STATUS OF WILDLIFE POPULATIONS, FALL 2006

(Including 1995-2005 Hunting and Trapping Harvest Statistics)

edited by
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Printed on recycled paper containing a minimum of 30% post-consumer waste and soy-based ink

This report should be cited as follows:

Dexter, M.H., editor. 2006. Status of wildlife populations, fall 2006. Unpub. Rep., Division of Fish and Wildlife, Minn. Dept. Nat. Res., St. Paul, Minnesota. 280 pp.

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

Status of Wildlife Populations, Fall 2006

(Including 1995-2005 Hunting and Trapping Harvest Statistics)

This is the 30th year that the DNR has compiled this booklet; it is primarily an administrative document intended for DNR personnel. (Since 1984 we have also generated a companion volume, *Summaries of Wildlife Research Findings*, containing annual summaries of activities and findings from ongoing research projects in the Wildlife Policy and Research Unit). This publication will be posted on the DNR website and available on CD. In the on-line format links are available 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. There are three additional reports this year regarding harvest statistics from special hunts for Canada geese and Light geese (snow, blue, and Ross').

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

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

Compiling and publishing this report was funded in part under the Federal Aid in Wildlife Restoration Act, Minnesota project W-69-S.

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FARMLAND WILDLIFE POPULATIONS

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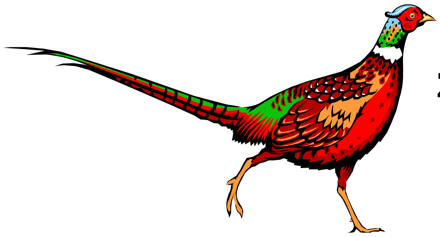

2006 Minnesota August Roadside Survey

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ABSTRACT

Population indices for ring-necked pheasants in 2006 were similar to last year. Gray partridge, cottontail rabbit, white-tailed jackrabbit, and deer indices were also similar to 2005, whereas mourning dove increased by 50%. The winter of 2005-06 was average to mild throughout Minnesota's agricultural zone, and spring weather was warm and dry. Overwinter survival of farmland wildlife in 2006 was probably above average, and reproductive success was moderate.

Although the pheasant index (113.8 birds/100 mi) was similar to last year, it was 75% above the 10-year average, but remained 58% 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). Adult pheasants indices increased from 2005, which reflects improved overwinter survival from last year, whereas reproductive success was similar to last year. Overall, the size of the fall population will be close to 2005 levels. The best opportunity for harvesting pheasants appears to be in the Southwest region, although good opportunities will likely also be available in the West Central and Central regions.

The gray partridge index was similar to last year, 43% below the 10-year mean, and 58% below the long-term average. No significant changes were observed at the regional level. The number of adults observed was similar to last year, but broods/adult decreased in 2006. Gray partridge counts were highest in the Southwest region.

The cottontail rabbit index was similar to last year, increased from the 10-year average, and was similar to the long-term average. Counts of cottontail rabbits were highest in the Southwest, Central, Southeast, and South Central regions. The jackrabbit index also held steady in 2006. The statewide index was also similar to the 10-year average, but was 86% 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 Southwest region.

The number of mourning doves observed in 2006 increased 50% from last year, 37% above the 10-year average, and was similar to the long-term average. Counts increased significantly in 5 of 7 regions.

INTRODUCTION

This report is a summary of the 2006 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 170 25-mile routes (1-4 routes/county); 151 routes are located in the ring-necked pheasant range.

Observers drove each route in the early morning at 15-20 miles/hour 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 <u>should be interpreted cautiously</u>.

ACKNOWLEDGMENTS

I thank all cooperators for their efforts in completing routes in 2006, without their help the survey would not be possible. Tonya Klinkner provided assistance with data entry. 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.

2005-2006 Weather Summary

The severity of the winter of 2005-06 was moderate to mild throughout most of the pheasant range in Minnesota (the fifth consecutive mild winter). The winter started harshly with continuous snow cover through most of December (MCWG, http://climate.umn.edu/doc/snowmap.htm). However, a warm January (mean temperature 17 degrees above the long-term average; MCWG, http://climate.umn.edu/cawap/monsum/ monsum.asp) eliminated most snow from the southern pheasant range, whereas deep snow persisted in the northern half of Minnesota including the northern pheasant range. Northwestern Minnesota retained deep snow through the end of March. Temperature was above average statewide in April, setting the stage for conditions conducive to good wildlife production. Spring weather in May and June was generally warmer and drier than normal. One untimely bought of cold, wet weather occurred June 9-11, immediately following the normal peak of Minnesota's pheasant hatch. Overwinter survival of farmland wildlife was probably above average; reproductive success was likely average due to generally warm, dry conditions in May and June and continuing through the summer.

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 over 650,000 acres of habitat are protected as Wildlife Management Areas (WMA) and Waterfowl Protection Areas. Within the pheasant range, protected grasslands account for about 6.1% of the landscape (range: 2.9-10.5%; Table 1).

Farm programs make up the largest portion of protected grasslands in the state. Sign-up for the Minnesota CREP II began June 2005 targeting enrollment of up to 120,000 new acres of environmentally sensitive cropland 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 CRP and CREP II, the expiration of a large proportion of existing CRP contracts beginning in 2007 is still a major concern for future wildlife populations. Re-enrollment and extension opportunities for CRP contracts expiring from 2007 to 2010, announced this year, may capture many of the contracts that will expire starting in 2007.

The MNDNR continues to expand the habitat base through accelerated WMA acquisition. In addition the Working Lands Initiative will attempt to protect and expand large wetland-grassland complexes in 12 counties in western Minnesota.

Survey Conditions

Cooperators completed 170 routes in 2006; one route in Washington County was conducted, but the data were not received in time to include in this report. Weather conditions during the survey ranged from excellent (calm, heavy dew, clear sky) to medium (light dew and overcast skies). Medium-to-heavy dew conditions were present at the start of 96% of the survey routes, which was better than 2005 (91%) and the 7-year average (91%). Clear skies (<30% cloud cover) were present at the start of 89% of routes, with wind speeds <4 mph recorded for 76% of routes. The survey period was extended from July 27th to August 17th to allow all routes to be completed.

Ring-Necked Pheasant

The average number of pheasants observed per 100 miles was similar to 2005 and 75% above the 10-year average (Table 2; Figure 2A). The pheasant index was similar to the long-term average (Table

2), but remained below the benchmark years of 1955-64 by 58%. Total pheasants observed per 100 miles ranged from 29.8 in the Southeast to 242.2 in the Southwest (Table 3, Figure 5). Changes from last year were not significant in any region (Table 3).

The range-wide hen index (hens/100 mi) increased 21% (95% CI: 7-35%) from last year (Table 2), and varied from 5.2 hens/100 miles in the Southeast to 41.2 hens/100 miles in the Southwest. The cock index also increased this year, up 49% (95% CI: 26-72%) from 2005 (Table 2). The 2006 hen:cock ratio was 1.6 compared to 2.0 in 2005 and 1.3 in 2004. Given the above-average fall population in 2005 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 study, indicated unusually high breeding pheasant populations, with a 95% increase in hen indices from 2005 (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 27.

The number of pheasant broods observed per 100 miles increased 13% from last year, 77% from the 10-year average, and 35% from the long-term average (Table 2). The brood index continues to remain below the benchmark years (1955-64). Regional brood indices ranged from 5.2 broods/100 miles in the Southeast to 37.8 broods/100 miles in the Southwest. Average brood size in 2006 (4.8 ± 0.1 [SE] chicks/brood) was similar to last year (5.0 ± 0.1 [SE] chicks/brood), the 10-year mean (5.0 chicks/brood), but below the long-term average (5.6 chicks/brood; Table 2). The median hatch date for pheasants was June 8 (n = 663), the same as last year and 1 day 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 8.2 weeks (range: 1-16 wks).

A high range-wide pheasant index was expected given the mild winter and warm, dry weather during the reproductive season. The combination of relatively high hen numbers and average reproductive success led to a large pheasant index for 2006. In addition the increase in the cock index indicates higher than average carryover from the 2005 reproductive season. Overall, the size of the fall population will be similar to 2005 levels. The best opportunity for harvesting pheasants appears to be in the Southwest region, although good opportunities will likely also be available in the West Central and Central regions.

Gray Partridge

Rangewide, the gray partridge index (6.3 partridge/100 miles) was similar to last year. However, the 2006 index was 43% below the 10-year average and 58% 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 28.6/100 miles in the Southwest (Table 3, Figure 6). There were no significant regional changes from last year (Table 3).

