	±387		5.1	-19	±115		10.8	-57	±67
Eastern cottontail		7.0	5.8	-17	±58		5.5	6	±57		6.4	1	±55
White-tailed jackrabbit		0.0	0.1				0.3	-46	±136		1.4	-88	±36
White-tailed deer		6.7	6.4	-4	±61		5.9	7	±52		3.7	73	±88
Mourning dove		209.1	145.9	-30	±29		186.0	-22	±21		243.9	-39	±16
East Central													
Ring-necked pheasant	14	40.9	54.3	33	±59	14	48.0	13	±74	14	89.0	-39	±33
Gray partridge		0.0	0.0				0.1	-100	±147		0.2	-100	±133
Eastern cottontail		8.0	9.4	18	±54		9.1	4	±51		8.4	12	±46
White-tailed jackrabbit		0.0	0.0				0.0				0.3	-100	±59
White-tailed deer		21.7	12.0	-45	±33		14.0	-14	±47		7.1	69	±114
Mourning dove		102.3	66.2	-35	±29		90.1	-27	±34		129.4	-49	±33

Table 3. Continued.

Region / Species	Change from 2004					Change from 10-year average				Change from long-term average			
	n	2004	2005	%	95% CI	*n*	1995-04	%	95% CI	*n*	LTA	%	95% CI
Southwest													
Ring-necked pheasant	19	122.9	225.8	84	±40	19	98.0	130	±57	19	112.2	101	±56
Gray partridge		18.8	42.5	126	±122		36.1	18	±63		45.0	-5	±50
Eastern cottontail		8.8	12.6	43	±71		7.8	61	±80		8.3	52	±70
White-tailed jackrabbit		0.4	0.6	49	±240		0.7	-9	±111		4.3	-85	±32
White-tailed deer		17.4	13.7	-22	±53		10.6	29	±67		7.0	95	±107
Mourning dove		276.7	322.9	17	±74		275.5	17	±56		310.0	4	±51
South Central													
Ring-necked pheasant	32	73.9	111.3	51	±41	32	84.7	31	±33	31	139.6	-21	±24
Gray partridge		12.9	9.1	-29	±100		23.8	-62	±38		20.7	-55	±34
Eastern cottontail		11.3	9.2	-18	±51		8.5	8	±28		7.6	24	±33
White-tailed jackrabbit		0.5	0.1	-75	±113		0.5	-74	±66		2.0	-94	±29
White-tailed deer		8.4	3.1	-63	±43		5.2	-40	±35		3.2	2	±56
Mourning dove		247.6	284.3	15	±32		223.4	27	±39		253.6	12	±43
Southeast													
Ring-necked pheasant	19	27.6	34.4	25	±64	19	50.8	-32	±35	19	78.1	-56	±35
Gray partridge		2.5	2.9	17	±230		10.2	-71	±53		15.2	-81	±35
Eastern cottontail		5.1	8.6	70	±136		8.4	3	±64		8.2	5	±70
White-tailed jackrabbit		0.2	0.2	0	±305		0.2	0	±244		0.7	-70	±61
White-tailed deer		25.5	18.3	-28	±40		17.0	8	±73		9.3	95	±106
Mourning dove		201.9	185.4	-8	±42		190.9	-3	±38		212.2	-13	±29

[a] Based on routes (*n*) surveyed in both years.

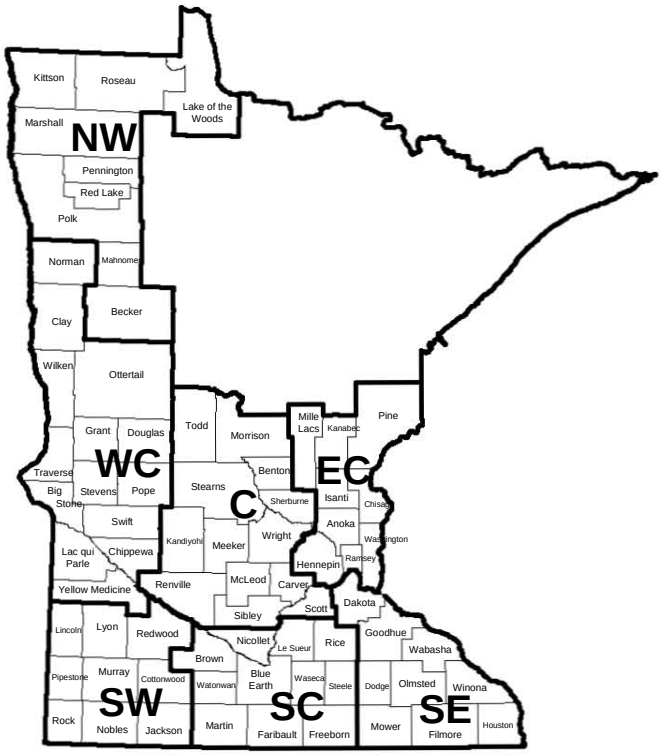
[b] Based on routes (*n*) surveyed at least 9 of 10 years.

[c] LTA = 1955-2004, except for Northwest region (1982-2004) and white-tailed deer (1974-2004). Estimates based on routes (*n*) surveyed ≥40 years (1955-2004), except for Northwest (≥20 years) and white-tailed deer (≥25 years).

[d] Eight Northwestern counties (19 routes) were added to August roadside survey in 1982.

August Roadside Survey

(pheasants/100 miles)



RANGEWIDE

2005	101
2004	57
1995-2004	60
1955-1964	288
LTA (1955-2004)	103
% change from:	
2004	77
1995-2004	69
1955-1964	-65
LTA	-2

WEST CENTRAL

2005	94
2004	45
1995-2004	39
1955-1964	346
LTA (1955-2004)	105
% change from:	
2004	109
1995-2004	142
1955-1964	-73
LTA	-10

CENTRAL

2005	86
2004	39
1995-2004	45
1955-1964	190
LTA (1955-2004)	74
% change from:	
2004	118
1995-2004	89
1955-1964	-55
LTA	16

EAST CENTRAL

2005	54
2004	41
1995-2004	47
1955-1964	184
LTA (1955-2004)	89
% change from:	
2004	33
1995-2004	15
1955-1964	-70
LTA	-39

SOUTHWEST

2005	226
2004	123
1995-2004	98
1955-1964	356
LTA (1955-2004)	112
% change from:	
2004	84
1995-2004	130
1955-1964	-37
LTA	101

SOUTH CENTRAL

2005	111
2004	74
1995-2004	85
1955-1964	409
LTA (1955-2004)	140
% change from:	
2004	51
1995-2004	31
1955-1964	-73
LTA	-20

SOUTHEAST

2005	33
2004	29
1995-2004	52
1955-1964	129
LTA (1955-2004)	82
% change from:	
2004	13
1995-2004	-37
1955-1964	-75
LTA	-60

Figure 1. Survey regions for Minnesota's August Roadside Survey. Ring-necked pheasants seen per 100 miles of August Roadside Survey and percent change from 2004, 10-yr mean (1995-2004), benchmark (1955-1964), and long-term average (1955-2004). Benchmark reflects soil-bank years with marginal cropland in long-term set-aside, a diversified agricultural landscape, more small grains and tame hay, and less pesticide use. **Note:** estimates are based on **all routes completed** and, thus, may differ from values in Table 2 and 3 (full report), which were based on routes directly comparable among years (i.e., unaltered routes with few or no missing survey years).

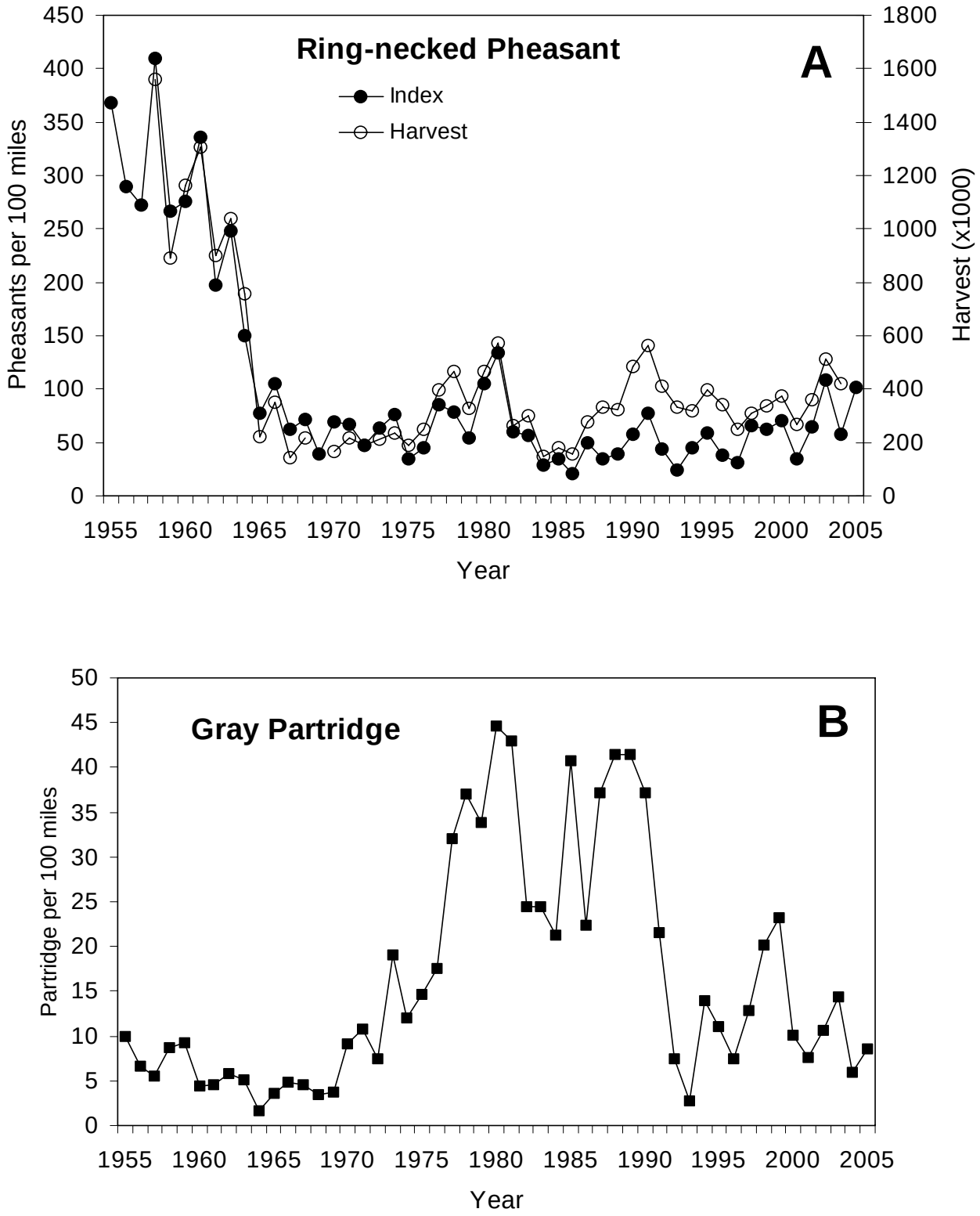


Figure 2. Statewide index of ring-necked pheasants (**A**) and gray partridge (**B**) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.

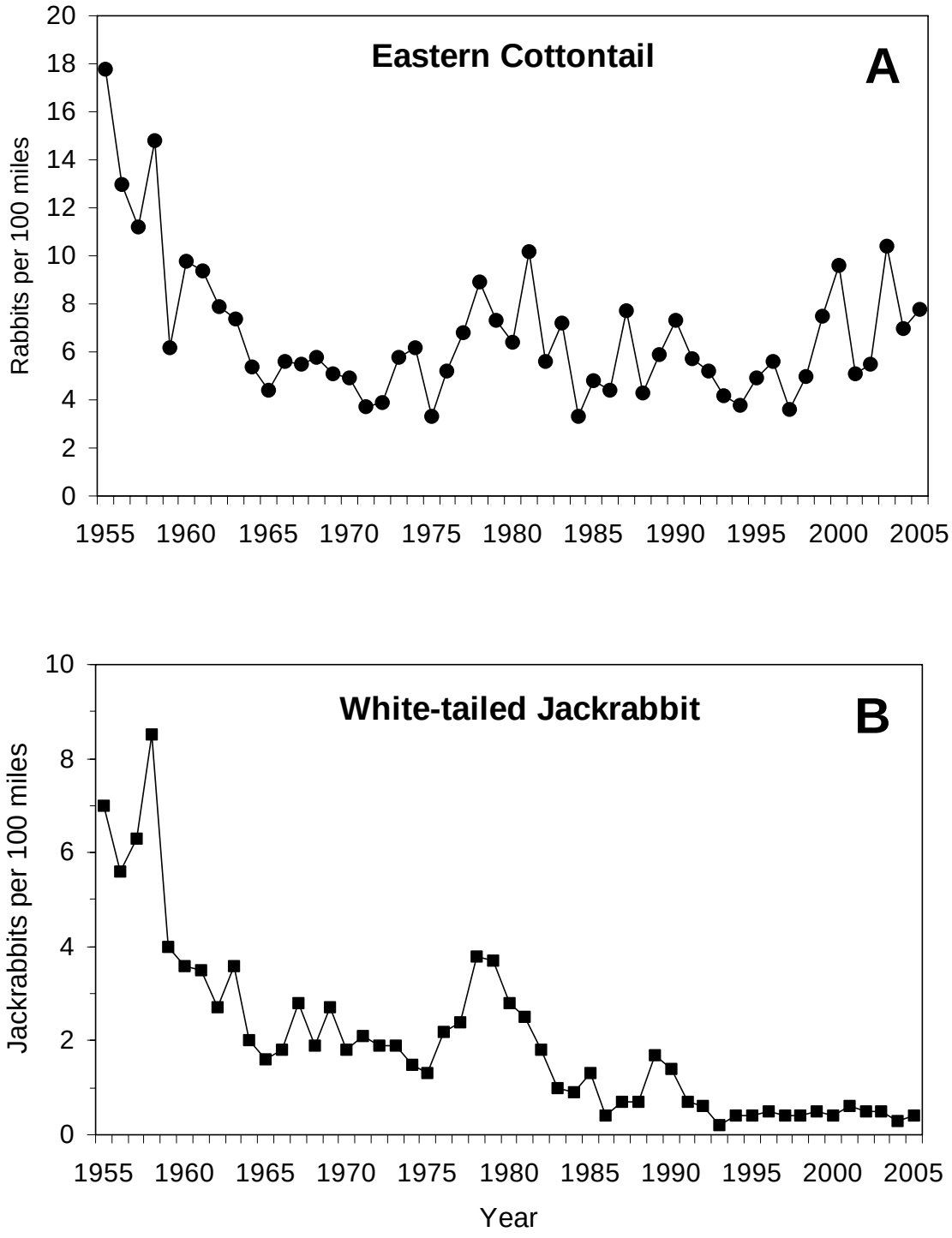


Figure 3. Statewide index of eastern cottontail (**A**) and white-tailed jackrabbits (**B**) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.

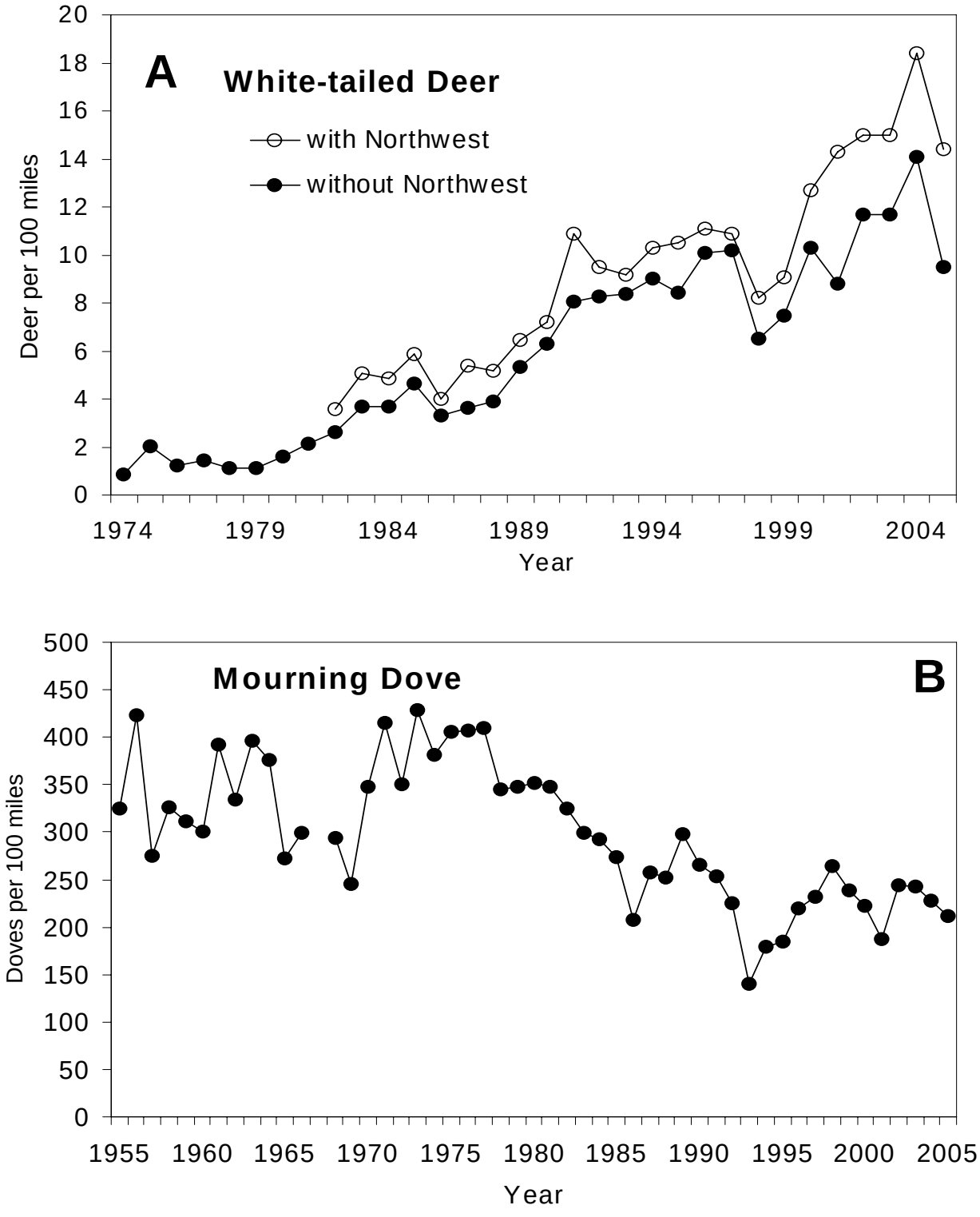


Figure 4. Statewide index of white-tailed deer (**A**) and mourning doves (**B**) seen per 100 miles driven. Doves were not counted in 1967 and the dove index does not include the Northwest region. Based on all survey routes completed.

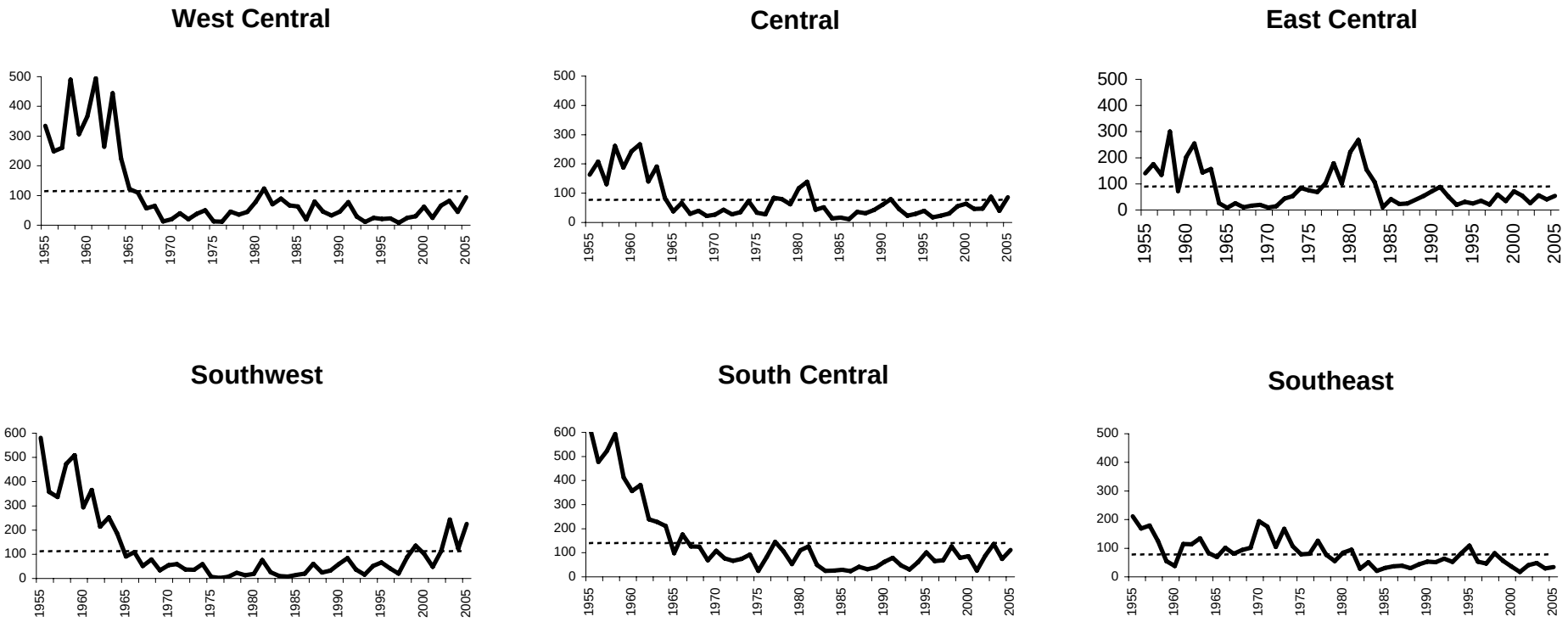


Figure 5. Regional index (——) and long-term average (·····) of **ring-necked pheasants seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same scale among survey regions.

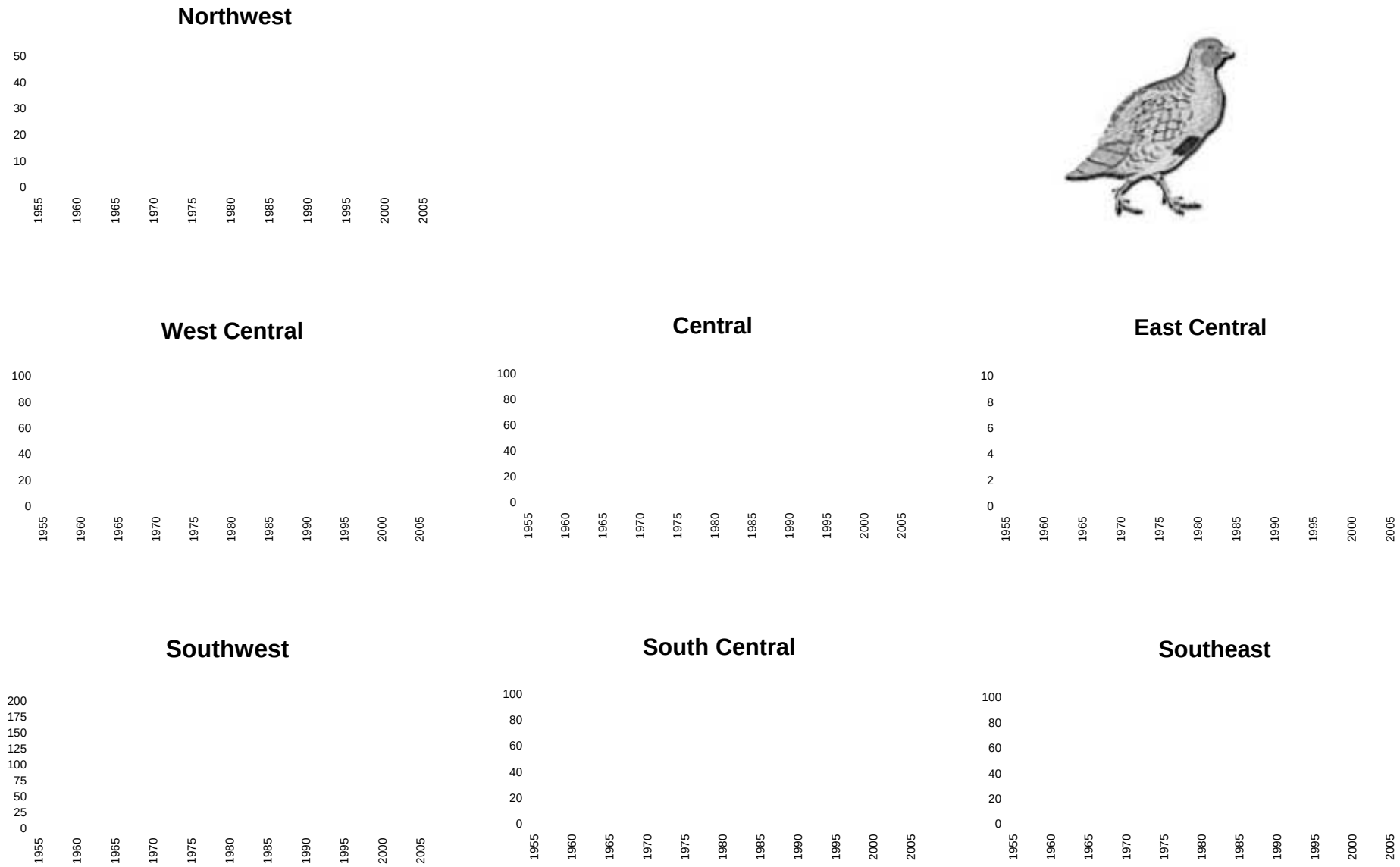


Figure 6. Regional index ( ) and long-term average ( ) of **gray partridge seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

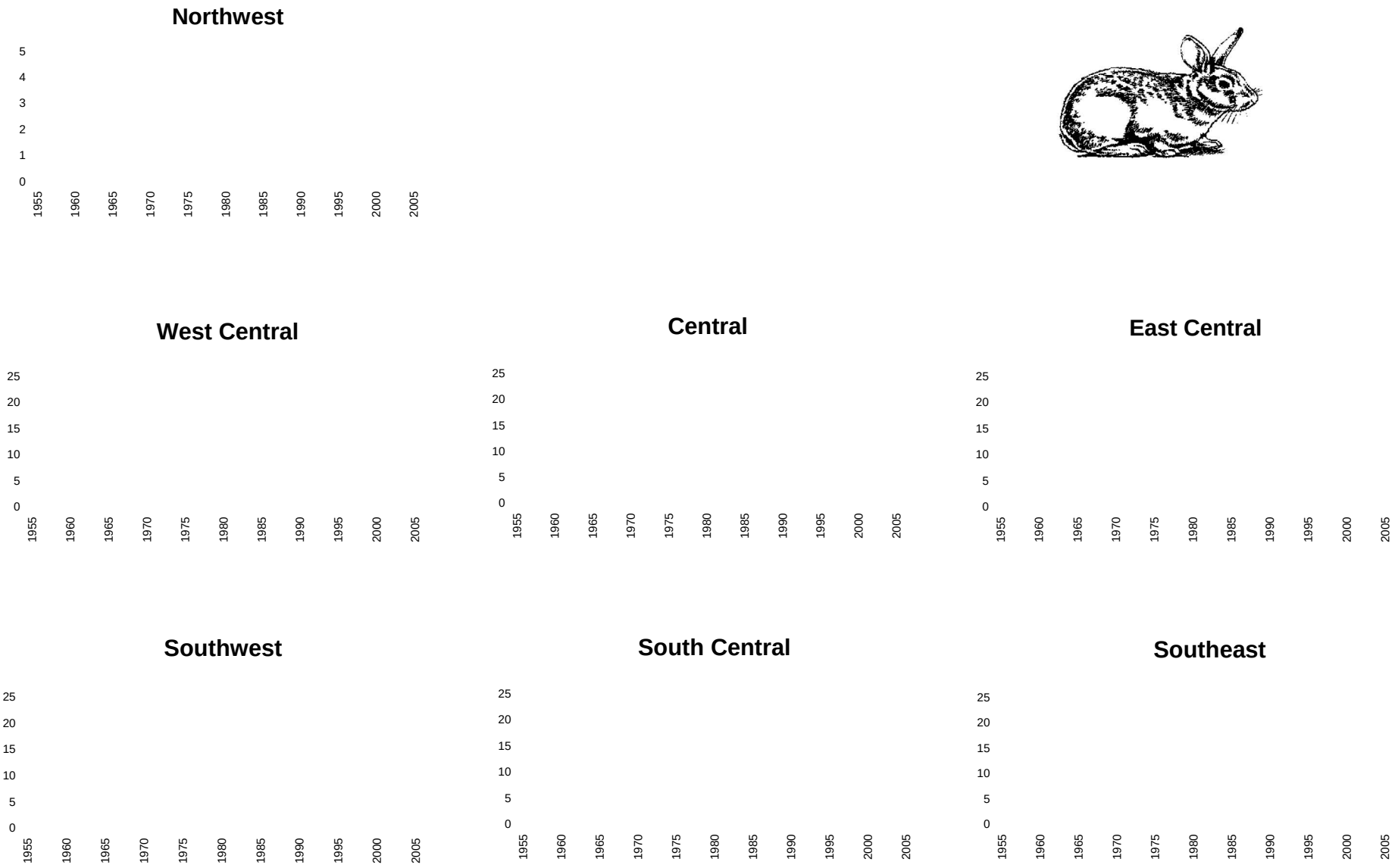


Figure 7. Regional index ( ) and long-term average ( ) of **cottontail rabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

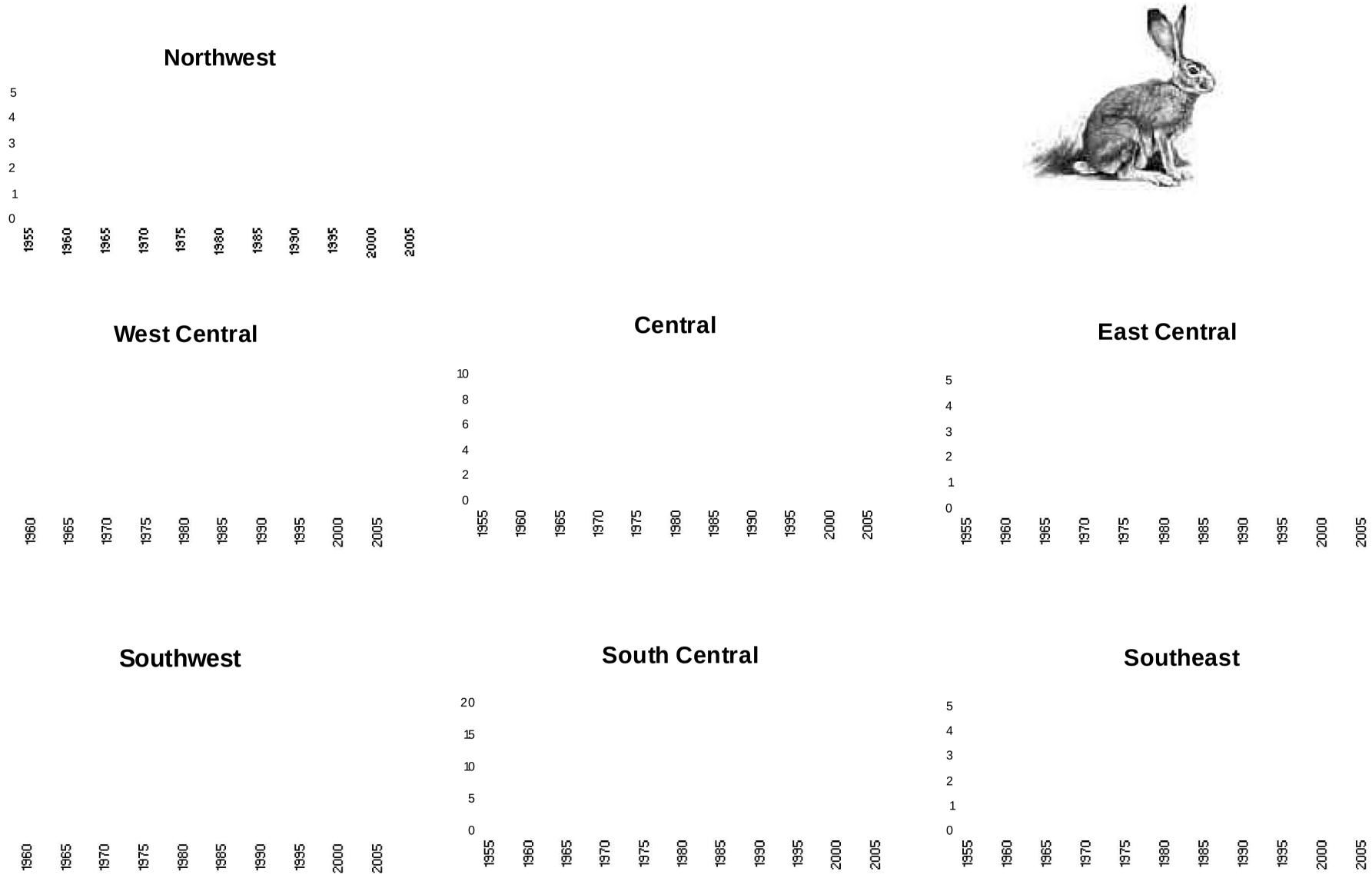


Figure 8. Regional index ( ) and long-term average ( ) of **white-tailed jackrabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

Population Trends of White-tailed Deer in Minnesota's Farmland/Transition Zone – 2005

Marrett Grund, Farmland Wildlife Populations and Research Group

INTRODUCTION

White-tailed deer (*Odocoileus virginianus*) represent one of the most important big game mammals in Minnesota. Although viewed as being important by both hunters and non-hunters, deer also pose socioeconomic and ecological challenges for wildlife managers, such as deer-vehicle accidents, crop depredation, and forest regeneration issues. Thus, monitoring the status of deer populations is critical so that appropriate harvest levels can be determined based on established deer management goals.

The intent of this document is to: 1) identify where the farmland population model is applied to model deer population dynamics in Minnesota, 2) describe the structure of and data inputs for the farmland population model, 3) discuss general trends of deer density and current abundance, and 4) describe trends of harvest patterns in the farmland/transition zone.

METHODS

Minnesota Farmland/Transition Zone

There are 4 deer management units (DMUs) in Minnesota's farmland/transition zone (Figure 1) and DMUs are further partitioned into deer management sub-units (DMSUs; Figure 2). The primary purpose of DMUs and DMSUs is to pool data in homogeneous landscape types. Permit areas (PAs) delineated within DMUs serve as the basis for population modeling and managing antlerless harvests (Figure 3). There are 87 PAs in Minnesota's farmland zone. However, the 2 PAs encompassing the Twin Cities metro region are not modeled.

Population Modeling

The population model used to analyze past trends and test harvest strategies in the farmland/transition zone can best be described as an accounting procedure that subtracts losses, adds gains, and keeps a running total of the number of animals alive in various sex-age classes during successive periods of the annual cycle. The deer population is partitioned into 4 sex-age classes (fawns, adults, males, and females). The 12-month year is divided into 4 periods representing important biological events in the deer's life (hunting season, winter, reproduction, and summer). The primary purposes of the farmland model are to: 1) organize and synthesize existing data on farmland deer populations, 2) advance our understanding of each deer population through population analysis, 3) provide population estimates and simulated vital rates for farmland deer populations, and 4) assist our management efforts through simulations, projections, and predictions of various management prescriptions.

The 3 most important parameters within the model reflect the aforementioned biological events, which include reproduction, harvest, and non-hunting mortality. Fetal rates are typically estimated at the DMU level via fetus surveys conducted each spring. Fetal rates are then used to estimate population reproductive rates for each deer herd within a particular DMU. The deer population increases in size after reproduction is simulated. Non-hunting mortality rates occurring during summer months (prior to the hunting season) are derived from field studies conducted in Minnesota and other agricultural regions. Although summer mortality rates are low, they do represent a reduction in the annual deer population. In

farmland deer herds, virtually all mortality occurring during the 12-month year can be attributed to hunter harvests. Annual harvests are simulated in the model by subtracting the numerical harvest (adjusted for crippling and non-registered deer) from the pre-hunt population for each respective sex-age class. In heavily hunted deer populations, like those in the farmland/transition region, the numerical harvest data "drive" the population model by substantially reducing the size of the deer herd. Winter mortality rates are estimated from field studies conducted in Minnesota and other farmland regions, similar to summer mortality rates. After winter mortality rates are simulated, the population is at its lowest point during the 12-month period and the annual cycle begins again with reproduction.

RESULTS AND DISCUSSION

Population Trends and Densities

Deer densities continued to increase throughout most of the farmland/transition zone. Deer densities were highest in the Big Woods DMU, lowest in the Prairie DMU, and at intermediate levels in northwestern Minnesota (Agassiz & Red River DMUs). Detailed long-term trends in deer densities can be reviewed in Table 1.

In northwestern Minnesota, simulated deer densities indicated a slight downward trend over the last couple of years (Figure 4). Efforts to reduce deer in this area may be having an impact. However, most managers and constituent groups indicated there were still too many deer in northwestern Minnesota.

In the Big Woods DMU, which incorporates the transition zone, deer densities continued to increase (Figure 4). Rate of increase was most rapid in the Southeast and Metro DMSUs, despite efforts to reduce deer populations in these areas (Fig 5).

In the Prairie DMU, deer densities have increased slowly over the last couple of years (Figure 4). Rate of increase was fastest in the North and Southwest DMSUs (Figure 6). This trend reflected objectives and management strategies of most wildlife managers in southwestern Minnesota who wished to either maintain or slightly increase deer herds in their respective work areas.

Harvest Trends

In northwestern Minnesota, registered harvest densities have steadily increased over the past 5-6 years (Figure 7). Harvest densities were higher and have increased at a faster rate in the Agassiz DMU than in the Red River DMU.

In the Big Woods DMU, harvest densities varied across DMSUs and across years (Figure 8). Trends in harvest densities have been most stable in the Metro and most variable in the Southeast DMSU. Harvest densities have generally increased in the Central and North DMSUs over the past 4-6 years.

In the Prairie DMU, harvest densities have declined in the River DMSU but have been relatively stable in North and Southwest DMSUs (Figure 9). Harvest densities have fluctuated in the Southeast DMSU but are comparable to harvest densities a decade ago.

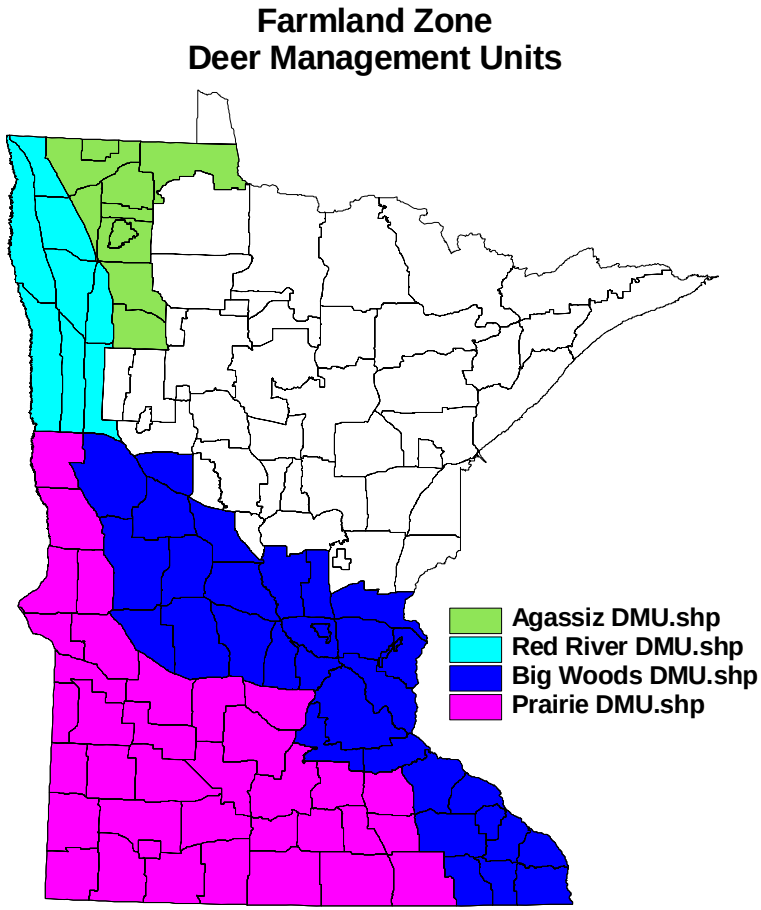


Figure 1. Deer management units in the farmland zone of Minnesota, 2004.

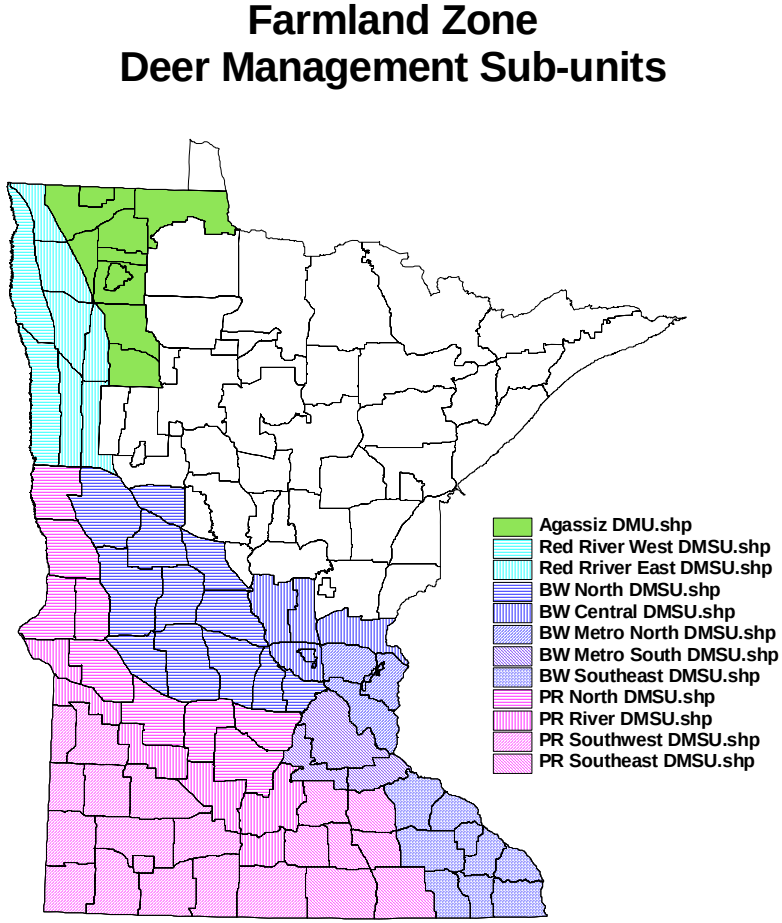


Figure 2. Deer management sub-units in the farmland zone of Minnesota, 2004.

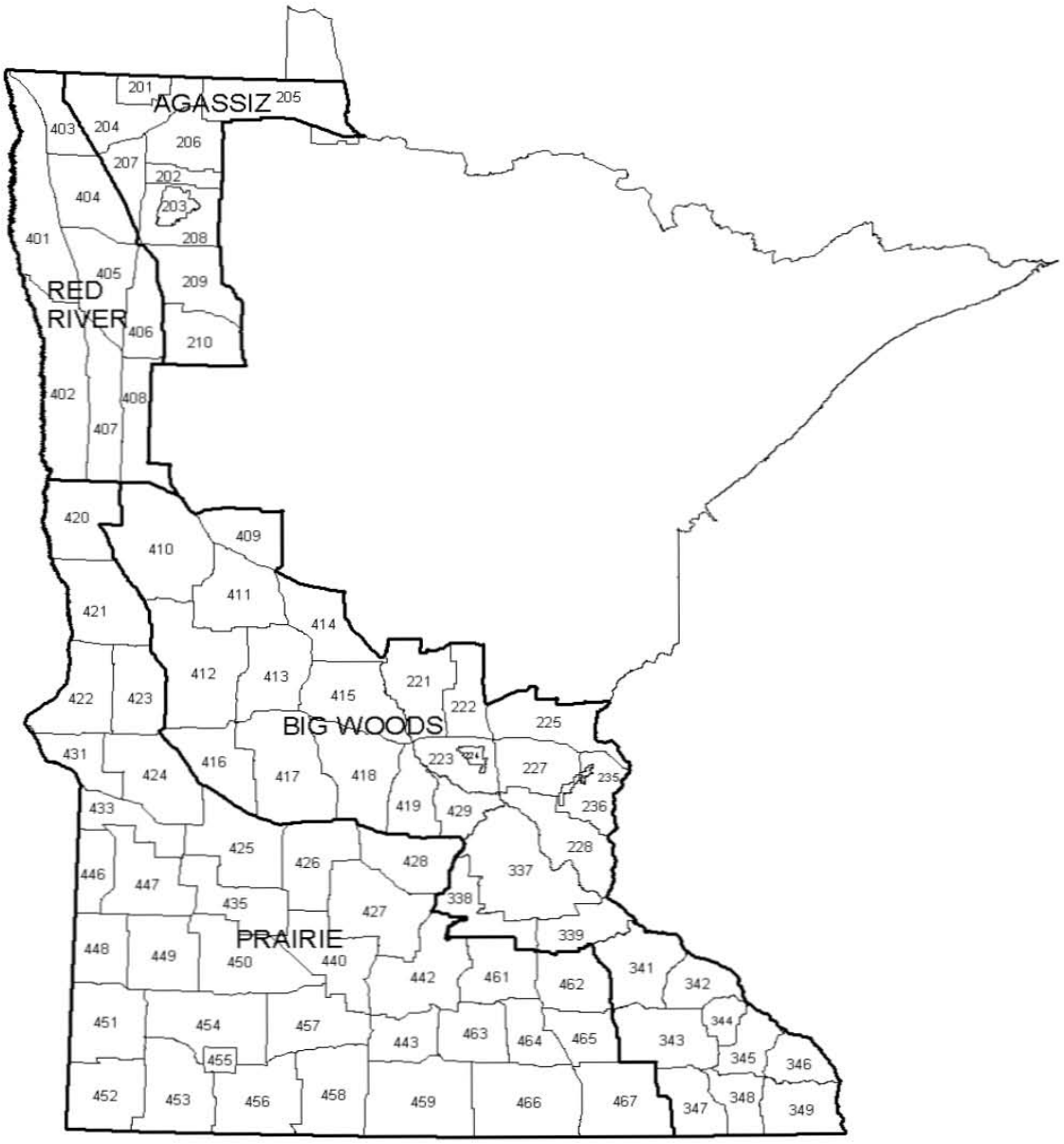


Figure 3. Deer permit areas in Minnesota's the farmland zone, 2004.

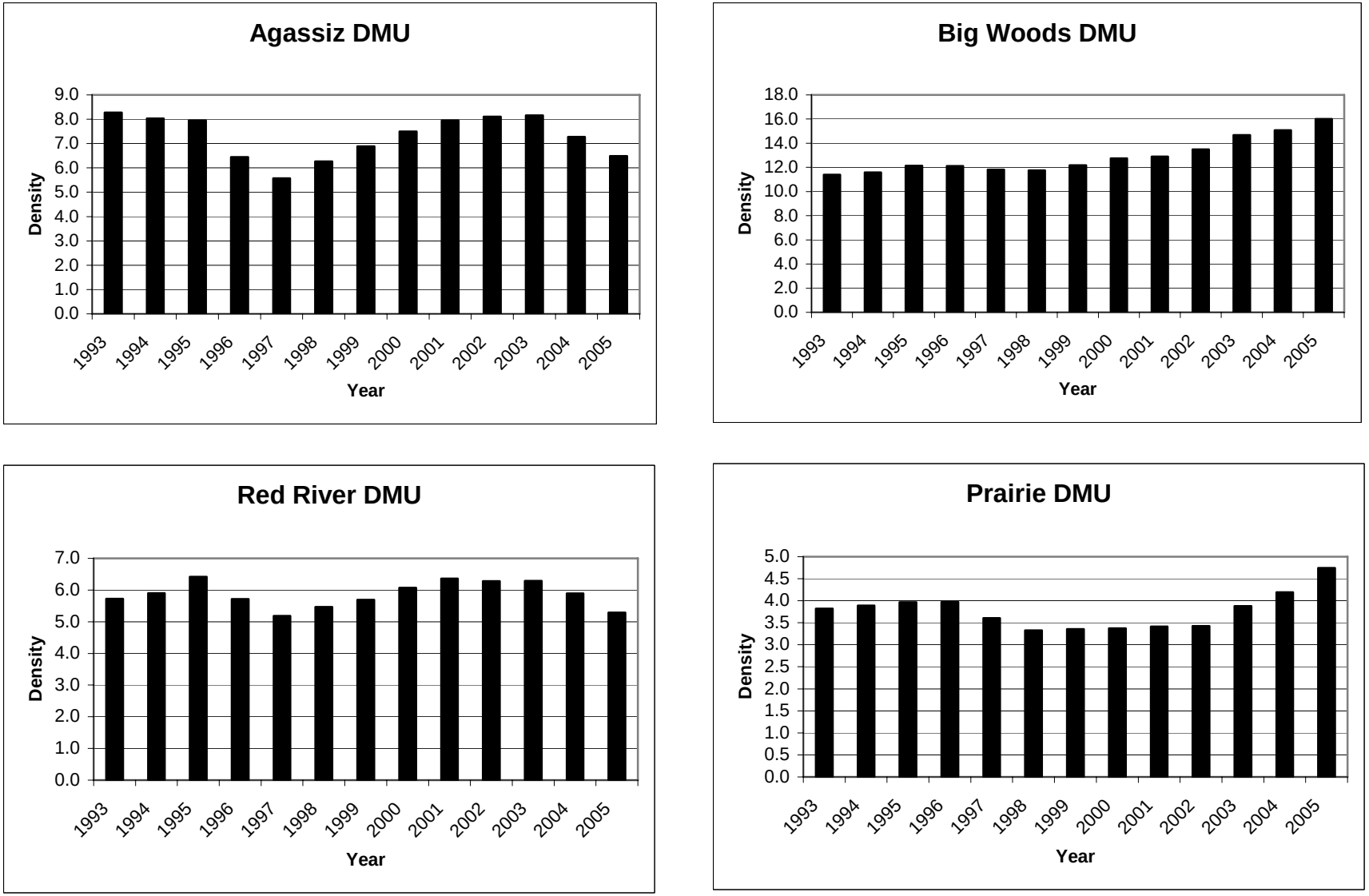
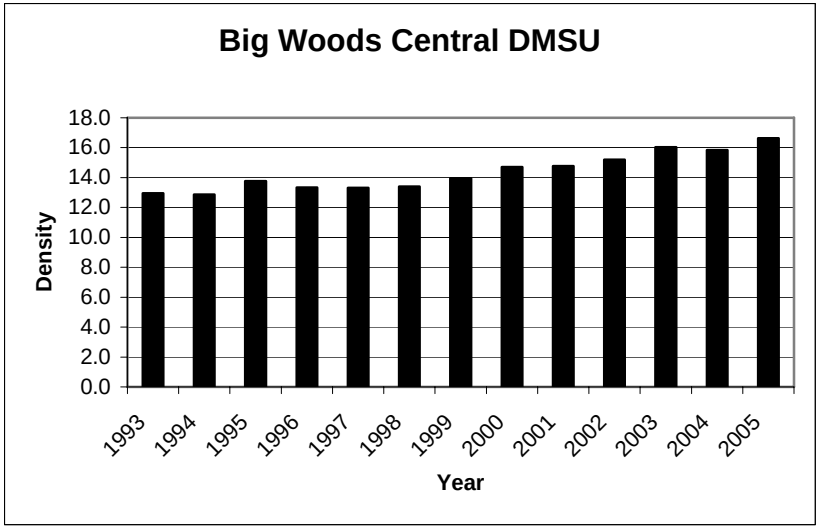
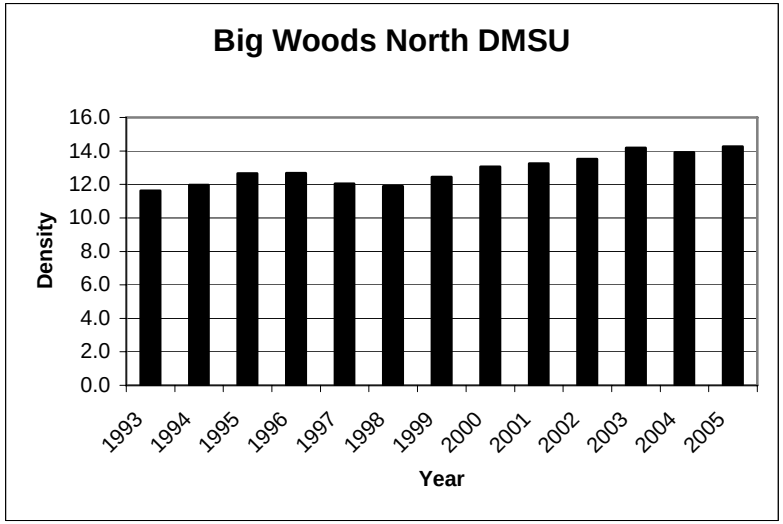
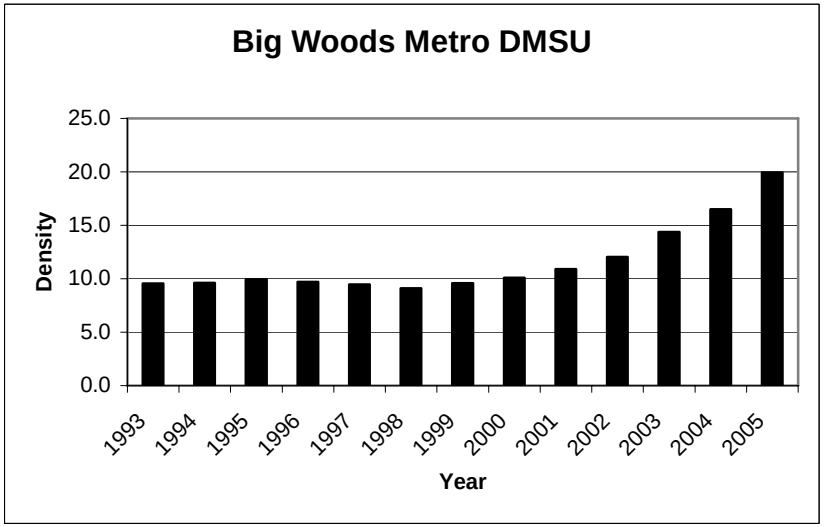


Figure 4. Modeled deer densities for each deer management unit in the farmland zone of Minnesota, 1993-2005.







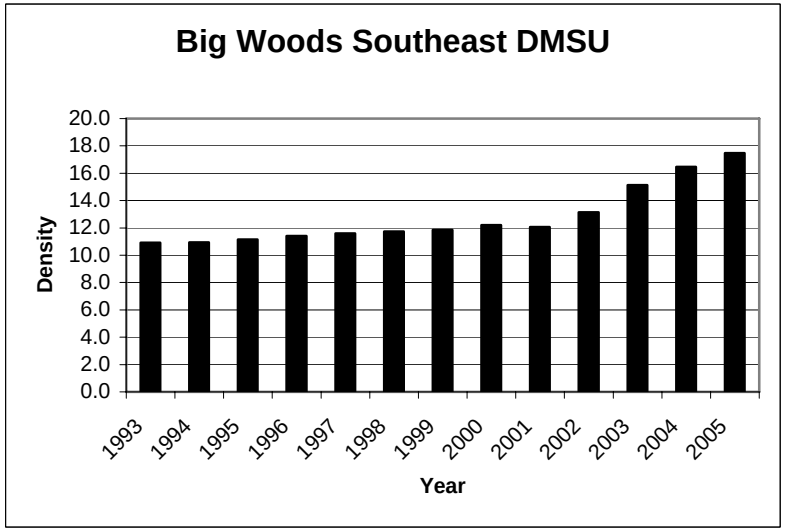
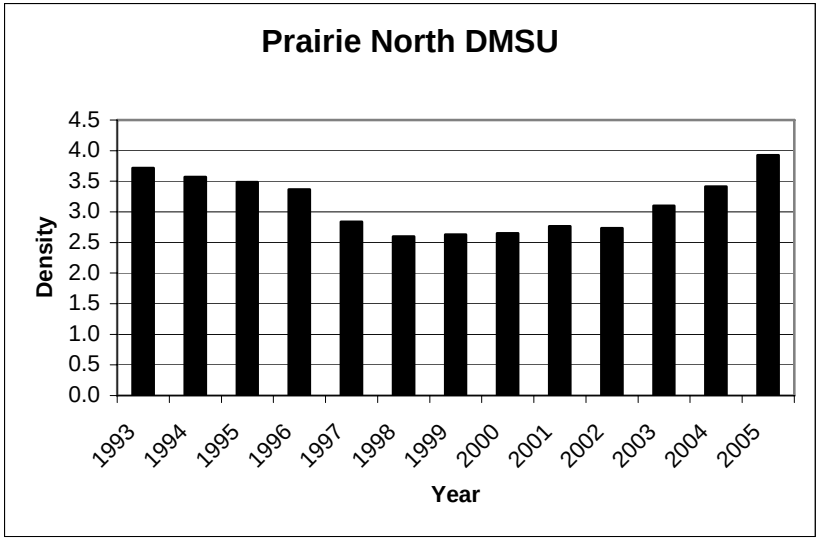
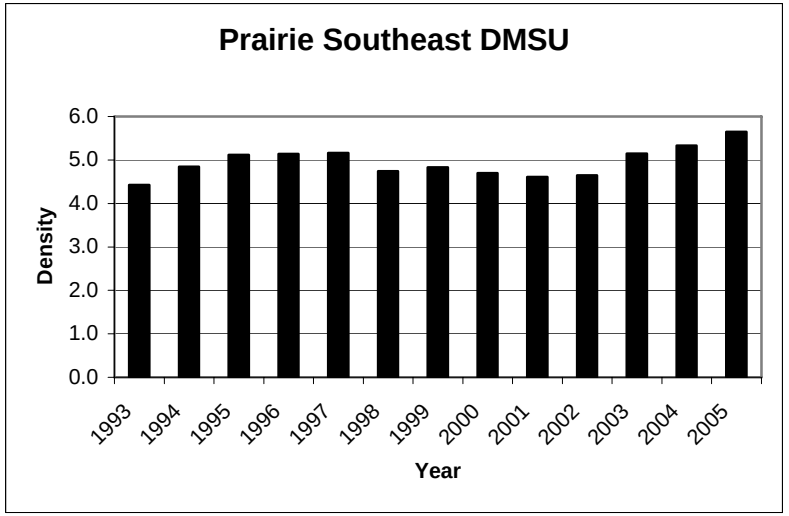
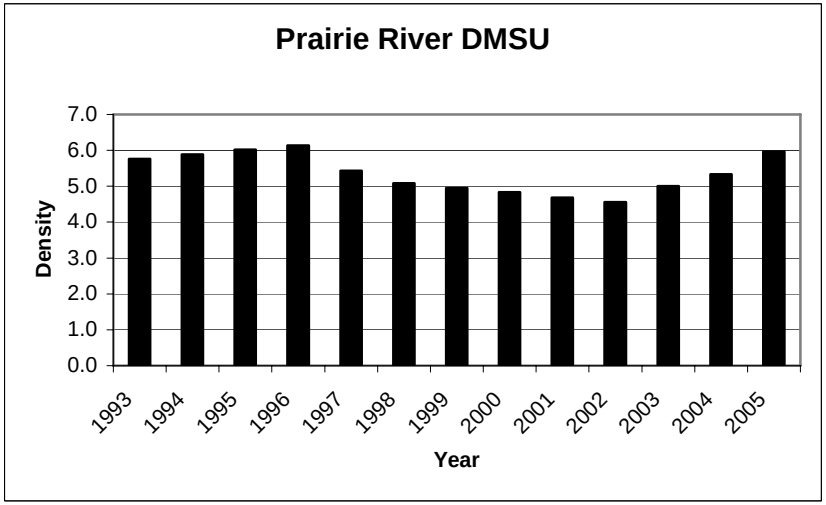


Figure 5. Modeled deer densities for Big Woods deer management sub-units of Minnesota, 1993-2005.







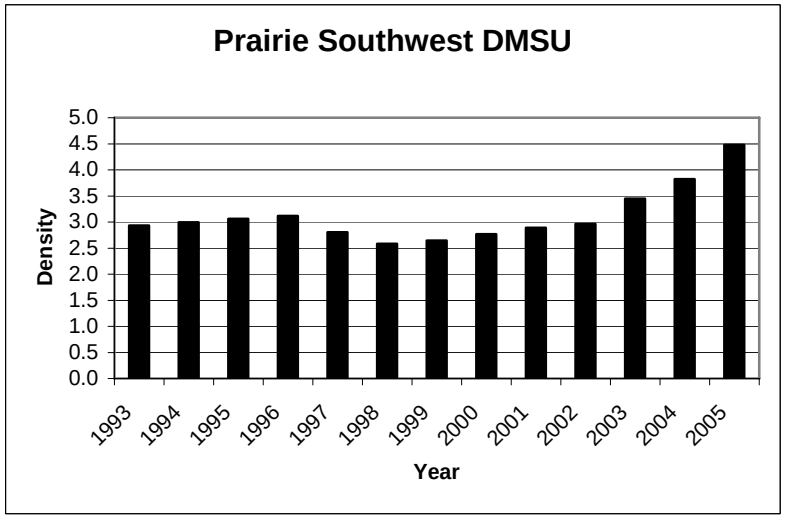


Figure 6. Modeled deer densities for Prairie deer management sub-units of Minnesota, 1993-2005.

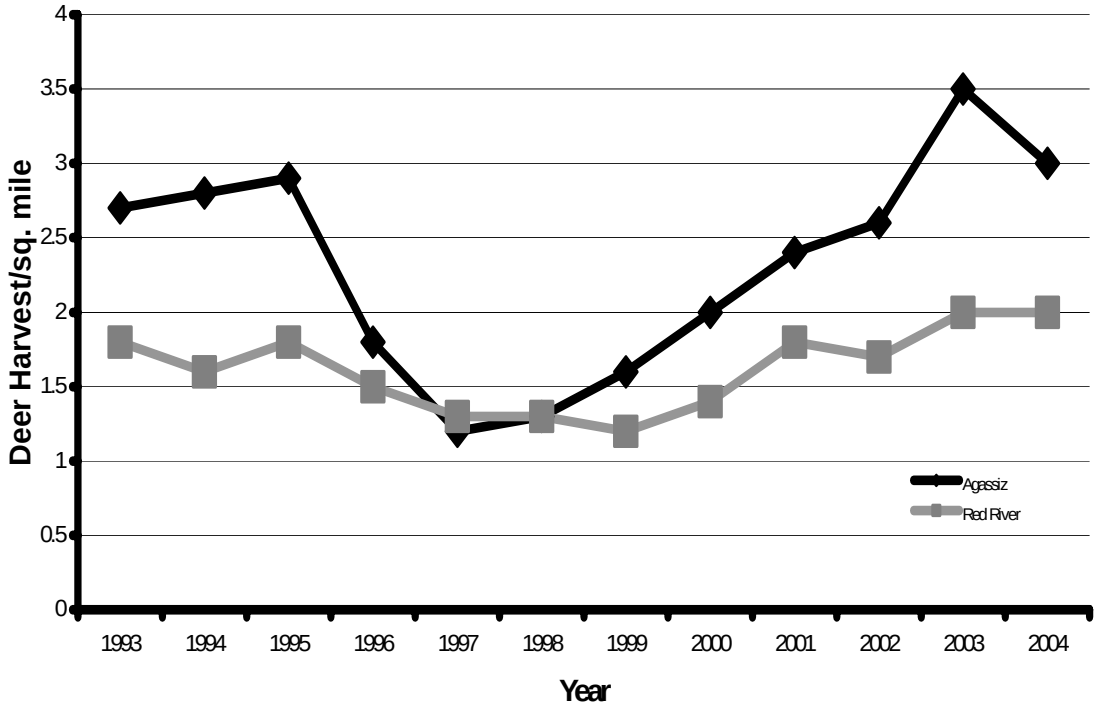


Figure 7. Deer harvest densities in the Agassiz and Red River deer management units of Minnesota, 1993-2004.

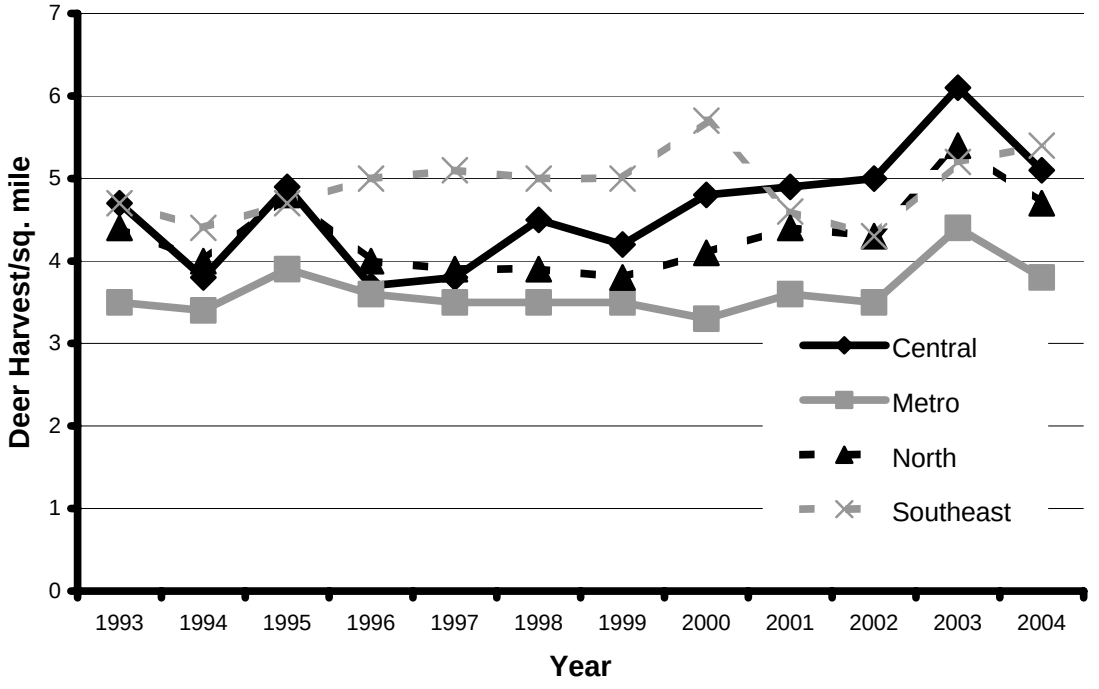


Figure 8. Deer harvest densities in Big Woods deer management sub-units of Minnesota, 1993-2004.

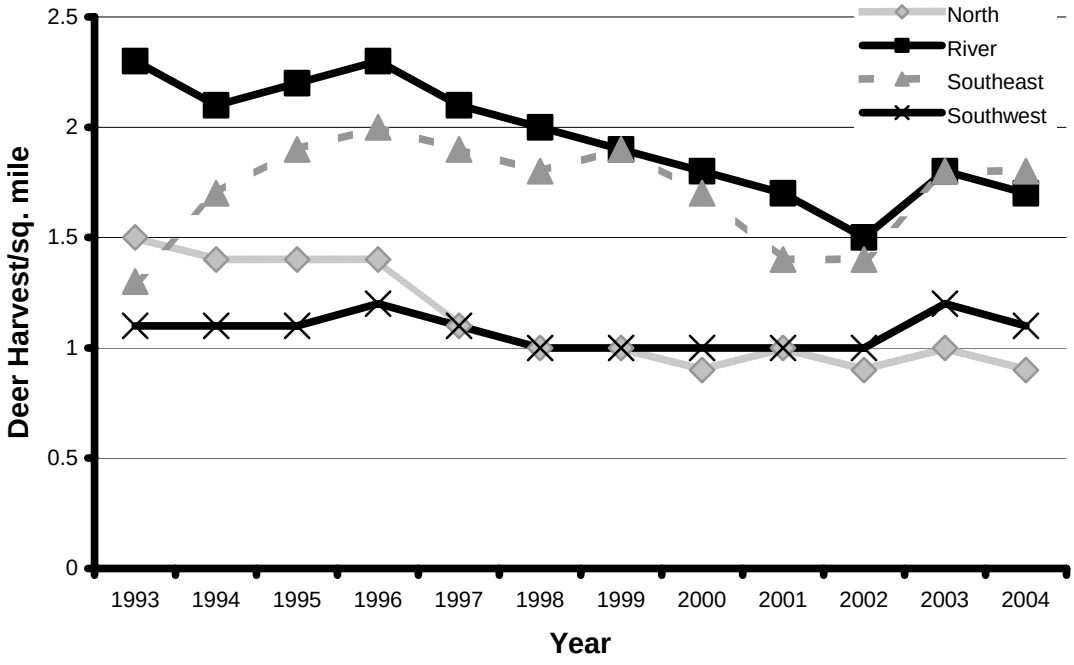


Figure 9. Deer harvest densities in Prairie deer management sub-units of Minnesota, 1993-2004.

Table 1. Pre-fawning deer density estimates[a] (deer/mi^2) by deer management unit (DMU), sub-unit (DMSU), and permit area (PA) in Minnesota's Farmland/Transition Zone, 1993-2005.

DMU	DMSU	PA	Area mi^2	Pre-fawning density												
				1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
RED RIVER	*West*	401	1039	2.1	2.2	2.5	2.3	2.0	2.0	2.0	2.1	2.2	2.2	2.3	2.4	2.4
		402	1021	3.3	3.4	3.8	3.5	2.9	3.0	3.2	3.3	3.4	3.0	2.8	2.3	1.7
		Total	2060	2.7	2.8	3.1	2.9	2.4	2.5	2.6	2.7	2.8	2.6	2.6	2.3	2.1
	East	403	396	6.2	6.3	6.9	5.9	5.7	6.2	6.6	7.1	7.5	7.9	8.1	7.8	7.2
		404	631	7.0	7.1	7.8	7.0	6.5	7.1	7.5	7.9	8.3	8.4	8.8	8.7	8.1
		405	654	6.5	6.6	7.1	6.3	5.9	6.4	6.9	7.4	7.8	7.6	7.7	7.2	6.6
		406	413	10.5	11.3	12.7	11.4	9.9	10.3	10.5	11.0	11.0	10.0	9.5	8.0	6.2
		407	618	8.5	8.5	9.1	8.1	7.5	7.7	8.0	8.8	9.2	9.4	9.1	8.6	7.5
		408	494	8.0	8.1	8.4	7.3	6.9	7.2	7.3	7.9	8.4	8.8	9.0	8.7	8.4
		Total	3206	7.7	7.9	8.5	7.5	7.0	7.4	7.7	8.3	8.6	8.6	8.7	8.2	7.4
Red River Total			5266	5.7	5.9	6.4	5.7	5.2	5.5	5.7	6.1	6.4	6.3	6.3	5.9	5.3
AGASSIZ		201	155	6.1	5.0	3.7	2.4	1.9	2.5	3.1	3.7	4.5	4.8	4.8	5.3	5.4
		202	156	11.4	10.4	9.8	7.4	6.2	7.6	8.7	9.9	11.0	10.9	10.7	9.3	8.5
		203	108	11.4	9.2	6.9	3.0	1.9	2.3	2.9	3.6	4.5	5.5	6.7	6.6	7.1
		204	718	7.3	7.3	7.3	6.0	4.7	5.2	5.6	5.9	6.0	5.7	5.8	5.2	4.9
		205	642	11.7	12.0	11.8	9.4	7.3	8.7	9.6	10.7	11.3	11.9	11.8	9.3	6.9
		206	471	8.7	8.2	8.3	6.8	5.7	6.4	7.2	8.1	8.8	8.8	8.3	6.9	5.4
		207	300	8.8	8.0	7.6	6.2	5.7	6.4	7.0	7.7	8.2	8.4	8.8	7.8	6.9
		208	448	4.2	3.9	3.5	2.6	2.4	2.9	3.4	3.9	4.2	4.3	4.6	4.3	4.2
		209	576	6.0	6.0	6.3	5.4	5.1	5.7	6.0	6.4	6.7	6.8	7.0	6.8	6.5
		210	485	11.3	11.5	12.0	10.7	9.6	9.8	10.5	10.9	11.2	11.4	11.5	11.1	10.7
Agassiz Total			4059	8.3	8.0	7.9	6.4	5.6	6.3	6.9	7.5	7.9	8.1	8.2	7.3	6.5
BIG WOODS	*North*	409	417	22.8	25.2	28.2	30.0	28.6	27.9	29.8	32.9	32.2	32.4	33.2	32.2	31.2

DMU	DMSU	PA	Area mi^2	Pre-fawning density												
				1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		410	924	13.0	13.2	13.8	13.5	12.9	13.1	14.5	15.7	16.4	17.1	18.2	18.7	20.0
		411	642	18.5	19.2	20.8	20.8	20.3	21.1	22.7	24.7	26.1	27.2	29.2	30.5	33.2
		412	989	10.5	10.3	10.5	10.0	9.2	9.0	9.5	9.6	9.4	9.5	10.1	10.2	10.5
		413	644	12.8	13.3	14.1	14.0	13.2	13.4	13.5	14.1	14.4	14.1	13.1	11.2	9.5
		414	557	14.8	15.5	17.0	17.0	17.3	17.5	18.1	18.7	18.9	19.4	20.4	19.0	18.4
		415	702	8.4	8.8	9.4	9.3	8.9	8.8	9.1	9.4	9.4	9.6	9.9	9.0	8.2
		416	544	9.2	9.6	9.7	9.7	9.1	8.8	8.5	8.1	8.0	7.6	7.9	7.4	7.4
		417	939	9.1	9.0	9.3	9.6	8.7	8.0	7.9	7.8	7.7	8.0	8.6	8.4	9.4
		418	760	7.7	7.6	7.9	7.8	7.2	7.0	7.3	7.1	7.1	7.3	8.0	7.7	7.9
		419	393	9.0	9.4	9.6	9.6	8.9	7.7	7.8	8.5	8.8	9.2	10.3	10.9	12.1
		429	288	5.3	5.5	5.3	5.4	5.1	4.8	5.1	5.6	5.9	6.3	7.0	7.2	8.1
		Total	7799	11.6	12.0	12.7	12.7	12.0	11.9	12.4	13.1	13.3	13.5	14.2	13.9	14.3
	Central	221	642	8.7	8.7	9.4	9.4	9.4	9.8	10.5	11.5	11.3	11.9	12.5	12.4	12.6
		222	412	12.8	12.4	13.4	12.9	12.7	13.2	13.8	14.4	14.2	14.6	14.9	13.9	14.2
		223	376	12.3	12.7	13.4	12.9	12.7	12.5	12.5	13.3	13.4	13.8	14.8	14.8	16.0
		224	48	13.5	14.2	15.4	15.2	16.2	17.5	18.4	20.2	22.3	24.5	27.4	28.4	30.9
		225	619	17.8	17.4	18.7	17.8	17.9	17.6	18.2	18.7	18.9	19.1	20.3	20.3	21.7
		Total	2097	13.0	12.9	13.8	13.3	13.3	13.4	14.0	14.7	14.8	15.2	16.0	15.8	16.6
	Metro[b]	227	472	15.4	15.5	16.4	12.9	12.9	12.8	13.4	13.7	14.5	15.3	17.7	19.6	22.8
		235	33	12.8	12.9	13.0	12.0	12.6	13.3	16.9	20.0	24.4	31.4	42.8	53.5	70.5
		236	374	15.0	15.3	16.0	16.4	16.2	15.6	16.5	17.3	18.5	20.4	23.4	26.0	30.6
		338	452	4.6	4.4	4.4	4.4	4.1	3.8	3.9	4.4	4.9	5.7	7.4	9.0	11.4
		339	395	5.4	5.6	5.5	5.5	5.0	4.5	4.7	5.0	5.5	6.3	8.0	9.8	12.6
		Total	1726	9.6	9.7	10.0	9.8	9.5	9.2	9.7	10.2	11.0	12.1	14.5	16.6	20.1
	Southeast	341	611	7.7	8.0	8.4	8.7	8.8	8.8	8.8	8.9	8.7	9.7	11.1	9.2	9.3
		342	352	10.4	10.5	10.6	9.9	10.1	11.0	11.2	11.5	11.4	12.6	15.0	17.2	10.0
		343	663	7.1	7.4	7.6	8.0	8.3	8.0	8.4	9.0	9.3	10.8	13.1	15.7	18.9
		344	189	18.1	17.5	17.3	16.9	15.6	14.6	13.9	14.2	14.5	16.6	20.1	23.5	28.4

DMU	DMSU	PA	Area mi^2	Pre-fawning density 1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		345	326	11.3	10.8	10.8	10.4	10.6	10.8	10.8	10.5	9.6	9.8	10.8	12.1	13.9
		346	319	17.3	16.6	16.7	17.3	18.0	17.7	18.0	18.8	18.9	20.1	22.8	24.9	26.9
		347	434	9.1	9.3	9.2	9.5	9.6	9.2	9.2	9.3	9.1	10.1	11.0	11.8	12.5
		348	332	15.6	15.7	16.1	16.7	17.0	17.1	16.5	16.2	15.1	15.0	16.1	16.5	16.5
		349	492	11.5	11.8	12.3	13.0	13.7	14.8	15.7	16.7	16.7	18.3	21.4	24.3	27.7
		Total	3718	10.9	10.9	11.1	11.3	11.6	11.7	11.8	12.1	12.0	13.1	15.1	16.4	17.4
Big Wood Total			15340	11.4	11.6	12.1	12.1	11.8	11.7	12.2	12.7	12.9	13.5	14.7	15.1	16.0
PRAIRIE	*North*	420	651	4.2	3.9	3.8	3.7	3.2	3.0	3.4	3.7	3.8	3.6	3.9	3.8	3.5
		421	749	3.5	3.4	3.3	3.1	2.7	2.5	2.7	2.8	3.1	3.0	3.6	4.1	4.8
		422	634	2.9	2.6	2.5	2.4	2.0	2.2	2.2	2.2	2.2	2.2	2.5	2.7	3.3
		423	531	4.3	4.1	4.1	4.1	3.7	3.4	3.3	3.2	3.4	3.1	3.5	3.7	4.4
		424	766	6.0	6.0	6.0	6.5	5.2	4.3	4.0	3.6	3.4	3.2	3.4	3.9	4.4
		425	779	2.4	2.3	2.2	1.9	1.3	1.0	0.9	0.9	1.0	1.0	1.2	1.5	1.8
		426	614	4.0	3.9	3.7	3.2	2.9	2.7	2.8	2.9	3.2	3.3	3.8	4.1	4.8
		427	837	2.4	2.3	2.2	1.8	1.5	1.3	1.4	1.5	1.6	1.8	2.1	2.4	3.0
		428	550	4.2	4.0	4.1	4.0	3.6	3.4	3.6	3.6	3.9	4.1	4.8	5.5	6.3
		Total	6111	3.7	3.6	3.5	3.4	2.8	2.6	2.6	2.6	2.8	2.7	3.1	3.4	3.9
	River	431	360	6.8	6.9	6.8	7.6	6.7	5.9	5.5	4.7	4.2	3.9	3.9	3.8	4.1
		433	397	9.5	9.9	10.3	10.4	9.3	8.8	8.3	8.2	7.9	7.7	8.9	9.1	10.1
		435	575	5.9	5.7	5.8	6.0	5.2	4.9	4.7	4.6	4.5	4.4	4.9	5.4	6.4
		440	662	4.3	4.4	4.5	4.5	4.1	3.9	3.9	3.8	3.7	3.5	3.8	4.0	4.1
		442	806	4.5	4.5	4.7	4.5	3.9	3.8	4.0	4.2	4.3	4.3	4.9	5.5	6.3
		443	386	6.0	6.4	6.7	6.7	6.0	5.5	5.2	4.9	4.6	4.5	4.7	4.8	5.3
		Total	3186	5.8	5.9	6.0	6.1	5.4	5.1	4.9	4.8	4.7	4.6	5.0	5.3	6.0
	Southwest	446	345	5.8	6.0	6.5	6.8	6.5	6.1	6.1	5.9	5.7	5.4	5.4	5.3	5.4
		447	675	2.7	2.6	2.7	2.6	2.2	2.1	2.0	2.1	2.0	2.0	2.4	2.6	3.1
		448	447	3.7	3.5	3.1	3.0	2.5	2.2	2.2	2.8	3.6	3.8	4.4	5.0	5.9

DMU	DMSU	PA	Area mi^2	Pre-fawning density												
				1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
		449	625	3.9	3.8	3.7	3.4	2.8	2.5	2.4	2.9	3.8	4.1	5.0	5.8	6.9
		450	816	1.9	2.0	2.0	1.8	1.5	1.4	1.5	1.4	1.4	1.3	1.6	1.7	2.0
		451	687	2.7	2.7	2.7	3.1	2.7	2.5	2.5	2.5	2.6	2.8	3.3	3.8	4.8
		452	637	2.6	2.7	3.0	3.3	3.2	3.2	3.3	3.5	3.5	3.6	4.1	4.5	5.2
		453	729	1.9	2.0	2.0	2.0	1.7	1.6	1.8	2.0	2.2	2.4	3.1	3.6	4.8
		454	840	3.5	3.5	3.6	3.6	3.2	3.0	3.1	3.3	3.4	3.4	3.9	4.4	5.0
		455	95	4.6	4.8	4.6	4.8	4.4	4.4	4.4	4.1	3.9	3.9	4.4	4.4	4.7
		456	712	3.2	3.3	3.5	3.6	3.3	3.2	3.3	3.3	3.5	3.7	4.4	5.2	6.0
		457	666	2.6	2.6	2.5	2.7	2.4	2.3	2.5	2.6	2.7	2.6	2.9	3.1	3.4
		458	715	2.5	2.8	2.8	2.9	2.6	2.4	2.3	2.4	2.4	2.4	2.7	2.9	3.3
		459	974	2.8	3.1	3.3	3.4	3.2	2.7	2.7	2.8	2.7	2.8	3.2	3.5	4.2
		Total	8963	2.9	3.0	3.1	3.1	2.8	2.6	2.6	2.8	2.9	3.0	3.4	3.8	4.5
	Southeast	461	481	7.5	8.1	8.6	8.8	8.8	8.0	7.8	7.5	7.2	7.1	7.6	7.4	7.0
		462	506	7.0	7.7	8.3	8.4	8.4	8.1	8.3	7.8	7.5	7.2	7.8	8.0	8.3
		463	453	3.4	3.5	3.6	3.4	3.3	3.0	3.1	3.2	3.3	3.3	3.5	3.8	4.3
		464	377	4.2	4.5	4.8	4.6	4.2	3.8	3.7	3.8	4.0	4.3	5.1	5.7	6.5
		465	385	4.3	4.7	5.1	4.9	4.9	4.3	4.5	4.1	4.1	4.2	4.7	4.8	5.1
		466	931	3.3	3.7	3.9	4.1	4.1	3.7	3.9	3.8	3.6	3.7	4.3	4.7	5.3
		467	774	2.9	3.4	3.5	3.5	3.6	3.4	3.5	3.7	3.7	3.7	4.2	4.1	4.2
		Total	3907	4.4	4.8	5.1	5.1	5.2	4.7	4.8	4.7	4.6	4.7	5.2	5.3	5.7
Prairie Total			22167	3.8	3.9	4.0	4.0	3.6	3.3	3.4	3.4	3.4	3.4	3.9	4.2	4.7
Farmland Zone Total			46832	6.9	7.0	7.3	7.1	6.6	6.6	6.8	7.1	7.2	7.4	8.1	8.2	8.6

[a]Density estimates are subject to change as new data are incorporated or the model is revised.
[b]Excluding permit areas 228 & 337, which were not modeled.

Fetus Survey Data Results of White-tailed Deer in the Farmland/Transition Zone of Minnesota – 2005

Marrett Grund and Bob Osborn, Farmland Populations & Research Group

INTRODUCTION

Fetus surveys are used to gather information on productivity (number of fetuses per doe) of juvenile (≤12 months of age) and adult (>12 months of age) female white-tailed deer (*Odocoileus virginianus*) in the farmland/transition zone of Minnesota (Figure 1). These data, along with other biological information, are incorporated into the farmland deer population model. The farmland deer population model is used to predict changes in population size and determine deer management strategies for 85 permit areas.

A simple and effective method for estimating productivity rates is through direct examination of the reproductive tracts of female deer killed by motor vehicles. The objectives of the this survey are to estimate 1) pregnancy rates of juvenile and adult white-tailed deer in the farmland/transition zone of Minnesota and 2) fetal rates of adult and juvenile white-tailed deer in the farmland/transition zone of Minnesota.

METHODS

Reproductive data required for the farmland deer population model include age of the female (juvenile or adult), pregnancy status, number of fetuses present, and gender of the fetuses. These data are collected annually from road-killed females from 1 February to 31 May. Personnel participating in the survey include all wildlife staff in the farmland/transition zone. Area Wildlife Managers are encouraged to contact local Department of Transportation staff and law enforcement officials to facilitate locating dead deer in a timely fashion. Where possible, the use of volunteers is also encouraged.

Equipment for data collection included a sharp knife or scalpel, vinyl gloves, and self-addressed, postage-paid postcards. When examining each deer, staff located and opened the uterus to check for fetuses. Staff recorded pregnancy/lactation status, age class of the female, number and gender of all fetuses present, and the location of the road-killed animal (Figure 2). Notes on body condition or any other unusual observations were also recorded.

RESULTS & DISCUSSION

A total of 262 deer were examined in 2005. Fifteen (6%) of these deer came from the Northwest Deer Management Unit (DMU; Table 1), 192 (73%) from the Big Woods DMU (Table 2), and 55 (21%) from the Prairie DMU (Table 3).

Pregnancy rates for fawns ranged from 13% in the Prairie DMU to 33% in the Northwest DMU. Throughout the farmland/transition zone, 44% of fawns were pregnant. Pregnancy rates for adults ranged from 89% in the Northwest DMU to 91% in the Big Woods DMU and averaged 90% across the farmland/transition zone.

Fetal rates for fawns ranged from 0.1 fetuses/fawn in the Prairie DMU to 0.4 fetuses/fawn in the Big Woods DMU, and averaged 0.3 fetuses/fawn across the farmland/transition zone. Fetal rates for adults ranged from 1.7 fetuses/adult in the Big Woods and Prairie DMUs, and 1.9 fetuses/adult in the Northwest DMU. Fetal rates averaged 1.7 fetuses/adult throughout the farmland/transition zone.

Table 1. Reproductive performance of white-tailed deer in Minnesota for the Northwest[a] Deer Management Unit, 1980 – 2005.

	Fawns			Adults		
Year	N	Percent Pregnant	Fetuses per doe	N	Percent Pregnant	Fetuses per doe
1980	8	50	0.6	12	92	1.7
1981	4	0	0.0	11	100	1.7
1982	6	67	0.7	18	94	1.8
1983	15	27	0.3	26	85	1.6
1984	10	40	0.6	23	87	1.7
1985	6	17	0.2	11	91	1.7
1986	3	0	0.0	6	83	1.3
1987	3	0	0.0	5	100	1.6
1988	3	33	0.3	4	50	0.8
1989	14	21	0.3	27	93	1.7
1990	18	22	0.2	29	93	1.7
1991	11	9	0.1	15	87	1.6
1992	13	8	0.1	24	96	1.6
1993	7	0	0.0	11	100	1.6
1994	7	14	0.1	13	92	1.4
1995	4	25	0.3	6	100	2.0
1996	5	0	0.0	21	81	1.3
1997	4	0	0.0	12	100	1.5
1998	3	0	0.0	7	86	1.6
1999	5	0	0.0	14	100	1.6
2000	7	14	0.1	11	100	2.0
2001	4	0	0.0	8	100	1.8
2002	7	14	0.1	13	100	1.8
2003	0	0	0.0	3	100	1.7
2004	2	50	0.5	2	100	2.0
2005	6	33	0.3	9	89	1.9
Mean (1980's)		26	0.3		88	1.6
Mean (1990's)		8	0.1		94	1.6
Mean (2000's)		19	0.2		98	1.9

[a]Red River (East and West) and Agassiz Deer Management Units were combined into the Northwest Deer Management Unit due to small sample sizes.