The number of adults observed per 100 miles was similar to last year, but 30% below the 10-year mean and 45% below the long-term average (Table 2). The proportion of adult partridge observed with broods (28%) decreased from 2005 (32%), the 10-year average (34%), and long-term average (33%). Average brood size in 2006 (7.5 chicks/brood) was larger than in 2005 (7.0 chicks/brood), but smaller than the 10-year average (7.9 chicks/brood) and the long-term average (8.9 chicks/brood). Total broods observed per 100 miles were similar to 2005, but 45% below the 10-year average, and 55% below the long-term average (Table 2). The median hatch date was June 26 (n = 24), which was 16 days later compared to 2005 and 7 days later than the 10-year average.

Conversion of diversified agricultural practices to more intense land-use with fewer haylands, pastures, small grain fields, and hedgerows have reduced the amount of suitable habitat for the gray partridge in Minnesota. The late median hatch date this year might indicate more renesting, possibly due to a short period of stormy weather during the nesting season. 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. Clutches resulting from renesting can be smaller than initial nest attempts. The Southwest region offers the best opportunity for harvesting gray partridge in 2006.

Cottontail Rabbit And White-Tailed Jackrabbit

The eastern cottontail rabbit index (7.2 rabbits/100 mi) was similar to last year, increased 19% from the 10-year average, and was similar to the long-term average (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 1.7 rabbits/100 miles in the Northwest to 10.9 rabbits/100 miles in the Southwest (Figure 7). The best opportunities for harvesting cottontail rabbits are in the Southwest, Central, Southeast, and South Central regions.

The index of white-tailed jackrabbits held steady in 2006. The statewide index (0.3 rabbits/100 mi) was also similar to the 10-year average (0.5), but remained 86% (95% CI: 72-100%) 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 Southwest region (Table 3, Figure 8). However, 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 (15.0 deer/100 mi) was comparable to last year and the 10-year average, and was 50% above the long-term average (1974-05; Table 2, Figure 4A). There were no significant regional changes from 2005. 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 2006 increased 50% from last year, 37% from the 10-year average, and was similar to the long-term average (Table 2, Figure 4B). The mourning dove index ranged from 136.5 doves/100 miles in the Northwest region to 533.4 doves/100 miles in the Southwest. Significant increases in dove counts were detected in all regions but the South Central and Southeast regions (Table 3). The number of mourning doves heard along U.S. Fish and Wildlife Service call-count survey (CCS) routes ($n = 8$) in Minnesota were similar to last year. Trend analyses indicated the number of mourning doves heard along the CCS routes declined 5.2% per year (90% CI: -10.2 to -0.3%) during 1997-2006 and 1.8% per year (90% CI: -3.3 to -0.3%) during 1966-2006 (Dolton and Rau 2006). In fall 2004, Minnesota held its first modern dove hunting season.

Other Species

Notable incidental sightings: 1 badger (Swift County), 1 bald eagle (Polk County), 2 Cooper's hawks (LeSueur County), 4 coyotes (Goodhue, Kandiyohi, Pine, and Roseau Counties), 6 elk (Kittson County), 1 fallow deer (Cottonwood County), 1 gray fox (Chisago County), 1 great gray owl (Marshall County), 4 green heron (Dodge and Polk Counties), 1 prairie chicken (Clay County), 3 red fox (Chisago and Wilkin County), 9 ruffed grouse (Lake of the Woods, Marshall, and Red Lake Counties), 215 sandhill crane (14 counties), 5 sharp-tailed grouse (Pennington County), 6 striped skunk (Dodge, Goodhue, Polk, and Wilkin Counties), 6 trumpeter swan (Brown, Douglas, and Otter Tail Counties), 248 wild turkeys and 93 turkey poults (24 counties).

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Dolton, D. D. and R. D. Rau. 2006. Mourning dove population status, 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA.

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Table 1. Abundance (total acres) and density (acres/mi^2) of undisturbed grassland habitat within pheasant range, 2006[a].

	Cropland Retirement									Density
AGREG	CRP	CREP	RIM	RIM-WRP	WRP	USFWS[c]	MNDNR[d]	Total	%	(ac/mi^2)
WC[b]	367,599	37,379	17,079	822	18,215	169,791	100,082	710,967	10.5	67.0
SW	125,446	22,040	12,214	579	766	15,307	51,182	227,533	6.0	38.5
C	141,425	14,490	17,028	714	2,976	83,257	44,480	304,370	5.0	32.2
SC	94,972	26,557	11,813	3,730	8,725	7,114	29,511	182,421	4.5	28.9
SE	92,132	0	5,554	554	620	18,438	46,883	164,181	4.4	28.4
EC	5,219	0	1,265	0	4	4,548	83,221	94,257	2.9	18.8
Total	826,793	100,465	64,953	6,398	31,306	298,456	355,358	1,683,729	6.1	39.1

[a] Unpublished data, Tabor Hoek, BWSR, 22 August 2006.

[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, 1955-2006.

Species / Subgroup	Change from 2005[a]					Change from 10-year average[b]				Change from long-term average[c]			
	n	2005	2006	%	95% CI	*n*	1996-05	%	95% CI	*n*	LTA	%	95% CI
Ring-necked pheasant													
Total pheasants	148	101.5	113.8	12	±14	146	65.6	75	±26	145	103.5	11	±19
Cocks		7.4	11.0	49	±23		5.8	92	±30		11.7	-5	±17
Hens		14.5	17.6	21	±14		9.4	89	±26		14.9	18	±20
Broods		15.8	17.9	13	±13		10.1	77	±24		13.3	35	±22
Chicks per brood		5.0	4.8	-5			5.0	-5			5.6	-15	
Broods per 100 hens		109.0	101.7	-7			109.4	-7			101.6	0	
Median hatch date		Jun 08	Jun 08				Jun 07						
Gray partridge													
Total partridge	167	7.7	6.3	-18	±52	165	11.2	-43	±30	145	17.2	-58	±21
Adults		2.4	2.1	-14	±37		3.0	-30	±23		4.3	-45	±21
Broods		0.8	0.6	-25	±53		1.0	-45	±31		1.5	-55	±23
Chicks per brood		7.0	7.5	7			7.9	-5			8.9	-17	
Broods per 100 adults		32.0	27.9	-13			34.1	-18			33.3	-16	
Median hatch date		Jun 10	Jun 26				Jun 19						
Eastern cottontail	167	7.0	7.2	4	±22	165	6.1	19	±19	145	6.8	17	±20
White-tailed jackrabbit	167	0.5	0.3	-40	±54	165	0.5	-37	±35	145	2.0	-86	±14
White-tailed deer	167	14.3	15.0	4	±20	165	13.0	16.1	±22	148	6.1	50	±25
Mourning dove	167	194.0	291.1	50	±20	165	213.3	37	±18	145	278.1	12	±18

[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 = 1955-2005, except for deer = 1974-2005. 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 $\geq$40 years; estimates for deer based on routes surveyed $\geq$25 years.

Table 3. Regional trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2006.

Region / Species	Change from 2005[a]					Change from 10-year average[b]				Change from long-term average[c]			
	n	2005	2006	%	95% CI	*n*	1996-05	%	95% CI	*n*	LTA	%	95% CI
Northwest[d]													
Gray partridge	19	0.0	0.0			19	0.0	0		19	4.3	-100	±71
Eastern cottontail		0.8	1.7	100	±394		0.9	86	±350		0.9	83	±314
White-tailed jackrabbit		1.1	0.4	-61	±139		0.6	-27	±115		0.8	-45	±88
White-tailed deer		52.8	60.4	14	±35		35.9	68	±56		25.8	134	±91
Mourning dove		57.7	136.5	137	±128		81.3	68	±81		130.4	5	±54
West Central													
Ring-necked pheasant	36	93.1	113.3	22	±30	34	47.6	151	±81	35	104.9	11	±41
Gray partridge		0.7	0.2	-67	±180		2.9	-92	±48		11.5	-98	±21
Eastern cottontail		3.9	3.6	-9	±50		2.8	34	±53		4.3	-15	±35
White-tailed jackrabbit		1.0	0.3	-67	±76		0.8	-56	±53		2.6	-87	±22
White-tailed deer		9.5	10.3	9	±52		11.5	-7	±33		7.9	31	±44
Mourning dove		208.5	312.6	50	±26		304.6	6	±16		396.2	-21	±18
Central													
Ring-necked pheasant	28	85.9	113.0	32	±34	28	52.8	109	±61	27	76.0	44	±57
Gray partridge		4.0	3.2	-20	±84		5.1	-37	±109		11.2	-71	±59
Eastern cottontail		6.7	10.2	51	±74		5.7	68	±74		6.6	54	±78
White-tailed jackrabbit		0.1	0.0	-100	±205		0.2	-100	±59		1.4	-100	±23
White-tailed deer		6.7	7.3	9	±50		6.2	17	±52		3.8	92	±82
Mourning dove		146.0	254.6	74	±49		180.0	41	±35		243.0	6	±31
East Central													
Ring-necked pheasant	13	58.5	82.3	41	±61	13	53.3	54	±75	13	91.6	-10	±46
Gray partridge		0.0	0.0				0.0	0			0.2	-100	±146
Eastern cottontail		9.2	7.5	-19	±66		9.4	-21	±33		8.3	-10	±41
White-tailed jackrabbit		0.0	0.0				0.0	0			0.3	-100	±64
White-tailed deer		12.0	10.5	-12	±106		13.7	-23	±63		7.2	47	±78
Mourning dove		64.9	150.7	132	±81		90.2	67	±60		119.9	26	±51

Table 3. Continued.