Table 2. Reproductive performance of white-tailed deer in Minnesota for the Big Woods Deer Management Unit[a], 1978 – 2005.

	Fawns			Adults		
Year	N	Percent Pregnant	Fetuses per doe	N	Percent Pregnant	Fetuses per doe
1978	74	47	0.5	113	96	1.8
1979	87	30	0.3	119	92	1.7
1980	87	61	0.7	107	97	1.8
1981	78	58	0.6	132	92	1.7
1982	95	43	0.5	197	95	1.8
1983	83	55	0.7	167	95	1.8
1984	77	22	0.3	123	95	1.8
1985	60	50	0.6	105	96	1.8
1986	79	37	0.4	116	88	1.6
1987	45	44	0.5	146	94	1.8
1988	14	64	0.8	31	97	1.8
1989	51	31	0.3	85	96	1.8
1990	96	32	0.3	125	95	1.8
1991	50	20	0.2	71	96	1.8
1992	67	24	0.3	100	95	1.8
1993	47	38	0.4	95	93	1.7
1994	46	15	0.2	99	94	1.7
1995	21	19	0.2	54	91	1.8
1996	59	15	0.2	112	96	1.8
1997	40	33	0.4	96	88	1.6
1998	53	23	0.3	109	91	1.7
1999	49	37	0.4	95	91	1.6
2000	62	23	0.3	76	91	1.6
2001	36	14	0.1	65	94	1.7
2002	70	23	0.3	97	95	1.8
2003	66	20	0.2	90	95	1.6
2004	65	20	0.2	60	88	1.6
2005	93	29	0.4	99	91	1.7
Mean (1980's)		47	0.5		95	1.8
Mean (1990's)		26	0.3		93	1.7
Mean (2000's)		22	0.2		92	1.7

[a]The majority of samples (approximately 85%) from this Deer Management Unit were obtained from the Big Woods Metro sub-unit. Consequently, the data reported in this table may not reflect reproductive performances throughout the remainder of the Big Woods Management Unit.

Table 3. Reproductive performance of white-tailed deer in Minnesota for the Prairie Deer Management Unit, 1980 – 2005.

	Fawns			Adults		
Year	N	Percent Pregnant	Fetuses per doe	N	Percent Pregnant	Fetuses per doe
1978	25	44	0.6	69	100	1.9
1979	83	34	0.4	92	90	1.8
1980	51	63	0.7	55	91	1.7
1981	57	44	0.5	65	92	1.8
1982	50	46	0.6	85	94	1.9
1983	42	62	0.9	51	96	1.9
1984	30	23	0.3	69	84	1.6
1985	21	38	0.4	49	94	1.9
1986	25	64	0.8	56	93	1.7
1987	27	52	0.6	47	94	0.9
1988	20	40	0.5	16	100	1.9
1989	37	38	0.4	54	89	1.7
1990	43	42	0.4	62	97	1.8
1991	30	20	0.2	67	94	1.8
1992	37	19	0.2	51	94	1.9
1993	39	38	0.4	75	93	1.8
1994	32	16	0.2	46	98	1.9
1995	39	21	0.3	50	92	1.7
1996	28	14	0.1	30	90	1.6
1997	26	4	0.0	49	92	1.7
1998	18	17	0.2	38	97	1.7
1999	26	19	0.2	47	96	1.7
2000	13	23	0.4	23	87	1.6
2001	18	6	0.1	39	87	1.5
2002	19	32	0.4	26	92	1.7
2003	18	22	0.2	123	93	1.7
2004	10	10	0.1	9	89	1.7
2005	16	13	0.1	39	90	1.7
Mean (1980's)		47	0.5		93	1.7
Mean (1990's)		21	0.2		94	1.8
Mean (2000's)		18	0.2		90	1.7

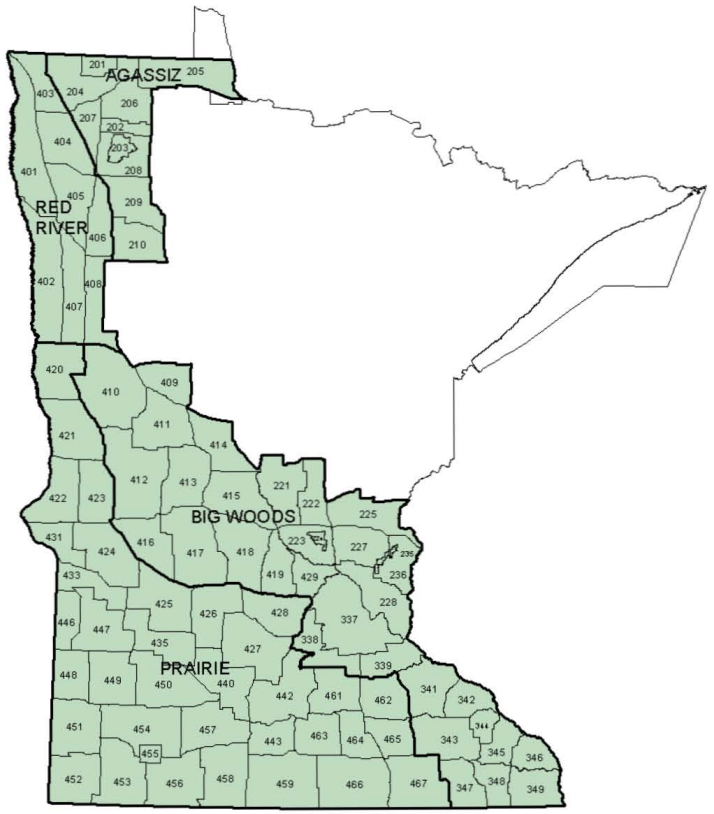


Figure 1. Permit areas within the Farmland Zone of Minnesota.

FETUS SURVEY REPORT FORM

Name _____ Date _____

Sex: _____ Age: Juv. (<12 months) _____ Adult (>12 months) _____

Pregnant: Yes _____ No _____ (Lactating _____)

Number of fetuses _____ Sex of Fetuses _____

County _____ Highway _____

Permit area _____ Twp _____ Rng _____ Sec _____

Miles _____ direction _____ from _____

Comments _____

Figure 2. Postcard for reporting fetus survey data.

WILDLIFE DAMAGE COMPLAINTS

WILDLIFE DAMAGE COMPLAINTS

Nick Reindl, Wildlife Damage Extension Specialist
and Steve Benson, Wildlife GIS Coordinator

Wildlife damage complaint information is collected statewide from wildlife managers. The 2004 information was compiled by MIS – GIS and summarized by the Wildlife Depredation Specialist, 1601 Minnesota Drive, Brainerd, MN 56401.

Wildlife managers recorded a total of 656 wildlife complaints in 2004, down 6.4% compared to the 2003 total of 703 complaints. Three species, black bear, white-tailed deer, and Canada geese account for 551, (85%) of the complaints received (Figure1). Five other species of special interest for wildlife damage; cougar, elk, moose, turkey, and sandhill crane, comprise an additional 39, (5.9 %) of the recorded complaints. Nineteen species are represented in 66 (10 %) of the complaints received.

The expenditure for depredation materials during FY 04 was $67,400 (16% bear, 69% deer, 14% goose). The average expenditure for the five-year period 1999-2003 was $84,350 (Figure 8.). During calendar year 2004 materials assistance for deer depredation was provided to three orchards, one vineyard, one strawberry farm, one melon farm, three vegetable farms, one Christmas tree farm, one tree nursery and two perennial nurseries. Exclusion techniques included the installation of six woven wire, and four energized permanent deer fences, one portable energized deer fence and the use of cedar panels and cattle guards at two other locations. Additional technical assistance was provided to the University of Minnesota, Morris, for research plots, the Division of Forestry for oak regeneration plots and two previous co-operators for deer exclusion upgrades to existing fences.

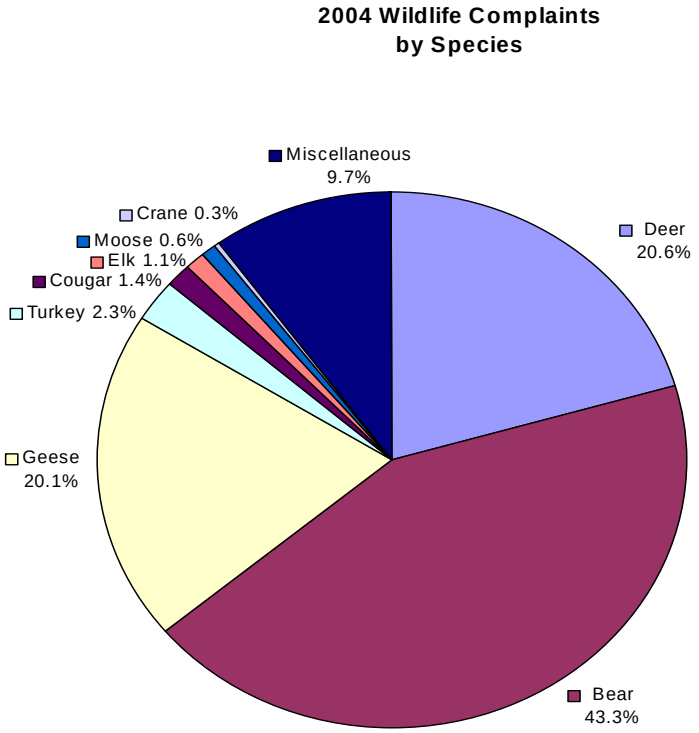


Figure 1. Wildlife complaints in Minnesota by species for the year 2004.

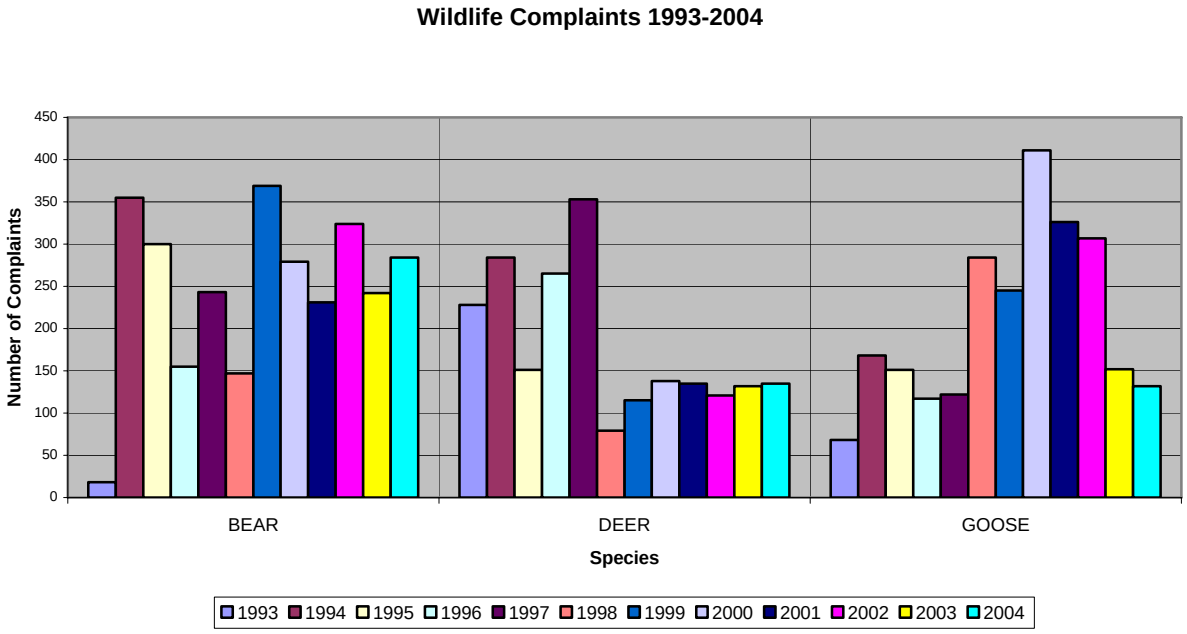


Figure 2. Number of wildlife complaints recorded by bear, deer & geese from 1993-2004, in Minnesota.

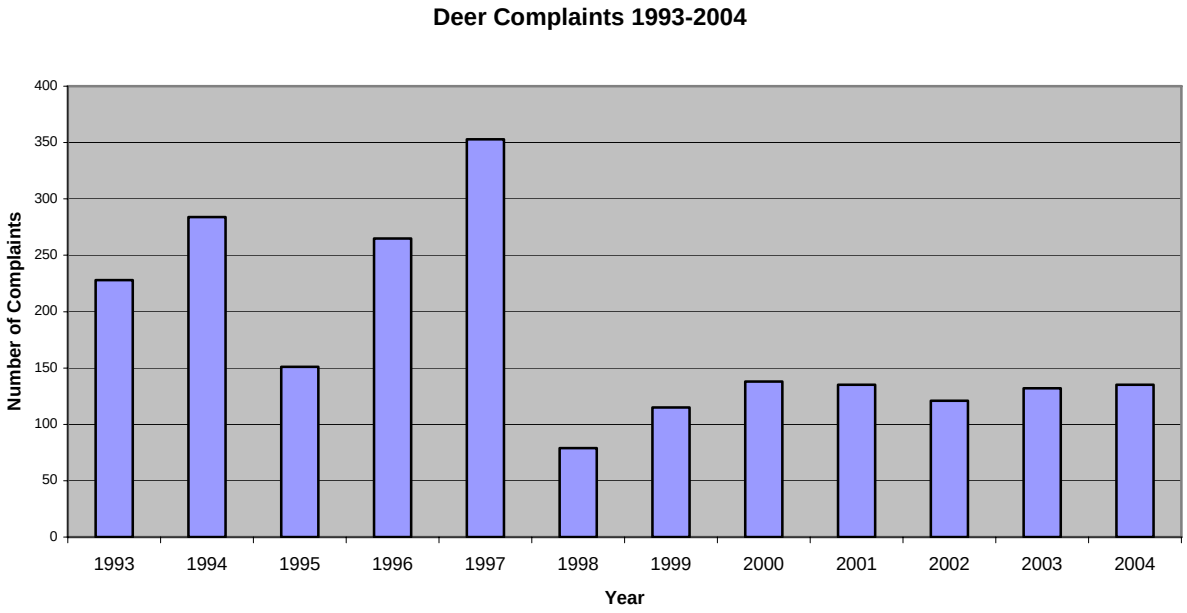


Figure 3. Number of deer complaints from 1993-2004, in Minnesota.

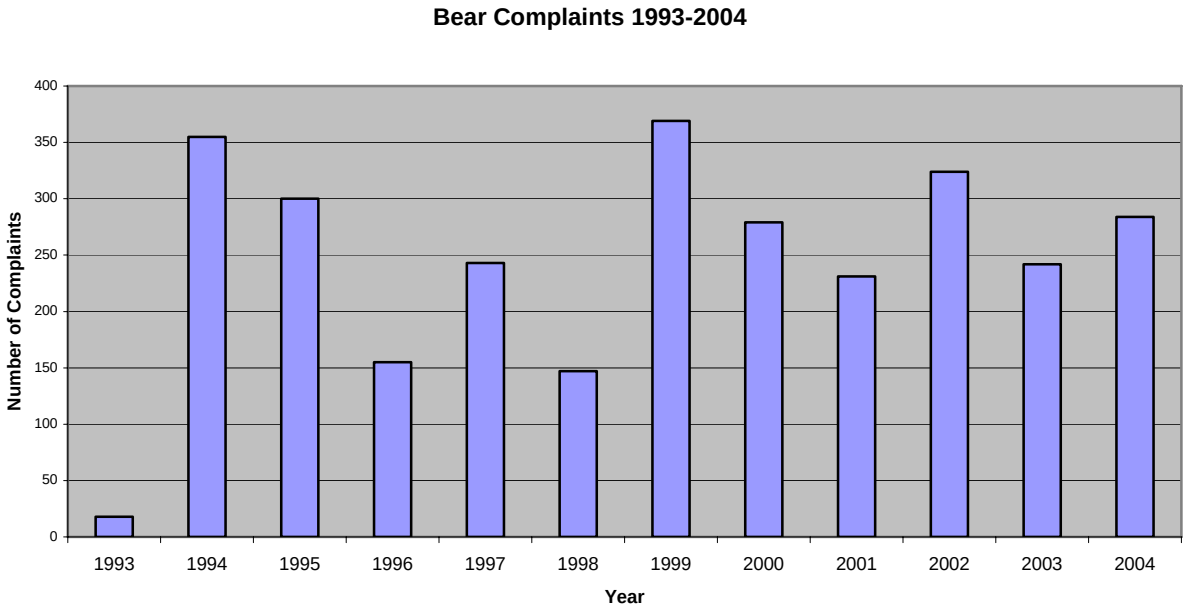


Figure 4. Number of bear complaints from 1993-2004 in Minnesota.

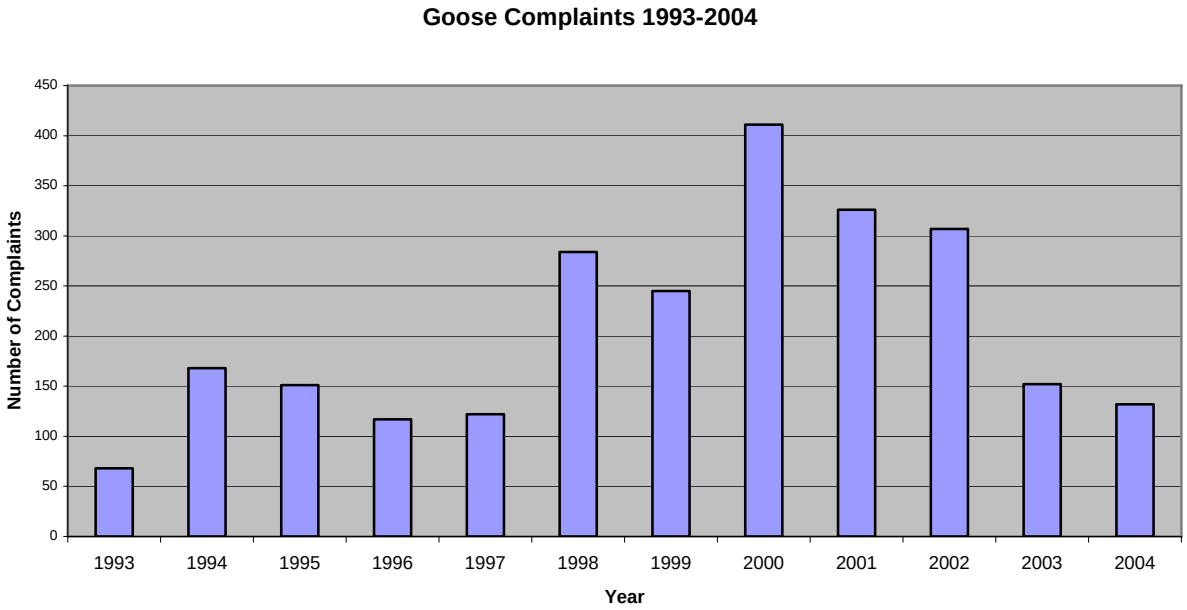


Figure 5. Number of goose complaints from 1993-2004, in Minnesota.

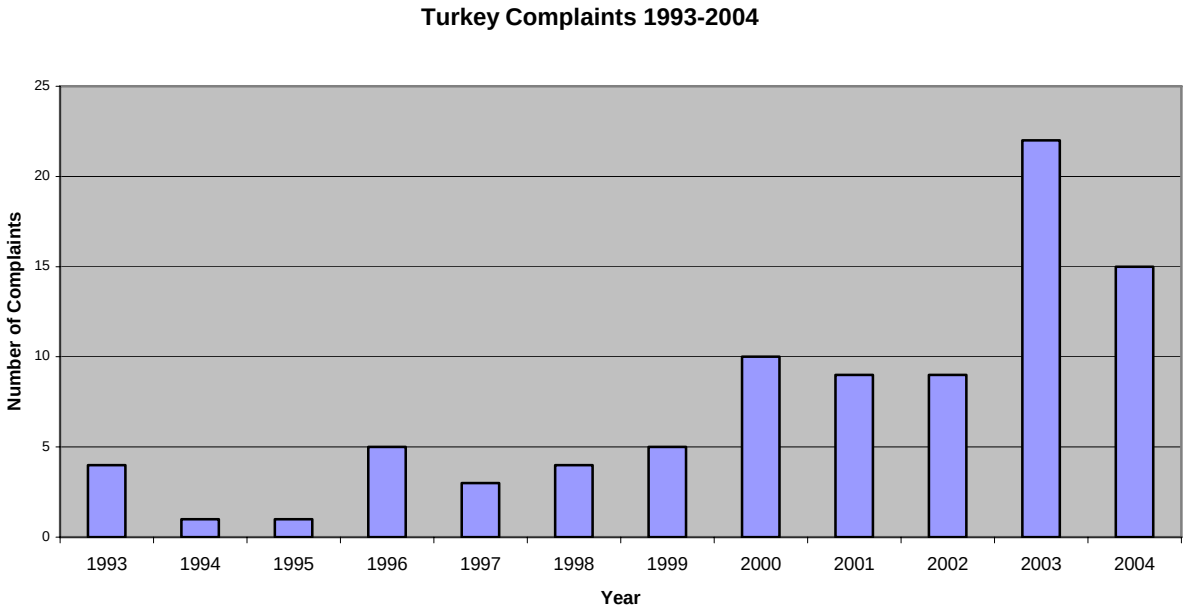


Figure 6. Number of turkey complaints from 1993-2004, in Minnesota.

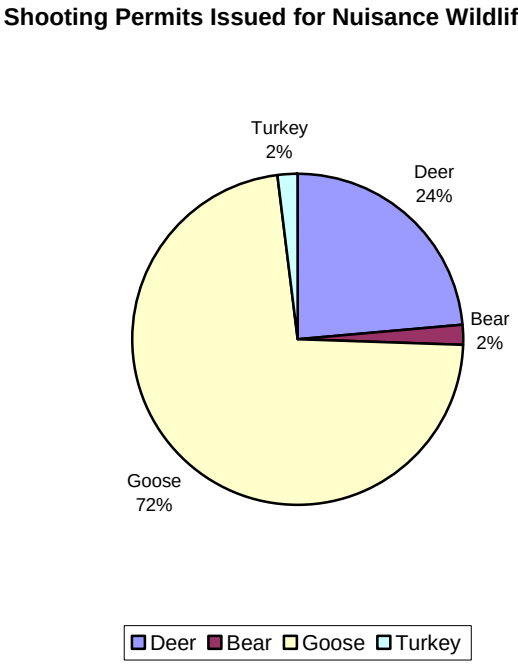


Figure 7. Shooting permits issued for nuisance wildlife control in Minnesota for 2004.

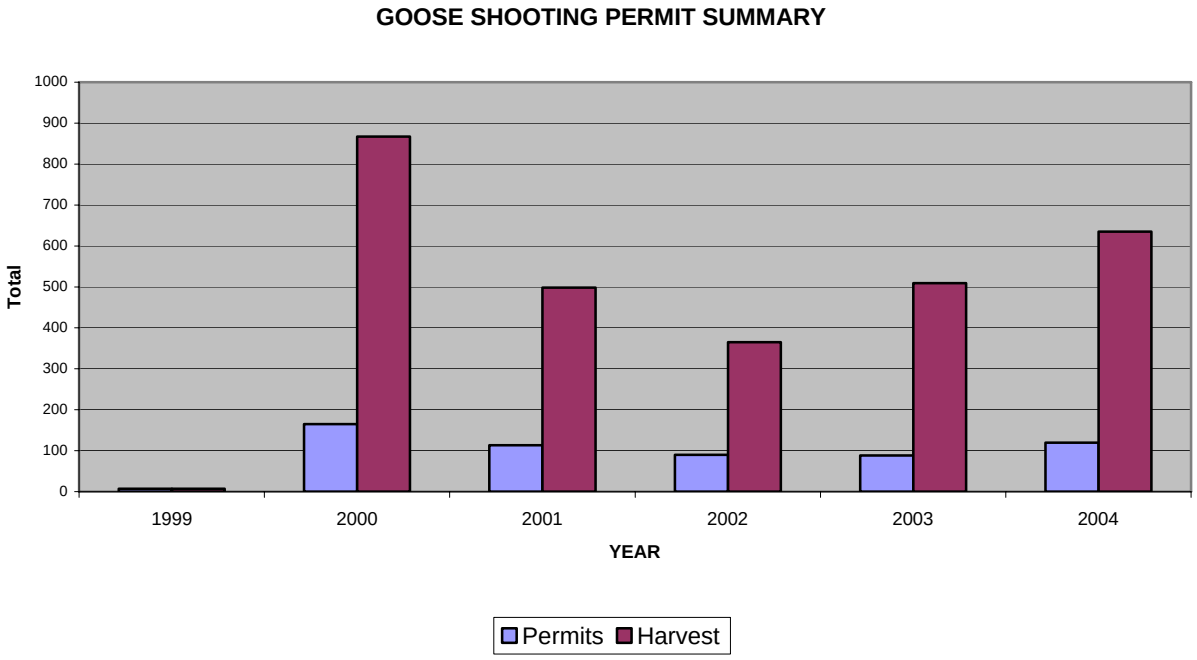
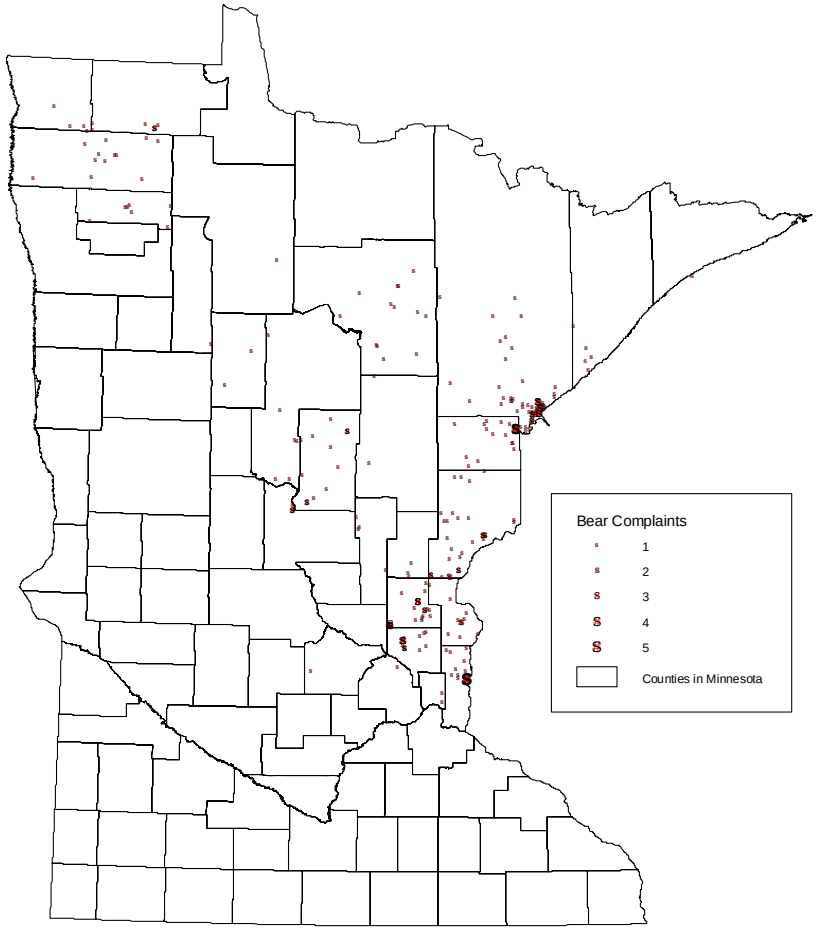
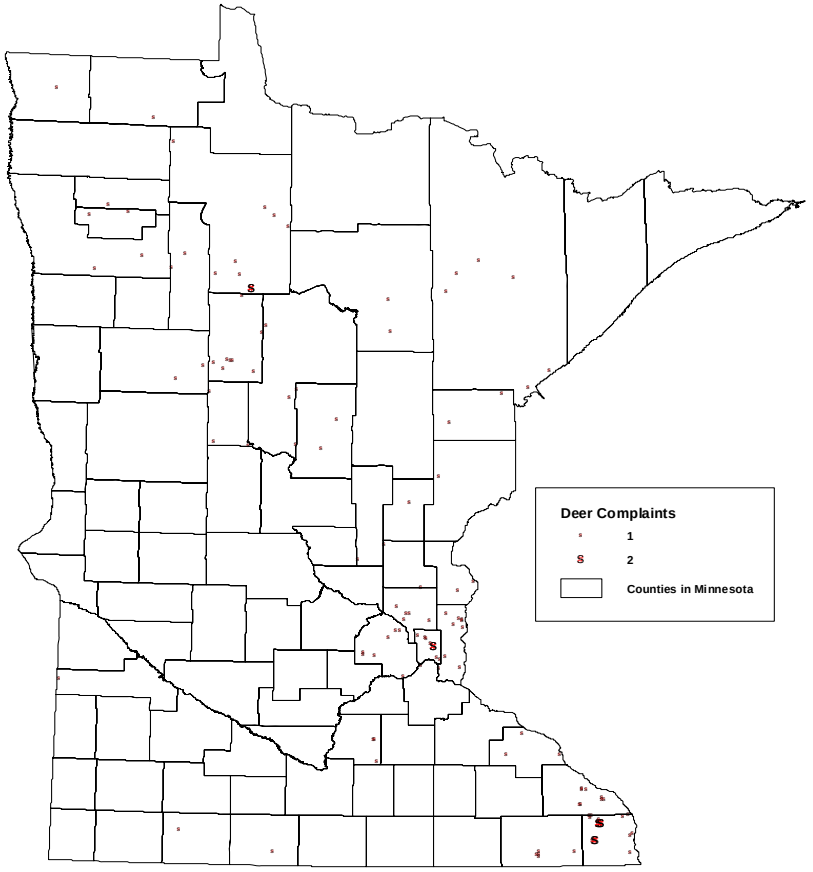


Figure 8. Comparison of nuisance goose shooting permits and harvest in Minnesota 1999-2004.



Location of bear damage complaints recorded in 2004 (n = 250)



Location of deer damage complaints recorded in 2004 (n = 119)

Figure 9. Location of bear damage complaints recorded in 2004. (n= 250) Figure 10. Location of deer damage complaints recorded in 2004. (n= 119)

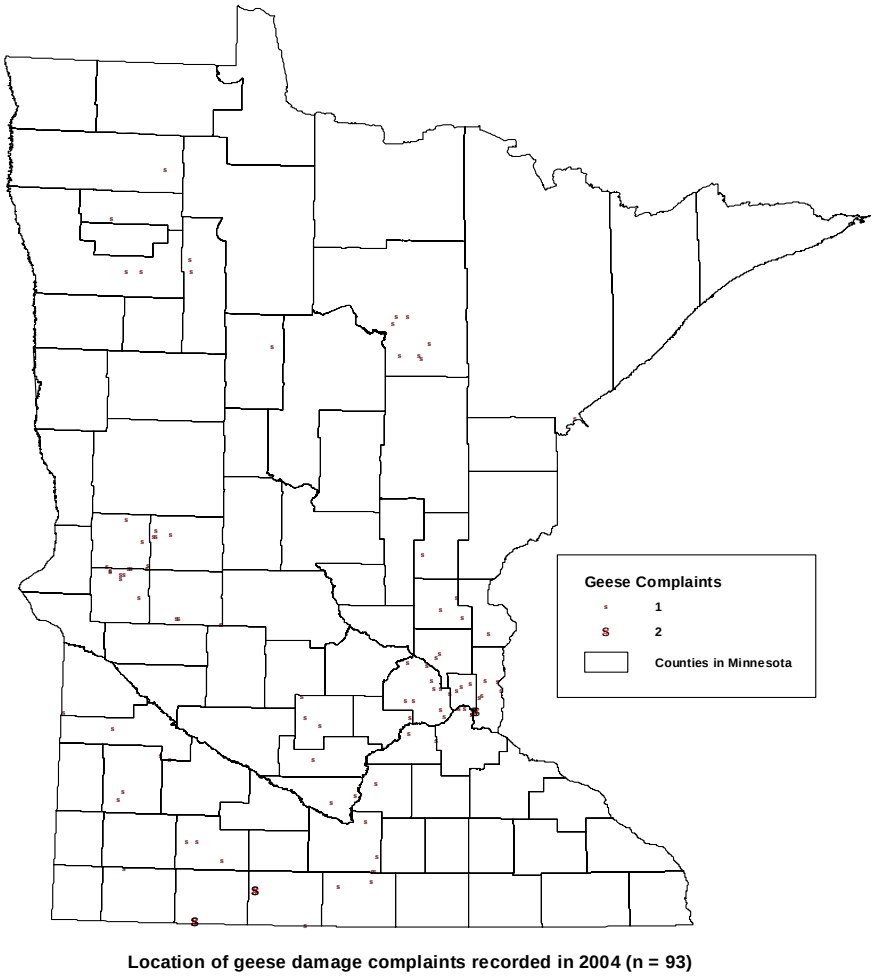


Figure 11. Location of geese damage complaints recorded in 2004. (n= 93)

PREDATOR SCENT POST SURVEY

AND

WINTER TRACK INDICES

NOTE: This survey is organized and coordinated by the Forest Wildlife Populations and Research Group.
Results are presented at this location in the book because of the statewide nature of the data.

FURBEARER WINTER TRACK SURVEY SUMMARY, 2004

John Erb, Forest Wildlife Populations & Research Group,

INTRODUCTION

Monitoring the distribution and abundance of carnivores can be important for documenting the effects of harvest, habitat change, and environmental variability on these populations. However, many carnivores are highly secretive, difficult to repeatedly capture, and naturally occur at low to moderate densities, making it difficult to estimate abundance over large areas using traditional methods (e.g., mark-recapture, distance sampling, etc.). Hence, indices of relative abundance are often used to monitor such populations over time (Hochachka et al. 2000, Wilson and Delahay 2001, Conn et al. 2004).

In winter, tracks of carnivores are readily observable following snowfall. Starting in 1991, Minnesota initiated a carnivore snow track survey in the northern portion of the State. The survey's primary objective is to use a harvest-independent method to monitor distribution and population trends of fisher and marten, 2 species for which no other survey data was available. Because sign of other carnivores is readily detectable in snow, participants also record tracks for other selected species. After 3 years of evaluating survey logistics, the survey became operational in 1994.

METHODS

Presently, 51 track survey routes are distributed across the northern portion of the state (Figure 1). Each route is 10 miles long, and follows secondary roads or trails. Route locations were subjectively determined based on availability of suitable roads/trails, but were chosen, where possible, to represent the varying forest habitat conditions in northern Minnesota. For data recording, each 10-mile route is divided into 20 0.5-mile segments.

Each route is surveyed once following a fresh snow from late November through January, and track counts are recorded for each 0.5-mile segment. When it is obvious the same animal crossed the road multiple times within a 0.5-mile segment, the animal is only recorded once. If it is obvious that an animal ran along the road and entered multiple 0.5 mile segments (which often occurs with canids), its' tracks are recorded in all segments, but circled to denote it was the same animal. While such duplicate tracks are not included in calculation of track indices (see below), recording data in this manner allows for future analysis of animal activity in relation to survey 'plot' size and habitat. Snowshoe hare are recorded only as present or absent in the first 0.1 miles of each 0.5-mile segment. While most routes are surveyed 1 day after the conclusion of a snowfall (ending by 6:00 pm), thereby allowing 1 night for track 'registry', a few routes are completed 2 or more nights following snowfall. In such cases, track counts on those routes are divided by the number of days post-snowfall.

Currently, 3 summary statistics (2 graphs) are presented for each species. First, I compute the percentage of 0.5-mile segments with species presence after removing any duplicates (e.g., if the same fox clearly traverses 2 adjacent 0.5-mile segments along the road, and it was the only 'new' fox in the second segment, only 1 of the 2 segments is considered independently occupied). In addition to this metric, but on the same graph, the average number of tracks per 10-mile route is presented after removing any obvious duplicate tracks across segments. For wolves traveling through adjacent segments, the maximum number of pack members recorded in any 1 of those segments is used as the track total for that particular group, though this is likely an underestimate of true pack size. Because individuals from many of the species surveyed tend to be solitary, these 2 indices will often yield mathematically equivalent

results (i.e., on average, one tends to differ from the other by a constant factor). In the case of wolf packs, and to a lesser extent fox and coyotes which may start traveling as breeding pairs in winter, the approximate equivalence of these 2 indices will still be true if average (detected) group sizes are similar across years. However, the solitary tendencies in some species are not absolute, potential density (in relation to survey plot size) varies across species, and for wolves, pack size may vary annually. For these reasons, as well as to provide an intuitive count metric, both indices are currently presented. Because snowshoe hares are tallied only as present/absent, the 2 indices will by definition be equivalent, though trends lines may deviate slightly in years when some routes are not fully surveyed.

In the second graph, I illustrate the percentage of routes where each species was detected (hereafter, the 'distribution index'). This measure is computed to help assess whether changes in the above track indices are a result of larger-scale changes in distribution (more/less routes with presence) and/or finer-scale changes in density along routes.

RESULTS

Forty of the 51 routes were completed this year (Figure 2). Total snow depths averaged 8" for completed routes, with surveys taking an average of 2.3 hours to complete. Survey routes were completed between Nov. 29 and Jan. 11 this year.

Following a recent peak, fisher track indices declined to their lowest point since the survey began (Figure 3). Given a lack of significant change in the percentage of routes occupied by fisher (Figure 3), the decline in track indices appears largely due to a decline in track density along occupied routes. For marten, little change was observed in this year's track indices (Figure 3). While there is some indication of a slow decline in marten indices from 1994-2002, recent results are within the bounds of previously observed values. It is possible that the decline (1994-2002) in the percentage of routes occupied by marten (Figure 3), particularly from 1995-2000, may be a result of a disproportionate number of new routes being added that were outside current marten range. A more detailed analysis of this possibility has yet to be completed.

Bobcat indices have undergone the most notable change since the survey began. While there was little change from last year, track indices remain well above those observed prior to 1999 (Figure 3). Wolf track indices also exhibited little change from last year (Figure 3). Overall, there has been no significant trend in wolf indices since 1994, though there is some indication that density around occupied routes has, on average, increased (Figure 3). Following an upswing through 1999, track indices for red fox have subsequently declined (Figure 3). Nevertheless, they remain one of the most ubiquitous species recorded on the survey. Coyote track indices have fluctuated, with some indication that coyote distribution has slowly declined since 1994 (Figure 3). Weasel track indices are best characterized as stable, with occasional 'irruptions' in density on occupied routes (Figure 3). Based on known cyclic patterns, snowshoe hare indices have been expected to decline. Following a 'prolonged' peak, hare winter track indices declined for the first time in 6 years (Figure 3).

DISCUSSION

Reliable interpretation of changes in track survey results is dependent on the assumption that the probability of detecting animals remains relatively constant across years (Gibbs 2000). Because this remains an untested assumption, caution is warranted when interpreting changes, particularly annual changes of low to moderate magnitude, or short-term trends.

While little change was noted in the broad-scale distribution of fisher across their range, track indices suggest that fisher density may have notably declined since last year. No significant changes were noted for marten. Bobcat populations appear to remain at high levels in spite of record harvests in recent years. While trends are apparent for some of the remaining species, track indices this winter were generally within the bounds of those previously recorded.

We recently completed the process of digitizing all survey routes and electronically entering all previous data. In the near future, I will be reviewing several aspects of survey design and analysis, including computation of confidence intervals around indices, adequacy of survey route sample size and distribution, and possible approaches for estimating, and hence correcting for, any differences in the probability of detecting animals across years (e.g., MacKenzie et al. 2004).

ACKNOWLEDGEMENTS

I wish to thank all those who participated in this year's survey, including DNR field staff, Lowell Deede (Tamarac National Wildlife Refuge), Jay Huseby, Kevin Spears, and Herb Mountain (Red Lake Band), Ben Whiting and Jim Dahl (Grand Portage Band), and Andy Edwards, Darren Vogt, and Carlye Olson (1854 Authority).

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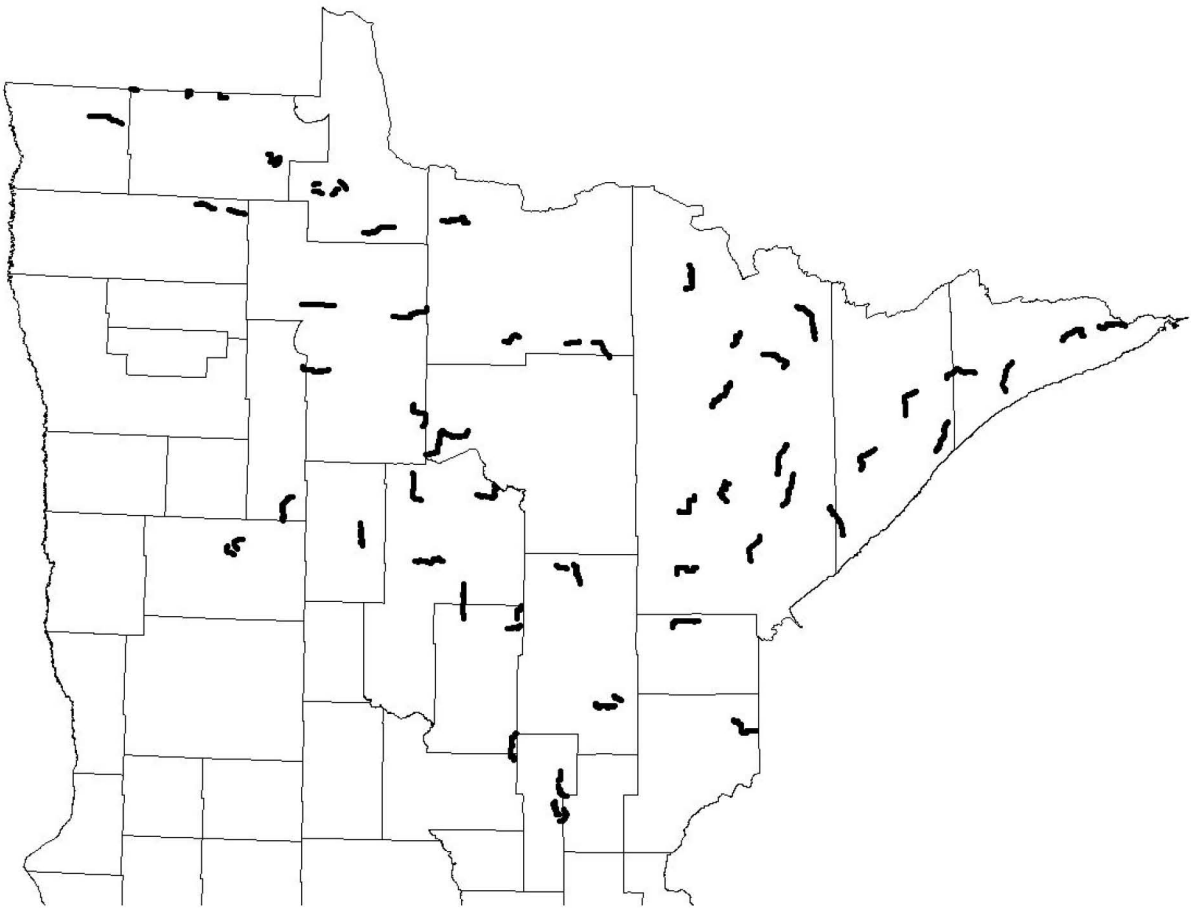

Figure. 1. Locations of established furbearer winter track survey routes.

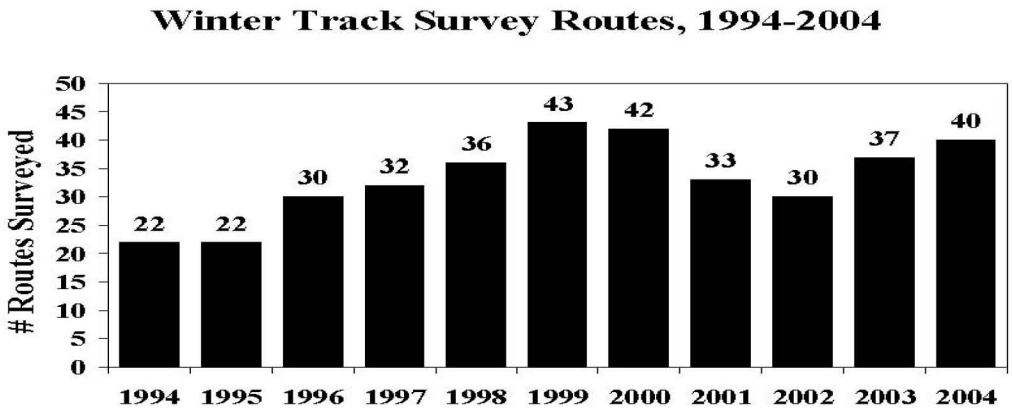

Figure. 2. Number of winter track routes surveyed, 1994-2004.

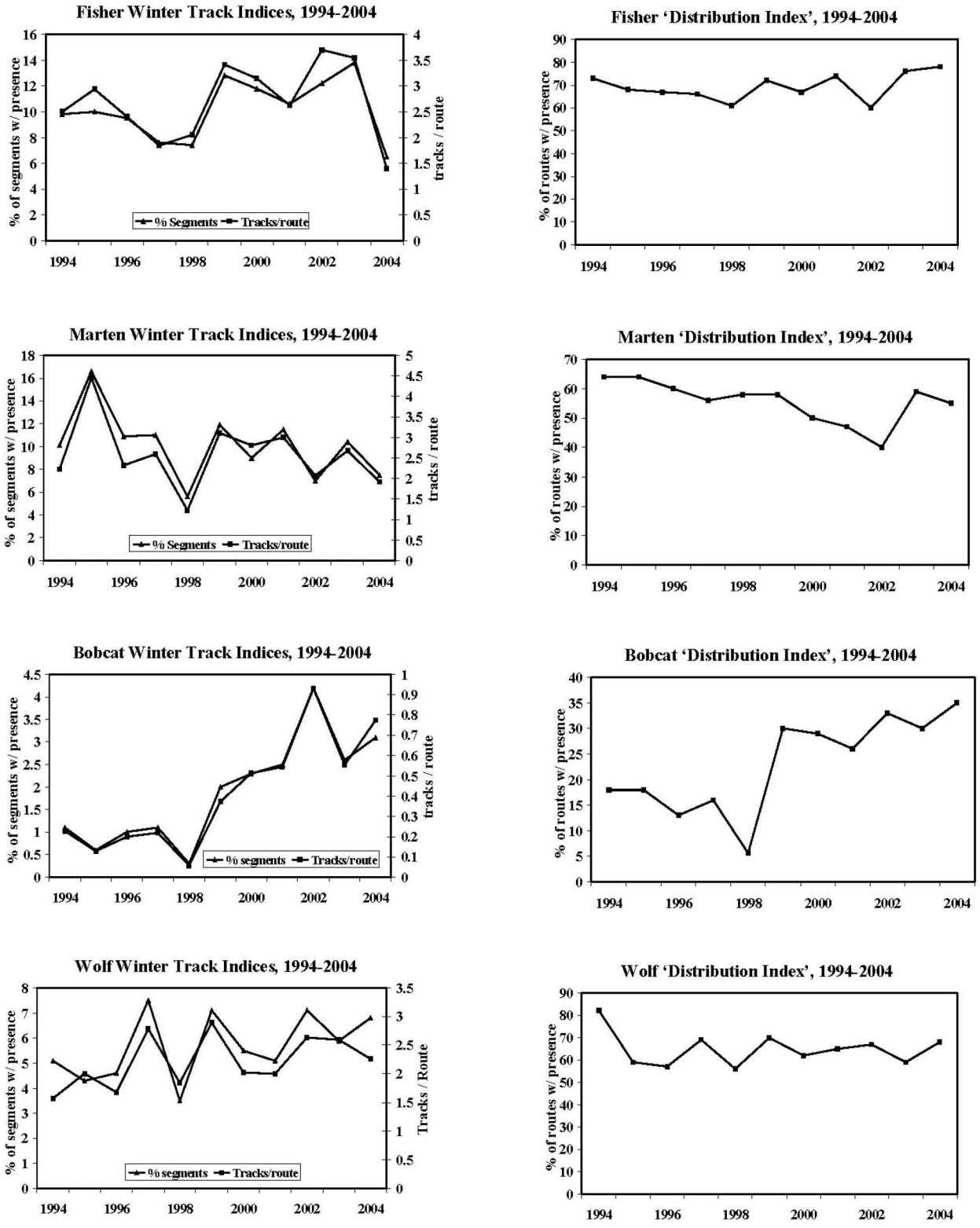

Figure. 3. Winter Track Indices for selected species in Minnesota

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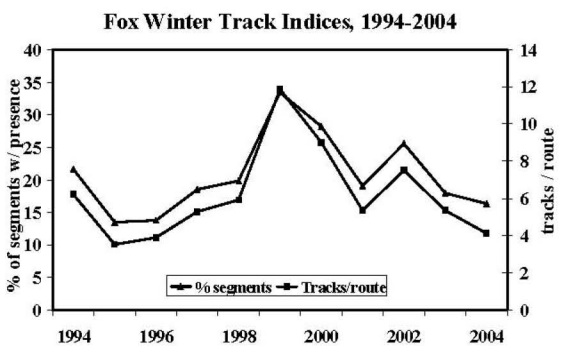
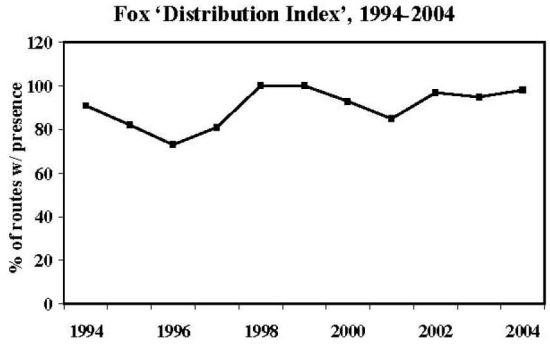
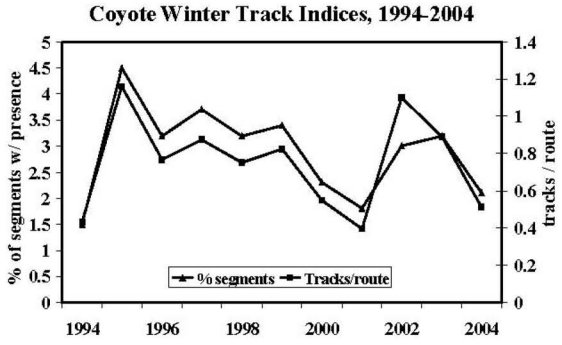
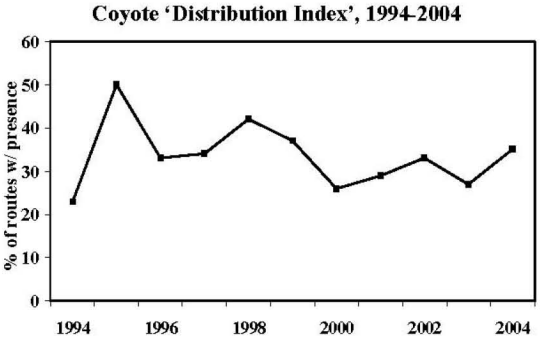
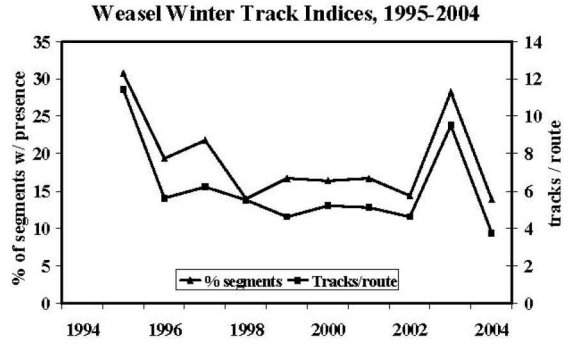
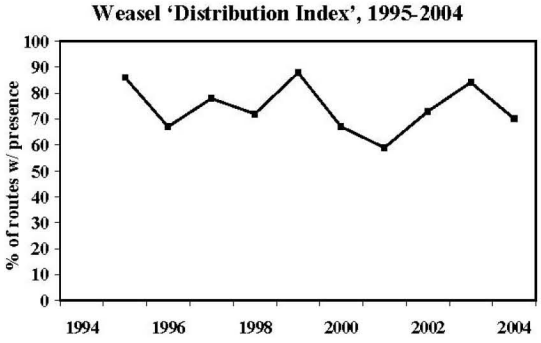


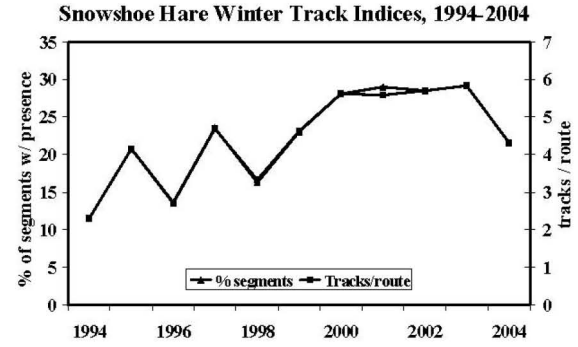












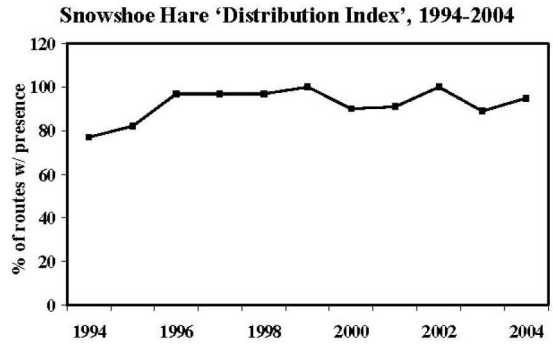


Figure 3. (continued).

PREDATOR/FURBEARER SCENT STATION SURVEY SUMMARY, 2004

John Erb, Forest Wildlife Populations & Research Group

The 29th annual Interagency Cooperative Scent Station Survey was conducted in autumn, 2004. The objective of the survey is to track population trends of many predator species in Minnesota. Cooperators in 2004 were: DNR Division of Wildlife; Superior National Forest; Agassiz, Big Stone, Rydell, Sherburne, Tamarac, and Rice Lake National Wildlife Refuges; all USFWS Wetland Management Districts; White Earth, Red Lake, and Leech Lake Reservations; 1854 Authority; Vermillion Community College; Beltrami and Cass County Land Departments; Marshall County Central High School; Richard Nelles and Tom Stuber; and the Boulder Lake Environmental Center.

A total of 381 routes were completed this year (Figure 1). There were 3,605 operable scent stations examined on the 381 2.7 mile routes. Route density varied from 1/176mi^2 in the Forest Zone to 1/309 mi^2 in the Farmland (Figure 1).

Statewide, route visitation rates were highest for red fox (39% of all routes), followed by domestic cat (37%), skunk (35%), raccoon (25%), dog (23%), and coyote (19%). Regionally, route visitation rates (% of routes with detection) were as follows: red fox – Farmland (FA) 41%, Transition (TR) 31%, Forest (FO) 43%; coyote – FA 33%, TR 17%, FO 13%; skunk – FA 52%, TR 41%, FO 23%; raccoon – FA 38%, TR 41%, FO 16%; domestic cat – FA 60%, TR 50%, FO 19%; and dog – FA 36%, TR 38%, FO 12%. Figures 2-5 show station visitation indices from the survey's inception through the current year. These index values are computed by multiplying the proportion of stations visited by 1000.

Although the survey is largely intended to document long-term trends in populations, I have included 95% bootstrap confidence intervals (percentile method) around recent indices to facilitate interpretation of annual changes. Based on these intervals, the only significant change from last year was a decline in raccoon indices in the farmland zone. Confidence intervals are not yet available for historic data.

Red fox indices in the farmland and transition zones have steadily declined over the past 15 years (Figure 2 and 3), and may be attributable to mange and changing agricultural practices. In the farmland zone, the decline may also be exacerbated by the apparent increase in coyotes over the past 10 years (Figure 2). After increasing for 15 years, raccoon indices in the farmland zone have now declined over the past 10 years (Figure 2). Indices for most other species/zones have fluctuated but have not exhibited any notable long-term trends.

Sincere thanks for your continued assistance with this survey.

JE

2004 Scent Station Specifics

Zone	Routes Completed	Route Density	Station Nights
Farmland	85	1/309mi^2	806
Transition	112	1/227mi^2	1061
Forest	184	1/176mi^2	1738
Totals	381	1/221mi^2	3605

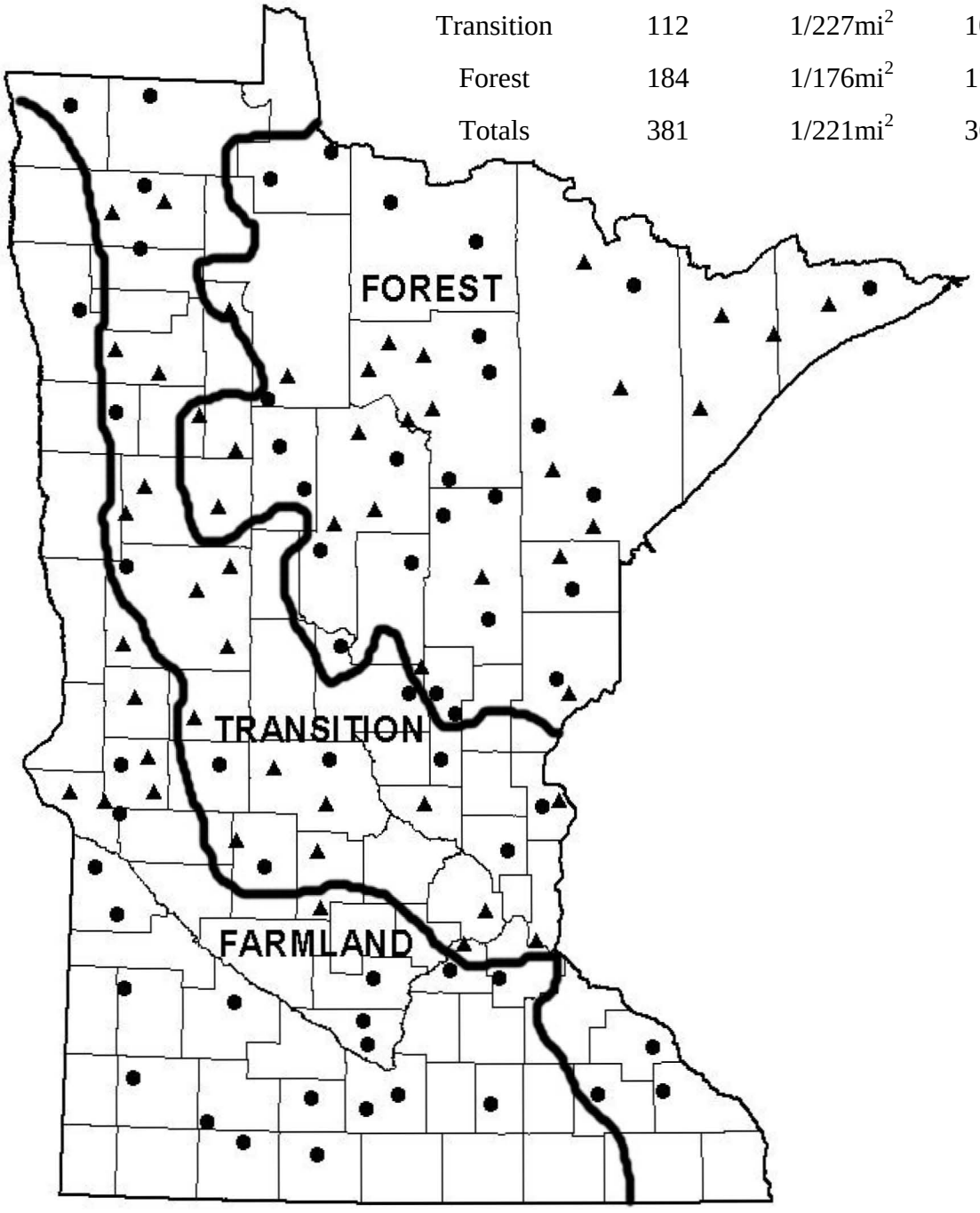
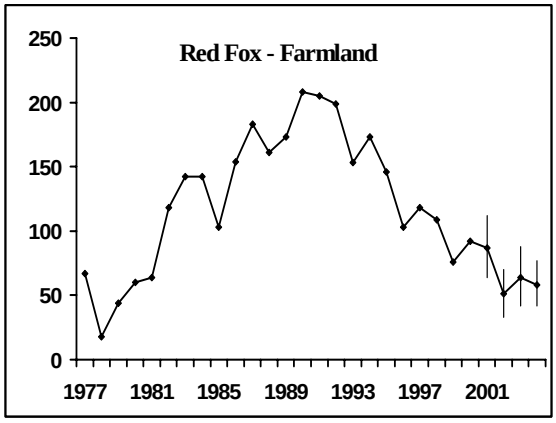
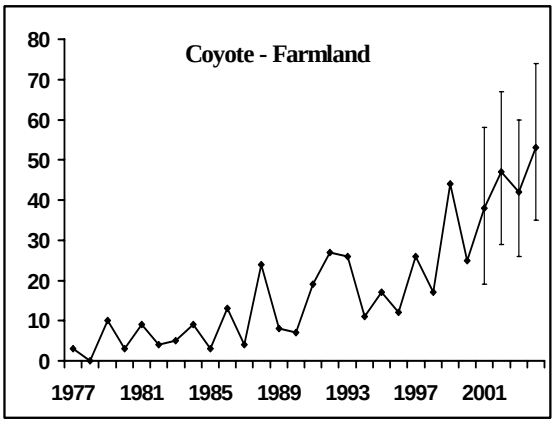
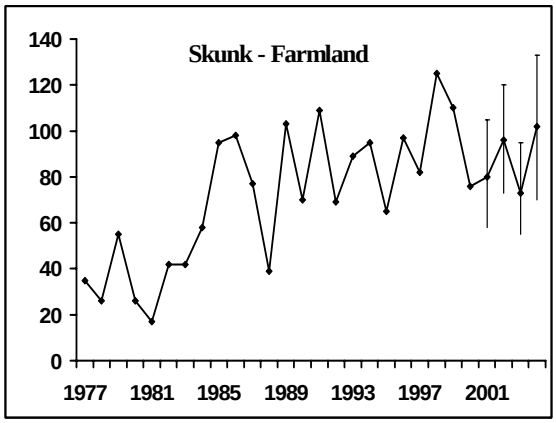
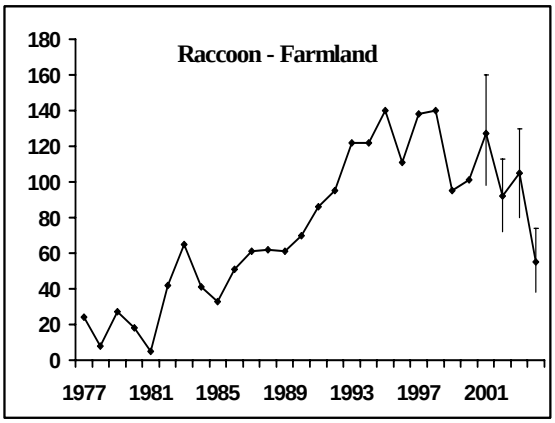


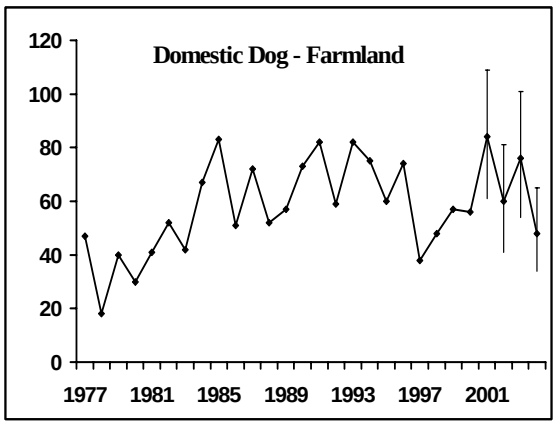
Figure 1. Approximate central locations of scent station routes conducted by Division of Wildlife (●) and interagency cooperators (▲). Each marked location may represent from 1-6 actual routes. Inset shows 2004 route specifics.











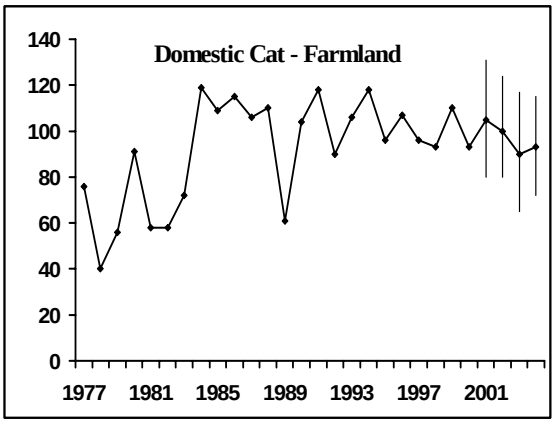


Figure 2. Scent station indices for selected species in the Farmland Zone of Minnesota, 1977-2004.

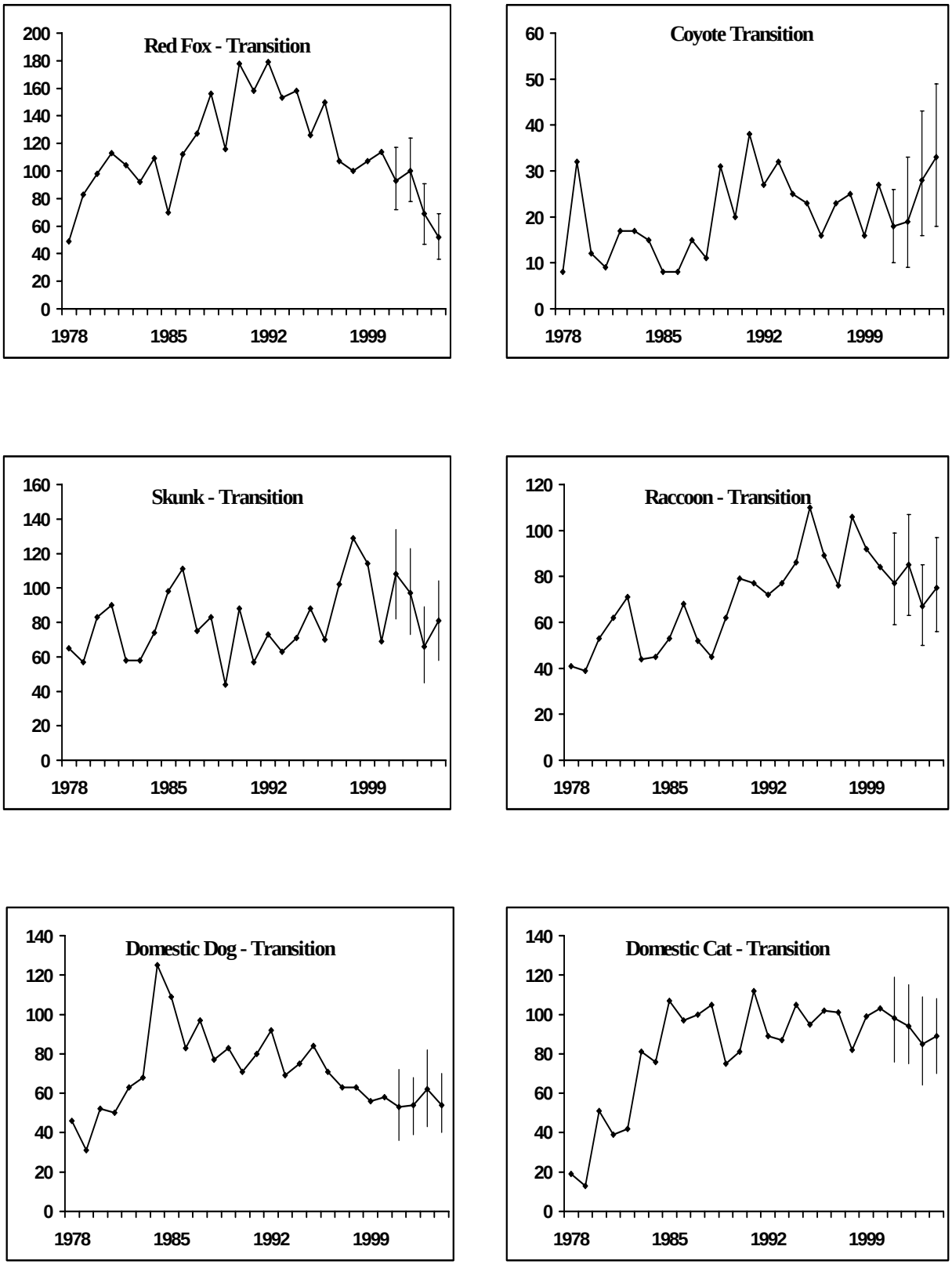


Figure 3. Scent station indices for selected species in the Transition Zone of Minnesota, 1978-2004.

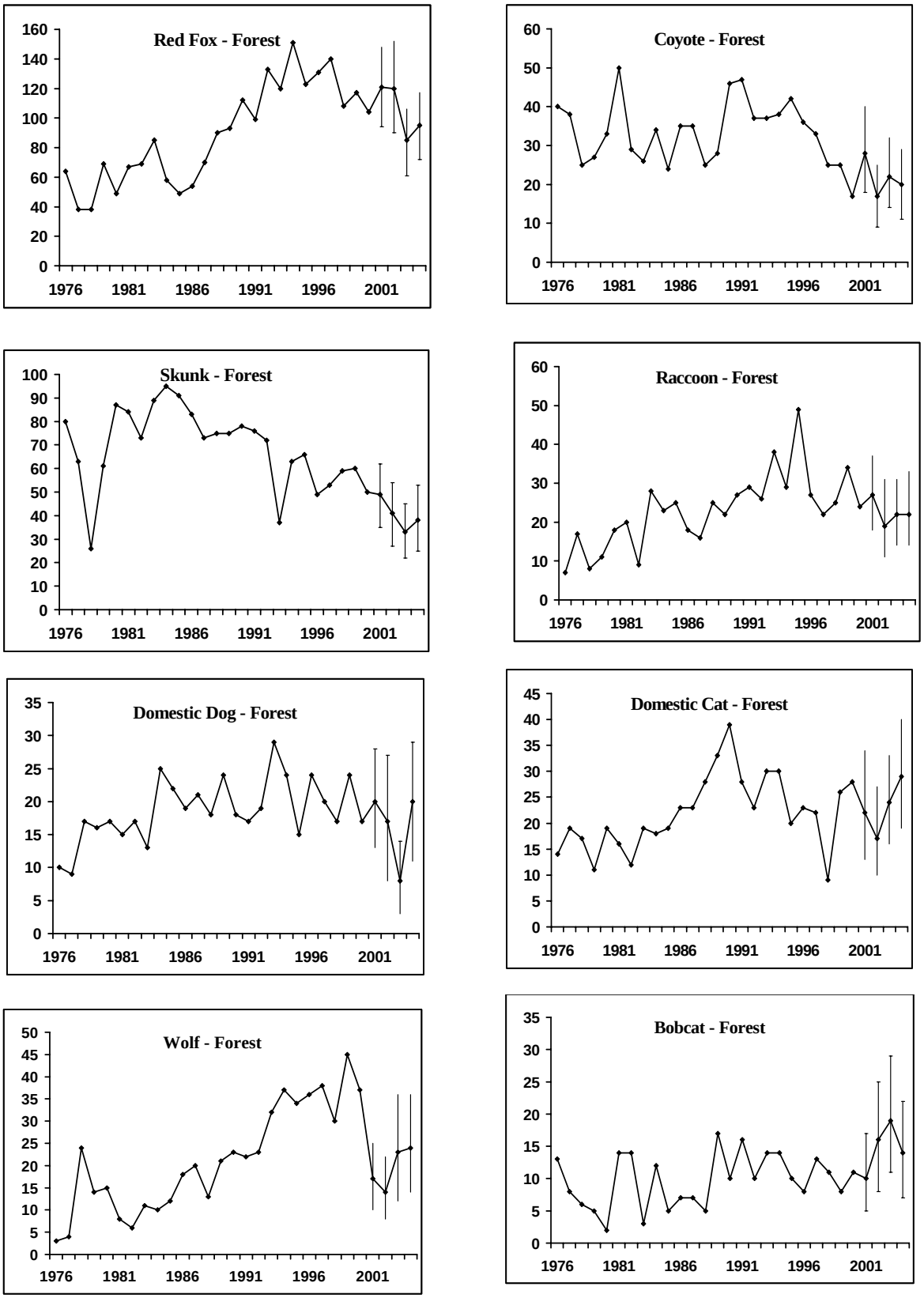


Figure 4. Scent station indices for selected species in the Forest Zone of Minnesota, 1976-2004.

FOREST WILDLIFE POPULATIONS

Forest Wildlife Populations & Research Group
1201 E. Hwy 2
Grand Rapids, MN 55744
(218) 327-4432

Ruffed grouse and sharp-tailed grouse surveys in Minnesota during spring 2005

Mike Larson, Ph.D., Forest Wildlife Populations & Research Group

ABSTRACT

Drum count surveys for ruffed grouse and count surveys of sharp-tailed grouse at dancing grounds were conducted during April and May 2005. Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 0.8 (95% confidence interval = 0.7–0.9) drums/stop (dps), which was the same as during 2004. Drum counts by survey zone were 1.2 (0.9–1.5) dps in the Northwest, 0.8 (0.6–1.0) dps in the North Central, 0.5 (0.3–0.6) dps in the Northeast, 0.6 (0.4–0.8) dps in the Central Hardwoods, and 0.7 (0.3–1.1) dps in the Southeast. Mean drum counts were also calculated for 7 sections of the Ecological Classification System (ECS). Index values by zone and by ECS section were all essentially the same as they were during 2004.

During the spring 2005 survey 1,824 sharp-tailed grouse were observed at 193 dancing grounds. The mean number of sharp-tailed grouse per dancing ground was 7.6 (6.3–8.9) in the East Central range, 11.4 (9.6–13.2) in the Northwest range, and 9.5 (8.3–10.6) statewide. Means were also calculated for re-defined ranges based on aggregations of ECS sections. The mean number of birds per dancing ground during 2005 was not different than during 2004 for dancing grounds where birds were counted during both years. The difference statewide was -0.6 (-1.4–0.3) birds per dancing ground, or -6 (-13–3)%.

INTRODUCTION

Index Surveys

The purpose of surveys of grouse populations in Minnesota is to monitor changes in the densities of grouse over time. Estimates of density, however, are difficult and expensive to obtain. Simple counts of animals, on the other hand, are convenient and, assuming that changes in density are the major source of variation in counts among years, they can provide a reasonable index to long-term trends in populations. Other factors, such as weather and habitat conditions, observer ability, and grouse behavior, vary over time and also affect simple counts of animals. These other factors make it difficult to make inferences about potential changes in wildlife populations over short periods of time (e.g., a few annual surveys) or from small changes in index values. Over longer periods of time or when changes in index values are large, assumptions upon which grouse surveys in Minnesota depend are more likely to be valid, thereby making inferences about grouse populations more valid. For example, index values from the ruffed grouse drumming count survey have documented what is believed to be true periodic fluctuations in ruffed grouse densities (i.e., the 10-year cycle).

Ruffed Grouse

The ruffed grouse (*Bonasa umbellus*) is Minnesota's most popular game bird. It occurs throughout the forested regions of the state. Annual harvest varies from approximately 150,000 to 1.4 million birds and averages >500,000 birds. Information derived from spring drumming counts and hunter harvest statistics indicates that ruffed grouse populations fluctuate cyclically at intervals of approximately 10 years.

During spring there is a peak in the drumming behavior of male ruffed grouse. Ruffed grouse drum to communicate to other grouse the location of their territory. The purpose is to attract females for

breeding and deter encroachment by competing males. Drumming makes male ruffed grouse much easier to detect, so counts of drumming males is a convenient basis for surveys to monitor changes in the densities of ruffed grouse. Ruffed grouse were first surveyed in Minnesota during the mid-1930s. Spring drumming counts have been conducted annually since the establishment of the first survey routes in 1949.

Sharp-tailed Grouse

Sharp-tailed grouse (*Tympanuchus phasianellus*) in Minnesota occur in brushlands, which often form transition zones between forests and grasslands. Sharp-tailed grouse are considered a valuable indicator of the availability and quality of brushlands for wildlife. Although sharp-tailed grouse habitat was more widely distributed in Minnesota during the early- and mid-1900s, the range of sharp-tailed grouse is now limited to areas in the Northwest (NW) and East Central (EC) portions of the state. The NW range consists primarily of Roseau, Marshall, Beltrami, Lake of the Woods, and Koochiching counties. The EC range consists primarily of Pine, Aitkin, Carlton, and St. Louis counties. Since 1990 annual harvest of sharp-tailed grouse by hunters has varied from 8,000 to 30,000 birds, and the number of hunters has varied from 6,000 to 13,000.

During spring male sharp-tailed grouse gather at dancing grounds, or leks, in grassy areas where they defend small territories and make displays to attract females for breeding. Surveys of sharp-tailed grouse populations are based on counts of males at dancing grounds. The first surveys of sharp-tailed grouse in Minnesota were conducted between the early 1940s and 1960. The current sharp-tailed grouse survey was initiated in 1976.

METHODS

Ruffed Grouse

Roadside routes consisting of 10 semipermanent stops approximately 1.6 km (1 mile) apart have been established. Routes were originally located along roads with little automobile traffic that were also near apparent ruffed grouse habitat. Therefore, route locations were not selected according to a statistically valid spatial sampling design, which means that data collected along routes is not necessarily representative of the larger areas (e.g., counties, regions) in which routes occur. Approximately 50 routes were established by the mid-1950s, and approximately 70 more were established during the late-1970s and early-1980s.

Observers from the Department of Natural Resources (DNR) Area Wildlife Offices and a variety of other organizations drove along each survey route once just after sunrise during April or May. Observers were not trained but often were experienced with the survey. At each designated stop along the route the observer listened for 4 minutes and recorded the number of ruffed grouse drums (not necessarily the number of individual grouse) he or she heard. Attempts were made to conduct surveys on days near the peak of drumming activity that had little wind and no precipitation.

The survey index value was the number of drums heard during each stop along a route. The mean number of drums/stop (dps) was calculated for each of the 5 ruffed grouse survey zones, each of 7 sections of the Ecological Classification System (ECS) in Minnesota, and for the entire state (Figure 1). As an intermediate step, the mean number of dps was calculated for each route. Mean index values for survey zones and ECS sections were calculated as the mean of route-level means for all routes occurring within the zone or section. Some routes crossed boundaries of ECS sections, so data from those routes were included in the means for both sections. The number of routes within zones and sections was not proportional to any meaningful characteristic of zones or sections. Therefore, the statewide mean index value was calculated as the weighted mean of index values for the ECS sections. The weight for each

section mean was the geographic area of the section (i.e., AAP = 11,761 km^2, MOP = 21,468 km^2, NSU = 24,160 km^2, DLP = 33,955 km^2, WSU = 14,158 km^2, MIM = 20,886 km^2, and PP = 5,212 km^2; see Figure 1 caption for full section names). Only approximately half of the Minnesota and Northeast Iowa Morainal section and Paleozoic Plateau section were within the ruffed grouse range, so the area used to weight drum index means for those sections was reduced accordingly.

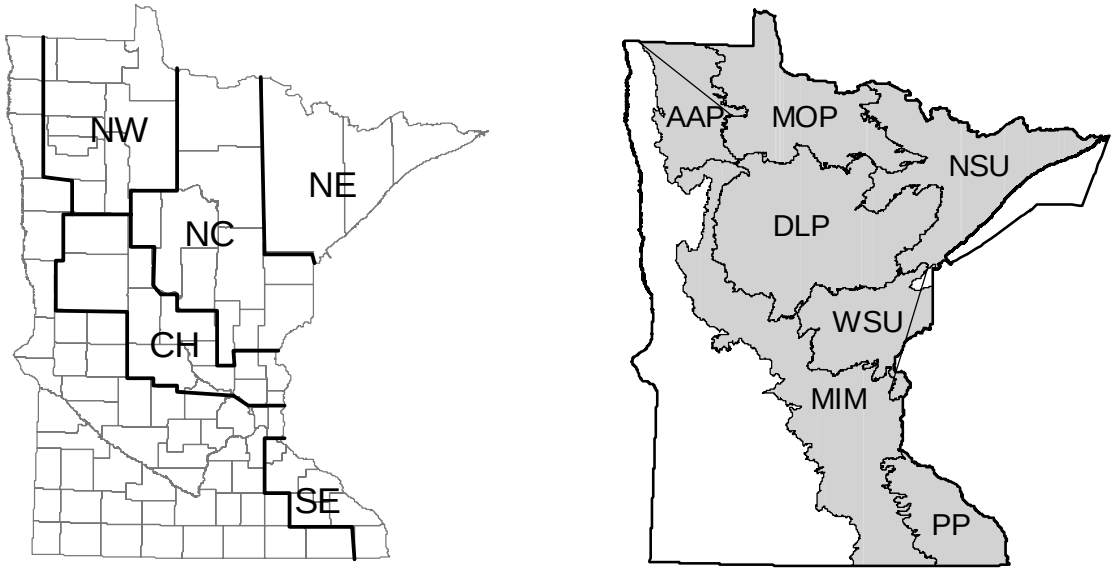


Figure 1. Ruffed grouse survey zones overlaid on county boundaries (left panel) and forested Sections of the Ecological Classification System (right panel) in Minnesota. Zones: NW = Northwest, NC = North Central, NE = Northeast, CH = Central Hardwoods, and SE = Southeast. ECS Sections: AAP = Lake Agassiz & Aspen Parklands, MOP = Northern Minnesota & Ontario Peatlands, NSU = Northern Superior Uplands, DLP = Northern Minnesota Drift & Lake Plains, WSU = Western Superior Uplands (including a small portion of the Southern Superior Uplands in eastern Carlton County), MIM = Minnesota and Northeast Iowa Morainal (only the northern half of which is surveyed for ruffed grouse), and PP = Paleozoic Plateau.

Stops along survey routes are a small sample of all possible stops within the range of ruffed grouse in Minnesota. Survey index values based on the sample of stops are not the same as they would be if drum counts were conducted at a different sample of stops or at all possible stops. To account for the uncertainty in index values because they are based on a sample, I calculated 95% confidence intervals (CI) for each mean. A 95% confidence interval is a numerical range in which 95% of similarly estimated intervals (i.e., from different hypothetical samples) would contain the true, unknown mean. I used 10,000 bootstrap samples of route-level means to estimate percentile confidence intervals for mean index values for survey zones, ECS sections, and the whole state.

I calculated mean index values and CIs for 1982–2005. Data from earlier years were not analyzed because they have not been entered into an electronic database. Annual index values for 1949–1981 are available in the DNR's 2004 Grouse and Hares report.

Sharp-tailed Grouse

Over time, DNR Wildlife Managers have recorded the locations of sharp-tailed grouse dancing grounds in their work areas. As new dancing grounds were located, they were added to the survey list. Known and accessible dancing grounds were surveyed by Wildlife Managers and their volunteers between sunrise and 2.5 hours after sunrise during April to count sharp-tailed grouse. When possible, surveys were conducted when the sky was clear and the wind was <16 km/hr (10 mph). Attempts were made to conduct surveys on >1 day to account for variation in the attendance of male grouse at the dancing ground. Survey data consist of the maximum of daily counts of sharp-tailed grouse at each dancing ground.

The dancing grounds included in the survey were not selected according to a statistically valid spatial sampling design. Therefore, data collected during the survey was not necessarily representative of the larger areas (e.g., counties, regions) in which the dancing grounds occur. It was believed, however, that most dancing grounds within each work area were included in the sample, thereby minimizing the limitations caused by the sampling design.

The index value of interest was the mean number of sharp-tailed grouse per dancing ground, averaged across dancing grounds within the NW and EC ranges and statewide. I calculated range and statewide means for all dancing grounds surveyed during 2004 and all dancing grounds surveyed during 2005. It was not valid to compare the full survey data and results from different years because survey effort and success in detecting and observing sharp-tailed grouse was different between years and the survey samples were not necessarily representative of other dancing grounds. To estimate differences in sharp-tailed grouse index values between years, therefore, I analyzed separately a set of data that included counts of birds only from dancing grounds that were successfully surveyed during both years. Although the dancing grounds in the separate data set were considered comparable, the counts of birds at the dancing grounds still were not. Many factors can affect the number of birds counted, so inferences based upon comparisons of survey data between years are tenuous. I used the separate data set to calculate the difference in the mean number of birds counted per dancing ground between 2004 and 2005 and the percent difference in the total number of birds counted on the comparable dancing grounds.

To account for the uncertainty in index values because they are based on a sample of dancing grounds rather than all dancing grounds, I calculated 95% confidence intervals (CI) for each mean. I used 10,000 bootstrap samples of dancing ground counts to estimate percentile confidence intervals for mean index values for the NW and EC ranges and the whole state.

I used 2 different definitions, or classifications, of range boundaries to summarize the sharp-tailed grouse survey results (Figure 2). I referred to the NW and EC ranges, as they were defined in the past for previous DNR Grouse and Hare reports, as the "former" classification. I defined "new" ranges by reclassifying the DNR's International Falls wildlife work area and the northwestern portion of the Tower wildlife work area to be in the NW range (formerly, they were included in the EC range). The Eveleth (i.e., southern) portion of the Tower area remained in the EC range under the new classification. The new range delineation was based on ECS section boundaries (Figure 1), with the NW range consisting of the Lake Agassiz & Aspen Parklands and Northern Minnesota & Ontario Peatlands sections and the EC range consisting of portions of the Northern Minnesota Drift & Lake Plains, Western Superior Uplands, and Southern Superior Uplands sections.

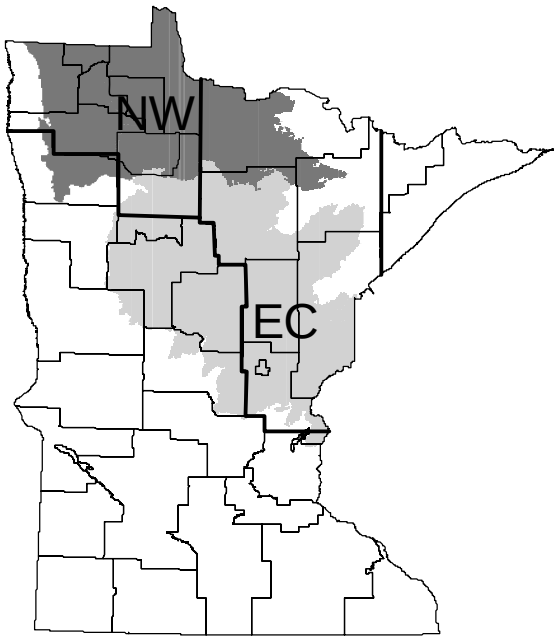


Figure 2. Northwest (NW) and East Central (EC) ranges of sharp-tailed grouse in Minnesota. The heavy lines, based largely on DNR Wildlife Work Area boundaries (light lines), represent the former range boundaries. The dark and light gray shading represent the new range boundaries, based on ECS section boundaries (see Figure 1 for ECS labels).

RESULTS

Ruffed Grouse

Observers from 22 cooperating organizations surveyed 124 routes between 14 April and 23 May 2005. Most routes (82%) were run between 20 April and 10 May. The cooperators included the DNR Division of Fisheries & Wildlife; Chippewa and Superior National Forests (USDA Forest Service); 1854 Authority; Fond du Lac, Grand Portage, Leech Lake, Red Lake, and White Earth Reservations; Agassiz and Tamarac National Wildlife Refuges (U.S. Fish & Wildlife Service); Central Lakes College and Vermilion Community College; Beltrami and Cass County Land Departments; UPM Blandin Paper Mill; and Gull Lake Recreation Area (U.S. Army Corps of Engineers). Observers reported survey conditions as Excellent, Good, and Fair on 48%, 39%, and 12% of routes, respectively. Survey conditions were similar during 2004.

Median index values for bootstrap samples were within 0.03 drums/stop (dps) of the 120 survey means by zone and 0.06 dps of the 168 survey means by ECS section for all annual estimates since 1982. Furthermore, bootstrap medians were within 0.02 dps of 89% of the survey means by ECS section. Therefore, no bias-correction was necessary, and CI limits were defined as the 2.5^{th} and 97.5^{th} percentiles of the bootstrap frequency distribution.

Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 0.8 (95% CI = 0.7–0.9) drums/stop (dps) during 2005. The statewide drum index has remained unchanged since 2002 at a level similar to the last time the ruffed grouse population was at a low point in its cycle (i.e., 1992–1994; Figure 3). Drum counts during 2005 in the 5 survey zones (Table 1, Figures 1 & 4–8) and the 7 ECS sections (Table 2, Figures 1 & 8–14) were all essentially the same as they were during 2004 (i.e., the CIs overlap considerably).

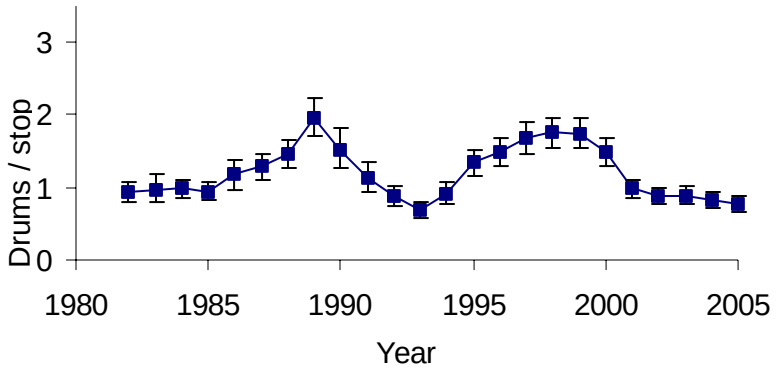


Figure 3. **Statewide** ruffed grouse drum count index values in Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

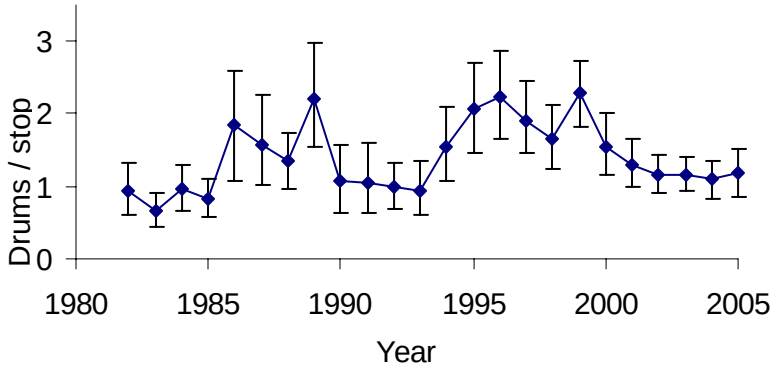


Figure 4. Ruffed grouse drum count index values in the **Northwest** survey zone of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

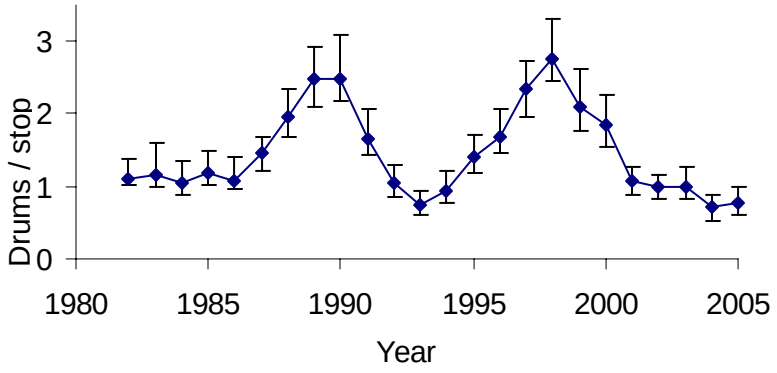


Figure 5. Ruffed grouse drum count index values in the **North Central** survey zone of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

Table 1. Ruffed grouse survey index values (drums/stop) by survey zone in Minnesota during the springs of 2004 and 2005.

	NW[a]		NC		NE		CH		SE	
Year	Mean	95% CI[b]	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
2004	1.1	0.8-1.4	0.7	0.5-0.9	0.6	0.5-0.9	0.7	0.5-1.1	0.7	0.3-1.1
2005	1.2	0.9-1.5	0.8	0.6-1.0	0.5	0.3-0.6	0.6	0.4-0.8	0.7	0.3-1.1

[a] NW = North West, NC = North Central, NE = North East, CH = Central Hardwoods, SE = South East, as defined by county boundaries.
[b] 95% CI = 95% confidence interval for the mean. It is an estimate of the uncertainty in the value of the mean.

Table 2. Ruffed grouse survey index values (drums/stop) by ECS Section[a] in Minnesota during the springs of 2004 and 2005.

	AAP[b]		MOP		NSU		DLP		WSU		MIM	
Year	Mean	95% CI[c]	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
2004	0.8	0.5-1.0	1.4	1.1-1.7	0.6	0.4-0.8	0.7	0.6-0.9	0.8	0.5-1.1	0.7	0.4-1.1
2005	0.9	0.6-1.2	1.4	1.0-1.9	0.5	0.4-0.7	0.8	0.6-1.0	0.6	0.4-0.7	0.6	0.3-0.8

[a] ECS = Ecological Classification System.
[b] AAP = Lake Agassiz & Aspen Parklands, MOP = Northern Minnesota & Ontario Peatlands, NSU = Northern Superior Uplands, DLP = Northern Minnesota Drift & Lake Plains, WSU = Western Superior Uplands, and MIM = Minnesota and Northeast Iowa Morainal. The Paleozoic Plateau is the same area as the Southeast Zone (see Table).
[c] 95% CI = 95% confidence interval for the mean. It is an estimate of the uncertainty in the value of the mean.

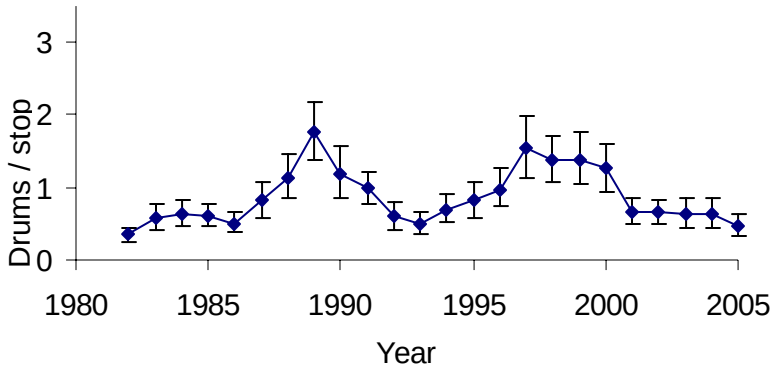


Figure 6. Ruffed grouse drum count index values in the **Northeast** survey zone of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

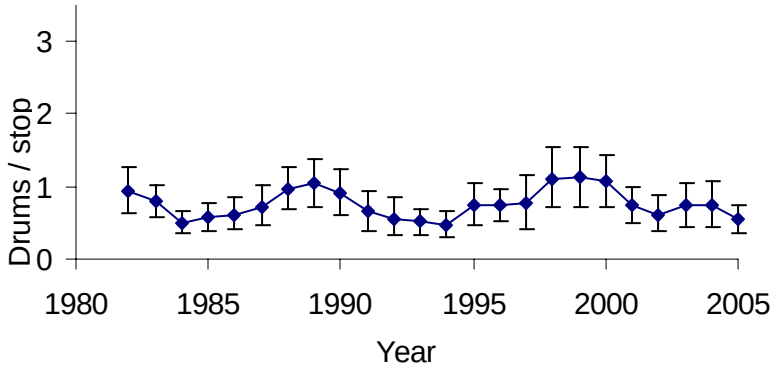


Figure 7. Ruffed grouse drum count index values in the **Central Hardwoods** survey zone of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

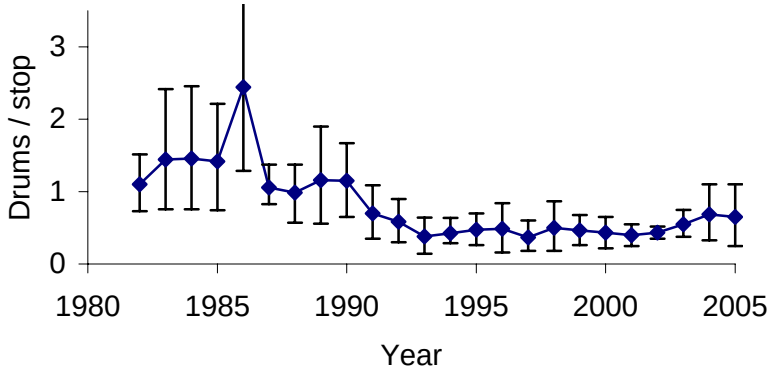


Figure 8. Ruffed grouse drum count index values in the **Southeast** survey zone of Minnesota. This represents the same area as the **Paleozoic Plateau** ECS section. Vertical error bars represent 95% confidence intervals based on bootstrap samples. The y-axis truncated 1 error bar so the scale would be identical for Figures 3–14.

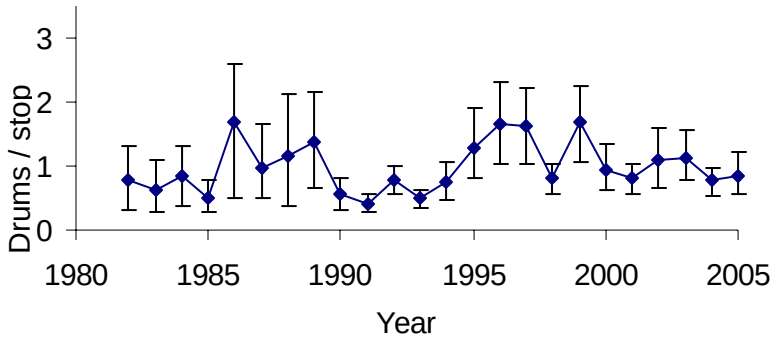


Figure 9. Ruffed grouse drum count index values in the **Lake Agassiz and Aspen Parklands** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

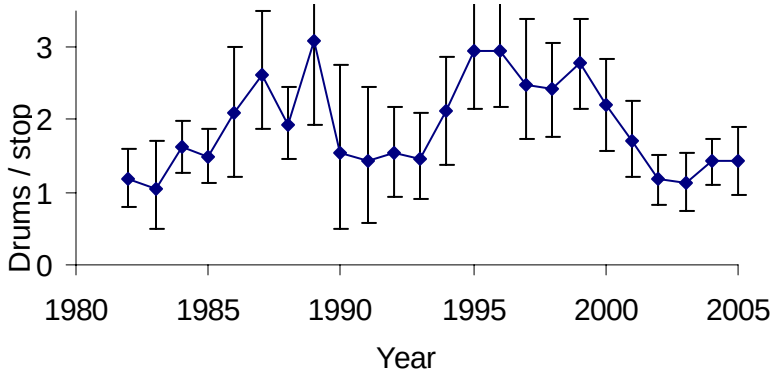


Figure 10. Ruffed grouse drum count index values in the **Northern Minnesota & Ontario Peatlands** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples. The y-axis truncated 3 error bars so the scale would be identical for Figures 3–14.

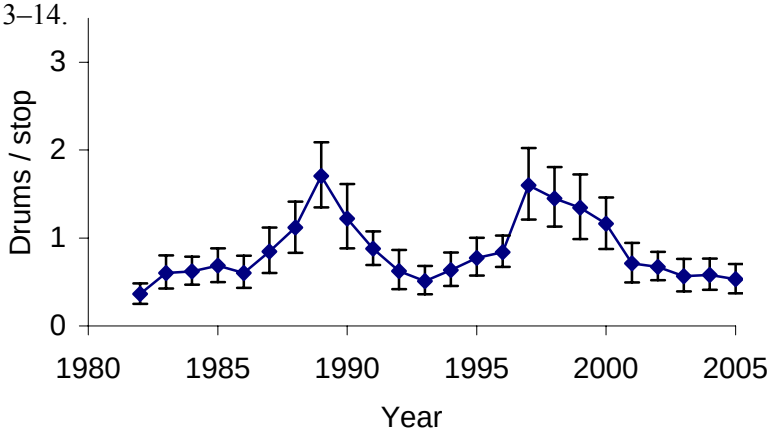


Figure 11. Ruffed grouse drum count index values in the **Northern Superior Uplands** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

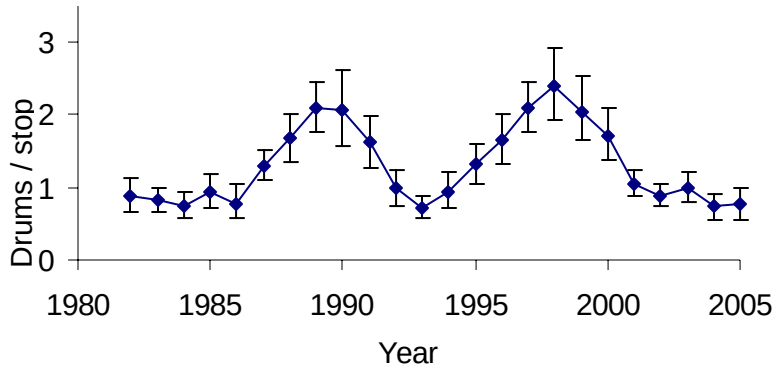


Figure 12. Ruffed grouse drum count index values in the **Northern Minnesota Drift & Lake Plains** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

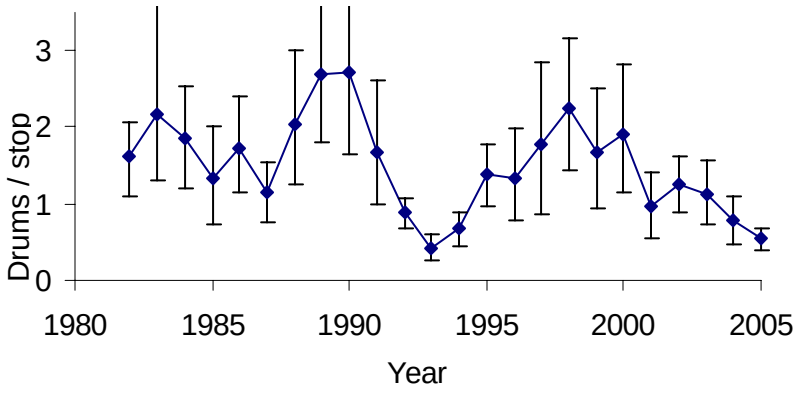


Figure 13. Ruffed grouse drum count index values in the **Western Superior Uplands** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples. The y-axis truncated 3 error bars so the scale would be identical for Figures 3–14.

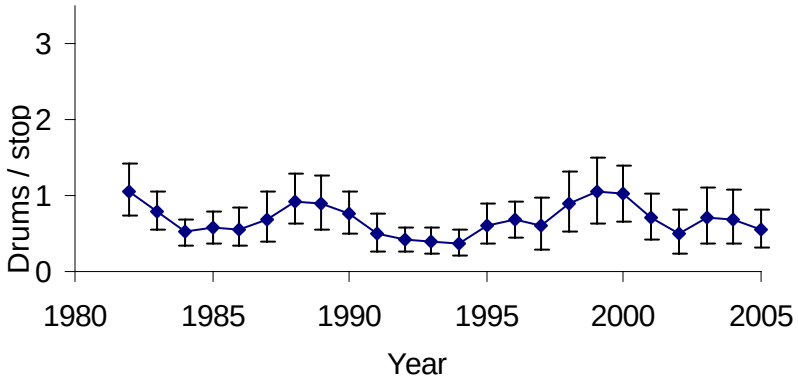


Figure 14. Ruffed grouse drum count index values in the **Minnesota and Northeast Iowa Morainal** ECS section of Minnesota. Vertical error bars represent 95% confidence intervals based on bootstrap samples.

Sharp-tailed Grouse

A total of 1,824 sharp-tailed grouse was observed at 193 dancing grounds during spring 2005 (Table 3). The number of sharp-tailed grouse counted per dancing ground in the EC range was lower than in the NW range, and the statewide mean was 9.5 (95% CI = 8.3–10.6) grouse counted per dancing ground (Table 4). The mean number of birds counted per dancing ground during 2005 was not different than during 2004 for the 182 dancing grounds where birds were counted during both years (i.e., all CIs contained 0; Tables 3 and 5).

Table 3. Number of sharp-tailed grouse dancing grounds observed during 2005 surveys and during both 2004 and 2005 surveys.

		Former[a]		New	
	Statewide	EC[b]	NW	EC	NW
2005 only	193	100	93	78	115
2004 & 2005	182	94	88	76	106

[a] See Methods for definitions of "former" and "new"range boundaries.
[b] EC = East Central, NW = Northwest.

DISCUSSION

Ruffed Grouse

Based upon the drum count index ruffed grouse densities during spring 2005 were likely very similar to spring densities during 2002–2004. Index values during low periods of the population cycle are often <0.9 drums/stop (dps), so drum counts during recent years are not unusual. Although 2005 was the 4th or 5th year of an apparent low period in the population cycle, similar 4- to 5-year periods of relatively low drum counts have occurred as recently as the early-1980s. The number of ruffed grouse encountered by hunters and other outdoors people this fall likely will depend nearly as much upon recruitment of juveniles as on densities of males during spring.

Sharp-tailed Grouse

Counts of sharp-tailed grouse at dancing grounds in Minnesota during 2005 were very similar to counts during 2004. The slight decline in counts between years in the NW range, given the moderate degree of uncertainty in the estimates, was not sufficient evidence to infer a meaningful change in the abundance of sharp-tailed grouse in northwestern Minnesota. Furthermore, sources of temporal variation that are not related to the abundance of sharp-tailed grouse, such as the timing and duration of surveys, could cause minor changes in bird counts and index values.

Although index values from different years are not necessarily comparable, the mean number of sharp-tailed grouse counted per dancing ground has fluctuated in a pattern consistent with an apparent long-term population cycle similar to that of ruffed grouse. During the last 20 years values of the sharp-tailed grouse index have been between approximately 7 and 11 birds counted per dancing ground. This year's statewide mean of 9.5 (8.3–10.6) birds counted per dancing ground was in the middle of that range.

Table 4. Number of sharp-tailed grouse counted per dancing ground in Minnesota during spring.

			Former[a]				New			
	Statewide		EC[b]		NW		EC		NW	
Year	Mean	95% CI[c]	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
2004	10.0	9.0–11.1	7.6	6.5–8.8	12.3	10.8–13.9	7.2	5.9–8.5	11.7	10.4–13.1
2005	9.5	8.3–10.6	7.6	6.3–8.9	11.4	9.6–13.2	7.2	5.8–8.7	11.0	9.4–12.6

[a] See Methods for definitions of "former" and "new" range boundaries.
[b] EC = East Central, NW = Northwest.
[c] 95% CI = 95% confidence interval for the mean. It is an estimate of the uncertainty in the value of the mean.

Table 5. Differences in counts of sharp-tailed grouse at comparable dancing grounds during 2004 and 2005 in Minnesota.

			Former[a]				New			
	Statewide		EC[b]		NW		EC		NW	
	Value	95% CI[c]	Value	95% CI	Value	95% CI	Value	95% CI	Value	95% CI
Birds/ground	-0.6	-1.4–0.3	0.1	-0.9–1.1	-1.2	-2.6–0.1	0.0	-1.0–1.0	-0.9	-2.2–0.3
% difference in total birds	-6	-13–3	1	-11–15	-10	-20–1	0	-13–14	-8	-17–3

[a] See Methods for definitions of "former" and "new" range boundaries.
[b] EC = East Central, NW = Northwest.
[c] 95% CI = 95% confidence interval for the value. It is an estimate of the uncertainty in the magnitude of the value.

ACKNOWLEDGEMENTS

I sincerely appreciate the help of all the DNR staff and volunteer cooperators who conducted the grouse surveys. I also appreciate the efforts of Bill Berg, who coordinated the collection of grouse survey data for many years, and John Erb and others who translated most of the grouse survey data into a digital format.

Spring 2005 Prairie-Chicken Survey in Minnesota

Mike Larson, Ph.D., Forest Wildlife Populations & Research Group

INTRODUCTION

Greater prairie-chickens (*Tympanuchus cupido pinnatus*) are a medium-sized grouse species (800–1000 g; 1.8–2.2 lbs). During spring they gather on communal breeding areas, or leks, where males display and compete for opportunities to mate. Prairie-chicken leks are also called booming grounds because males make a low-frequency, booming vocalization during their displays. Orange air sacs on the sides of a male's neck inflate and amplify the booming sound. Pinnae, the long feathers on the sides of the neck, stand erect above the male prairie-chicken's head during display (Schroeder and Robb 1993). Prairie-chickens are also called pinnated grouse.

During the early 1800s prairie-chickens were present along the southern edge of Minnesota. Following the planting of crops and clearing of forests by immigrants of European descent, the range of prairie-chickens expanded to cover most of the state by approximately 1900. As agriculture intensified, more prairies were tilled, and grassland openings in northeastern Minnesota succeeded back to forest, the range of prairie-chickens receded (Svedarsky *et al*. 1997). Currently, most prairie-chickens in Minnesota occur along the beach ridges of glacial Lake Agassiz in the west. The population of prairie-chickens there was expanded southward to the upper Minnesota River valley by a series of relocations during 1998–2005. A remnant population of prairie-chickens still exists in central Minnesota also (primarily Wadena and Cass counties).

From 1974 to 2003 the Minnesota Prairie Chicken Society (MPCS) coordinated annual counts of prairie-chickens at booming grounds. The MPCS surveys provided evidence to support the initiation in 2003 of a prairie-chicken hunting season, which had not occurred in Minnesota since 1942. The hunt has been limited to 100 participants, and fewer than 130 birds/year have been harvested. During 2003 and 2004 the Minnesota Department of Natural Resources (DNR) began coordinating the annual prairie-chicken surveys, and a standardized survey design was adopted (Giudice 2004). The objectives of the current survey are to monitor trends in the abundance of prairie-chickens in selected but widely distributed areas and to provide conservative information for making decisions about regulations for the fall hunting season.

METHODS

During the few hours near sunrise from late-March until mid-May cooperating biologists from the DNR, U.S. Fish & Wildlife Service (FWS), and The Nature Conservancy (TNC) and numerous volunteers counted prairie-chickens at leks in western Minnesota. They attempted to locate and observe multiple times all prairie-chicken leks within 17 designated survey blocks (Figure 1). Each block was approximately 4 miles × 4 miles square (4,144 ha) and was selected nonrandomly based upon the spatial distribution of leks and the presence of relatively abundant grassland habitat. Ten survey blocks were located in what was considered the core of the prairie-chicken range in Minnesota. The other 7 blocks were located in the periphery of the range. The permit areas for the fall hunting season roughly coincide with the core of the range (Figure 1).

Observations of leks outside the survey blocks were also recorded. They contribute to the known minimum abundance of prairie-chickens and may be of historical significance. These observations, however, were only incidental to the formal survey. Bird counts from areas outside the survey blocks

cannot be used to make inferences about the relative abundance of prairie-chickens among different geographic areas (e.g., counties, permit areas) or points in time (e.g., years) because the amount of effort expended to obtain the observations was not standardized or recorded.

Observers counted prairie-chickens at leks from a distance using binoculars. If vegetation or topography obscured the view of a lek, the observer attempted to flush the birds to obtain an accurate count. Observed prairie-chickens were classified by sex as either male, female, or unknown. Male prairie-chickens were usually obvious due to their display behavior. Birds were classified as unknown sex when none of the birds at a lek were observed displaying or when the birds had to be flushed to be counted. Most birds classified as unknown likely were males because most birds at leks are males. Although most male prairie-chickens attend leks most mornings, female attendance at leks is much more limited and sporadic (Svedarsky 1983). Females are also more difficult to detect because they do not vocalize or display like males. Counts of males rather than females, therefore, were used to make comparisons between core and peripheral ranges and between years.

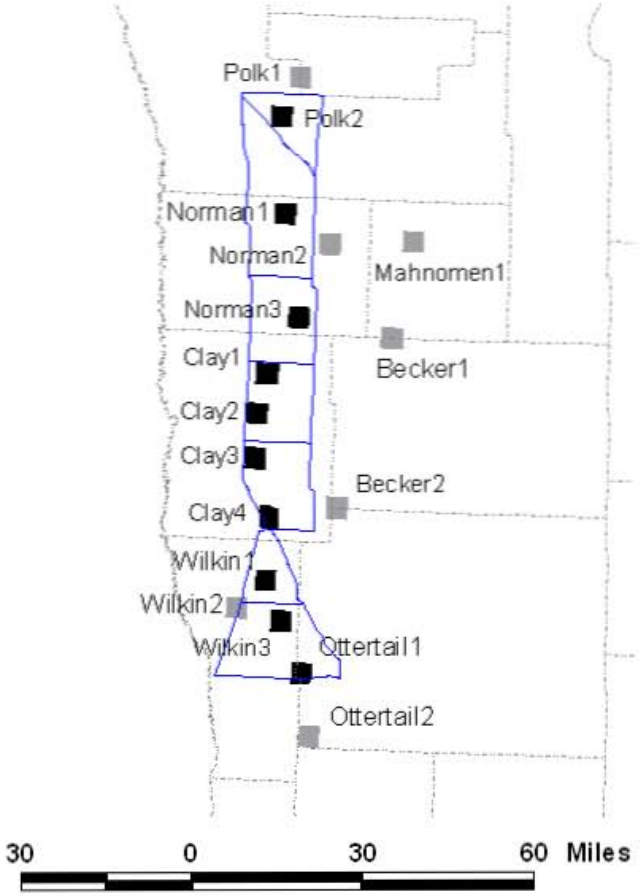


Figure 1. Survey blocks (labeled squares) and hunting permit area boundaries (solid lines) for prairie-chickens in western Minnesota. Survey blocks were designated as being in either the core (black) or periphery (gray) of the range. Blocks were named after the counties (dashed lines) in which they were primarily located. Permit areas are ordered from north to south: 405A, 407A, 407B, 407C, 420A, 420B,and 421A.

RESULTS AND DISCUSSION

During spring 2005 there were a minimum of 2,958 male prairie-chickens in western Minnesota (Table 1). Within hunting permit areas there were a minimum of 0.13 leks/mi^2 (0.05 leks/km^2) and 1.7 males/mi^2 (0.7 males/km^2). Minimum counts in Table 1 and the densities calculated from them are not comparable among permit areas or years because they included surveys conducted outside of the survey blocks. It was likely that probabilities of detecting leks and individual males were substantially different among permit areas during 2005 and among years within most permit areas. Minimum counts of males summarized by permit area provide conservative information for setting quotas for the fall hunting season.

Table 1. Minimum abundance of prairie-chickens within and outside of hunting permit areas in western Minnesota during spring 2005. Counts of leks and birds are not comparable among permit areas or years.

Permit Area	Area (sq. mi.)	Leks	Males	Unk.[a]
405A	101.9	25	327	4
407A	295.1	16	128	13
407B	171.9	27	257	4
407C	161.1	27	531	0
420A	168.1	27	375	0
420B	101.3	24	304	35
421A	236.6	11	182	16
PA subtotal[b]	1,236.0	157	2,104	72
Outside PAs[c]	NA[d]	86	854	47
Grand total	NA	243	2,958	119

[a] Unk. = prairie-chickens of unknown sex. It is likely that most were males.
[b] Sum among the 7 permit areas.
[c] Counts from outside the permit areas.
[d] NA = not applicable. The size of the area outside permit areas was not defined.

Within survey blocks observers counted 1,319 male prairie-chickens on 98 booming grounds (Table 2). Each booming ground was observed on a median of 2 (mean = 1.9) different days, but 45% of leks were observed only once. Attendance of males at prairie-chicken leks varies among days and by time of day (Svedarsky 1983). Single counts of males at a booming ground, therefore, may be an unreliable indication of true abundance. Similar counts on multiple days, on the other hand, demonstrate that the counts may be a good indicator of true abundance. Even multiple counts, however, cannot overcome the problems associated with the failure to estimate the probability of detecting leks and individual birds at leks. Without estimates of detection probability, the prairie-chicken survey is an index to, not an estimate of, prairie-chicken abundance within the survey blocks. The credibility of the index for monitoring changes in abundance among years is dependent upon the assumption that a linear relationship exists between counts of male prairie-chickens and true abundance. In other words, we assume that (the expected value of) the probability of detection does not change among years (Yoccoz *et al*. 2001).

Table 2. Counts of prairie-chickens within survey blocks in Minnesota.

Range[a]	Survey Block	Area (sq. mi.)	2005 Leks	2005 Males	2005 Unk.[b]	Change from 2004[c] Leks	Change from 2004[c] Males
Core	Polk 2	16.2	9	119	0	2	14
	Norman 1	16.1	5	22	7	4	14
	Norman 3	16.0	5	66	2	-1	-2
	Clay 1	17.6	8	145	0	0	-14
	Clay 2	16.0	3	108	0	1	-16
	Clay 3	16.1	9	168	0	1	-59
	Clay 4	14.9	6	68	0	0	-26
	Wilkin 1	15.4	10	145	35	0	-70
	Wilkin 3	16.1	6	85	16	1	-29
	Otter Tail 1	15.9	2	31	0	-1	-16
	Core subtotal	160.2	63	957	60	7	-204
Periphery	Polk 1	15.9	10	89	0	3	-8
	Norman 2	16.3	8	88	11	-6	-20
	Mahnomen	16.1	5	67	0	2	44
	Becker 1	16.0	4	41	0	0	20
	Becker 2	16.1	4	43	0	-2	-20
	Wilkin 2	16.1	2	23	0	0	-5
	Otter Tail 2	15.7	2	11	17	-1	-54
	Periphery subtotal	112.2	35	362	28	-4	-43
Grand total		272.4	98	1,319	88	3	-247

[a] Survey blocks were classified as either mostly within the hunting permit areas (core) or mostly outside the permit areas (periphery).
[b] Unk. = prairie-chickens of unknown sex. It is likely that most were males.
[c] The 2004 count was subtracted from the 2005 count, so a negative value indicates a decline.

In survey blocks in the core of the range we observed 0.39 leks/mi^2 (0.15 leks/km^2) and 15.2 males/lek, whereas in peripheral blocks we observed 0.31 leks/mi^2 (0.12 leks/km^2) and 10.3 males/lek (Table 2). Counts of males in survey blocks during 2005 were 16% less than during 2004, with declines of 18% and 11% in the core and periphery, respectively. Eight of 10 core blocks and 5 of 7 peripheral blocks experienced declines in counts. The number of leks observed in survey blocks during 2005 was 3% greater than during 2004, with an increase of 13% and a decrease of 10% in the core and periphery, respectively.

It is premature to infer a population trend from 2 annual surveys. The apparent decline in the abundance of male prairie-chickens in survey blocks between the springs of 2004 and 2005, however, has 2 possible explanations. First, if the decline in abundance was real, it was likely part of normal fluctuations experienced by wildlife populations. Such fluctuations may be caused by weather patterns, random variations in the rates of survival and reproductive success, or fluctuations in habitat quality or predator populations. The hunting season alone could not have caused a decline in the prairie-chicken population. Only approximately 55 birds were killed during the fall 2004 hunting season (Larson 2005), and the harvest allowed under the prairie-chicken hunting regulations (i.e., a maximum of 200 birds) is

conservative and unlikely to affect the abundance of prairie-chickens the following spring. The second possible explanation for the decline in counts is that the probability of detecting leks or individual males during the 2005 survey may have been less than the probabilities of detection during 2004. The ratio of detection probabilities during the 2 surveys is unknown, so inferences about changes in true abundance should be made cautiously. Overall, the abundance of prairie-chickens in western Minnesota appears to have been increasing steadily from 1997 to 2004 (Giudice 2004).

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REGISTERED FURBEARER POPULATION MODELING
2005 Report

John Erb, Forest Wildlife Populations & Research Group

INTRODUCTION

For populations of secretive carnivores, obtaining field-based estimates of population size remains a challenging task (Hochachka et al. 2000; Wilson and Delehay 2001; Conn et al. 2004). This is particularly true when one is interested in annual estimates, multiple species, and/or large areas. Nevertheless, population estimates are desirable to assist in making management/harvest decisions. Population modeling is a valuable tool for synthesizing our knowledge of population demography, predicting outcomes of management decisions, and approximating population size.

In the late 1970s, Minnesota developed population models for 4 species of carnivores (fisher, marten, bobcat, and otter) to help 'estimate' population size and track population changes. All are deterministic 'accounting' models that do not currently incorporate density-dependence. Modeling projections are interpreted in conjunction with harvest data and results from annual field-based track surveys, with the exception of otter for which no harvest-independent survey data is currently available for comparison.

METHODS

Primary model inputs include the estimated 1977 'starting' population size, estimates of age-specific survival and reproduction, and sex- and age-specific harvest data. Reproductive inputs are based largely on carcass data collected in the early 1980's, and for bobcats, additional data collected in 1992 and from 2003-present. Initial survival inputs were based on a review of published estimates in the literature. Obtaining updated Minnesota-specific survival estimates remains a goal for future research.

Harvest data is obtained through mandatory furbearer registration. A detailed summary of 2004 harvest information is available in a separate report. Bobcat and pine marten year-class data is obtained via a combination of x-ray examination of pulp cavity width and microscopic counts of cementum annuli from teeth of harvested animals. While the population models only utilize data for the 3 age-classes (juvenile, yearling, adult), marten and bobcat cementum annuli counts have been collected for all non-juveniles in recent years to facilitate interpretation of reproductive data (bobcats) and to obtain current information on year-class distribution for both species. Current harvest age proportions for fisher and otter are approximated using averages computed from carcass collections obtained during 1980-86 (otter) and 1977-1994 (fisher).

For comparison to model projections, field-based track survey indices are presented in this report as running 3-year (t-1, t, t+1) averages of the observed track index, with the most recent year's average computed as (2/3*current index + 1/3*previous index). More detailed descriptions of scent post and winter track survey methods and results are available in separate reports.

RESULTS AND DISCUSSION

Bobcat. The 2004 registered DNR trapping and hunting harvest set a new record (631; Table 1). Modeled harvest, which includes tribal take, was 709. Based on population modeling estimates, 28% of the fall population was harvested. The percentage of yearlings in the harvest was slightly higher and the percentage of adults slightly lower than normal, a reversal of the deviation noted last year. Nevertheless, overall age/sex statistics and average take per trapper/hunter were within the bounds previously observed (Table 1).

Based on examination of reproductive tracts, pregnancy rate of yearlings was estimated at 48%, compared to only 16% last year. Average litter size for pregnant yearlings was 2.3 (2.0 last year). Pregnancy rate for 2+ year olds averaged 82%, with a mean litter size of 2.75. While sample sizes are

small for the oldest age-classes, data from the past 2 years suggests pregnancy rates and litter sizes are highest for 4-6 year old females.

After another record harvest, modeling predicts a decline in this spring's bobcat population (Figure 1) to pre-2001 levels. Winter track counts, however, remain well above pre-2001 levels. The estimated 2005 spring population is ~ 1,700.

Fisher: Harvest under the DNR framework was 2,552 (Table 2). Modeled take was 2,753, a 1% increase from 2003. An estimated 17% of the fisher population was harvested, within the bounds of previous seasons. Carcass collections ended in 1994, so no current age or reproductive data are available. Population modeling suggests a steadily increasing fisher population for the past 6 years. However, harvests have remained relatively stable during this time, and winter track counts have declined the last 2 years (Figure 3). Modeling estimates a current spring population of ~12,600.

Marten: For the third year in a row, marten harvest set a record (DNR framework – 3,241; modeled take – 3,592) (Table 3). Although juveniles clearly predominate in the marten harvest, 'older' marten are evident in the harvest as well (Figure 5). The maximum age observed this year was 12, similar to last year's result (13) as well as information from Ontario (13; Fryxell et al. 2001). Based on modeling, a record 23% of the fall population was harvested. The percent juveniles (26%) and the juvenile:adult female ratio (1.3) in the harvest dropped to their lowest levels since data collection began.

Following 3 years of increased harvest, modeling suggests the population is declining, with an estimated spring population of ~11,800 (Figure 4). Since 1997, averaged winter track indices have been stable to slightly declining.

Otter: The DNR framework harvest increased 25% to a record 3,450, and the modeled harvest total was 3,700 (Table 4). An estimated 27% of the fall population was harvested, the highest such estimate since modeling began. Carcass collections ended in 1986, so no age or reproductive data are available. Modeling indicates the population has slightly declined in each of the past 4 years (Figure 6). No independent otter survey data are currently available for comparison. The current estimated spring population is ~ 10,600.

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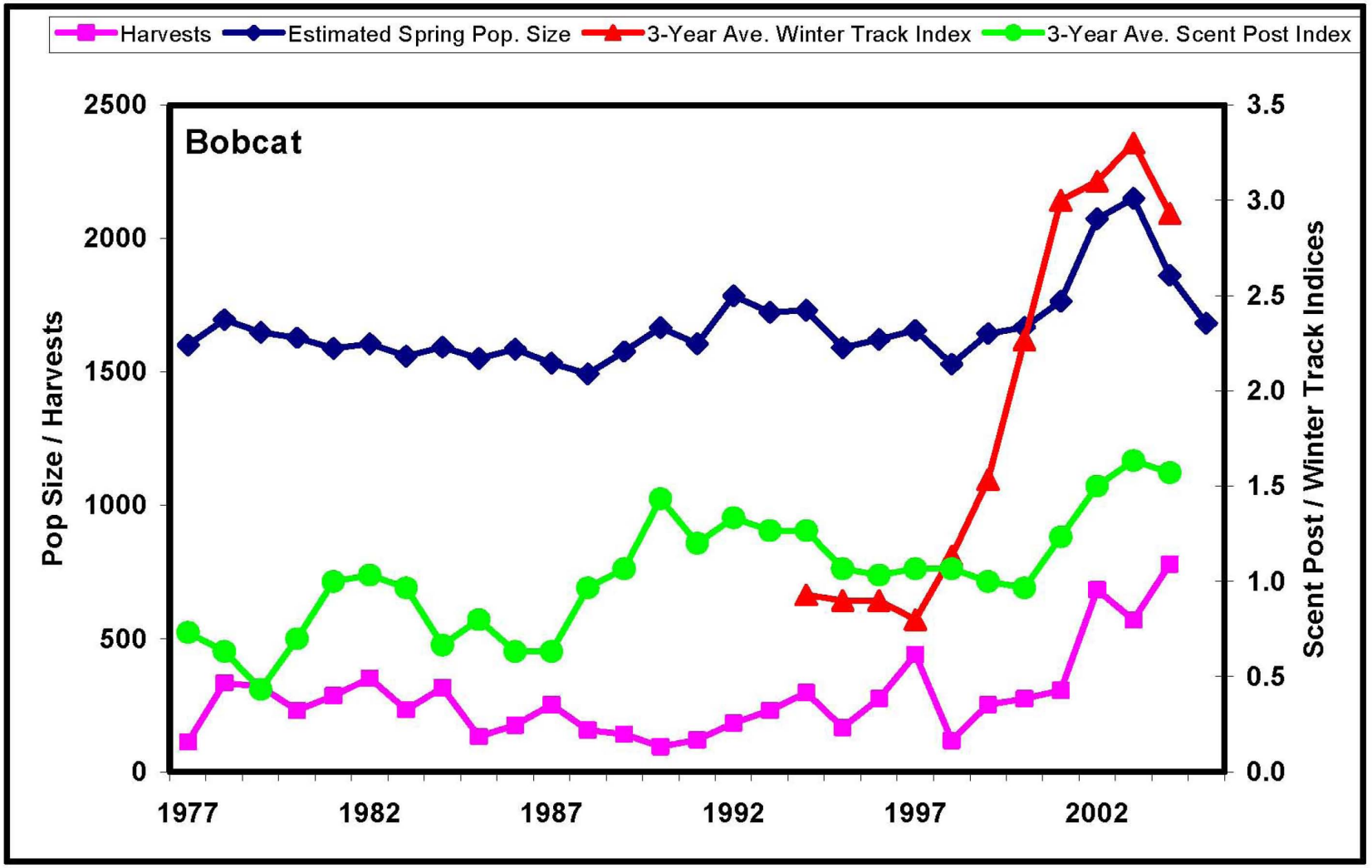
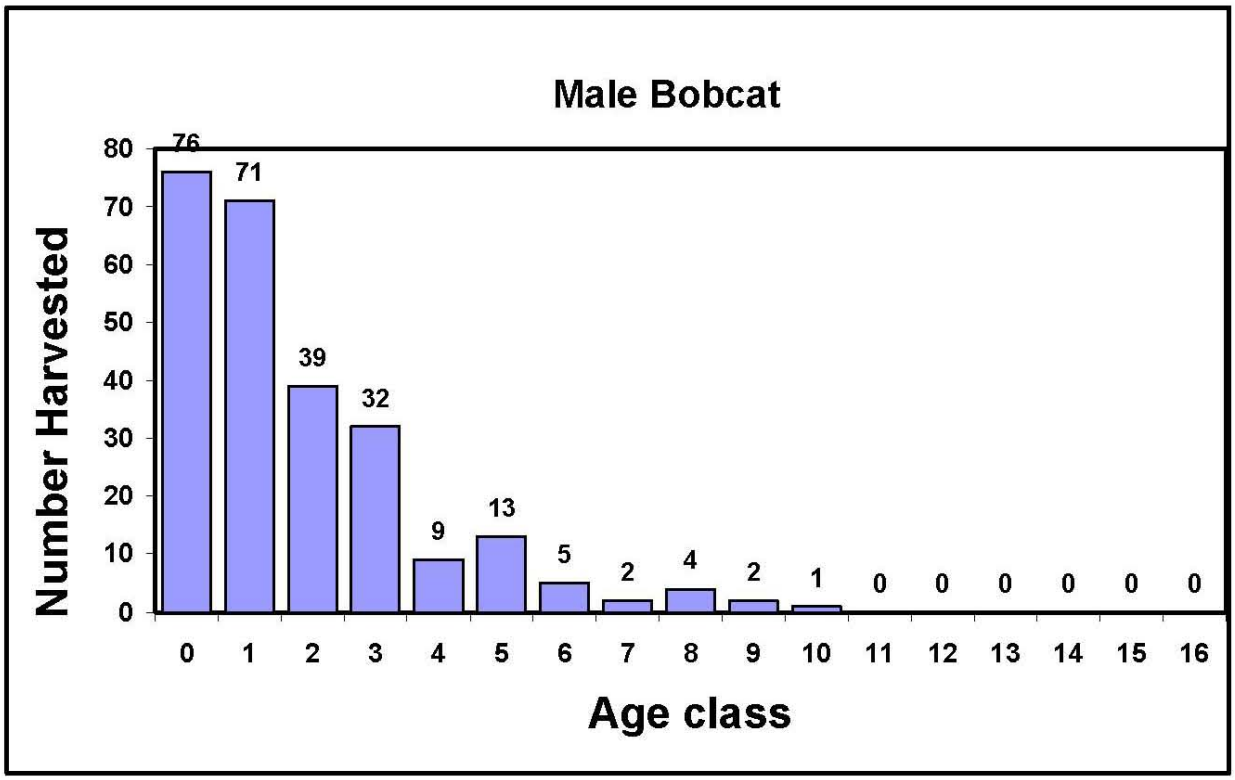


Figure 1. Bobcat populations, harvests, and survey indices, 1977-2005. Harvests include estimated accidental take.

Table 1. Bobcat harvest data, 1977 to 2004.

Year	Season	Limit	Registered DNR harvest	Modeled harvest[1]	% Autumn Pop. Taken[2]	Carcasses examined	% juveniles	% yearlings	% adults	Juvs : adult female	% male juveniles	% male yearlings	% male adults	Overall % males	Mean Pelt Price[5]
1977	12/1-1/31	5	103	103	5%	34	35	18	47	1.2	50	33	41	41	$74
1978	12/1-1/31	5	304	304	14%	113	54	15	31	4.4	61	53	60	59	$164
1979	12/1-1/31	5	291	291	14%	75	37	12	51	1.6	54	44	53	52	$118
1980	12/1-1/31	5	210	210	10%	48	31	33	36	1.9	80	69	56	66	$79
1981	12/1-1/23	5	260	260	12%	230	37	23	40	2.1	59	63	55	58	$73
1982	12/1-1/23	5	274	320	14%	261	35	15	50	1.3	47	49	47	48	$66
1983	12/1-1/22	5	208	212	10%	205	37	26	37	1.5	54	53	30	45	$61
1984	12/1-1/20	5	280	288	13%	288	37	13	50	1.4	52	66	44	51	$76
1985	11/30-1/19	5	119	121	6%	99	33	19	48	1.2	41	41	43	42	$70
1986	11/29 -1/3	5	160	160	8%	132	26	17	57	0.9	53	32	51	51	$120
1987	11/28-1/3	5	214	229	11%	163	33	16	51	1.4	44	52	48	48	$101
1988	11/26-1/1	5	140	143	8%	114	40	18	42	1.7	58	62	46	54	$68
1989	12/2-1/7	5	129	129	6%	119	39	17	44	2	49	53	56	53	$48
1990	12/1-1/6	5	84	87	5%	62	20	34	46	0.8	58	80	44	59	$43
1991	11/30-1/5	5	106	110	6%	93	35	33	32	3.6	59	55	70	61	$37
1992	11/28-1/3	5	167	167	9%	151	28	22	50	1.2	55	45	53	53	$28
1993	12/4-1/9	5	201	210	11%	161	32	20	48	1.4	51	45	52	50	$43
1994	12/3-1/8	5	238	270	14%	187	26	16	58	0.8	64	43	45	50	$36
1995	12/2-1/7	5	134	152	9%	96	31	15	54	2.7	57	71	79	71	$34
1996	11/30 -1/5	5	223	250	13%	164	35	20	45	1.5	51	30	49	46	$33
1997	11/29-1/4	5	364	401	20%	270	35	16	49	1.2	60	37	43	48	$30
1998	11/28-12/13	5	103	107	6%	77	29	26	45	1.6	59	60	60	60	$28
1999	12/4-1/9	5	206	228	12%	163	18	24	58	0.8	55	59	62	60	$24
2000	12/2-1/7	5	231	250	13%	183	31	26	43	1.5	54	59	50	53	$33
2001	11/24-1/6	5	259	278	13%	213	30	21	49	1.3	52	51	53	52	$35
2002	11/30-1/5	5	544	621	31%	475	27	25	48	1.0	66	49	46	52	$46
2003	11/29-1/4	5	483	518	18%	425	25	13	62	0.9	61	46	53	54	$96
2004	11/27 – 1/9	5	631	709	28%	524	28	34	38	1.6	51	40	54	49	$99

[1]includes DNR and Tribal harvests
[2]estimated from population model; includes estimated accidental harvests of 10%.
[3]population index for autumn prior to harvest season
[4]different population index for winter during/after harvest season
[5] Average pelt price based on a survey of in-state fur buyers only.



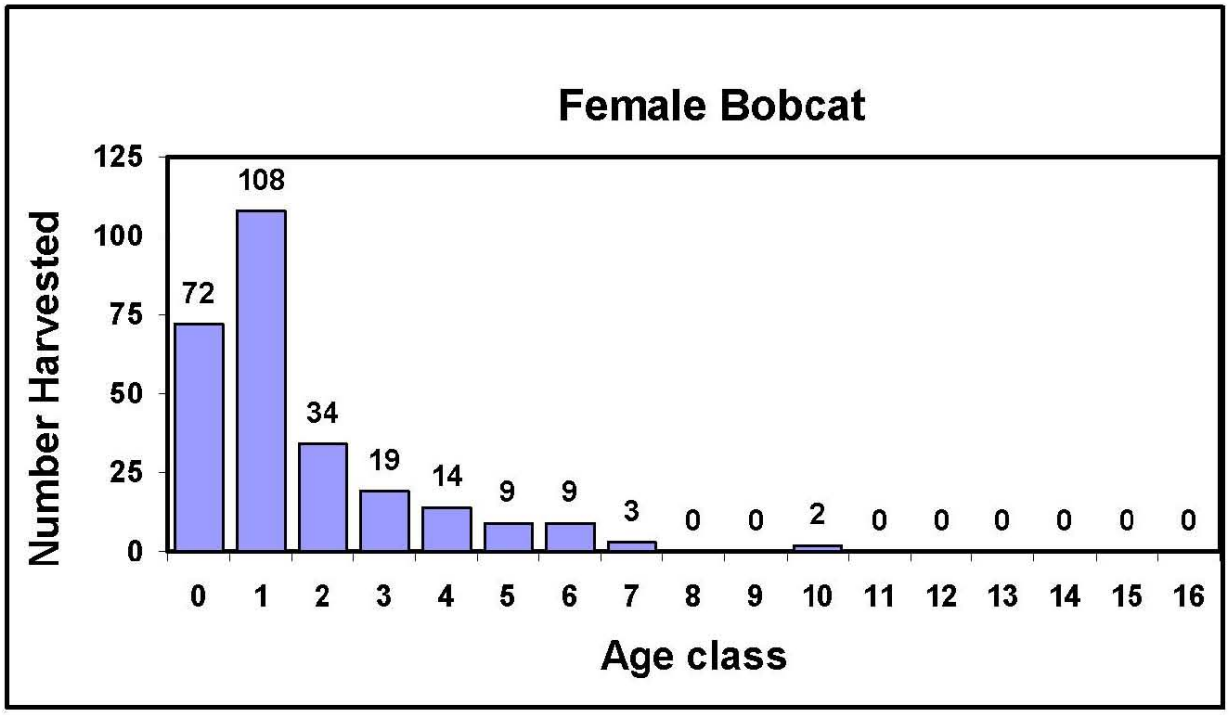


Figure 2. Age structure of male and female bobcat in the 2004-05 harvest.

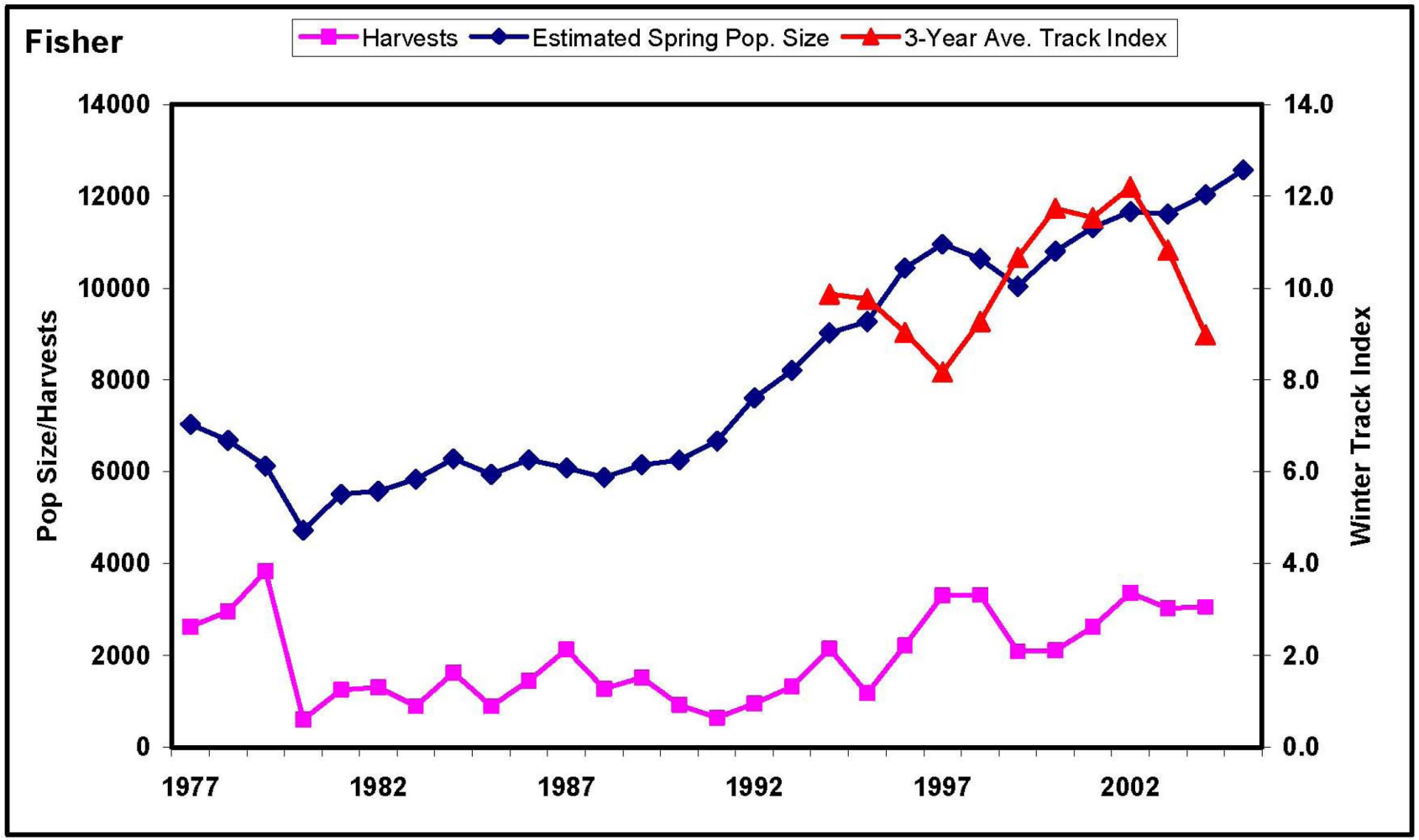


Figure 3. Fisher populations, harvests, and survey indices, 1977-2005. Harvests include estimated accidental take.

Table 2. Fisher harvest data, 1977 to 2004.

Year	Season	Limit	Registered DNR harvest	Modeled harvest[1]	% autumn pop. harvested[2]	Carcasses examined	% juveniles	% yearlings	% adults	Juv:ad. females	% male juveniles	% male yearlings	% male adults	% males overall	Pelt price Males[5]	Pelt price females[5]
1977	12/1-1/31	3	2150	2150	25%	562	69%	16%	14%	8.4:1	54%	28%	43%	48%	$71	$71
1978	12/1-1/31	3	2426	2426	29%	577	70%	16%	14%	7.1:1	44%	35%	28%	40%	$132	$147
1979	12/1-1/31	3	3032	3032	41%	467	65%	15%	21%	5.6:1	54%	46%	44%	50%	$108	$128
1981	12/1-12/10	1	862	1022	16%	843	66%	24%	10%	10.5:1	48%	43%	37%	47%	$94	$110
1982	12/1-12/10	1	912	1073	14%	1073	66%	19%	15%	9.4:1	46%	41%	52%	46%	$70	$99
1983	12/1-12/11	1	631	735	11%	662	69%	18%	13%	8.8:1	45%	40%	40%	44%	$71	$121
1984	12/1-12/16	1	1285	1332	19%	1270	63%	20%	17%	7.2:1	52%	45%	45%	49%	$70	$122
1985	11/30-12/15	1	678	735	11%	712	63%	20%	18%	5.4:1	46%	40%	34%	43%	$74	$130
1986	11/29-12/4	1	1068	1186	17%	1186	59%	24%	18%	5.3:1	48%	50%	37%	46%	$84	$162
1987	11/28-12/13	1	1642	1749	24%	1534	63%	15%	22%	4.7:1	46%	40%	37%	43%	$84	$170
1988	11/26-12/11	1	1025	1050	16%	805	70%	15%	15%	6.8:1	48%	45%	33%	45%	$54	$100
1989	12/2-12/17	1	1243	1243	15%	1024	64%	19%	17%	5.8:1	47%	47%	36%	45%	$26	$53
1990	12/1-12/16	1	746	756	11%	592	65%	14%	21%	4.5:1	44%	55%	30%	43%	$35	$46
1991	11/30-12/15	1	528	528	7%	410	66%	21%	13%	7.8:1	50%	52%	35%	48%	$21	$48
1992	11/28-12/13	1	778	782	10%	629	58%	21%	21%	4.9:1	42%	55%	45%	46%	$16	$29
1993	12/4-12/19	2	1159	1192	12%	937	59%	22%	19%	5.3:1	47%	37%	42%	44%	$14	$28
1994	12/3-12/18	2	1771	1932	18%	1360	56%	18%	26%	4.0:1	47%	54%	44%	48%	$19	$30
1995	12/2-12/17	2	942	1060	10%	-	-	-	-	-	-	-	-	-	$16	$25
1996	11/30-12/15	2	1773	2000	18%	-	-	-	-	-	-	-	-	-	$25	$34
1997	11/29-12/14	2	2761	2974	26%	-	-	-	-	-	-	-	-	-	$31	$34
1998	11/28-12/13	2	2695	2987	25%	-	-	-	-	-	-	-	-	-	$19	$22
1999	12/4-12/19	2	1725	1880	13%	-	-	-	-	-	-	-	-	-	$19	$20
2000	12/2-12/17	4	1674	1900	13%	-	-	-	-	-	-	-	-	-	$20	$19
2001	11/24-12/9	4	2145	2362	16%	-	-	-	-	-	-	-	-	-	$20	$19
2002	11/30-12/15	5	2660	3028	20%	-	-	-	-	-	-	-	-	-	$23	$23
2003	11/29-12/14	5	2521	2728	18%	-	-	-	-	-	-	-	-	-	$27	$26
2004	11/27-12/12	5	2552	2753	17%	-	-	-	-	-	-	-	-	-	$30	$27

[1] includes DNR and Tribal harvests

[2] estimated from population model, includes estimated accidental harvests of 22% 1977-1992, and 11% in 1993-1999

[3] Population index for winter during/after harvest season

[4] combined limit since 1999 of any combination of marten and fisher totaling the specified limit, except in 1999 where fisher portion of limit could only be 2.

[5] Average pelt price based on a survey of in-state fur buyers only.

Note: Season closed in 1980. Carcass collections ended in 1994.

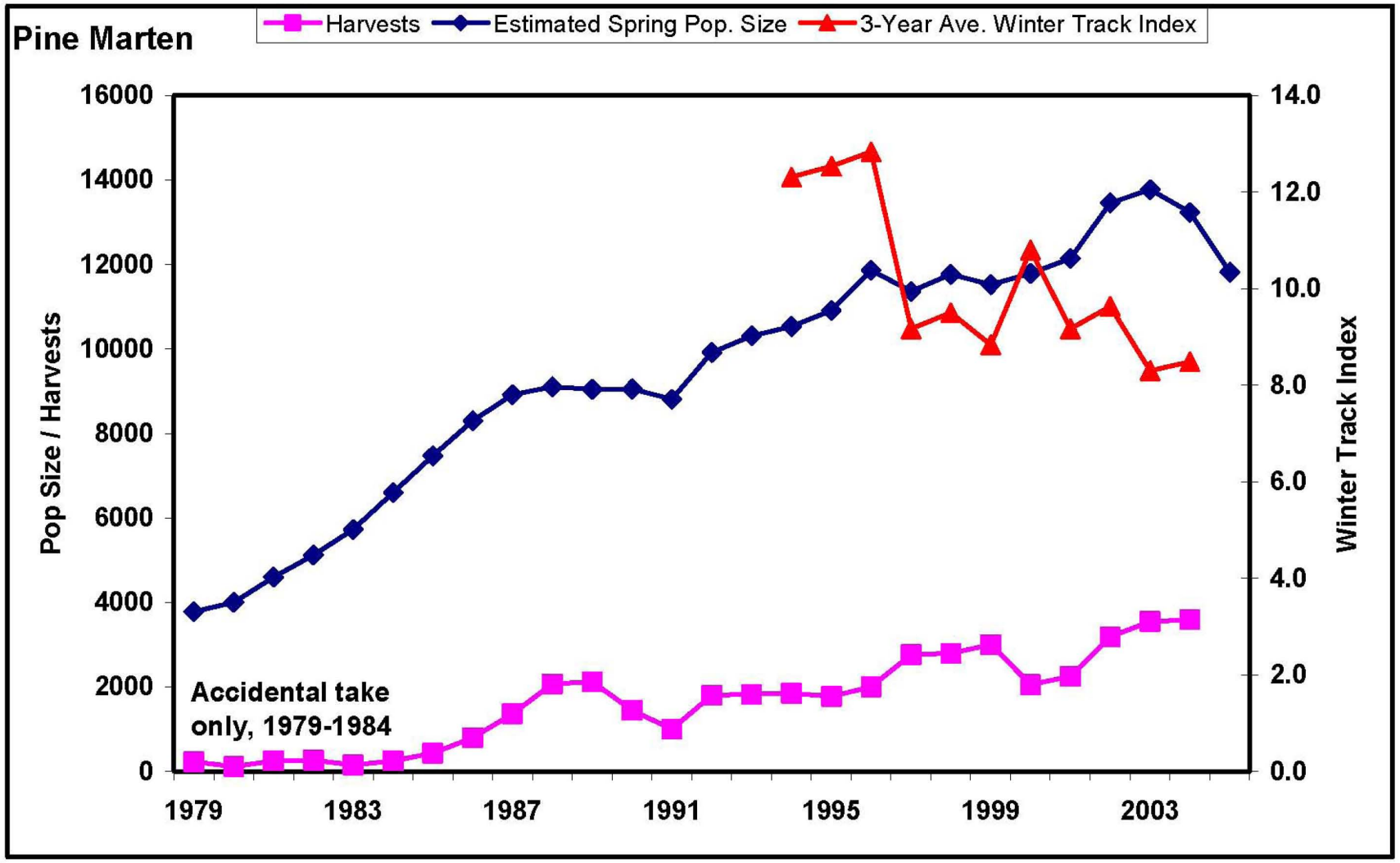


Figure 4. Pine marten populations, harvests, and survey indices, 1979-2005. Harvests include estimated accidental take.

Table 3. Pine marten harvest data, 1985 to 2004.

Year	Season	Limit	Registered DNR harvest	Modeled harvest[1]	% Autumn Pop. Taken[2]	Carcasses examined	% juveniles	% yearlings	% adults	juv:ad females	% male juveniles	% male yearlings	% male adults	% males overall	Pelt price Males[5]	Pelt price females[5]
1985	11/30-12/15	1	430	430	6%	507	73%	18%	9%	17.2	69%	68%	82%	70%	$30	$28
1986	11/29-12/14	1	798	798	6%	884	64%	21%	15%	12.3	65%	71%	81%	69%	$36	$27
1987	11/28-12/13	1	1363	1363	15%	1754	66%	18%	16%	11.2	65%	67%	75%	67%	$43	$39
1988	11/26-12/11	2	2072	2072	19%	1977	66%	11%	23%	8.6	58%	50%	66%	59%	$50	$43
1989	12/2-12/17	2	2119	2119	20%	1014	68%	12%	20%	9.7	57%	63%	65%	59%	$48	$47
1990	12/1-12/16	2	1349	1447	15%	1375	48%	18%	34%	3.6	59%	54%	61%	59%	$44	$41
1991	11/30-12/15	1	686	1000	11%	716	74%	9%	17%	16.1	69%	71%	72%	70%	$40	$27
1992	11/28-12/13	2	1602	1802	15%	1661	65%	18%	17%	15.1	63%	70%	75%	66%	$28	$25
1993	12/4-12/19	2	1438	1828	15%	1396	57%	20%	23%	7.5	61%	71%	67%	64%	$36	$30
1994	12/3-12/18	2	1527	1846	15%	1452	58%	15%	27%	6.4	62%	76%	67%	66%	$34	$28
1995	12/2-12/17	2	1500	1774	13%	1393	60%	18%	22%	8.2	63%	68%	66%	65%	$28	$21
1996	11/30-12/15	2	1625	2000	16%	1372	48%	22%	30%	4.8	62%	69%	67%	65%	$34	$29
1997	11/29-12/14	2	2261	2762	21%	2238	61%	13%	26%	6.2	60%	60%	63%	61%	$28	$22
1998	11/28-12/13	2	2299	2795	20%	1577	57%	18%	25%	6.6	62%	66%	65%	63%	$20	$16
1999	12/4-12/19	4	2423	3000	20%	2013	67%	12%	21%	9.8	65%	66%	67%	66%	$25	$21
2000	12/2-12/17	4	1629	2050	14%	1598	56%	25%	19%	8.9	62%	69%	66%	64%	$28	$21
2001	11/24-12/9	4	1940	2250	14%	1895	62%	15%	23%	11.0	66%	73%	75%	69%	$28	$21
2002	11/30-12/15	5	2839	3192	19%	2451	39%	30%	31%	3.1	57%	63%	61%	60%	$24	$23
2003	11/29-12/14	5	3214	3548	20%	2391	48%	17%	35%	4.0	57%	65%	66%	62%	$30	$27
2004	11/27-12/12	5	3241	3592	23%	2776	26%	28%	46%	1.3	52%	64%	57%	58%	$31	$27

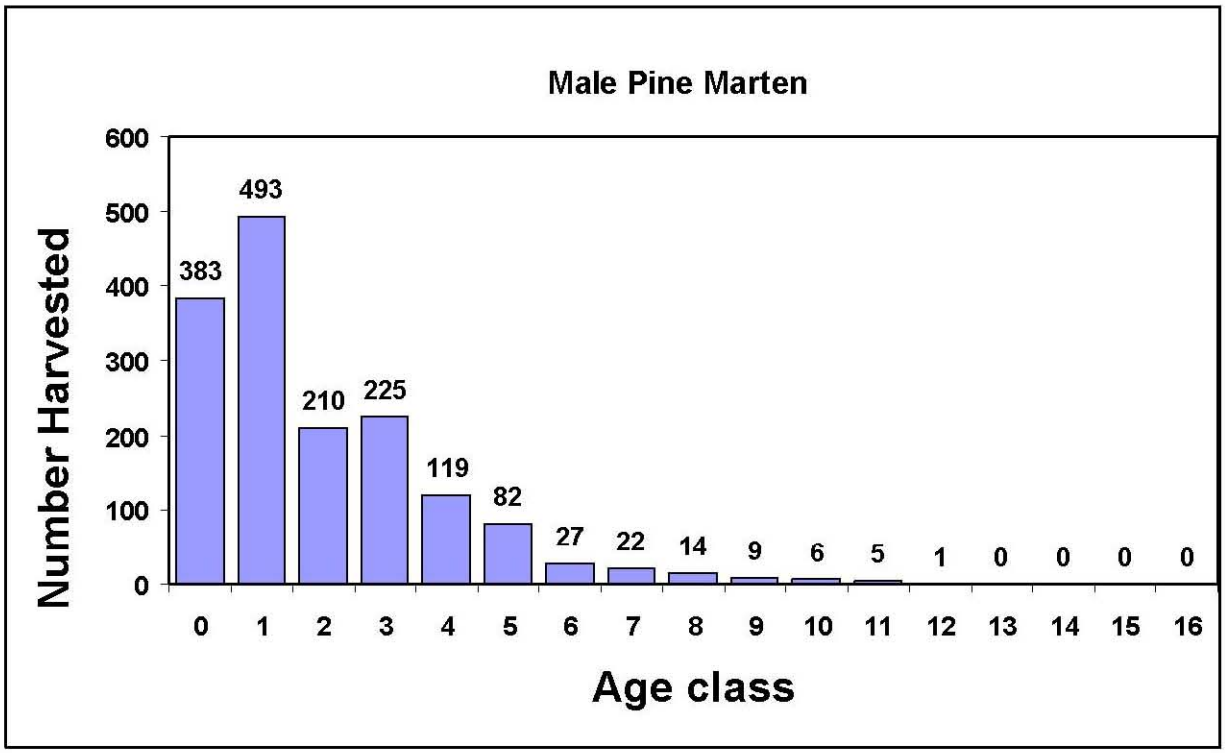
[1] includes DNR and Tribal harvests

[2] estimated from population model; includes estimated accidental harvests of 40% in 1985-1987 and 1991, 20% in 1988-1990 and 1992-1998, and 15% from 1999-present.

[3] population index for winter during/after harvest season

[4] Combined limit since 1999 of any combination of fisher and marten totaling the specified limit, except in 1999 where fisher portion of limit could only be 2.

[5] Average pelt price based on a survey of in-state fur buyers only.



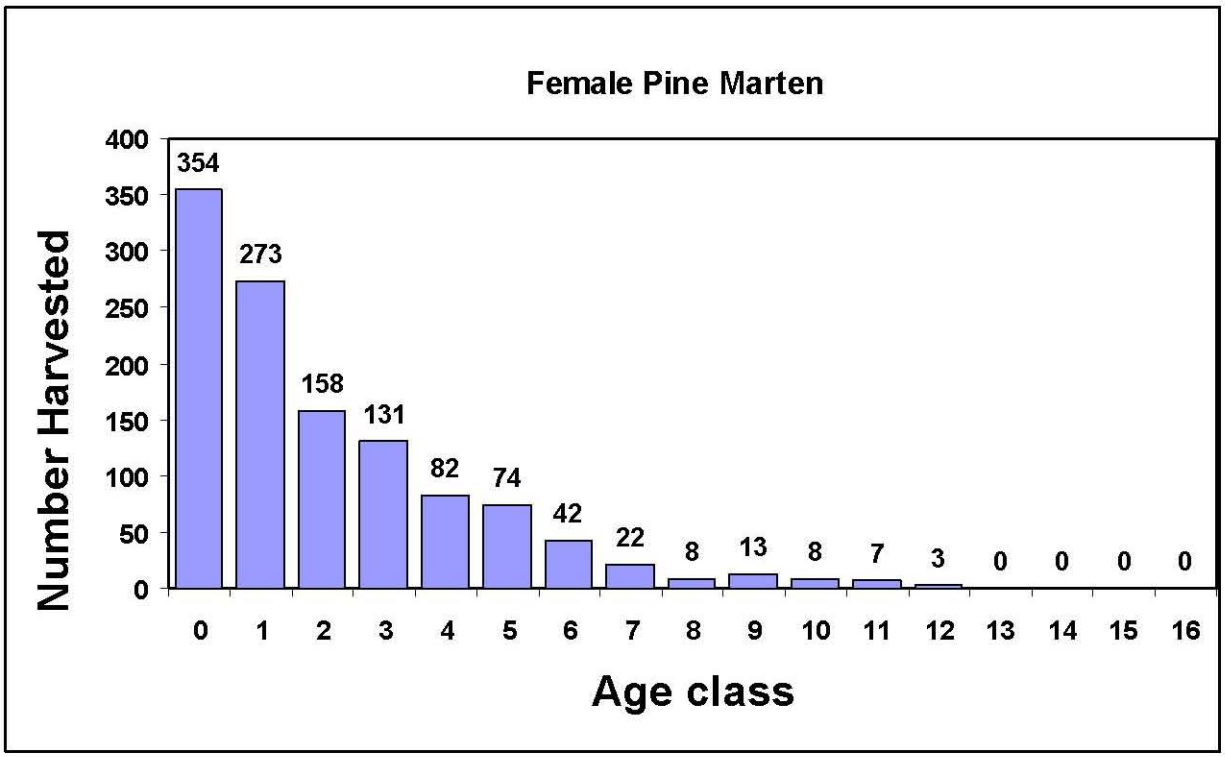


Figure 5. Age structure of male and female pine marten in the 2004-05 harvest.

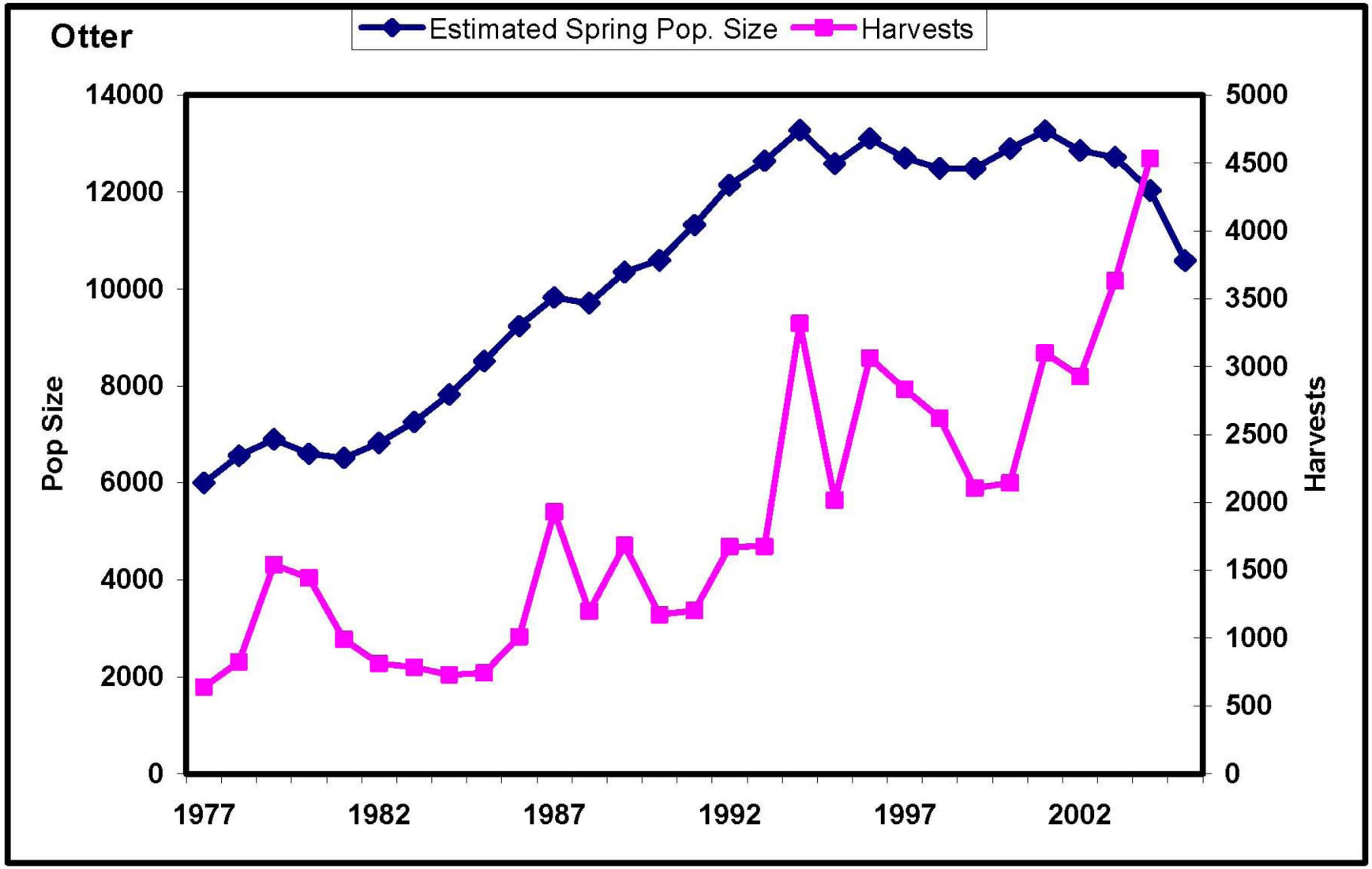


Figure 6. Otter populations and harvests, 1977-2005. Harvests include estimated accidental take.

Table 4. Otter harvest data, 1980-2004. Carcasses were not collected after 1986.

Year	Season dates	Limit	Registered DNR harvest	Modeled harvest[1]	% Autumn Pop. taken[2]	Carcasses examined	% juveniles	% yearlings	% male juveniles	% males yearlings	Mean pelt prices: otter[3]	Mean pelt prices: beaver (autumn)[3]
1980	11/15-11/29	2	1111	1111	16%	88	54.5	14.7	39.6	57.5	$33	$18
1981	11/14-11/28	2	485	762	11%	471	55	19.7	55.6	53.3	$30	$14
1982	11/13-11/27	2	385	625	9%	389	50.6	25.6	56.7	65.1	$26	$11
1983	11/12-11/26	2	408	614	8%	433	42.3	30.9	55.7	56.8	$25	$12
1984	11/17-12/01	2	513	561	7%	549	47.9	23.3	47.1	50	$22	$12
1985	11/16-12/15	3	559	572	7%	572	43.4	22.9	53.3	50	$21	$15
1986	10/24-11/29	3	777	777	8%	745	45.2	23.3	45.1	48.1	$24	$20
1987	10/27-11/29	3	1386	1484	15%	-	-	-	-	-	$23	$17
1988	10/29-11/27	3	922	922	8%	-	-	-	-	-	$22	$14
1989	10/28-12/17	3	1294	1294	12%	-	-	-	-	-	$22	$12
1990	10/27-1/6	3	888	903	8%	-	-	-	-	-	$24	$9
1991	10/26-1/5	3	855	925	8%	-	-	-	-	-	$25	$9
1992	10/24-1/3	4	1368	1368	10%	-	-	-	-	-	$30	$7
1993	10/23-1/9	4	1459	1646	10%	-	-	-	-	-	$43	$11
1994	10/29-1/8	4	2445	2708	19%	-	-	-	-	-	$48	$14
1995	10/28-1/7	4	1435	1466	12%	-	-	-	-	-	$38	$13
1996	10/26-1/5	4	2219	2500	17%	-	-	-	-	-	$39	$19
1997	10/25-1/4	4	2145	2313	16%	-	-	-	-	-	$39	$19
1998	10/24-1/3	4	1946	2139	16%	-	-	-	-	-	$34	$11
1999	10/23-1/9	4	1635	1717	13%	-	-	-	-	-	$41	$12
2000	10/28-1/7	4	1578	1750	12%	-	-	-	-	-	$51	$15
2001	10/27-1/6	4	2323	2531	17%	-	-	-	-	-	$51	$15
2002	10/26-1/5	4	2145	2390	17%	-	-	-	-	-	$46	$13
2003	10/25-1/4	4	2766	2966	21%	-	-	-	-	-	$85	$13
2004	10/23-1/9	4	3450	3700	27%	-	-	-	-	-	$87	$14

[1] Includes DNR and Tribal harvests
[2] Estimated from population modeling; includes estimated accidental harvests of 30% to 1991, and 22% after 1991.
[3] Average pelt price based on a survey of in-state fur buyers only.

Population Trends of White-tailed Deer in the Forest Zone – 2005

Mark S. Lenarz, Forest Wildlife Populations & Research Group

INTRODUCTION

Deer hunters are required by regulation to register each deer they harvest within 24 hours of the close of the deer-hunting season. Data collected as part of this registration process provide important information on the sex and age of deer killed, population trends, and the effectiveness of current management regulations. The following report presents a brief analysis of the 2004 harvest registration data in the forest zone (Figure 1). This is followed by a discussion of deer population trends and projections in the forest zone based on simulation modeling.

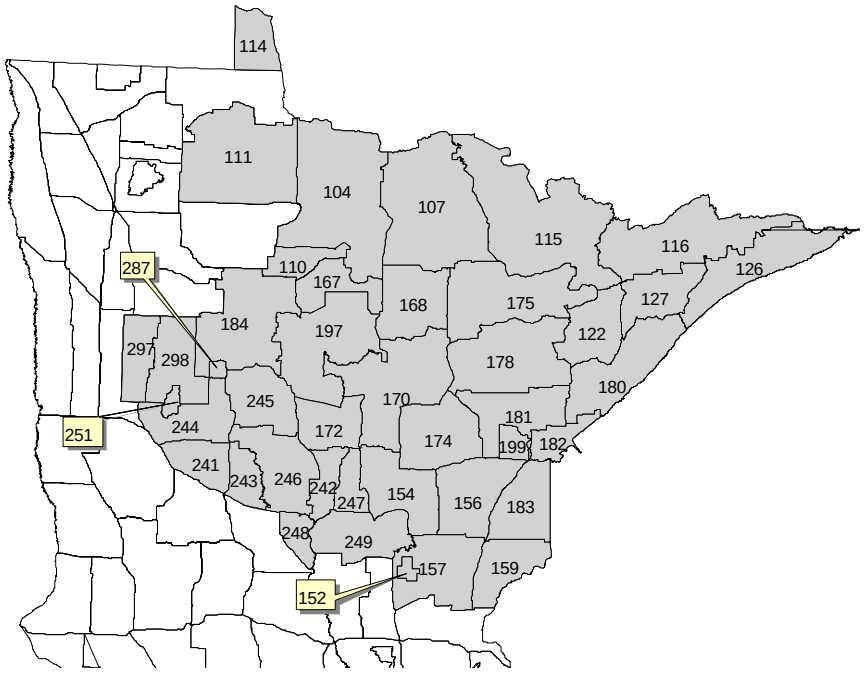


Figure 1. Either-sex permit areas in the forested zone, 2005. Permit areas 283 and 110 were combined into single permit area (110). Permit area numbers 211, 214 and 284 changed to 111, 114, and 184, respectively. Permit areas 114, 152, and 287, were not modeled.

HARVEST

In 2004, hunters registered 260,604 deer, the second highest harvest ever recorded in Minnesota. Of that number, 51% or 132,442 deer were harvested in the forested zone (Figure 1, Table 1). The 2004 forest zone harvest declined 11% from the 2003 harvest. The following discussion applies to the subset of deer harvested in the forest zone.

The buck harvest increased or remained stable in 20 of the 37 permit areas (Table 2). The total forest zone buck harvest declined 3%, however. The change in buck harvest by permit area was correlated with the change in simulated density *($r = 0.52$, $p<0.01$)*. This implies that the buck harvest did

not decline in response to the high number of either-sex opportunities and still represents a good trend indicator for deer populations in the forest. Buck hunter success (buck harvest/licenses) in 2004 remained at historically high levels in both Zones 1 and 2 (Figure 2).

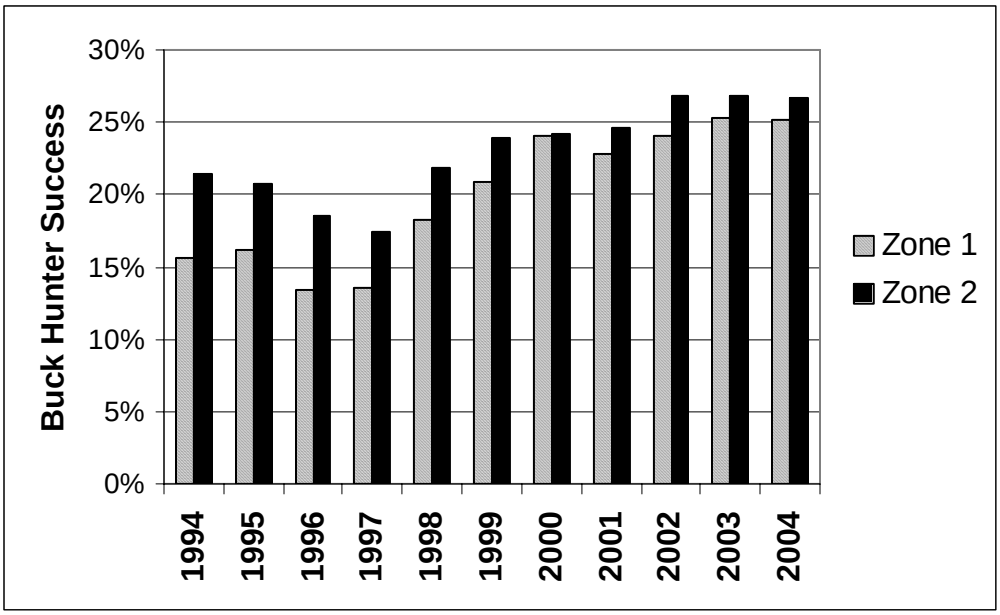


Figure 2. Success of licensed hunters at killing a buck, 1994-2004.

The antlerless harvest declined in 31 of the 37 permit areas (Table 3) and the total antlerless harvest declined 17%. The greatest decline occurred in Permit Area 180 (60%), which shifted from "managed" status in 2003 to "lottery" in 2004. Similarly, the greatest increases in antlerless harvest took place in permit areas (PA126, 131%; PA168, 37%; and PA297, 232%), which shifted from "lottery" in 2003 to "managed" in 2004.

The decline in the antlerless harvest was likely caused by a combination of several factors. Model simulations indicated that there were 8% fewer deer in the forest zone in 2004 (Table 4). In addition, anecdotal reports suggested that many hunters still had venison left over from the 2003 season and were less interested in killing more than one deer. This conjecture is corroborated by the fact that statewide sales of bonus permits decreased 6% from 2003.

The harvest by archers and muzzleloader hunters accounted for almost 7% of the total harvest. The archery harvest increased 6% over the previous year while the muzzleloader harvest increased by 7%. Increased sales of All Season Licenses and the availability of bonus permits likely account for these increases.

Population Trends and Model Projections

Based on the winter severity index (WSI), the winter of 2004-05 was relatively mild in the southwestern portion of the forest zone (Figure 3). Stations in the remainder of the forest zone had WSI values more representative of a moderate to moderately severe winter. Warm temperatures in late March and early April rapidly melted off the snow and likely reduced levels of winter mortality, especially along the Canadian border and in the "Arrowhead".

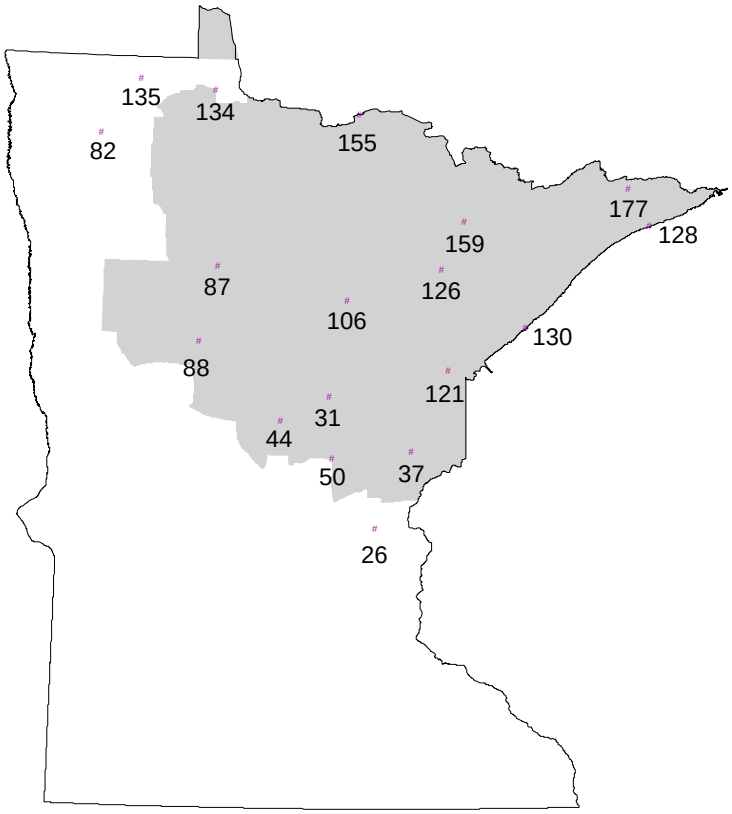


Figure 3. Winter Severity Index (WSI) readings from winter 2004-2005. WSI readings between 100 and 180 are considered moderate.