Region / Species	Change from 2005					Change from 10-year average				Change from long-term average			
	n	2005	2006	%	95% CI	*n*	1996-05	%	95% CI	*n*	LTA	%	95% CI
Southwest													
Ring-necked pheasant	19	225.8	242.2	7	±20	19	114.0	113	±56	19	114.5	112	±63
Gray partridge		42.5	28.6	-33	±80		38.0	-25	±72		44.9	-36	±53
Eastern cottontail		12.6	10.9	-13	±51		8.7	26	±51		8.4	30	±49
White-tailed jackrabbit		0.6	1.5	132	±127		0.7	98	±115		4.2	-65	±31
White-tailed deer		13.7	13.2	-3	±52		11.0	20	±54		7.2	83	±87
Mourning dove		322.9	533.4	65	±65		296.5	80	±90		310.3	72	±90
South Central													
Ring-necked pheasant	32	111.3	103.9	-7	±38	32	85.7	21	±41	31	139.0	-24	±29
Gray partridge		9.1	11.5	26	±91		22.2	-48	±28		20.5	-42	±36
Eastern cottontail		9.2	8.5	-8	±37		8.8	-4	±30		7.6	13	±35
White-tailed jackrabbit		0.1	0.0	-100	±204		0.4	-100	±43		2.0	-100	±26
White-tailed deer		3.1	4.5	44	±76		5.1	-12	±37		3.2	46	±67
Mourning dove		284.3	290.5	2	±33		232.1	25	±33		254.2	15	±36
Southeast													
Ring-necked pheasant	20	32.7	29.8	-9	±48	20	43.8	-32	±38	20	80.3	-63	±32
Gray partridge		2.8	2.6	-8	±235		8.9	-71	±82		14.9	-83	±44
Eastern cottontail		8.2	9.4	15	±60		8.1	16	±32		7.9	19	±45
White-tailed jackrabbit		0.2	0.0	-100	±209		0.2	-100	±104		0.7	-100	±42
White-tailed deer		17.3	12.2	-30	±57		17.1	-29	±21		9.3	31	±49
Mourning dove		181.9	312.5	72	±91		201.3	55	±57		228.0	37	±54

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

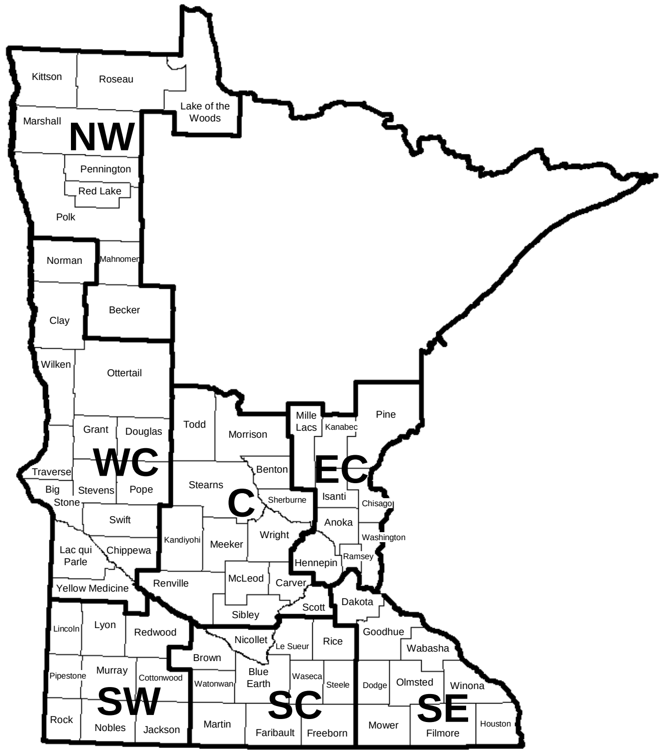
[b] Based on routes (*n*) surveyed at least 9 of 10 years.

[c] LTA = 1955-2005, except for Northwest region (1982-2005) and white-tailed deer (1974-2005). Estimates based on routes (*n*) surveyed $\geq$40 years (1955-2005), except for Northwest ($\geq$20 years) and white-tailed deer ($\geq$25 years).

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

August Roadside Survey

(pheasants/100 miles)



RANGEWIDE	
2006	113
2005	101
1996-2005	64
1955-1964	288
LTA (1955-2005)	103
% change from:	
2005	11
1996-2005	76
1955-1964	-61
LTA	10

WEST CENTRAL	
2006	113
2005	94
1996-2005	46
1955-1964	346
LTA (1955-2005)	105
% change from:	
2005	20
1996-2005	144
1955-1964	-67
LTA	8

CENTRAL	
2006	107
2005	86
1996-2005	50
1955-1964	190
LTA (1955-2005)	74
% change from:	
2005	25
1996-2005	115
1955-1964	-44
LTA	44

EAST CENTRAL	
2006	82
2005	54
1996-2005	50
1955-1964	184
LTA (1955-2005)	88
% change from:	
2005	52
1996-2005	65
1955-1964	-55
LTA	-6

SOUTHWEST	
2006	242
2005	226
1996-2005	114
1955-1964	356
LTA (1955-2005)	115
% change from:	
2005	7
1996-2005	113
1955-1964	-32

SOUTH CENTRAL	
2006	104
2005	111
1996-2005	86
1955-1964	409
LTA (1955-2005)	139
% change from:	
2005	-7
1996-2005	21
1955-1964	-75

SOUTHEAST	
2006	30
2005	33
1996-2005	44
1955-1964	129
LTA (1955-2005)	81
% change from:	
2005	-9
1996-2005	-32
1955-1964	-77

Figure 1. Ring-necked pheasants seen per 100 miles of August Roadside Survey and percent change from 2005, 10-yr mean (1996-2005), benchmark (1955-1964), and long-term average (1955-2005). 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).

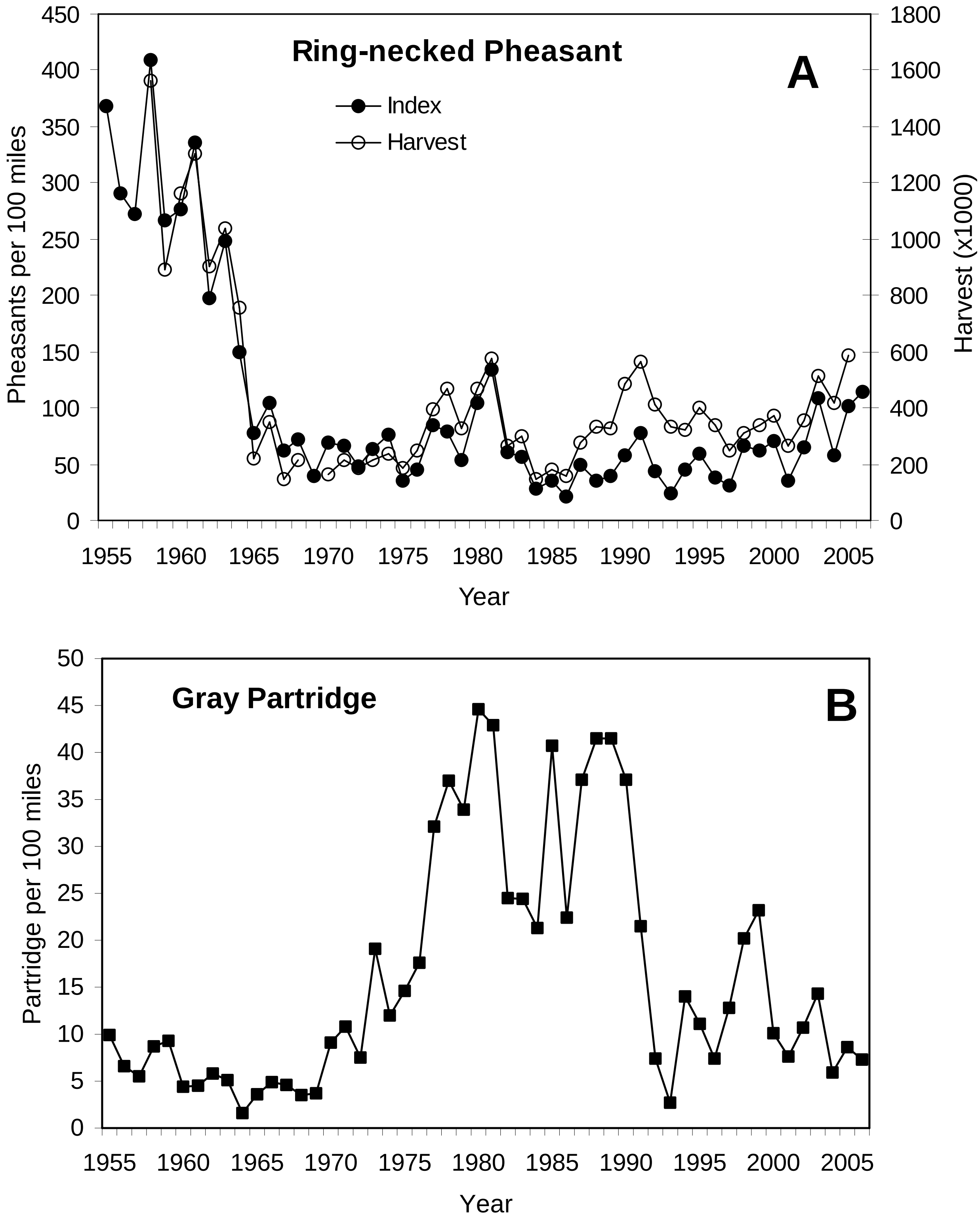


Figure 2. Rangewide index of ring-necked pheasants (**A**) and gray partridge (**B**) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.

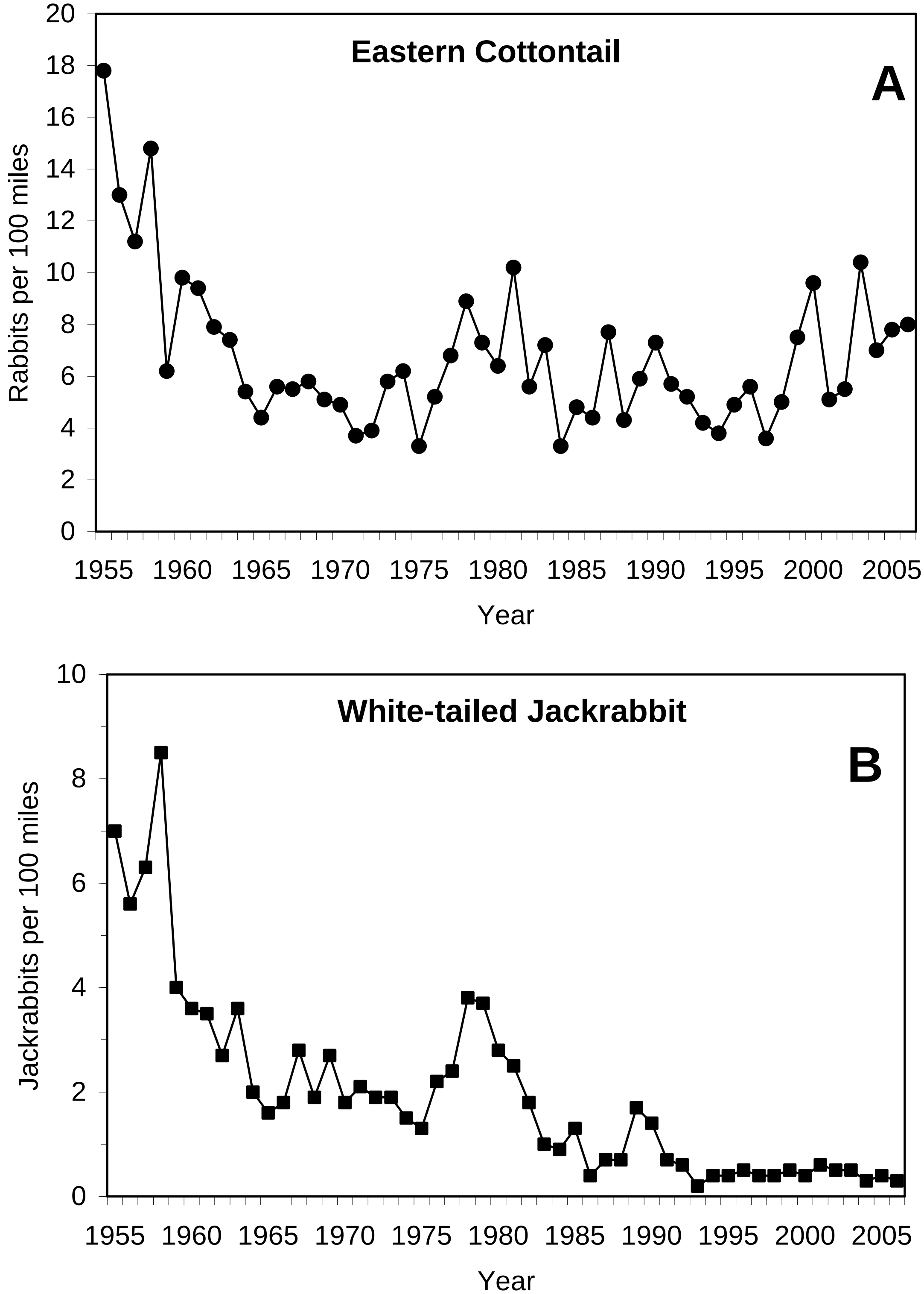
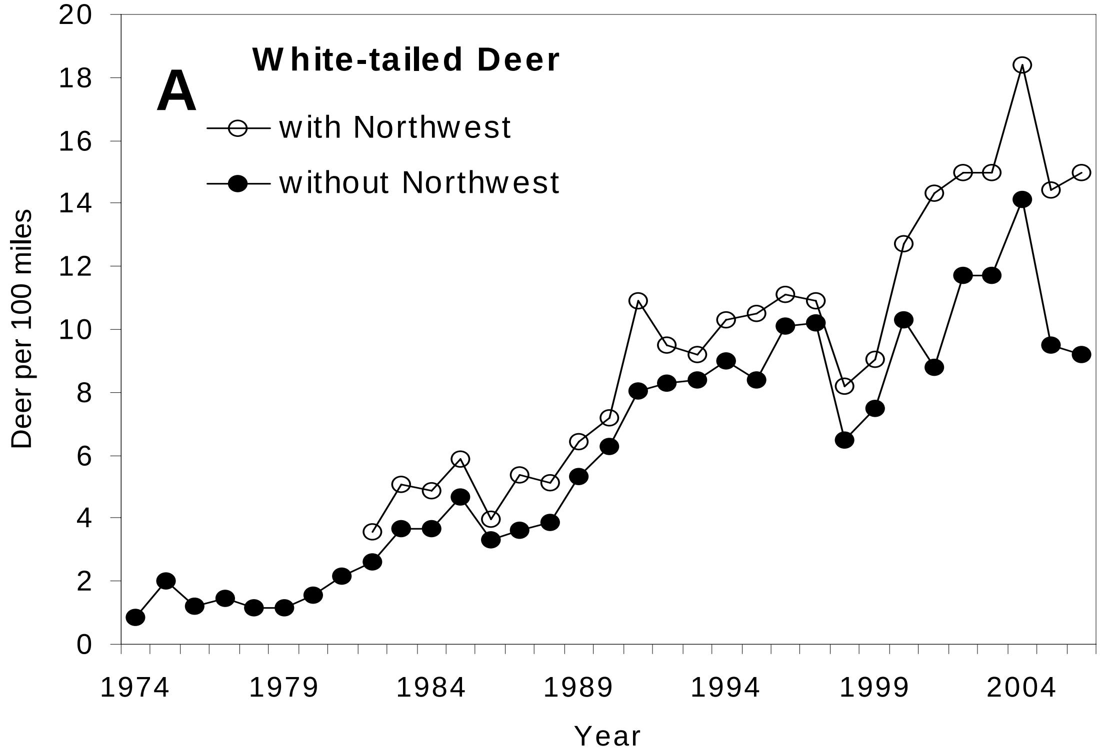


Figure 3. Rangewide index of eastern cottontail (A) and white-tailed jackrabbits (B) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.