Simulation modeling was used in 36 permit areas (Figure 1, Table 4) to approximate deer density, identify trends, and project the effect of the 2005-hunting season. To better summarize the results for this report, permit areas were lumped in to one of 5 areas (Figs. 4 and 5). Deer density varied according to area with the lowest densities occurring in the Northeast (NE) and Northwest (NW). Highest densities occurred in the West Central (WC). The same basic trend occurred in all 5 areas; deer density was at the lowest level in 1997 following the severe winters of the mid-1990's and then steadily increased in response to low (or no) antlerless permits and mild winters. In the South (S), deer density peaked in 2000, stabilized, and then declined in response to an increased opportunity to kill multiple antlerless deer. The remaining areas peaked in 2003. Since 2003, the declines in the NW, WC and Central (C) were a response to the high antlerless harvest. There was less opportunity to kill antlerless deer in the NE and the decline there, was likely associated with winters that were more severe than elsewhere in the forest.

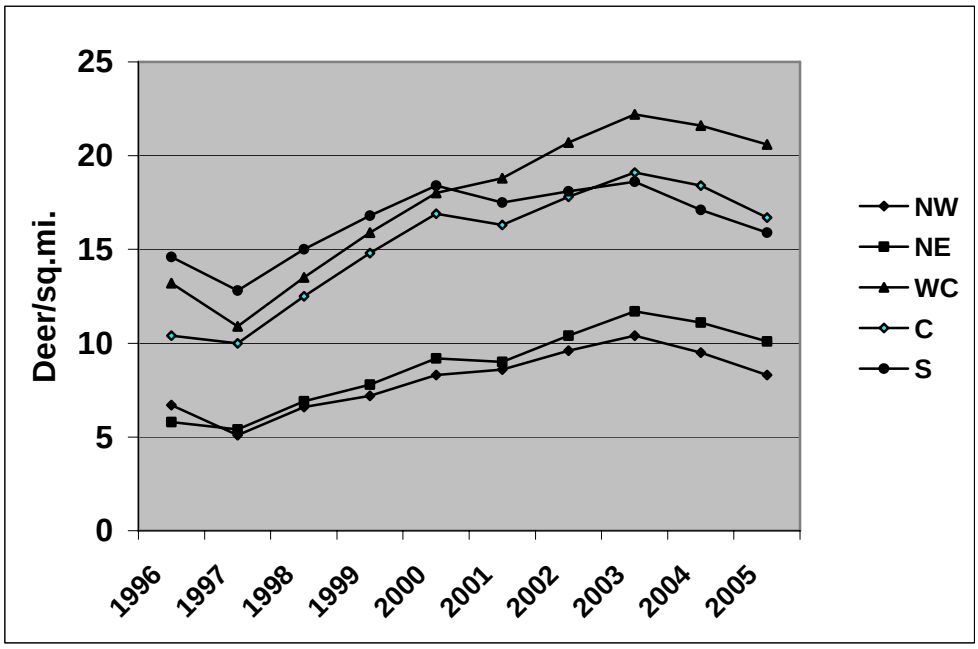


Figure 4. Population trends of deer in forest zone. Trend lines represent the groups of permit areas as illustrated in Figure 5. Density represents pre-fawn density.

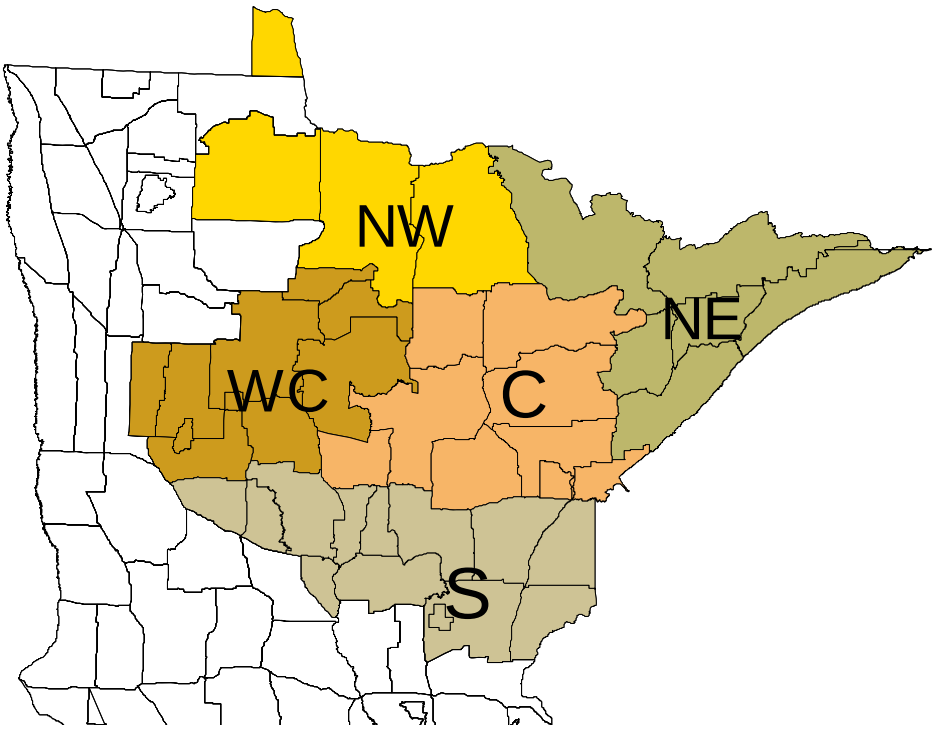


Figure 5. Groups of permit areas discussed in text and in figure 4.

After simulation modeling, wildlife managers in the forest zone came to consensus on the status of permit areas for the 2005 deer-hunting season. Managers recommended that 9 permit areas be designated as "Lottery" areas with a total of 19,700 permits. Most of these areas extend from the Leech Lake Indian reservation, east to the BWCAW (Figure 6). Thirteen permit areas in the west central or southern part of the forest were designated as "Intensive". The remaining 20 areas were designated as "Managed".

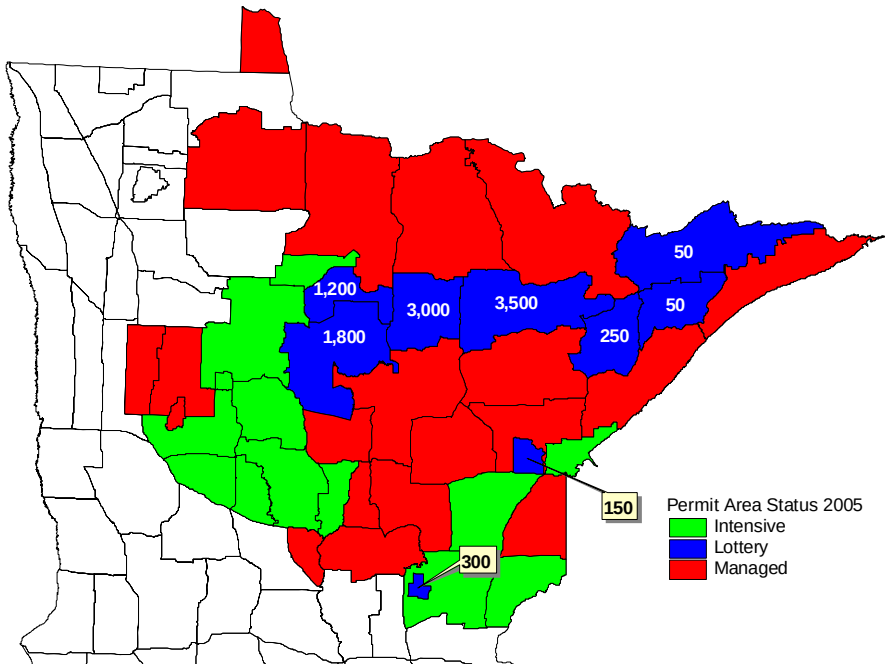


Figure 6. Final designation of permit areas in Minnesota's Forested Zone. Number of permits listed within Lottery permit areas.

Table 1. Total registered deer harvest for Deer Permit Areas in Minnesota's Forested Zone.

Permit Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Change
104	3,381	756	567	897	1,372	1,837	1,940	2,253	3,421	2,902	-15%
107	3,892	1,090	948	1,176	1,994	2,846	3,550	3,499	5,206	4,027	-23%
110	710	193	153	228	933	944	949	1,080	1,372	1,509	10%
115	3,653	1,216	1,029	1,347	2,334	3,170	3,589	3,815	5,373	4,417	-18%
116	210	113	100	146	138	150	162	157	264	295	12%
122	769	273	251	457	296	551	622	564	685	716	5%
126	507	210	197	268	306	445	470	595	690	837	21%
127	105	54	63	83	176	81	99	108	146	165	13%
152	260	129	143	213	225	283	264	217	235	246	5%
154	2,254	1,334	1,370	1,952	2,977	4,415	4,168	5,032	5,717	5,176	-9%
156	2,286	1,500	1,546	2,109	2,646	3,753	3,036	3,246	4,935	4,583	-7%
157	4,323	2,892	3,293	4,709	5,385	6,985	7,196	7,727	9,001	7,606	-15%
159	2,933	1,881	2,312	3,493	3,971	5,070	4,167	3,934	5,028	3,871	-23%
167	1,955	476	338	599	1,452	1,601	1,971	2,488	1,572	1,463	-7%
168	3,247	785	552	988	2,410	2,686	2,379	3024	3,218	3,978	24%
170	4,404	1,152	1,143	2,220	2,857	4,938	4,833	4,716	8,460	7,154	-15%
172	2,999	859	979	1,443	2,960	4,253	4,624	4,910	7,004	5,490	-22%
174	2,241	755	754	1,371	1,927	2,436	2,141	2,678	3,811	3,346	-12%
175	2,683	2,684	2,685	2,686	2,320	3,029	3,339	3184	5,034	4,254	-15%
178	2,833	914	1,532	2,190	2,344	3,064	3,343	3,650	5,486	5,267	-4%
180	1,587	612	595	1,009	1,003	1,592	1,790	1,960	3,279	2,465	-25%
181	2,385	909	914	1,532	2,298	3,046	3,159	3110	4,524	4,489	-1%
183	1,671	637	640	1,073	2,296	2,939	2,934	2,964	4,235	3,779	-11%
197	1,324	442	407	597	933	1,372	1,167	1,413	1,652	1,723	4%
211	2,971	1,598	580	733	1,198	1,861	2,353	2,264	3,064	2,621	-14%
243	2,068	1,435	1,268	1,602	1,908	2,634	2,864	3,238	4,131	3,684	-11%
244	3,837	2,449	2,034	2,396	2,952	3,862	4,841	5,805	7,452	6,702	-10%
245	2,929	1,607	1,021	1,657	3,524	4,838	5,056	5,626	8,231	6,377	-23%
246	3,677	2,550	2,254	2,847	3,358	4,760	5,150	5,149	7,530	6,782	-10%
247/242	2,858	2,020	2,250	2,664	3,183	3,743	4,188	4527	5,512	4,826	-12%
248	1,230	756	564	943	850	1,039	881	1,352	1,897	1,864	-2%
249	2,125	1,474	1,110	1,514	2,217	2,826	3,149	3,238	4,223	3,800	-10%
251	409	234	231	255	246	326	254	298	470	387	-18%
283/284/285	7,640	4,028	2,221	3,120	6,548	7,715	8,185	9284	13,860	12,920	-7%
287	311	312	313	314	368	376	460	470	529	425	-20%
297	395	153	138	220	201	244	296	313	343	563	64%
298	819	465	326	516	704	803	826	932	1988	1733	-13%
Forested Zone	83,881	40,947	36,821	51,567	72,810	96,513	100,395	108,820	149,578	132,442	-11%

Note: Permit area totals prior to 1999 are estimates that assume an evenly distributed harvest in the old permit areas and may be biased.

Table 2. Registered buck harvest for Deer Permit Areas in Minnesota's Forested Zone.

Permit Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Change
104	1,523	747	565	887	1,137	1,240	1,266	1,332	1,589	1,586	0%
107	1,758	1,085	942	1,160	1,706	1,948	2,174	2,119	2,523	2,277	-10%
110	312	179	140	212	421	487	484	500	561	593	6%
115	1,855	1,207	1,009	1,316	1,898	2,036	2,145	2,371	2,894	2,663	-8%
116	159	112	100	144	138	150	156	157	238	249	5%
122	494	267	242	447	293	415	452	441	490	567	16%
126	383	210	183	250	306	390	417	493	582	587	1%
127	97	54	62	81	176	80	82	93	126	145	15%
152	137	76	89	127	173	191	182	130	106	152	43%
154	1,119	935	984	1,437	2,017	2,304	2,142	2,169	2,071	2,049	-1%
156	1,157	1,037	1,081	1,531	1,836	2,066	1,680	1,645	1,989	1,996	0%
157	2,302	1,748	1,988	2,675	3,099	3,327	3,143	3,047	3,207	3,030	-6%
159	1,712	1,194	1,428	1,867	1,980	2,412	1,773	1,605	1,916	1,514	-21%
167	843	466	327	585	906	1,036	968	1,211	821	819	0%
168	1,402	774	543	973	1,579	1,653	1,454	1,675	1,698	1,889	11%
170	2,110	1,121	1,135	2,109	1,609	3,106	2,787	2,611	3,435	3,233	-6%
172	1,278	791	896	1,175	1,820	2,292	2,260	2,200	2,359	2,147	-9%
174	1,188	741	702	1,224	1,234	1,446	1,255	1,361	1,541	1,596	4%
175	1,526	831	810	1,273	1,917	2,107	2,072	2,113	2,463	2,319	-6%
178	1,661	905	895	1,363	1,945	2,052	2,012	2,212	2,638	2,756	4%
180	956	603	538	924	998	1,265	1,434	1,469	1,921	1,927	0%
181	1,326	896	819	1,378	1,737	2,081	2,026	2,069	2,471	2,493	1%
183	929	628	574	965	1,747	2,052	1,765	1,684	1,776	1,769	0%
197	744	442	403	585	923	1,142	953	998	1,040	1,143	10%
211	1,522	1,109	552	719	1,113	1,350	1,474	1,463	1,467	1,408	-4%
243	856	734	752	957	1,082	1,192	1,169	1,247	1,343	1,217	-9%
244	1,500	1,295	1,159	1,452	1,848	2,105	2,040	2,300	2,540	2,390	-6%
245	1,354	1,122	973	1,480	2,216	2,492	2,180	2,430	2,743	2,449	-11%
246	1,522	1,306	1,338	1,701	1,954	2,300	2,041	2,384	2,599	2,527	-3%
242/247	1,164	1,081	1,181	1,426	1,782	2,169	1,941	1,772	1,959	1,695	-13%
248	370	284	176	365	541	550	430	720	694	739	6%
249	860	756	668	1,045	1,310	1,590	1,479	1,429	1,479	1,327	-10%
251	109	105	94	110	129	134	152	132	176	183	4%
283/284/285	3,303	2,564	2,105	2,720	4,077	4,369	4,115	4,509	4,815	5,068	5%
287	128	118	70	127	167	189	201	184	207	182	-12%
297	205	118	106	161	154	169	213	225	266	307	15%
298	532	465	326	492	601	648	685	654	952	894	-6%
Forested Zone	40,396	28,106	25,955	37,443	48,569	56,535	53,202	55,154	61,695	59,885	-3%

Note: Permit area totals prior to 1999 are estimates that assume an evenly distributed harvest in the old permit areas and may be biased.

Table 3. Registered antlerless deer harvest for Deer Permit Areas in Minnesota's Forested Zone.

Permit Area	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Change
104	1,858	9	2	10	235	597	674	921	1,832	1,316	-28%
107	2,134	5	6	16	288	898	1,376	1,380	2,683	1,750	-35%
110	398	14	13	16	512	457	465	580	811	916	13%
111	1,449	489	28	14	85	511	879	801	1,597	1,213	-24%
115	1,798	9	20	31	436	1,134	1,444	1,444	2,479	1,754	-29%
116	51	1	0	2	0	0	6	0	26	46	77%
122	275	6	9	10	3	136	170	123	195	149	-24%
126	124	0	14	18	0	55	53	102	108	250	131%
127	8	0	1	2	0	1	17	15	20	20	0%
152	123	53	54	86	52	92	82	87	129	94	-27%
154	1,135	399	386	515	960	2,111	2,026	2,863	3,646	3,127	-14%
156	1,129	463	465	578	810	1,687	1,356	1,601	2,946	2,587	-12%
157	2,021	1,144	1,305	2,034	2,286	3,658	4,053	4,680	5,794	4,576	-21%
159	1,221	687	884	1,626	1,991	2,658	2,394	2,329	3,112	2,357	-24%
167	1,112	10	11	14	546	565	1,003	1,277	751	644	-14%
168	1,845	11	9	15	831	1,033	925	1,349	1,520	2,089	37%
170	2,294	31	8	111	1,248	1,832	2,046	2,105	5,025	3,921	-22%
172	1,721	68	83	268	1,140	1,961	2,364	2,710	4,645	3,343	-28%
174	1,053	14	52	147	693	990	886	1,317	2,270	1,750	-23%
175	1,157	1,853	1,875	1,413	403	922	1,267	1,071	2,571	1,935	-25%
178	1,172	9	637	827	399	1,012	1,331	1,438	2,848	2,511	-12%
180	631	9	57	85	5	327	356	491	1,358	538	-60%
181	1,059	13	95	154	561	965	1,133	1,041	2,053	1,996	-3%
183	742	9	66	108	549	887	1,169	1,280	2,459	2,010	-18%
184	4,337	1,464	116	400	2,471	3,346	4,070	4,775	9,045	7,852	-13%
197	580	0	4	12	10	230	214	415	612	580	-5%
243	1,212	701	516	645	826	1,442	1,695	1,991	2,788	2,467	-12%
244	2,337	1,154	875	944	1,104	1,757	2,801	3,505	4,912	4,312	-12%
245	1,575	485	48	177	1,308	2,346	2,876	3,196	5,488	3,928	-28%
246	2,155	1,244	916	1,146	1,404	2,460	3,109	2,765	4,931	4,255	-14%
247/242	1,694	939	1,069	1,238	1,401	1,574	2,247	2,755	3,553	3,131	-12%
248	860	472	388	578	309	489	451	632	1,203	1,125	-6%
249	1,265	718	442	469	907	1,236	1,670	1,809	2,744	2,473	-10%
251	300	129	137	145	117	192	102	166	294	204	-31%
287	183	194	243	187	201	187	259	286	322	243	-25%
297	190	35	32	59	47	75	83	88	77	256	232%
298	287	0	0	24	103	155	141	278	1,036	839	-19%
Forested Zone	43,485	12,841	10,866	14,124	24,241	39,978	47,193	53,666	87,883	72,557	-17%

Table 4. Pre-fawn deer density (deer/sq.mi.) as simulated from modeling in each permit area in Minnesota's forested zone.

Permit Area	Area (sq. mi.)	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Change
104	2,078	7	5	6	6	7	8	9	10	9	8	-9%
107	1,895	8	7	9	11	12	12	13	15	13	11	-15%
110[a]	300	16	14	18	21	23	23	25	26	25	24	-7%
111[b]	1,831	5	3	4	5	6	6	7	7	6	6	-13%
115	1,872	10	9	12	14	17	17	20	22	20	18	-10%
116	1,158	2	2	2	2	3	3	3	3	3	3	-15%
122	620	3	2	3	3	4	3	4	4	4	3	-16%
126	940	4	4	5	5	5	5	5	6	6	4	-20%
127	562	3	2	3	3	4	3	4	4	4	3	-16%
154	761	10	10	12	14	16	16	16	16	14	13	-10%
156	826	11	11	12	14	15	14	15	16	15	14	-6%
157	890	15	14	17	19	21	20	21	21	19	18	-6%
159	568	17	17	20	21	22	19	19	20	18	18	-1%
167	440	-	13	18	18	19	19	20	18	17	15	-9%
168	724	11	10	13	15	16	15	16	16	16	14	-13%
170	1,315	13	12	15	18	21	20	22	24	24	22	-6%
172	451	17	17	22	28	33	31	33	35	31	27	-12%
174	835	9	8	10	12	13	13	14	15	15	14	-7%
175	1,266	8	8	9	11	12	11	12	13	12	11	-13%
178	1,264	9	9	11	13	15	15	17	19	19	17	-10%
180	1,059	8	7	9	10	12	12	14	16	17	16	-2%
181	1,009	11	11	13	15	16	16	17	18	18	16	-13%
183	707	12	12	14	16	17	16	16	17	15	12	-19%
184[c]	1,260	13	11	15	18	21	22	25	27	26	24	-5%
197	960	10	9	11	12	13	13	15	16	17	17	2%
242	209	-	18	21	23	25	23	23	23	20	17	-14%
243	314	24	22	27	31	35	35	37	38	37	35	-4%
244	586	20	19	23	26	31	33	37	39	38	37	-4%
245	583	16	16	21	25	29	30	32	33	30	27	-9%
246	758	19	17	20	23	25	24	24	25	24	23	-6%
247	229	-	18	21	23	25	23	23	23	20	17	-14%
248	213	16	15	18	19	21	19	20	21	20	18	-10%
249	502	13	11	13	15	17	16	17	17	16	15	-8%
251	56	17	15	17	19	21	21	23	26	25	26	1%
297	439	6	5	6	7	7	8	8	9	10	10	-1%
298	620	13	11	13	14	16	16	18	20	19	18	-5%
Forest Zone	30,100	10	9	11	13	15	15	16	17	16	15	-8%

[a] Now includes old permit area 283; [b] formerly permit area 211; [c] formerly permit area 284

Aerial Moose Survey, 2005

Mark S. Lenarz, Forest Wildlife Populations & Research Group

INTRODUCTION

Each year, we conduct an aerial survey in northern Minnesota in an effort to monitor moose (*Alces alces*) numbers and identify fluctuations in the status of Minnesota's largest deer species. The primary objectives of this annual survey are to estimate moose numbers and determine the calf:cow and bull:cow ratios. These data are subsequently used in a simulation model to identify population trends and the harvestable surplus.

METHODS

We used a stratified random block survey protocol originally developed in Alaska to estimate moose population parameters (Gasaway et al. 1986). Briefly, moose numbers and age/sex ratios were estimated by flying transects within a stratified random sample of survey plots (Figure 1). In contrast to previous years, all survey plots in 2005 were rectangular (5 x 2.67 mi.) and all transects were oriented east west. The survey was conducted using helicopters (Bell Jet Ranger) flown by DNR Enforcement pilots. Moose were sexed using the presence of antlers, shape of the bell, nose color and/or vulval patch (Mitchell 1970) and calves were identified on the basis of size and behavior. UTM coordinates for all moose observed within the plots were recorded. A suite of covariates was recorded each time moose were located, including environmental variables (temperature, snow depth, wind speed), group size, cover type, and the amount of visual obstruction.

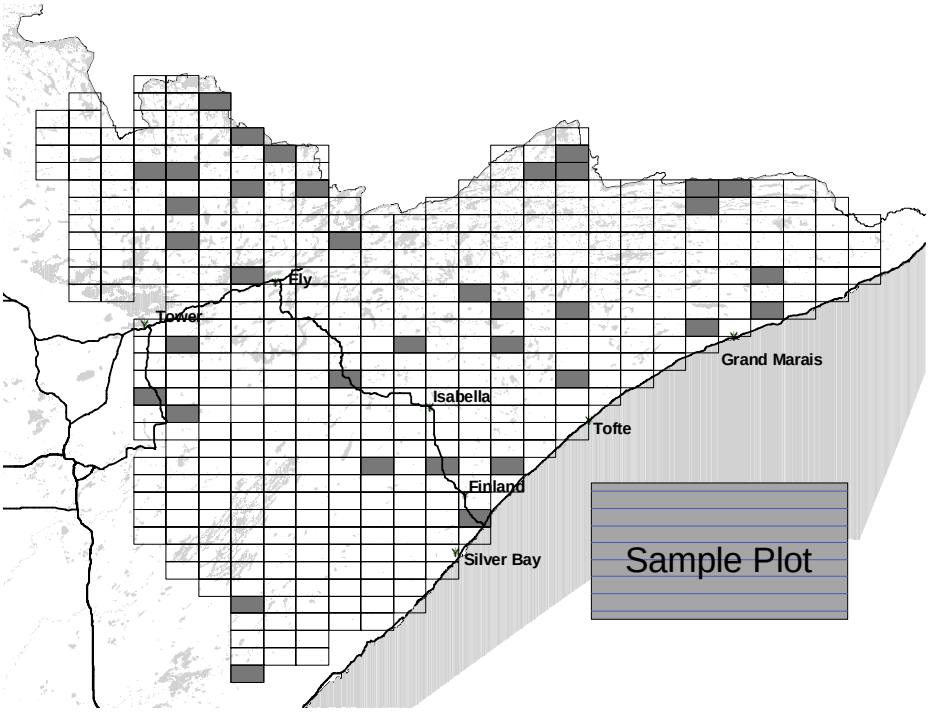


Figure 1. Northeast moose survey area and sample plots (dark gray) flown in the 2005 aerial moose survey. The sample plot illustrates the transect lines flown in the helicopter to locate moose.

Test plots (one-half of a rectangular plot) containing 1 or more radio-collared moose also were flown during the survey with the same protocol used on regular survey plots. If radio-collared moose known to be in the test plot were not observed from transects, they were located using telemetry following completion of the plot. Each time a radio-collared moose was located, the suite of covariates mentioned above was collected. These data were used to develop a logistic regression model or "sightability model" (Ackerman 1988, Anderson and Lindzey 1996, Otten et al. 1993, Quayle et al. 2001, Samuel et al. 1987) to correct for animals not seen during the aerial survey. This sightability model was also used to recalculate the population estimate, bull:cow and calf:cow ratios from the 2004 survey.

RESULTS

The survey was initiated on 3 January and completed on 26 January. Snow depth ranged from 8" to 16" on 10 plots and greater than 16" on 26 plots. Survey conditions were rated as "Good" (highest rank) on all 36 plots. During the survey flights, a total of 372 moose were located on the 36 plots (478 mi^2) and included 152 bulls, 138 cows, 70 calves, and 12 unidentified moose.

Forty-one radio-collared moose were located in 31 test plots; 21 were observed from transects and 17 were located using telemetry. A sightability model was developed from these observations. The model with the highest predictive reliability incorporated a single covariate (visual obstruction [VOC]) grouped into 6 equal intervals (Giudice and Fieberg, unpubl.). The inverse of the probability of detection calculated with this model was used to "correct" the number of moose in each moose observation. Data on VOC from the test plots collected in 2004 were not consistent among observers and were not included in this year's sightability model.

Based on the moose observed on the survey plots and "corrected" by the sightability model, the estimated moose population in northeastern Minnesota numbered 6,481±1,697 (Table 1). Estimates of the calf:cow and bull:cow ratio were 0.49 and 0.84, respectively (Table 1).

Table 1. Estimated moose numbers, calves:cow, bulls:cow, and percent cows with twins from aerial surveys in northeastern Minnesota.

Survey	Estimate	Calves/ Cows	Bulls/ Cows	% Cows w/ Twins
1997	3,960 ±35%	0.49	1.57	1
1998	3,464 ±36%	0.71	0.98	0
1999	3,915 ±35%	0.57	1.30	9
2000	3,733 ±25%	0.70	1.34	7
2001	3,879 ±28%	0.61	1.05	5
2002	5,214 ±23%	0.93	1.22	20
2003	4,161 ±37%	0.70	2.01	11
2004	10,826 ±27%	0.47	1.19	4
2005	6,481±26%	0.49	0.84	9

DISCUSSION

The 2005 population estimate is considerably lower than the 2004 estimate and reflects a change in how some observers determined the level of VOC. Mean VOC in 2005 ($\tilde{}$= 44) was significantly lower than determined in 2004 ($\tilde{}$ = 58, $t = 5.14$, $P < 0.001$). In 2004, one or more observers equated VOC to crown closure and this tended to over-estimate VOC. A mature aspen stand, for example, may have 100% crown closure, but the trees don't totally obscure moose. In contrast, it would be virtually impossible to observe moose in a conifer stand with 100% crown closure. The increased VOC in 2004

resulted in a population estimate that was biased high. The 2005 estimate is likely a more accurate estimate of moose numbers in northeastern Minnesota.

The relationship between VOC and detection probability varied between 2004 and 2005, likely a result of differences in how VOC was determined. Utilization of a sightability model in the moose survey assumes that this relationship does not vary annually. We intend to collect additional information for the sightability model for at least three more years to test for annual variability and allow for testing of other possible models.

Given that the 2004 estimate was biased high, it should not be inferred that the 2005 population estimate represents an increase from 2003. We are using a new procedure to estimate moose numbers and the estimates are not directly comparable.

Prior to 1998 we initiated the survey each year as soon as there was 8 to 12 inches of snow on the ground in the survey area. Analyses (Lenarz 1998) indicated, however, that estimated population size declined as a function of the starting date. In 1993, for example, we began the survey on 4 January and the estimate was 4,421; in the following year, we began the survey on 9 December and the estimate increased to 6,005. A mid-winter shift to coniferous cover, where moose are more difficult to see, is common to moose populations throughout the boreal forest (Lynch 1975, Peek et al. 1976, Crête et al 1986, Peterson and Page 1993) and likely contributes to this bias. To deal with this relationship we changed the survey protocol in 1998 so that the survey was initiated on a consistent starting date in early January. With this change, we acknowledged that population estimates were biased low, but believed that results were more comparable among years. This year's estimate better accounts for differences in visibility during the survey and suggests that moose numbers are higher than we previously believed.

In September 2004, survey plot boundaries were re-drawn and all plots were stratified. As a group, wildlife managers, researchers, and tribal biologists from northeastern Minnesota reviewed GIS data, past survey data, and used personal knowledge to assign each of the new rectangular plots to 1 of 3 strata (low, medium, or high moose density). This re-stratification appears to have improved the precision of this year's estimate. In contrast to 2004, differences in mean moose/plot (corrected for sightability) agreed with strata designations of relative abundance. Differences in sampling variance indicate that the allocation of sample units was nearly optimal (Giudice and Fieberg, unpubl.).

The estimated bull:cow ratio (Table 1) was significantly lower than the average estimated for the previous 20 years (χ^2=120, t=15.03, $P<0.001$), in part because of the new methodology. Each observation is corrected based on the level of VOC to account for animals not observed. Because VOC values for cows tended to higher (χ^2_{bulls}=40, χ^2_{cows} = 46), the number of cows was increased generating a lower bull:cow ratio. The "uncorrected" estimate for this ratio was 1.10, a value more in line with previous estimates.

The estimated calf:cow ratio (Table 1) was significantly lower than the average estimated in the previous 20 years (χ^2=59, t=2.7, P=0.0071). The proportion of twins observed was not significantly different (χ^2=6.8%, t =-1.85, P=0.079). The low calf:cow ratios in both 2004 and 2005 were not caused by the new methodology. Calves continue to accompany cows during the winter and hence, their numbers would be corrected equally based on measurements of VOC.

In the January survey, only 3% of the moose exhibited hair loss, which is indicative of infestation with the winter tick (*Dermacentor albipictus*). Moose will often rub off patches of hair when high numbers of the tick begin to engorge. During the capture operation in early February, 73% of the moose (n=30) had bare patches and ticks were observed on 100% of the moose handled. None of the moose had lost more than 25% of their hair.

ACKNOWLEDGMENTS

These surveys would not be possible without the excellent partnership between the Division of Enforcement, the Division of Fish and Wildlife, the Fond du Lac Band and the 1854 Authority. In particular, I would like to thank Mike Trenhom for coordinating all of the helicopters and pilots; Dan Litchfield for coordinating flights and survey crews; and Mike Schrage (Fond du Lac) and Andy Edwards (1854 Authority) for securing supplemental survey funding from their respective groups. I also want to thank Dan Litchfield, Tom Rusch, Andy Edwards, Mike Schrage, and Kevin Carlisle who flew as observers; it takes dedication and a strong stomach. I thank John Fieberg and John Giudice for their analyses in creating and applying the sightability model. Finally, I want to thank Barry Sampson for the countless hours he has spent creating and improving the GIS survey maps

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MIGRATORY BIRD POPULATIONS

Wetland Wildlife Populations & Research
102 23rd Street
Bemidji, MN 56601
(218) 755-2973

2005 MINNESOTA WATERFOWL BREEDING POPULATION SURVEY

Steve Cordts, Wetland Wildlife & Populations Research

ABSTRACT

The number of breeding waterfowl in a portion of Minnesota has been estimated each year since 1968 as a part of the overall inventory of North American breeding waterfowl. The survey consists of aerial observations supplemented by more intensive ground counts on selected routes to determine the proportion of birds counted by the aerial crew. Procedures used are similar to those used elsewhere across the waterfowl breeding grounds. The 2005 aerial survey portion was flown from 3-29 May. Pond numbers increased 22% compared to 2004 and were similar to the long-term average. Estimated numbers of temporary (Type 1) wetlands increased 224% from 2004 but remained below (-58%) the long-term average. The mallard breeding population (238,500) declined significantly (-36%, P = 0.03) from 2004 (375,313). Mallard numbers were well below the 10-year average (-30%) but similar to the long-term average (223,368). The blue-winged teal breeding population (194,125) decreased significantly (-45%; P = 0.02) compared to 2004 (353,209) and was below the 10-year (-19%) and long-term (-15%) averages. Populations of "other" ducks (199,355), excluding scaup, decreased 29% and remained below the 10-year average (-21%) but above the long-term average (+12%). Wood ducks (35%), ring-necked ducks (30%), gadwalls (8%), and redheads (5%) accounted for most (78%) of the total population of "other" ducks. The estimate of total duck abundance (632,000), which excludes scaup, decreased 37% compared to 2004 and was 24% below the 10-year average but unchanged from the long-term average (630,000). Canada goose numbers (uncorrected for visibility) decreased 15% compared to 2004 but were 4% above the 10-year average and 109% above the long-term average. Declines in duck numbers, particularly blue-winged teal, were expected this year, in part because conditions during spring 2004 may have delayed migration of blue-winged teal through the state and resulted in some migrant teal being counted last year. Survey timing in 2005 may have also contributed to lower estimates of duck abundance. Weather delays resulted in most (70%) of the survey being flown after 15 May when leaf-out and other factors may have led to lower estimates of duck abundance.

METHODS

The aerial survey is based on a sampling design that includes three survey strata (Table 1, Figure 1). The strata cover 39% of the state area and are defined by density of lake basins (>10 acres) exclusive of the infertile northeastern lake region. The strata include the following:

Stratum I: high density, 21 or more lake basins per township.
Stratum II: moderate density, 11 to 20 lake basins per township.
Stratum III: low density, 2 to 10 lake basins per township.

Areas with less than two basins per township are not surveyed. Strata boundaries were based upon "An Inventory of Minnesota Lakes" (Minnesota Conserv. Dept. 1968:12). Standard procedures for the survey follow those outlined in "Standard Operating

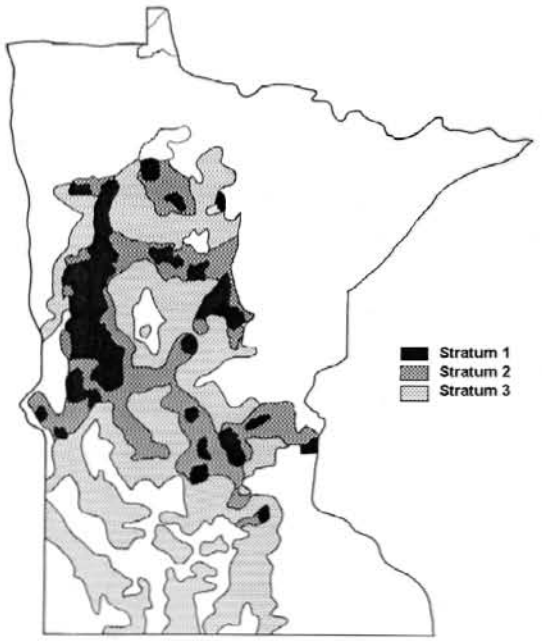

Figure 1. Location of waterfowl breeding population survey strata in Minnesota.

Breeding Ground Populations and Habitat Surveys in North America" (USFWS/CWS 1987). Changes in survey methodology were described in the 1989 Minnesota Waterfowl Breeding Population Survey report. Pond and waterfowl data for 1968-74 were calculated from Jessen (1969-72) and Maxson and Pace (1989).

All aerial transects in Strata I-III (Table 1) were flown using a Cessna 185 (N105NR). Wetlands were counted on the observer's side of the plane (0.125 mile wide transect) only; a correction factor obtained in 1989 was used to adjust previous data (1968-88) that was obtained when the observer counted wetlands on both sides of the plane (0.25 mile wide transect).

During the 2005 survey, we used the U.S. Fish and Wildlife Service computer program RECORD to capture data in the airplane (Jack Hodges, US Fish and Wildlife Service, Migratory Bird Management—Juneau, AK). We mounted 2 laptop computers in the rear of the plane and connected them to the plane GPS. Data were recorded and stored as WAV files through the plane intercom system (pilot) or a remote microphone/mouse system (observer). When the microphones were keyed, an associated GPS location was captured in a POS file so that each wetland or waterfowl observation would have an approximate GPS location associated with it. The TRANSCRIBE portion of the software, which allows users to transcribe WAV files and summarize data, was used for data entry.

Visibility correction factors (VCFs) were derived from intensive ground surveys on 14 selected routes flown by the aerial crew. Many of these routes use a county road as the mid-point of the transect boundary which aids in navigation and helps ensure the aerial and ground crews survey the same area. Ground routes each originally included approximately 100 wetland areas; however, drainage has reduced the number of wetlands on most of the routes. All observations from both ground crews and aerial crews were used to calculate the VCFs.

The SAS computer program was modified in 1992 to obtain standard errors for mallard and blue-winged teal breeding population estimates. These calculations were based upon SAS computer code written by Graham Smith, USFWS-Office of Migratory Bird Management. Estimates for 2004 and 2005 were compared using two-tailed Z-tests.

SURVEY CHRONOLOGY

The 2005 aerial survey portion began on 3 May in southern Minnesota and concluded in northern Minnesota on 29 May. The survey was completed in 12 days of flight time. Transects were flown on 3-4, 6, 8, 15-16, 20, 23-24, 26-27, and 29 May. Aerial flights began no earlier than 7 AM each day and were completed by 12 PM each day except on 29 May when 7 transects were flown between 4-8 PM. Most delays were due to low ceilings, high winds (>20 mph) or precipitation events. Most (70%) of the survey was completed after 15 May; the survey spanned the longest period (27 days) on record and the completion date (29 May) was the 2nd latest recorded since 1968.

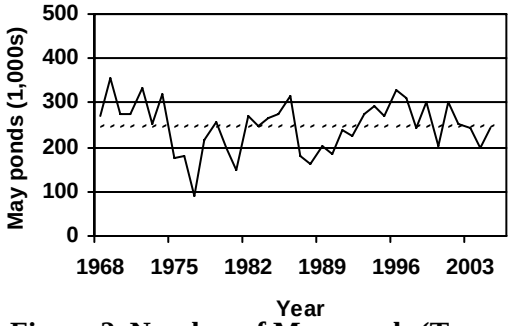

Figure 2. Number of May ponds (Types II-V) and long-term average (dashed line) in Minnesota, 1968-2005.

WEATHER AND HABITAT CONDITIONS

Wetland conditions in spring 2005 were much improved from 2004. Ice out on most lakes across the state occurred 5-10 days earlier than

average. April temperatures averaged 5.2°F above normal statewide and regional temperatures ranged from 3.2°F above average in northeast Minnesota to 5.9°F above average in the northwest and south central Minnesota (http://climate.umn.edu/cawap/monsum/0504.txt). April precipitation was near average statewide and ranged from 0.92 inches below normal in northeast to 0.56 inches above normal in the central portion of the state. May temperatures averaged about 3.2°F below normal statewide. May precipitation was 0.77 inches above normal statewide and ranged from 0.36 inches below normal in southeast Minnesota to 1.93 inches above normal in north central Minnesota (*http://climate.umn.edu/cawap/monsum/0505.txt*). Additional temperature and precipitation data during the survey period are provided in Appendix A.
In late April 2005, statewide topsoil moisture indices were rated as 4% very short or short, 84% adequate, and 12% surplus moisture. On May 29, statewide indices were rated as 1% short, 63% adequate and 36% surplus moisture. (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, *http://www.nass.usda.gov/mn/*). For comparison, in late April 2004 statewide topsoil moistures indices were rated as 42% very short or short, 57% adequate, and 1% surplus moisture.

Planting dates for row crops were later in 2005 than previous years. By May 1, 41% of the corn acres had been planted statewide compared to 64% in 2004 and 47% for the previous 5-year average. Rain events later in May delayed the initial cutting of alfalfa hay across the state. By June 5, only 9% of alfalfa hay had been cut compared to 12% in 2004 and a 5-year average of 28% (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, *http://www.nass.usda.gov/mn/*).

Wetland numbers (Type II-V) increased 22% from 2004 and were 8% below the 10-year average (Table 2) and 2% below the long-term average (Table 2; Figure 2). The number of temporary (Type 1) wetlands increased 224% from 2004 but remained 42% below the 10-year average and 58% below the long-term average.

Leaf-out dates were considerably earlier than 2004, which made visibility from the air extremely difficult, particularly along transects in the forested portion of the state.

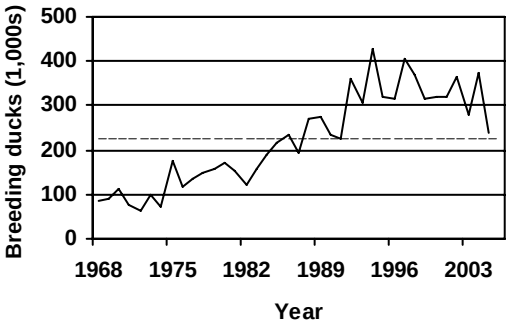

Figure 3. Mallard population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2005.

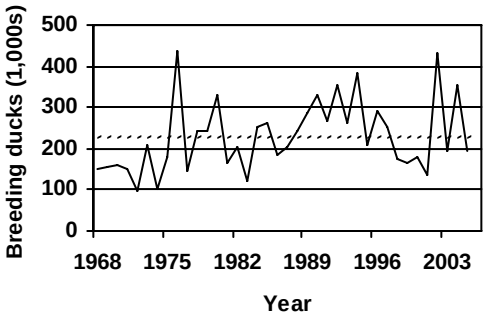

Figure 4. Blue-winged teal population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2005.

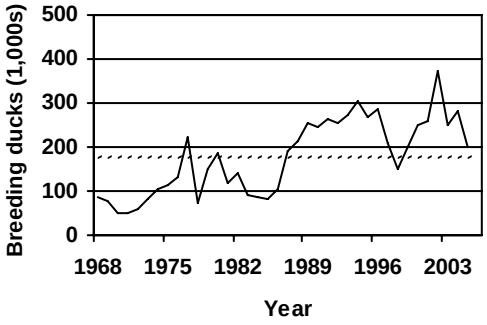

Figure 5. Other duck (excluding scaup) populations (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2005.

WATERFOWL POPULATIONS

The number of ducks, Canada geese, and coots, by stratum, are shown in Tables 3-5; total numbers are presented in Table 6. These estimates are not corrected for visibility bias.

The 2005 waterfowl breeding population estimate of mallards was 238,500 (SE = 28,595), which was 36% lower and significantly different (Z = 2.13, P = 0.03) than 2004 (Table 7, Figure 3). Mallard numbers were below (-30%) the 10-year average but 7% higher than the long-term average. Mallard abundance in 2005 was the lowest recorded since 1991.

The estimated blue-winged teal population was 194,125 (SE = 37,358), which was significantly less than 2004 (Z = 2.35, P = 0.02). Blue-winged teal numbers were 19% below the 10-year average and 15% below the long-term average (Table 7, Figure 4).

Other duck numbers (excluding scaup) declined 29% to 199,355 and were 12% above the long-term average and below the 10-year average (-21%) (Table 7, Figure 5). Scaup numbers were 46% lower than in 2004. The total duck population, excluding scaup, was 631,980, which was 37% lower than 2004, 24% below the 10-year average and unchanged from the long-term average (Table 7, Figure 6). This was the lowest total duck estimate since 1987.

Visibility Correction Factors (VCFs) were higher in 2005 for mallards (+22%), blue-winged teal (+7%), and "other" ducks (+45%) compared to 2004 (Table 7). Mallard VCFs were 36% higher than the long-term average and the 3rd highest on record. The blue-winged teal VCF was unchanged from the long-term average. The VCF for "other" ducks was 36% above long-term averages. Some differences were expected due to a change in pilots in 2005 and early leaf-out conditions, which decreased visibility on many transects.

Canada goose numbers (uncorrected for visibility) decreased 15% compared to 2004 and were 109% above the long-term average (Table 7, Figure 7). The VCF for Canada geese was 2.02, 28% higher than 2004 and 16% below the long-term average. The population estimate of Canada geese adjusted for visibility increased 8% (Table 7, Figure 8).

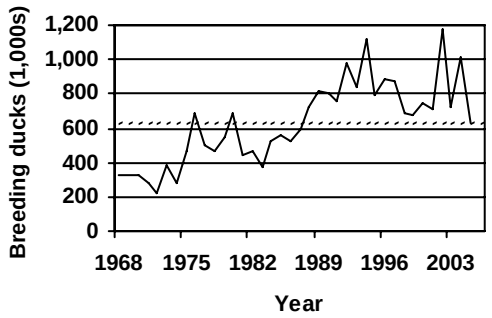

Figure 6. Total duck (excluding scaup) population estimate and long-term average (dashed line) in Minnesota, 1968-2005.

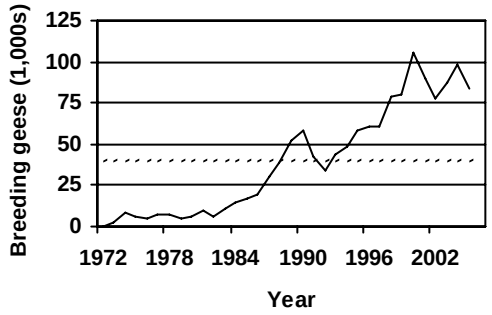

Figure 7. Canada goose population estimates (not adjusted for visibility bias) and long-term average in Minnesota, 1972-2005.

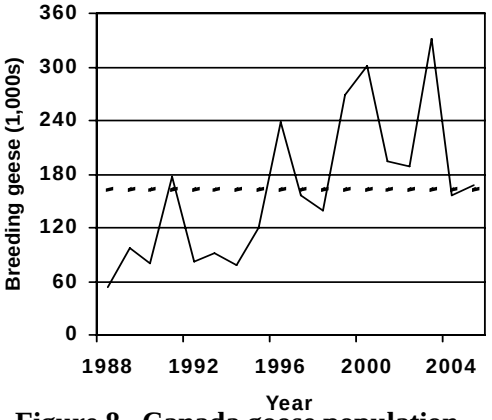

Figure 8. Canada goose population estimates (adjusted for visibility bias) and long-term average in Minnesota, 1988-2005.

The estimated coot population was 11,640, which was 74% below the long-term average.

SUMMARY

Wetland conditions were improved from 2004 but similar to long-term averages. Mallard abundance (238,500) declined significantly from 2004 (375,313) (P=0.02) but remained near the long-term average (223,000). Blue-winged teal abundance (194,125) declined significantly from 2004 (353,209) (P=0.02) and was below the long-term average (229,000). Duck abundance for most other species declined relative to 2004. Canada goose numbers, unadjusted for visibility bias, decreased 15% from 2004 but were 4% above the 10-year average.

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Table 1. Survey design for Minnesota, May 2005.[1]

	Stratum			
	1	2	3	Total
Survey design				
Square miles in stratum	5,075	7,970	17,671	30,716
Square miles in sample - waterfowl	182.75	136.375	203.125	522.25
Square miles in sample - ponds	91.375	68.1875	101.5625	261.125
Linear miles in sample	731.0	545.5	812.5	2,089.0
Number of transects in sample	39	36	40	115
Minimum transect length (miles)	5	6	7	5
Maximum transect length (miles)	36	35	39	39
Expansion Factor - waterfowl	27.770	58.442	86.996	
Expansion Factor - ponds	55.540	116.884	173.991	
Current year coverage				
Square miles in sample - waterfowl	182.75	136.375	203.125	522.25
Square miles in sample - ponds	91.375	68.1875	101.5625	261.125
Linear miles in sample	731.0	545.5	812.5	2,089.0
Number of transects in sample	39	36	40	115
Minimum transect length (miles)	5	6	7	5
Maximum transect length (miles)	36	35	39	39
Expansion Factor - waterfowl	27.770	58.442	86.996	
Expansion Factor - ponds	55.540	116.884	173.991	

[1] Also, 8 additional air-ground transects (total linear miles = 202.5, range - 10-60 miles) were flown to use in calculating the VCF

Table 2. Estimated number of May ponds (Type 1 and Types II-V) during Minnesota waterfowl breeding population survey, 1968-2005.

Year	Type I	Number of ponds [1]
1968		272,000
1969		358,000
1970		276,000
1971		277,000
1972		333,000
1973		251,000
1974		322,000
1975		175,000
1976		182,000
1977		91,000
1978		215,000
1979		259,000
1980		198,000
1981		150,000
1982		269,000
1983		249,000
1984		264,000
1985		274,000
1986		317,000
1987		178,000
1988		160,000
1989		203,000
1990		184,000
1991	82,862	237,000
1992	10,019	225,000
1993	199,870	274,000
1994	123,958	294,000
1995	140,432	272,000
1996	147,859	330,000
1997	30,751	310,000
1998	20,560	243,000
1999	152,747	301,000
2000	5,090	204,000
2001	66,444	303,000
2002	30,602	254,000
2003	34,005	244,000
2004	9,494	198,000
2005	30,764	241,000
10-year average (1996-2005)	52,832	262,800
Long-term average (1968-2005)	72,364	247,026
Change from:		
2004	+224%	+22%
10-year average	-42%	-8%
Long-term average	-58%	-2%

[1] Type II-V, correction factor from 1989 (123,000/203,000=0.606) used to adjust 1968-88 pond numbers. Ponds counted on 0.125 mile wide transect after 1988.

Table 3. Minnesota waterfowl breeding populations by species for Stratum I (high wetland density), expanded for area but not visibility, 1987-2005.

	Year																		
Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Dabblers:																			
Mallard	30,713	32,769	26,659	29,686	25,854	28,770	23,327	22,160	20,494	25,104	26,992	33,157	26,576	26,604	28,742	29,297	25,937	29,381	19,050
Black Duck	1,440	0	0	0	56	0	0	56	0	0	0	0	0	0	0	0	0	0	56
Gadwall	499	916	722	2,694	2,721	2,777	778	444	1,055	1,083	611	1,111	1,777	833	1,333	944	1,250	2,111	1,166
American Wigeon	0	111	83	222	0	56	0	0	194	0	0	56	56	56	111	0	56	555	167
Green-winged Teal	0	0	0	0	56	0	111	278	0	278	56	333	0	278	56	278	222	444	56
Blue-winged Teal	22,654	17,467	14,218	23,771	15,940	15,274	10,358	9,164	7,609	6,720	6,387	8,220	6,998	11,247	7,387	14,218	9,664	23,771	9,303
Northern Shoveler	831	278	722	778	1,777	1,000	111	278	111	1,277	1,500	500	555	1,055	305	1,277	278	1,166	333
Northern Pintail	111	500	222	444	389	222	611	167	167	167	111	111	167	167	389	56	111	56	0
Wood Duck	14,789	11,580	8,303	14,468	10,775	10,941	11,636	7,359	6,831	6,498	9,497	12,302	5,582	10,219	6,720	2,888	4,499	8,081	5,498
Dabbler Subtotal	71,037	63,621	50,929	72,063	57,568	59,040	46,932	39,906	36,461	41,127	45,154	55,790	41,711	50,459	45,043	48,958	42,017	65,565	35,629
Divers:																			
Redhead	1,800	1,277	2,638	3,305	2,555	3,499	1,416	1,972	639	722	778	944	500	583	1,444	750	333	805	666
Canvasback	1,357	722	2,888	1,972	2,305	2,111	2,777	3,166	3,860	1,166	1,333	1,777	2,971	1,222	2,027	1,833	1,333	666	972
Scaup	1,883	2,860	14,024	8,970	9,858	23,854	6,748	19,661	7,192	13,829	3,416	9,247	1,750	7,415	5,832	2,444	2,055	5,971	4,110
Ring-necked Duck	499	528	1,500	1,638	1,777	4,721	2,222	3,582	1,583	3,166	2,694	2,749	2,360	4,776	2,444	2,777	1,361	5,165	1,722
Goldeneye	0	56	167	56	0	222	111	222	111	167	0	111	56	56	333	111	0	222	222
Bufflehead	0	56	583	0	333	722	0	444	56	278	0	56	111	56	111	222	111	389	167
Ruddy Duck	323	666	722	1,500	361	500	1,250	639	167	139	528	11,052	972	0	83	1,305	417	305	1,222
Hooded Merganser	0	0	0	139	0	444	222	111	278	611	555	389	722	500	722	555	333	278	333
Large Merganser	0	0	0	0	56	111	0	56	0	0	56	0	0	0	111	0	972	0	111
Diver Subtotal	5,862	6,165	22,522	17,580	17,245	36,184	14,746	29,853	13,886	20,078	9,360	26,325	9,442	14,608	13,107	9,997	6,915	13,801	9,525
Total Ducks	76,899	69,786	73,451	89,643	74,813	95,224	61,678	69,759	50,347	61,205	54,514	82,115	51,153	65,067	58,150	58,955	48,932	79,366	45,154
Other:																			
Coot	1,163	3,777	22,799	27,326	11,108	11,386	1,166	528	611	3,055	5,054	555	83	3,999	1,722	2,888	2,666	21,411	2,444
Canada Goose	8,059	12,024	14,663	16,523	9,803	10,914	13,135	12,802	14,413	12,774	10,330	16,967	19,495	22,160	24,882	24,104	22,160	23,160	22,938

Table 4. Minnesota waterfowl breeding populations by species for Stratum II (medium wetland density), expanded for area but not visibility, 1987-2005.

	Year																		
Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Dabblers:																			
Mallard	50,260	41,085	42,896	39,682	39,215	45,585	37,111	42,896	42,896	48,507	54,643	53,942	52,247	49,559	44,650	43,773	34,715	44,474	26,883
Black Duck	0	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0
Gadwall	0	584	1,344	2,805	1,870	2,045	1,286	1,403	1,052	935	468	584	1,519	3,039	1,636	701	584	3,565	584
American Wigeon	0	3,507	0	234	701	351	0	117	0	468	351	818	0	468	0	0	0	2,513	117
Green-winged Teal	234	117	117	0	0	0	351	117	0	935	234	351	117	117	117	468	234	234	0
Blue-winged Teal	29,455	30,039	25,189	31,208	24,663	26,766	18,818	19,227	10,636	13,851	13,792	13,208	10,578	19,637	9,701	21,390	15,955	30,624	11,513
Northern Shoveler	701	1,695	2,338	2,104	3,857	1,636	1,286	935	818	1,636	2,571	701	2,104	4,675	1,052	2,221	1,403	1,753	234
Northern Pintail	818	468	701	701	701	234	351	468	234	117	234	468	117	117	117	0	117	0	0
Wood Duck	10,052	14,494	10,578	14,903	8,065	11,221	9,468	9,409	6,662	8,708	11,338	10,520	19,753	13,792	7,831	5,143	4,558	8,766	3,273
Dabbler subtotal	91,520	91,989	83,163	91,637	79,072	87,838	68,671	74,572	62,298	75,157	83,631	80,592	86,435	91,404	65,221	73,696	57,566	91,929	42,604
Divers:																			
Redhead	701	1,169	1,636	4,325	1,519	3,097	2,279	3,799	1,403	1,110	1,987	935	1,636	2,805	2,455	234	584	1,110	292
Canvasback	0	935	584	234	117	0	584	1,052	0	234	701	117	117	935	0	468	1,052	234	0
Scaup	5,552	3,857	25,598	25,189	13,383	22,208	877	14,085	7,831	21,916	18,935	4,032	3,331	6,779	3,039	5,961	2,279	7,188	2,981
Ring-necked Duck	1,461	2,104	3,214	2,513	2,104	2,922	3,156	3,331	1,403	7,714	3,565	2,279	2,221	5,610	3,799	6,370	2,455	5,377	1,929
Goldeneye	234	468	935	351	818	351	584	701	701	1,753	818	234	935	584	468	234	234	351	117
Bufflehead	0	0	701	234	0	526	117	234	0	117	117	0	0	0	0	1,169	117	468	351
Ruddy Duck	0	2,162	3,390	1,227	4,558	1,227	3,390	409	117	58	117	0	468	0	0	1,870	2,688	0	351
Hooded Merganser	0	234	0	0	0	351	584	468	117	234	468	117	701	935	1,403	701	701	234	234
Large Merganser	0	0	0	0	0	117	0	0	0	0	0	0	0	117	117	0	0	234	351
Diver subtotal	7,948	10,929	36,058	34,073	22,499	30,799	11,571	24,079	11,572	33,136	26,708	7,714	9,409	17,765	11,281	17,007	10,110	15,196	6,606
Total Ducks	99,468	102,918	119,221	125,710	101,571	118,637	80,242	98,651	73,870	108,293	110,339	88,306	95,844	109,169	76,502	90,703	67,676	107,125	49,210
Other:																			
Coot	1,169	2,338	3,740	11,630	5,552	11,162	5,201	1,461	526	7,013	5,026	643	234	1,110	468	4,909	1,519	8,007	584
Canada Goose	4,675	5,143	10,227	11,279	8,591	7,305	9,409	12,565	12,682	13,559	16,364	19,812	18,585	25,831	24,604	20,688	22,091	28,461	20,688

Table 5. Minnesota waterfowl breeding populations by species for Stratum III (low wetland density), expanded for area but not visibility, 1987-2005.

	Year																		
Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Dabblers:																			
Mallard	84,908	81,689	54,807	71,511	63,246	69,771	63,333	73,425	79,166	79,862	78,993	101,873	90,390	81,690	72,642	72,121	55,156	84,561	36,539
Black Duck	0	0	0	174	0	0	0	0	0	0	0	0	0	0	0	0	0	174	0
Gadwall	0	1,914	5,220	8,787	2,262	2,436	1,218	2,610	3,306	3,306	2,436	3,045	2,436	2,610	10,701	3,306	1,566	6,960	2,001
American Wigeon	0	1,827	174	957	696	522	348	1,218	0	1,044	348	696	0	522	174	1,218	174	1,566	1,044
Green-winged Teal	1,566	0	522	0	348	0	348	174	0	957	348	174	0	1,218	1,392	522	174	0	174
Blue-winged Teal	50,371	53,677	50,893	52,198	50,893	51,067	35,494	41,932	29,492	36,625	25,316	26,360	18,530	29,405	20,618	56,374	21,140	39,758	27,578
Northern Shoveler	3,306	3,654	6,264	23,663	5,568	11,048	1,914	2,784	5,307	12,701	11,049	4,176	4,002	20,444	10,701	6,264	870	3,828	348
Northern Pintail	174	3,219	696	696	1,914	870	1,218	696	174	870	522	870	870	696	522	0	174	348	174
Wood Duck	30,449	21,662	23,141	25,055	17,747	24,185	25,229	23,228	16,355	27,926	14,268	23,837	20,531	25,055	17,225	13,572	12,702	20,705	7,482
Dabbler subtotal	170,774	167,642	141,717	183,041	142,674	159,899	129,102	146,067	133,800	163,291	133,280	161,031	136,759	161,640	133,975	153,377	91,956	157,900	75,340
Divers:																			
Redhead	696	609	2,175	3,219	2,610	6,438	1,827	2,958	7,134	1,044	1,044	2,001	3,480	2,523	3,654	1,305	174	1,740	1,479
Canvasback	0	174	174	1,044	696	0	348	696	174	1,392	0	3,306	174	3,915	522	696	1,131	2,784	0
Scaup	2,871	3,828	32,276	5,916	17,486	20,009	4,176	23,924	13,397	29,840	8,787	15,137	8,961	18,182	6,873	4,611	783	17,747	5,307
Ring-necked Duck	2,349	1,566	2,088	2,088	3,480	3,654	2,871	5,568	1,044	12,875	3,654	2,958	1,479	8,178	8,526	7,395	1,479	5,133	10,179
Goldeneye	174	522	870	609	696	1,044	696	783	1,479	1,914	522	696	696	1,044	1,566	3,132	1,305	696	1,044
Bufflehead	0	0	1,392	0	552	696	348	696	0	1,044	174	348	0	0	0	1,218	783	2,088	0
Ruddy Duck	2,175	1,566	1,305	1,218	9,396	6,786	1,218	2,175	2,349	1,740	348	0	174	0	696	18,878	87	2,262	870
Hooded Merganser	0	174	0	174	348	348	348	696	1,044	1,566	696	696	1,218	957	174	2,175	174	1,740	1,218
Large Merganser	0	0	0	0	0	348	0	174	174	0	0	0	0	0	0	522	0	0	261
Diver subtotal	8,265	8,439	40,280	14,268	35,264	39,323	11,832	37,670	26,795	51,415	15,225	25,142	16,182	34,799	22,011	39,932	5,916	34,190	20,358
Total Ducks	179,039	176,081	181,997	197,309	177,938	199,222	140,934	183,737	160,595	214,706	148,505	186,173	152,941	196,439	155,986	193,309	97,872	192,090	95,698
Other:																			
Coot	1,914	59,940	24,794	11,918	47,587	62,463	12,179	12,788	3,828	182,953	24,620	5,133	14,702	67,684	3,132	14,007	7,134	77,427	8,613
Canada Goose	17,225	21,923	27,056	30,623	23,837	15,746	21,314	23,228	30,971	34,537	33,755	42,368	41,933	57,940	39,932	33,407	43,412	46,717	39,758

Table 6. Minnesota waterfowl breeding populations by species for Stratum I-III combined, expanded for area coverage but not for visibility, 1987-2005.

	Year																		
Species	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Dabblers:																			
Mallard	165,881	155,543	124,362	140,879	128,315	144,126	123,771	138,481	142,556	153,473	160,628	188,972	169,213	157,853	146,034	145,191	115,974	158,416	82,472
Black Duck	1,440	0	0	174	56	0	0	56	0	0	0	0	0	0	117	0	0	174	56
Gadwall	499	3,414	7,286	14,286	6,853	7,258	3,282	4,457	5,413	5,324	3,515	4,740	5,733	6,482	13,670	4,951	3,400	12,635	3,752
American Wigeon	0	5,445	257	1,413	1,397	929	348	1,335	194	1,512	699	1,570	56	1,045	285	1,218	230	4,634	1,327
Green-winged Teal	1,800	117	639	0	404	0	810	569	0	2,170	638	858	117	1,613	1,564	1,267	630	678	230
Blue-winged Teal	102,480	101,183	90,300	107,177	91,496	93,107	64,670	70,323	47,737	57,196	45,495	47,788	36,106	60,288	37,706	91,982	46,759	94,152	48,394
Northern Shoveler	4,838	5,627	9,324	26,545	11,202	13,684	3,311	3,997	6,236	15,614	15,120	5,377	6,661	26,175	12,058	9,762	2,550	6,747	915
Northern Pintail	1,103	4,187	1,619	1,841	3,004	1,326	2,180	1,331	575	1,154	867	1,449	1,153	979	1,028	56	402	404	174
Wood Duck	55,290	47,736	42,022	54,426	36,587	46,347	46,333	39,996	29,848	43,132	35,103	46,659	45,866	49,067	31,777	21,603	21,759	37,553	16,253
Dabbler subtotal	333,331	323,252	275,809	346,741	279,314	306,777	244,705	260,545	232,559	279,575	262,065	297,413	264,905	303,502	244,239	276,030	191,704	315,393	153,573
Divers:																			
Redhead	3,197	3,055	6,449	10,849	6,684	13,034	5,522	8,729	9,176	2,876	3,809	3,880	5,616	5,911	7,552	2,289	1,092	3,656	2,438
Canvasback	1,357	1,831	3,646	3,250	3,118	2,111	3,709	4,914	4,034	2,792	2,034	5,200	3,262	6,072	2,549	2,996	3,516	3,684	972
Scaup	10,306	10,545	71,898	40,075	40,727	66,071	11,801	57,670	28,420	65,585	31,138	28,416	14,041	32,376	15,743	13,016	5,117	30,906	12,397
Ring-necked Duck	4,309	4,198	6,802	6,239	7,361	11,297	8,249	12,481	4,030	23,755	9,913	7,986	6,060	18,565	14,768	16,542	5,294	15,675	13,829
Goldeneye	408	1,046	1,972	1,016	1,514	1,617	1,391	1,706	2,291	3,834	1,340	1,041	1,687	1,684	2,367	3,477	1,539	1,269	1,383
Bufflehead	0	56	2,676	234	885	1,944	465	1,374	56	1,439	291	404	111	56	111	2,609	1,011	2,944	517
Ruddy Duck	2,498	4,394	5,417	3,945	14,315	8,513	5,858	3,223	2,633	1,937	993	11,052	1,613	0	779	22,054	3,192	2,567	2,443
Hooded Merganser	0	408	0	313	348	1,143	1,154	1,275	1,439	2,411	1,719	1,202	2,641	2,392	2,299	3,432	1,209	2,251	1,785
Large Merganser	0	0	0	0	56	576	0	230	174	0	56	0	0	117	228	522	972	234	723
Diver subtotal	22,075	25,533	98,860	65,921	75,008	106,306	38,149	91,602	52,253	104,629	51,293	59,181	35,031	67,173	46,396	66,937	22,942	63,186	36,487
Total Ducks	355,406	348,785	374,669	412,662	354,322	413,083	282,854	352,147	284,812	384,204	313,358	356,594	299,936	370,675	290,635	342,967	214,646	378,579	190,060
Other:																			
Coot	4,246	66,055	51,333	50,874	64,247	85,011	18,546	14,777	4,965	193,021	34,700	6,331	15,020	72,793	5,321	21,804	11,319	106,845	11,641
Canada Goose	29,959	39,090	51,946	58,425	42,231	33,965	43,858	48,595	58,066	60,870	60,449	79,147	80,012	105,932	89,418	78,200	87,663	98,339	83,384

Table 7. Estimated waterfowl populations during the Minnesota Waterfowl breeding population survey, 1968-2005.

	Mallard				Blue-winged teal				Other ducks (exc. scaup)		
Year	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI
1968[2]	41,030	2.04	83,701		61,943	2.44	151,141		41,419	2.08	86,152
1969[2]	53,167	1.67	88,789		45,180	3.45	155,871		34,605	2.27	78,553
1970[2]	67,463	1.69	113,945		31,682	5.06	160,343		30,822	1.62	49,932
1971[2]	47,702	1.65	78,470		42,445	3.49	148,218		29,520	1.71	50,450
1972[2]	49,137	1.27	62,158		49,386	1.96	96,895		34,405	1.69	58,127
1973[3]	56,607	1.76	99,832		53,095	3.92	208,292		33,155	2.45	81,362
1974[3]	44,866	1.62	72,826		39,402	2.59	102,169		38,266	2.79	106,609
1975	55,093	3.19	175,774		45,948	3.95	181,375		34,585	3.31	114,459
1976	69,844	1.69	117,806		89,370	4.87	435,607		39,022	3.35	130,669
1977	60,617	2.21	134,164		37,391	3.86	144,187		18,633	11.95	222,748
1978	56,152	2.61	146,781		28,491	8.53	242,923		22,034	3.3	72,798
1979	61,743	2.57	158,704	28,668	46,708	5.21	243,167	62,226	39,749	3.79	150,545
1980	83,775	2.05	171,957	22,312	50,966	6.49	330,616	40,571	47,322	3.97	188,020
1981	79,562	1.95	154,844	16,402	64,546	2.59	167,258	23,835	30,947	3.8	117,667
1982	51,655	2.33	120,527	17,078	42,772	4.75	203,167	34,503	32,726	4.32	141,501
1983	73,424	2.12	155,762	15,419	42,728	2.81	119,980	20,809	32,240	2.84	91,400
1984	94,514	1.99	188,149	24,065	89,896	2.82	253,821	33,286	40,326	2.18	87,709
1985	96,045	2.26	216,908	32,935	90,453	2.91	263,607	33,369	35,018	2.35	82,383
1986	108,328	2.16	233,598	30,384	68,235	2.69	183,338	28,204	38,900	2.67	103,851
1987	165,881	1.16	192,289	23,500	102,480	1.99	203,718	32,289	76,746	2.51	192,947
1988	155,543	1.75	271,718	38,675	101,183	2.38	240,532	39,512	81,514	2.61	212,988
1989	124,362	2.19	272,968	26,508	90,300	3.16	285,760	39,834	88,109	2.89	254,887
1990	140,879	1.65	232,059	26,316	107,177	3.09	330,659	44,455	124,531	1.97	245,152
1991	128,315	1.75	224,953	28,832	91,496	2.9	265,138	42,057	93,784	2.81	263,619
1992	144,126	2.5	360,870	43,621	93,107	3.83	356,679	53,619	109,779	2.33	255,774
1993	123,771	2.47	305,838	31,103	64,670	4.02	260,070	36,307	82,612	3.28	271,263
1994	138,482	3.08	426,455	66,240	70,324	5.48	385,256	82,580	85,671	3.55	303,847
1995	142,557	2.24	319,433	48,124	47,737	4.4	210,043	40,531	66,096	4.05	267,668
1996	153,473	2.05	314,816	53,461	57,196	5.05	288,913	64,064	107,950	2.64	285,328
1997	160,629	2.54	407,413	65,771	45,496	5.57	253,408	67,526	76,095	2.72	207,316
1998	188,972	1.95	368,450	61,513	47,788	3.66	174,848	33,855	91,478	1.64	149,786
1999	169,213	1.87	316,394	51,651	36,106	4.53	163,499	36,124	80,459	2.49	200,570
2000	157,853	2.02	318,134	36,857	60,288	2.97	179,055	32,189	120,158	2.09	250,590
2001	146,034	2.2	320,560	39,541	37,706	3.6	135,742	19,631	91,152	2.85	260,051
2002	145,191	2.53	366,625	46,264	91,982	4.67	429,934	87,312	92,778	4.04	374,978
2003	115,974	2.42	280,517	34,556	46,759	4.13	193,269	36,176	46,796	5.30	248,019
2004	158,416	2.37	375,313	57,591	94,152	3.75	353,209	56,539	95,105	2.94	279,802
2005	82,472	2.89	238,500	28,595	48,394	4.01	194,125	37,358	46,797	4.26	199,355
Averages:											
10-year (1995-2004)	153,831	2.22	338,766	49,533	56,521	4.23	238,192	47,395	86,807	3.08	252,411
Long-term (1968-2005)	105,075	2.12	223,368	36,888	61,973	3.88	228,838	42,917	60,824	3.14	177,339
% change from:											
2004	-48%	+22%	-36%	-50%	-49%	+7%	-45%	-34%	-51%	+45%	-29%
10-year average	-46%	+30%	-30%	-42%	-14%	-5%	-19%	-21%	-46%	+38%	-21%
Long-term average	-22%	+36%	+7%	-23%	-22%	+3%	-15%	-13%	-23%	+36%	+12%

[1] Unad. PI - unadjusted population index, VCF - Visibility Correction Factor, PI - adjusted population index, SE - standard error.
[2] Calculated from data in Waterfowl breeding ground survey reports, 1968 through 1972, from Minn. Game Res. Quarterly Reps. 1968 and 1969 other duck VCF is total duck VCF.
[3] Calculated from data in Maxson and Pace (1989).

Table 7. Continued.

	Scaup			Total ducks (ex. scaup)		Total Ducks		Canada geese		
Year	Unad. PI	VCF	PI	Unad. PI	PI	Unad. PI	PI	Unad. PI	VCF	PI
1968	22,834	2.08	47,495	144,392	320,994	167,226	368,488			
1969	9,719	2.27	22,062	132,952	323,213	142,671	345,275			
1970	12,105	1.62	19,610	129,967	324,219	142,072	343,829			
1971	5,713	1.71	9,764	119,667	277,137	125,380	286,901			
1972	12,062	1.69	20,379	132,928	217,181	144,990	237,560	366		
1973	10,633	2.45	26,093	142,857	389,486	153,490	415,580	1,965		
1974	18,378	2.79	51,201	122,534	281,605	140,912	332,806	8,835		
1975	9,563	3.31	31,649	135,626	471,608	145,189	503,257	5,997		
1976	22,494	3.35	75,323	198,236	684,082	220,730	759,405	5,409		
1977	2,971	11.95	35,517	116,641	501,099	119,612	536,616	7,279		
1978	14,774	3.35	48,812	106,677	462,502	121,451	511,314	7,865		
1979	92,134	3.79	348,948	148,200	552,416	240,334	901,364	4,843		
1980	12,602	3.97	50,070	182,063	690,593	194,665	740,663	6,307		
1981	19,844	3.88	75,451	175,055	439,769	194,899	515,220	10,156		
1982	21,556	4.32	93,204	127,153	465,195	148,709	558,399	6,600		
1983	9,551	2.84	27,077	148,392	367,142	157,943	394,219	11,081		
1984	15,683	2.18	34,111	224,736	529,679	240,419	563,790	14,051		
1985	7,409	2.35	17,430	221,516	562,898	228,925	580,328	16,658		
1986	6,247	2.67	16,678	215,463	520,787	221,710	537,465	19,599		
1987	10,306	2.51	25,910	345,107	588,954	355,413	614,864	29,960		
1988	10,545	2.61	27,553	338,240	725,238	348,785	752,791	39,057	1.36	53,004
1989	71,898	2.89	207,991	302,771	813,615	374,669	1,021,606	51,946	1.88	97,898
1990	40,075	1.97	78,892	372,587	807,870	412,662	886,761	58,425	1.37	80,147
1991	40,727	2.81	114,480	313,595	753,710	354,322	868,191	42,231	4.18	176,465
1992	66,071	2.33	153,939	347,012	973,323	413,083	1,127,262	33,965	2.43	82,486
1993	11,801	3.28	38,750	271,053	837,172	282,854	875,921	43,858	2.08	91,369
1994	57,670	3.55	204,536	294,477	1,115,558	352,147	1,320,095	48,595	1.68	77,878
1995	28,421	4.05	115,096	256,390	797,144	284,811	912,241	58,065	2.08	120,775
1996	65,585	2.64	173,351	318,619	889,057	384,204	1,062,408	60,870	3.92	238,708
1997	31,138	2.72	84,834	282,220	868,137	313,358	952,971	60,449	2.59	156,817
1998	28,416	1.64	46,528	328,238	693,084	356,654	739,612	79,147	1.75	138,507
1999	14,041	2.49	35,002	285,778	680,463	299,819	715,465	80,012	3.35	268,168
2000	32,376	2.10	67,520	338,299	747,779	370,675	815,299	105,932	2.84	301,298
2001	15,743	2.85	44,914	274,892	716,353	290,653	761,267	89,418	2.17	193,887
2002	13,016	4.04	52,606	327,951	1,171,537	340,967	1,224,143	78,200	2.42	189,353
2003	5,117	5.30	27,120	209,529	721,805	214,646	748,925	87,663	3.78	331,094
2004	30,906	2.94	90,926	347,673	1,008,324	378,579	1,099,250	98,339	1.58	155,859
2005	12,397	3.98	49,340	177,663	631,980	190,060	681,320	83,384	2.02	168,469
Averages:										
10-year (1995-2004)	26,476	3.08	73,790	296,959	829,368	323,437	903,158	79,810	2.65	209,447
Long-term (1968-2005)	24,014	3.14	70,794	227,820	629,545	251,834	700,339	39,898	2.42	162,343
% change from:										
2004	-60%	+35%	-46%	-49%	-37%	-50%	-38%	-15%	+28%	+8%
10-year average	-53%	+29%	-33%	-40%	-24%	-41%	-25%	+4%	-24%	-20%
Long-term average	-48%	+27%	-30%	-22%	0	-25%	-3%	+109%	-16%	+4%

[1] Unad. PI - unadjusted population index, VCF - Visibility Correction Factor, PI - adjusted population index, SE - standard error.

Appendix A. Temperature and precipitation at selected cities in, or adjacent to, Minnesota May Waterfowl Survey Strata, 1 May-29 May 2005 (Source: Minnesota Climatological Working Group, http://climate.umn.edu/cawap/nwssum/nwssum.asp).

		Temperature (F) for week ending:										Total weekly precipitation (in)					Precipitation departure from normal
		1-May		8-May		15-May		22-May		29-May							
Region	City	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	1-May	8-May	15-May	22-May	29-May	1 Apr-29 May
NW	Crookston	36.2	-12.3	47.2	-4.8	48.2	-6.9	60.5	2.7	54.4	-5.8	0.02	0.05	1.00	1.49	0.66	0.07
NC	Grand Rapids	36.1	-10.9	52.3	2.1	45.2	-7.8	54.4	-1.2	54.4	-3.4	0.40	0.24	1.02	1.08	2.81	1.77
	Itasca	36.2	-8.2	45.4	-2.5	47.6	-3.5	55.3	1.3	53.8	-2.6	0.29	0.15	0.93	0.53	2.55	1.45
WC	Alexandria	38.2	-10.7	53.2	1.1	46.0	-9.0	58.6	1.0	55.3	-4.6	0.04	0.37	0.57	0.61	1.00	0.40
	Fergus Falls	38.8	-10.5	49.2	-3.4	47.7	-7.8	60.2	2.0	56.5	-3.9	0.00	0.17	2.30	0.50	1.50	2.20
	Montivideo	40.5	-10.0	50.5	-3.3	47.2	-9.6	61.7	2.2	57.4	-4.6	0.10	0.35	1.94	1.37	0.81	3.15
	Morris	39.6	-10.8	49.8	-3.8	48.0	-8.6	58.6	-0.6	57.9	-3.7	0.01	0.15	0.72	0.68	0.54	0.28
C	Becker	41.4	-8.2	51.2	-1.4	51.3	-4.1	56.8	-1.0	58.4	-1.6	0.08	0.11	1.02	1.00	1.22	-0.18
	Hutchinson	42.2	-9.1	52.2	-2.3	51.6	-5.9	57.7	-2.4	59.2	-3.3	0.14	0.15	1.07	1.51	0.75	1.54
	St. Cloud	39.8	-9.8	53.6	1.0	48.8	-6.6	58.0	0.2	57.6	-2.4	0.06	0.26	0.66	1.14	1.25	0.54
	Staples	37.7	-10.4	48.1	-2.9	48.8	-5.0	55.4	-0.9	55.1	-3.3	0.08	0.02	0.45	0.57	2.34	1.78
	Willmar	41.8	-8.7	50.4	-3.3	49.8	-6.9	57.8	-1.6	59.1	-2.8	0.05	0.52	0.99	0.58	1.03	0.95
EC	Aitkin	37.3	-9.4	46.8	-2.9	47.4	-5.0	51.4	-3.5	59.0	1.8	0.29	0.11	0.38	0.91	1.44	-0.03
	Cambridge	missing															
	Msp Airport	41.5	-10.8	55.8	0.6	50.8	-7.2	59.4	-1.1	59.5	-3.3	0.21	0.26	1.34	0.87	0.31	-0.21
SW	Pipestone	39.6	-10.8	52.0	-1.5	49.0	-7.3	62.5	3.5	58.2	-3.2	0.07	0.63	1.11	1.04	0.94	0.49
	Redwood Falls	41.4	-11.4	54.4	-1.6	48.4	-10.5	61.7	0.1	59.0	-5.1	0.10	1.08	1.45	1.47	0.18	1.33
	Worthington	40.7	-8.7	52.0	-0.7	50.6	-5.1	60.6	2.0	59.4	-1.7	0.08	0.94	1.55	2.03	0.54	3.03
SC	Faribault	41.3	-8.6	49.9	-3.1	52.4	-3.5	56.0	-2.7	59.5	-1.8	0.28	0.63	2.29	0.95	0.52	0.55
	Waseca	41.2	-9.6	52.6	-1.4	51.3	-5.7	57.1	-2.6	59.8	-2.4	0.33	0.92	3.25	1.08	0.74	2.44
	Winnebago	43.6	-7.4	52.6	-1.6	51.8	-5.3	58.9	-1.0	60.2	-2.3	0.26	1.20	4.75	0.70	0.78	4.58
Statewide		39.5	-9.6	50.5	-1.7	48.7	-6.3	57.3	-0.4	56.8	-3.2	0.20	0.45	1.40	1.02	0.96	

[1] Average temperature (°F) for the week ending on the date shown.
[2] Departure from normal temperature.
m = missing data

The following waterfowl information is taken from the U.S. Fish and Wildlife Service report Waterfowl Population , 2005 by Pamela R. Garrettson, Timothy J. Moser, and Khristi Wilkins. The entire report is available on the Division of Migratory Bird Management home pate (http://migratorybirds.fws.gov).

Table 1. Canada goose population indices (in thousands) of the eastern prairie flock, 1971-2005 (from: U.S. Fish and Wildlife Service. 2005. Waterfowl population status, 2005. U.S. Department of the Interior, Washington, D.C. U.S.A.).

Year	Population[a,b]
1971-72	125,000
1972-73	138,000
1973-74	120,000
1974-75	144,000
1975-76	216,000
1976-77	164,000
1977-78	180,000
1978-79	99,000
1979-80	n.a.
1980-81	125,000
1981-82	132,000
1982-83	155,000
1983-84	136,000
1984-85	158,000
1985-86	195,000
1986-87	203,000
1987-88	209,000
1988-89	210,000
1989-90	232,000
1990-91	212,000
1991-92	202,000
1992-93	157,000
1993-94	211,000
1994-95	205,000
1995-96	190,000
1996-97	199,000
1997-98	126,000
1998-99	207,000
1999-00	275,000
2000-01	215,000
2001-02	216,000
2002-03	229,000
2003-04	291,000
2004-05	255,000

[a] Surveys conducted in Spring.
[b] Indirect or preliminary estimate.

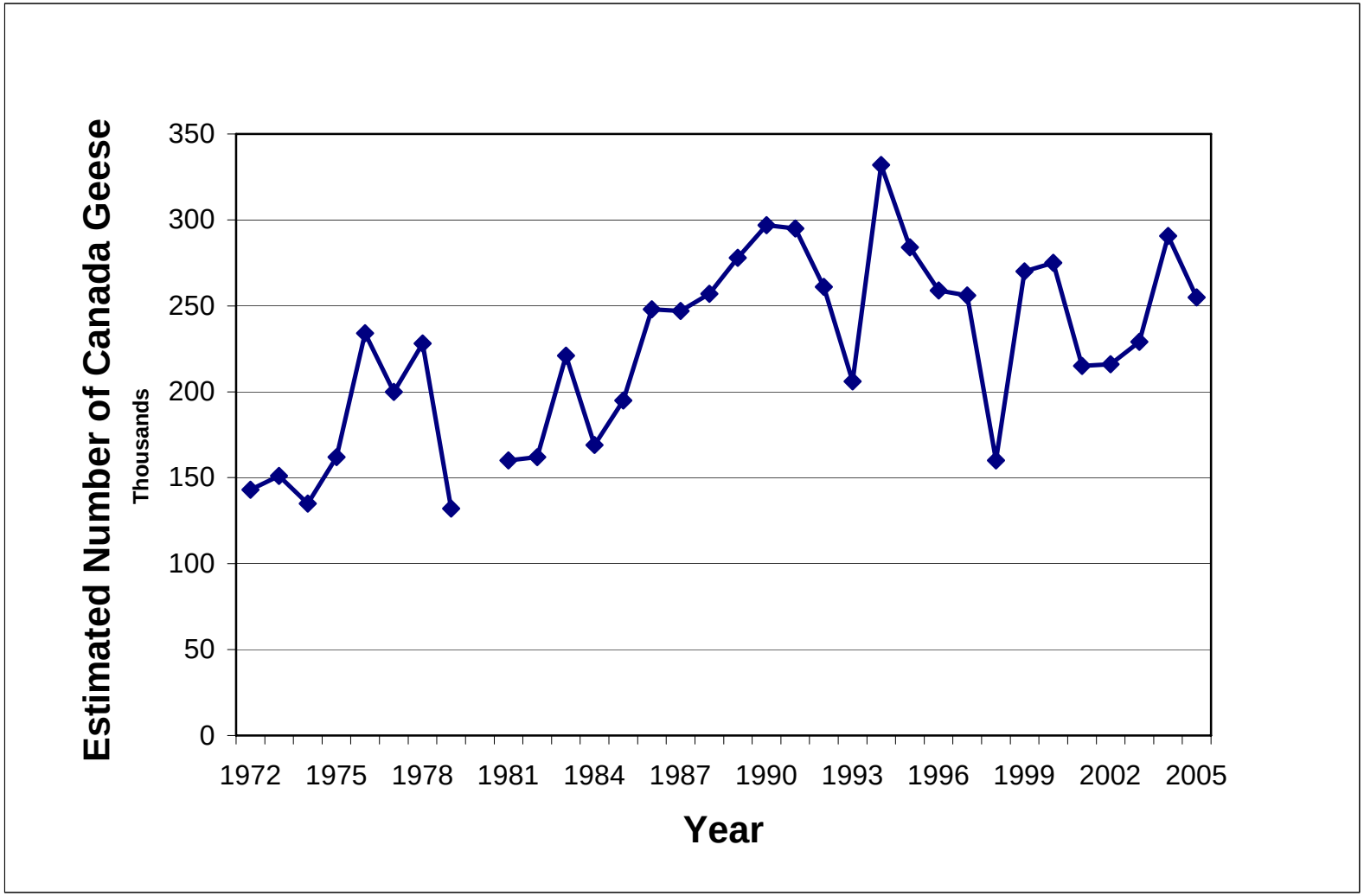

Figure 1. Breeding ground survey estimates of the Eastern Prairie Population of Canada geese, 1972-2005. (from: U.S. Fish and Wildlife Service. 2005. Waterfowl population status, 2005. U.S. Department of the Interior, Washington, D.C. U.S.A.). Surveys conducted in spring. Indirect or preliminary estimates. Data not available for 1980.

Table 2. Estimated number of May ponds (adjusted for visibility) in Prairie Canada (portions of Alberta, Saskatchewan and Manitoba) 1961-2005 and north-central U.S. (North Dakota, South Dakota and Montana) 1974-2005. (from: U.S. Fish and Wildlife Service. 2005. Waterfowl population status, 2005. U.S. Department of the Interior, Washington, D.C. U.S.A.)