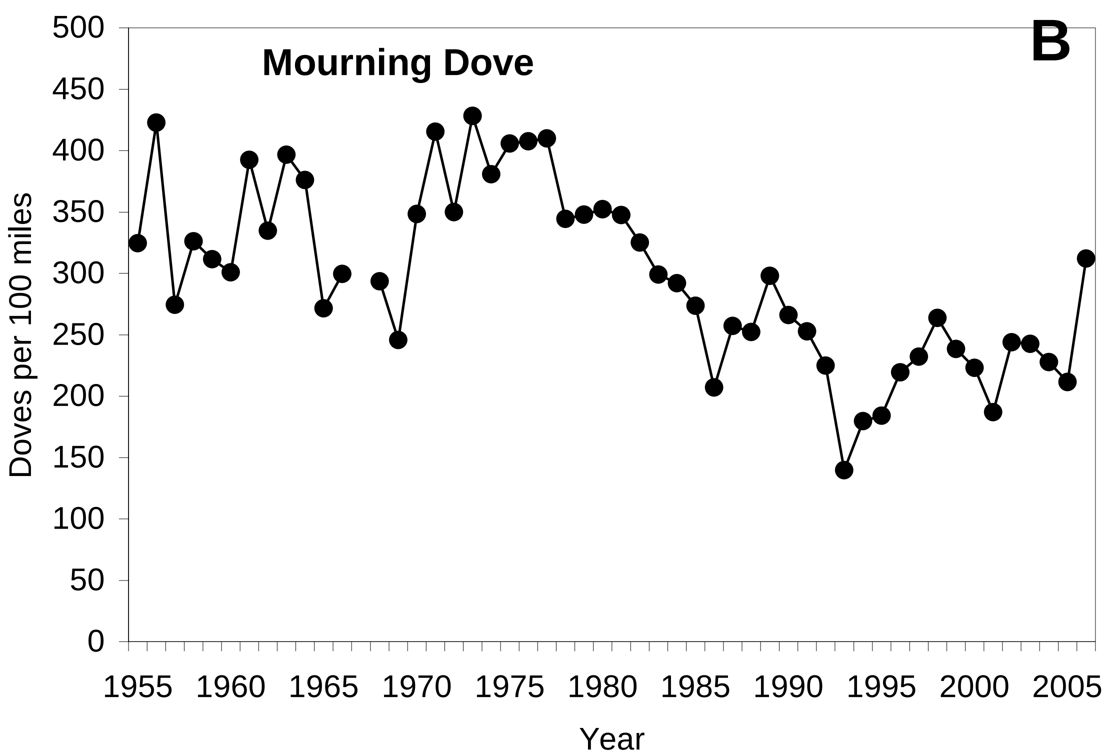


Figure 4. Rangewide index of white-tailed deer (**A**) and mourning doves (**B**) seen per 100 miles driven. Doves were not counted in 1967 and the dove index does not include the Northwest region. Based on all survey routes completed.

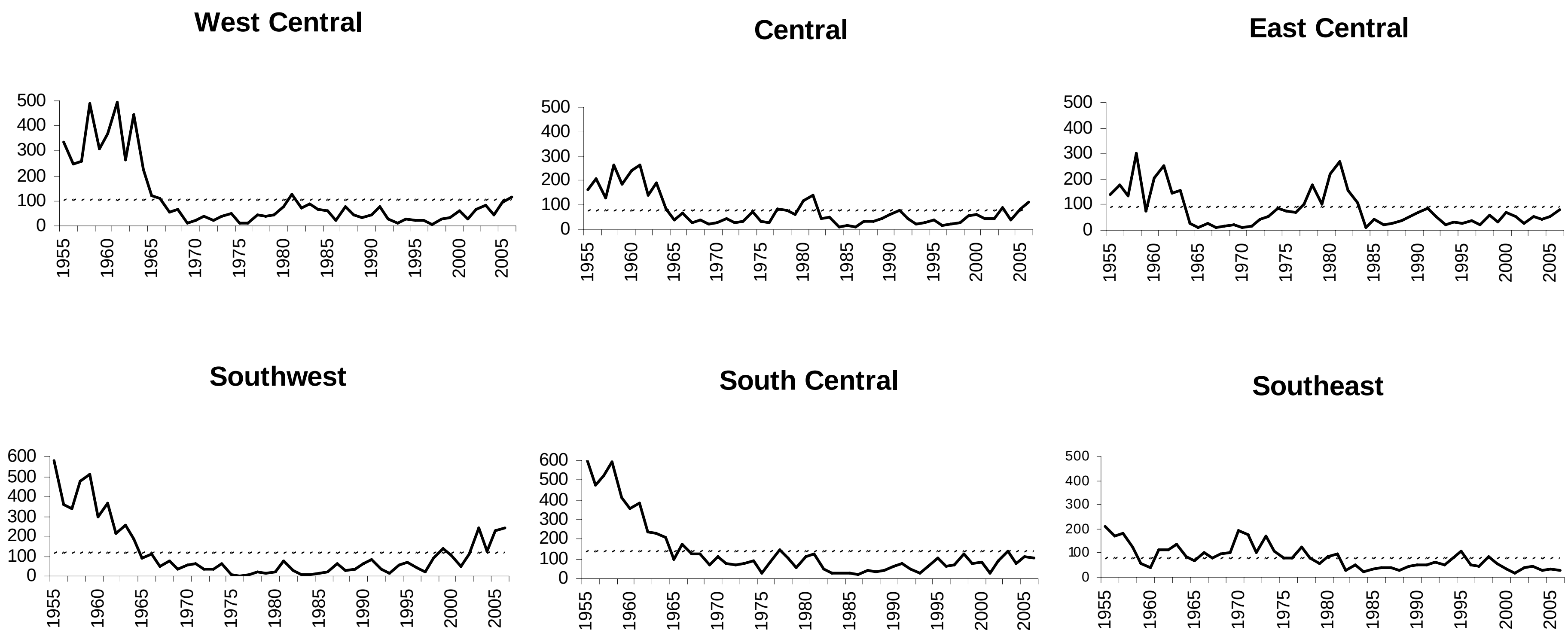


Figure 5. Regional index (——) and long-term average (······) of **ring-necked pheasants seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same scale among survey regions.

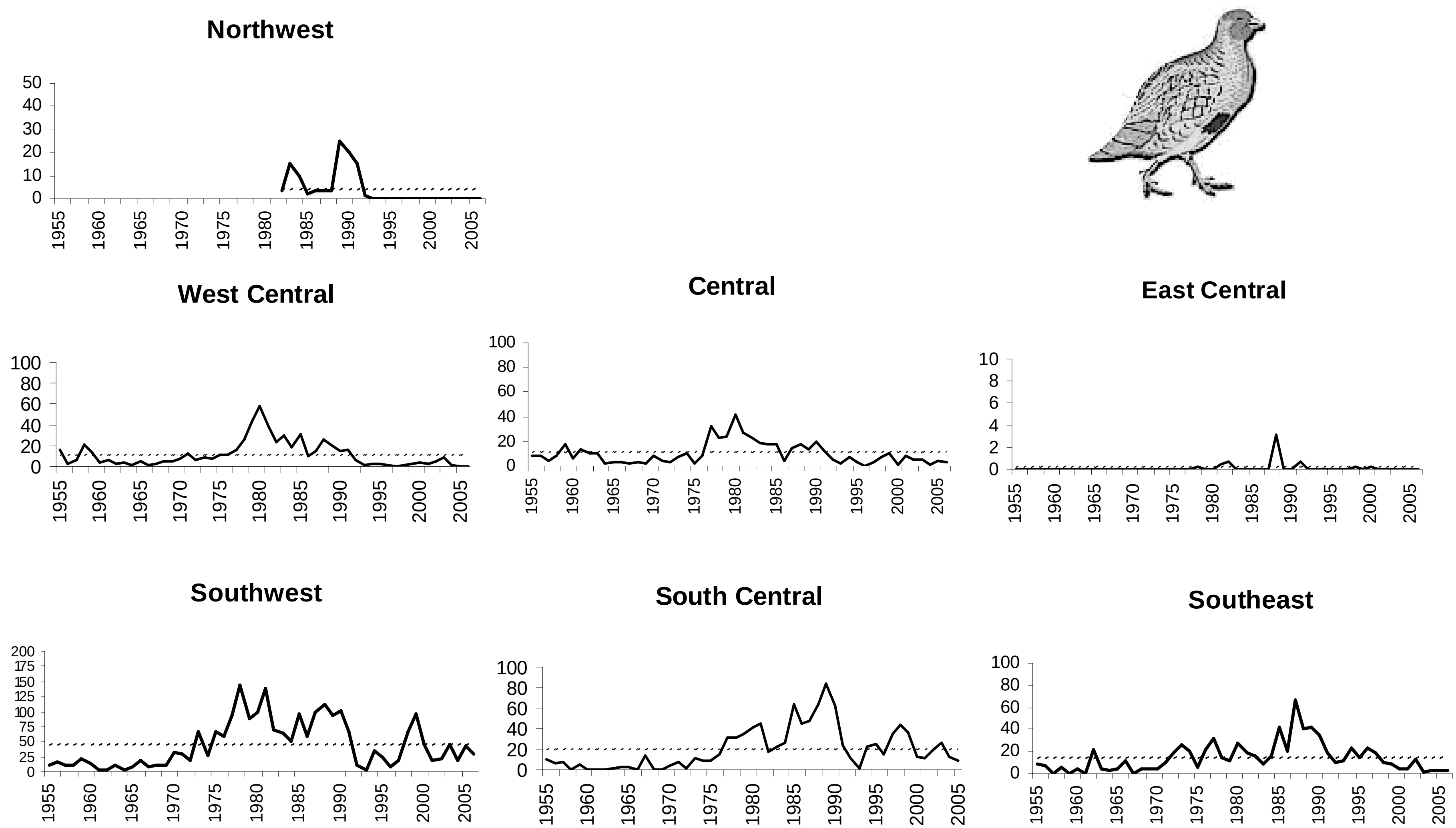


Figure 6. Regional index (——) and long-term average (·······) of **gray partridge seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

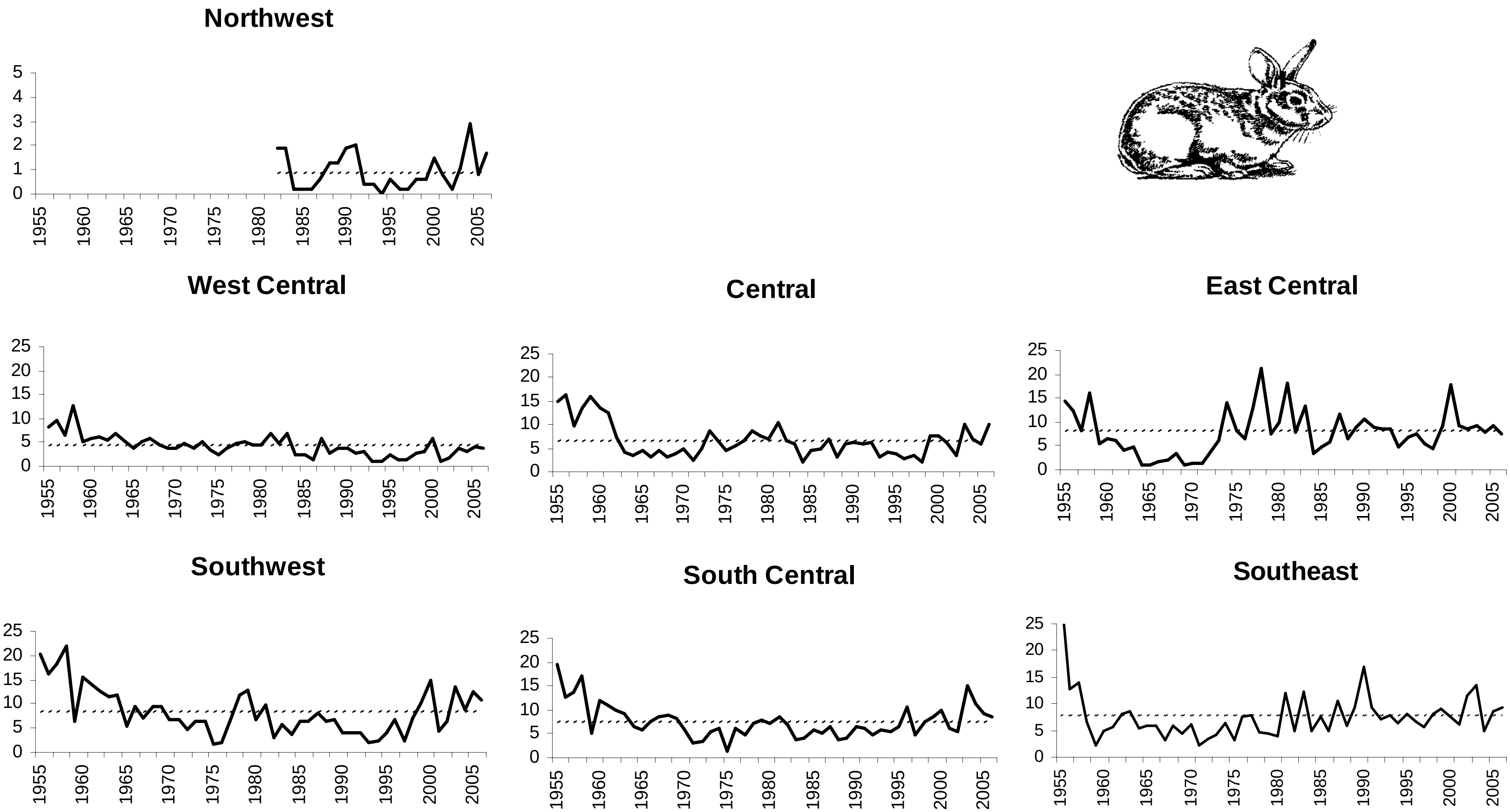


Figure 7. Regional index (——) and long-term average (······) of **cottontail rabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

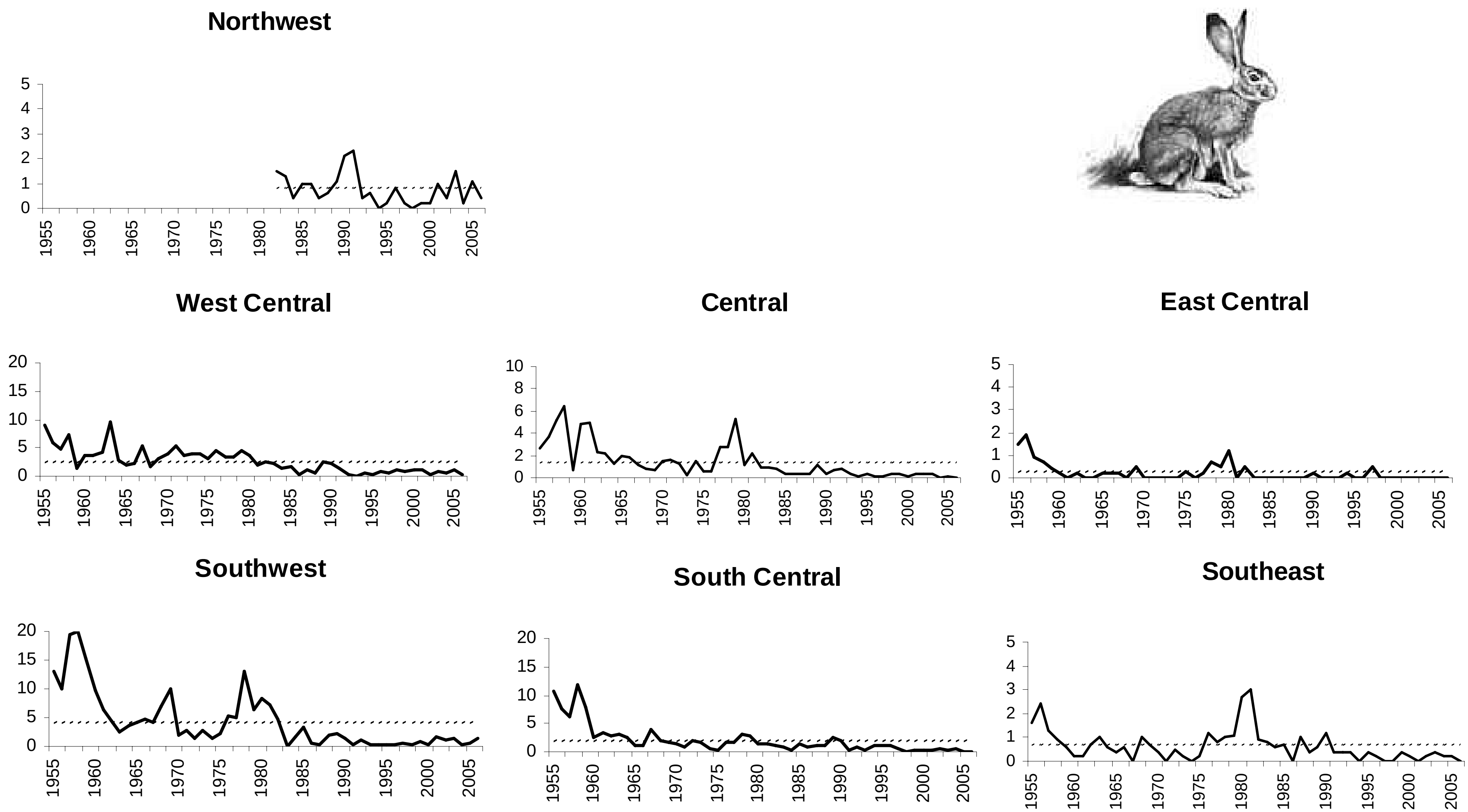


Figure 8. Regional index (▬▬) and long-term average (......) of **white-tailed jackrabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

Monitoring Population Trends Of White-Tailed Deer In Minnesota's Farmland/Transition Zone – 2006

Marrett D. 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 collisions, 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 management goals.