	Ponds (thousands)	
Year	Prairie Canada	North Central U.S.[a]
1961	1,977	--
1962	2,369	--
1963	2,482	--
1964	3,371	--
1965	4,379	--
1966	4,555	--
1967	4,691	--
1968	1,986	--
1969	3,548	--
1970	4,875	--
1971	4,053	--
1972	4,009	--
1973	2,950	--
1974	6,390	1,841
1975	5,320	1,911
1976	4,599	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	2,473	1,766
1985	4,283	1,327
1986	4,025	1,735
1987	2,524	1,348
1988	2,110	791
1989	1,693	1,290
1990	2,817	691
1991	2,494	706
1992	2,784	825
1993	2,261	1,351
1994	3,769	2,216
1995	3,893	2,443
1996	5,003	2,480
1997	5,061	2,397
1998	2,522	2,065
1999	3,862	2,842
2000	2,422	1,524
2001	2,747	1,893
2002	1,439	1,281
2003	3,522	1,668
2004	2,513	1,407
2005	3,921	1,461
Average	3,381	1,522
2005	3,921	1,461
% Change in 2005 from:		
2004	+ 56	+ 4
Long term Average	+ 16	– 4

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

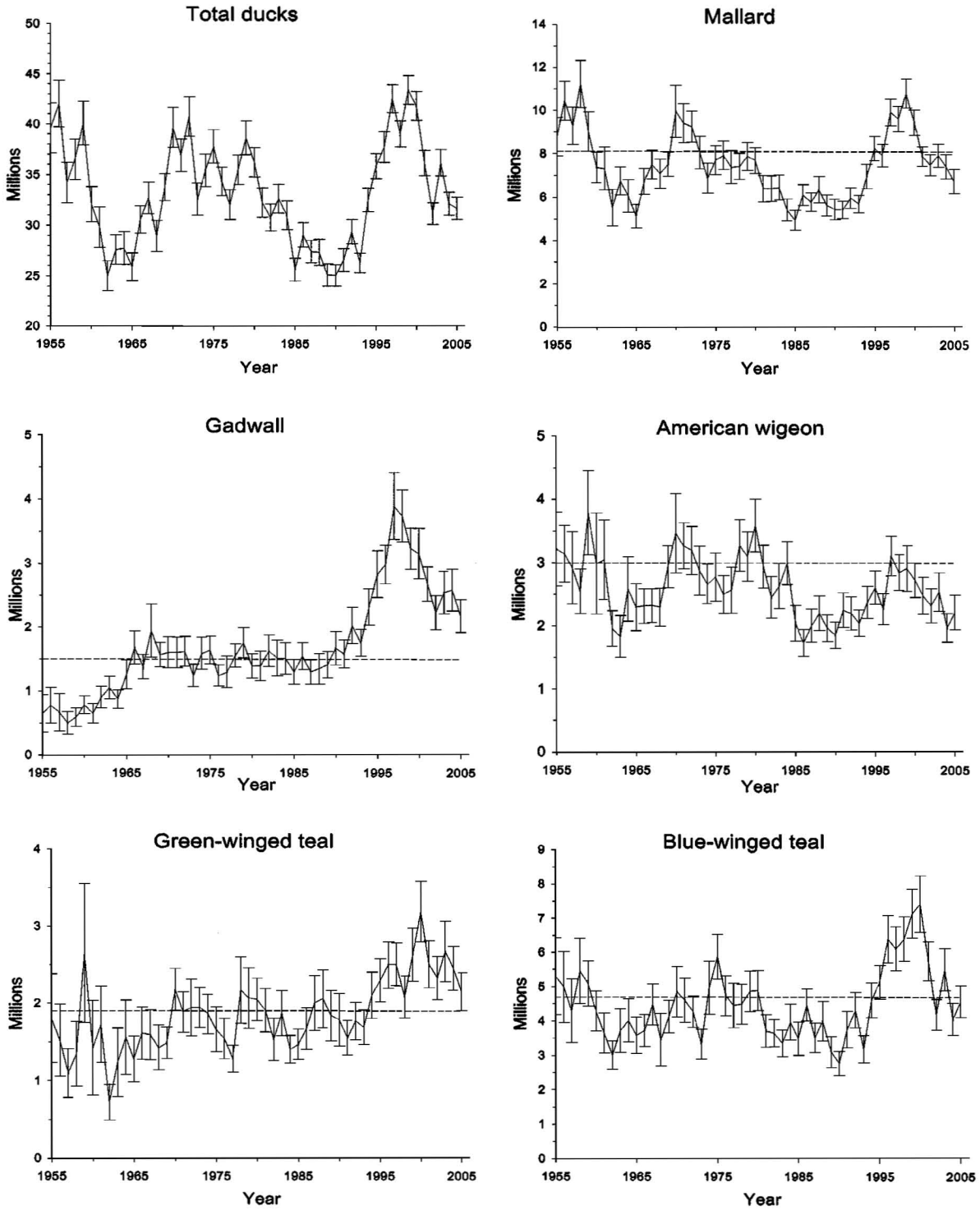

Figure 2. Estimates of North American breeding populations, 95% confidence intervals, and North American Waterfowl Management Plan population goal (dashed line) for selected species and number of water areas in May in Prairie Canada and Northcentral U.S. (from: U.S. Fish and Wildlife Service. 2005. Waterfowl population status, 2005. U.S. Department of the Interior, Washington, D.C. U.S.A.)

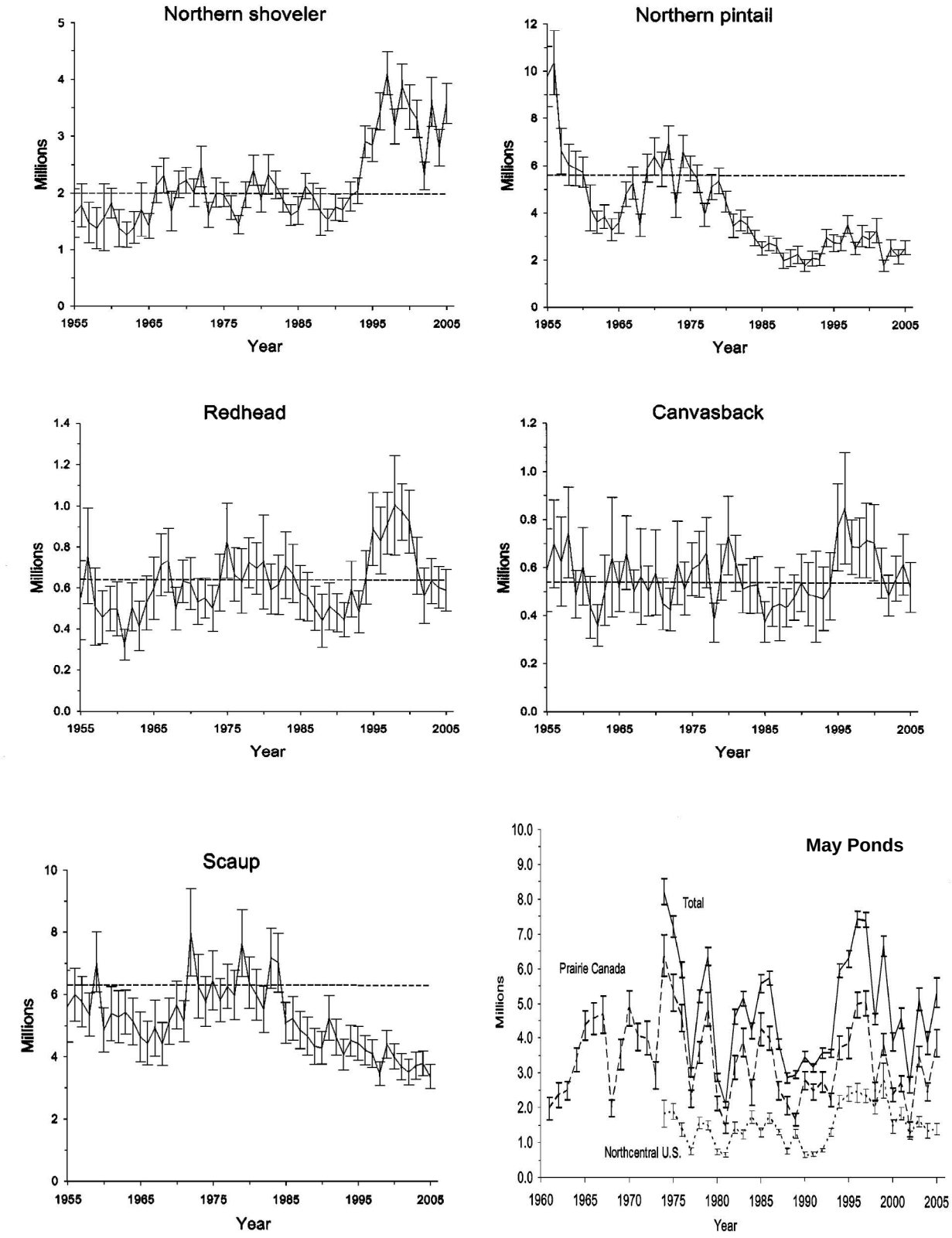

Figure 2. (Continued).

Minnesota Spring Canada Goose Survey, 2005

Stephen Maxson, Wetland Wildlife Populations & Research Group

INTRODUCTION

This report presents results from the fifth year of a spring helicopter survey of resident Canada geese in Minnesota. The purpose of the survey is to produce a statewide population estimate with 95% Confidence Intervals.

METHODS

The state was divided into three ecoregions (Prairie Parkland, Eastern Broadleaf Forest/Tallgrass Aspen Parklands, Laurentian Mixed Forest) hereafter referred to as Prairie, Transition, and Forest. The 7 county Metro area was excluded from the Transition ecoregion. Similarly, Lake and Cook Counties plus the Boundary Waters Canoe Area were excluded from the Forest ecoregion. Within each ecoregion, 900 - ¼ section plots were randomly selected using ArcView.

The 900 plots in each ecoregion were divided into 3 strata based on habitat quality for resident geese. The 3 strata were defined as follows: 1) not nesting habitat – expect no geese, 2) limited nesting habitat – expect 1 or 2 pairs, 3) prime nesting habitat – expect 3 or more pairs. Stratification was based on National Wetland Inventory data and was done using ArcView. Strata were separated based on the total acres of type 3, 4, and 5 wetlands and rivers on the plot as described below:

Prairie

No geese =	Type 3-4-5 <0.5 acres and rivers <10 acres or plot is all water. (n = 476 plots).
1-2 pairs =	Type 3-4-5 > 0.5 acres but Type 3 <15 acres or Type 3-4-5 <0.5 acres and rivers >10 acres. (n = 344 plots).
3+ pairs =	Type 3 >15 acres, but plot is not all water. (n = 80 plots).

Transition

No geese =	Type 3-4-5 <1 acre and rivers <8 acres or plot is all water. (n = 377 plots).
1-2 pairs =	Type 3-4-5 = 1-25 acres or Type 3-4-5 >25 acres, but Type 3 <15 acres or Type 3-4-5 <1 acre and rivers >8 acres. (n = 428 plots).
3+ pairs =	Type 3-4-5 >25 acres, but Type 3 >15 acres and plot is not all water. (n = 95 plots).

Forest

No geese =	Type 3-4-5 <2 acres and rivers <2 acres or plot all water. (n = 510 plots).
1-2 pairs =	Type 3-4-5 >2 acres, but not all water or Type 3-4-5 <2 acres and rivers >2 acres. (n = 390 plots).
3+ pairs =	None.

Plots in the No geese strata are not flown. Each year 30 plots are randomly selected in each of the 5 remaining strata and these 150 plots are surveyed at low level using a helicopter. Ideally, the survey should be conducted during mid-incubation.

Pilot John Heineman and I flew the survey 20-24 April, 28-29 April and 2-3 May, 2005. Canada geese seen within plot boundaries were recorded as singles, pairs, and groups. We also recorded whether

singles and pairs were observed with a nest. The number of singles was doubled when the total number of geese per plot was calculated (unless 2 singles were observed to associate as a pair after being flushed).

RESULTS AND DISCUSSION

The total population estimate for 2005 was 320,754 (±90,541). Adding 17,500 for the Twin Cities metro area (Cooper 2004) yields a statewide estimate of **338,254** (Table 1). Confidence Intervals were 28.2% of the estimate which is near the target of 25.0%. The survey tallied 33.0% singles (after doubling, as noted above), 50.2% pairs, and 16.8% groups (Table 2). Typically, many of the pairs seen on this survey are not associated with nests and are likely nonbreeders. An index to nesting effort (i.e., "Productive Geese") can be obtained by combining singles (after doubling) and pairs associated with nests. In 2005, 40.7% of the geese seen were classified as Productive Geese (Table 2). While confidence intervals overlap among years, a linear trend line applied to these data suggests the population has been increasing over the 5 years of this survey (Figure 1).

Type 1 wetlands were few and scattered during the survey. However, water levels in Type 3, 4 and 5 wetlands appeared to be about normal. Barring extensive nest flooding, I would expect average to above-average Canada goose production in 2005.

ACKNOWLEDGEMENTS

Frank Martin (Univ. of MN) was instrumental in designing the survey. Tim Loesch, Christopher Pouliot, and Shelly Buitenwerf set up the original 2,700 - ¼ section plots using ArcView and were very helpful in getting the survey up and running in 2001. Shelly Buitenwerf provided GPS coordinates of plots to the pilot, and printed out maps of the 150 plots flown this year. John Giudice wrote the SAS program that analyzes the survey data.

BIBLIOGRAPHY

Cooper, J. 2004. Canada goose program report 2004. Unpublished report. 20 pp.

Table 1. Spring Canada goose population estimates in Minnesota, 2001-2005.

Year	Prairie	Transition	Forest	Subtotal	95% CI	Metro	**TOTAL**
2001	77,360	95,470	92,390	265,220	69,500	20,000	**285,220**
2002	135,850	144,900	33,940	314,690	134,286	20,000	**334,690**
2003	106,520	121,290	56,420	284,230	78,428	20,000	**304,230**
2004	128,501	130,609	95,636	354,747	107,303	20,000	**374,747**
2005	113,939	149,286	57,529	320,754	90,541	17,500	**338,254**

Table 2. Proportions of Canada Geese seen as singles, pairs, groups, and productive geese on the Minnesota Spring Canada Goose Survey, 2001-2005.

Year	Singles[1]	Pairs[1]	Groups	Productive Geese[2]
2001	27.0	63.9	9.1	36.4
2002	30.7	52.0	17.2	41.5
2003	27.9	58.2	13.9	29.3
2004	26.5	57.5	16.0	35.5
2005	33.0	50.2	16.8	40.7

[1]Numbers of singles and pairs were doubled before calculating proportions.
[2]Productive geese equals Singles + Pairs with nests.

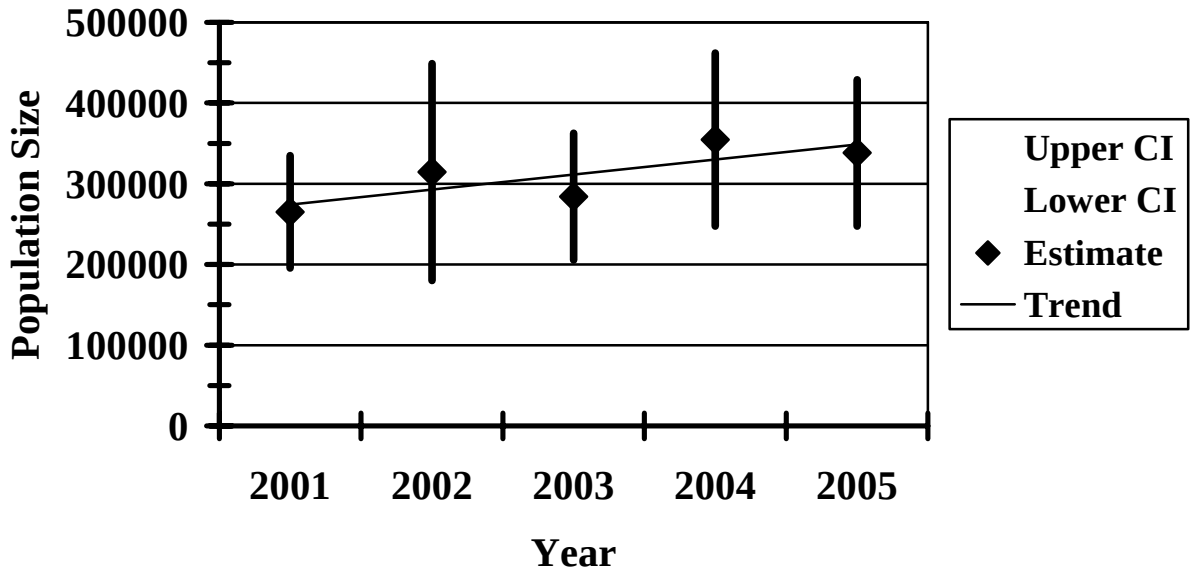

Figure 1. Spring Canada goose population estimates (±95% CI) in Minnesota, 2001-2005. (Does not include Metro area.)

The following mourning dove information is taken from the U.S. Fish and Wildlife Service report by Dolton, D.D. and R.D. Rau. 2005. Mourning dove population status, 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp. The entire report is available on the Division of Migratory Bird Management home page (http://migratorybirds.fws.gov).

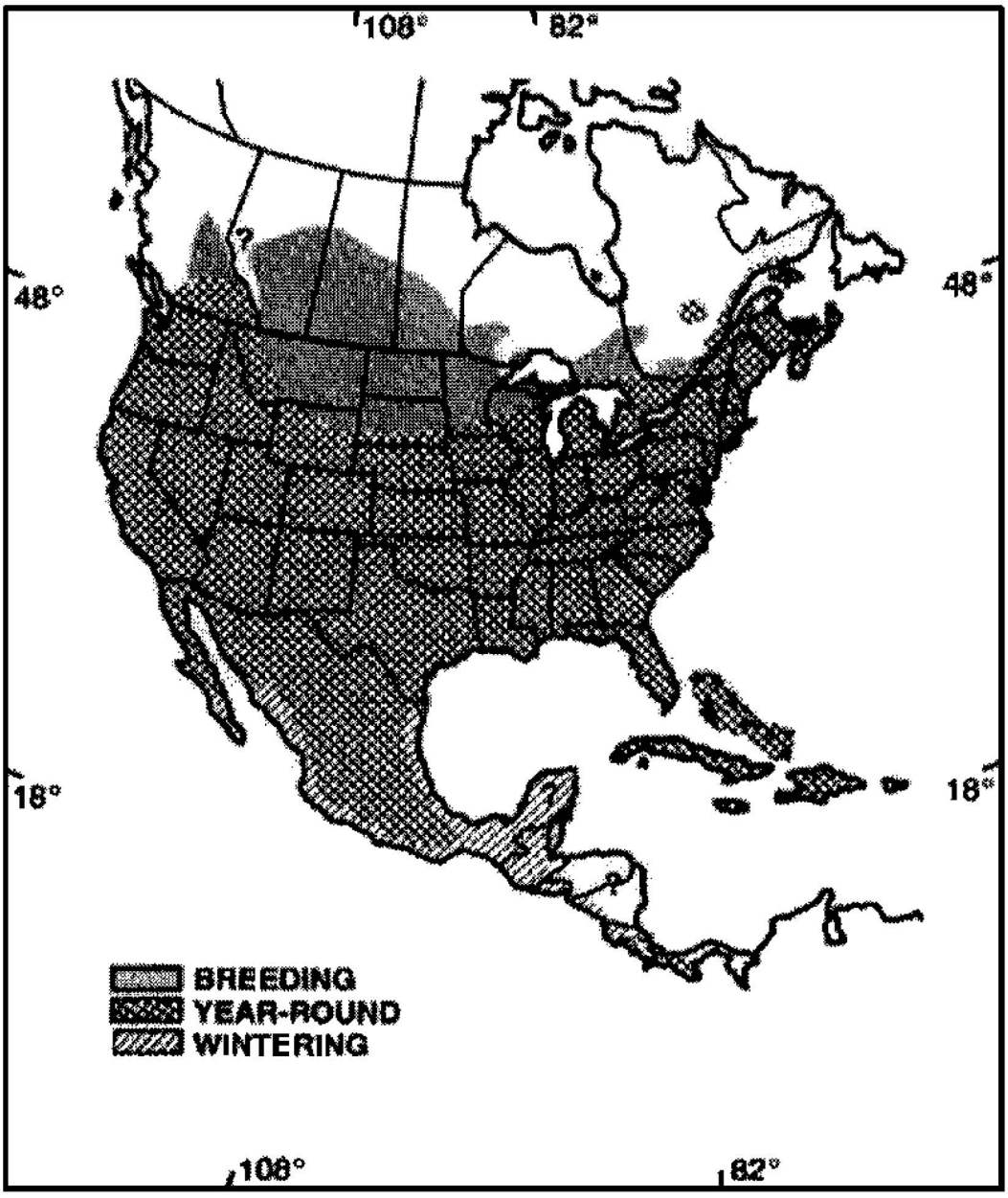

Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994). From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp.

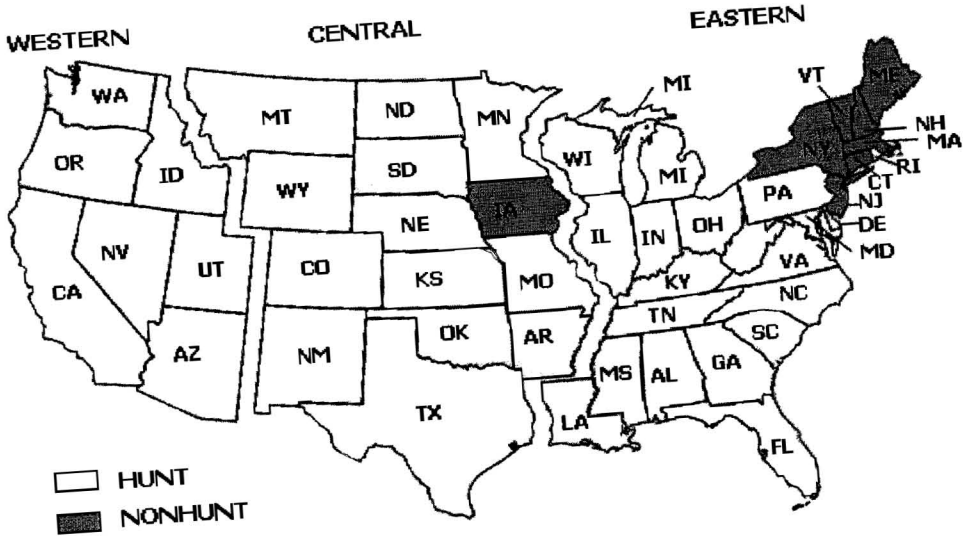

Figure 2. Mourning dove management units with 2004 hunting and nonhunting states. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

Table 1. Preliminary estimates of the number of hunters, days hunted, and total bag from Harvest Information Program surveys for the 2004-05 season. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

Management unit / State	Hunters	Days Hunted	Birds bagged
CENTRAL	512,500	1,844,300 ± 8%	9,807,700 ± 8%
AR	37,900 ± 13%	114,000 ± 21%	740,600 ± 19%
CO	19,400 ± 8%	54,800 ± 19%	299,900 ± 16%
KS	35,800 ± 10%	119,300 ± 13%	689,400 ± 13%
MN	13,700 ± 20%	61,100 ± 50%	107,000 ± 42%
MO	41,600 ± 9%	128,800 ± 17%	775,900 ± 30%
MT	2,600 ± 31%	11,300 ± 99%	20,900 ± 44%
NE	19,100 ± 11%	71,400 ± 14%	365,900 ± 15%
NM	9,900 ± 15%	42,000 ± 19%	302,800 ± 23%
ND	4,500 ± 25%	13,000 ± 24%	57,500 ± 32%
OK	27,100 ± 9%	94,000 ± 11%	555,300 ± 14%
SD	10,000 ± 16%	36,700 ± 21%	184,100 ± 26%
TX	287,700 ± 9%	1,089,200 ± 13%	5,664,600 ± 14%
WY	3,200 ± 27%	8,700 ± 34%	43,700 ± 46%

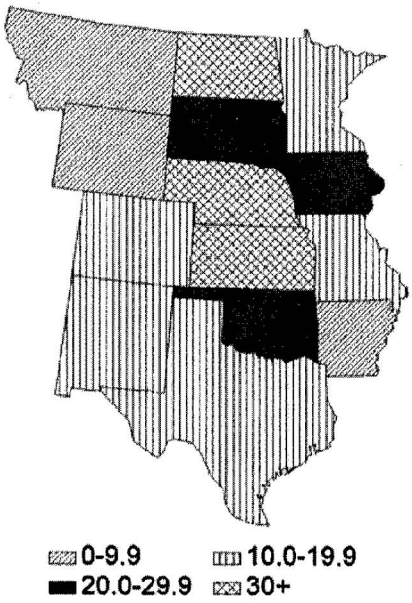

Figure 3. Mean number of mourning doves heard per route by state in the Central Management Unit, 2004-05. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

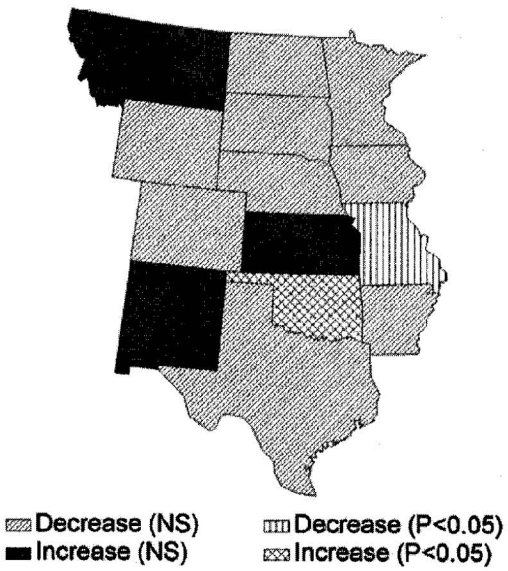

Figure 4. Trends in number of mourning doves heard per route by state in the Central Management Unit, 1996-2005. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

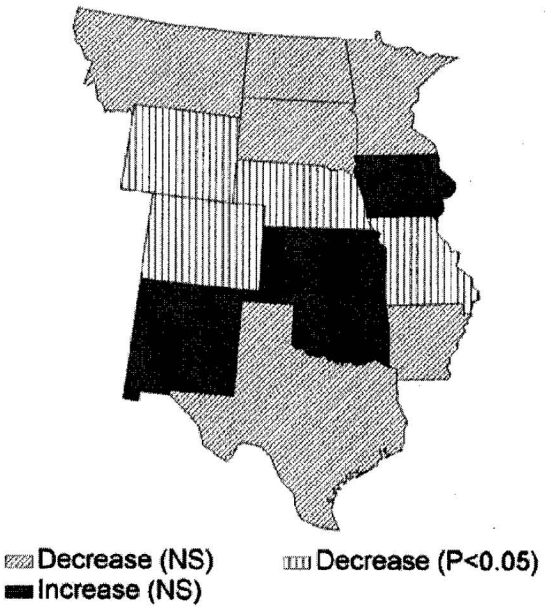

Figure 5. Trends in mourning doves heard per route by state in the Central Management Unit, 1966-2005. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

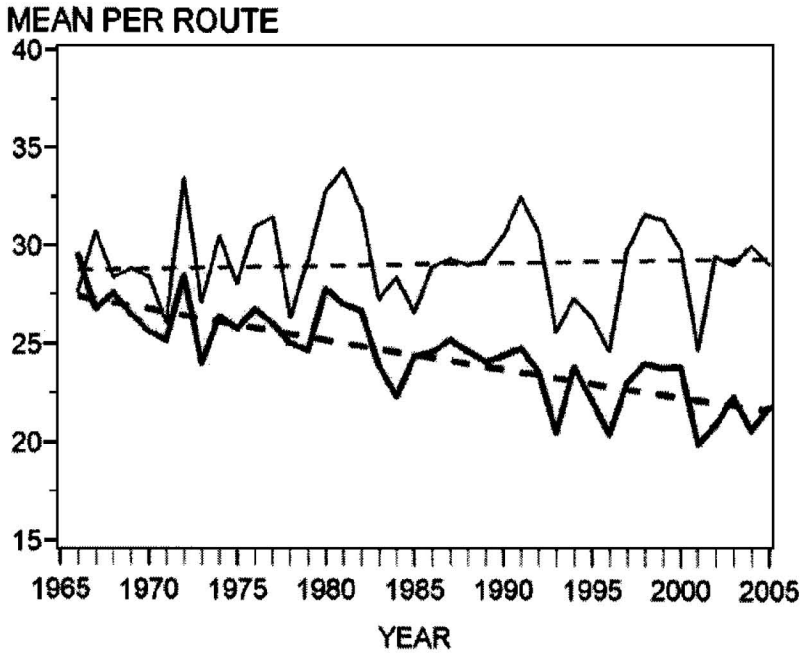

Figure 6. Population indices and trends of breeding mourning doves in the Central Management Unit, 1966-2005. Heavy solid line = doves heard; light solid line = doves seen. Light and heavy dashed lines = predicted trends. (From: Mourning dove population status, 2005. Dolton, D.D. and R.D. Rau. 2005. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

The following American woodcock information is taken from the U.S. Fish and Wildlife Service report American Woodcock Population Status, 2005 by James R. Kelley, Jr. and Rebecca D. Rau.
The entire report is available on the Division of Migratory Bird Management home page (http://migratorybirds.fws.gov).

Figure 1. Woodcock management regions, breeding range, singing-ground survey coverage, (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.)

Table 1. Trends (% change per year [a]) in number of American woodcock heard in singing-ground survey as determined by the estimating equations technique (Link and Sauer, 1994) (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 15pp).

Management Unit/State	2 year N[c]	(2004-05) % Change	Routes Run[b]	10 year N	(1995-05) % Change	37 year N	(1968-05) % Change
CENTRAL	205	5.2	336	394	0.1	625	− 1.8***
IL	0		5	5	10.9	25	25.5
IN	3	-51.4 ***	12	7	− 3.7	39	− 6.6**
MB[e]	4	34.5	12	22	− 0.9	22	− 2.2
MI	62	0.3	93	110	− 0.6	146	− 1.7***
MN	55	12.8	77	77	0.4	101	− 1.0**
OH	11	-36.7*	25	24	− 3.1	56	− 6.2***
ON	20	10.3	43	75	2.6	136	− 2.0***
WI	49	18.4	69	74	− 0.3	100	− 1.9***

[a] Mean of weighted route trends within each State, Province, or Region. To estimate the total percent change over several years, use: $100(\%\ change/100+1)^{y}-100$ where y is the number of years. Note: extrapolating the estimated trend statistic (% change per year) over time (e.g., 30 years) may exaggerate the total change over the period.

[b] Total number of routes surveyed in 2004 for which data were received by 1 June.

[c] Number of comparable routes (2003 versus 2004) with at least 2 non-zero counts.

[d] Indicates slope is significantly different from zero: * $P \leq 0.10$; ** $P \leq 0.05$; *** $P \leq 0.01$; significance levels are approximate for states where $N < 10$.

[e] Manitoba began participating in the Singing-ground survey in 1990.

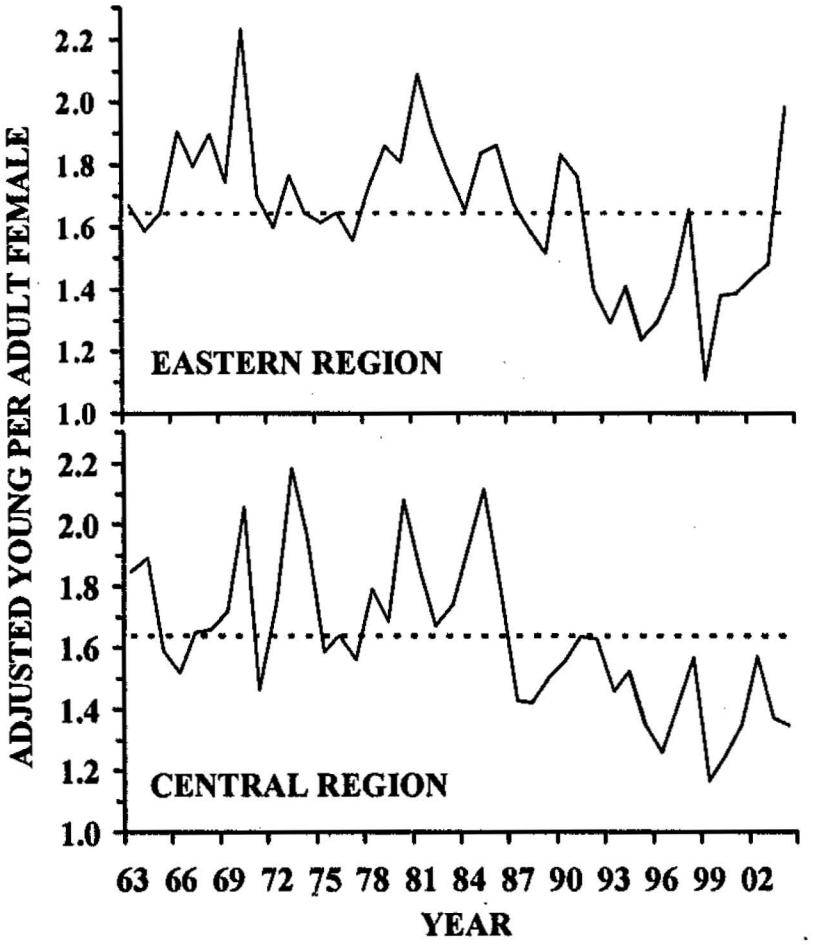

Figure 2. Adjusted index of American woodcock recruitment, 1963-2004. Dashed line is the index based on all 1963-2003 average. (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp).

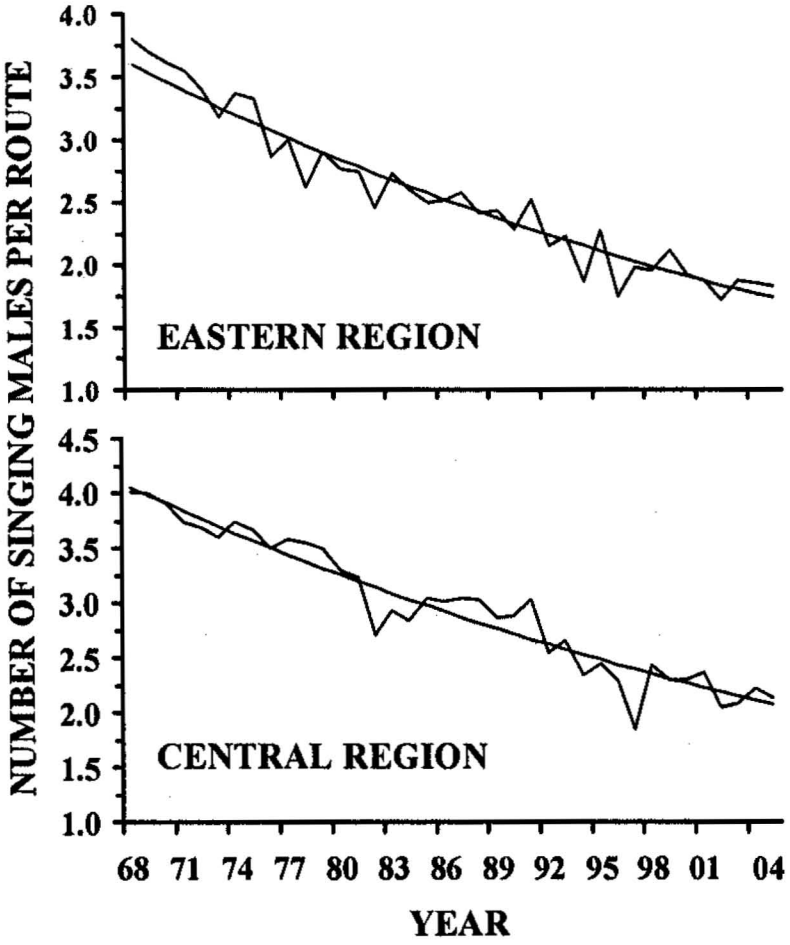

Figure 3. American woodcock singing ground survey long term trends and annual indices, 1968-2005. (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp)

Table 2. Preliminary estimates of woodcock hunter numbers, days afield, and harvest for selected states, from the 2002-03, 2003-04, and 2004-05. Harvest Information Program surveys. (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp).

Management Unit / State	Active woodcock hunters			Days afield			Harvest		
	2002-03	2003-04	2004-05	2002-03	2003-04	2004-05	2002-03	2003-04	2004-05
Central Region	n.a. [a]	n.a.	n.a.	428,200 ± 26%	369,900 ± 16%	366,100 ± 15%	187,500 ± 24%	213,500 ± 23%	234,800 ± 20%
IL	3,000 ± 90%	2,400 ± 79%	1,200 ± 74%	6,400 ± 88%	12,200 ± 112%	3,500 ± 78%	9,000 ± 110%	2,200 ± 90%	1,900 ± 96%
IN	1,700 ± 114%	700 ± 97%	1,100 ±104%	24,200 ± 172%	6,000 ± 134%	5,300 ±124%	6,900 ± 161%	1,800 ± 31%	7,900 ± 145%
MI	25,200 ± 18%	35,100 ± 14%	31,200 ± 13%	135,400 ± 23%	159,000 ± 18%	147,000 ± 14%	78,300 ± 26%	121,500 ± 30%	102,500 ± 21%
MN	8,200 ± 66%	14,300 ± 38%	14,500 ± 27%	49,300 ± 92%	48,700 ± 43%	67,000 ± 33%	9,200 ± 31%	29,900 ± 84%	38,500 ± 53%
OH	5,200 ± 108%	3,400 ± 88%	2,600 ± 82%	23,200 ± 138%	10,300 ± 86%	18,200 ± 126%	3,100 ± 45%	2,500 ± 78%	4,600 ±101%
WI	17,600 ± 30%	16,100 ± 30%	15,700 ± 30%	58,900 ± 26%	65,600 ± 33%	61,100 ± 30%	33,900 ± 34%	30,300 ± 35%	47,300 ±50%

[a] Regional estimates of hunter numbers cannot be obtained due to the occurrence of individual hunters being registered in the Harvest Information Program in more than one state.

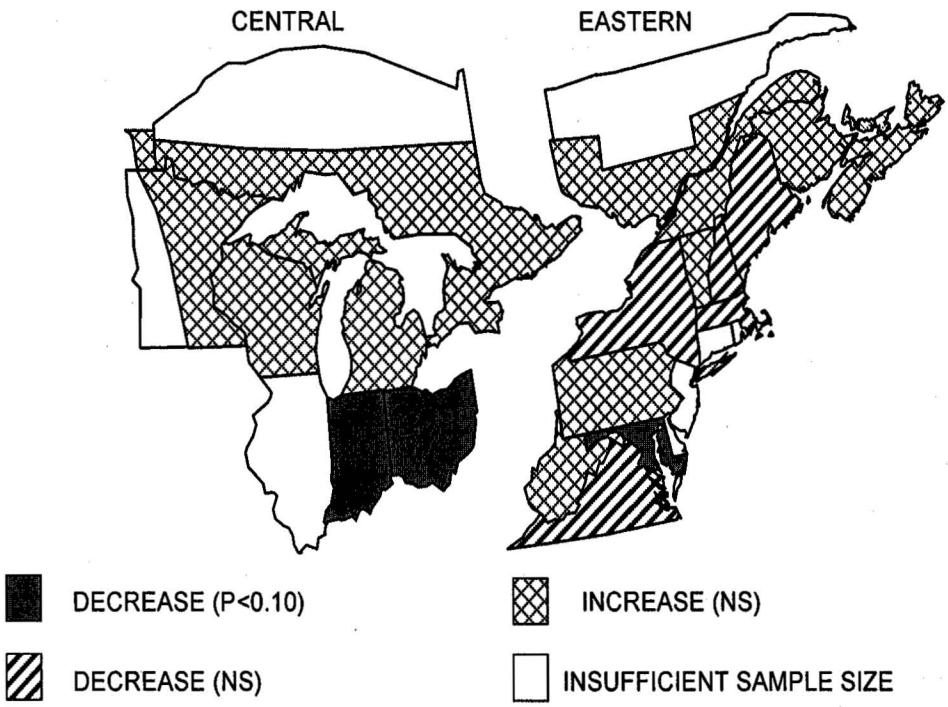

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Figure 4. Short-term trends in number of American woodcock heard on the Singing-ground Survey; 2004-05. (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp)

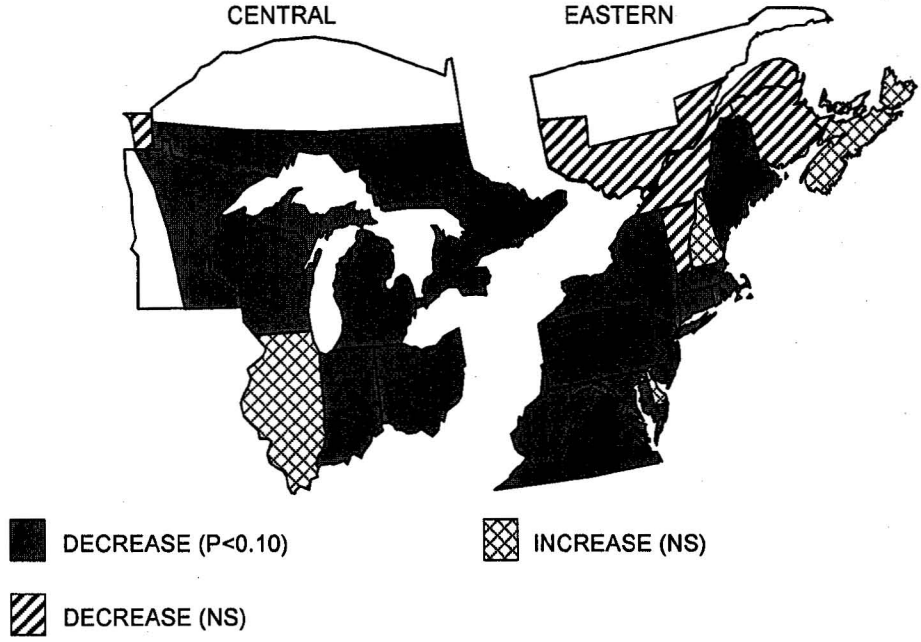


Figure 5. Long-term trends in number of American woodcock heard on the Singing-ground Survey; 1968-05. (from: Kelley, J.R., Jr., and R.D. Rau. 2005. American woodcock population status, 2005. U.S. Fish and Wildlife Service, Laurel, MD. 15pp)

HUNTING HARVEST STATISTICS

Division of Fish and Wildlife
500 Lafayette Road, Box 20
Saint Paul, MN 55155 - 4020
(651) 296-3344

2004 Small Game Hunter mail survey

Margaret Dexter, Wildlife Surveys & Statistical Unit

INTRODUCTION:

The Minnesota Department of Natural Resources, Research Surveys and Statistics unit annually conducts a survey of small game hunters. Annual harvest estimates from survey data provide the basis for future hunting regulations and season structure.

METHODS:

The Research Surveys and Statistics unit requests a random sample be drawn from the Electronic License System database in late February to ensure that each license holder has an equal chance of being in the survey sample. The sample consists of 6,000 (approximately 2%) names /addresses for Small Game License holders, drawn proportionately from each of the Small Game license types available.

Hunters that return the survey questionnaire (Figure 1) within three weeks, are marked returned and eliminated from follow-up mailings. Follow-up mailings were sent to non-respondents at three week intervals. There were three follow-up mailings to non-respondents.

Completed and returned questionnaires were checked for completeness, consistency, and biological practicability. Cards were marked with numeric county codes corresponding to the hunter's written information. Data from each usable card was converted to an electronic database. Data were checked for errors, duplicate responses, and /or missing data. The following is a list of assumptions made in data coding:

1) If an individual checked the box indicating (s)he did not hunt, but harvest information was provided, it is assumed that the individual did hunt.
2) If a range is given for "number of days hunted" or "number of animals harvested", the median of the range, rounded to the nearest even integer is recorded.
3) If a hunter indicates spending time hunting for a species, but leaves "number bagged" blank, the # bagged is entered as missing data.
4) If a small game hunter indicated bagging a species, but leaves "number of days hunted" blank, then "number of days hunted" is recorded as missing data.
5) If more than one county is indicated for "county hunted in most", the first county listed is recorded. However, if the several counties listed are indicated to apply to all species hunted, then counties are recorded in sequential order in relation to species hunted.
6) If "county hunted in most" is left unanswered or not legible, the county is recorded as missing data.

Data from all usable cards are tabulated and statistically analyzed by the St. Paul staff, using SAS statistical analysis software programs.

RESULTS

Attached are the survey results. All estimates are Statewide unless otherwise indicated.

Table 1. Small game hunter response to mail surveys, 1979 - 80 through 2004 - 05.

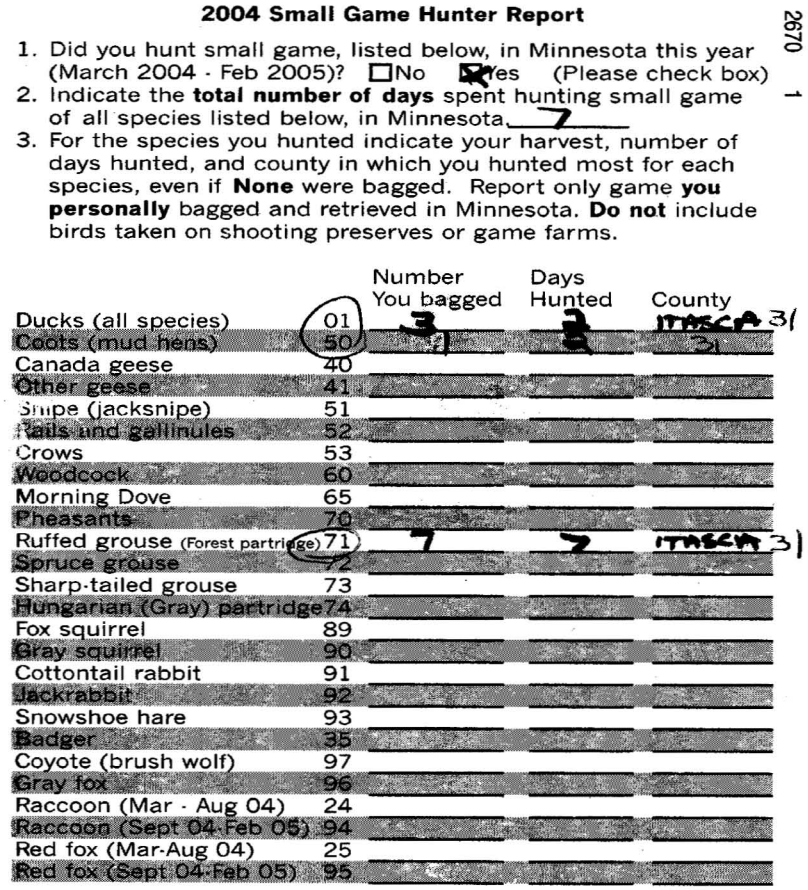
Year	Number mailed	Number not delivered	Delivered questionnaires completed and returned	
			Number	Percent
1979 - 80	5,696	443	4,504	85.7
1980 - 81	6,434	385	4,963	82.0
1981 - 82	6,656	399	5,419	86.6
1982 - 83	5,963	266	4,792	84.1
1983 - 84	4,551	269	3,325	77.7
1984 - 85	4,096	127	3,280	82.6
1985 - 86	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
1989 - 90[a]	10,893	735	7,790	76.7
1990 - 91[a]	5,000	394	3,467	75.3
1991 - 92[a]	5,050	387	3,541	75.9
1992 - 93[a]	5,000	288	3,625	76.9
1993 - 94[a]	5,011	282	3,320	70.2
1994 - 95[a]	5,000	387	3,353	72.7
1995 - 96[a]	5,000	321	3,293	70.4
1996 - 97[a]	5,000	170	3,334	69.0
1997 - 98[a]	5,000	198	3,234	67.3
1998 - 99[a]	5,000	200	3,153	65.7
1999 - 00[a]	5,001	180	3,349	69.5
2000 - 01[a]	5,000	184	3,001	62.3
2001 - 02 [a]	6,000	225	3,667	64.0
2002 - 03 [a]	6,000	363	3,862	68.5
2003 – 04[a]	6,400	381	3,972	66.0
2004 – 05[a]	6,000	356	3,823	68.0

[a] Includes resident and non-resident licenses, and excludes duplicate licenses.

Table 2. Use of small game hunter licenses, 1994-95 through 2004-2005.

		Returns from mail survey	Projections from license sales
1994-95	Hunted	2,826 (84.6%)	244,654
	Did not hunt	516 (15.4%)	44,535
		3,342 (100.0%)	289,189
1995-96	Hunted	2,714 (84.6%)	252,775
	Did not hunt	494 (15.4%)	46,014
		3,208 (100.0%)	298,789
1996-97	Hunted	2,631 (79.6%)	237,476
	Did not hunt	674 (20.4%)	60,861
		3,305(100.0%)	298,337
1997-98	Hunted	2,604 (80.7%)	246,285
	Did not hunt	622 (19.3%)	58,901
		3,226 (100.0%)	305,186
1998-99	Hunted	2,612 (82.8%)	265,215
	Did not hunt	541 (17.2%)	55,093
		3,153 (100.0%)	320,308
1999-00	Hunted	2,689 (80.7%)	264,237
	Did not hunt	644 (19.3%)	63,194
		3,333 (100.0%)	327,431
2000-01	Hunted	2,254 (78.7%)	252,518
	Did not hunt	610 (21.3%)	68,344
		2,864 (100.0%)	320,862
2001-02	Hunted	2,849 (77.7%)	231,589
	Did not hunt	610 (21.3%)	66,466
		3,665 (100.0%)	298,055
2002-03	Hunted	2,962 (76.7%)	221,455
	Did not hunt	900 (23.3%)	67,274
		3,862 (100.0%)	288,729
2003-04	Hunted	3,085 (78.2%)	232,206
	Did not hunt	862 (21.8%)	64,733
		3,947 (100.0%)	296,939
2004-05	Hunted	2,934 (77.6%)	232,206
	Did not hunt	847 (22.4%)	64,733
		3,781 (100.0%)	287,725

Includes resident and non-resident information. Excludes duplicates.



2004 Small Game Hunter Report

2670 1

1. Did you hunt small game, listed below, in Minnesota this year (March 2004 - Feb 2005)? ☐No ☒Yes (Please check box)
2. Indicate the **total number of days** spent hunting small game of all species listed below, in Minnesota 7
3. For the species you hunted indicate your harvest, number of days hunted, and county in which you hunted most for each species, even if **None** were bagged. Report only game **you personally** bagged and retrieved in Minnesota. **Do not** include birds taken on shooting preserves or game farms.

		Number You bagged	Days Hunted	County
Ducks (all species)	01	3	3	ITASCA 31
Coots (mud hens)	50	1	3	21
Canada geese	40			
Other geese	41			
Snipe (jacksnipe)	51			
Rails and gallinules	52			
Crows	53			
Woodcock	60			
Morning Dove	65			
Pheasants	70			
Ruffed grouse (Forest partridge)	71	7	2	ITASCA 31
Spruce grouse	72			
Sharp-tailed grouse	73			
Hungarian (Gray) partridge	74			
Fox squirrel	89			
Gray squirrel	90			
Cottontail rabbit	91			
Jackrabbit	92			
Snowshoe hare	93			
Badger	35			
Coyote (brush wolf)	97			
Gray fox	96			
Raccoon (Mar - Aug 04)	24			
Raccoon (Sept 04-Feb 05)	94			
Red fox (Mar-Aug 04)	25			
Red fox (Sept 04-Feb 05)	95			

Dear Small Game Hunter: **Please complete this questionnaire. Many surveys have been received but we still need yours to get an accurate picture of small game hunting in Minnesota.**

You have been selected at random from among Minnesota's small game hunting license buyers to assist us in evaluating the 2004-2005 small game hunting season **(March 2004-February 2005)**. We need information to estimate the season's harvest and to help set future small game seasons. Answer only for your Minnesota 2004 hunting experience.

YOUR RESPONSE IS NEEDED
EVEN IF YOU DID NOT HUNT OR HARVEST SMALL GAME.

Please fill out the attached questionnaire and mail as soon as possible. No envelope or stamp is necessary; just tear along the perforation and drop into a mailbox.

THANK YOU FOR YOUR COOPERATION

John Guenther, Director
Division of Fish and Wildlife
Department of Natural Resources

Minnesota Department of Natural Resources
Division of Fish and Wildlife
Surveys and Statistical Services
500 Lafayette Road, Box 20
St. Paul, MN 55155

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Figure 1. Sample of Small Game Hunter survey card

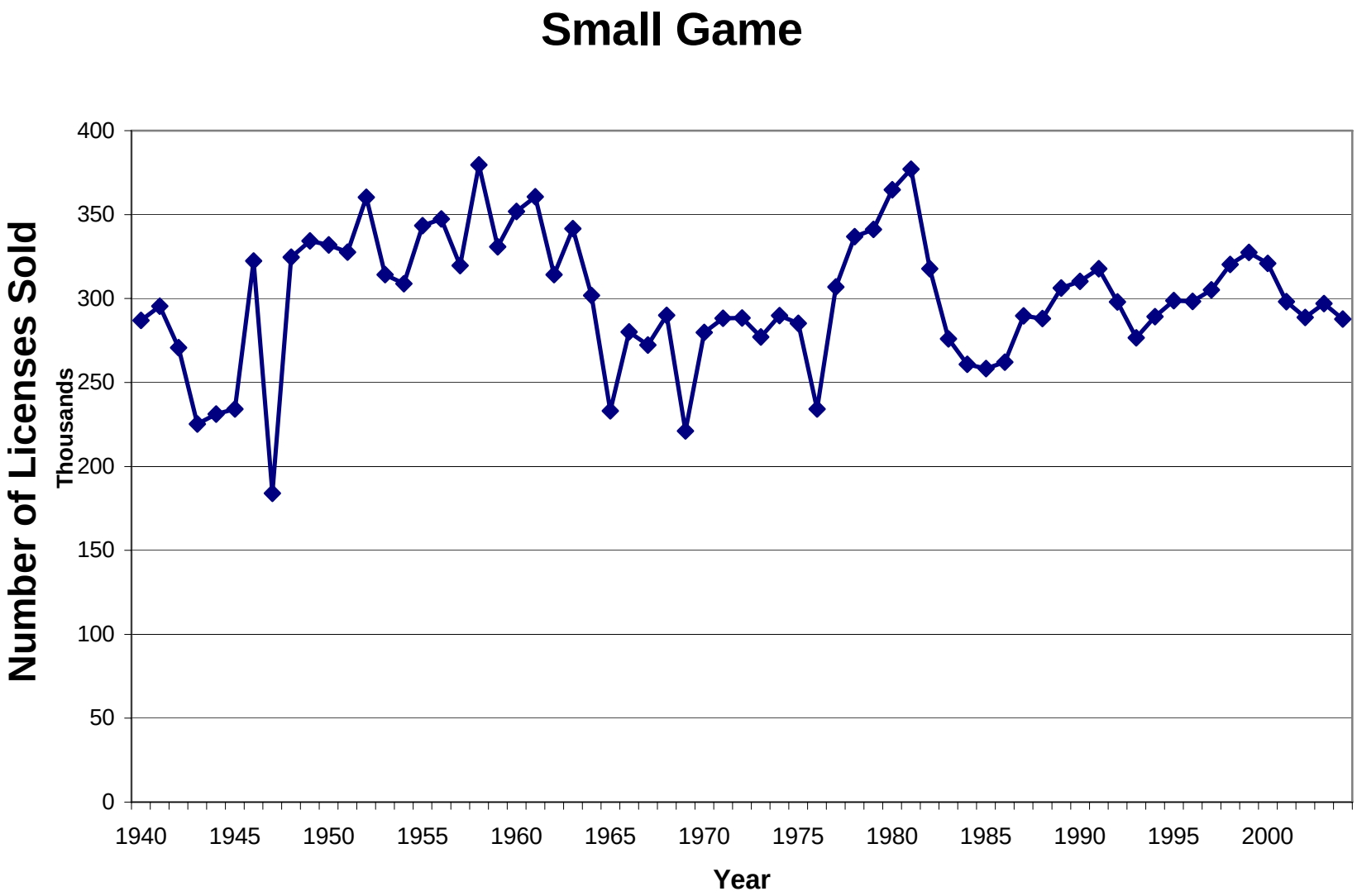


Figure 2. Number of Minnesota small game licenses sold, 1940 – 2004.

Table 3. Estimated number of hunters (thousands) for various species, 1992-93 through 2004-05.

	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Ducks	107	109	118	119	114	122	117	122	109	109	112	101	105
Canada goose	61	62	70	73	75	79	77	80	77	76	79	75	75
Other geese	6	9	7	10	6	5	6	5	7	7	6	7	5
American coot	5	6	7	9	6	7	5	6	4	4	4	4	5
Common snipe	3	2	2	2	2	2	2	2	2	1	2	1	2
Rails / gallinules	<1	1	1	1	<1	<1	<1	<1	<1	<1	1	<1	<1
Crow *	11	10	12	15	13	11	11	14	14	11	13	12	12
American woodcock	21	17	21	21	18	17	19	19	16	11	12	13	12
Mourning dove													16
Ring-necked pheasant	105	88	92	96	88	80	88	93	100	85	91	105	104
Ruffed grouse	124	102	107	116	118	127	142	139	121	101	91	94	79
Spruce grouse	13	11	12	14	11	11	11	11	9	9	7	9	7
Sharp-tailed grouse	10	8	7	8	7	8	8	8	10	8	6	7	6
Gray partridge	17	15	14	12	11	8	10	10	8	7	7	8	5
Gray squirrel	32	32	35	35	33	27	30	31	27	26	25	29	23
Fox squirrel	22	23	24	23	20	16	18	20	17	15	15	20	15
Eastern cottontail	24	21	21	23	19	14	19	18	20	17	16	21	19
White-tailed jackrabbit	5	4	4	5	4	3	3	3	2	3	2	3	3
Snowshoe hare	8	5	6	5	4	4	7	7	5	6	6	6	4
Raccoon (Sept 04 - Feb 05)	9	9	10	10	10	9	9	6	6	6	6	6	6
Raccoon‡ (March 04-Aug 04)			3	5	4	3	4	3	5	4	4	5	3
Red fox (Sept 04-Feb 05)	19	16	15	15	11	9	9	8	10	6	7	7	6
Red fox‡ (March 04-Aug 04)			3	4	3	2	3	2	2	3	2	2	1
Gray fox	3	3	2	3	n.a.	2	2	2	1	1	1	2	2
Coyote	14	14	11	15	13	10	11	11	16	11	12	15	16
Badger	1	1	1	<1	1	1	<1	<1	1	<1	1	<1	1

*Crow season added in 1989. ‡ Raccoon and red fox season changed to year round beginning May 1994. Mourning dove season added 2004.

Table 4. Estimated take per hunter, for respondents reporting that they hunted a particular species, 1991-92 through 2004-05.

	Estimated take per hunter													
	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Ducks	8.0	8.1	7.6	8.1	9.7	9.6	9.9	9.5	8.4	8.9	9.1	9.2	9.0	6.9
Canada geese	2.6	2.5	2.5	2.4	2.5	3.2	2.9	2.8	3.5	3.9	4.0	3.3	3.9	3.8
Other geese	1.0	0.9	1.1	0.8	0.9	1.4	2.3	1.0	1.2	2.2	1.2	1.9	1.7	1.5
American coot	2.7	4.7	2.7	3.2	3.1	3.8	4.1	4.7	4.0	2.7	4.5	4.6	2.8	4.0
Common snipe	3.7	2.9	1.9	1.3	1.6	2.8	2.6	2.9	1.6	1.3	1.3	1.5	1.8	1.1
Rails/gallinules	7.6	1.7	1.5	1.3	2.3	1.0	0.7	0.5	0.2	3.7	0.6	2.6	0.5	0.3
Crow *	7.6	6.2	5.0	9.4	8.5	7.3	6.6	9.3	4.4	6.9	7.7	5.6	6.7	5.8
American woodcock	3.5	4.7	4.0	3.5	3.9	3.2	3.4	3.3	2.8	2.8	2.3	2.4	2.4	3.5
Mourning dove														6.2
Ring-necked pheasant	4.6	3.9	3.8	3.5	4.2	3.9	3.1	3.5	3.7	3.7	3.2	3.9	4.9	4.0
Ruffed grouse	6.6	4.4	2.8	3.5	3.9	4.5	5.2	6.7	4.9	5.1	3.3	2.8	3.8	2.5
Spruce grouse	2.0	1.7	1.2	1.9	1.8	1.4	2.3	2.4	1.8	2.5	1.1	1.6	2.1	1.3
Sharp-tailed grouse	2.4	2.0	1.4	1.2	1.3	1.2	1.7	2.6	1.6	1.6	1.2	1.3	1.7	1.7
Gray partridge	3.8	2.9	2.4	1.8	2.2	2.2	1.9	2.5	1.9	2.1	1.5	1.7	2.8	2.4
Gray squirrel	4.9	4.6	5.5	5.4	4.9	4.9	4.9	5.0	4.3	5.3	5.6	5.2	6.0	5.7
Fox squirrel	4.6	4.2	4.5	4.2	4.6	3.8	4.4	3.3	3.5	3.9	4.1	4.5	4.2	4.1
Eastern cottontail	4.1	3.1	3.6	3.6	4.3	3.4	4.5	4.6	3.2	3.9	3.6	3.3	4.3	4.6
White-tailed jackrabbit	1.7	2.1	2.4	1.5	1.5	2.6	1.6	2.5	1.9	2.8	2.6	1.6	2.4	2.3
Snowshoe hare	5.9	3.2	3.2	3.2	2.0	2.3	2.0	3.5	3.1	5.2	3.3	1.9	2.2	1.8
Raccoon (Sept 04 - Feb 05)	7.5	8.6	8.9	15.9	14.7	21.3	13.8	16.6	10.9	7.6	9.4	10.0	8.5	9.0
Raccoon‡ (March 04-Aug 04)				8.0	11.3	24.4	5.1	5.8	6.4	7.8	4.4	5.4	4.7	6.1
Red fox (Sept 04-Feb 05)	3.6	3.3	3.6	2.8	3.1	3.0	1.4	1.3	1.2	1.9	1.2	1.5	1.8	1.1
Red fox‡ (March 04-Aug 04)				1.4	1.5	1.3	0.8	1.2	0.6	0.9	1.5	1.7	0.6	0.6
Gray fox	1.0	1.3	0.8	0.6	1.0	n.a.	1.3	0.9	0.9	0.7	0.4	0.4	0.4	1.1
Coyote	2.1	1.5	1.3	1.1	1.8	2.3	1.6	1.3	1.3	1.8	1.1	1.2	1.3	1.1
Badger	2.2	0.9	0.7	1.4	1.4	2.1	0.9	4.3	1.1	0.8	0.6	1.7	0.7	1.0

*Crow season added in 1989. ‡ Raccoon and red fox season changed to year round beginning May 1994. Mourning dove season added 2004.

Table 5. Mean Harvest for successful hunters and hunter success rates (%), 1993 - 94 through 2003 - 04.

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Ducks	9.2 (88.5)	11.0 (88.2)	10.7 (90.2)	11.1 (88.4)	10.8 (87.8)	9.7 (86.2)	10.2 (84.9)	10.6 (85.6)	10.6 (86.7)	10.4 (86.7)	8.6 (81.1)
Canada geese	3.3 (71.9)	3.4 (72.2)	4.3 (75.1)	4.1 (71.2)	4.0 (70.9	4.7 (74.7)	5.3 (74.2)	5.3 (76.3)	4.6 (72.0)	5.1 (76.0)	5.2 (72.8)
Other geese	2.3 (32.1)	2.4 (39.0)	2.6 (52.2)	4.8 (47.2)	2.3 (44.6)	2.8 (38.2)	4.0 (54.1)	2.8 (43.8)	4.4 (42.5)	2.7 (65.3)	3.3 (45.7)
American coot	4.1 (77.5)	4.4 (69.4)	5.1 (75.0)	4.6 (89.2)	6.0 (78.8)	5.5 (73.0)	4.2 (64.7)	7.5 (60.4)	6.4 (71.2)	3.7 (76.9)	5.5 (73.1)
Common snipe	2.2 (61.9)	2.5 (65.2)	3.2 (89.5)	3.1 (83.3)	3.5 (83.3)	2.3 (66.7)	1.5 (85.0)	2.4 (52.9)	2.6 (60.0)	2.3 (78.9)	1.6 (68.0)
Rails / gallinules	2.2 (60.0)	4.7 (50.0)	2.0 (50.0)	2.0 (33.3)	1.0 (50.0)	1.0 (20.0)	3.7 (100.0)	1.5 (40.0)	3.8 (66.7)	1.0 (50.0)	1.0 (33.3)
Crow	10.5 (89.4)	9.0 (93.9)	7.9 (91.8)	7.1 (93.2)	10.6 (87.6)	5.2 (85.5)	8.2 (84.0)	8.6 (89.4)	6.3 (89.0)	7.9 (85.3)	6.4 (90.8)
American woodcock	4.7 (74.5)	5.0 (76.8)	4.3 (73.5)	4.6 (73.5)	3.7 (87.3)	3.8 (74.6)	3.6 (80.3)	3.4 (68.3)	3.6 (65.6)	3.3 (71.8)	5.3 (64.6)
Mourning dove											7.9 (78.9)
Ring-necked pheasant	5.0 (68.9)	5.7 (73.6)	5.4 (71.2)	4.5 (68.6)	5.0 (70.9)	5.2 (69.8)	5.2 (71.9)	4.7 (66.4)	5.5 (71.7)	6.3 (77.2)	5.7 (70.0)
Ruffed grouse	4.9 (70.9)	5.3 (74.0)	6.0 (75.4)	6.6 (77.9)	8.0 (82.9)	6.3 (78.9)	6.4 (80.7)	4.8 (68.5)	4.3 (63.8)	5.1 (73.5)	3.9 (63.3)
Spruce grouse	3.3 (56.6)	3.2 (57.0)	2.4 (59.1)	3.4 (67.8)	3.4 (68.8)	2.9 (62.7)	4.1 (60.7)	2.3 (47.2)	3.4 (48.0)	3.3 (62.9)	2.3 (54.2)
Sharp-tailed grouse	3.5 (34.5)	2.7 (47.1)	3.1 (39.7)	3.5 (48.2)	4.4 (60.2)	3.4 (48.2)	3.1 (52.9)	2.4 (49.5)	3.5 (38.8)	3.3 (52.2)	3.1 (54.3)
Gray partridge	3.2 (54.8)	3.4 (62.9)	3.3 (66.7)	3.3 (57.5)	3.8 (64.2)	3.1 (62.4)	3.7 (58.6)	2.5 (58.3)	2.8 (59.1)	4.1 (68.9)	3.6 (65.7)
Gray squirrel	6.2 (87.1)	5.6 (87.9)	5.8 (84.3)	5.8 (84.0)	5.8 (86.9)	5.1 (84.7)	6.7 (84.9)	6.6 (84.4)	6.1 (86.2)	7.0 (85.3)	6.9 (82.5)
Fox squirrel	5.1 (82.6)	5.5 (83.8)	4.7 (80.1)	5.3 (82.9)	3.9 (82.7)	4.5 (79.0)	4.8 (80.5)	5.3 (77.7)	5.9 (76.4)	5.1 (82.6)	4.8 (85.1)
Eastern cottontail	4.5 (79.1)	5.2 (83.5)	4.3 (79.9)	5.7 (80.0)	5.6 (83.1)	4.0 (80.0)	4.8 (82.5)	4.7 (77.7)	4.7 (70.5)	5.2 (84.2)	5.8 (79.6)
White-tailed jackrabbit	2.4 (61.5)	2.5 (59.3)	4.0 (65.1)	2.5 (65.5)	3.2 (78.6)	2.6 (72.7)	4.1 (68.2)	5.2 (50.0)	2.7 (60.6)	3.3 (72.5)	3.0 (75.0)
Snowshoe hare	5.4 (59.7)	3.4 (59.3)	3.7 (60.4)	2.8 (70.5)	4.7 (75.4)	3.9 (79.4)	6.3 (82.6)	4.4 (75.0)	2.9 (67.1)	3.5 (60.8)	3.0 (61.4)
Raccoon (Sept 04-Feb 05)	16.3 (97.5)	16.0 (92.0)	22.5 (94.4)	14.8 (92.6)	18.1 (91.8)	11.4 (95.1)	8.0 (94.8)	10.0 (93.6)	11.6 (86.3)	9.6 (88.5)	9.9 (91.6)
Raccoon[‡] (March 04-Aug 04)	9.1 (88.6)	12.2 (92.5)	29.6 (82.2)	6.3 (80.0)	6.2 (92.5)	6.6 (96.2)	8.2 (95.1)	4.9 (90.2)	5.9 (91.7)	5.6 (85.2)	6.7 (90.9)
Red fox (Sept 04-Feb 05)	4.4 (64.7)	4.8 (64.5)	5.3 (57.1)	2.4 (59.8)	2.6 (52.7)	2.4 (51.9)	3.4 (56.7)	2.7 (44.9)	3.1 (49.0)	3.5 (51.0)	2.8 (38.2)
Red fox[‡] (March 04-Aug 04)	3.0 (46.9)	2.3 (65.1)	2.4 (51.6)	1.6 (52.2)	1.8 (65.4)	1.3 (47.4)	1.9 (47.1)	2.8 (54.5)	3.6 (46.7)	1.1 (51.7)	1.4 (44.4)
Gray fox	2.5 (23.1)	1.8 (58.1)	n.a.	2.0 (62.5)	1.6 (53.3)	2.3 (40.0)	2.0 (33.3)	1.4 (26.3)	1.8 (23.5)	1.3 (30.0)	2.6 (40.9)
Coyote	2.4 (48.1)	2.9 (61.1)	4.1 (55.9)	2.8 (57.0)	2.9 (45.0)	2.5 (49.1)	3.4 (53.9)	2.4 (47.3)	3.2 (36.6)	2.7 (48.8)	2.5 (45.3)
Badger	1.7 (85.7)	1.8 (80.0)	2.1 (100.0)	1.0 (85.7)	6.5 (66.7)	1.3 (87.5)	1.0 (83.3)	1.0 (60.0)	2.8 (60.0)	1.0 (66.7)	1.2 (85.7)

[‡] Raccoon and red fox season changed to year round beginning May 1994. Mourning dove season added 2004.

Table 6. Statewide small game hunting license sales and estimated hunter harvest, 1993-94 through 2004-05.

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Small game license sales[a]	276,625	289,189	298,425	298,337	305,186	320,308	327,431	320,862	298,055	288,729	296,939	287,725
Federal duck stamp sales	110,738	149,428	132,546	132,738	138,331	134,098	134,138	135,884	140,980[e]	144,851[e]		
State duck stamp sales	104,839	116,346	122,092	122,634	126,009	126,488	128,245	121,709	118,590	119,677	118,757	114,003
Pheasant stamp sales	94,443	104,621	105,093	95,866	85,093	99,664	106,945	114,440	97,665	102,097	121,456	114,653
Estimated harvest[b] (thousands)												
Ducks[c]	824	955	1,162	1,098	1,206	1,119	1,021	969	990	1,024	914	727
Canada geese[c]	156	166	180	241	230	218	285	301	308	257	290	284
Other geese[c]	9	6	9	8	11	6	6	15	8	11	13	8
American coot [c]	15	22	28	23	29	25	25	10	17	20	11	20
Common snipe	4	2	3	5	4	5	3	3	2	3	3	2
Rails / gallinules	1	1	1	<1	<1	<1	<1	1	<1	2	<1	<1
Crow	51	114	130	96	74	106	60	96	88	72	82	72
American woodcock	68	74	82	58	58	63	54	45	27	28	30	41
Mourning dove[f]												97
Ring-necked pheasant	332	319	398	341	248	309	339	375	267	358	511	420
Ruffed grouse	288	371	457	533	654	946	685	619	332	249	351	194
Spruce grouse	12	23	25	16	25	27	19	23	9	12	18	9
Sharp-tailed grouse	11	9	10	8	13	22	14	16	10	9	12	10
Gray partridge	35	26	26	24	16	24	19	17	10	11	22	13
Gray squirrel	178	187	169	158	131	149	132	140	146	134	175	133
Fox squirrel	105	99	105	75	68	57	71	65	63	67	85	62
Eastern cottontail	75	77	100	65	65	89	59	78	63	52	93	87
White-tailed jack rabbit	9	7	7	10	4	7	6	7	8	4	7	7
Snowshoe hare	16	19	11	10	8	25	21	27	22	11	12	8
Raccoon (Sept 04-Feb 05)	79	163	155	207	124	143	65	49	59	60	50	57
Raccoon[d] (Mar 04–Aug 05)		24	55	99	17	2	16	36	18	19	22	20
Red fox (Sept 04-Feb 05)	63	42	48	33	13	13	10	19	7	11	13	6
Red fox [d] (Mar 04–Aug 05)		4	6	4	2	3	1	2	4	4	1	1
Gray fox	2	1	3	n.a.	3	1	2	1	1	1	1	2
Coyote	18	13	26	30	16	14	13	29	12	14	20	18
Badger	<1	1	1	1	1	1	1	1	<1	1	<1	<1

Harvest estimates in this table, and the number of hunters and mean take per hunter in Table 32, 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. Beginning in 1989-90 this table was changed from Resident harvest estimates to Statewide harvest estimates, which includes non-resident harvest estimates.

[a] Duplicate licenses not included.

[b] Estimates based upon response of hunters to questionnaires.

[c] U.S. Fish and Wildlife Service HIP harvest estimates for 2003 are:

Ducks . . . . . 884,500 Canada geese . . . . . 282,495 Other geese 0

[d] Raccoon and red fox seasons changed to year round beginning May,1994.

[e] Federal duck stamps sold have not been audited for non-hunting stamp purchasers. [f.] Mourning dove season added 2004.

Table 7. Mail survey results of nonresident small game hunters, 1991-92 through 2003-04.

	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Nonresident licenses issued[a]	4,718	3,809	4,435	4,993	5,488	6,361	7,155	7,572	7001	5,843	5,852	6,291	6,385
Questionnaires:													
Number mailed	170	229	182	205	51	269	200	199	98	124	130	123	182
Number not delivered	8	21	7	14	4	18	17	16	6	9	9	17	13
Number (percent) returned	32 (82)	149 (72)	128 (73)	140 (73)	32 (68)	183 (73)	117 (64)	136 (74)	56 (61)	77 (67)	75 (66)	68 (64)	114 (67)
Estimated nonresidents and (percent) of all nonresidents hunting:													
Ducks	1,751 (37)	1,789 (47)	1,975 (45)	2,354 (47)	1,209 (19)	2,331 (37)	2,874 (40)	2,505 (33)	2,375 (34)	2,727 (47)	2,263 (39)	2,498 (40)	2,394 (37)
Canada goose	1,101 (21)	792 (21)	1,005 (23)	1,248 (25)	686 (13)	1,113 (17)	1,468 (20)	1,225 (16)	1,500 (21)	1,169 (20)	1,092 (19)	1,388 (24)	1,368 (21)
Ruffed grouse	1,465 (31)	895 (24)	1,421 (32)	1,534 (31)	2,744 (50)	2,157 (34)	3,608 (50)	3,508 (46)	3,000 (43)	1,169 (20)	2,029 (35)	2,313 (40)	1,824 (29)
Ring-necked pheasant	894 (19)	741 (20)	832 (19)	820 (16)	515 (9)	731 (11)	612 (8)	947 (13)	625 (9)	935 (16)	1,404 (24)	2,128 (36)	2,679 (42)
Raccoon [b]	0 (0) [c]	26 (1)	0 (0) [c] *	107 (2) *	172 (3)	35 (1)	0 (0) [c]	56 (1)	250 (4)	0 (0)	0 (0)	0 (0)	0 (0)
Estimated nonresident take:													
Ducks	17,442	13,574	15,696	26,713	6,346	15,967	26,663	26,391	18,253	42,225	17,556	17,855	19,269
Canada goose	3,610	2,122	2,287	4,173	1,544	4,905	4,587	6,960	5,001	13,400	5,852	5,736	6,214
Ruffed grouse	10,758	4,985	7,242	9,415	23,153	16,072	27,886	23,384	24,003	6,622	9,207	9,437	7,924
Ring-necked pheasant	4,110	3,042	4,366	3,638	1,887	2,505	1,712	4,844	4,001	3,740	7,647	9,344	11,174
Raccoon	0	26	0	3,638	8,061	70	0	724	3,375	0	0	0	0

[a] Excludes duplicate licenses and nonresident shooting preserve licenses.

[b] 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.

[c] In 1998, 2001, 2002 and 2003 small game hunter survey no non-residents reported hunting/harvesting raccoons. * Non-resident raccoon hunting license was not required for 1994 and 1995.

	Raccoon take per hunter		
	Resident	Nonresident	Number of nonresident raccoon licenses
1997	15	2	58
1998[c]	18	0	56
1999	11	13	48
2000	8	13	51
2001	10	0	48
2002	11	0	46
2003	10	0	44
2004	8	0	46

The following information was taken from: U.S. Fish and Wildlife Service. 2005 Migratory bird harvest information, 2004: preliminary estimates. U.S. Department of the Interior, Washington, D.C. U.S.A. The entire report is available on-line at http://migratorybirds.fws.gov

Table 1. Species composition of the Minnesota waterfowl harvest, 2003 and 2004. (from: Richkus, K.D, Moore, M.T., Padding, P.I., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Harvest Information, 2004: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2005. 67 pp).**Note:** All hunter activity and harvest estimates are preliminary, pending final counts of the number of migratory bird hunters in each state and complete audits of all survey response data.

	Minnesota Harvest					Mississippi Flyway Harvest		
Species	2003	% of Harvest	2004	% of Harvest	Percent change in Harvest 03-04	2003	2004	Percent change Harvest 03-04
Mallard	303,995	34.37	179,277	26.23	- 41	2,571,468	2,199,931	– 14
Domestic mallard	1,666	0.19	838	0.12	- 50	6,018	5,015	– 17
American black duck	833	0.09	279	0.04	– 66	33,971	35,692	+ 5
Black x mallard	416	0.05	558	0.08	+ 34	5,316	2,651	– 50
Gadwall	47,057	5.32	31,276	4.57	– 33	858,504	654,488	– 24
American wigeon	15,408	1.74	24,574	3.59	+ 59	124,228	149,793	+ 21
Green-winged teal	100,776	11.39	44959	6.58	- 55	724,851	498,019	– 31
Blue-winged /cinnamon teal	92,448	10.45	106,114	15.52	+ 15	611,188	365,488	– 40
Northern shoveler	18,323	2.07	17,313	2.53	- 5	209,872	158,905	– 24
Northern pintail	18,323	2.07	14,242	2.08	– 22	123,318	90,542	– 27
Wood duck	129,926	14.68	127,616	18.67	– 2	779,488	729,608	– 6
Redhead	11,660	1.32	9,494	1.39	– 19	37,828	35,334	– 7
Canvasback	2,915	0.33	4,747	0.69	+ 63	11,259	10,824	– 4
Greater scaup	416	0.05	3,072	0.45	+638	14,469	28,056	+ 94
Lesser scaup	34,147	3.86	12,008	1.76	– 65	153,617	108,534	– 29
Ring-necked duck	72,459	8.19	75,118	10.99	+ 4	239,855	233,979	– 2
Goldeneye	9,578	1.08	9,494	1.39	– 1	32,612	30,290	– 7
Bufflehead	10,411	1.18	8,936	1.31	– 14	89,254	59,789	– 33
Ruddy duck	833	0.09	1,955	0.28	+135	13,202	5,227	– 60
Scoters	833	0.09	838	0.12	+ 1	5,033	4,286	– 15
Hooded merganser	9,578	1.08	9,215	1.35	– 4	55,608	47,469	– 15
Other mergansers	2,499	.028	1,117	0.16	- 55	9,844	8,808	– 10
Total Duck Harvest (retrieved kill)	884,500 ± 10%		683,600 ± 10%		– 23	6,759,100 ± 9%	5,505,500 ± 5%	– 18

[a] Sum of all species does not equal total because of rounding error. [b] No percentage change.

Table 2. Top 10 states in number of **adult duck hunters**, 2004, and number of hunter-days and retrieved duck kill, in each (from: Richkus, K.D, Moore, M.T., Padding, P.I., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Harvest Information, 2004: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2005. 67 pp). **Note:** All hunter activity and harvest estimates are preliminary, pending final counts of the number of migratory bird hunters in each state, and complete audits of all survey response data.

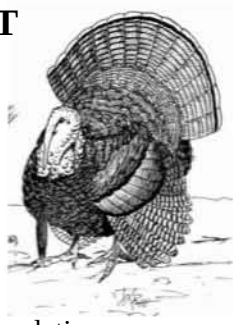
State	Number of active duck hunters	Duck hunter days afield	Total duck harvest	Seasonal duck harvest per hunter
Minnesota	89,600 ± 7%	595,600 ± 12%	683,600 ± 10%	7.6 ± 13%
Texas	84,900 ± 20%	497,000 ± 42%	909,600 ± 40%	10.7 ± 45%
Arkansas	67,800 ± 8%	538,000 ± 11%	1,127,400 ± 17	16.6 ± 15%
Wisconsin	67,400 ± 8%	447,100 ± 9%	429,900 ± 10%	6.4 ± 13%
California	52,900 ± 11%	554,600 ± 16%	1,480,700 ± 21%	28.0 ± 23%
Louisiana	52,200 ± 10%	449,500 ± 14%	822,000 ± 13%	15.7 ±16%
Michigan	43,100 ± 9%	270,600 ± 10%	333,000 ±15%	7.7 ± 17%
Illinois	37,300 ± 8%	314,100 ± 11%	320,500 ± 12%	8.6 ± 14%
North Dakota	39,900 ± 5%	194,200 ± 8%	541,900 ± 8%	14.7 ± 9%
Missouri	28,500 ± 13%	213,600 ± 18%	329,100 ± 19%	11.5 ± 23%
Mississippi Flyway		3,857,300 ± 4%	5,505,500 ± 5%	
United States		7,326,100 ± 4%	12,312,200 ± 5%	

Table 3. Top 10 states in number of **adult goose hunters**, 2004, and number of hunter-days and retrieved goose kill, in each (from: Richkus, K.D, Moore, M.T., Padding, P.I., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Harvest Information, 2004: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2005. 67 pp). **Note:** All hunter activity and harvest estimates are preliminary, pending final counts of the number of migratory bird hunters in each state, and complete audits of all survey response data.

State	**Number of active goose hunters**	**Goose hunter days afield**	**Total goose harvest**	**Seasonal goose harvest per hunter**
Minnesota	72,100 ± 7%	470,600 ± 11%	235,500 ± 13%	3.3 ± 15%
Wisconsin	51,100 ± 9%	314,400 ± 12%	97,300 ± 16%	1.9 ± 18%
Texas	47,400 ± 23%	140,600 ± 25%	248,100 ± 27%	5.2 ± 36%
Michigan	34,300 ± 9%	177,200 ± 12%	130,000 ± 15%	3.8 ± 17%
Pennsylvania	32,500 ± 11%	180,800 ± 14%	172,000 ± 17%	5.3 ± 20%
California	38,200 ± 11%	273,000 ± 15%	130,900 ± 14%	3.4 ± 18%
Illinois	27,900 ± 10%	217,700 ± 14%	103,900 ± 17%	3.7 ± 19%
North Dakota	24,700 ± 6%	123,100 ± 9%	138,200 ± 13%	5.6 ± 14%
Ohio	27,000 ± 14%	160,000 ± 18%	96,000 ± 17%	3.6 ± 22%
Maryland	24,600 ± 7%	136,300 ± 10%	148,200 ± 11%	6.0 ± 13%
Mississippi Flyway		2,086,800 ± 5%	1,235,600 ± 7%	
United States [b]		4,202,000 ± 3%	3,189,700 ± 4%	

[b]. Goose hunter statistics do not include brant hunter statistics for coastal states with brant seasons: Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, Virginia, California, Oregon, Washington, and Alaska.

2004 FALL WILD TURKEY HARVEST REPORT



Sharon Goetz
Farmland Wildlife Populations & Research Group

INTRODUCTION

In Minnesota, monitoring wild turkey harvest is an important component of population management, which includes setting permit levels for subsequent seasons. Wild turkey populations, permit levels available for the fall season, and harvest have all increased since Minnesota's first fall hunting season in 1990. Fall harvest is affected by wild turkey population size, by harvest pressure, and weather conditions during the fall hunting season.

METHODS

The 2004 fall turkey season took place from 13 October through 24 October (2, 5-day periods). There were 4,380 permits available in the 24 permit areas open to fall hunting, with a total of 5,878 applicants (Table 1). Available permits increased by 510 permits from 2003 (3,870). One new permit area was opened to fall hunting (PA 449). Spring turkey hunters are required to register their bird at a designated registration station within 24 hours of harvest. During registration sex, age, and harvest date are recorded.

RESULTS

This year's harvest of 758 was down from 2003 (889), but still above the 5-year average of 718 (Table 1). The highest harvest occurred in Permit Area 341 with a total of 89 turkeys registered (Table 2, Figure 1). Hunter success rate was 26% overall, which is below the long-term average of 32%. Fifty-one percent of the harvest occurred during Season A (October 13-17), and 49% during Season B (October 20-24).

The numbers of juvenile versus adult birds were similar across sex (Table 3). Females comprised 50% of the overall reported harvest. Juveniles made up 23% of the harvest (Table 4), this is lower than 2003 (32%). In the newest permit area open to hunting (PA 449), 5 adult males, 1 adult female, and 1 sex/age unknown turkey were registered. Harvest age ratios are biased by hunter preference for taking adult gobblers. Also, because age data are hunter reported, some juvenile birds are likely misclassified as adults (i.e., it is assumed that hunters are more likely to report shooting an adult).

Table 1. Fall wild turkey applications, permits, harvest and adjusted hunter success rates in Minnesota, 1990-2004.

Year	# Applicants	# Permits Available	# Permits Issued	# Turkeys Registered	Hunter Success (%)[1]
1990	4,522	1,000	951	326	38
1991	2,990	2,200	2,020	552	30
1992	2,782	2,200	2,028	588	32
1993	3,186	2,400	2,094	605	32
1994	3,124	2,500	2,106	601	32
1995	3,685	2,500	2,125	648	34
1996	4,453	2,500	2,289	685	33
1997	4,574	2,580	2,378	698	33
1998	4,526	2,710	2,483	828	37
1999	5,354	2,890	2,644	865	36
2000	5,263	3,090	2,484	735	33
2001	4,501	2,870	2,262	629	31
2002	5,180	3,790	2,945	594	22
2003	5,264	3,870	2,977	889	33
2004	5,878	4,380	3,277	758	26

[1] Success rates adjusted using a 10% non-participation rate based on hunter survey data.

Table 2. Fall wild turkey harvest and hunter success rates by permit area, 2004.

Permit Area	# Permits Available	# Permits Issued	# Turkeys Registered	Hunter Success (%)[1]
228	60	52	14	27
236	80	61	14	23
337	90	64	18	28
338	140	105	20	19
339	140	106	21	20
341	500	412	89	22
342	450	320	61	19
343	130	102	38	37
344	200	168	29	17
345	250	149	37	25
346	390	247	59	24
347	150	116	37	32
348	300	226	56	25
349	560	411	80	19
442	250	209	53	25
443	100	73	15	21
448	10	9	3	33
449	10	12	7	58
461	160	123	38	31
462	160	119	27	23
464	40	30	7	23
465	60	42	9	21
466	80	64	17	27
467	70	57	9	16
Total	4,380	3,277	758	23

[1] Success rates not adjusted for non-participants.

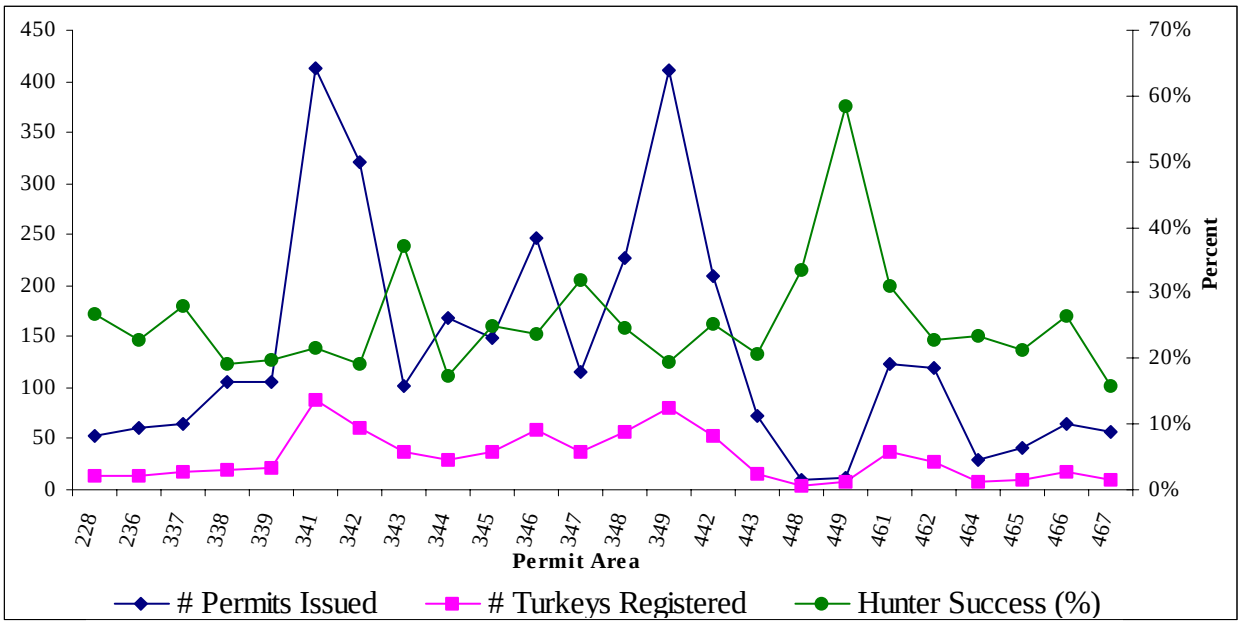
Table 3. Age and sex structure of fall wild turkey harvest by permit area, 2004.