This document: 1) identifies where the farmland population model was applied to model deer population dynamics in Minnesota, 2) describes the structure of and data inputs for the farmland population model, 3) discusses general trends of deer density and current abundance, and 4) describes trends of harvest patterns in the farmland/transition zone.

METHODS

Minnesota Farmland/Transition Zone

There were 4 deer management units (DMUs) in Minnesota's farmland/transition zone (Figure 1) and DMUs were further partitioned into deer management sub-units (DMSUs; Figure 2). The primary purpose of DMUs was to pool data in homogeneous landscape types. Permit areas (PAs) delineated within DMUs served as the basis for population modeling and managing antlerless harvests (Figure 3). There were 86 PAs in Minnesota's farmland zone in 2005. However, the 2 PAs encompassing the Twin Cities metro region were not modeled. Over the past year, there were 9 PAs in northwest Minnesota changed from Zone 4 to Zone 2, and PA 205 changed from Zone 2 to Zone 1. These PAs were renamed to reflect their respective zones. As a result of some PA changes, deer herd dynamics in PAs 105 and 241 are now modeled by the Forest Research Group rather than the Farmland Research Group.

Population Modeling

The population model used to analyze past trends and test harvest strategies 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 were to: 1) organize and synthesize data on farmland deer populations, 2) advance the understanding of each deer population through population analysis, 3) provide population estimates and simulate vital rates for farmland deer populations, and 4) assist our management efforts through simulations, projections, and predictions of various management prescriptions.

The three most important parameters within the model reflect the aforementioned biological events, which include reproduction, harvest, and non-hunting mortality. Embryo rates were typically estimated at the DMU level via fetal surveys conducted each spring (for details, see Dunbar 2005). Embryo rates were then used to estimate population reproductive rates for each deer herd within a particular DMU. The deer population increased in size after reproduction was simulated. Non-hunting mortality rates occurring during summer months (prior to the hunting season) are estimated from field studies conducted in Minnesota and other agricultural regions. Although summer mortality rates were low, they did 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 were 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 were estimated from field studies conducted in Minnesota and other farmland regions, similar to summer mortality. After winter mortality rates were simulated, the population was at its lowest point during the 12-month period and the annual cycle began again with reproduction.

Model Recalibration Efforts

Previous research demonstrated this model provides reliable population estimates if the model is recalibrated every 4-5 years using field surveys (Grund and Woolf 2004). Thus, efforts began in 2004 to obtain population estimates using aerial and ground surveys. See Grund et al. (2005) and Haroldson et al. (2005) for more details about these surveys. Fifteen PAs have been surveyed over the past 2 years (Table 1). Several PAs have been surveyed using both techniques due to concurrent studies. Preliminary estimates from both techniques have been useful to recalibrate models. However, additional research needs to be conducted to refine field protocols and produce more precise population estimates.

Population Trends and Densities

Deer densities continue 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 the Northwest (Agassiz & Red River DMUs). Detailed long-term trends in deer densities can be reviewed in Table 2.

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

In the Big Woods DMU, which incorporates the transition zone, deer densities continue to increase. Rate of increase is most rapid in the Southeast and Metro DMSUs, despite efforts to reduce deer populations in these areas.

In the Prairie DMU, deer densities have increased slowly over the last couple of years. Rate of increase is fastest in the North and Southwest DMSUs. This trend reflects objectives and management strategies of most wildlife managers in southwestern Minnesota who wish 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. Harvest densities are 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 vary across DMSUs and across years. 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. Harvest densities have fluctuated in the Southeast DMSU but are comparable to harvest densities a decade ago.

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Haroldson, B. S, R. G. Osborn, And J. H. Giudice. 2005. Estimating white-tailed deer abundance using aerial quadrat surveys. Pages 128-131 *in* P. J. Wingate, R. O. Kimmel, J. S. Lawrence, and M. S. Lenarz, editors. Summaries of Wildlife Research Findings, 2005. Division of Wildlife, Minnesota Department of Natural Resources, St. Paul, Minnesota, USA.

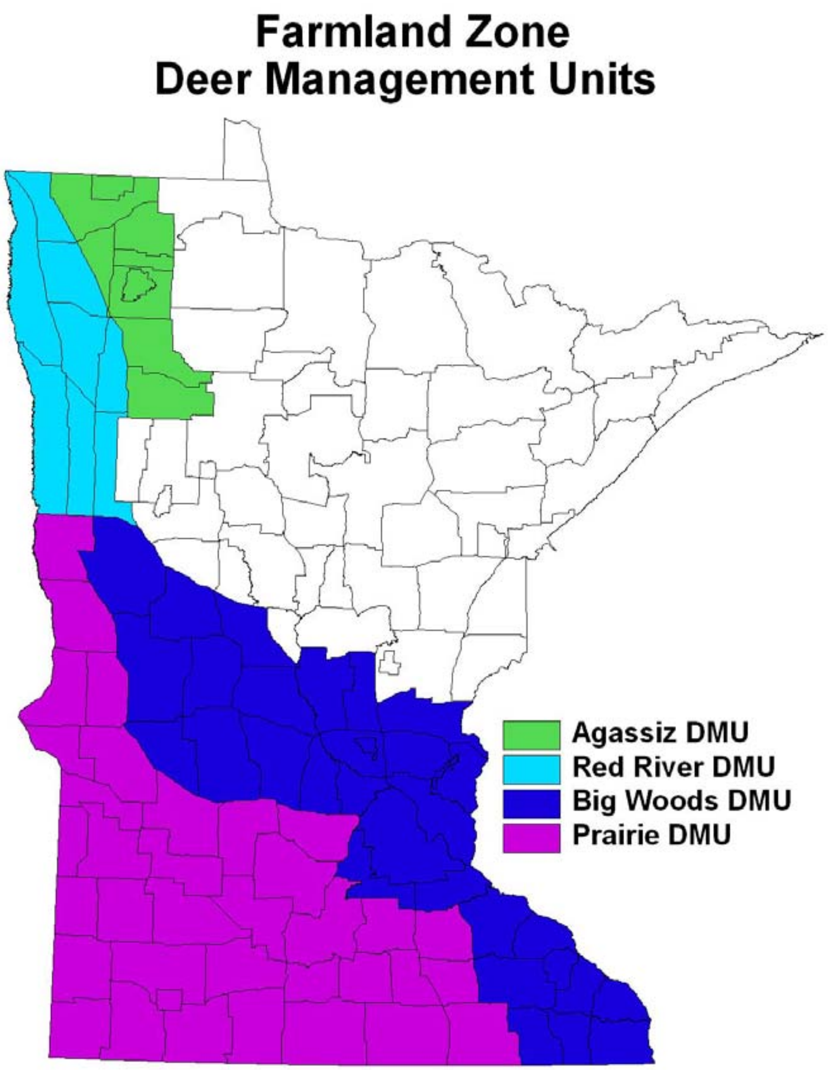

Figure 1. Deer management units in the farmland zone of Minnesota, 2005.

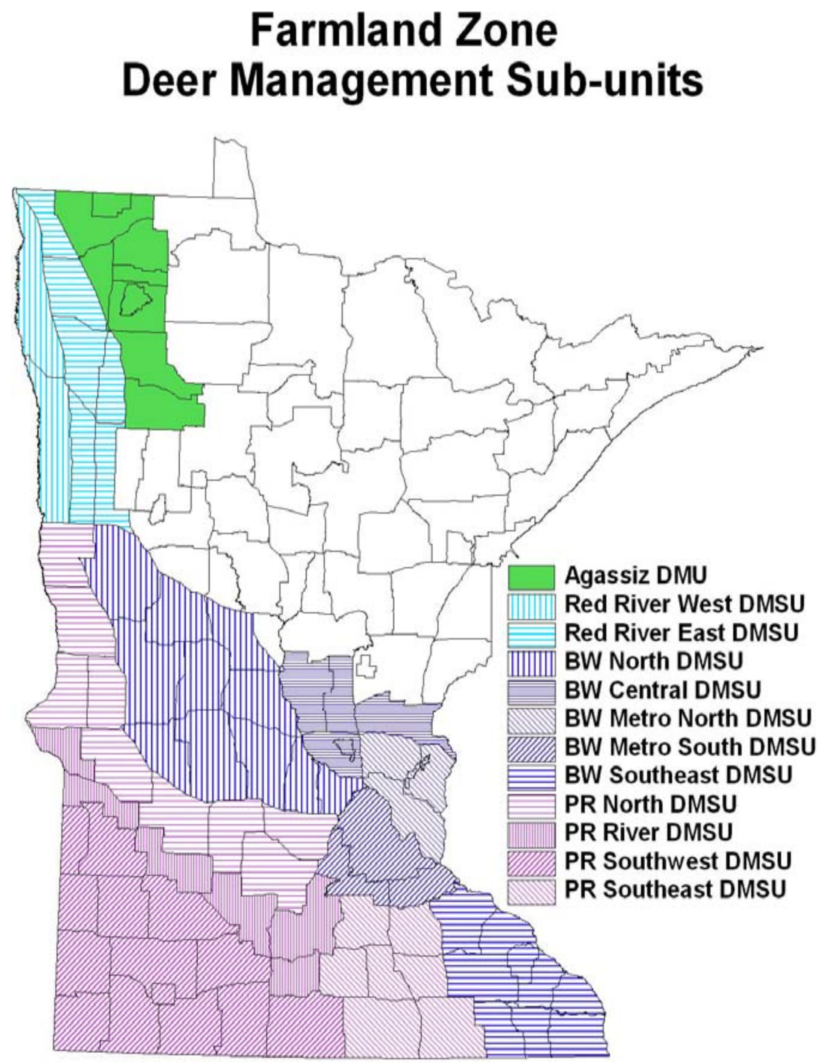

Figure 2. Deer management sub-units in the farmland zone of Minnesota, 2005.