	Male		Female			
Permit Area	**Juvenile**	**Adult**	**Juvenile**	**Adult**	**Unknown**	**Total**
228	0	3	1	10		14
236	3	8	1	2		14
337	1	9	0	8		18
338	2	11	0	7		20
339	1	7	4	8	1	21
341	7	32	9	35	6	89
342	8	12	10	31		61
343	3	19	2	14		38
344	3	7	2	17		29
345	0	12	5	20		37
346	7	20	6	26		59
347	5	20	2	10		37
348	13	17	7	19		56
349	13	26	12	29		80
442	3	24	4	21	1	53
443	1	1	5	7	1	15
448	0	1	0	2		3
449	0	5	0	1	1	7
461	10	16	5	7		38
462	1	9	4	10	3	27
464	0	4	1	2		7
465	1	4	1	3		9
466	7	5	2	3		17
467	1	4	0	4		9
Total	90	276	83	296	13	758

Table 4. Age and sex structure of fall wild turkey harvest in Minnesota, 1990-2004.

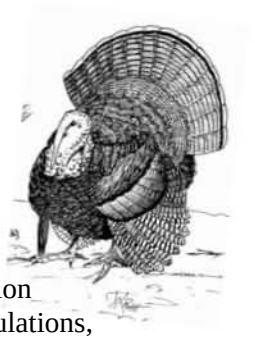
	Male			Female				
Year	**Juvenile**	**Adult**	**Unknown**	**Juvenile**	**Adult**	**Unknown**	**Unknown Age/Sex**	**Total**
1990	67 (21%)	83 (25%)		85 (26%)	91 (28%)			326
1991	121 (22%)	80 (15%)		211 (38%)	140 (25%)			552
1992	120 (20%)	86 (15%)		208 (35%)	174 (30%)			588
1993	110 (18%)	112 (19%)		184 (30%)	196 (32%)		3(<1%)	605
1994	105 (17%)	83 (14%)		210 (35%)	203 (34%)			601
1995	131 (20%)	136 (21%)		194 (30%)	187 (29%)			648
1996	96 (14%)	141 (20%)		224 (33%)	224 (33%)			685
1997	115 (16%)	130 (19%)		215 (31%)	238 (34%)			698
1998	152 (18%)	139 (17%)		261 (32%)	274 (33%)		2(<1%)	828
1999	141 (16%)	213 (25%)		253 (29%)	258 (30%)			865
2000	101 (14%)	175 (24%)		206 (28%)	253 (34%)			735
2001	81 (13%)	119 (19%)		178 (28%)	251 (40%)			629
2002	94 (16%)	109 (18%)	2 (<1%)	169 (28%)	205 (35%)	3 (<1%)	12 (2%)	594
2003	121 (14%)	237 (27%)		164 (18%)	347 (39%)	1 (<1%)	19 (2%)	889
2004	90 (12%)	276 (36%)		83 (11%)	296 (39%)		13 (2%)	758

Figure 1. Total harvest, permits issued, and hunter success rate for the 2004 fall wild turkey hunting season in Minnesota.



2005 SPRING TURKEY HARVEST REPORT

Sharon Goetz, Bryan Abel, and Allison Boies
Farmland Wildlife Populations & Research Group



INTRODUCTION

In Minnesota, monitoring wild turkey harvest is an important component of population management, which includes setting permit levels for subsequent seasons. Wild turkey populations, permit levels available for the spring season, and harvest have all increased substantially since Minnesota's first modern hunting season in 1978. Spring harvest is affected by wild turkey population size, by harvest pressure, and weather conditions during the spring hunting season.

METHODS

Spring turkey hunting opportunities are now available in approximately half of Minnesota; 6 new permit areas (PA; 222, 413, 424, 447, 456, and 458) were opened in 2005 (Figure 1). The 2005 spring turkey season took place from 13 April through 26 May (6 5-day time periods and 2 7-day time periods). An archery permit was offered the last 2 times periods in any permit area with at least 50 permits per time period. Spring turkey hunters are required to register their bird at a designated registration station within 24 hours of harvest. During registration sex, age, and harvest date are recorded.

RESULTS

A total of 49,181 applications were received for the 31,784 available permits (Table 1). The chance of being drawn for a permit varies by permit area (PA) and time period selected by the hunter (Table 2). There were 27,638 total regular permits and 2,210 archery permits issued. Surplus permits that were sold after the initial lottery drawing accounted for 7% (1,869) of the sales (Figure 2).

A total of 7,800 turkeys were registered in spring 2005 compared to 8,434 in 2004 (Table 1, Figure 3). Overall hunter success was 28.2%, slightly lower than last year (33.4%) and the 5-year average of 30.7% (Table 3). The highest harvest occurred in PA 349 where 653 turkeys were registered (Table 3). Most PAs (52%) showed increased (n = 33) or identical (n = 1) harvests from 2004. Hunter success by PA ranged from 2.9% (newly split PA 456) to 61.1% (PA 449; Table 3). Hunters in the first 2 time periods had the highest success rates (42.7% and 40.2%, respectively), with lower success rates in subsequent time periods, following the 5-year trend (Table 4, Figure 4).

Juveniles made up 10% of the harvest (Table 5, Figure 5), which is lower than the past 4 years (20% in 2004, 23% in 2003, and 30% in 2002). Wisconsin reported similar juvenile harvest of 12% for spring 2005 (22% in 2004, 24% in 2003 and 28% in 2002). Harvest age ratios are biased by hunter preference for taking adult gobblers. Also, because age data are hunter reported, some juvenile birds are likely misclassified as adults (i.e., it is assumed that hunters are more likely to report shooting an adult).

Total huntable area (forest cover buffered by 50 meters, with non-huntable areas removed) is used to calculate harvest density (Table 6). The number of turkeys harvested per square mile of huntable habitat ranged from 0.04 (PA 157 and 159) to 4.36 (PA 343) with an average of 0.96 statewide (Table 6).

No new turkey hunting accidents were reported during spring 2005. Twelve spring hunting accidents have been reported since 1978, none of which has been fatal.

DISCUSSION

Spring 2005 wild turkey harvest decreased slightly from spring 2004. Harvest in the early time periods was on track for harvest comparable to 2004. However, wet and cold weather in May impacted harvest in the last 4 time periods.

The 2005 turkey harvest data were obtained primarily from electronic licensing system (ELS) registration stations. One factor that complicates harvest reporting is the continued presence of a few stations that registered birds using hand-tally data sheets. A goal is to convert all turkey registration to ELS in the future, which will streamline the harvest reporting process.

Table 1. Spring and fall wild turkey applications, permits, and harvest in Minnesota, 1978-2005.

Year	Spring Applications	Spring Permits Available	Spring Permits Issued	% of Available Issued	Spring Harvest	% Spring Hunter Success[a]	Fall Applications	Fall Permits Available	Fall Harvest
1978	10,740	420	411	97.9	94	22.9	-	-	-
1979	11,116	840	827	98.5	116	14.0	-	-	-
1980	9,613	1,200	1,191	99.3	98	8.2	-	-	-
1981	8,398	1,500	1,437	95.8	113	7.9	-	-	-
1982	7,223	2,000	1,992	99.6	106	5.3	-	-	-
1983	8,153	2,100	2,079	99.0	116	5.6	-	-	-
1984	7,123	3,000	2,837	94.6	178	6.3	-	-	-
1985	5,662	2,750	2,449	89.1	323	13.2	-	-	-
1986	5,715	2,500	2,251	90.0	333	14.8	-	-	-
1987	6,361	2,700	2,520	93.3	520	20.6	-	-	-
1988	8,402	3,000	2,994	99.8	674	22.5	-	-	-
1989	13,007	4,000	3,821	95.5	930	24.3	-	-	-
1990	14,326	6,600	6,126	92.8	1,709	27.9	4,522	1,000	326
1991	15,918	9,170	8,607	93.9	1,724	20.0	2,990	2,200	552
1992	16,401	9,310	9,051	97.2	1,691	18.7	2,782	2,200	588
1993	17,800	9,625	9,265	96.3	2,082	22.5	3,186	2,400	605
1994	19,853	9,940	9,479	95.4	1,975	20.8	3,124	2,500	601
1995	21,345	9,975	9,550	95.7	2,339	24.5	3,685	2,500	648
1996	23,757	12,131	10,983	90.5	2,841	25.9	4,453	2,500	685
1997	25,958	12,530	11,610	92.7	3,302	28.4	4,574	2,580	698
1998	29,727	14,035	13,229	94.3	4,361	33.0	4,526	2,710	828
1999	39,957	18,360	16,387	89.3	5,132	31.3	5,354	2,890	865
2000	42,022	20,160	18,661	92.6	6,154	33.0	5,263	3,090	735
2001	41,048	22,936	21,404	93.3	6,383	29.8	4,501	2,870	629
2002	42,415	24,136	22,607	93.7	6,516	28.8	5,180	3,790	594
2003	44,415	25,016	22,770	91.0	7,666	33.7	5,264	3,870	889
2004	48,059	27,600	25,261	91.5	8,434	33.4	5,878	4,380	758
2005	49,181	31,748	27,638	87.1	7,800	28.2			

[a] Success rate not adjusted for non-participants.

Table 2. Number of regular (non-landowner) applicants, permits available, and chance of being drawn in the regular spring turkey lottery by permit area and time period in Minnesota, 2005.

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
157	A	36	5	1	4	11%
	B	16	5	1	4	25%
	C	38	5	0	5	13%
	D	16	5	1	4	25%
	E	12	5	0	5	42%
	F	6	5	0	5	83%
	G	8	5	0	5	63%
	H	4	5	1	4	100%
159	A	34	5	1	4	12%
	B	34	5	1	4	12%
	C	44	5	1	4	9%
	D	30	5	0	5	17%
	E	14	5	1	4	29%
	F	10	5	1	4	40%
	G	9	5	1	4	44%
	H	8	5	0	5	63%
221	A	87	20	4	16	18%
	B	53	20	4	16	30%
	C	122	20	3	17	14%
	D	58	20	3	17	29%
	E	28	20	0	20	71%
	F	24	20	0	20	83%
	G	15	20	3	17	100%
	H	11	20	0	20	100%
222	A	26	5	1	4	15%
	B	9	5	1	4	44%
	C	33	5	1	4	12%
	D	26	5	1	4	15%
	E	6	5	1	4	67%
	F	4	5	0	5	100%
	G	13	5	1	4	31%
	H	5	5	1	4	80%
223	A	284	75	12	63	22%
	B	190	75	12	63	33%
	C	294	75	15	60	20%
	D	203	75	15	60	30%
	E	87	75	15	60	69%
	F	50	75	15	60	100%
	G	85	75	15	60	71%
	H	41	75	15	60	100%
225	A	266	100	20	80	30%
	B	168	100	20	80	48%
	C	280	100	18	82	29%
	D	199	100	20	80	40%
	E	78	100	20	80	100%
	F	61	100	20	80	100%
	G	109	100	20	80	73%
	H	19	100	20	80	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
227	A	212	60	12	48	23%
	B	143	60	12	48	34%
	C	191	60	12	48	25%
	D	175	60	12	48	27%
	E	70	60	12	48	69%
	F	61	60	12	48	79%
	G	45	60	0	60	100%
	H	18	60	0	60	100%
228	A	129	40	8	32	25%
	B	82	40	8	32	39%
	C	114	40	8	32	28%
	D	94	40	0	40	43%
	E	69	40	8	32	46%
	F	29	40	8	32	100%
	G	48	40	0	40	83%
	H	22	40	8	32	100%
235	A	65	15	0	15	23%
	B	56	15	0	15	27%
	C	84	15	0	15	18%
	D	77	15	0	15	19%
	E	5	15	0	15	100%
	F	15	15	0	15	100%
	G	23	15	0	15	65%
	H	5	15	0	15	100%
236	A	325	95	19	76	23%
	B	260	95	19	76	29%
	C	381	95	19	76	20%
	D	273	95	19	76	28%
	E	161	95	19	76	47%
	F	55	95	0	95	100%
	G	108	95	19	76	70%
	H	61	95	0	95	100%
244	A	48	25	5	20	42%
	B	42	25	5	20	48%
	C	70	25	5	20	29%
	D	53	25	5	20	38%
	E	23	25	0	25	100%
	F	21	25	0	25	100%
	G	21	25	0	25	100%
	H	11	25	5	20	100%
248	A	21	5	1	4	19%
	B	14	5	0	5	36%
	C	31	5	1	4	13%
	D	31	5	1	4	13%
	E	12	5	1	4	33%
	F	5	5	1	4	80%
	G	14	5	0	5	36%
	H	3	5	0	5	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
249	A	23	15	3	12	52%
	B	32	15	3	12	38%
	C	31	15	3	12	39%
	D	26	15	3	12	46%
	E	8	15	0	15	100%
	F	5	15	0	15	100%
	G	14	15	0	15	100%
	H	5	15	0	15	100%
337	A	164	55	11	44	27%
	B	100	55	11	44	44%
	C	183	55	11	44	24%
	D	104	55	11	44	42%
	E	65	55	0	55	85%
	F	36	55	0	55	100%
	G	51	55	0	55	100%
	H	31	55	0	55	100%
338	A	257	85	17	68	26%
	B	148	85	17	68	46%
	C	239	85	17	68	28%
	D	160	85	17	68	43%
	E	86	85	0	85	99%
	F	36	85	0	85	100%
	G	90	85	17	68	76%
	H	38	85	0	85	100%
339	A	167	80	16	64	38%
	B	112	80	16	64	57%
	C	177	80	16	64	36%
	D	125	80	16	64	51%
	E	60	80	16	64	100%
	F	36	80	16	64	100%
	G	86	80	0	80	93%
	H	17	80	0	80	100%
341	A	601	225	45	180	30%
	B	366	225	45	180	49%
	C	663	225	45	180	27%
	D	513	225	45	180	35%
	E	218	225	45	180	83%
	F	164	225	45	180	100%
	G	199	225	45	180	90%
	H	75	225	45	180	100%
342	A	438	225	45	180	41%
	B	273	225	45	180	66%
	C	496	225	45	180	36%
	D	350	225	45	180	51%
	E	189	225	0	225	100%
	F	121	225	45	180	100%
	G	162	225	45	180	100%
	H	51	225	0	225	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
343	A	474	155	31	124	26%
	B	276	155	31	124	45%
	C	605	155	31	124	20%
	D	333	155	31	124	37%
	E	186	155	31	124	67%
	F	112	155	31	124	100%
	G	190	155	31	124	111%
	H	112	155	0	155	100%
344	A	497	140	28	112	23%
	B	279	140	28	112	40%
	C	427	140	28	112	26%
	D	293	140	28	112	38%
	E	134	140	0	140	100%
	F	116	140	0	140	100%
	G	176	140	0	140	80%
	H	55	140	0	140	100%
345	A	230	200	40	160	70%
	B	202	200	40	160	79%
	C	281	200	40	160	57%
	D	257	200	40	160	62%
	E	104	200	0	200	100%
	F	55	200	40	160	100%
	G	67	200	40	160	100%
	H	22	200	40	160	100%
346	A	562	325	65	260	46%
	B	356	325	65	260	73%
	C	543	325	65	260	48%
	D	486	325	65	260	53%
	E	224	325	65	260	100%
	F	85	325	0	325	100%
	G	149	325	0	325	100%
	H	32	325	0	325	100%
347	A	327	150	30	120	37%
	B	250	150	30	120	48%
	C	382	150	30	120	31%
	D	290	150	30	120	41%
	E	121	150	0	150	100%
	F	71	150	0	150	100%
	G	93	150	30	120	100%
	H	33	150	0	150	100%
348	A	510	175	35	140	27%
	B	326	175	35	140	43%
	C	505	175	35	140	28%
	D	346	175	35	140	40%
	E	176	175	35	140	80%
	F	126	175	35	140	100%
	G	115	175	0	175	100%
	H	64	175	35	140	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
349	A	994	450	90	360	36%
	B	587	450	90	360	61%
	C	967	450	90	360	37%
	D	718	450	90	360	50%
	E	362	450	90	360	99%
	F	216	450	0	450	100%
	G	313	450	90	360	100%
	H	85	450	90	360	100%
410	A	177	45	9	36	20%
	B	160	45	9	36	23%
	C	266	45	9	36	14%
	D	205	45	9	36	18%
	E	93	45	9	36	39%
	F	40	45	0	45	100%
	G	113	45	9	36	32%
	H	43	45	9	36	84%
411	A	136	45	9	36	26%
	B	78	45	9	36	46%
	C	147	45	9	36	24%
	D	112	45	9	36	32%
	E	65	45	9	36	55%
	F	36	45	9	36	100%
	G	64	45	9	36	56%
	H	24	45	9	36	100%
412	A	175	45	9	36	21%
	B	108	45	9	36	33%
	C	228	45	9	36	16%
	D	199	45	9	36	18%
	E	87	45	9	36	41%
	F	44	45	9	36	82%
	G	87	45	9	36	41%
	H	51	45	0	45	88%
413	A	47	10	2	8	17%
	B	23	10	2	8	35%
	C	35	10	2	8	23%
	D	32	10	2	8	25%
	E	11	10	0	10	91%
	F	5	10	0	10	100%
	G	21	10	2	8	38%
	H	5	10	0	10	100%
414	A	50	15	3	12	24%
	B	25	15	3	12	48%
	C	38	15	3	12	32%
	D	36	15	3	12	33%
	E	24	15	3	12	50%
	F	7	15	3	12	100%
	G	18	15	3	12	67%
	H	10	15	0	15	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
415	A	218	65	13	52	24%
	B	123	65	13	52	42%
	C	241	65	13	52	22%
	D	240	65	13	52	22%
	E	57	65	13	52	91%
	F	50	65	13	52	100%
	G	74	65	0	65	88%
	H	56	65	13	52	93%
416	A	38	10	2	8	21%
	B	34	10	2	8	24%
	C	64	10	2	8	13%
	D	54	10	2	8	15%
	E	15	10	0	10	67%
	F	19	10	0	10	53%
	G	32	10	2	8	25%
	H	8	10	0	10	100%
417	A	133	40	8	32	24%
	B	105	40	8	32	30%
	C	164	40	8	32	20%
	D	75	40	8	32	43%
	E	35	40	8	32	91%
	F	33	40	8	32	97%
	G	42	40	0	40	95%
	H	31	40	0	40	100%
418	A	196	65	13	52	27%
	B	142	65	13	52	37%
	C	288	65	13	52	18%
	D	222	65	13	52	23%
	E	75	65	13	52	69%
	F	63	65	0	65	100%
	G	103	65	13	52	50%
	H	40	65	13	52	100%
419	A	105	40	8	32	30%
	B	58	40	8	32	55%
	C	109	40	8	32	29%
	D	59	40	0	40	68%
	E	39	40	8	32	82%
	F	27	40	0	40	100%
	G	27	40	8	32	100%
	H	8	40	0	40	100%
420	A	8	7	0	7	88%
	B	3	7	0	7	100%
	C	9	7	0	7	78%
	D	16	7	0	7	44%
	E	7	7	0	7	100%
	F	1	7	0	7	100%
	G	1	7	0	7	100%
	H	0	7	0	7	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
422	A	13	5	0	5	38%
	B	5	5	0	5	100%
	C	24	5	0	5	21%
	D	14	5	0	5	36%
	E	12	5	0	5	42%
	F	1	5	0	5	100%
	G	4	5	0	5	100%
	H	5	5	0	5	100%
424	A	4	5	0	5	100%
	B	4	5	1	4	100%
	C	3	5	1	4	100%
	D	1	5	0	5	100%
	E	0	5	0	5	100%
	F	1	5	0	5	100%
	G	0	5	0	5	100%
	H	0	5	0	5	100%
425	A	180	60	12	48	27%
	B	115	60	12	48	42%
	C	216	60	12	48	22%
	D	196	60	12	48	24%
	E	74	60	0	60	81%
	F	34	60	12	48	100%
	G	81	60	12	48	59%
	H	50	60	12	48	96%
426	A	10	5	1	4	40%
	B	3	5	1	4	100%
	C	12	5	0	5	42%
	D	1	5	0	5	100%
	E	7	5	0	5	71%
	F	2	5	0	5	100%
	G	1	5	0	5	100%
	H	1	5	0	5	100%
427	A	24	10	2	8	33%
	B	12	10	0	10	83%
	C	21	10	2	8	38%
	D	8	10	0	10	100%
	E	5	10	0	10	100%
	F	2	10	0	10	100%
	G	9	10	2	8	89%
	H	4	10	0	10	100%
428	A	47	15	3	12	26%
	B	26	15	3	12	46%
	C	49	15	3	12	24%
	D	44	15	0	15	34%
	E	8	15	3	12	100%
	F	20	15	0	15	75%
	G	17	15	0	15	88%
	H	6	15	0	15	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
429	A	55	30	6	24	44%
	B	31	30	6	24	77%
	C	27	30	0	30	100%
	D	31	30	0	30	97%
	E	20	30	0	30	100%
	F	5	30	0	30	100%
	G	7	30	0	30	100%
	H	3	30	0	30	100%
431	A	19	5	1	4	21%
	B	17	5	0	5	29%
	C	19	5	1	4	21%
	D	17	5	0	5	29%
	E	6	5	0	5	83%
	F	1	5	0	5	100%
	G	6	5	0	5	83%
	H	1	5	0	5	100%
433	A	42	5	1	4	10%
	B	29	5	1	4	14%
	C	27	5	1	4	15%
	D	13	5	1	4	31%
	E	1	5	0	5	100%
	F	6	5	1	4	67%
	G	13	5	0	5	38%
	H	5	5	0	5	100%
440	A	144	70	14	56	39%
	B	106	70	14	56	53%
	C	151	70	14	56	37%
	D	130	70	14	56	43%
	E	30	70	0	70	100%
	F	22	70	0	70	100%
	G	53	70	14	56	100%
	H	10	70	0	70	100%
442	A	438	160	32	128	29%
	B	256	160	32	128	50%
	C	565	160	32	128	23%
	D	320	160	32	128	40%
	E	145	160	32	128	88%
	F	116	160	32	128	100%
	G	214	160	32	128	60%
	H	81	160	32	128	100%
443	A	160	70	14	56	35%
	B	88	70	14	56	64%
	C	173	70	14	56	32%
	D	151	70	14	56	37%
	E	69	70	14	56	81%
	F	27	70	0	70	100%
	G	38	70	14	56	100%
	H	4	70	0	70	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
446	A	25	5	1	4	16%
	B	10	5	1	4	40%
	C	20	5	1	4	20%
	D	13	5	1	4	31%
	E	7	5	0	5	71%
	F	4	5	0	5	100%
	G	7	5	1	4	57%
	H	4	5	1	4	100%
447	A	14	5	0	5	36%
	B	6	5	1	4	67%
	C	0	5	0	5	100%
	D	6	5	1	4	67%
	E	0	5	0	5	100%
	F	3	5	0	5	100%
	G	3	5	0	5	100%
	H	1	5	0	5	100%
448	A	6	7	2	5	83%
	B	26	7	0	7	27%
	C	30	7	2	5	17%
	D	27	7	2	5	19%
	E	17	7	0	7	41%
	F	8	7	0	7	88%
	G	10	7	2	5	50%
	H	0	7	0	7	100%
449	A	36	7	2	5	14%
	B	19	7	2	5	26%
	C	37	7	2	5	14%
	D	29	7	2	5	17%
	E	15	7	0	7	47%
	F	15	7	0	7	47%
	G	22	7	2	5	23%
	H	9	7	2	5	56%
450	A	21	7	0	7	33%
	B	16	7	2	5	31%
	C	18	7	0	7	39%
	D	5	7	0	7	100%
	E	6	7	0	7	100%
	F	2	7	0	7	100%
	G	9	7	2	5	56%
	H	1	7	0	7	100%
451	A	24	5	1	4	17%
	B	21	5	0	5	24%
	C	27	5	0	5	19%
	D	31	5	1	4	13%
	E	8	5	1	4	50%
	F	8	5	0	5	63%
	G	1	5	0	5	100%
	H	5	5	0	5	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
454	A	21	5	0	5	24%
	B	13	5	0	5	38%
	C	12	5	0	5	42%
	D	14	5	0	5	36%
	E	8	5	0	5	63%
	F	10	5	0	5	50%
	G	10	5	0	5	50%
	H	10	5	1	4	40%
456	A	5	5	0	5	100%
	B	4	5	0	5	100%
	C	7	5	1	4	57%
	D	6	5	1	4	67%
	E	10	5	0	5	50%
	F	3	5	0	5	100%
	G	1	5	0	5	100%
	H	0	5	0	5	100%
457	A	11	5	0	5	45%
	B	11	5	0	5	45%
	C	16	5	0	5	31%
	D	11	5	0	5	45%
	E	5	5	0	5	100%
	F	2	5	0	5	100%
	G	3	5	0	5	100%
	H	5	5	0	5	100%
458	A	3	5	0	5	100%
	B	1	5	0	5	100%
	C	2	5	0	5	100%
	D	0	5	0	5	100%
	E	1	5	0	5	100%
	F	0	5	0	5	100%
	G	0	5	0	5	100%
	H	0	5	0	5	100%
459	A	65	25	5	20	31%
	B	29	25	5	20	69%
	C	65	25	5	20	31%
	D	34	25	5	20	59%
	E	18	25	0	25	100%
	F	16	25	0	25	100%
	G	23	25	0	25	100%
	H	6	25	0	25	100%
461	A	235	80	16	64	27%
	B	140	80	16	64	46%
	C	258	80	16	64	25%
	D	192	80	16	64	33%
	E	70	80	16	64	91%
	F	45	80	16	64	100%
	G	66	80	16	64	97%
	H	13	80	0	80	100%

Permit Area	Time Period	Regular Applicants	Total Permits Available	Landowner Permits Offered[a]	Regular Permits Available	Chance of Regular Applicants being Drawn (%)[b]
462	A	213	90	18	72	34%
	B	121	90	18	72	60%
	C	226	90	18	72	32%
	D	186	90	18	72	39%
	E	62	90	0	90	100%
	F	56	90	18	72	100%
	G	83	90	18	72	87%
	H	27	90	0	90	100%
463	A	73	20	4	16	22%
	B	39	20	4	16	41%
	C	72	20	4	16	22%
	D	30	20	0	20	67%
	E	16	20	4	16	100%
	F	7	20	0	20	100%
	G	14	20	0	20	100%
	H	0	20	0	20	100%
464	A	33	25	5	20	61%
	B	40	25	0	25	63%
	C	56	25	5	20	36%
	D	48	25	0	25	52%
	E	10	25	5	20	100%
	F	8	25	0	25	100%
	G	9	25	0	25	100%
	H	3	25	0	25	100%
465	A	56	30	6	24	43%
	B	29	30	0	30	100%
	C	78	30	0	30	38%
	D	34	30	0	30	88%
	E	15	30	6	24	100%
	F	6	30	0	30	100%
	G	10	30	0	30	100%
	H	4	30	0	30	100%
466	A	124	50	10	40	32%
	B	68	50	10	40	59%
	C	117	50	10	40	34%
	D	86	50	10	40	47%
	E	48	50	10	40	83%
	F	31	50	10	40	100%
	G	32	50	0	50	100%
	H	22	50	0	50	100%
467	A	131	40	8	32	24%
	B	53	40	8	32	60%
	C	129	40	8	32	25%
	D	80	40	8	32	40%
	E	28	40	0	40	100%
	F	14	40	0	40	100%
	G	44	40	8	32	73%
	H	19	40	0	40	100%
Total		**47,359**	**31,784**	**4,861**	**26,923**	

Table 3. Spring wild turkey harvest and hunter success rates by permit area in Minnesota, 2005.

Permit Area	Permits Available	Permits Issued[a]	Registered Harvest	% Hunter Success (2005)[b]	% Hunter Success (2-5 Yr Ave)[c]
157	40	34	11	32.4	31.3 (2)
159	40	41	13	31.7	25.6 (2)
221	160	146	65	44.5	48.1 (3)
222	40	38	17	44.7	NA[d]
223	600	520	198	38.1	36.3 (5)
225	800	689	117	17.0	23.8 (5)
227	480	417	138	33.1	32.9 (5)
228	320	278	120	43.2	38.9 (5)
235	120	106	41	38.7	34.7 (5)
236	760	702	263	37.5	40.0 (5)
244	200	164	53	32.3	30.8 (4)
248	40	56	28	50.0	44.4 (2)
249	120	109	35	32.1	27.7 (3)
337	440	385	132	34.3	34.9 (5)
338	680	584	156	26.7	31.1 (5)
339	640	542	186	34.3	33.4 (5)
341	1,800	1584	505	31.9	34.3 (5)
342	1,800	1559	358	23.0	27.2 (5)
343	1,240	1099	419	38.1	40.3 (5)
344	1,120	966	184	19.0	26.8 (5)
345	1,600	1356	232	17.1	22.4 (5)
346	2,600	2126	410	19.3	25.2 (5)
347	1,200	1041	201	19.3	26.6 (5)
348	1,400	1187	269	22.7	25.1 (5)
349	3,600	3087	653	21.2	25.9 (5)
410	360	313	133	42.5	44.6 (4)
411	360	321	110	34.3	40.1 (5)
412	360	321	128	39.9	42.6 (5)
413	80	72	25	34.7	NA[d]
414	120	110	39	35.5	39.5 (2)
415	520	466	178	38.2	38.2 (5)
416	80	78	29	37.2	38.7 (5)
417	320	277	97	35.0	39.8 (5)
418	520	468	189	40.4	40.9 (5)
419	320	272	68	25.0	24.8 (5)
420	56	50	24	48.0	47.1 (2)
422	40	36	15	41.7	34.2 (5)
424	40	18	9	50.0	NA[d]
425	480	441	172	39.0	37.6 (5)
426	40	29	7	24.1	25.9 (5)
427	80	62	24	38.7	35.8 (5)
428	120	111	43	38.7	37.3 (5)
429	240	219	47	21.5	21.2 (5)

Permit Area	Permits Available	Permits Issued[a]	Registered Harvest	% Hunter Success (2005)[b]	% Hunter Success (2-5 Yr Ave)[c]
431	40	40	22	55.0	38.5 (5)
433	40	41	17	41.5	45.1 (2)
440	560	504	149	29.6	31.8 (5)
442	1,280	1123	348	31.0	34.5 (5)
443	560	509	132	25.9	32.0 (5)
446	40	44	18	40.9	NA[d]
447	40	34	15	44.1	NA[d]
448	56	58	27	46.6	57.6 (2)
449	56	54	33	61.1	60.0 (2)
450	56	51	15	29.4	28.6 (5)
451	40	40	21	52.5	59.2 (3)
454	40	37	10	27.0	NA[d]
456	40	35	1	2.9	NA[d]
457	40	32	8	25.0	25.7 (5)
458	40	26	8	30.8	NA[d]
459	200	179	37	20.7	25.5 (5)
461	640	560	178	31.8	32.4 (5)
462	720	642	230	35.8	35.7 (5)
463	160	138	44	31.9	27.7 (5)
464	200	175	54	30.9	23.7 (5)
465	240	207	41	19.8	24.8 (5)
466	400	344	136	39.5	38.1 (4)
467	320	285	115	40.4	35.0 (4)
Total	31,784	27,638	7,800	28.2	30.7

[a] 2,210 permits were issued to archery hunters
[b] Success rate not adjusted for non-participants.
[c] Number in parenthesis equals the number of years data was available.
[d] New or newly split permit area; average value is not available.

Table 4. Spring wild turkey hunter success by time period in Minnesota, 2005.

Time Period	Permits Issued	Registered Harvest	% Hunter Success (2005)[a]	% Hunter Success (5 Yr Ave)[a]
A) April 14-18	3,642	1,556	42.7	42.7
B) April 19-23	3,533	1,421	40.2	39.6
C) April 24-28	3,668	1,040	28.4	30.9
D) April 29-3	3,625	819	22.6	27.7
E) May 4-8	3,590	1,005	28.0	31.4
F) May 9-13	3,235	869	26.9	29.7
G) May 14-20	3,383	374	11.1	21.3
H) May 21-27	2,962	716	24.2	22.3
Total	27,638	7,800	28.2	30.7

[a] Success rate not adjusted for non-participants.

Table 5. Age structure of spring wild turkey harvest by permit area in Minnesota, 2005.
Note: Age is hunter reported and is subject to error.

Permit Area	Adults	Juveniles	Unknown	% Juveniles	Total Harvest
157	9	2	0	18.2	11
159	12	1	0	7.7	13
221	63	2	0	3.1	65
222	15	2	0	11.8	17
223	183	13	2	6.6	198
225	101	15	1	12.8	117
227	125	11	2	8.0	138
228	109	11	0	9.2	120
235	33	8	0	19.5	41
236	235	26	2	9.9	263
244	44	9	0	17.0	53
248	27	1	0	3.6	28
249	29	6	0	17.1	35
337	118	14	0	10.6	132
338	144	12	0	7.7	156
339	156	27	3	14.5	186
341	454	50	1	9.9	505
342	325	33	0	9.2	358
343	389	30	0	7.2	419
344	160	23	1	12.5	184
345	207	25	0	10.8	232
346	346	61	3	14.9	410
347	177	21	3	10.4	201
348	252	17	0	6.3	269
349	568	83	2	12.7	653
410	124	7	2	5.3	133
411	92	16	2	14.5	110
412	119	9	0	7.0	128
413	21	2	2	8.0	25
414	32	6	1	15.4	39
415	162	16	0	9.0	178
416	27	2	0	6.9	29
417	91	6	0	6.2	97
418	170	18	1	9.5	189
419	51	16	1	23.5	68
420	22	2	0	8.3	24
422	14	1	0	6.7	15
424	9	0	0	0.0	9
425	154	18	0	10.5	172
426	5	2	0	28.6	7
427	20	4	0	16.7	24
428	41	2	0	4.7	43
429	39	8	0	17.0	47
431	19	3	0	13.6	22

Permit Area	Adults	Juveniles	Unknown	% Juveniles	Total Harvest
433	17	0	0	0.0	17
440	136	11	2	7.4	149
442	315	31	2	8.9	348
443	118	14	0	10.6	132
446	18	0	0	0.0	18
447	15	0	0	0.0	15
448	25	2	0	7.4	27
449	27	0	6	0.0	33
450	7	2	6	13.3	15
451	18	1	2	4.8	21
454	8	2	0	20.0	10
456	0	1	0	100.0	1
457	7	1	0	12.5	8
458	7	1	0	12.5	8
459	35	2	0	5.4	37
461	161	17	0	9.6	178
462	210	17	3	7.4	230
463	36	6	2	13.6	44
464	48	6	0	11.1	54
465	33	8	0	19.5	41
466	126	10	0	7.4	136
467	105	9	1	7.8	115
Total	6,965	782	53	10.0	7,800

Table 6. Spring wild turkey harvest per square mile of huntable habitat[a] in Minnesota, 2005.

Permit Area	Total Huntable Habitat[a] (Square Miles)	Turkeys Harvested Per Square Mile
157	269	0.04
159	294	0.04
221	93	0.70
222	NA	NA
223	90	2.20
225	233	0.50
227	111	1.24
228	43	2.79
235	15	2.73
236	169	1.56
244	353	0.15
248	115	0.24
249	207	0.17
337	60	2.20
338	99	1.58
339	92	2.02
341	232	2.18
342	159	2.25
343	96	4.36
344	93	1.98
345	137	1.69
346	216	1.90
347	140	1.44
348	159	1.69
349	277	2.36
410	392	0.34
411	184	0.60
412	275	0.47
413	NA	NA
414	252	0.15
415	264	0.67
416	88	0.33
417	192	0.51
418	222	0.85
419	163	0.42
420	61	0.39
422	44	0.34
424	NA	NA
425/435	128	1.34
426	46	0.15
427	64	0.38
428	110	0.39
429	108	0.44
431	42	0.52
433	51	0.33
440	97	1.54
442	164	2.12
443	80	1.65
446	91	0.20
447	NA	NA
448	44	0.57
449	59	0.41
450	56	0.27
451/452/453	97	0.22
454/455/456/458	178	0.06
456	NA	NA
457	68	0.12
458	NA	NA
459	104	0.36
461	131	1.36
462	118	1.95
463	70	0.63
464	60	0.90
465	48	0.85
466	115	1.18
467	80	1.44
Total	8,098	0.96

[a] Huntable habitat is forest cover buffered by 50 meters, with non-huntable areas (e.g., lakes, cities) removed.

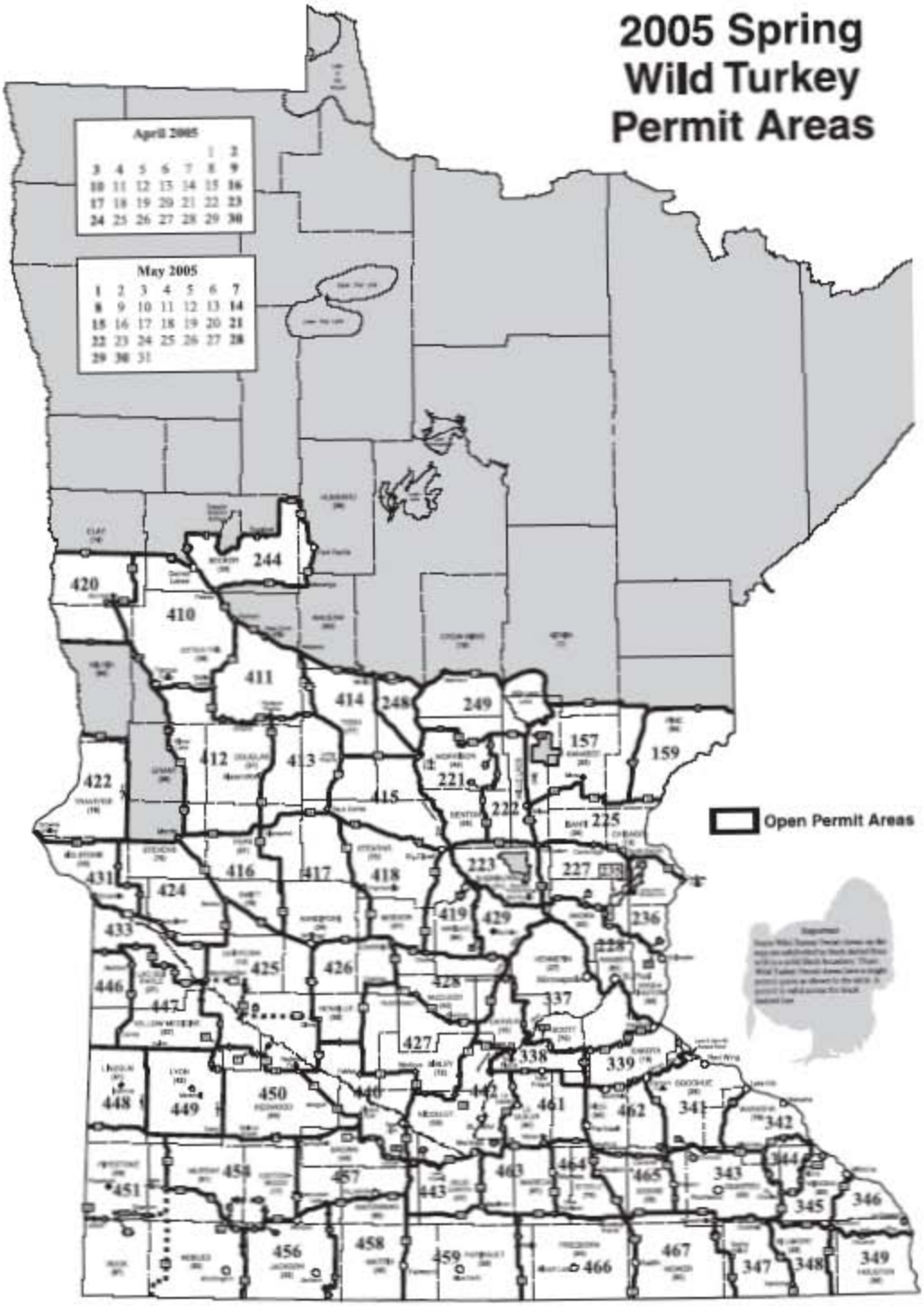


Figure 1. Turkey permit areas open to spring hunting in Minnesota, 2005.

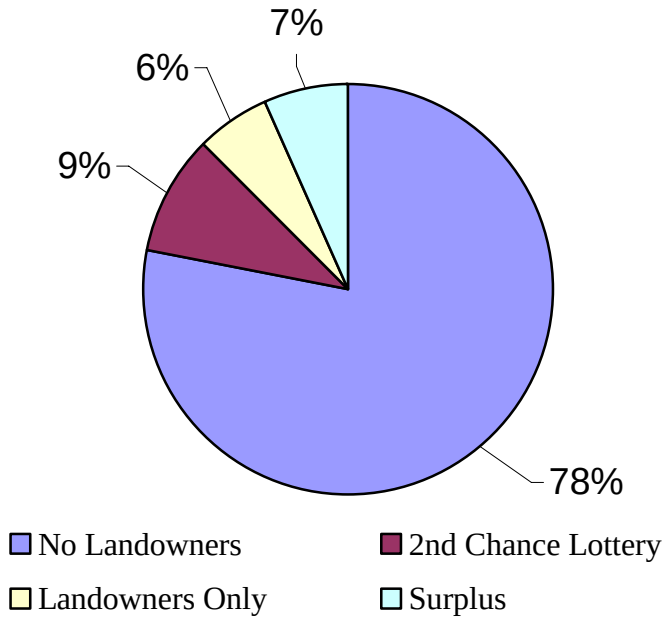


Figure 2. Lottery permits issued for the spring wild turkey hunting season by category in Minnesota, 2005.

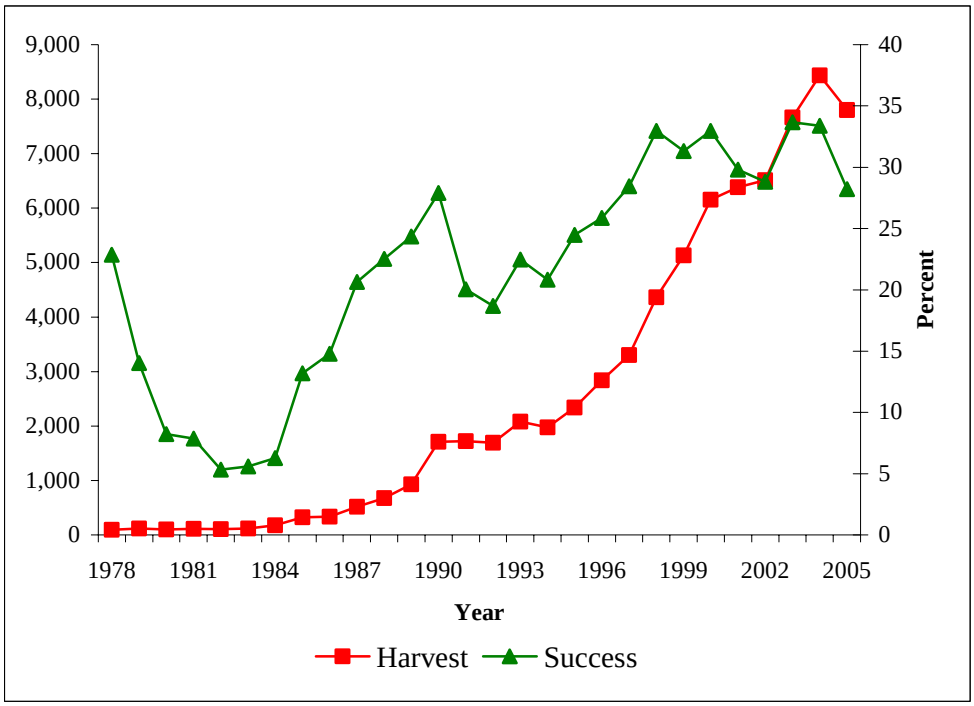


Figure 3. Total harvest and hunter success rate for the spring wild turkey hunting season in Minnesota from 1978 to 2005.

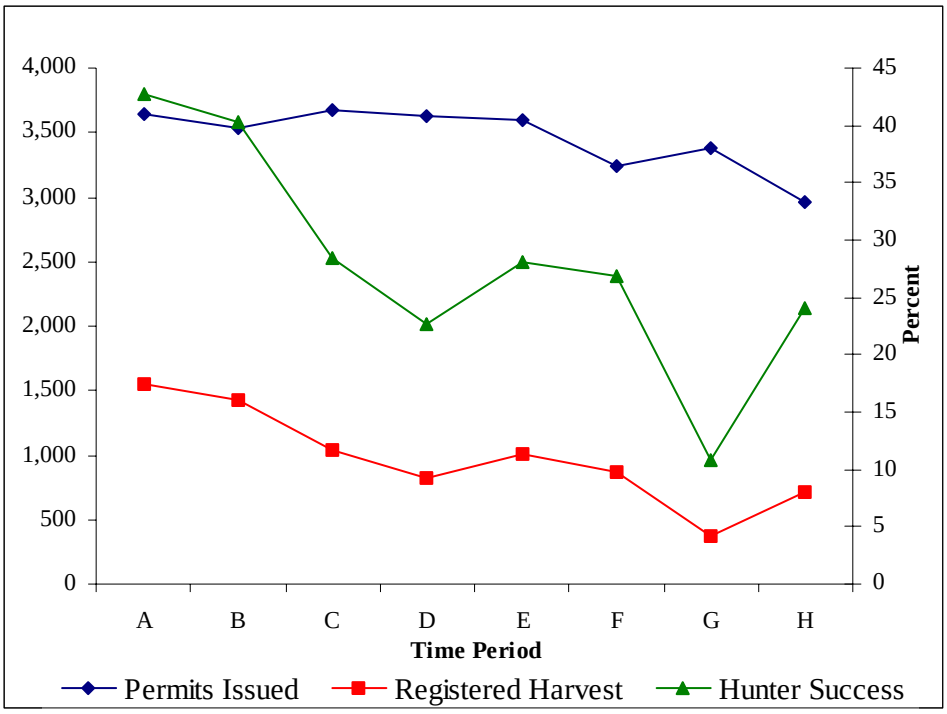


Figure 4. Permits issued, registered harvest, and hunter success by time period for the spring wild turkey hunting season in Minnesota, 2005.

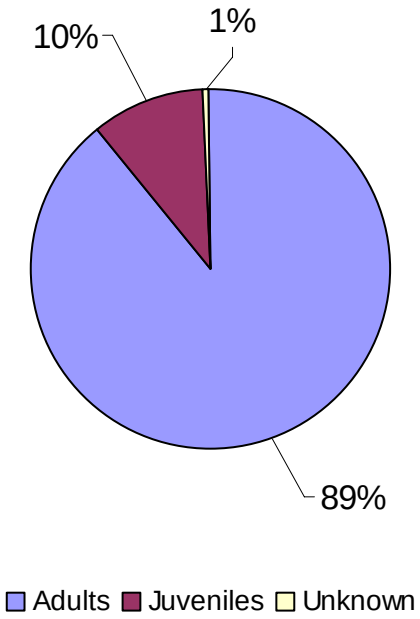


Figure 5. Hunter reported age structure of spring wild turkey harvest in Minnesota, 2005.
Note: Age is hunter reported and is subject to error.

Minnesota Prairie-chicken Hunting Season and Hunter Survey, 2004

Michael A. Larson, Forest Wildlife Populations & Research Group

Hunting seasons for prairie-chickens (*Tympanuchus cupido pinnatus*) in Minnesota were closed from 1943 through 2002. During October 2003 a limited-entry, 5-day hunting season for prairie-chickens was held within 7 contiguous permit areas in western Minnesota (Figure 1). The format for the 2004 hunting season, which was held 23–27 October, was similar. Permits were awarded through a lottery system, and each hunter could harvest a maximum of 2 prairie-chickens.

Eighty-three (11%) of 734 regular applicants were awarded permits (Table 1). An additional 18 permits (72% success) were awarded through a separate lottery to hunters who applied as landowners or tenants of ≥40 acres of grassland within a permit area. In 3 instances 1 or 2 more permits were awarded than were available in a permit area because the last hunter selected in the lottery had applied as a member of a hunting party, so other members of the party also were offered permits.

Results of the hunting season came from 2 sources—the Electronic Licensing System (ELS), which recorded the mandatory registration of each prairie-chicken harvested, and a post-season mail survey sent to all 90 hunters who purchased a permit. Seventy-two hunters responded to the first mailing of the survey, and 14 responded to the second mailing, so the response rate was 95.6%. The ELS and survey results differ slightly because party hunting is allowed, so a hunter who registered a prairie-chicken may not have been the hunter who reported killing it. In addition, 3.5% of 86 hunters who purchased a permit and responded to the survey reported that they did not hunt.

The number of prairie-chicken hunters, amount of time spent hunting, and hunting methods were similar during 2003 and 2004 (Figures 2, 3 and 4). Hunter harvest of prairie-chickens during 2004, however, was less than during 2003. Hunters killed and retrieved approximately 55 prairie-chickens during 2004 and 129 during 2003 (Table 2). Only 2.4% of hunters (n = 83) reported knocking down a prairie-chicken and not being able to retrieve it during 2004. Whereas 46% of hunters harvested at least 1 prairie-chicken during 2004, 68% did during 2003. Hunters also may have flushed fewer prairie-chickens during 2004 (Figure 5). Thirty-three percent of hunters (n = 86) commented on poor weather conditions during and prior to the 2004 prairie-chicken hunting season. Many reported heavy rains, and a few mentioned large areas of standing water.

Thirty-five percent of hunters (n = 83) hunted only on public land, 25% hunted only on private land, and 33 (40%) hunted on both public and private land. Of the 40 hunters who reported their ease of gaining access to private land and who had not applied for a permit as a landowner or tenant, 48%, 25%, 20%, and 8% reported it being very easy, somewhat easy, somewhat difficult, and very difficult,

respectively. This distribution is only slightly different than when landowners themselves were added to the sample (Figure 6).

Hunter satisfaction with the 2004 prairie-chicken hunting season was reported as a median of 8 (mean = 6.8) on a 1–10 scale (n = 82, Figure 7), and 95% of hunters reported that they would apply for a prairie-chicken permit again in the future. Seven prairie-chicken hunters (8.4%, n = 83) reported being interfered with by other hunters 12 times during 2004.

ACKNOWLEDGMENTS.

Robin Williams assisted with mailing and entering data from the hunter survey. Wendy Krueger, Richard Kimmel, and others developed and initially implemented the hunter survey for the 2003 prairie-chicken hunt. Wendy also provided the map in Figure 1.

Table 1. Results of the lottery for prairie-chicken hunting permits in Minnesota during 2004.

Permit area	Permit type	Permits avail.	No. of applicants	Lottery winners		Permits purchased	
				no.	prop.[a]	no.	prop.[a]
405 A	Regular	10	116	10	0.09	6	0.60
	Landowner	3	2	2	1.00	2	1.00
407 A	Regular	8	81	8	0.10	7	0.88
	Landowner	3	7	5	0.71	5	1.00
407 B	Regular	12	89	13	0.15	13	1.00
	Landowner	3	5	3	0.60	3	1.00
407 C	Regular	11	54	11	0.20	11	1.00
	Landowner	3	2	2	1.00	2	1.00
420 A	Regular	10	85	10	0.12	10	1.00
	Landowner	3	7	4	0.57	4	1.00
420 B	Regular	18	188	18	0.10	12	0.67
	Landowner	0	0				
421 A	Regular	13	121	13	0.11	13	1.00
	Landowner	3	2	2	1.00	2	1.00
All	Regular	82	734	83	0.11	72	0.87
	Landowner	18	25	18	0.72	18	1.00
	All	100	759	101	0.13	90	0.89

[a] Proportion of the previous column (i.e., lottery winners/applicants and purchasers/winners).

Table 2. Hunter harvest of prairie-chickens in Minnesota during 2004.

Permit area	Permit type	No. of hunters[b]	Birds retrieved		Birds / hunter		Success rate[a]	
			ELS[c]	Survey[d]	ELS	Survey	ELS	Survey
405 A	Regular	6	1	1	0.2	0.2	0.17	0.17
	Landowner	2	0	0	0.0	0.0	0.00	0.00
407 A	Regular	5	2	2	0.3	0.4	0.14	0.20
	Landowner	5	1	2	0.2	0.4	0.20	0.40
407 B	Regular	13	9	10	0.7	0.8	0.46	0.54
	Landowner	3	2	2	0.7	0.7	0.33	0.33
407 C	Regular	10	9	10	0.8	1.0	0.45	0.60
	Landowner	2	0	0	0.0	0.0	0.00	0.00
420 A	Regular	10	10	10	1.0	1.0	0.70	0.70
	Landowner	3	0	2	0.0	0.7	0.00	0.67
420 B	Regular	12	10	9	0.8	0.8	0.58	0.58
	Landowner	0						
421 A	Regular	11	7	7	0.5	0.6	0.31	0.36
	Landowner	1	0	0	0.0	0.0	0.00	0.00
All	Regular	67	48	49	0.7	0.7	0.43	0.49
	Landowner	16	3	6	0.2	0.4	0.11	0.31
	All	83	51	55	0.6	0.7	0.37	0.46

[a] Proportion of hunters who killed and retrieved at least 1 prairie-chicken.

[b] Number of hunters who responded to a mail survey and reported to have hunted. Number of hunters according to the Electronic License System (ELS) is the number who purchased a permit to hunt prairie-chickens (Table 1).

[c] Results from the ELS database of registered harvest.

[d] Results from a mail survey sent to hunters after the prairie-chicken hunting season.

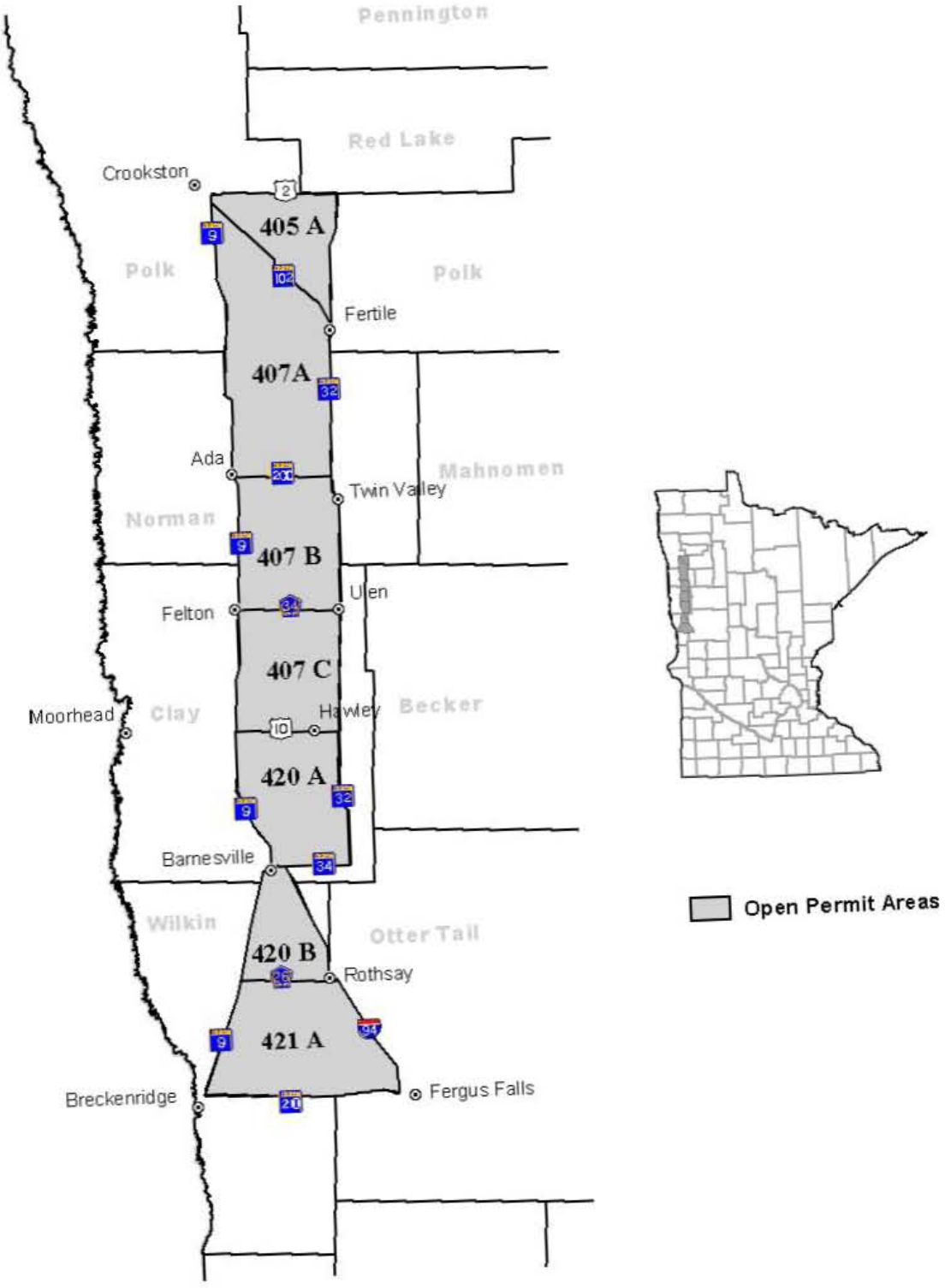


Figure 1. Map of permit areas for prairie-chicken hunting in Minnesota during 2003–2004.

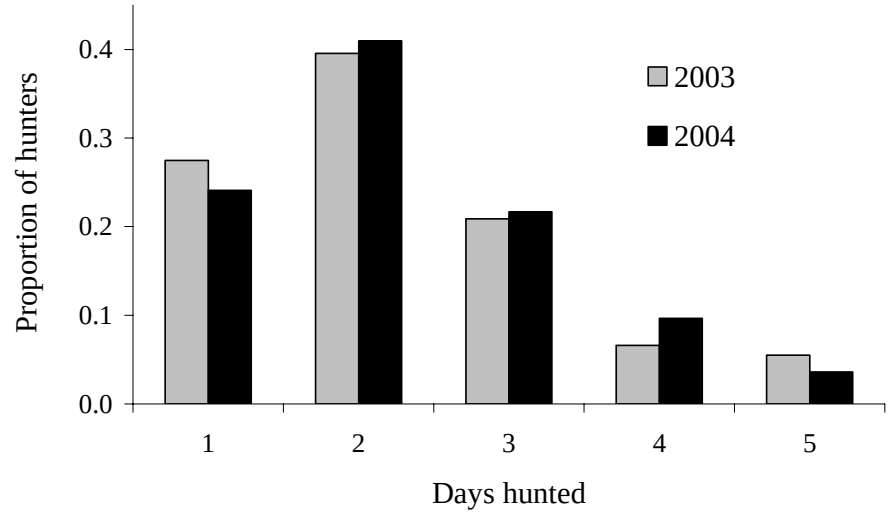


Figure 2. Number of days hunters pursued prairie-chickens in Minnesota during 2003 (*n* = 91 survey respondents) and 2004 (*n* = 83).

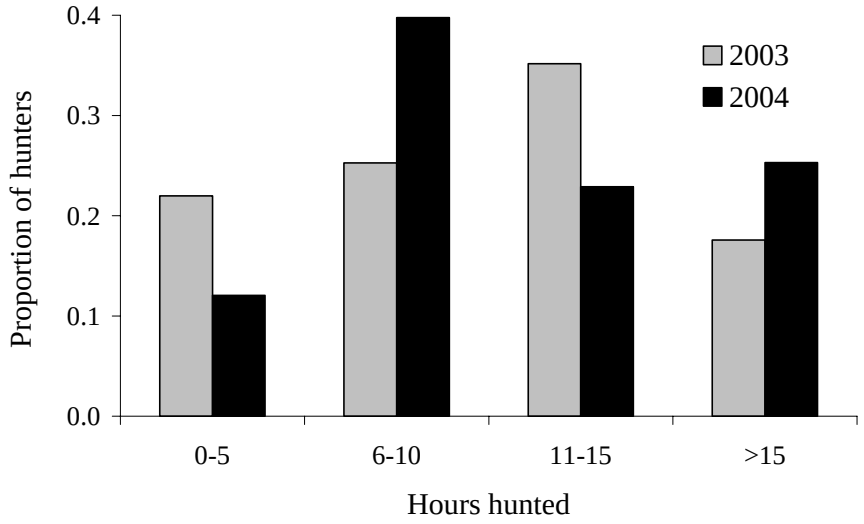


Figure 3. Number of hours hunters pursued prairie-chickens in Minnesota during 2003 (*n* = 91 survey respondents) and 2004 (*n* = 83).

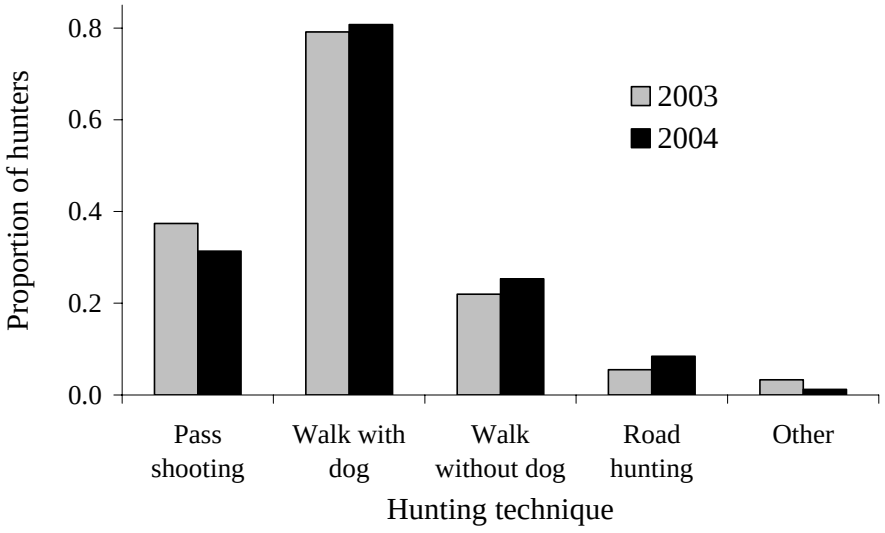


Figure 4. Methods used by prairie-chicken hunters in Minnesota during 2003 (n = 91 survey respondents) and 2004 (n = 83).

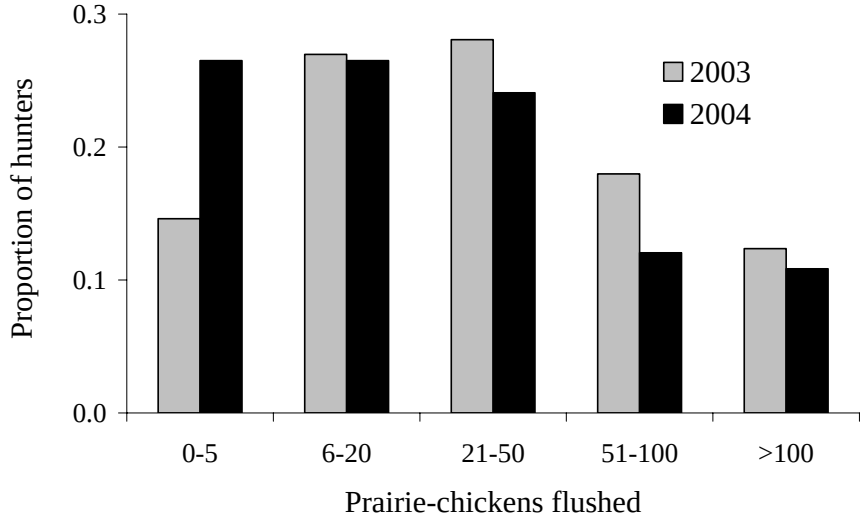


Figure 5. Number of prairie-chickens flushed by prairie-chicken hunters in Minnesota during 2003 (n = 89 survey respondents) and 2004 (n = 83).

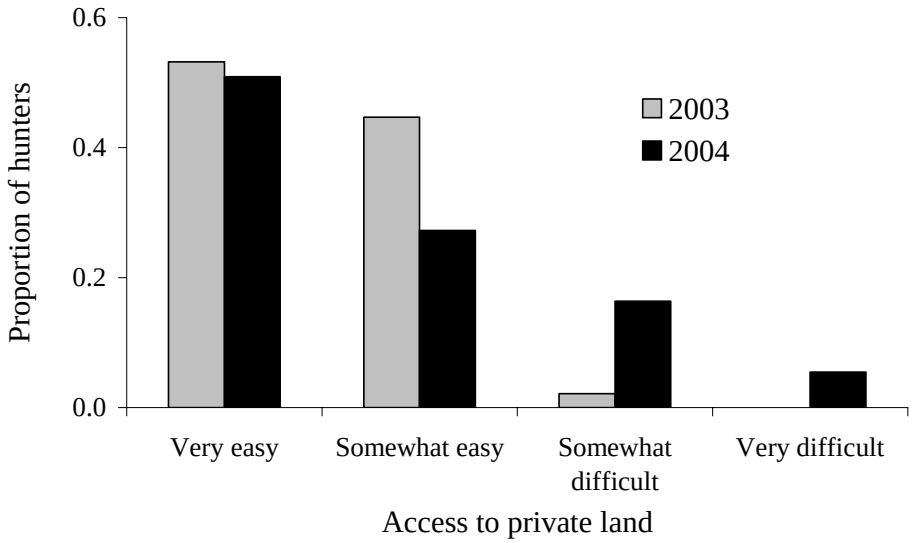


Figure 6. Ease of acquiring permission to access private land for prairie-chicken hunters in Minnesota during 2003 (n = 47 survey respondents) and 2004 (n = 55).

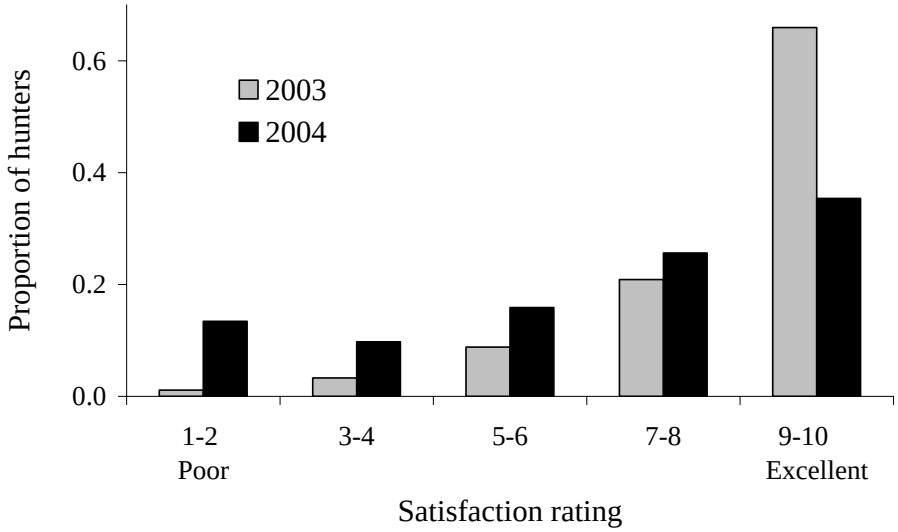


Figure 7. Degree of overall satisfaction of hunters with the prairie-chicken season during 2003 (n = 91 survey respondents) and 2004 (n = 82).

2004 Minnesota Deer Harvest Report

Lou Cornicelli, Big Game / Season Program Consultant, Division of Fish and Wildlife

INTRODUCTION

The white-tailed deer may be considered Minnesota's most popular wildlife species. Each year 500,000 hunters harvest over 200,000. In 2004, hunters registered 260, 604 deer. This harvest marked the second highest harvest recorded in Minnesota.

METHODS

Every deer taken by hunting in Minnesota must be registered within 24 hours of the close of the season under which the deer was taken. Deer may be registered at any of the 825 "Big Game Registration" stations available throughout the state. Implementation of electronic licensing (ELS) has improved the efficiency and accuracy of deer harvest estimates and provides a more timely release of harvest information. Registered deer are recorded as adult buck, fawn buck, adult doe, or fawn doe. Additional information gathered at time of registration includes date and time of kill, county, zone, season, and method of take (firearms, archery).

RESULTS

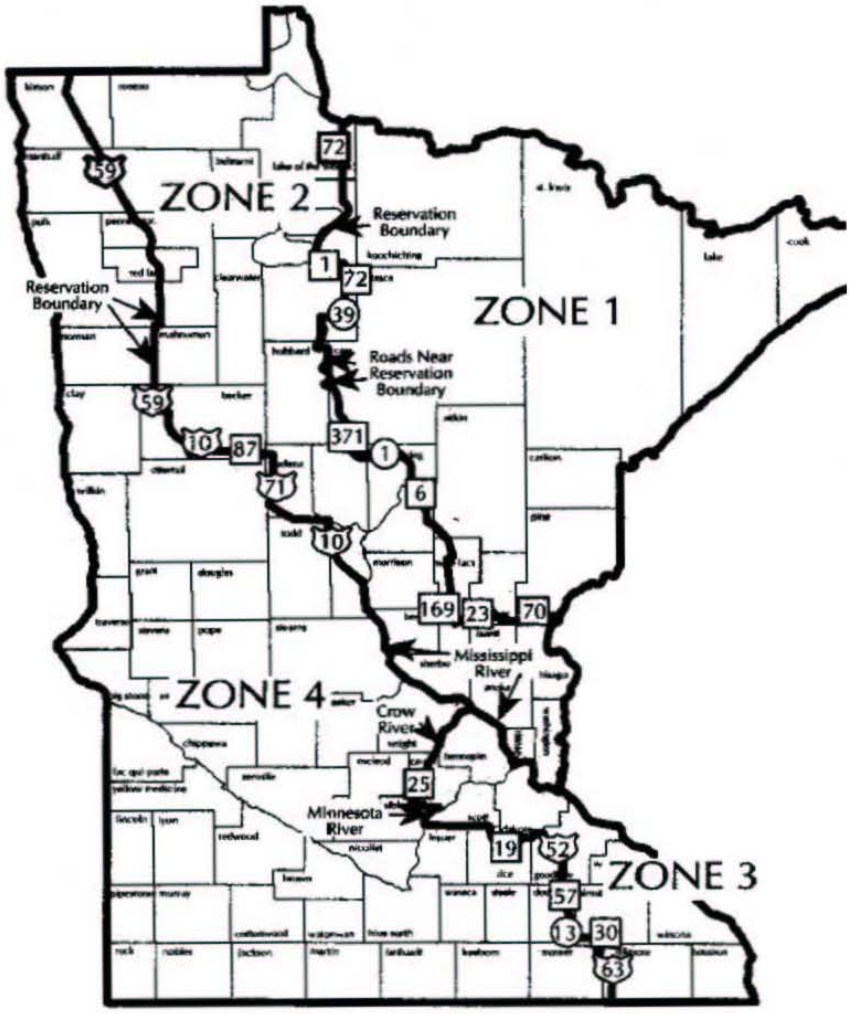
Outcome of the 2004 deer harvest are presented in the following tables.

Table 1. Statewide Firearms, Archery, and Muzzleloader Harvest, License Sales, and Success Rates 1994 - 2004.

Regular Firearms											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Resident License Sales	427,343	419,965	389,745	369,190	378,320	395,745	400,814	401,005	367,964	344,875	309,698
Non-Resident License Sales	9,190	9,339	8,535	7,830	8,852	9,970	10,595	10,972	10,835	11,334	12,036
Antlerless Permit Sales	19,308	22,603	27,148	32,229	20,884	23,785	34,802	59,013	105,699	194,201	183,186
Multi-Zone Buck License Sales	24,590	29,902	38,806	42,803	44,739	43,903	42,669	41,921	35,658	32,929	32,359
Resident Youth License Sales		1,835	2,964	3,844	3,445	2,038	3,215	4,011	2,884	34,463	51,347
All Season Deer License Sales							2,384	3,986	22,125	30,998	46,008
Total License Sales	480,879	483,644	467,198	455,896	456,240	475,441	495,289	519,601	545,165	648,800	634,634
Registered Buck Harvest[1]	85,579	88,997	71,242	64,867	82,921	92,584	102,961	98,894	101,333	110,440	116,612
Antlerless Permits Offered	199,950	201,525	154,195	150,195	140,280	177,380	232,595	286,540	365,667	31,625	30,760
Antlerless Permits Issued	164,418	162,761	116,650	105,481	108,016	135,852	180,490	196,603	192,907	25,386	24,111
Antlerless Permits App.	260,086	257,653	174,329	142,260	151,148	214,597	237,571	225,341	202,086	30,253	28,454
Registered AL Harvest[1]	92,704	109,196	68,106	62,038	60,475	71,681	88,492	98,169	102,280	147,420	123,278
Registered Total Harvest[1]	178,283	198,193	139,348	126,905	143,396	164,265	191,453	197,063	203,613	257,860	239,890
Registered % Successful[2]	37.1	40.1	29.8	27.8	31.4	34.8	38.6	37.9	37.3	39.7	37.8
ARCHERY											
Resident License Sales	71,409	70,056	67,058	63,499	63,826	66,226	68,947	69,608	57,532	59,339	50,601
Non-Resident License Sales	1,156	1,171	1,098	980	1,029	1,073	1,271	1,288	1,275	1,428	1,144
Mgmt Permit License Sales	13,121	15,387	15,632	17,478	15,846	16,945	20,393	22,141	18,126	N/A	N/A
Total License Sales	85,686	86,614	83,788	81,957	80,701	84,244	90,611	93,037	76,933	60,767	51,745
Registered Harvest	13,818	14,521	14,338	13,258	12,306	13,376	15,776	15,884	14,744	21,720	17,237
Registered Harvest - AS license											3,489
Registered % Successful[2]	16.1	16.8	17.1	16.2	15.2	15.8	17.4	17.1	19.2	35.7	33.3
MUZZLELOADER											
Total Muzzleloader License Sales							11,972	13,043	11,764	9,142	10,512
Registered Harvest - MZ license[1]	1,725	2,452	3,367	3,164	3,152	2,928	4,548	4,494	3,505	5,095	4,143
Registered Harvest - AS license										4,371	5,146
Registered % Successful[2]							38	34.5	29.8	55.7	39.4
Total Registered Harvest	193,826	215,166	157,317	143,327	158,854	180,569	211,777	217,452	222,050	290,525	260,604

[1] Does not include free landowner licenses [2] Based on total license sales - does not include all-season deer

Figure 1. 2004 Firearms and Archery Deer Seasons. 2004 Minnesota Firearms Deer Season.



Zone	Dates
Zone 1	Nov. 6-21
Zone 2	Nov. 6-14
Zone 3A	Nov. 6-12
Zone 3B	Nov. 20-28
Zone 4A	Nov. 6-7
Zone 4B	Nov. 13-16
Muzzleloader	Nov. 27- Dec. 12

2004 Minnesota Archery Deer Season

Northeast Border Zone (Permit Areas 116 and 127): September 18-November 21.

Remainder of State: September 18-December 31.

Antlerless deer and legal bucks may be taken by archery, except only legal bucks may be taken in permit areas that have no either-sex permits or have youth-only either-sex permits.

Table 2. Deer Harvest by License Type and Zone, 2004.

Firearms/Zone	Hunters	Bucks	Harvest Antlerless	Total	Overall Success
1	148,303	35,672	36,169	71,841	48.4%
2	111,708	27,039	40,546	67,585	60.5%
3A	17,992	5,008	1,316	6,324	35.1%
3B	22,135	3,067	7,853	10,920	49.3%
4A	73,474	11,996	16,973	28,969	39.4%
4B	37,049	4,620	12,139	16,759	45.2%
Multi-Zone Buck	32,359	9,169	0	9,169	28.3%
Free Landowner[1]	4,196	0	1,317	1,317	31.4%
All-Season Deer[1]	46,008	12,743	13,597	26,340	57.3%
Muzzleloader Lic.	10,512	480	3,663	4,143	39.4%
Archery License[2]	51,745	5,815	11,422	17,237	33.3%
TOTAL[3]	**526,298**	**115,609**	**144,995**	**260,604**	49.5%

[1] Includes deer taken during regular firearms, muzzleloader, and archery seasons

[2] Includes Camp Ripley harvest. Total number of people who bought only an archery license was 22,526.

[3] Due to the fact that a hunter can buy multiple licenses, this is an estimate and may be biased high.

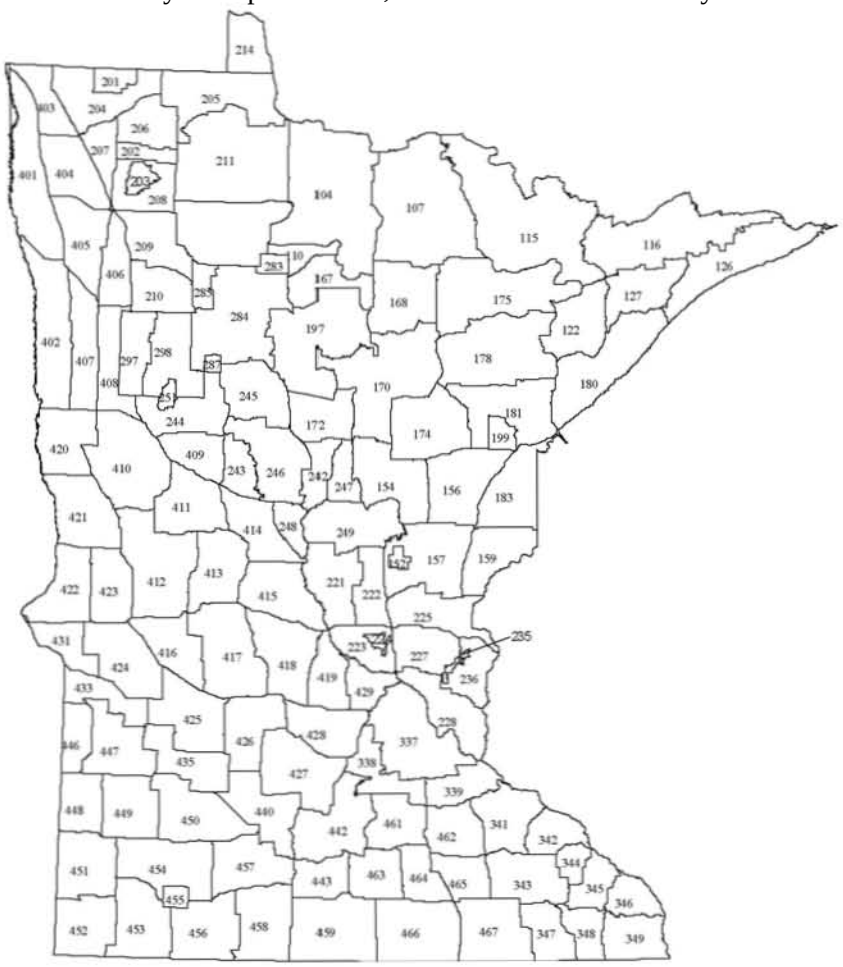


Figure 2. 2004 Deer Permit Areas.

Table 3. Firearms Harvest and Harvest per Square Mile by Permit Area, 2004.
Includes regular, youth, and bonus permits.

Permit Area	A or B Season	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
104		1	1,434	215	874	122	2,645	2,078	0.69	0.58	1.27
107		1	2,098	286	1,140	189	3,713	1,895	1.11	0.85	1.96
110		1	512	140	567	111	1,330	198	2.59	4.13	6.72
115		1	2,459	274	1,136	212	4,081	1,872	1.31	0.87	2.18
116		1	225	4	26	2	257	1,158	0.19	0.03	0.22
122		1	519	14	112	13	658	620	0.84	0.22	1.06
126		1	531	28	168	20	747	940	0.56	0.23	0.79
127		1	130	1	15	1	147	562	0.23	0.03	0.26
152		1	130	16	52	11	209	61	2.13	1.30	3.43
154		1	1,832	612	1,809	379	4,632	761	2.41	3.68	6.09
156		1	1,816	472	1,475	346	4,109	826	2.20	2.78	4.97
157		1	2,712	952	2,321	641	6,626	890	3.05	4.40	7.44
159		1	1,343	427	1,366	274	3,410	568	2.36	3.64	6.00
167		1	696	107	379	78	1,260	440	1.58	1.28	2.86
168		1	1,658	374	1,257	266	3,555	543	3.05	3.49	6.55
170		1	2,882	767	2,295	455	6,399	1,315	2.19	2.67	4.87
172		1	1,886	615	1,951	382	4,834	451	4.18	6.54	10.72
174		1	1,449	341	1,024	223	3,037	835	1.74	1.90	3.64
175		1	2,159	336	1,272	205	3,972	1,029	2.10	1.76	3.86
178		1	2,581	419	1,566	324	4,890	1,264	2.04	1.83	3.87
180		1	1,703	77	321	36	2,137	1,059	1.61	0.41	2.02
181		1	2,163	381	1,100	211	3,855	861	2.51	1.97	4.48
183		1	1,592	404	1,167	235	3,398	707	2.25	2.55	4.81
197		1	931	103	342	50	1,426	960	0.97	0.52	1.49
199		1	117	8	31	3	159	148	0.79	0.28	1.07
201	Youth	2	0	0	1	0	1				
201		2	55	13	60	13	141	166	0.33	0.52	0.85
202	Youth	2	0	1	2	0	3				
202		2	245	62	198	40	545	157	1.56	1.91	3.47
203		2	88	19	68	26	201	117	0.75	0.97	1.72
204	Youth	2	1	3	12	2	18				
204		2	562	132	458	110	1,262	718	0.78	0.97	1.76
205	Youth	2	0	0	1	1	2				
205		2	1,172	310	1,008	255	2,745	642	1.83	2.45	4.28
206	Youth	2	0	4	19	0	23				
206		2	535	146	511	122	1,314	471	1.14	1.65	2.79
207	Youth	2	0	0	2	0	2				
207		2	357	100	357	76	890	300	1.19	1.78	2.97
208	Youth	2	0	1	7	0	8				
208		2	234	66	240	75	615	448	0.52	0.85	1.37
209	Youth	2	0	0	1	1	2				
209		2	516	160	386	140	1,202	576	0.90	1.19	2.09
210		2	668	182	599	171	1,620	486	1.37	1.96	3.33
211	Youth	2	0	1	0	0	1				
211		2	1,221	203	737	118	2,279	1,831	0.67	0.58	1.24
214		2	41	5	25	4	75	123	0.33	0.28	0.61
221		2	908	369	794	335	2,406	642	1.41	2.33	3.75
222		2	753	281	584	207	1,825	413	1.82	2.60	4.42
223		2	430	151	353	105	1,039	376	1.14	1.62	2.76
224		2	129	49	134	23	335	48	2.69	4.29	6.98
225		2	1,237	464	888	324	2,913	619	2.00	2.71	4.71
227		2	819	256	549	168	1,792	472	1.74	2.06	3.80
228		2	230	41	164	35	470	614	0.37	0.39	0.77
235		2	68	13	48	11	140	33	2.06	2.18	4.24
236		2	690	176	522	145	1,533	374	1.84	2.25	4.10
242		2	578	264	625	215	1,682	215	2.68	5.13	7.81
243		2	1,022	468	1,207	382	3,079	314	3.25	6.55	9.81
244		2	2,046	911	2,081	711	5,749	586	3.49	6.32	9.81
245		2	2,088	812	1,877	601	5,378	583	3.58	5.64	9.22

Table 3. (Continued).

Permit Area	A or B Season	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
246		2	2,216	934	2,132	668	5,950	771	2.87	4.84	7.71
247		2	794	306	776	206	2,082	230	3.45	5.59	9.04
248		2	420	155	383	121	1,079	1,328	0.32	0.50	0.81
249		2	1,156	527	1,087	409	3,179	502	2.30	4.03	6.33
251		2	160	49	101	40	350	56	2.86	3.39	6.25
283		2	185	59	216	67	527	102	1.81	3.35	5.17
284		2	3,705	1,262	3,359	959	9,285	1,260	2.94	4.43	7.37
285		2	465	154	476	118	1,213	169	2.75	4.43	7.18
287		2	171	53	149	29	402	47	3.64	4.91	8.55
297		2	237	47	143	35	462	439	0.54	0.51	1.05
298		2	798	177	443	141	1,559	620	1.29	1.23	2.51
337	A	3	185	39	113	30	367	1,025	0.18	0.18	0.36
337	B	3	64	24	79	20	187	1,025	0.06	0.12	0.18
338	A	3	145	20	35	12	212	452	0.32	0.15	0.47
338	B	3	91	37	121	28	277	452	0.20	0.41	0.61
339	A	3	136	11	23	6	176	394	0.35	0.10	0.45
339	B	3	64	35	109	24	232	394	0.16	0.43	0.59
341	A	3	538	32	91	30	691	611	0.88	0.25	1.13
341	B	3	315	163	517	116	1,111	611	0.52	1.30	1.82
342	A	3	362	30	64	12	468	350	1.03	0.30	1.34
342	B	3	279	140	419	109	947	350	0.80	1.91	2.71
343	A	3	484	26	57	13	580	663	0.73	0.14	0.87
343	B	3	306	174	493	123	1,096	663	0.46	1.19	1.65
344	A	3	361	24	77	5	467	190	1.90	0.56	2.46
344	B	3	147	71	216	50	484	190	0.77	1.77	2.55
345	A	3	342	16	37	7	402	326	1.05	0.18	1.23
345	B	3	208	108	309	70	695	326	0.64	1.49	2.13
346	A	3	629	25	76	22	752	319	1.97	0.39	2.36
346	B	3	431	222	697	174	1,524	319	1.35	3.43	4.78
347	A	3	411	29	62	8	510	434	0.95	0.23	1.18
347	B	3	265	207	460	131	1,063	434	0.61	1.84	2.45
348	A	3	504	21	88	18	631	331	1.52	0.38	1.91
348	B	3	326	174	579	145	1,224	331	0.98	2.71	3.70
349	A	3	908	34	102	14	1,058	492	1.85	0.30	2.15
349	B	3	525	288	847	210	1,870	492	1.07	2.73	3.80
401	A	4	74	22	71	12	179	1,040	0.07	0.10	0.17
401	B	4	62	16	86	13	177	1,040	0.06	0.11	0.17
401	Youth	4	0	0	3	1	4				
402	A	4	131	57	165	39	392	1,023	0.13	0.26	0.38
402	B	4	52	38	122	34	246	1,023	0.05	0.19	0.24
403	A	4	95	30	125	31	281	396	0.24	0.47	0.71
403	B	4	94	50	183	36	363	396	0.24	0.68	0.92
403	Youth	4	0	1	4	2	7				
404	A	4	216	79	253	58	606	631	0.34	0.62	0.96
404	B	4	204	70	355	70	699	631	0.32	0.78	1.11
404	Youth	4	0	0	25	7	32				
405	A	4	187	61	247	50	545	654	0.29	0.55	0.83
405	B	4	128	60	233	53	474	654	0.20	0.53	0.72
405	Youth	4	0	2	4	1	7				
406	A	4	196	79	186	77	538	413	0.47	0.83	1.30
406	B	4	91	61	182	52	386	413	0.22	0.71	0.93
407	A	4	197	99	228	96	620	618	0.32	0.68	1.00
407	B	4	118	82	215	84	499	618	0.19	0.62	0.81
408	A	4	180	91	209	73	553	494	0.36	0.76	1.12
408	B	4	69	53	151	37	310	494	0.14	0.49	0.63
409	A	4	651	335	659	301	1,946	417	1.56	3.11	4.67
409	B	4	129	184	491	140	944	417	0.31	1.95	2.26
410	A	4	975	380	870	327	2,552	925	1.05	1.70	2.76
410	B	4	200	174	406	152	932	925	0.22	0.79	1.01

Table 3. (continued)

Permit Area	A or B Season	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
411	A	4	871	403	800	317	2,391	642	1.36	2.37	3.72
411	B	4	154	292	420	140	1,006	642	0.24	1.33	1.57
412	A	4	638	214	573	175	1,600	989	0.65	0.97	1.62
412	B	4	132	101	310	95	638	989	0.13	0.51	0.65
413	A	4	566	234	449	220	1,469	644	0.88	1.40	2.28
413	B	4	114	144	331	85	674	644	0.18	0.87	1.05
414	A	4	675	342	599	332	1,948	557	1.21	2.29	3.50
414	B	4	121	198	414	153	886	557	0.22	1.37	1.59
415	A	4	410	207	386	132	1,135	702	0.58	1.03	1.62
415	B	4	132	123	248	97	600	702	0.19	0.67	0.85
416	A	4	284	63	173	46	566	544	0.52	0.52	1.04
416	B	4	107	32	148	35	322	544	0.20	0.40	0.59
417	A	4	473	87	316	78	954	939	0.50	0.51	1.02
417	B	4	147	48	140	29	364	939	0.16	0.23	0.39
418	A	4	344	159	307	101	911	761	0.45	0.75	1.20
418	B	4	94	84	189	63	430	761	0.12	0.44	0.57
419	A	4	167	61	132	41	401	393	0.42	0.60	1.02
419	B	4	65	44	101	25	235	393	0.17	0.43	0.60
420	A	4	104	32	131	46	313	651	0.16	0.32	0.48
420	B	4	69	41	121	38	269	651	0.11	0.31	0.41
421	A	4	104	32	89	17	242	749	0.14	0.18	0.32
421	B	4	48	20	86	17	171	749	0.06	0.16	0.23
422	A	4	56	21	50	14	141	635	0.09	0.13	0.22
422	B	4	32	15	35	5	87	635	0.05	0.09	0.14
423	A	4	74	18	46	14	152	531	0.14	0.15	0.29
423	B	4	35	10	52	16	113	531	0.07	0.15	0.21
424	A	4	158	17	75	15	265	766	0.21	0.14	0.35
424	B	4	89	19	70	14	192	766	0.12	0.13	0.25
425	A	4	68	9	18	5	100	779	0.09	0.04	0.13
425	B	4	41	4	34	7	86	779	0.05	0.06	0.11
426	A	4	127	22	91	21	261	615	0.21	0.22	0.42
426	B	4	53	19	55	7	134	615	0.09	0.13	0.22
427	A	4	119	3	57	6	185	837	0.14	0.08	0.22
427	B	4	46	4	52	4	106	837	0.05	0.07	0.13
428	A	4	119	29	79	20	247	550	0.22	0.23	0.45
428	B	4	61	22	71	15	169	550	0.11	0.20	0.31
429	A	4	57	17	46	10	130	288	0.20	0.25	0.45
429	B	4	33	21	47	13	114	288	0.11	0.28	0.40
431	A	4	74	12	47	7	140	360	0.21	0.18	0.39
431	B	4	46	9	38	8	101	360	0.13	0.15	0.28
433	A	4	186	25	120	11	342	402	0.46	0.39	0.85
433	B	4	85	24	96	17	222	402	0.21	0.34	0.55
435	A	4	179	24	106	27	336	576	0.31	0.27	0.58
435	B	4	88	19	64	12	183	576	0.15	0.16	0.32
440	A	4	227	24	171	25	447	663	0.34	0.33	0.67
440	B	4	37	9	51	8	105	663	0.06	0.10	0.16
442	A	4	289	51	134	19	493	807	0.36	0.25	0.61
442	B	4	73	17	104	22	216	807	0.09	0.18	0.27
443	A	4	123	28	51	19	221	386	0.32	0.25	0.57
443	B	4	31	11	61	19	122	386	0.08	0.24	0.32
446	A	4	133	10	59	7	209	344	0.39	0.22	0.61
446	B	4	47	12	85	5	149	344	0.14	0.30	0.43
447	A	4	132	17	73	7	229	674	0.20	0.14	0.34
447	B	4	33	8	41	3	85	674	0.05	0.08	0.13
448	A	4	148	24	151	19	342	448	0.33	0.43	0.76
448	B	4	39	8	49	8	104	448	0.09	0.15	0.23
449	A	4	215	28	120	28	391	626	0.34	0.28	0.62
449	B	4	61	23	80	12	176	626	0.10	0.18	0.28

Table 3. (continued).

Permit Area	A or B Season	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
450	A	4	81	12	58	9	160	816	0.10	0.10	0.20
450	B	4	33	3	49	3	88	816	0.04	0.07	0.11
451	A	4	102	20	64	13	199	687	0.15	0.14	0.29
451	B	4	103	20	74	13	210	687	0.15	0.16	0.31
452	A	4	87	18	64	13	182	637	0.14	0.15	0.29
452	B	4	120	33	93	16	262	637	0.19	0.22	0.41
453	A	4	98	12	55	13	178	729	0.13	0.11	0.24
453	B	4	56	4	45	5	110	729	0.08	0.07	0.15
454	A	4	204	35	131	22	392	840	0.24	0.22	0.47
454	B	4	125	27	85	13	250	840	0.15	0.15	0.30
455	A	4	20	5	12	2	39	96	0.21	0.20	0.41
455	B	4	22	1	16	0	39	96	0.23	0.18	0.41
456	A	4	143	24	117	21	305	712	0.20	0.23	0.43
456	B	4	118	40	165	20	343	712	0.17	0.32	0.48
457	A	4	117	19	96	16	248	667	0.18	0.20	0.37
457	B	4	61	12	54	15	142	667	0.09	0.12	0.21
458	A	4	93	23	56	13	185	716	0.13	0.13	0.26
458	B	4	78	12	63	15	168	716	0.11	0.13	0.23
459	A	4	184	14	106	13	317	975	0.19	0.14	0.33
459	B	4	89	18	85	12	204	975	0.09	0.12	0.21
461	A	4	169	59	152	37	417	481	0.35	0.52	0.87
461	B	4	75	63	167	41	346	481	0.16	0.56	0.72
462	A	4	206	38	162	30	436	506	0.41	0.45	0.86
462	B	4	67	36	148	28	279	506	0.13	0.42	0.55
463	A	4	77	16	78	13	184	453	0.17	0.24	0.41
463	B	4	23	11	32	10	76	453	0.05	0.12	0.17
464	A	4	75	21	87	10	193	377	0.20	0.31	0.51
464	B	4	61	22	66	11	160	377	0.16	0.26	0.42
465	A	4	56	15	43	8	122	389	0.14	0.17	0.31
465	B	4	74	16	72	15	177	389	0.19	0.26	0.46
466	A	4	129	47	100	47	323	931	0.14	0.21	0.35
466	B	4	126	35	189	44	394	931	0.14	0.29	0.42
467	A	4	133	27	84	22	266	774	0.17	0.17	0.34
467	B	4	105	37	167	26	335	774	0.14	0.30	0.43
901		1	9	1	6	0	16				
902		1	82	34	82	38	236				
903		1	0	1	15	4	20				
904		1	8	11	13	1	33				
905		1	5	0	2	0	7				
906		1	5	3	20	3	31				
907		1	1	0	1	0	2				
909		2	10	4	16	3	33				
910		2	0	1	10	7	18				
911		2	28	13	57	8	106				
912		2	0	2	10	7	19				
913		2	1	4	13	2	20				
914		3B	22	5	13	3	43				
915		3B	1	1	7	2	11				
916		3B	0	9	19	4	32				
917		3B	23	10	30	3	66				
918		3B	0	4	21	4	29				
919		3B	0	2	10	1	13				
920		3B	0	1	12	3	16				
922		4B	24	14	35	14	87				
953		3	3	0	5	2	10				
954		2	0	3	6	2	11				
956		1	4	2	3	1	10				
TOTAL			**87,402**	**25,247**	**71,176**	**18,573**	**202,398**				

Table 4a. Firearm Bonus Permit Harvest by Permit Area, 2004. Managed Permit Areas

Permit Area	A or B Season	Zone	Fawn Male	Adult Female	Fawn Female	Total
104		1	124	523	77	724
107		1	147	663	121	931
115		1	160	601	121	882
126		1	14	92	12	118
168		1	176	586	144	906
170		1	390	1,273	270	1,933
172		1	309	1,059	219	1,587
174		1	175	549	108	832
175		1	188	705	118	1,011
178		1	209	818	191	1,218
181		1	197	607	121	925
183		1	195	607	140	942
201		2	10	34	5	49
211		2	112	412	69	593
214		2	4	16	3	23
224		2	21	66	13	100
235		2	5	30	9	44
251		2	35	60	21	116
297		2	28	87	23	138
298		2	94	236	75	405
338	B	3	7	39	13	59
339	B	3	13	49	11	73
344	B	3	25	60	20	105
345	B	3	36	113	28	177
416	A	4	26	57	15	98
416	B	4	17	69	17	103
418	A	4	52	104	30	186
418	B	4	35	78	25	138
422	A	4	8	22	6	36
422	B	4	9	22	3	34
452	A	4	10	22	3	35
452	B	4	18	40	5	63
456	A	4	9	54	11	74
456	B	4	27	79	16	122
461	A	4	20	51	14	85
461	B	4	30	84	26	140
462	A	4	18	70	9	97
462	B	4	21	72	18	111
464	A	4	10	36	3	49
464	B	4	12	29	5	46
465	A	4	7	21	3	31
465	B	4	7	28	9	44
466	A	4	20	45	18	83
466	B	4	12	98	25	135
467	A	4	13	38	10	61
467	B	4	19	83	12	114
Total			**3,074**	**10,487**	**2,215**	**15,776**

Table 4b. Firearm Bonus Permit Harvest by Permit Area, 2004. Intensive Permit Areas

Permit Area	A or B Season	Zone	Fawn Male	Adult Female	Fawn Female	Total
110		1	96	377	75	548
154		1	371	1,125	265	1,761
156		1	280	891	247	1,418
157		1	587	1,423	438	2,448
159		1	269	807	168	1,244
202		2	41	149	28	218
203		2	13	48	20	81
204		2	91	333	75	499
205		2	221	707	207	1,135
206		2	99	379	84	562
207		2	70	256	52	378
208		2	45	179	55	279
209		2	109	272	108	489
210		2	114	415	125	654
221		2	210	441	217	868
222		2	147	295	122	564
223		2	79	203	67	349
225		2	272	512	197	981
227		2	169	339	120	628
228		2	32	130	30	192
348	B	3	81	265	66	412
349	B	3	148	470	136	754
401	A	4	18	51	10	79
401	B	4	13	73	10	96
402	A	4	35	105	23	163
402	B	4	30	101	31	162
403	A	4	22	97	24	143
403	B	4	37	138	27	202
404	A	4	43	193	47	283
404	B	4	49	256	50	355
405	A	4	39	170	32	241
405	B	4	46	168	42	256
406	A	4	57	133	54	244
406	B	4	39	130	41	210
407	A	4	61	150	69	280
407	B	4	58	150	63	271
408	A	4	52	135	49	236
408	B	4	32	102	23	157
409	A	4	226	484	212	922
409	B	4	138	398	117	653
410	A	4	222	508	218	948
410	B	4	131	300	126	557
236		2	119	376	97	592
242		2	160	395	152	707
243		2	303	770	266	1,339
244		2	633	1,459	512	2,604
245		2	487	1,151	416	2,054
246		2	555	1,268	441	2,264
247		2	182	453	137	772
248		2	90	236	78	404
249		2	280	650	262	1,192
283		2	31	147	44	222
284		2	828	2,307	689	3,824
285		2	106	341	80	527
287		2	28	80	18	126
337	A	3	32	90	27	149
337	B	3	14	63	16	93
341	B	3	84	223	71	378
342	B	3	71	180	59	310
343	B	3	93	263	79	435
346	B	3	109	363	89	561
347	B	3	106	252	73	431
411	A	4	228	502	200	930
411	B	4	134	319	115	568
412	A	4	86	258	92	436
412	B	4	63	209	74	346
413	A	4	120	236	132	488
413	B	4	93	240	59	392
414	A	4	186	335	196	717
414	B	4	129	278	105	512
415	A	4	97	156	43	296
415	B	4	69	136	55	260
419	A	4	26	71	21	118
419	B	4	29	62	15	106
420	A	4	19	75	25	119
420	B	4	17	77	23	117
421	A	4	21	38	2	61
421	B	4	15	53	8	76
423	A	4	8	24	8	40
423	B	4	4	26	7	37
429	A	4	6	21	6	33
429	B	4	14	27	4	45
Total			**10,567**	**28,068**	**8,966**	**47,601**

Table 5. Multi-Zone Buck Harvest by Permit Area, 2004.

Zone 1		Zone 2		Zone 3		Zone 4	
Permit Area	**Adult Male**	**Permit Area**	**Adult Male**	**Permit Area**	**Adult Male**	**Permit Area**	**Adult Male**
104	39	201	1	337	27	401	89
107	28	202	9	338	23	402	116
110	25	203	1	339	18	403	134
115	40	204	36	341	15	404	242
116	2	205	29	342	6	405	203
122	8	206	12	343	20	406	196
126	7	207	22	344	9	407	172
127	1	208	13	345	2	408	162
152	7	209	43	346	6	409	502
154	37	210	37	347	19	410	585
156	24	211	54	348	9	411	571
157	50	214	2	349	10	412	287
159	25	221	28	**Zone 3 Total**	**164**	413	333
167	35	222	19			414	388
168	41	223	23			415	215
170	31	224	2			416	113
172	55	225	50			417	174
174	19	227	22			418	146
175	17	228	15			419	123
178	18	235	5			420	118
180	23	236	28			421	46
181	15	242	18			422	46
183	20	243	46			423	41
197	48	244	89			424	63
199	2	245	70			425	33
Zone 1 Total	**617**	246	54			426	72
		247	17			427	68
		248	21			428	87
		249	19			429	86
		251	9			431	34
		283	7			433	75
		284	141			435	79
		285	16			440	92
		287	4			442	132
		297	24			443	46
		298	28			446	38
		Zone 2 Total	**1014**			447	41
						448	101
						449	75
						450	47
						451	72
						452	38
						453	69
						454	98
						455	6
						456	72
						457	82
						458	83
						459	91
						461	106
						462	101
						463	48
						464	57
						465	58
						466	126
						467	96
						Zone 4 Total	**7,374**

Grand Total	**9,169**

Table 6. Summary of Firearms Special Hunts, 2004. Includes regular, youth, all-season licenses, and bonus permits.

				Harvest				
Area	Dates	Zone	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
901 - Rice Lake Nat. Wildlife Refuge	11/13 - 11/21	1A	40*	12	1	6	0	19
902 - St. Croix State Park1	11/13 - 11/14	1A	550*	93	34	90	39	256
903 - Savanna Portage State Park1	11/13 - 11/21	1A	25**	0	1	15	4	20
904 - Gooseberry Falls State Park1	11/6 - 11/21	1A	25*	9	11	13	1	34
905 - Split Rock Lighthouse State Park1	11/6 - 11/21	1A	25*	5	0	2	0	7
906 - Tettegouche State Park1	11/6 - 11/21	1A	125*	5	3	20	3	31
907 - Scenic State Park1	11/6 - 11/21	1A	30*	1	0	1	0	2
908 - Lake Bronson State Park1	11/6 - 11/8	2A	25**	0	0	0	0	0
909 - William O'Brien State Park1	11/6 - 11/7	2A	65*	10	4	16	3	33
910 - Zippel Bay State Park1	11/6 - 11/14	2A	55**	0	1	10	7	18
911 - Wild River State Park1	11/6 - 11/9	2A	150*	35	14	63	8	120
912 - Lake Bemidji State Park1	11/6 - 11/9	2A	35**	0	2	11	7	20
913 - Hayes Lake State Park1	11/6 - 11/14	2A	60**	1	4	13	2	20
914 - Elm Creek Park Reserve1	11/20 -11/21	3B	145*	22	5	13	3	43
915 - Lake Rebecca Park Reserve1	11/27 - 11/28	3B	75*	1	1	7	2	11
916 - Forestville/Mystery Cave SP1	11/20 - 11/28	3B	110**	0	9	19	4	32
917 - Frontenac State Park	11/20 - 11/23	3B	50*	23	10	30	3	66
918 - Great River Bluffs State Park1	11/20 - 11/22 11/26 - 11/28	3B	100**	0	4	21	4	29
919 - Zumbro Falls Woods SNA1	11/20 - 11/28	3B	10**	0	2	10	1	13
920 - Whitewater Refuge	11/20 - 11/28	3B	75**	0	1	12	3	16
921 - Rydell National Wildlife Refuge	11/13 - 11/16	4B	10**	0	0	0	0	0
922 - Maplewood State Park1	11/13 - 11/16	4B	100*	34	19	41	14	108
923 - Glacial Lakes State Park	11/13 - 11/16	4B	30**	0	0	0	0	0
953 - Whitewater Youth	10/21 - 10/24		50*	3	0	5	2	10
954 - Lake Bemidji State Park - Youth	10/21 - 10/24		25**	0	3	6	2	11
956 - St. Croix State Park - Youth	10/30 - 10/31		37*	4	2	3	1	10
957 - Rydell NWR - Youth	10/30 - 10/31		25**	0	0	0	0	0
TOTAL				258	131	427	113	929

[1] Bonus permits available

*Either sex

** Antlerless Only

Table 7. Free Landowner Firearms Harvest by Permit Area, 2004.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	0	1	5	1	7
107	0	0	4	0	4
110	0	0	3	0	3
154	0	0	2	1	3
156	0	0	2	0	2
157	0	6	31	4	41
159	0	2	3	1	6
170	0	3	7	0	10
172	0	1	2	1	4
174	0	1	1	0	2
175	0	0	0	2	2
178	0	3	4	0	7
181	0	1	7	0	8
183	0	1	1	1	3
201	0	0	1	0	1
202	0	0	0	1	1
204	0	0	3	1	4
205	0	1	6	2	9
206	0	2	2	0	4
207	0	1	5	0	6
208	0	2	5	1	8
209	0	2	9	2	13
210	0	1	3	4	8
211	0	0	2	1	3
221	0	11	20	9	40
222	0	1	2	2	5
223	0	0	1	0	1
225	0	3	9	8	20
227	0	0	5	0	5
242	0	1	1	0	2
243	0	3	19	2	24
244	0	10	22	8	40
245	0	1	5	3	9
246	0	4	13	5	22
247	0	1	0	0	1
248	0	1	2	0	3
249	0	6	22	11	39
283	0	0	3	1	4
284	0	13	41	8	62
285	0	1	3	2	6
297	0	0	1	0	1
298	0	2	3	2	7
337	0	1	3	0	4
339	0	0	1	0	1
341	0	7	18	5	30
342	0	5	15	5	25
343	0	4	11	0	15
344	0	2	13	1	16
345	0	3	22	2	27
346	0	4	34	4	42
347	0	1	11	1	13
348	0	4	16	5	25
349	0	10	41	9	60

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
401	0	2	0	0	2
402	0	4	13	8	25
403	0	0	4	0	4
404	0	3	13	2	18
405	0	0	15	1	16
406	0	1	15	3	19
407	0	3	23	3	29
408	0	5	13	3	21
409	0	9	18	9	36
410	0	6	16	6	28
411	0	5	25	8	38
412	0	2	5	2	9
413	0	14	31	6	51
414	0	27	44	21	92
415	0	20	20	16	56
416	0	0	2	2	4
418	0	2	11	3	16
419	0	0	1	1	2
420	0	3	10	4	17
421	0	1	1	0	2
422	0	2	1	0	3
423	0	0	2	2	4
429	0	0	2	1	3
452	0	1	5	1	7
456	0	1	6	0	7
461	0	1	6	0	7
462	0	0	2	0	2
464	0	0	2	0	2
465	0	0	4	1	5
466	0	0	4	4	8
467	0	1	7	3	11
TOTAL	**0**	**240**	**786**	**226**	**1,252**

Table 8. Archery Harvest by Permit Area, 2004. Includes regular, youth, and bonus permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	13	2	21	4	40
107	18	3	27	1	49
110	7	2	29	1	39
115	26	6	21	2	55
116	7	0	7	0	14
122	2	0	0	0	2
126	12	3	10	0	25
127	3	0	1	1	5
152	1	1	3	0	5
154	62	26	119	19	226
156	51	27	99	18	195
157	114	55	238	36	443
159	74	15	129	24	242
167	9	2	3	0	14
168	30	5	34	4	73
170	59	11	93	14	177
172	49	23	81	11	164
174	24	8	46	6	84
175	38	4	20	2	64
178	52	14	49	5	120
180	56	3	23	2	84
181	172	22	125	18	337
183	61	10	74	11	156
197	13	0	13	2	28
199	5	0	0	0	5
201	0	1	1	0	2
202	8	5	11	2	26
203	1	0	0	0	1
204	25	1	35	1	62
205	37	6	59	11	113
206	20	3	28	6	57
207	10	0	25	1	36
208	6	0	10	2	18
209	23	2	21	3	49
210	7	4	23	3	37
211	13	2	24	2	41
214	4	3	9	0	16
221	43	40	121	34	238
222	35	16	65	14	130
223	83	47	123	25	278
224	10	8	9	1	28
225	115	53	169	24	361
227	179	67	238	45	529
228	230	94	271	59	654
235	15	1	13	4	33
236	233	88	303	66	690
242	75	41	158	37	311
243	39	22	115	20	196
244	59	26	141	21	247
245	83	42	166	39	330
246	74	32	119	18	243
247	69	39	115	32	255
248*	191	46	245	50	532
249	59	39	128	29	255
251	2	0	2	0	4
283	6	2	9	1	18
284	161	91	359	57	668
285	8	6	9	3	26

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
287	0	0	1	0	1
297	9	1	2	1	13
298	7	0	6	0	13
337	219	69	277	51	616
338	55	6	40	4	105
339	83	14	59	13	169
341	104	41	153	27	325
342	74	32	91	25	222
343	222	64	313	61	660
344	42	9	35	10	96
345	58	9	56	10	133
346	106	32	192	34	364
347	63	12	115	19	209
348	65	21	136	24	246
349	111	32	160	34	337
401	12	3	17	3	35
402	26	4	39	7	76
403	20	2	26	5	53
404	21	4	40	4	69
405	17	6	26	5	54
406	11	8	27	3	49
407	29	6	35	5	75
408	11	3	12	5	31
409	52	39	123	29	243
410	84	30	138	20	272
411	56	30	112	26	224
412	63	27	126	15	231
413	59	26	135	16	236
414	44	46	120	30	240
415	79	33	122	27	261
416	32	8	50	7	97
417	60	6	26	2	94
418	60	21	81	22	184
419	54	35	101	11	201
420	39	12	48	12	111
421	15	6	26	4	51
422	11	0	10	1	22
423	7	2	10	2	21
424	11	0	5	1	17
425	10	0	1	0	11
426	23	0	8	1	32
427	15	3	5	0	23
428	44	3	15	0	62
429	39	11	56	13	119
431	5	2	6	1	14
433	28	2	6	2	38
435	19	1	5	1	26
440	25	4	16	3	48
442	74	7	50	13	144
443	26	2	21	2	51
446	6	0	2	0	8
447	5	1	3	0	9
448	10	1	5	0	16
449	34	1	16	2	53
450	14	0	4	0	18
451	14	0	11	0	25
452	24	3	14	1	42
453	19	3	3	0	25

Table 8. (continued).

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
454	18	5	14	1	38
455	3	1	4	0	8
456	23	1	26	2	52
457	10	4	7	0	21
458	22	1	7	2	32
459	24	3	4	0	31
461	40	12	37	2	91
462	63	20	68	7	158
463	18	0	8	0	26
464	18	5	20	6	49
465	49	7	46	5	107
466	55	8	47	7	117
467	65	20	60	11	156
953	1	0	0	0	1
Total	**5,815**	**1,899**	**8,075**	**1,448**	**17,237**

*Includes Camp Ripley

Table 9. Archery Harvest using Bonus Permits by Permit Area, 2004.

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
104	1	1	15	1	17
107	1	1	11	0	12
110	1	2	24	0	26
115	1	3	11	0	14
126	1	2	7	0	9
154	1	19	91	16	126
156	1	7	21	4	32
157	1	37	152	21	210
159	1	2	30	6	38
168	1	2	19	4	25
170	1	6	69	7	82
172	1	14	61	8	83
174	1	3	28	3	34
175	1	2	9	2	13
178	1	4	19	1	24
181	1	3	29	5	37
183	1	0	4	2	6
201	2	1	0	0	1
202	2	5	9	2	16
204	2	1	30	0	31
205	2	5	48	6	59
206	2	2	22	3	27
207	2	0	19	0	19
208	2	0	10	1	11
209	2	2	15	3	20
210	2	4	22	3	29
211	2	2	10	1	13
214	2	0	3	0	3
221	2	11	17	5	33
222	2	6	26	2	34
223	2	35	95	23	153
224	2	5	7	1	13
225	2	46	142	21	209
227	2	45	154	37	236
228	2	35	72	21	128
235	2	1	8	4	13
236	2	44	123	26	193
242	2	35	141	32	208
243	2	12	68	15	95
244	2	24	125	20	169
245	2	36	148	32	216
246	2	28	92	11	131
247	2	30	99	28	157
248	2	26	173	32	231
249	2	16	72	19	107
251	2	0	2	0	2
283	2	1	6	1	8
284	2	83	312	48	443
285	2	5	7	2	14
287	2	0	1	0	1
297	2	1	0	1	2
298	2	0	5	0	5
337	3	53	208	41	302
338	3	5	31	4	40
339	3	7	46	9	62
341	3	20	97	15	132
342	3	14	37	9	60
343	3	32	126	26	184
344	3	1	2	3	6
345	3	4	7	2	13
346	3	7	38	8	53
347	3	4	32	8	44
348	3	3	21	8	32
349	3	7	29	13	49
401	4	3	16	3	22
402	4	4	32	7	43
403	4	2	23	5	30
404	4	4	34	3	41
405	4	6	24	4	34
406	4	6	25	2	33
407	4	6	34	3	43
408	4	3	11	5	19
409	4	36	110	25	171
410	4	25	123	18	166
411	4	27	93	20	140
412	4	26	105	12	143
413	4	19	78	11	108
414	4	8	18	5	31
415	4	12	66	16	94
416	4	7	44	4	55
418	4	17	62	20	99
419	4	32	91	11	134

Table 9. (Continued)

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
420	4	10	48	10	68
421	4	5	23	3	31
422	4	0	8	1	9
423	4	2	10	2	14
429	4	7	45	12	64
452	4	3	14	0	17
456	4	1	21	1	23
461	4	9	26	1	36
462	4	10	59	6	75
464	4	3	17	5	25
465	4	6	40	5	51
466	4	5	42	6	53
467	4	16	49	9	74
TOTAL		**1,132**	**4,748**	**861**	**6,741**

Table 10. Summary of Archery Special Hunts, 2004. Includes regular, youth, and bonus permits.

Area	Dates	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
Camp Ripley	10/16-10/17	2,250	114	20	127	23	284
Camp Ripley	10/25-10/26	2,250	104	8	79	9	200
Cleary Lake	11/14-11/16	55	0	0	0	1	1
Crow-Hassan Park Reserve	11/14-11/16	130	4	1	5	1	11
Murphy-Hanrahan Park Reserve	11/14-11/16	185	7	4	11	1	23
City of New Ulm	10/11-12/31	50	2	2	13	3	20
City of Mankato	10/23-12/31	30	9	0	2	0	11
City of Red Wing	9/18-12/31	85**	3	6	8	1	18
Camp Ripley - Youth	10/9 - 10/10	150	1	0	7	1	9
Arden Hills - Site A	10/21 - 10/22	30	0	0	2	0	2
Arden Hills - Site B	10/23 - 10/24	30	3	0	0	0	3
Whitewater Youth*	10/21 - 10/24	50	1	0	0	0	1

*Total permits for this hunt was 50 and hunters could use either firearms or archery equipment.
**Total number of hunters. Permits were unlimited.

Table 11. Free Landowner Archery Harvest by Permit Area, 2004.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
181	0	0	1	0	1
221	0	0	0	1	1
244	0	0	1	1	2
283	0	0	1	0	1
284	0	1	0	0	1
341	0	0	0	1	1
342	0	0	2	0	2
343	0	4	4	1	9
347	0	0	0	1	1
349	0	0	1	0	1
405	0	0	1	0	1
410	0	0	0	1	1
413	0	2	0	0	2
414	0	1	0	0	1
415	0	0	1	0	1
456	0	0	1	0	1
467	0	0	1	0	1
TOTAL	0	8	14	6	28

Table 12. Muzzleloader Harvest by Permit Area, 2004. Includes regular muzzleloader, youth, and bonus permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	0	1	5	0	6
107	1	3	14	0	18
110	0	2	8	0	10
115	2	3	9	0	14
116	0	0	3	0	3
152	0	1	0	0	1
154	1	8	21	3	33
156	2	4	20	7	33
157	4	11	50	10	75
159	0	1	11	2	14
167	0	1	0	0	1
168	4	2	7	4	17
170	3	2	24	6	35
172	2	10	26	5	43
174	2	1	8	2	13
175	4	2	8	0	14
178	1	1	9	2	13
180	0	0	3	0	3
181	0	1	5	3	9
183	0	2	7	0	9
197	5	0	4	0	9
201	2	1	1	0	4
202	4	1	6	5	16
204	5	6	24	7	42
205	1	3	27	7	38
206	1	2	18	6	27
207	0	1	7	2	10
208	1	1	3	1	6
209	1	2	4	1	8
210	1	1	6	1	9
211	3	5	15	1	24
214	0	1	0	1	2
221	0	7	19	5	31
222	0	1	6	3	10
223	0	3	7	0	10
224	0	0	2	0	2
225	3	13	35	16	67
227	1	5	18	5	29
228	0	1	10	0	11
235	0	0	3	0	3
236	3	8	24	4	39
242	8	13	32	15	68
243	0	7	32	10	49
244	7	21	60	14	102
245	12	16	70	26	124
246	6	12	43	16	77
247	7	14	39	8	68
248	0	3	12	5	20
249	5	9	24	11	49
251	0	1	0	1	2
283	1	2	10	2	15
284	13	18	78	26	135
285	2	2	16	4	24
297	2	0	2	1	5
298	5	1	3	4	13
337	0	0	4	2	6
338	3	0	5	0	8

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
339	0	1	3	1	5
341	1	7	32	4	44
342	6	10	25	3	44
343	4	6	41	8	59
344	0	1	11	2	14
345	0	0	10	0	10
346	0	6	28	6	40
347	4	12	39	4	59
348	0	8	33	8	49
349	0	14	44	11	69
401	4	2	38	7	51
402	12	9	49	12	82
403	12	8	48	8	76
404	7	6	26	0	39
405	10	3	15	3	31
406	2	17	5	2	26
407	17	13	42	8	80
408	4	5	24	4	37
409	6	24	45	19	94
410	9	11	50	13	83
411	2	20	37	18	77
412	10	13	39	16	78
413	1	15	45	11	72
414	1	11	26	7	45
415	0	16	27	12	55
416	4	6	24	13	47
417	6	8	10	4	28
418	3	7	26	5	41
419	3	15	19	9	46
420	7	6	32	9	54
421	1	3	13	6	23
422	4	2	7	1	14
423	2	1	6	3	12
424	6	3	16	4	29
425	3	0	2	1	6
426	4	2	3	0	9
427	2	0	3	1	6
428	2	1	5	0	8
429	0	1	7	2	10
431	3	3	11	3	20
433	12	1	13	1	27
435	4	2	12	2	20
440	3	2	2	3	10
442	11	7	25	0	43
443	6	6	8	1	21
446	8	2	9	1	20
447	1	2	8	3	14
448	5	4	19	1	29
449	4	4	16	4	28
450	5	0	4	1	10
451	11	3	13	1	28
452	13	7	29	2	51
453	14	1	10	2	27
454	11	3	34	2	50
455	3	1	3	1	8
456	10	4	46	0	60
457	1	0	3	1	5

Table 12. (continued)

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
458	10	5	18	4	37
459	3	3	17	3	26
461	8	8	26	3	45
462	7	1	23	4	35
463	3	0	5	3	11
464	2	1	9	2	14
465	1	6	17	4	28
466	12	16	40	9	77
467	17	15	34	6	72

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
931	4	6	18	6	34
932	1	7	7	2	17
933	0	2	8	3	13
934	0	3	7	6	16
935	0	4	9	5	18
936	0	5	8	2	15
937	0	7	20	4	31
938	0	2	2	1	5
TOTAL	**480**	**673**	**2,395**	**595**	**4,143**

Table 13. Muzzleloader Harvest using Bonus Permits by Permit Area, 2004.

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
104	1	1	4	0	5
107	1	2	13	0	15
110	1	2	7	0	9
115	1	1	9	0	10
154	1	8	19	3	30
156	1	3	20	6	29
157	1	10	45	8	63
159	1	1	10	2	13
168	1	2	7	4	13
170	1	2	16	6	24
172	1	7	18	2	27
174	1	1	3	2	6
175	1	1	7	0	8
178	1	1	7	2	10
181	1	1	5	3	9
183	1	2	7	0	9
201	2	1	1	0	2
202	2	1	4	5	10
204	2	6	23	6	35
205	2	3	27	7	37
206	2	2	16	6	24
207	2	1	7	1	9
208	2	1	3	1	5
209	2	1	3	1	5
210	2	1	6	1	8
211	2	5	13	1	19
214	2	1	0	1	2
221	2	7	19	5	31
222	2	0	6	1	7
223	2	3	7	0	10
224	2	0	2	0	2
225	2	12	33	16	61
227	2	5	17	5	27
228	2	1	10	0	11
235	2	0	2	0	2
236	2	7	21	3	31
242	2	11	28	13	52
243	2	6	26	9	41
244	2	17	53	14	84
245	2	13	63	22	98
246	2	11	40	15	66
247	2	12	35	8	55
248	2	3	11	5	19
249	2	9	22	9	40
251	2	1	0	1	2
283	2	2	10	2	14
284	2	18	65	21	104
285	2	2	13	3	18
297	2	0	2	1	3
298	2	1	1	3	5
337	3	0	4	2	6
338	3	0	4	0	4
339	3	1	3	1	5
341	3	7	27	4	38
342	3	8	22	2	32
343	3	6	40	7	53
344	3	1	10	2	13
345	3	0	9	0	9
346	3	6	27	6	39
347	3	12	37	3	52
348	3	8	33	8	49
349	3	14	44	11	69
401	4	2	37	7	46
402	4	8	47	9	64
403	4	6	43	8	57
404	4	6	22	0	28
405	4	2	11	1	14
406	4	16	5	2	23
407	4	11	42	8	61
408	4	5	23	4	32
409	4	20	41	18	79
410	4	11	44	13	68
411	4	18	33	18	69
412	4	12	37	12	61
413	4	14	45	10	69
414	4	11	26	7	44
415	4	16	27	11	54
416	4	5	18	11	34
418	4	6	24	3	33
419	4	15	19	8	42
420	4	5	30	8	43
421	4	3	13	5	21
422	4	0	6	1	7
423	4	0	5	3	8
429	4	1	7	2	10
452	4	7	18	0	25
453	4	0	1	0	1
456	4	4	32	0	36
461	4	7	21	1	29
462	4	1	18	4	23
464	4	1	8	2	11
465	4	5	14	3	22
466	4	8	29	6	43
467	4	8	23	6	37
TOTAL		**506**	**1,815**	**461**	**2,782**

Table 14. Summary of Muzzleloader Special Hunts, 2004. Includes regular, youth, all-season, and bonus permits.

Area	Dates	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
931 - Jay Cooke SP1	11/27 - 12/1	90*	10	6	20	7	43
932 - Crow Wing SP1	12/10 - 12/12	40**	2	7	9	3	21
933 - Afton SP1	12/10 - 12/11	40**	0	2	9	3	14
934 - Lake Shetek SP	12/4 - 12/7	25***	0	5	10	7	22
935 - Sibley SP	12/4 - 12/5	50**	0	4	15	6	25
936 - Rice Lake SP1	11/27-11/29 12/4 - 12/5	15***	0	5	8	2	15
937 - Lake Louise SP	11/27 - 11/28	25***	0	8	20	4	32
938 - Interstate SP	11/27 - 12/5	15***	0	2	4	1	7
TOTAL			12	39	95	33	179

[1] Bonus permits available *Either Sex first two days only **Either Sex ***Antlerless Only

Table 15. Free Landowner Muzzleloader Harvest by Permit Area, 2004.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
157	0	1	0	0	1
170	0	1	0	0	1
181	0	0	2	0	2
205	0	0	0	1	1
206	0	0	1	0	1
225	0	0	1	0	1
243	0	1	0	0	1
244	0	0	1	1	2
246	0	1	0	1	2
249	0	0	1	0	1
341	0	1	0	0	1
344	0	1	0	0	1
346	0	0	1	0	1
347	0	0	1	0	1
349	0	0	2	0	2
402	0	0	3	0	3
404	0	0	1	0	1
405	0	0	1	0	1
410	0	0	1	0	1
411	0	0	2	1	3
414	0	0	2	1	3
415	0	1	2	0	3
416	0	1	0	0	1
422	0	0	0	1	1
462	0	0	1	0	1
Total	**0**	**8**	**23**	**6**	**37**

Table 16. Firearms All-Season Deer Harvest by Permit Area, 2004.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
104	87	6	39	5	137
107	119	11	42	7	179
110	43	2	40	4	89
115	122	10	43	7	182
116	13	1	0	1	15
122	36	0	4	1	41
126	29	3	11	1	44
127	11	0	1	0	12
152	13	1	6	0	20
154	98	18	47	17	180
156	87	17	56	9	169
157	124	28	98	17	267
159	52	11	50	9	122
167	73	7	45	14	139
168	141	23	68	14	246
170	201	36	115	20	372
172	121	42	122	25	310
174	80	11	39	11	141
175	84	11	46	6	147
178	86	18	54	7	165
180	112	8	20	1	141
181	106	15	49	7	177
183	77	11	48	5	141
197	130	12	29	8	179
199	4	0	0	0	4
Zone 1 Total	**2,049**	**302**	**1,072**	**196**	**3,619**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
337	27	5	6	3	41
338	27	3	4	3	37
339	26	4	7	1	38
341	49	8	17	2	76
342	41	3	9	1	54
343	58	5	15	2	80
344	28	8	5	1	42
345	35	2	7	1	45
346	39	7	24	6	76
347	56	8	16	2	82
348	50	6	18	2	76
349	86	9	26	3	124
Zone 3 Total	**522**	**68**	**154**	**27**	**771**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	9	3	3	0	15
202	12	3	12	1	28
203	13	0	5	0	18
204	49	6	37	5	97
205	68	12	42	6	128
206	34	8	30	5	77
207	25	3	16	2	46
208	14	3	20	3	40
209	27	5	31	4	67
210	47	7	32	9	95
211	97	14	49	9	169
214	6	1	3	0	10
221	50	25	49	20	144
222	44	12	27	9	92
223	41	3	23	13	80
224	16	2	4	2	24
225	69	19	44	21	153
227	65	8	31	6	110
228	17	1	11	2	31
235	4	2	5	0	11
236	37	5	32	9	83
242	37	9	40	10	96
243	91	24	84	21	220
244	147	50	119	36	352
245	158	37	113	32	340
246	145	38	112	32	327
247	48	16	30	6	100
248	31	12	29	7	79
249	61	27	66	14	168
251	12	0	8	1	21
283	16	4	13	0	33
284	234	48	183	31	496
285	29	3	21	1	54
287	7	1	7	3	18
297	28	2	12	2	44
298	52	16	24	8	100
Zone 2 Total	**1,840**	**429**	**1,367**	**330**	**3,966**

Table 16. (Continued).

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
401	30	4	18	3	55
402	34	4	29	3	70
403	22	3	23	7	55
404	68	8	41	6	123
405	46	6	38	6	96
406	46	7	32	8	93
407	111	22	77	18	228
408	65	16	48	12	141
409	226	56	169	45	496
410	240	55	163	44	502
411	233	49	171	53	506
412	200	37	127	30	394
413	146	45	132	39	362
414	178	51	141	44	414
415	164	60	118	52	394
416	115	22	86	13	236
417	239	26	110	19	394
418	173	47	117	25	362
419	123	44	87	31	285
420	61	10	55	15	141
421	34	10	27	7	78
422	31	2	12	3	48
423	36	4	24	4	68
424	77	7	30	5	119
425	31	3	3	0	37
426	71	6	30	4	111
427	50	6	17	2	75
428	94	7	35	7	143
429	34	16	45	11	106
431	28	2	16	1	47
433	101	9	45	7	162
435	90	4	27	3	124
440	107	11	44	6	168
442	162	6	45	12	225
443	58	4	17	6	85
446	41	5	16	0	62
447	59	3	19	2	83
448	42	5	26	1	74
449	105	3	32	7	147
450	33	0	9	1	43
451	55	1	17	4	77
452	33	5	20	2	60
453	52	1	21	3	77
454	119	9	36	4	168
455	21	1	6	0	28
456	82	6	48	8	144
457	67	6	20	2	95
458	76	6	17	3	102
459	110	7	28	8	153
461	96	16	65	15	192
462	114	16	70	11	211
463	52	5	21	2	80
464	55	14	30	7	106
465	51	7	25	2	85
466	109	13	74	12	208
467	84	13	46	8	151
Zone 4 Total	**4,980**	**811**	**2,845**	**653**	**9,289**

Special Hunts					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
901	3	0	0	0	3
902	11	0	8	1	20
904	1	0	0	0	1
911	7	1	6	0	14
912	0	0	1	0	1
922	10	5	6	0	21
Special Hunts Total	**32**	**6**	**21**	**1**	**60**

GRAND TOTAL	**9,423**	**1,616**	**5,459**	**1,207**	**17,705**

Table 17. Archery All-Season Deer Harvest by Permit Area, 2004.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
104	3	0	3	0	6
107	6	1	9	1	17
110	3	1	3	0	7
115	2	0	5	0	7
116	2	0	1	0	3
122	1	0	3	0	4
126	8	0	4	0	12
127	0	0	0	0	0
152	0	0	0	0	0
154	6	4	12	2	24
156	6	2	11	1	20
157	17	11	18	4	50
159	16	2	13	2	33
167	1	0	4	0	5
168	7	1	9	2	19
170	38	1	17	3	59
172	12	2	11	1	26
174	14	1	10	1	26
175	8	0	5	0	13
178	8	3	12	2	25
180	21	2	23	1	47
181	25	5	15	1	46
183	11	5	9	1	26
197	9	0	5	1	15
199	0	0	0	0	0
Zone 1 Total	**224**	**41**	**202**	**23**	**490**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	0	0	0	0	0
202	1	0	1	0	2
203	0	0	0	0	0
204	0	1	2	0	3
205	6	1	1	0	8
206	1	0	7	0	8
207	1	1	1	0	3
208	0	0	1	0	1
209	2	0	3	1	6
210	5	0	5	1	11
211	8	1	2	1	12
214	2	0	1	0	3
221	9	4	17	6	36
222	9	4	19	2	34
223	20	5	22	4	51
224	0	0	11	0	11
225	17	4	7	3	31
227	29	6	23	6	64
228	22	1	10	2	35
235	0	0	0	0	0
236	22	6	17	1	46
242	14	4	13	3	34
243	6	3	22	2	33
244	13	3	26	3	45
245	15	8	23	3	49
246	13	3	18	7	41
247	9	3	13	2	27
248	68	7	38	3	116
249	14	6	19	1	40
251	0	0	0	0	0
283	2	1	1	1	5
284	32	6	24	4	66
285	3	1	4	1	9
287	0	0	0	0	0
297	1	1	1	0	3
298	3	0	2	0	5
Zone 2 Total	**347**	**80**	**354**	**57**	**838**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
337	36	2	16	2	56
338	13	1	8	2	24
339	7	2	4	2	15
341	9	1	8	1	19
342	4	2	11	1	18
343	23	3	23	0	49
344	8	0	2	0	10
345	5	0	8	1	14
346	20	0	14	1	35
347	14	0	14	2	30
348	12	5	9	2	28
349	12	3	11	0	26
Zone 3 Total	**163**	**19**	**128**	**14**	**324**

Table 17. (Continued).

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
401	1	0	2	0	3
402	4	1	6	1	12
403	1	0	3	0	4
404	4	1	6	0	11
405	7	2	3	1	13
406	6	1	7	0	14
407	10	3	17	0	30
408	1	0	5	0	6
409	22	15	54	9	100
410	30	11	30	2	73
411	30	6	45	8	89
412	32	7	25	3	67
413	34	2	36	6	78
414	28	7	27	4	66
415	39	11	32	7	89
416	8	2	8	1	19
417	54	2	42	5	103
418	40	5	29	1	75
419	30	5	21	2	58
420	11	0	7	0	18
421	5	0	4	0	9
422	3	0	1	2	6
423	4	1	3	0	8
424	8	2	11	1	22
425	3	2	3	0	8
426	12	2	9	0	23
427	15	3	4	0	22
428	37	3	26	3	69
429	6	6	10	3	25
431	6	0	7	2	15
433	22	1	11	2	36
435	17	4	13	1	35
440	12	2	17	0	31
442	31	8	44	4	87
443	18	0	11	4	33
446	12	2	3	1	18
447	8	1	4	2	15
448	11	1	10	0	22
449	12	1	13	2	28
450	9	0	17	1	10

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
451	4	0	44	2	15
452	5	0	11	1	10
453	5	0	3	1	12
454	12	1	4	0	30
455	4	1	10	0	9
456	15	3	13	1	29
457	13	2	0	0	25
458	15	1	9	0	22
459	19	2	4	3	43
461	16	3	6	1	27
462	20	2	17	1	40
463	7	1	4	3	21
464	13	0	10	0	23
465	9	2	8	1	20
466	20	3	14	1	38
467	14	0	7	2	23
Zone 4 Total	**834**	**141**	**767**	**95**	**1,837**

GRAND TOTAL	**1,568**	**281**	**1,451**	**189**	**3,489**

Table 18. Muzzleloader All-Season Deer Harvest by Permit Area, 2004.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
104	10	4	7	1	22
107	7	1	9	2	19
110	3	0	3	0	6
115	12	4	20	2	38
116	0	0	1	0	1
122	1	0	2	0	3
126	0	0	2	0	0
127	0	0	0	0	0
152	1	0	3	0	4
154	13	5	19	4	41
156	11	4	15	2	32
157	9	5	32	7	53
159	4	4	10	1	19
167	5	0	4	0	9
168	8	2	16	1	27
170	19	8	35	8	70
172	22	9	22	1	54
174	8	4	9	3	24
175	9	0	14	2	25
178	10	1	15	3	29
180	12	0	18	0	30
181	12	5	22	1	40
183	8	3	13	3	27
197	7	0	10	1	18
199	2	0	0	0	2
Zone 1 Total	**193**	**59**	**301**	**42**	**595**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
337	9	3	4	1	17
338	6	5	6	0	17
339	2	1	7	1	11
341	12	3	9	4	28
342	9	6	24	5	44
343	22	7	27	2	58
344	12	3	19	2	36
345	5	3	12	0	20
346	6	0	24	0	30
347	18	2	27	2	49
348	8	4	17	4	33
349	23	6	19	2	50
Zone 3 Total	**132**	**43**	**195**	**23**	**393**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	2	1	0	1	4
202	2	1	9	0	12
203	0	0	1	0	1
204	18	1	17	3	39
205	13	6	12	2	33
206	14	3	13	0	30
207	7	0	7	1	15
208	4	0	5	1	10
209	10	2	4	0	16
210	6	0	5	0	11
211	12	5	17	4	38
214	0	1	1	0	2
221	15	12	21	4	52
222	9	4	12	2	27
223	13	7	10	5	35
224	0	0	1	0	1
225	23	11	21	6	61
227	16	7	19	6	48
228	6	1	4	0	11
235	4	0	1	0	5
236	14	5	26	4	49
242	10	3	16	4	33
243	14	2	14	7	37
244	29	5	32	8	74
245	23	16	32	6	77
246	19	15	22	10	66
247	11	2	19	0	32
248	8	0	4	2	14
249	13	5	26	6	50
251	0	0	0	1	1
283	3	0	0	0	3
284	36	9	38	10	93
285	3	2	7	0	12
287	0	0	0	0	0
297	6	3	1	1	11
298	1	2	4	1	8
Zone 2 Total	**364**	**131**	**421**	**95**	**1,011**

Table 18. (Continued).

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
401	16	1	14	2	33
402	25	1	13	1	40
403	22	7	18	1	48
404	18	4	19	1	42
405	10	4	16	1	31
406	6	1	8	0	15
407	29	6	21	5	61
408	8	3	11	2	24
409	33	9	39	7	88
410	54	11	36	15	116
411	21	14	30	14	79
412	32	11	32	8	83
413	36	11	38	18	103
414	17	6	14	5	42
415	17	12	24	7	60
416	15	3	29	2	49
417	39	13	74	8	134
418	20	9	31	10	70
419	23	10	18	5	56
420	24	8	16	3	51
421	14	4	18	5	41
422	14	2	12	3	31
423	10	5	3	1	19
424	17	6	43	0	66
425	13	5	17	2	37
426	16	3	10	1	30
427	6	2	23	6	37
428	18	15	26	4	63
429	5	1	11	1	18
431	10	5	19	7	41
433	27	12	59	4	102
435	19	7	41	2	69
440	14	4	21	3	42
442	37	13	63	11	124
443	11	9	39	5	64
446	17	3	32	2	54
447	12	1	26	6	45
448	15	6	26	0	47
449	20	5	42	3	70
450	14	1	14	1	30
451	18	0	25	7	50
452	11	0	11	2	24
453	27	4	32	2	65
454	39	14	63	7	123
455	3	2	7	0	12
456	17	6	27	2	52

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
457	16	8	25	4	53
458	12	2	29	4	47
459	25	5	53	4	87
461	17	8	20	5	50
462	11	7	39	5	62
463	17	1	22	2	42
464	11	4	16	1	32
465	9	2	19	3	33
466	30	7	32	6	75
467	19	9	24	3	55
Zone 4 Total	**1,056**	**332**	**1,490**	**239**	**3,117**

Special Hunts					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
931	6	0	2	1	9
932	1	0	2	1	4
933	0	0	1	0	1
934	0	2	3	1	6
935	0	0	6	1	7
937	0	1	2	0	3
Special Hunts Total	**7**	**3**	**16**	**4**	**30**

GRAND TOTAL	**1,752**	**568**	**2,423**	**403**	**5,146**

Table 19. Total All-Season Deer Harvest by Permit Area, 2004.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
104	100	10	49	6	165
107	132	13	60	10	215
110	49	3	46	4	102
115	136	14	68	9	227
116	15	1	2	1	19
122	38	0	9	1	48
126	37	3	17	1	58
127	11	0	1	0	12
152	14	1	9	0	24
154	117	27	78	23	245
156	104	23	82	12	221
157	150	44	148	28	370
159	72	17	73	12	174
167	79	7	53	14	153
168	156	26	93	17	292
170	258	45	167	31	501
172	155	53	155	27	390
174	102	16	58	15	191
175	101	11	65	8	185
178	104	22	81	12	219
180	145	10	61	2	218
181	143	25	86	9	263
183	96	19	70	9	194
197	146	12	44	10	212
199	6	0	0	0	6
Zone 1 Total	**2,466**	**402**	**1,575**	**261**	**4,704**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
337	72	10	26	6	114
338	46	9	18	5	78
339	35	7	18	4	64
341	70	12	34	7	123
342	54	11	44	7	116
343	103	15	65	4	187
344	48	11	26	3	88
345	45	5	27	2	79
346	65	7	62	7	141
347	88	10	57	6	161
348	70	15	44	8	137
349	121	18	56	5	200
Zone 3 Total	**817**	**130**	**477**	**64**	**1,488**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	11	4	3	1	19
202	15	4	22	1	42
203	13	0	6	0	19
204	67	8	56	8	139
205	87	19	55	8	169
206	49	11	50	5	115
207	33	4	24	3	64
208	18	3	26	4	51
209	39	7	38	5	89
210	58	7	42	10	117
211	117	20	68	14	219
214	8	2	5	0	15
221	74	41	87	30	232
222	62	20	58	13	153
223	74	15	55	22	166
224	16	2	16	2	36
225	109	34	72	30	245
227	110	21	73	18	222
228	45	3	25	4	77
235	8	2	6	0	16
236	73	16	75	14	178
242	61	16	69	17	163
243	111	29	120	30	290
244	189	58	177	47	471
245	196	61	168	41	466
246	177	56	152	49	434
247	68	21	62	8	159
248	107	19	71	12	209
249	88	38	111	21	258
251	12	0	8	2	22
283	21	5	14	1	41
284	302	63	245	45	655
285	35	6	32	2	75
287	7	1	7	3	18
297	35	6	14	3	58
298	56	18	30	9	113
Zone 2 Total	**2,551**	**640**	**2,42**	**482**	**5,815**

Table 19. (Continued).

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
401	47	5	34	5	91
402	63	6	48	5	122
403	45	10	44	8	107
404	90	13	66	7	176
405	63	12	57	8	140
406	58	9	47	8	122
407	150	31	115	23	319
408	74	19	64	14	171
409	281	80	262	61	684
410	324	77	229	61	691
411	284	69	246	75	674
412	264	55	184	41	544
413	216	58	206	63	543
414	223	64	182	53	522
415	220	83	174	66	543
416	138	27	123	16	304
417	332	41	226	32	631
418	233	61	177	36	507
419	176	59	126	38	399
420	96	18	78	18	210
421	53	14	49	12	128
422	48	4	25	8	85
423	50	10	30	5	95
424	102	15	84	6	207
425	47	10	23	2	82
426	99	11	49	5	164
427	71	11	44	8	134
428	149	25	87	14	275
429	45	23	66	15	149
431	44	7	42	10	103
433	150	22	115	13	300
435	126	15	81	6	228
440	133	17	82	9	241
442	230	27	152	27	436
443	87	13	67	15	182
446	70	10	51	3	134
447	79	5	49	10	143
448	68	12	62	1	143
449	137	9	87	12	245
450	56	1	23	3	83
451	77	1	51	13	142
452	49	5	35	5	94
453	84	5	59	6	154
454	170	24	116	11	321

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
455	28	4	17	0	49
456	114	15	85	11	225
457	96	16	55	6	173
458	103	9	52	7	171
459	154	14	100	15	283
461	129	27	92	21	269
462	145	25	126	17	313
463	76	7	53	7	143
464	79	18	56	8	161
465	69	11	52	6	138
466	159	23	120	19	321
467	117	22	77	13	229
Zone 4 Total	**6,870**	**1,284**	**5,102**	**987**	**14,243**

Special Hunts					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
901	3	0	0	0	3
902	11	0	8	1	20
904	1	0	0	0	1
911	7	1	6	0	14
912	0	0	1	0	1
922	10	5	6	0	21
931	6	0	2	1	9
932	1	0	2	1	4
933	0	0	1	0	1
934	0	2	3	1	6
935	0	0	6	1	7
937	0	1	2	0	3
Special Hunts Total	**39**	**9**	**37**	**5**	**90**

GRAND TOTAL	**12,743**	**2,465**	**9,333**	**1,799**	**26,340**

Table 20. Total Deer Harvest by Permit Area, 2004.
Includes all license types, permits, and special hunts.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	1,586	229	954	133	2,902
107	2,277	305	1,245	200	4,027
110	593	147	653	116	1,509
115	2,663	297	1,234	223	4,417
116	249	5	38	3	295
122	567	14	121	14	716
126	587	34	195	21	837
127	145	1	17	2	165
152	152	19	64	11	246
154	2,049	673	2,029	425	5,176
156	1,997	526	1,678	383	4,584
157	3,030	1,069	2,788	719	7,606
159	1,514	462	1,582	313	3,871
167	819	117	435	92	1,463
168	1,889	407	1,391	291	3,978
170	3,233	829	2,586	506	7,154
172	2,147	702	2,215	426	5,490
174	1,596	367	1,137	246	3,346
175	2,319	353	1,365	217	4,254
178	2,756	459	1,709	343	5,267
180	1,927	90	408	40	2,465
181	2,493	430	1,326	241	4,490
183	1,769	436	1,319	256	3,780
197	1,143	115	403	62	1,723
199	130	8	31	3	172
201	69	19	67	14	169
202	281	73	239	49	642
203	103	19	74	26	222
204	696	150	588	129	1,563
205	1,326	339	1,156	285	3,106
206	617	168	629	139	1,553
207	422	106	420	82	1,030
208	272	73	291	83	719
209	622	173	459	152	1,406
210	771	195	673	189	1,828
211	1,408	231	846	136	2,621
214	55	11	39	5	110
221	1,053	468	1,041	414	2,976
222	869	319	713	239	2,140
223	610	216	541	152	1,519
224	157	59	161	26	403
225	1,514	567	1,174	402	3,657
227	1,131	349	883	236	2,599
228	520	139	470	98	1,227
235	96	16	70	15	197
236	1,027	288	924	229	2,468
242	740	335	885	284	2,244
243	1,218	530	1,493	444	3,685
244	2,390	1,026	2,483	803	6,702
245	2,449	932	2,286	710	6,377
246	2,527	1,039	2,459	757	6,782
247	955	381	992	254	2,582
248	739	224	713	188	1,864
249	1,327	619	1,373	481	3,800
251	183	50	111	43	387
283	220	68	253	72	613
284	4,322	1,448	4,082	1,095	10,947

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
285	526	169	536	129	1,360
287	182	54	157	32	425
297	307	54	162	40	563
298	894	198	485	156	1,733
337	567	143	502	109	1,321
338	363	72	219	49	703
339	336	68	213	48	665
341	1,043	263	845	190	2,341
342	781	228	660	161	1,830
343	1,139	293	984	210	2,626
344	607	119	378	71	1,175
345	655	141	461	91	1,348
346	1,237	296	1,090	247	2,870
347	850	271	745	170	2,036
348	974	243	896	208	2,321
349	1,675	396	1,253	283	3,607
401	288	50	249	41	628
402	400	118	439	105	1,062
403	400	101	434	90	1,025
404	780	175	779	148	1,882
405	608	144	599	121	1,472
406	554	175	462	145	1,336
407	683	234	658	219	1,794
408	500	176	473	136	1,285
409	1,621	671	1,598	559	4,449
410	2,177	678	1,710	580	5,145
411	1,938	819	1,642	585	4,984
412	1,394	412	1,237	344	3,387
413	1,289	493	1,197	401	3,380
414	1,452	689	1,387	597	4,125
415	1,056	483	980	350	2,869
416	678	137	520	119	1,454
417	1,192	190	718	145	2,245
418	880	334	791	230	2,235
419	588	214	480	125	1,407
420	433	112	420	127	1,092
421	267	76	264	56	663
422	197	44	128	30	399
423	209	41	146	42	438
424	429	54	250	40	773
425	202	23	78	15	318
426	378	54	206	34	672
427	321	21	161	19	522
428	462	80	257	49	848
429	260	73	224	54	611
431	206	33	144	29	412
433	536	74	350	44	1,004
435	495	61	268	48	872
440	517	56	322	48	943
442	809	109	465	81	1,464
443	319	60	208	56	643
446	302	34	206	16	558
447	291	33	174	23	521
448	371	49	286	29	735
449	526	65	319	58	968
450	236	16	138	16	406
451	379	44	213	40	676

Table 20. (Continued).

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
452	331	67	240	38	676
453	340	25	172	26	563
454	626	94	380	49	1,149
455	82	12	52	3	149
456	480	85	446	54	1,065
457	367	51	215	38	671
458	389	50	196	41	676
459	545	52	312	43	952
461	527	170	480	104	1,281
462	589	121	529	86	1,325
463	245	34	176	33	488
464	292	67	240	37	636
465	307	55	234	39	635
466	607	129	500	130	1,366
467	533	122	430	81	1166
901	12	1	6	0	19
902	93	34	90	39	256
903	0	1	15	4	20
904	9	11	13	1	34
905	5	0	2	0	7
906	5	3	20	3	31
907	1	0	1	0	2
909	10	4	16	3	33
910	0	1	10	7	18
911	35	14	63	8	120
912	0	2	11	7	20
913	1	4	13	2	20
914	22	5	13	3	43
915	1	1	7	2	11
916	0	9	19	4	32
917	23	10	30	3	66
918	0	4	21	4	29
919	0	2	10	1	13
920	0	1	12	3	16
922	34	19	41	14	108
931	10	6	20	7	43
932	2	7	9	3	21
933	0	2	9	3	14
934	0	5	10	7	22
935	0	4	15	6	25
936	0	5	8	2	15
937	0	9	24	4	37
938	0	1	0	1	2
953	4	0	5	2	11
954	0	3	6	2	11
956	4	2	3	1	10
TOTAL	**115,609**	**30,541**	**91,801**	**22,653**	**260,604**

*Includes Camp Ripley data

Table 21. Antlerless Lottery Distribution Report, 2004.

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
116	1 2 **181**	145 36 **181**	3 1 **4**	77 0 **77**	65 35 **100**	**100**	**0.0 %**
122	1 2 3 4 **725**	659 56 9 1 **725**	7 3 3 1 **14**	211 0 0 0 **211**	441 53 6 0 **500**	**500**	**0.0 %**
127	1 2 **125**	116 9 **125**	1 2 **3**	22 0 **22**	93 7 **100**	**100**	**0.0 %**
152	1 2 3 4 **314**	283 26 4 1 **314**	12 1 2 1 **16**	48 0 0 0 **48**	223 25 2 0 **250**	**250**	**0.0 %**
167	1 2 3 4 **2,060**	1781 265 12 2 **2,060**	56 14 3 1 **74**	0 0 0 0 **0**	1,725 251 9 1 **1,986**	**2,000**	**0.7 %**
180	1 2 3 4 **1,559**	1,408 103 45 3 **1,559**	58 2 0 1 **61**	0 0 0 0 **0**	1,350 101 45 2 **1,498**	**1,900**	**21.2 %**
197	1 2 3 4 5 **1,681**	1,513 138 24 4 2 **1,681**	42 14 4 0 0 **60**	21 0 0 0 0 **21**	1,450 124 20 4 2 **1,600**	**1,600**	**0.0 %**
199	1 2 3 **138**	127 10 1 **138**	4 0 1 **5**	0 0 0 **0**	123 10 00 **133**	**150**	**11.3 %**
338 A	1 2 3 **188**	162 24 2 **188**	9 4 0 **13**	25 0 0 **25**	128 20 2 **150**	**150**	**0.0 %**
339 A	1 2 **161**	136 25 **161**	7 1 **8**	3 0 **3**	126 24 **150**	**150**	**0.0 %**
341 A	1 2 3 **423**	414 7 2 **423**	17 4 1 **22**	0 0 0 **0**	397 3 1 **401**	**600**	**33.2 %**
342 A	1 2 **328**	318 10 **328**	15 7 **22**	0 0 **0**	303 3 **306**	**500**	**38.8 %**

Table 21. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
343 A	1 2 3 **300**	291 8 1 **300**	18 3 0 **21**	0 0 0 **0**	273 5 1 **279**	**600**	**53.5 %**
344 A	1 2 **414**	401 13 **414**	37 5 **42**	0 0 **0**	364 8 **372**	**400**	**7.0 %**
345 A	1 2 **264**	256 8 **264**	4 4 **8**	0 0 **0**	252 4 **256**	**400**	**36.0 %**
346 A	1 2 3 **394**	370 23 1 **394**	13 8 0 **21**	0 0 0 **0**	357 15 1 **373**	**800**	**53.4 %**
347 A	1 2 **256**	250 6 **256**	8 3 **11**	0 0 **0**	242 3 **245**	**500**	**51.0 %**
348 A	1 2 **375**	370 5 **375**	12 4 **16**	0 0 **0**	358 1 **359**	**700**	**48.7 %**
349 A	1 2 3 **461**	449 9 3 **461**	16 1 2 **19**	0 0 0 **0**	433 8 1 **442**	**900**	**50.9 %**
417 A	1 2 3 **1,670**	1,609 51 10 **1,670**	66 11 3 **80**	0 0 0 **0**	1,543 40 7 **1,590**	**2,200**	**27.7 %**
417 B	1 2 3 **807**	788 17 2 **807**	38 4 0 **42**	0 0 0 **0**	750 13 2 **765**	**1200**	**36.3 %**
424 A	1 2 3 4 **541**	417 121 2 1 **541**	11 5 2 1 **19**	222 0 0 0 **222**	184 116 0 0 **300**	**300**	**0.0 %**
424 B	1 2 3 4 **317**	296 16 4 1 **317**	9 2 3 1 **15**	2 0 0 0 **2**	285 14 1 0 **300**	**300**	**0.0 %**
425 A	1 2 4 **198**	166 31 1 **198**	6 3 1 **10**	88 0 0 **88**	72 28 0 **100**	**100**	**0.0 %**
425 B	1 2 4 **128**	120 7 1 **128**	7 1 1 **9**	19 0 0 **19**	94 6 0 **100**	**100**	**0.0 %**

Table 21. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
426 A	1 2 3 **386**	362 20 4 **386**	12 2 2 **16**	0 0 0 **0**	350 18 2 **370**	**400**	**7.5 %**
426 B	1 2 3 4 **238**	228 7 2 1 **238**	3 1 0 0 **4**	0 0 0 0 **0**	225 6 2 1 **234**	**300**	**22.0 %**
427 A	1 2 3 4 **442**	211 155 72 4 **442**	19 2 3 1 **25**	192 125 0 0 **317**	0 28 69 3 **100**	**100**	**0.0 %**
427 B	1 2 3 4 **226**	144 71 9 2 **226**	3 3 0 0 **6**	120 0 0 0 **120**	21 68 9 2 **100**	**100**	**0.0 %**
428 A	1 2 3 **545**	489 51 5 **545**	22 4 3 **29**	0 0 0 **0**	467 47 2 **516**	**600**	**14.0 %**
428 B	1 2 3 **383**	363 17 3 **383**	15 4 3 **22**	0 0 0 **0**	348 13 0 **361**	**500**	**27.8 %**
431 A	1 2 3 **274**	190 82 2 **274**	8 3 2 **13**	111 0 0 **111**	71 79 0 **150**	**150**	**0.0 %**
431 B	1 2 **196**	143 53 **196**	4 3 **7**	39 0 **39**	100 50 **150**	**150**	**0.0 %**
433 A	1 2 3 4 **649**	438 205 4 2 **649**	28 11 4 1 **44**	205 0 0 0 **205**	205 194 0 1 **395**	**400**	**0.0 %**
433 B	1 2 3 4 5 **410**	348 54 4 3 1 **410**	7 3 2 2 1 **15**	0 0 0 0 0 **0**	341 51 2 1 0 **395**	**400**	**1.3 %**
435 A	1 2 3 4 **625**	565 55 4 1 **625**	24 14 1 1 **40**	35 0 0 0 **35**	506 41 3 0 **550**	**550**	**0.0 %**
435 B	1 2 **327**	318 9 **327**	9 1 **10**	0 0 **0**	309 8 **317**	**350**	**9.4 %**

Table 21. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
440 A	1 2 3 4 **810**	503 300 6 1 **810**	31 9 5 0 **45**	315 0 0 0 **315**	157 291 1 1 **450**	**450**	**0.0 %**
440 B	1 2 3 4 **274**	247 24 2 1 **274**	10 4 2 1 **17**	0 0 0 0 **0**	237 20 0 0 **257**	**300**	**14.3 %**
442 A	1 2 3 4 **974**	535 368 69 2 **974**	29 7 4 1 **41**	506 27 0 0 **533**	0 334 65 1 **400**	**400**	**0.0 %**
442 B	1 2 3 **538**	372 165 1 **538**	19 5 1 **25**	113 0 0 **113**	240 160 0 **400**	**400**	**0.0 %**
443 A	1 2 3 **422**	252 169 1 **422**	12 3 1 **16**	181 0 0 **181**	59 166 0 **225**	**225**	**0.0 %**
443 B	1 2 4 **253**	193 59 1 **253**	10 3 1 **14**	14 0 0 **14**	169 56 0 **225**	**225**	**0.0 %**
446 A	1 2 3 4 **261**	203 56 1 1 **261**	10 4 1 1 **16**	45 0 0 0 **45**	148 52 0 0 **200**	**200**	**0.0 %**
446 B	1 2 3 **234**	214 18 2 **234**	8 2 2 **12**	22 0 0 **22**	184 16 0 **200**	**200**	**0.0 %**
447 A	1 2 3 4 **336**	248 77 10 1 **336**	15 6 2 1 **24**	112 0 0 0 **112**	121 71 8 0 **200**	**200**	**0.0 %**
447 B	1 2 3 4 **152**	135 13 3 1 **152**	8 2 2 0 **12**	0 0 0 0 **0**	127 11 1 1 **140**	**200**	**30.0 %**

Table 21. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
448 A	1 2 3 **421**	403 16 2 **421**	12 3 2 **17**	0 0 0 **0**	391 13 0 **404**	**500**	**19.2 %**
448 B	1 2 3 **132**	124 5 3 **132**	4 1 3 **8**	0 0 0 **0**	120 4 0 **124**	**300**	**58.7 %**
449 A	1 2 3 4 **493**	459 29 3 1 1 **493**	23 6 2 1 0 **32**	0 0 0 0 1 **1**	436 23 1 0 0 **460**	**575**	**20.0 %**
450 A	1 2 **235**	207 28 **235**	10 8 **18**	0 0 **0**	197 20 **217**	**300**	**27.7 %**
450 B	1 2 **144**	133 11 **144**	4 3 **7**	0 0 **0**	129 8 **137**	**200**	**31.5 %**
451 A	1 2 3 **242**	179 57 6 **242**	9 2 3 **14**	0 0 0 **0**	170 55 3 **228**	**300**	**24.0 %**
451 B	1 2 3 4 **191**	149 39 2 1 **191**	1 3 1 1 **6**	0 0 0 0 **0**	148 36 1 0 **185**	**300**	**38.3 %**
453 A	1 2 3 **261**	213 47 1 **261**	12 7 0 **19**	0 0 0 **0**	201 40 1 **242**	**300**	**19.3 %**
453 B	1 2 3 **138**	123 14 1 **138**	3 1 1 **5**	0 0 0 **0**	120 13 0 **133**	**300**	**55.7 %**
454 A	1 2 3 4 **544**	496 40 7 1 **544**	24 1 3 0 **28**	0 0 0 0 **0**	472 39 4 1 **516**	**700**	**26.3 %**
454 B	1 2 3 **323**	306 14 3 **323**	17 1 2 **20**	3 0 0 **3**	286 13 1 **300**	**300**	**26.3 %**
455 A	1 2 **65**	51 14 **65**	5 0 **5**	5 0 **5**	41 14 **55**	**55**	**0.0 %**
455 B	1 2 **51**	44 7 **51**	1 0 **1**	0 0 **0**	43 7 **50**	**55**	**9.1 %**

Table 21. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
457 A	1 2 **421**	293 128 **421**	23 10 **33**	0 0 **0**	270 118 **388**	**400**	**3.0 %**
457 B	1 2 **256**	201 55 **256**	8 1 **9**	97 0 **97**	96 54 **150**	**150**	**0.0 %**
458 A	1 2 3 **302**	248 51 3 **302**	14 5 3 **22**	0 0 0 **0**	234 46 0 **280**	**400**	**30.0 %**
458 B	1 2 3 **229**	205 23 1 **229**	13 4 1 **18**	11 0 0 **11**	181 19 0 **200**	**200**	**0.0 %**
459 A	1 2 3 4 **533**	513 16 3 1 **533**	15 5 2 1 **23**	0 0 0 0 **0**	498 11 1 0 **510**	**650**	**21.5 %**
459 B	1 2 **367**	359 8 **367**	7 5 **12**	0 0 **0**	352 3 **355**	**450**	**21.1 %**
463 A	1 2 3 **366**	297 68 1 **366**	14 2 1 **17**	0 0 0 **0**	283 66 0 **349**	**350**	**0.3 %**
463 B	1 2 **172**	164 8 **172**	2 0 **2**	0 0 **0**	162 8 **170**	**350**	**51.4 %**
TOTAL		**28,454**	**1,361**	**2,982**	**24,111**	**30,760**	

Table 22. Special Permit Areas for Firearms Hunters, 2004

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	Bonus Permits
901-Rice Lake Nat. Wildlife Refuge	1 2 **43**	38 5 **43**	0 0 **0**	1 0 **1**	37 5 **42**	**40**	**No**
902-St. Croix State Park	1 2 3 **582**	545 36 1 **582**	0 0 0 **0**	30 0 0 **30**	515 36 1 **552**	**550**	**Yes**
903-Savanna Portage State Park	1 2 **24**	21 3 **24**	0 0 **0**	0 0 **0**	21 3 **24**	**25**	**Yes**
904-Gooseberry Falls State Park	1 **22**	22 **22**	0 **0**	0 **0**	22 **22**	**25**	**Yes**
905-Split Rock Lighthouse State Park	1 **24**	24 **24**	0 **0**	0 **0**	24 **24**	**25**	**Yes**
906-Tettegouche State Park	1 2 **62**	59 3 **62**	0 0 **0**	0 0 **0**	59 3 **62**	**125**	**Yes**
907-Scenic State Park	1 2 **24**	18 6 **24**	0 0 **0**	0 0 **0**	18 6 **24**	**30**	**Yes**
908-Lake Bronson State Park	1 **16**	16 **16**	0 **0**	0 **0**	16 **16**	**25**	**Yes**
909-William O'Brien State Park	1 2 **116**	82 34 **116**	0 0 **0**	51 0 **51**	31 34 **65**	**65**	**Yes**
910- Zipple Bay State Park	1 **44**	44 **44**	0 **0**	0 **0**	44 **44**	**55**	**Yes**
911-Wild River State Park	1 2 3 **257**	166 84 7 **257**	0 0 0 **0**	107 0 0 **107**	59 84 7 **150**	**150**	**Yes**
912-Lake Bemidji State Park	1 **23**	23 **23**	0 **0**	0 **0**	23 **23**	**35**	**Yes**
913-Hayes Lake State Park	1 2 **28**	26 2 **28**	0 0 **0**	0 0 **0**	26 2 **28**	**60**	**Yes**
914-Elm Creek Park Reserve	1 2 **157**	94 63 **157**	0 0 **0**	11 0 **11**	83 63 **146**	**145**	**Yes**
915-Lake Rebecca Park Reserve	1 2 **58**	50 8 **58**	0 0 **0**	0 0 **0**	50 8 **58**	**75**	**Yes**
916-Forestville/Mystery Cave State Park	1 2 **85**	84 1 **85**	0 0 **0**	0 0 **0**	84 1 **85**	**110**	**Yes**
917-Frontenac State Park	1 2 **54**	41 13 **54**	0 0 **0**	4 0 **4**	37 13 **50**	**50**	**Yes**
918-Great River Bluffs State Park	1 **7**	7 **7**	0 **0**	0 **0**	7 **7**	**110**	**Yes**

Table 22. (Continued).

Permit Area Numbers	Preference Level	Applications		Unsuccessful	Winners	Permits Available	Bonus Permits
		Total	Rejected				
919-Zumbro Falls Woods SNA	1	14	0	11	3	**10**	**Yes**
	2	8	0	0	8		
		22	**0**	**11**	**11**		
920-Whitewater State Game Refuge	1	36	0	0	36	**75**	**No**
	2	12	0	0	12		
		18	**0**	**0**	**48**		
921-Rydell National Wildlife Refuge	1	4	0	0	4	**20**	**Yes**
		4	**0**	**0**	**4**		
922-Maplewood State Park	1	158	0	141	17	**100**	**Yes**
	2	84	0	0	84		
	3	1	0	0	1		
	4	1	0	0	1		
		244	**0**	**141**	**103**		
923-Glacial Lakes State Park	1	36	0	5	31	**30**	**Yes**
	2	1	0	0	1		
		37	**0**	**5**	**32**		
TOTAL		**1,981**	**0**	**361**	**1,620**	**1,905**	

Table 23. Special Permit Areas for Muzzleloader Hunters, 2004.

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	Bonus Permits
931-Jay Cooke State Park	1 2 3 **166**	157 8 1 **166**	0 0 0 **0**	76 0 0 **76**	81 8 1 **90**	**90**	**Yes (4)**
932-Crow Wing State Park	1 2 4 **140**	74 65 1 **140**	0 0 0 **0**	74 26 0 **100**	0 39 **39**	**40**	**Yes (4)**
933-Afton State Park	1 2 **54**	41 13 **54**	0 0 **0**	14 0 **14**	27 13 **40**	**40**	**Yes (4)**
934-Lake Shetek State Park	1 2 3 **33**	21 11 1 **33**	0 0 0 **0**	7 0 0 **7**	14 11 1 **26**	**25**	**No**
935-Sibley State Park	1 2 **53**	43 10 **53**	0 0 **0**	2 0 **2**	41 10 **51**	**50**	**No**
936-Rice Lake State Park	1 2 3 **45**	30 13 2 **45**	0 0 0 **0**	30 0 0 **30**	0 13 2 **15**	**15**	**Yes (1)**
937-Lake Louise State Park	1 2 3 **59**	51 6 2 **59**	0 0 0 **0**	34 0 0 **34**	17 6 2 **25**	**25**	**Yes (4)**
938-Interstate State Park	1 2 **24**	23 1 **24**	0 0 **0**	9 0 **9**	14 1 **15**	**15**	**Yes (4)**
TOTAL		**574**	**0**	**272**	**301**	**300**	

GRAND TOTAL		**30,436**	**1,361**	**3,343**	**25,732**	**32,665**	

2004 Minnesota Bear Harvest Report

David Garshelis, Karen Noyce, Pam Coy
Forest Wildlife Populations & Research Group

INTRODUCTION

Since 1982, out of concern that the Minnesota bear population was being overharvested, bear harvests have been regulated by a quota on licenses within the primary bear range. Eleven bear management units (BMUs) have been designated (Figure 1), with separate quotas for each. Outside the primary bear range, where bear depredation to crops is a primary concern, license sales are unlimited (no-quota area), and hunters can purchase licenses before or during the bear season. In recent years, hunters in this area could harvest 2 bears. In all areas the bear season runs from September 1 through mid-October.

Corresponding with the change in bear management in 1982, a long-term telemetry study was initiated near the center of the bear range to monitor reproductive rates and to design methods for monitoring population size and structure. All population monitoring and harvest analyses are conducted by the Wildlife Research unit in Grand Rapids. This report summarizes status and trends in harvests and population size and structure.

METHODS

Successful hunters must register their bears at designated registration stations. Harvest data were a simple tally of these registrations, partially corrected for non-compliance. Hunters also were required to submit a tooth from harvested bears (although compliance was only about 70%) from which an age estimate was obtained. In some years they were also required to submit rib samples. Bear population estimates were obtained from a statewide mark–recapture using tetracycline as a biomarker and tooth and rib samples submitted by hunters as the recapture sample. Bear food abundance, which impacts hunting success, was measured qualitatively by DNR and other field personnel. Reproductive rates were obtained by visits to dens of radiocollared female bears after the birth of cubs.

RESULTS

The number of hunting permits that were made available steadily increased through the 1980s and 1990s (Table 1) in response to increasing bear numbers. Permit availability was capped at just over 20,000 from 1999–2003, whereas during this period permit applications declined. Concomitantly, since 2001, a diminishing proportion of permittees bought licenses, resulting in 7 of 11 BMUs being undersubscribed by 2003. Permits were reduced in 2004 in accordance with the diminishing level of interest and hunter complaints of overcrowding, but 7 BMUs remained undersubscribed. Harvests, while variable due to natural food abundance, showed no trend over the past 10 years, averaging about 3400 bears, with hunting success averaging 26%. Harvest sex ratios, uncorrected for misreporting (Table 1, footnote d) averaged 57% male, but varied by BMU (Table 2). In 2004, harvests (Table 2) and hunting success (Table 3) were about average for most BMUs. Generally about 70% of the harvest occurs during the first week of the season (Table 4).

The number of bears killed by hunters each year is largely explained by 2 factors: fall food abundance and hunter numbers (Figure 2). Bear numbers, which increased dramatically until about 1997 but have since stabilized at 20–30,000 (Figure 3), are no longer an important factor in year-to-year variations in harvest. Nevertheless, trends in harvest age structure, specifically an increasing proportion of yearlings in the harvest (Figure 4), suggest ongoing changes in the living age structure. Likewise, reproductive rates appear to have become more variable and synchronous over the past decade (Figure 5).

DISCUSSION

The apparent decline in interest in bear hunting is somewhat enigmatic. Interest seems to have waned as permit availability peaked, and corresponded with complaints by hunters of overcrowding and thus less hunting enjoyment. Another contributing factor may have been the recent availability of electronic licenses, enabling hunters to delay purchase until they assessed bear visitation to their baits and hence likely hunting success.

Despite concern over this trend, harvests have remained high and apparently sufficient to stabilize the bear population at an acceptable level. Bear population estimates, however, have a wide degree of uncertainty, so caution must be exercised in interpreting trends. Moreover, trends in age structure and reproductive rates suggest that despite relative stability in overall population size, the structure continues to change, which may inevitably lead to unpredictable changes in numbers. Continued monitoring of this population and the factors impacting it are hence warranted.

Table 1. Bear permits, licenses, hunters, harvests, and success rates, 1985–2004.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Permit applications	22954	20694	19687	25879	24096	24861	25890	26428	27365	30127	29922	30405	27353	30245	29384	29275	26824	21886	16431	16466
Permits available	4290	4730	4810	5310	5520	6370	7140	7920	8630	9400	11950	12030	11370	18210	20840	20710	20710	20610	20110	16450
Licenses purchased (total) [a]	3948	4188	6054	5643	5901	7094	7757	8485	9224	9826	12448	12414	11440	16737	18355	19304	16510	14639	14409	13669
Quota area [a]	3948	4188	4213	4297	4628	5568	6257	6845	7528	8125	10304	10592	9655	14941	16563	17021	13632	12350	9833	10063
Quota area surplus [a]																	235	209	2554	1356
No-quota area [a]			1841	1346	1273	1526	1500	1640	1696	1701	2144	1822	1785	1796	1792	2283	2643	2080	2022	2238
% Licenses bought [b]																				
Of permits available [b]	92.0	88.5	87.6	80.9	83.8	87.4	87.6	86.4	87.2	86.4	86.2	88.0	84.9	82.0	79.5	82.2	67.0	60.9	61.6	69.4
Of permits issued [b]														84.4	87.2	83.9	69.8	66.3	65.7	68.3
Estimated no. hunters [c]	3700	3900	5600	5100	5500	6600	7200	7900	8600	9100	11600	11500	10300	14500	15900	16800	15500	13700	13500	12800
Harvest	1340	1438	1577	1509	1930	2381	2143	3175	3003	2329	4956	1874	3212	4110	3620	3898	4936	1915	3598	3391
Harvest sex ratio (%M) [d]	53	59	60	58	57	52	59	50	56	62	47	62	55	55	53	58	56	61	58	57
Success rate (%)																				
Total harvest/hunters	36	37	28	30	35	36	30	40	35	26	43	16	31	28	23	23	29[e]	14[e]	26[e]	26[e]
Quota harvest/licenses			33	28	36	35	30	41	34	26	42	15	29	25	20	20	28[e]	14	25	26

[a] Quota area established in 1982. No-quota area established in 1987. Surplus licenses from undersubscribed quota areas sold beginning in 2000; originally open only to unsuccessful permit applicants, but beginning in 2003, open to all. Total licenses = quota + quota surplus + no-quota + military (no permit needed).

[b] Quota licenses bought (including surplus)/permits available, or licenses bought (prior to surplus)/permits issued (permits issued more relevant for years when some areas were undersubscribed; see Table 3).

[c] Number of licensed hunters x percent of license-holders hunting. Percent hunting is based on data from bear hunter surveys conducted during 1981–91, 1998 (86.8%), and 2001(93.9%).

[d] Sex ratio as reported by hunters; hunters classify about 10% of female bears as males, so the actual harvest has a lower %M than shown here. In good food years, the harvest is more male-biased.

[e] Success rates in 2001–2004 were calculated as number of successful hunters/total hunters, rather than bears killed/total hunters, because hunters could take 2 bears (2001: statewide, 4936 bears were taken by 4456 successful hunters; in the quota area, 3859 hunters were successful; 2002: statewide, 1915 bears taken by 1900 successful hunters; all 15 second bears taken in the no-quota area; 2003: statewide, 3598 bears taken by 3556 successful hunters; all 42 second bears taken in the no-quota area; 2004: statewide 3391 bears taken by 3363 successful hunters; all 28 second bears taken in the no-quota area).

Table 2. Minnesota bear harvest tally[a] for 2004 by Bear Management Unit (BMU) and sex compared to harvests during 1998-2003 and record high harvests.

	2004											Record high harvest
BMU	M	(%M)	F	U	Total	**2003**	**2002**	**2001**	**2000**	**1999**	**1998**	(yr)
Quota												
12	98	(59)	67	0	165	174	104	263	186	142	170	263 (01)
13	123	(63)	73	1	197	185	116	241	211	134	216	258 (95)
22	6	(60)	4	0	10	3	7	6	4	10	8	41 (89)
24	105	(51)	101	6*	212	163	101	273	168	257	274	288 (95)
25	301	(56)	237	8*	546	510	328	584	387	443	419	584 (01)
26	182	(57)	137	1	320	303	171	397	284	371	373	513 (95)
31	289	(60)	195	0	484	436	301	697	413	483	544	697 (01)
41	55	(66)	28	0	83	100	51	201	171	92	120	201 (01)
44	150	(53)	132	1	283	444	183	553	556	435	563	643 (95)
45	62	(53)	55	1	118	143	36	178	150	153	170	178 (01)
51	286	(53)	258	0	544	667	300	895	795	739	812	895 (01)
Total	1657	(56)	1287	19	2962	3128	1698	4288	3325	3259	3669	4288 (01)
No Quota[b]												
11	121	(68)	56	0	177	200	112	321	244	65	163	321 (01)
52	134	(53)	117	1	252	270	105	327	329	296	278	382 (93)
Total	255	(60)	173	1	429	470	217	648	573	361	441	678 (95)
State	1912	(57)	1460	6	**3391**	**3598**	**1915**	4936	3898	3620	4110	4956 (95)

[a] Harvest data were obtained from registration slips (submitted by registration stations) and tooth envelopes (submitted by hunters). The following table shows the number of tooth envelopes that had no corresponding registration slip. These bears were apparently registered (tooth envelopes were available only at registration stations), but the slips were lost.

Year	Quota area	No-quota area
1998	49	6
1999	45	4
2000	39	16
2001	56	7
2002	46	7
2003	84	13
2004*	96	39

[b] Some hunters with no-quota licenses hunted in the quota area. Some were drawn for the quota area but received NQ licenses. Others hunted in the wrong area purposefully or out of ignorance. All these are tallied in the area where they actually killed a bear (n=27 in 2001; n=5 in 2002; n=14 in 2003; n=6 in 2004). Otherwise, the tally represents the number of bears killed by hunters who had licenses for the indicated area, even if they killed a bear in another BMU. Typically 2–3% of the harvest is taken outside the BMU in which the hunter was supposed to be hunting.

* Tooth envelopes with no corresponding registration slip were spread among at least 51 different registration stations in 2004. One station in Cook was known to have lost 41 slips; envelopes were received from 28 of these. The remaining 13, without matching tooth envelopes, were allocated to BMU (24 or 25) based on the proportional split among other bears registered at this station. An estimated 43 more bears correspond to slips lost at other stations, although these are not included in this tally.

Table 3. Bear hunting success (%) by BMU, measured as the known harvest (Table 1, excluding second bear) divided by the number of licenses sold, 1998–2004.

BMU	Median success 1998-2003	2004		2003		2002		2001		2000	1999	1998
		% Success	% Taking 2 bears[a]	% Success	% Taking 2 bears[a]	% Success	% Taking 2 bears[a]	% Success	% Taking 2 bears[a]			
Quota	**23**	**26**	**—**	**25**	**—**	**14**	**—**	28	(11)	20	20	25
12	31	33	—	35	—	22	—	44	(17)	32	24	30
13	28	33	—	31	—	19	—	31	(9)	26	17	31
22	7	11	—	4	—	8	—	7	(0)	3	8	6
24	24	27	—	25	—	15	—	28	(8)	15	24	26
25	26	38	—	34	—	23	—	34	(11)	19	24	27
26	31	31	—	29	—	17	—	32	(10)	23	32	38
31	24	33	—	25	—	17	—	34	(15)	19	23	28
41	27	23	—	29	—	14	—	40	(16)	34	14	25
44	22	20	—	26	—	9	—	23	(10)	22	18	25
45	11	12	—	13	—	4	—	13	(7)	9	10	15
51	19	19	—	21	—	9	—	24	(10)	19	18	19
No Quota	**22**	**18**	**(7)**	**21**	**(10)**	**10**	**(7)**	23	(9)	25	20	25
Statewide	**23**	**25**		**25**		**13**	**—**	27	(11)[b]	20	20	25

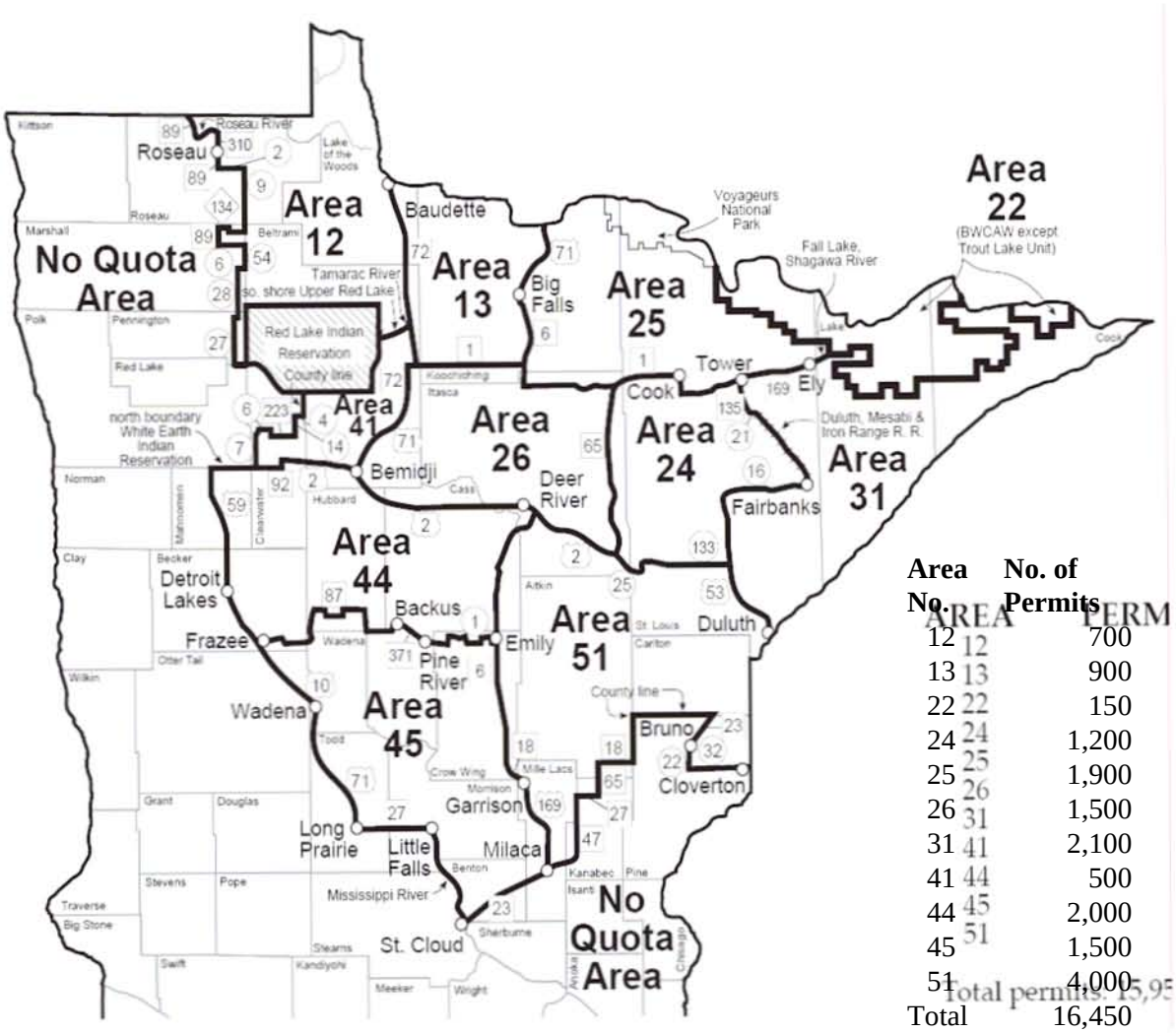
[a] Percent of successful hunters that shot 2 bears; 2nd bear is not included in the calculation of hunting success. The taking of 2 bears was legal statewide in 2001, but only in the no-quota area in 2002, 2003 & 2004.

[b] 480 of 4456 (11%) successful hunters killed 2 bears. Alternately, 2nd bears comprised 10% (480 of 4936) of the total harvest.

Table 4. Cumulative bear harvest (% of total harvest) by date, 1990–2004.

Year	Day of week for opener	Aug 22/23– Aug 31 (9–10 days)	Sep 1 – Sep 7 (7 days)	Sep 8 – Sep 14 (7 days)	Sep 15 – Sep 30 (16 days)
1990	Sat		69	82	96
1991	Sun		64	76	93
1992	Tue		72	86	96
1993	Wed		67	80	94
1994	Thu		67	78	92
1995	Fri		72	87	97
1996	Sun		56	70	87[a]
1997	Mon		76	88	97
1998	Tue		76	87	96
1999	Wed		69	81	95
2000	Wed	57	72	82	96
2001	Wed	67	82	88	98
2002	Sun		57	69	90[a]
2003	Mon		72	84	96
2004	Wed		68	82	95

[a] The large proportion of the harvest taken late in the season in 1996 and 2002 (e.g., >10% in October) was related to the high abundance of food in those years.



Area No.	No. of Permits
12	700
13	900
22	150
24	1,200
25	1,900
26	1,500
31	2,100
41	500
44	2,000
45	1,500
51	4,000
Total	16,450

Figure 1. Bear management units (areas) within the primary bear range in Minnesota.

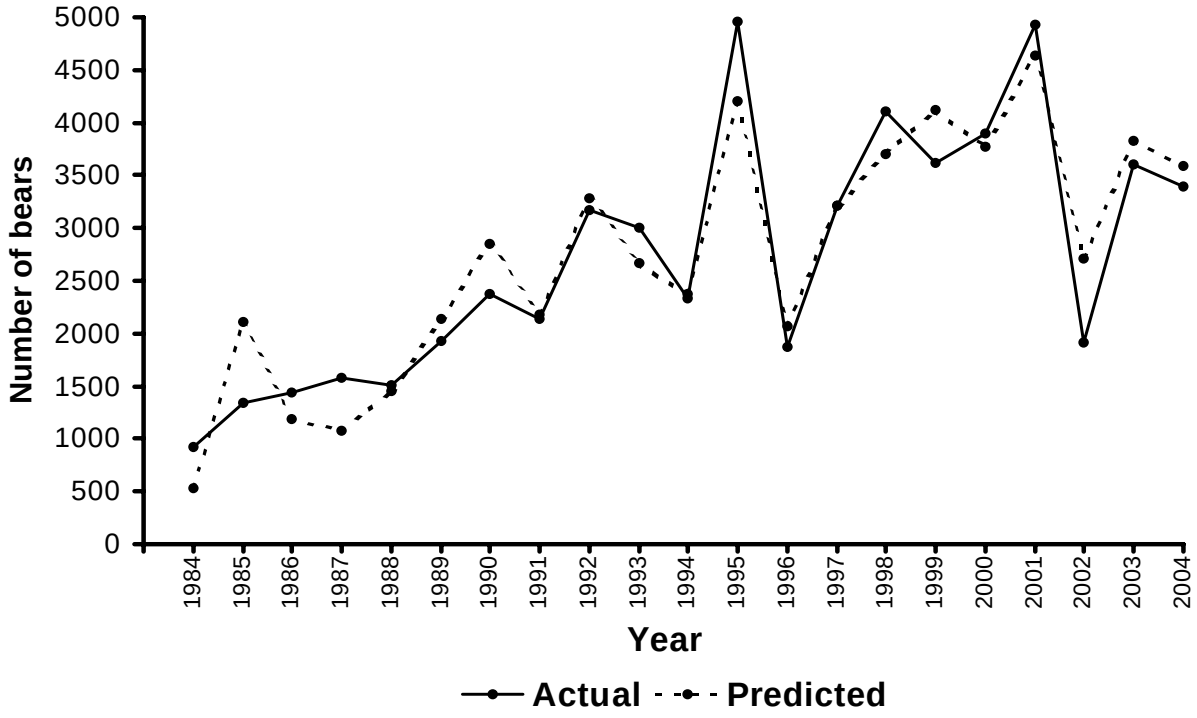


Figure 2. Number of bears killed vs. number predicted to have been killed based on fall food abundance and hunter numbers. Prediction for 2004 from 1984–2003 regression: $R^2 = 0.87$.

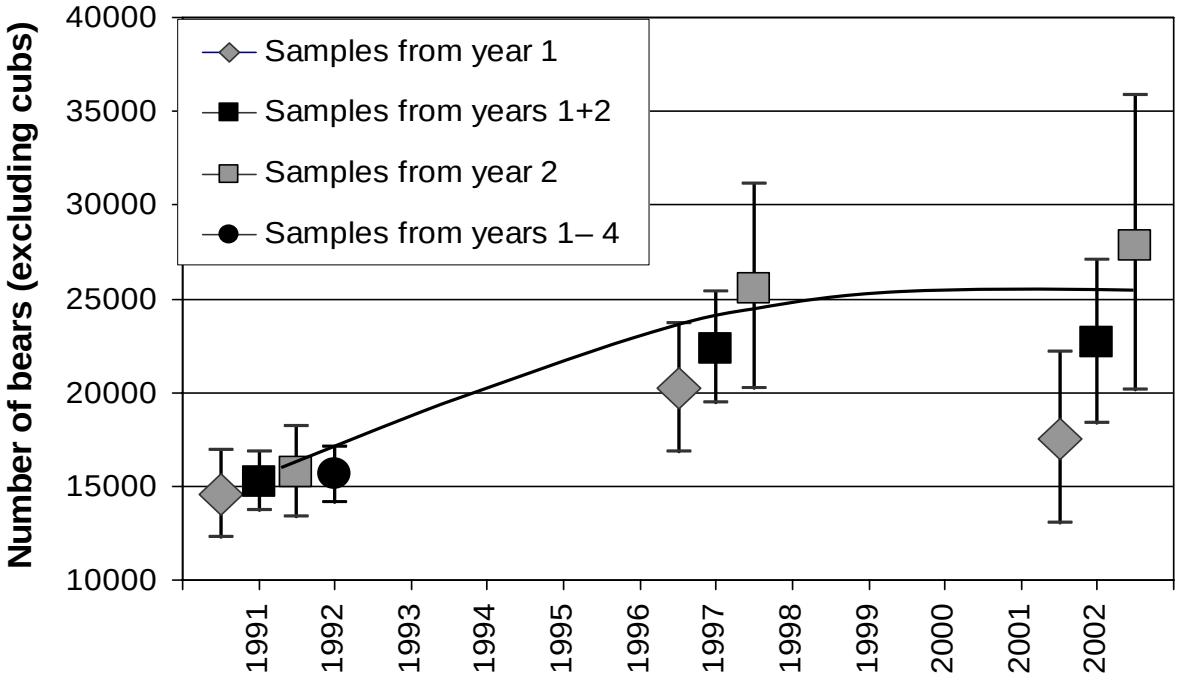


Figure. 3. Population estimates (± 95% CI) from tetracycline-marking. Three clusters of points correspond with different estimates for the years of marking, 1991, 1997 & 2002. Curve approximate population trajectory.

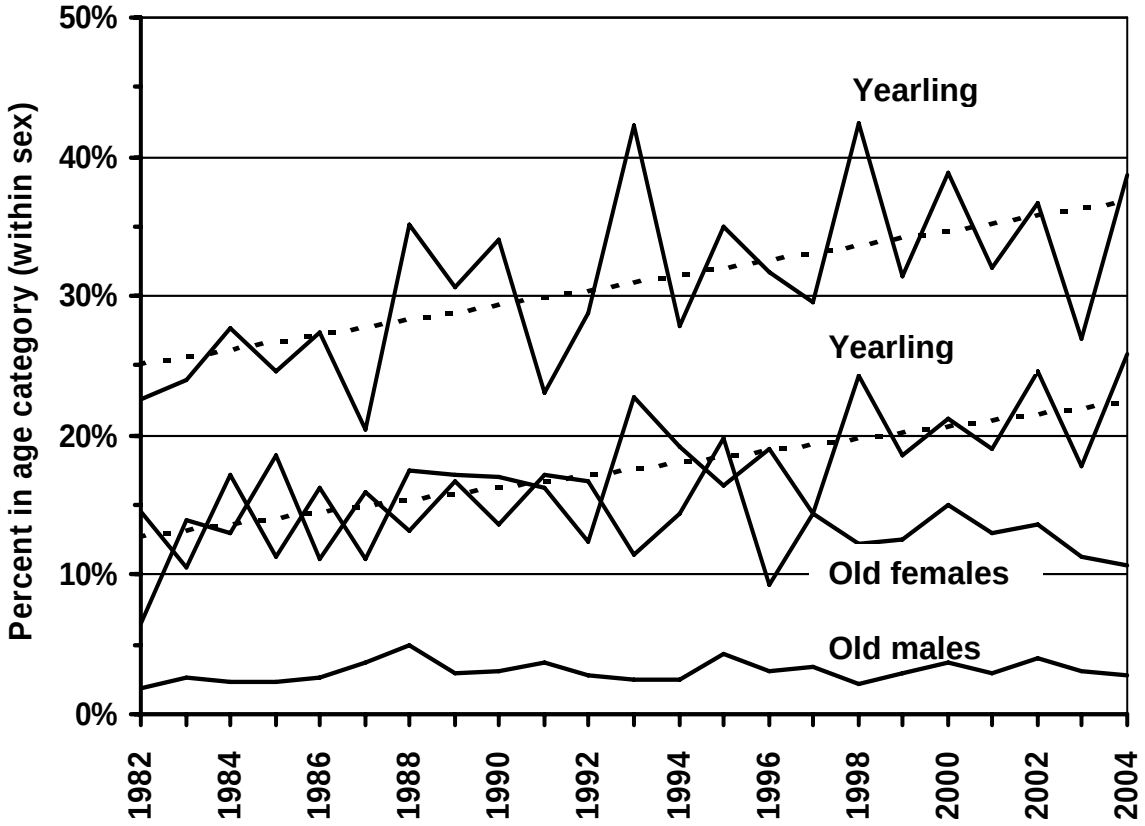


Figure 4. Trends in harvest age structure (linear regressions for yearlings shown with dashed lines).

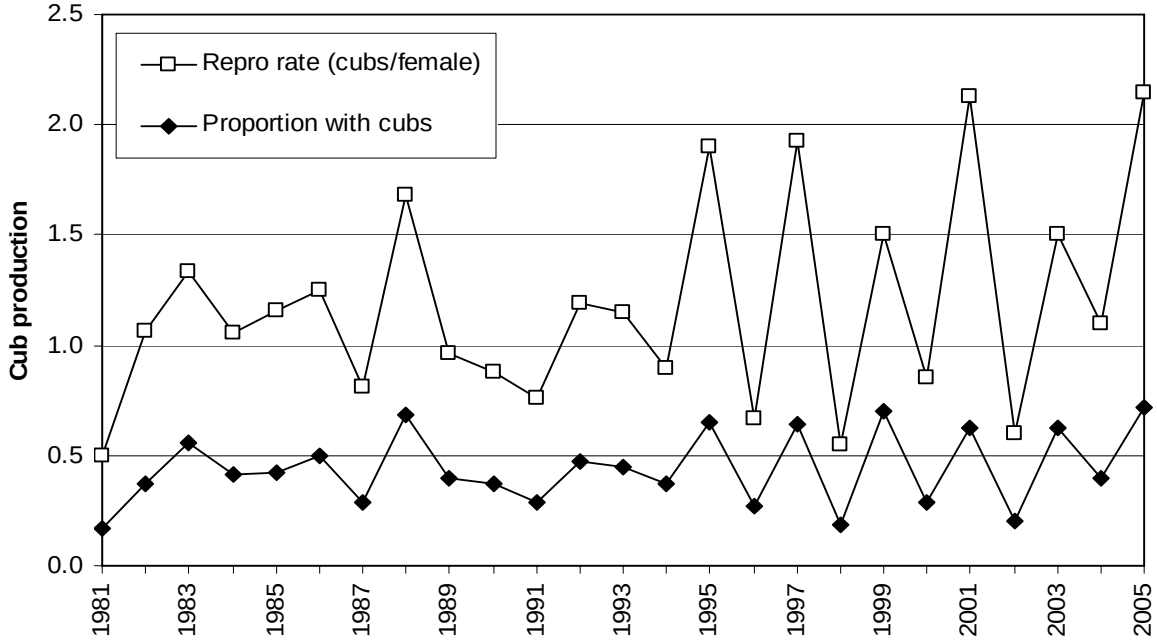


Figure 5. Year-specific cub production of bears near the center of the bear range measured as the proportion of females with cubs during March den visits and cubs (M+F) per 4+ year-old female. Sample sizes vary from 5–25 females monitored per year (mean = 16).

2004 Minnesota Moose Harvest

Mark S. Lenarz, Forest Wildlife Populations & Research Group

INTRODUCTION

Each year, a limited number of permits are issued that allow Minnesota residents to hunt moose. The following report is intended to document the number of hunters applying for permits, the number of permits issued, a hunting party's chance of receiving a permit, hunter success rate, and a breakdown of the harvest by hunting zone (Figure 1). Information on permit numbers and moose harvested by members of the 1854 Authority or Fond du Lac band of Lake Superior Chippewa within the 1854 Ceded Territory is also provided.

METHODS

All successful State hunters are required to register their moose at one of 9 registration stations and provide information on the location where they killed their moose, date of kill, and sex of moose harvested.

RESULTS

In 2004, 212 moose were harvested in northeastern Minnesota. No season was held in northwestern Minnesota. The State of Minnesota licensed 245 hunting parties and hunters killed 151 moose including 127 bulls and 24 cows (Table 1). Data on the number of permits offered, chance of being selected for a permit, hunter success, and sex ratio of the harvest, are also listed (Table 1). The 1854 Authority issued 47 hunter permits and 4 subsistence permits. A total of 22 bulls and 6 cows were killed (including 3 animals taken with subsistence permits). The Fond du Lac band issued a total of 76 permits and hunters killed 31 moose (28 bulls and 3 cows). Two additional cow moose were taken for subsistence purposes.

DISCUSSION

The success rate of State hunters in 2004 was 62% and represents an all time low for moose hunts in northeastern Minnesota (Tables 1 and 2). In 2003, the success rate for State hunters was 64%. The success rates for 1854 Authority and Fond du Lacs hunters were 53% and 41%, respectively.

Table 1. Breakdown by sex, permit numbers, party success, and percent bulls in 2004 moose harvest by State hunters in northeastern Minnesota.

Zone	Bulls	Cows	Total	Permits	Party* Applications	Chances for Permit	% Success	% Bulls
20	4	5	9	25	202	12%	36%	44%
21	4	0	4	5	57	9%	80%	100%
22	3	1	4	5	50	10%	80%	75%
23	2	0	2	4	29	14%	50%	100%
24	7	1	8	9	365	2%	89%	88%
25	5	0	5	8	249	3%	63%	100%
26	1	0	1	7	46	15%	14%	100%
27	1	0	1	5	21	24%	20%	0%
28	5	0	5	5	25	20%	100%	100%
29	6	1	7	7	135	5%	100%	86%
30	4	2	6	7	132	5%	86%	67%
31	12	1	13	14	360	4%	93%	92%
32	2	1	3	5	51	10%	60%	67%
33	3	0	3	5	67	7%	60%	100%
34	3	1	4	7	76	9%	57%	75%
35	3	0	3	5	42	12%	60%	100%
36	7	1	8	14	49	29%	57%	88%
60	4	0	4	4	19	21%	100%	100%
61	7	2	9	11	51	22%	82%	78%
62	8	3	11	16	129	12%	69%	73%
63	4	0	4	7	49	14%	57%	100%
64	1	0	1	19	95	20%	5%	100%
70	2	0	2	3	98	3%	67%	100%
72	3	1	4	5	73	7%	80%	75%
73	3	0	3	8	113	7%	38%	100%
74	5	1	6	9	102	9%	67%	83%
76	5	2	7	9	169	5%	78%	71%
77	5	1	6	8	85	9%	75%	83%
79	6	0	6	6	45	13%	100%	100%
80	2	0	2	3	78	4%	67%	100%
Total	127	24	151	245	3062	8%	62%	84%

* Number of 2, 3, and 4 person parties.

Table 2. Total applicants, moose permits, harvest, and success rates in northeastern and northwestern Minnesota since 1993.

	Northwest				Northeast			
Year	Party* Applicants	Permits	Moose Harvested	Party Success	Party* Applicants	Permits	Moose Harvested	Party Success
1993	6558	446	422	95%	2934	315	264	84%
1994	8208	262	244	93%	3022	189	155	82%
1995	7622	191	171	90%	3181	188	156	83%
1996	2476	39	38	97%	3830	207	156	75%
1997	No Season				3958	198	152	77%
1998	No Season				4157	182	125	69%
1999	No Season				3919	189	136	72%
2000	No Season				No Season			
2001	No Season				3164	182	125	69%
2002	No Season				2580	208	141	68%
2003	No Season				2328	224	144	64%
2004	No Season				3062	245	151	62%

*Number of 2, 3, or 4 person parties

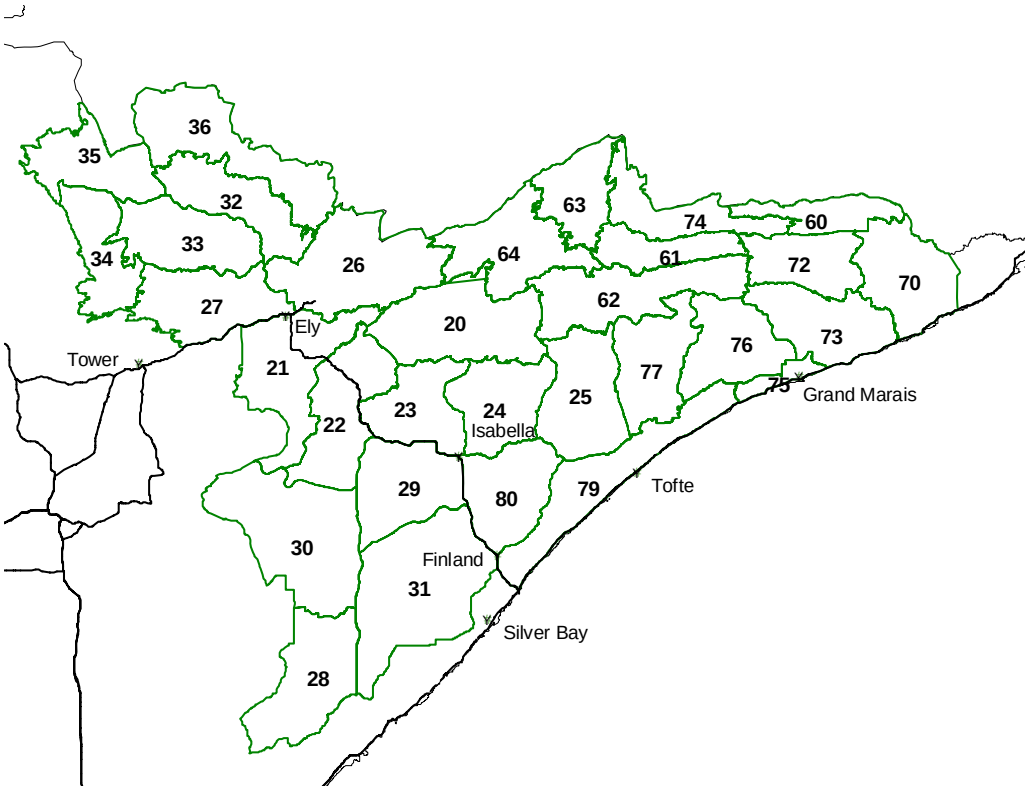


Figure 1. Moose hunting zones in northeastern Minnesota, 2004.

TRAPPING HARVEST STATISTICS

Division of Fish and Wildlife
500 Lafayette Road, Box 20
Saint Paul, MN 55155-4020
(651) 296-3344

2004 Trapper Harvest Survey

Margaret Dexter, Wildlife Surveys & Statistical Unit

INTRODUCTION

The Minnesota Department of Natural Resources, Research Surveys and Statistics unit annually conducts a survey of trapper license holders. Annual harvest estimates from survey data provide the basis for future trapping regulations and season structure.

METHODS

The Research Surveys and Statistics unit requests a list of all active trapper license holders from the Electronic License System database in late February. The sample consisted of all valid Regular, Junior and Non-resident Trapper License holders. For the 2004-05 trapping season there were 5,588 Resident Regular Trappers, 680 Resident Junior Trappers, and 3 Nonresident (MN landowners) Trappers surveyed. Of the 6,271 valid licenses, 6267 had usable addresses for purposes of the survey.

Trappers that returned the survey questionnaire within three weeks were marked returned and eliminated from follow-up mailings. Follow-up mailings were sent to non-respondents at intervals of three weeks. There were three follow-up mailings to non-respondents.

Completed and returned questionnaires were checked for completeness, consistency, and biological practicability. Cards were marked with numeric county codes corresponding to the trapper's written information. Data from each usable card was converted to an electronic database. Data were checked for errors, duplicate responses, and /or missing data. The following is a list of assumptions made in data coding:

1) If an individual checked the box indicating (s)he did not trap, but harvest information was provided, it was assumed that the individual did trap.
2) If a range was given for "number of days trapped" or "number of animals harvested", the median of the range, rounded to the nearest even integer was recorded.
3) If a trapper indicated spending time trapping for a species, but left "number trapped" blank, the # trapped was entered as missing data.
4) If a trapper indicated taking a species, but left "number of days trapped" blank, then "number of days trapped" was recorded as missing data.
5) If more than one county was indicated for "county trapped in most", the first county listed was recorded. However, if the several counties listed were indicated to apply to all species trapped, then counties were recorded in sequential order in relation to species hunted.
6) If "county trapped in most" was left unanswered or not legible, the county was recorded as missing data.

Data from all usable cards were tabulated and statistically analyzed by the St. Paul staff, using SAS statistical analysis software programs.

RESULTS

Attached are results showing survey response rate, estimated number of trappers, estimated take per trapper, and estimated harvest statewide (Tables 1 – 5).

Table 1. Trapper response to mail surveys, 1979-80 through 2004-05.

Year	Number mailed	Number not delivered	Delivered questionnaires completed and returned	
			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	87.2
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
1989-90	3,302	120	2,804	88.1
1990-91	2,294	102	1,875	85.5
1991-92	2,643	149	2,062	82.7
1992-93	2,080	76	1,681	83.9
1993-94	2,828	100	2,194	80.4
1994-95	2,382	76	1,876	81.5
1995-96	3,244	118	2,467	80.3
1996-97	4,071	132	3,017	76.6
1997-98	3,500	96	2,629	77.2
1998-99	3,900	117	2,878	76.4
1999-00	3,110	74	2,313	76.2
2000-01	5,262	146	3,941	77.0
2001-02	5,482	127	4,132	78.6
2002-03	5,655	210	4,148	76.0
2003-04	5,812	197	4,234	75.4
2004-05	6,267	235	4,547	75.4

Table 2. Use of trapper licenses, 1992-93 through 2004-05.

		Return from mail survey	Projections from license sales
1992-93	Trapped	1,438 (85.5%)	4,927
	Did not trap	243 (14.5%)	836
		1,681 (100.0%)	5,763[a]
1993-94	Trapped	1,904 (85.5%)	4,862
	Did not trap	290 (13.2%)	739
		2,194 (100.0%)	5,601[a]
1994-95	Trapped	1,647 (87.8%)	6,054
	Did not trap	228 (12.2%)	841
		1,875 (100.0%)	6,895[a]
1995-96	Trapped	2,053 (83.2%)	4,684
	Did not trap	414 (16.8%)	946
		2,467 (100.0%)	5,630[a]
1996-97	Trapped	2,505 (84.8%)	5,660
	Did not trap	450 (15.2%)	1,015
		2,955 (100.0%)	6,675[a]
1997-98	Trapped	2,310 (88.6%)	6,198
	Did not trap	296 (11.4%)	798
		2606 (100.0%)	6,996[a]
1998-99	Trapped	2,398 (88.6%)	5,541
	Did not trap	480 (16.7%)	1,111
		2,878 (100.0%)	6,652[a]
1999-00	Trapped	1,927 (83.5%)	4,122
	Did not trap	381 (16.5%)	814
		2,308 (100.0%)	4,936[a]
2000-01	Trapped	2,897 (75.9%)	4,051
	Did not trap	920 (24.1%)	1,286
		3,817 (100.0%)	5,337[a]
2001-02	Trapped	3,332 (81.5%)	4,510
	Did not trap	754 (18.5%)	1,024
		4,086 (100.0%)	5,534[a]
2002-03	Trapped	3,344 (80.6%)	4,615
	Did not trap	804 (19.4%)	1,111
		4,148 (100.0%)	5,726[a]
2003-04	Trapped	3,412 (81.1%)	4,737
	Did not trap	793 (18.9%)	1,104
		4,205 (100.0%)	5,841[a]
2004-05	Trapped	3,697 (81.9%)	5,136
	Did not trap	815 (18.1%)	1,135
		4,512 (100.0%)	6,271[a]

[a] excludes duplicates.

Table 3. Estimated number of trappers of various furbearers, 1990-91 through 2004-05.

Estimated number of trappers (thousands)															
	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Muskrat	2	2	3	3	4	3	4	4	3	2	2	2	2	2	2
Mink	3	2	3	3	3	2	3	3	3	2	2	2	2	2	2
Short-tailed weasel	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
Long-tailed weasel	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
Raccoon (Sept 04-Feb 05)	2	2	2	3	3	2	3	3	3	2	2	2	2	2	3
Raccoon (Mar 04-Aug 04)[a]					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Striped skunk	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Eastern spotted skunk	<1	<1	<1	<1	<1	<1	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Badger	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Opossum	1	1	1	1	1	1	1	1	1	<1	<1	1	1	1	1
Red fox (Sept 04Feb 05)	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1
Red fox (Mar 04-Aug 04)[a]					<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Gray fox	<1	<1	<1	<1	<1	<1	n.a.	<1	<1	<1	<1	<1	<1	<1	<1
Coyote	1	1	1	1	1	1	1	1	1	1	<1	1	1	1	1
Beaver (Oct 04- Feb 05)	2	2	2	2	3	2	2	3	3	2	2	2	2	2	2
Beaver (Mar 04- Apr 04)	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1

[a] Raccoon and red fox season changed to year round beginning May, 1994.

Table 4. Estimated take per trapper of various furbearers, 1990-91 through 2004-2005.

	Estimated take per successful trapper reporting that species														
	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Muskrat	24	20	36	64	90	70	55	58	42	46	42	42	35	33	32
Mink	10	8	12	12	12	11	11	11	13	14	12	14	10	9	10
Short-tailed weasel	3	4	5	6	12	10	9	10	7	5	8	10	7	7	6
Long-tailed weasel	3	5	4	4	6	5	5	5	5	5	5	7	4	5	3
Raccoon (Sept 04-Feb 05)	16	14	16	5	20	23	23	24	23	20	20	27	25	22	23
Raccoon (Mar 04Aug 04)[a]					15	15	13	14	15	14	11	19	12	15	12
Striped skunk	12	9	8	9	8	8	10	10	9	8	8	8	8	8	8
Eastern spotted skunk	7	3	2	6	4	5	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Badger	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
Opossum	11	9	10	8	9	9	9	9	11	13	11	8	11	12	14
Red fox (Sept 04-Feb 05)	18	14	11	11	11	9	7	7	5	6	6	6	6	5	4
Red fox (Mar 04-Aug 04)[a]					9	5	4	4	3	4	4	5	5	6	3
Gray fox	3	2	4	3	2	2	n.a.	3	3	2	2	2	2	2	2
Coyote	3	4	5	5	4	5	4	3	3	4	4	4	4	5	4
Beaver (Oct 04-Feb 05)	13	15	13	16	18	14	16	16	16	16	15	18	13	12	13
Beaver (Mar 04 - Apr 04)	19	27	29	29	37	29	31	32	29	27	26	31	26	21	26

[a] Raccoon and red fox season changed to year round beginning May, 1994.

Table 5. Minnesota trapper license sales and estimated annual harvest, 1990-91 through 2004-2005[a]

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Trapper license sales[b]	6,163	5,220	5,763	5,601	6,895	5,630	6,675	6,996	6,652	4,936	5,337	5,534	5,725	5,841	6,271
Estimated harvest[c] (thousands)															
Muskrat	55	45	92	202	355	195	202	194	131	97	86	101	75	69	72
Mink	25	21	32	33	40	26	35	34	36	27	23	29	20	17	21
Short-tailed weasel	1	1	1	2	6	4	4	4	2	2	3	4	3	4	3
Long-tailed weasel	1	1	1	1	3	2	2	2	2	2	1	2	1	2	1
Raccoon (Sept 04- Feb 05)	34	31	34	56	58	53	69	66	64	37	32	60	61	54	57
Raccoon (Mar 04-Aug 04)[f]					1	5	5	5	7	4	4	6	4	5	5
Striped skunk	15	10	7	9	9	8	11	11	9	5	5	7	8	8	9
Eastern spotted skunk[g]	<1	<1	<1	<1	<1	<1	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Badger	1	1	1	1	1	<1	1	1	<1	<1	<1	<1	<1	1	<1
Opossum	6	5	6	5	5	6	6	6	7	6	5	5	8	11	14
Red fox (Sept 04- Feb 05)	33	25	23	22	24	14	13	12	6	7	6	7	8	7	5
Red fox (Mar 04-Aug 04)[f]					1	1	1	1	<1	<1	<1	<1	1	1	<1
Gray fox	1	1	1	1	1	1	n.a.	1	1	1	<1	1	1	1	1
Coyote	3	3	4	4	5	3	3	3	2	2	2	2	4	4	4
Beaver (Oct 04- Feb 05)	24	25	22	29	49	25	38	36	39	31	25	36	24	23	29
Beaver (Mar 04-Apr 04)	20	26	34	32	64	41	48	47	55	36	37	42	34	26	38
Registered harvest															
Otter	88	855	1,368	1,459	2,445	1,435	2,219	2,145	1,946	1,635	1,578	2,301	2,145	2,766	3,450
Lynx[g]	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Bobcat[e]	84	106	168	201	238	134	223	359	103	206	231	250	544	483	631
Fisher	746	528	778	1,159	1,771	942	1,773	2,761	2,695	1,725	1,674	2,119	2,660	2,517	2,552
Marten	1,349	656	1,602	1,438	1,527	1,500	1,625	2,261	2,299	2,423	1,629	1,928	2,839	3,214	3,241

[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. As of March 3, 2005 6,271 trapping licenses were sold in 2004 680 (10.8%) were juvenile licenses and 5,588 (89.1%) were adult licenses 3 (<1%) were Nonresident (MN Landowner) licenses. Duplicate licenses excluded.

[c] Based upon trappers' responses to mail surveys. [d] 1 is any number which rounds to 1. <1 is any number that is <0.5.

[e] Registered harvest for bobcat includes animals taken by hunting. [f] Raccoon and red fox seasons changed to year round beginning May 1994.

[g] Lynx (1984) and Eastern spotted skunk (1996) listed as Special Concern and threatened species (respectively) and are fully protected.

Minnesota Fur Buyers Survey for the 2004- 05 hunting and trapping season.

Conrad Christianson, Wildlife Furbearer / Depredation Program Consultant
Margaret Dexter, Wildlife Surveys & Statistical Unit

INTRODUCTION

Fur buyers are individuals licensed by the State of Minnesota to buy and sell raw fur. They are required to keep complete records of all transactions and activities related to buying, selling, and disposing of raw furs. Each year buyers are sent a questionnaire asking them to submit information regarding the "average" price they paid to trappers for various furbearers the previous season.

METHODS

In February 2005, questionnaires were mailed to the 48 licensed furbuyers in Minnesota. The survey asked them to report the number and type of fur purchased from Minnesota trappers and hunters in 2004-05 and the "average price" paid to those hunters and trappers based on all furs purchased. A total of 32 usable surveys were received, for a return rate of 66.7%.

Calculations of average pelt price for each species (Table 1) were weighted according to the number of pelts purchased by each buyer. Average pelt prices for the past 14 years are summarized in Table 2. Total estimated value of the furbearer harvest to trappers and hunters in 2004-05 was $980,790.00, a decline of 28.2% from 2003-04.

RESULTS

Survey summaries are presented in the following tables.

Table 1. Minnesota fur prices as reported by licensed fur dealers, 2004-05.

Species	Number Buyers	Number Pelts	Minimum Price	Maximum price	Weighted Mean
Muskrat	22	20,535	$ 1.00	$ 2.80	$ 1.90
Mink, female	27	4,347	$ 5.00	$ 14.00	$ 10.22
Mink, male	28	4,789	$ 7.00	$ 16.00	$ 11.34
Raccoon	28	33,855	$ 7.50	$ 13.00	$ 10.49
Red fox	29	2,071	$ 12.00	$ 25.00	$ 17.28
Gray fox	22	249	$ 8.00	$ 20.00	$ 12.58
Coyote	25	2,296	$ 8.58	$ 21.00	$ 15.24
Bobcat	10	153	$ 65.00	$110.00	$ 98.99
River Otter	21	913	$ 45.00	$ 90.00	$ 87.23
Beaver, fall	30	7,100	$ 8.72	$ 30.00	$ 13.62
Beaver, spring	23	8,998	$ 6.75	$ 17.25	$ 13.80
LT weasel	7	43	$ 1.00	$ 5.00	$ 3.05
ST weasel	14	778	$ 1.00	$ 3.00	$ 2.52
Striped skunk	15	77	$ 1.00	$ 5.00	$ 3.95
Badger	22	195	$ 7.26	$ 18.00	$ 12.94
Opossum	16	542	$ 0.50	$ 1.80	$ 1.51
Fisher, male	16	449	$ 25.00	$ 35.00	$ 30.02
Fisher, female	14	372	$ 19.28	$ 32.00	$ 27.47
Marten, male	12	445	$ 22.00	$ 40.00	$ 30.65
Marten, female	12	321	$ 22.00	$ 35.00	$ 27.42
Deer Hides	26	11,074	$ 2.50	$ 5.00	$ 3.95
Bear Hides	6	59	$ 25.00	$ 50.00	$ 46.61

Table 2. Average price per pelt paid to hunters and trappers in Minnesota, 1991-92 through 2004-05.

		Average pelt prices paid hunters and trappers in Minnesota (dollars)												
Species	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Muskrat	1.55	1.35	1.35	1.61	1.53	3.49	2.24	1.11	1.57	1.83	2.32	2.11	2.05	1.90
Mink (male)	27.30	24.74	21.89	14.90	11.75	20.82	13.52	9.83	11.61	11.15	9.34	9.55	11.41	11.34
Mink (female)	17.36	15.02	12.18	11.43	8.56	13.71	9.65	6.11	8.22	7.70	6.76	6.52	7.23	10.22
S.T. Weasel	0.77	1.31	1.72	1.73	1.84	2.32	2.33	1.72	2.16	2.30	2.41	2.63	2.53	2.52
L.T. Weasel	1.21	1.06	1.05	2.05	1.24	3.33	2.67	2.05	2.34	1.80	2.98	1.94	3.34	3.05
Raccoon	8.57	7.29	8.26	9.02	9.40	15.16	13.92	7.25	5.09	8.86	9.53	10.33	11.45	10.49
Striped Skunk	1.47	2.69	3.70	3.52	3.21	2.11	3.18	4.72	4.40	4.79	3.91	5.81	4.66	3.95
Badger	3.51	4.20	4.62	6.12	6.33	8.49	6.53	6.30	7.30	10.15	9.39	13.18	14.23	12.94
Opossum	0.96	0.78	0.89	0.98	0.97	1.04	1.10	0.58	0.96	0.97	1.19	1.22	1.23	1.51
Red Fox	10.81	8.88	10.59	13.42	14.21	14.81	11.23	8.04	11.82	14.45	17.07	22.08	20.02	17.28
Gray Fox	5.22	6.73	6.55	9.69	7.49	9.00	7.69	5.63	7.06	7.52	8.36	9.05	13.64	12.58
Coyote	14.85	15.55	14.68	13.55	10.89	12.25	10.12	5.57	9.42	12.40	13.37	16.12	18.37	15.24
Bobcat	37.44	28.18	43.42	36.36	31.81	32.82	30.39	27.66	24.23	33.09	46.00	71.54	95.90	98.99
Beaver (fall-winter)	9.00	7.10	11.24	13.80	12.56	19.24	16.48	11.40	11.51	14.66	12.74	10.05	12.57	13.62
Beaver (spring)	9.25	7.89	9.41	14.48	10.96	19.14	17.39	14.06	11.02	12.80	12.47	9.99	11.09	13.80
Otter	24.74	29.90	43.14	47.50	38.76	38.75	39.81	34.03	41.41	50.52	46.19	61.16	85.33	87.23
Fisher (male)	21.46	15.73	14.17	19.06	16.17	25.48	31.09	18.92	19.45	20.14	23.18	26.70	27.15	30.02
Fisher (female)	47.93	28.79	28.40	29.93	24.90	34.47	33.65	21.76	19.91	19.01	22.86	25.44	25.71	27.47
Marten (male)	39.59	27.87	35.86	34.07	28.30	34.47	27.82	19.70	24.89	27.56	24.10	28.00	30.09	30.65
Marten (female)	27.24	24.96	29.58	28.34	21.42	29.26	21.79	16.12	21.27	21.25	22.52	27.30	26.70	27.42
Deer Hides		5.67	5.27	7.17	6.92		6.97	6.40	6.32	6.46	2.86	3.48	5.41	3.95
Bear Hides		30.21	46.77	38.93	50.72		37.27	36.23	33.87	39.81	36.10	40.56	41.55	46.61

REGISTERED FURBEARER HARVEST STATISTICS

Forest Wildlife Populations & Research Group
1201 E. Hwy 2
Grand Rapids, MN 55744
(218) 327-4432

REGISTERED FURBEARER HARVEST STATISTICS
2004-05 Report

John Erb, Forest Wildlife Populations & Research Group

INTRODUCTION

Monitoring harvest is an important component of population management for many wildlife populations. For many species, harvest represents a large proportion of overall mortality. Obtaining harvest information can be useful for documenting changes in the distribution and abundance of animals, as well as the effects of changes in harvest seasons, harvest techniques, and habitat. The level of detail or accuracy necessary in harvest information may vary across species, depending on such factors as density, harvest pressure, habitat sensitivity of the species, and reproductive potential.

In Minnesota, detailed harvest information is collected on 4 carnivores – fisher, marten, bobcat, and river otter. These species have lower reproductive potential, naturally occur at low to moderate densities, have comparatively 'restricted' distributions, and/or may be more subject to effects of habitat change. Hence, detailed harvest information is desirable to help ensure sustainable populations. For approximately the past 25 years, such data has been collected for these species.

METHODS

Currently, harvest of these species is allowed in approximately the northern 60% of the state. Furharvesters are required to bring pelts from harvested animals (fisher, pine marten, bobcat, otter) in to fur registration stations within 48 hours of the close of the season. Upon registration, information is collected on the sex, date, and location (township) of the harvested animal, and the pelt is tagged to verify it has been registered.

RESULTS

All harvest summaries are provided in the following tables.

NOTE: This report does not include tribal harvests, or any confiscations.

Table 1. Registered furbearer harvests and total permits[a] issued, 1985-2004.

Year	Bobcat		Fisher		Pine marten		Otter	
	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1985-86	--	119	--	678	746	430	--	559
1986-87	--	160	3,302	1,607	2,171	798	3,198	777
1987-88	--	214	4,952	1,642	3,025	1,363	4,708	1,386
1988-89	--	140	4,419	1,025	3,369	2,072	4,070	922
1989-90	--	129	3,712	1,243	3,074	2,119	3,549	1,294
1990-91	--	84	2,385	746	2,090	1,349	2,199	888
1991-92	--	106	2,360	528	2,020	686	2,282	855
1992-93	--	168	2,420	778	2,050	1,602	3,440	1,368
1993-94	--	201	2,299	1,159	1,925	1,438	2,254	1,459
1994-95	--	238	2,186	1,771	2,477	1,527	2,964	2,445
1995-96	--	134	2,520	942	2,268	1,500	2,579	1,435
1996-97	--	223	1,557	1,773	1,392	1,625	1,623	2,219
1997-98	--	359	2,517	2,761	2,517	2,261	2,543	2,145
1998-99	–	103	2,808	2,695	2,808	2,299	2,749	1,946
1999-00	–	206	1,984	1,725	1,984	2,423	1,918	1,635
2000-01	–	231	3,226	1,674	3,226	1,629	3,116	1,578
2001-02	--	250	--	2,119	--	1,928	--	2,301
2002-03	--	544	--	2,660	--	2,839	--	2,145
2003-04	--	483	--	2,521	--	3,214	--	2,766
2004-05	--	631	--	2,552	--	3,241	--	3,450

[a] Prior request tags and permits were required beginning in 1985 for marten and in 1986 for fisher and otter. No possession tags or prior permits have been required for bobcat, and prior request tags and permits were no longer required for fisher, marten, or otter starting in 2001-02.

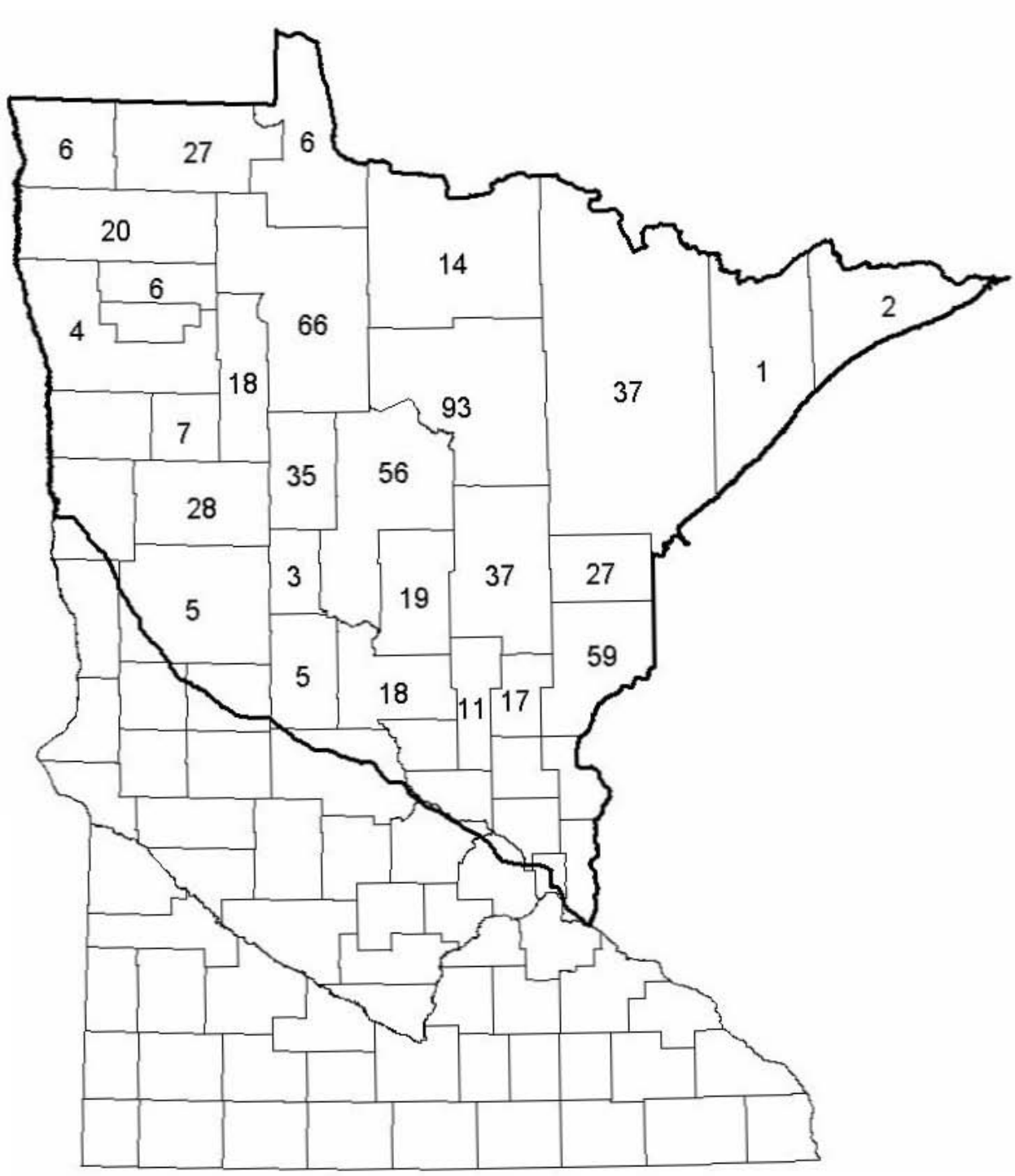


Figure 1. Bobcat harvest by county, 2004-2005.

Table 2. Bobcat harvest by county and sex, 2004-05.

	Sex*			
County	Male	Female	Unknown	Total
Aitkin	18	18	1	37
Becker	15	13	0	28
Beltrami	20	46	0	66
Benton	0	0	0	0
Carlton	11	16	0	27
Cass	27	29	0	56
Chisago	0	0	0	0
Clearwater	11	7	0	18
Clay	0	0	0	0
Cook	1	1	0	2
Crow Wing	10	9	0	19
Hubbard	14	19	2	35
Isanti	0	0	0	0
Itasca	38	54	1	93
Kanabec	10	7	0	17
Kittson	4	2	0	6
Koochiching	4	10	0	14
Lake	0	1	0	1
LOW	3	3	0	6
Mahnomen	4	3	0	7
Marshall	7	13	0	20
Mille Lacs	5	6	0	11
Morrison	8	10	0	18
Ottertail	5	0	0	5
Pennington	3	3	0	6
Pine	25	34	0	59
Polk	3	1	0	4
Red Lake	0	0	0	0
Roseau	12	15	0	27
St. Louis	19	18	0	37
Todd	0	5	0	5
Wadena	2	1	0	3
Unknown	0	4	0	4
Total	279	348	4	631

* Trapper/hunter reported sex ratios in this table are **NOT** adjusted according to results from DNR carcass analyses

Table 3. Comparison of bobcat harvest by county, 1994-95 through 2004-05.

County	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Aitkin	14	12	20	19	6	25	32	20	35	19	37
Becker	7	5	4	10	1	8	6	28	26	19	28
Beltrami	23	6	20	37	7	13	16	26	63	47	66
Benton	0	1	0	0	0	0	0	0	0	0	0
Carlton	8	5	14	18	4	10	12	14	11	20	27
Cass	31	10	22	64	16	24	11	17	59	48	56
Chisago	0	0	0	0	0	0	0	0	1	0	0
Clearwater	7	6	3	14	1	4	0	6	24	19	18
Clay	0	0	0	0	0	0	0	0	0	1	0
Cook	0	2	0	0	0	0	0	0	1	1	2
Crow Wing	8	5	5	8	15	21	13	4	20	15	19
Hubbard	4	2	4	19	1	7	4	10	31	21	35
Isanti	0	0	0	0	0	2	0	0	0	2	0
Itasca	51	20	51	45	10	23	40	33	74	76	93
Kanabec	3	1	6	13	3	4	11	8	10	9	17
Kittson	3	3	1	0	0	7	6	7	5	8	6
Koochiching	6	1	23	14	2	8	11	12	23	25	14
Lake	0	2	0	0	1	0	1	0	0	0	1
LOW	2	0	2	0	2	2	3	0	6	4	6
Mahnomen	0	1	0	2	0	1	1	1	0	3	7
Marshall	4	2	5	28	4	10	2	4	24	14	20
Mille Lacs	5	3	0	0	0	1	2	0	10	4	11
Morrison	5	6	5	1	2	6	8	4	6	14	18
Ottertail	0	0	0	2	0	0	0	1	0	0	5
Pennington	0	0	2	1	0	0	1	1	1	0	6
Pine	26	23	20	23	12	15	21	23	49	44	59
Polk	0	0	1	1	0	0	1	0	2	2	4
Red Lake	0	0	0	0	0	0	2	0	1	1	0
Roseau	9	1	5	15	3	7	12	18	22	28	27
St. Louis	15	7	7	14	10	5	9	7	30	25	37
Todd	0	0	0	0	2	1	0	1	3	6	5
Wadena	0	2	1	5	1	2	0	5	7	8	3
Unknown	7	8	2	4	0	0	4	0	0	0	4
Total	238	134	223	357	103	206	229	250	544	483	631

Table 4. Bobcat harvest by sex and week, 2004-2005 season.

	Sex*			Total	% of Total	Cumulative %
	Male	Female	Unknown			
Nov. 27 – Dec 3	53	49	0	102	16.16	16.16
Dec. 4 – 10	65	74	1	140	22.19	38.35
Dec. 11 – 17	41	56	1	98	15.53	53.88
Dec. 18 – 24	37	43	1	81	12.84	66.72
Dec. 25 – 31	39	57	1	97	15.37	82.09
Jan. 1 – 9**	37	48	0	85	13.47	95.56
Unknown	13	15	0	28	4.44	100%
Total	285	342	4	631	100%	

* Trapper/hunter reported sex ratios in this table are **NOT** adjusted according to results from DNR carcass analyses

** 9-day interval

Table 5. Distribution of bobcat harvest* among takers, 1984-85 thru 2004-05.

Number (%) of Takers	Number Taken					
	1	2	3	4	5	Total Takers
1984-85	116 (65)	39 (22)	13 (7)	9 (5)	1 (1)	178
1985-86	70 (79)	11 (12)	6 (7)	1 (1)	1 (1)	89
1986-87	92 (77)	18 (15)	9 (8)	0 (0)	1 (1)	120
1987-88	104 (72)	23 (16)	10 (7)	6 (4)	2 (1)	145
1988-89	88 (82)	11 (10)	7 (7)	1 (1)	1 (1)	108
1989-90	56 (69)	13 (16)	5 (6)	3 (4)	4 (5)	81
1990-91	47 (77)	9 (15)	1 (2)	4 (7)	0 (0)	61
1991-92	42 (64)	15 (23)	4 (6)	3 (5)	2 (3)	66
1992-93	69 (64)	21 (20)	9 (9)	5 (5)	2 (2)	106
1993-94	90 (70)	17 (13)	13 (10)	7 (5)	2 (2)	201
1994-95	103 (68)	25 (17)	12 (8)	6 (4)	5 (3)	151
1995-96	67 (74)	13 (14)	5 (6)	4 (4)	2 (2)	91
1996-97	115 (73)	28 (18)	85 (5)	2 (1)	4 (3)	157
1997-98	129 (61)	43 (20)	17 (8)	12 (6)	9 (5)	210
1998-99	59 (77)	11 (14)	2 (3)	3 (4)	1 (2)	76
1999-00	113 (76)	21 (14)	10 (6)	4 (3)	1(1)	149
2000-01	99 (69)	23 (16)	7 (5)	5 (4)	9 (6)	143
2001-02	101 (71)	23 (16)	12 (8)	1 (1)	5 (4)	142
2002-03	185 (60)	64 (21)	33 (10)	15 (5)	12 (4)	309
2003-04	171 (64)	40 (15)	25 (10)	20 (7)	11 (4)	267
2004-05	193 (59)	55 (17)	32 (10)	25 (7)	24 (7)	329

* Product of categories above may not equal total harvest due to some unknown name/license numbers

Table 6. Bobcat harvest by method of take, 1982-2004.

Year	Total Harvest[a]	Trapping				Hunting			
		Harvest	% of Total	# Takers[b]	Ave. Take[b]	Harvest	% of Total	# Takers[b]	Ave. Take[b]
1982-83	274	239	87	147	1.6	35	13	23	1.5
1983-84	208	168	81	118	1.4	40	19	32	1.3
1984-85	280	252	90	156	1.6	28	10	22	1.3
1985-86	119	83	70	62	1.3	36	30	27	1.3
1986-87	160	119	74	89	1.3	41	26	31	1.3
1987-88	214	177	83	118	1.5	37	17	26	1.4
1988-89	140	94	67	76	1.2	46	33	32	1.4
1989-90	129	90	70	49	1.8	39	31	28	1.4
1990-91	84	61	73	43	1.4	22	26	17	1.3
1991-92	106	59	56	31	1.9	43	41	33	1.3
1992-93	168	133	80	85	1.6	35	20	23	1.5
1993-94	201	147	73	88	1.7	54	27	41	1.3
1994-95	238	189	80	120	1.6	49	21	31	1.6
1995-96	134	73	55	53	1.4	61	46	38	1.6
1996-97	223	133	60	91	1.5	70	31	53	1.3
1997-98	359	313	87	176	1.8	44	13	34	1.3
1998-99	103	95	92	67	1.4	8	8	8	1
1999-00	206	155	75	114	1.4	51	25	36	1.4
2000-01	231	140	61	85	1.6	91	39	58	1.6
2001-02	250	208	83	116	1.8	42	17	27	1.3
2002-03	544	500	92	279	1.8	44	8	32	1.4
2003-04	483	415	86	230	1.8	68	14	40	1.7
2004-05	631	542	86	279	1.9	89	14	53	1.7

[a] Sum of trapping and hunting harvest may not be equal to total harvest due to incomplete method-of-take data.

[b] Multiplying # takers and average take may not match total harvest due to some incomplete name/license #'s

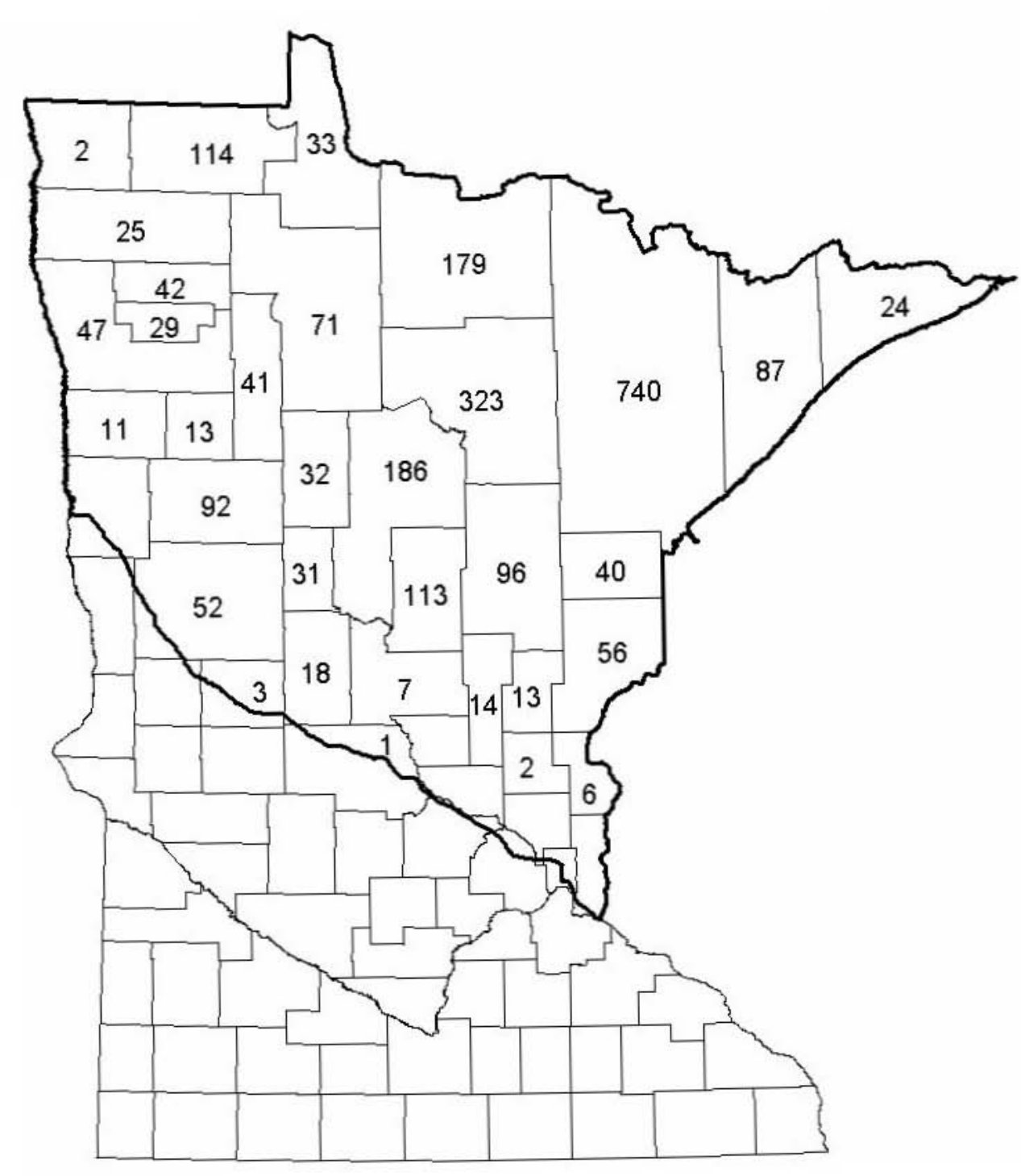


Figure 2. Fisher harvest by county, 2004-2005.

Table 7. Fisher harvest by county and sex, 2004-05 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	53	43	0	96
Anoka	0	0	0	0
Becker	58	34	0	92
Beltrami	36	35	0	71
Benton	0	0	0	0
Carlton	23	17	0	40
Cass	100	86	0	186
Chisago	5	1	0	6
Clearwater	23	18	0	41
Cook	10	14	0	24
Crow Wing	65	48	0	113
Douglas	1	2	0	3
Hubbard	23	8	1	32
Isanti	0	2	0	2
Itasca	168	155	0	323
Kanabec	10	3	0	13
Kittson	1	1	0	2
Koochiching	83	93	3	179
Lake	35	52	0	87
LOW	15	18	0	33
Mahnomen	7	6	0	13
Marshall	16	9	0	25
Mille Lacs	8	6	0	14
Morrison	2	5	0	7
Norman	6	5	0	11
Ottertail	25	27	0	52
Pennington	26	16	0	42
Pine	29	27	0	56
Polk	23	23	1	47
Red Lake	13	16	0	29
Roseau	64	50	0	114
St. Louis	354	386	0	740
Sherburne	0	0	0	0
Stearns	0	1	0	1
Todd	9	9	0	18
Wadena	13	18	0	31
Unknown	7	2	0	9
Total	1,311	1,236	5	2,552

Table 8. Comparison of fisher harvest by county, 1993-94 through 2004-05.

County	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Aitkin	17	23	26	58	86	105	84	68	103	122	124	96
Anoka	0	0	0	0	0	0	0	0	0	0	1	0
Becker	4	22	17	15	25	15	32	42	46	96	88	92
Beltrami	44	103	27	84	140	105	70	60	73	117	74	71
Benton	0	0	0	0	0	0	0	0	0	0	1	0
Carlton	12	14	14	10	45	25	23	27	37	48	42	40
Cass	57	100	58	142	212	133	123	122	134	225	205	186
Chisago	0	0	0	0	0	1	0	3	2	6	5	6
Clearwater	3	13	0	6	31	18	13	15	45	45	52	41
Cook	17	16	12	12	24	26	19	19	33	27	28	24
Crow Wing	23	30	24	32	65	75	53	71	82	106	106	113
Douglas	0	0	0	0	0	0	0	1	0	0	3	3
Hubbard	6	8	15	30	66	38	34	34	64	59	62	32
Isanti	0	0	0	0	0	0	0	0	0	0	0	2
Itasca	177	299	116	291	477	441	248	288	298	354	319	323
Kanabec	0	1	0	6	7	3	11	4	4	19	21	13
Kittson	1	1	0	0	7	3	3	3	7	3	11	2
Koochiching	148	250	92	232	386	369	150	159	156	178	171	179
Lake	82	99	43	60	123	84	46	62	54	72	74	87
LOW	8	43	4	30	59	99	83	71	48	115	78	33
Mahnomen	1	1	0	0	0	0	3	0	12	16	14	13
Marshall	7	9	2	4	21	7	10	27	19	18	21	25
Mille Lacs	0	0	0	6	0	3	0	4	3	16	22	14
Morrison	0	0	0	0	0	0	2	0	1	6	3	7
Norman	0	0	0	0	0	0	6	0	0	1	1	11
Ottertail	0	0	0	0	0	1	0	0	1	12	40	52
Pennington	0	1	0	1	1	0	2	4	4	10	18	42
Pine	17	23	20	24	34	55	36	37	29	44	54	56
Polk	1	2	3	3	6	5	6	8	24	46	65	47
Red Lake	1	0	0	2	5	0	2	18	16	15	16	29
Roseau	68	93	26	89	134	171	111	157	180	106	141	114
St. Louis	463	616	153	604	783	880	546	369	608	734	611	740
Sherburne	0	0	0	0	0	0	0	0	0	0	2	0
Stearns	0	0	0	0	0	0	0	0	0	0	0	1
Todd	0	0	0	0	2	0	0	0	2	5	14	18
Wadena	0	0	1	2	10	5	8	0	31	39	32	31
Unknown	2	5	289	30	12	28	2	1	1	0	2	9
Total	1,159	1,772	942	1,773	2,761	2,695	1,726	1,674	2,117	2,660	2,521	2,552

Table 9. Fisher harvest by date and sex, 2004-05 season.

Date	Sex			Total	% of Known Total	Cumulative %
	Male	Female	Unknown			
Nov. 27	4	2	0	6	0.24	0.24
Nov. 28	55	51	0	106	4.15	4.39
Nov. 29	88	62	1	151	5.92	10.31
Nov. 30	101	79	0	180	7.05	17.36
Dec. 1	109	92	1	202	7.92	25.28
Dec. 2	74	64	0	138	5.41	30.69
Dec. 3	81	81	0	162	6.35	37.04
Dec. 4	110	108	1	219	8.58	45.62
Dec. 5	83	78	1	162	6.35	51.97
Dec. 6	68	62	0	130	5.09	57.06
Dec. 7	67	75	0	142	5.56	62.62
Dec. 8	80	78	1	159	6.23	68.85
Dec. 9	80	68	0	148	5.80	74.65
Dec. 10	71	85	0	156	6.11	80.76
Dec. 11	61	90	0	151	5.92	86.68
Dec. 12	56	62	0	118	4.62	91.3
Unknown	99	123	0	222	8.70	100%
Total	1,287	1,260	5	2,552	100%	

Table 10. Distribution of fisher harvest* among takers, 1993-94 thru 2004-05.

Number (%) of Takers	Number Taken					
	1	2	3	4	5	Total Takers
1993-94	239 (34)	460 (66)	----	----	----	699
1994-95	321 (31)	725 (69)	----	----	----	1,046
1995-96	232 (40)	355 (60)	----	----	----	587
1996-97	321 (31)	726 (69)	----	----	----	1,047
1997-98	351 (23)	1,205 (77)	----	----	----	1,556
1998-99	443 (28)	1,141 (72)	----	----	----	1,584
1999-00	397 (37)	664 (63)	----	----	----	1,061
2000-01	301(38)	251 (31)	129 (16)	121 (15)	----	802
2001-02	294 (33)	271 (31)	146 (17)	168 (19)	----	879
2002-03	336 (35)	234 (25)	138 (15)	117 (12)	123 (13)	948
2003-04	403 (39)	249 (24)	150 (15)	107 (11)	115 (11)	1,024
2004-05	390 (37)	260 (25)	184 (17)	95 (9)	132 (12)	1,061

* Product of categories above may not equal total harvest due to some unknown name/license numbers

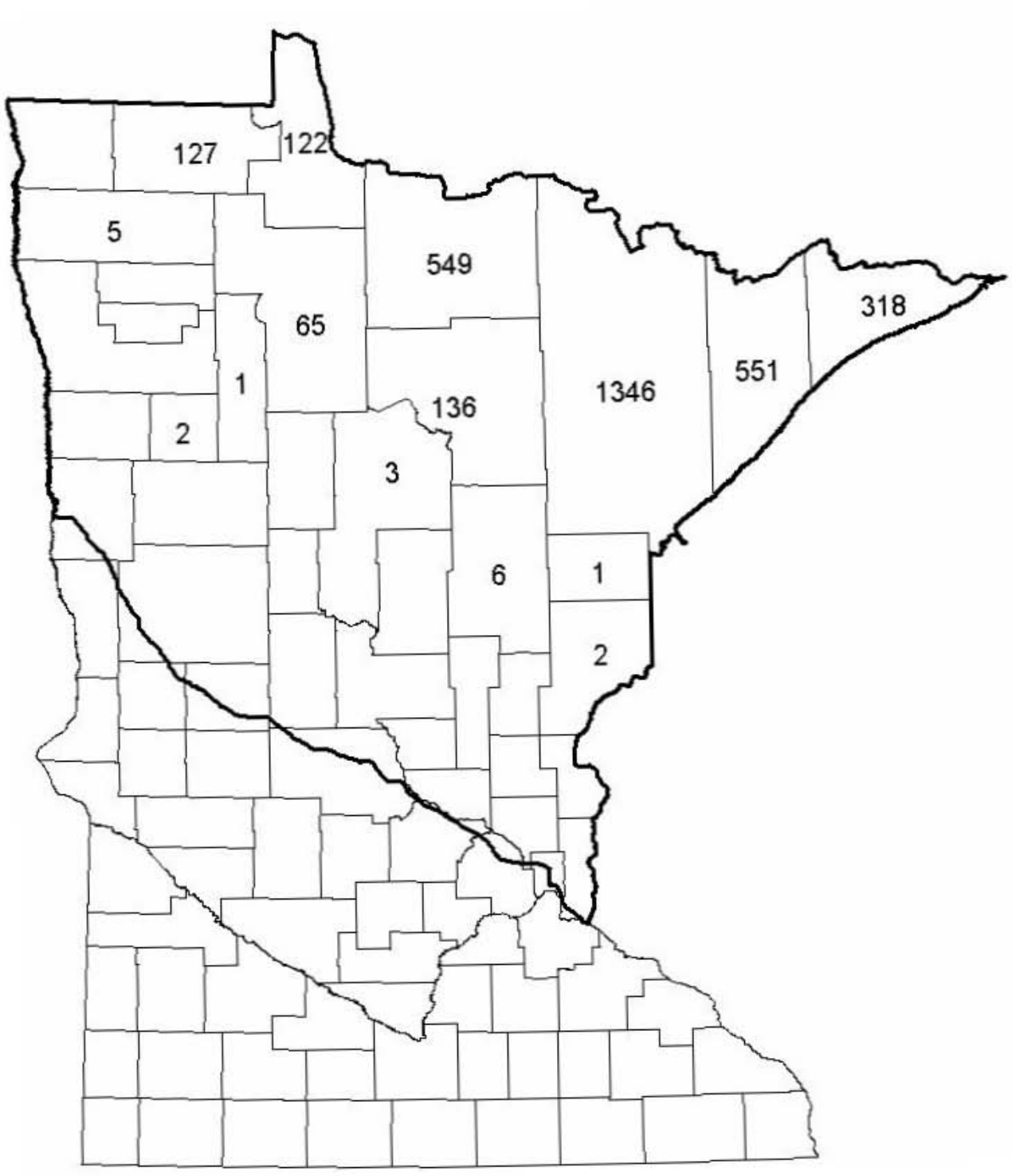


Figure 3. Pine marten harvest by county, 2004-2005.

Table 11. Pine marten harvest by county and sex, 2004-05 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	5	1	0	6
Beltrami	40	25	0	65
Carlton	0	1	0	1
Cass	2	1	0	3
Clearwater	1	0	0	1
Cook	181	132	5	318
Crow Wing	0	0	0	0
Itasca	81	55	0	136
Koochiching	322	224	3	549
Lake	313	238	0	551
Lake of the Woods	86	36	0	122
Mahnomen	2	0	0	2
Marshall	3	2	0	5
Pennington	0	0	0	0
Pine	1	1	0	2
Red Lake	0	0	0	0
Roseau	76	51	0	127
St. Louis	819	526	1	1,346
Unknown	3	4	0	7
Total	1,935	1,297	9	3,241

Table 12. Comparison of pine marten harvest by county in Minnesota, 1993-94 through 2004-05.

County	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Aitkin	0	0	0	0	0	1	2	2	3	5	6	6
Beltrami	0	1	0	2	12	12	37	2	24	30	38	65
Carlton	0	0	0	0	0	3	6	5	11	4	11	1
Cass	0	0	0	0	0	1	2	3	1	3	2	3
Clearwater	0	0	0	0	0	0	0	0	0	0	1	1
Cook	133	164	156	116	195	208	240	190	164	228	411	318
Crow Wing	0	0	0	0	0	0	3	0	0	0	0	0
Itasca	43	41	26	83	164	155	114	82	102	147	141	136
Koochiching	232	313	251	382	597	517	492	306	327	525	534	549
Lake	252	299	252	234	287	284	284	323	243	492	541	551
Lake of the Woods	1	2	0	0	12	26	58	15	13	104	71	122
Mahnomen	0	0	0	0	0	0	0	0	0	0	0	2
Marshall	0	0	0	0	0	0	1	1	1	1	1	5
Pennington	0	0	0	0	0	0	0	2	0	0	0	0
Pine	0	0	0	0	0	0	0	0	0	0	1	2
Red Lake	0	0	0	0	0	0	0	3	0	0	0	0
Roseau	0	0	0	0	0	41	51	98	48	116	104	127
St. Louis	771	707	396	797	980	1,020	1,131	596	991	1,184	1,352	1,346
Unknown	6	0	419	11	14	31	2	1	0	0	0	7
Total	1,438	1,527	1,500	1,625	2,261	2,299	2,423	1,629	1,928	2,839	3,214	3,241

Table 13. Pine marten harvest by date and sex, 2004-05 season.

Date	Sex			Total	% of Known Total	Cumulative %
	Male	Female	Unknown			
Nov. 27	10	3	0	13	0.40	0.4
Nov. 28	182	109	1	292	9.01	9.41
Nov. 29	142	85	1	228	7.03	16.44
Nov. 30	149	82	2	233	7.19	23.63
Dec. 1	171	93	1	265	8.18	31.81
Dec. 2	87	59	1	147	4.54	36.35
Dec. 3	111	83	0	194	5.99	42.34
Dec. 4	171	98	1	270	8.33	50.67
Dec. 5	101	68	2	171	5.28	55.95
Dec. 6	76	58	0	134	4.13	60.08
Dec. 7	99	74	0	173	5.34	65.42
Dec. 8	117	95	0	212	6.54	71.96
Dec. 9	70	68	0	138	4.26	76.22
Dec. 10	105	49	0	154	4.75	80.97
Dec. 11	96	81	0	177	5.46	86.43
Dec. 12	55	47	0	102	3.15	89.58
Unknown	193	145	0	338	10.43	100%
Total	1,935	1,297	9	3,241	100%	

Table 14. Distribution of pine marten harvest* among takers, 1993-94 thru 2004-05.

Number (%) of Takers	Number Taken					
	1	2	3	4	5	Total Takers
1993-94	76 (10)	681 (90)	----	----	----	757
1994-95	165 (20)	681 (80)	----	----	----	846
1995-96	78 (10)	711 (90)	----	----	----	789
1996-97	157 (18)	734 (82)	----	----	----	891
1997-98	161 (13)	1050 (87)	----	----	----	1,211
1998-99	187 (15)	1056 (85)	----	----	----	1,243
1999-00	164 (17)	318 (34)	213 (23)	246 (26)	----	941
2000-01	188 (28)	190 (28)	123 (18)	173 (26)	----	674
2001-02	147 (23)	175 (27)	138 (21)	187 (29)	----	647
2002-03	149 (21)	138 (19)	147 (21)	123 (17)	160 (22)	717
2003-04	126 (15)	135 (16)	159 (19)	170 (20)	265 (31)	855
2004-05	165 (17)	153 (16)	171 (18)	164 (18)	282 (30)	935

- Product of categories above may not equal total harvest due to some unknown name/license numbers

Table 15. Number of takers of different fisher/pine marten combinations, 2004-05. (Combined limit = 5)

Number of Takers	**Number of Pine marten**					
Number of Fisher	0	1	2	3	4	5
0		39	39	41	36	280
1	172	32	29	28	129	
2	114	22	23	101		
3	89	32	63			
4	54	41				
5	132			Total takers of at least 1 fisher or pine marten.		**1,496**

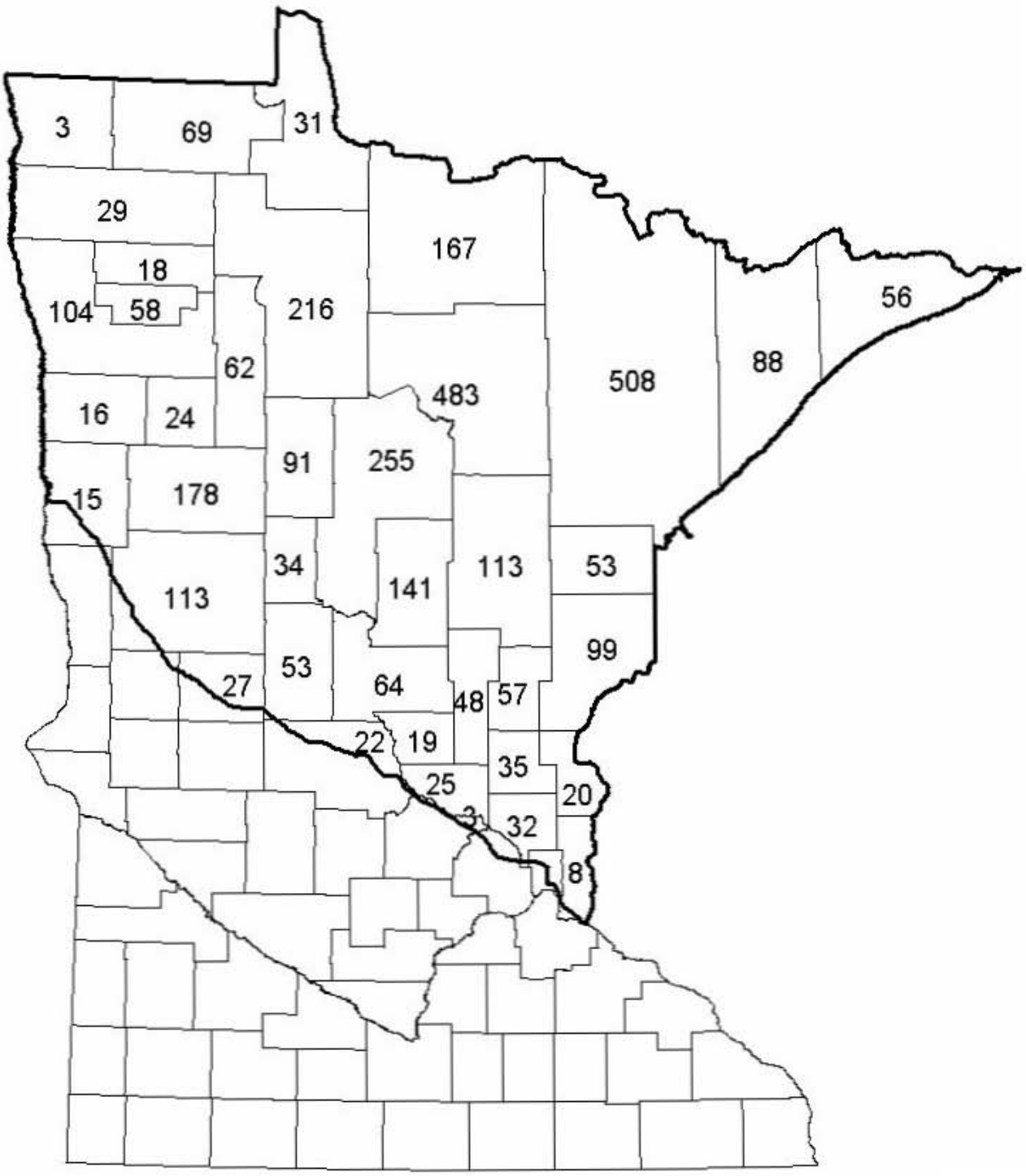


Figure 4. Otter harvest by county, 2004-2005.

Table 16. Otter harvest by county and sex, 2004-05 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	66	47	0	113
Anoka	21	11	0	32
Becker	87	91	0	178
Beltrami	128	88	0	216
Benton	8	11	0	19
Carlton	39	14	0	53
Cass	127	128	0	255
Chisago	12	8	0	20
Clay	9	6	0	15
Clearwater	37	24	1	62
Cook	33	23	0	56
Crow Wing	75	66	0	141
Douglas	16	11	0	27
Hubbard	38	52	1	91
Isanti	18	17	0	35
Itasca	256	225	2	483
Kanabec	30	27	0	57
Kittson	1	2	0	3
Koochiching	105	62	0	167
Lake	43	45	0	88
Lake of the Woods	20	11	0	31
Mahnomen	15	9	0	24
Marshall	12	17	0	29
Mille Lacs	21	27	0	48
Morrison	29	35	0	64
Norman	11	5	0	16
Ottertail	55	58	0	113
Pennington	13	5	0	18
Pine	69	30	0	99
Polk	54	46	4	104
Red Lake	36	22	0	58
Roseau	42	27	0	69
St. Louis	306	202	0	508
Sherburne	13	12	0	25
Stearns	13	9	0	22
Todd	34	19	0	53
Wadena	15	19	0	34
Washington	3	5	0	8
Wright	2	1	0	3
Unknown	10	3	0	13
Total	1,922	1,520	8	3,450

Table 17. Comparison of otter harvest by county, 1993-94 –2004-05.

County	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Aitkin	70	83	57	78	95	87	103	82	100	78	87	113
Anoka	18	20	13	13	21	23	25	14	17	17	13	32
Becker	38	62	64	54	85	30	64	45	125	104	105	178
Beltrami	91	166	59	133	133	81	103	74	108	127	173	216
Benton	4	5	0	1	4	6	2	7	10	6	7	19
Carlton	38	40	17	33	43	39	45	29	33	40	38	53
Cass	114	184	124	184	189	149	109	107	197	189	198	255
Chisago	17	26	9	13	20	20	13	12	26	18	22	20
Clay	0	0	0	2	7	0	7	3	1	7	7	15
Clearwater	27	52	13	57	25	18	29	25	47	61	52	62
Cook	44	53	37	28	29	48	30	26	26	31	41	56
Crow Wing	75	111	59	73	84	81	77	76	96	108	119	141
Douglas	0	0	2	5	7	7	1	1	1	0	12	27
Hubbard	30	43	48	89	95	28	23	19	61	64	70	91
Isanti	19	20	10	17	29	26	20	28	33	33	27	35
Itasca	259	432	245	383	371	339	220	296	337	310	382	483
Kanabec	32	57	13	20	43	24	29	32	56	40	38	57
Kittson	0	1	1	0	2	1	0	0	1	2	3	3
Koochiching	65	147	68	139	109	126	63	107	118	96	164	167
Lake	44	76	33	62	57	77	44	70	57	57	81	88
LOW	1	20	9	16	24	32	36	18	17	21	42	31
Mahnomen	2	21	18	11	6	9	10	10	17	7	23	24
Marshall	7	13	3	14	14	5	8	16	13	35	34	29
Mille Lacs	16	40	7	27	18	17	15	12	20	22	33	48
Morrison	13	34	12	20	25	18	30	17	45	36	46	64
Norman	0	0	4	3	1	0	2	4	3	4	1	16
Ottertail	10	10	19	14	41	29	20	14	51	32	45	113
Pennington	0	0	0	5	6	2	10	2	6	12	16	18
Pine	52	92	59	72	73	62	21	35	42	61	78	99
Polk	28	33	36	45	35	23	21	34	60	63	72	104
Red Lake	5	8	1	9	9	7	8	22	18	27	35	58
Roseau	11	29	3	24	41	40	37	40	36	27	72	69
St. Louis	286	507	148	473	332	421	353	255	453	316	483	508
Sherburne	7	11	10	12	15	13	14	10	11	11	24	25
Stearns	0	0	3	15	15	11	7	5	5	17	13	22
Todd	1	1	19	22	22	23	16	22	24	30	49	53
Wadena	4	3	9	14	8	6	13	3	23	23	35	34
Washington	0	1	0	7	4	6	4	4	4	12	10	8
Wright	0	0	0	0	0	0	0	0	0	1	2	3
Unknown	31	44	203	32	8	12	3	2	3	0	14	13
Totals	1,459	2,445	1,435	2,219	2,145	1,946	1,635	1,578	2,301	2,145	2,766	3,450

Table 18. Otter harvest by sex and week, 2004-05 season.

Interval	Sex			Total Harvest	% of Known Total	Cumulative %
	Male	Female	Unknown			
Oct. 23-29	117	116	0	233	6.75	6.75
Oct. 30 - Nov. 5	327	278	1	606	17.57	24.32
Nov. 6-12	235	177	1	413	11.97	36.29
Nov. 13-19	173	141	0	314	9.10	45.39
Nov. 20-26	196	137	0	333	9.65	55.04
Nov. 27 – Dec. 3	252	177	0	429	12.43	67.47
Dec. 4-10	193	152	4	349	10.12	77.59
Dec. 11-17	105	65	0	170	4.93	82.52
Dec. 18-24	87	59	1	147	4.26	86.78
Dec. 25-31	53	53	0	106	3.07	89.85
Jan. 1-9*	50	37	0	87	2.52	92.37
Unknown	134	128	1	263	7.62	100%
Total	1,922	1,520	8	3,450	100%	

* 9-day interval.

Table 19. Distribution of otter harvest* among takers, 1993-94 thru 2004-05.

Number (%) of Takers	Number Taken				
	1	2	3	4	Total Takers
1993-94	193 (33)	115 (19)	100 (17)	184 (31)	592
1994-95	250 (27)	185 (20)	143 (15)	349 (38)	927
1995-96	183 (31)	134 (23)	88 (15)	180 (31)	585
1996-97	257 (29)	205 (23)	140 (16)	283 (32)	885
1997-98	304 (33)	235 (26)	117 (13)	255 (28)	911
1998-99	263 (32)	183 (23)	139 (17)	226 (28)	811
1999-00	222 (33)	124 (19)	99 (15)	217 (33)	662
2000-01	206 (32)	122 (19)	108 (17)	201 (32)	637
2001-02	147 (23)	175 (27)	138 (21)	187 (29)	647
2002-03	253 (33)	147 (19)	122 (16)	241 (32)	763
2003-04	269 (27)	201 (20)	152 (16)	361 (37)	983
2004-05	302 (25)	235 (19)	182 (15)	498 (41)	1,217

* Product of categories above may not equal total harvest due to some unknown name/license numbers