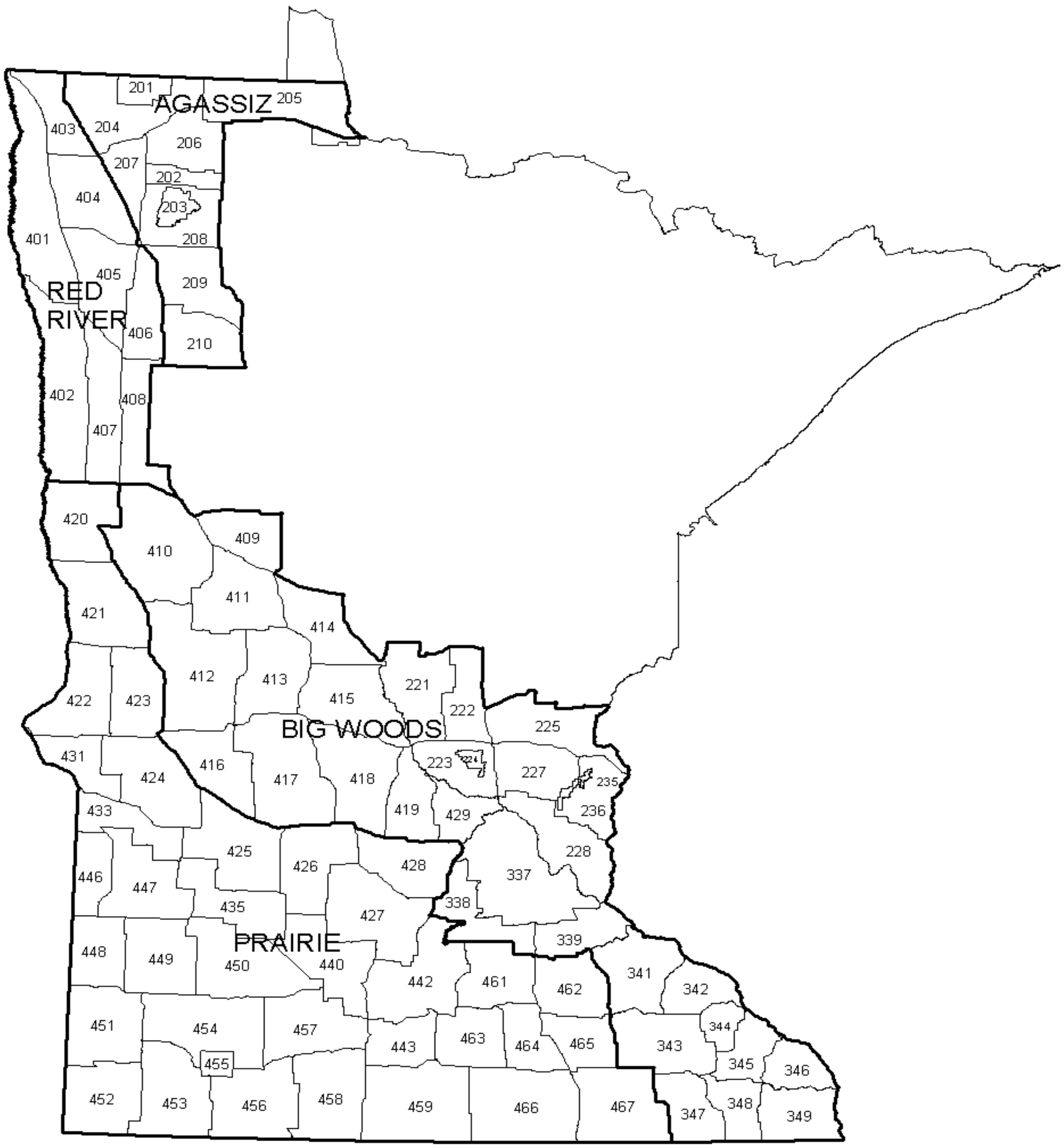

Figure 3. Deer permit areas in Minnesota, 2005.

Table 1. Deer density (deer/mi^2) estimates for permit areas in Minnesota's Farmland/Transition Zone where field surveys have been conducted, 2005-2006.

Permit Area	**Winter**	**Survey Type**	**Density Estimate (CIs)**	**Simulated Winter Estimate Prior to Field Survey**
201	2006	Aerial Survey	2 (1-3)	6
204	2006	Aerial Survey	5 (3-6)	5
206	2005	Aerial Survey	5 (4-7)	5
209	2006	Aerial Survey	10 (8-12)	5
209	2006	Ground Survey	6 (4-8)	5
210	2006	Aerial Survey	6 (5-8)	12
210	2006	Ground Survey	11 (7-17)	12
225	2006	Ground Survey	7 (4-10)	24
227	2006	Ground Survey	14 (9-21)	27
236	2006	Aerial Survey	18 (14-22)	35
236	2006	Ground Survey	13 (8-21)	35
252	2005	Aerial Survey	3 (2-4)	2
252	2006	Ground Survey	1 (1-2)	2
256	2006	Aerial Survey	7 (5-9)	5
256	2006	Ground Survey	3 (2-5)	5
257	2005	Aerial Survey	6 (4-8)	6
257	2006	Ground Survey	6 (4-9)	6
342	2005	Aerial Survey	9 (8-11)	19
420	2006	Aerial Survey	3 (2-4)	3
421	2005	Aerial Survey	1 (0-1)	5
423	2006	Aerial Survey	1 (0-1)	5

Table 2. Pre-harvest 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, 1994-2006.

DMU	DMSU	PA	Area mi^2	Pre-harvest density 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
RED RIVER	*West*	252	1039	3	4	3	3	3	3	3	4	4	4	4	4	4
		253	1021	5	6	5	4	5	5	5	5	4	4	3	2	1
		Total	2060													
	East	254	396	10	10	9	9	9	10	11	11	12	12	11	9	9
		255	631	11	12	10	10	10	11	11	12	12	13	13	11	10
		256	654	8	8	7	7	8	8	9	8	9	8	7	6	7
		257	413	18	19	16	14	14	14	15	15	14	13	11	11	8
		258	618	13	13	11	11	11	11	12	13	13	13	12	10	8
		259	494	12	12	10	10	10	10	11	12	13	13	12	12	11
		Total	3206													
Red River Total			5266													
AGASSIZ		201	155	7	6	4	3	4	5	6	7	7	8	7	8	8
		202	156	16	15	11	10	12	14	16	17	17	17	15	13	12
		203	108	16	12	5	4	4	5	7	8	10	12	12	13	15
		204	718	11	11	9	7	8	9	9	9	9	9	8	8	7
		205	642													
		206	471	13	13	10	9	10	11	13	14	14	13	11	10	8
		207	300	12	12	9	9	10	11	12	13	13	14	12	11	9
		208	448	6	5	4	4	5	5	6	7	7	7	7	7	6
		209	576	9	9	8	8	8	9	9	10	10	10	10	10	7
		210	485	17	18	14	13	14	15	16	16	17	17	17	15	10
Agassiz Total			4059													

Table 2. (Continued)

DMU	DMSU	PA	Area mi²	Pre-harvest density 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
BIG WOODS	*North*	409	417	40	43	45	41	41	44	49	47	48	48	47	45	44
		410	924	21	21	21	19	20	22	24	25	26	28	29	31	34
		411	642	30	32	32	30	32	34	37	39	41	44	46	50	57
		412	989	16	16	15	14	14	14	15	14	14	16	16	16	17
		413	644	21	22	22	19	21	21	21	22	22	20	17	15	11
		414	557	24	27	26	26	27	27	29	29	30	32	29	28	28
		415	702	14	15	15	13	14	14	15	15	15	15	14	13	11
		416	544	15	15	15	13	14	13	12	12	11	12	11	12	12
		417	939													11
		418	760	12	12	12	11	11	11	11	11	12	13	12	13	13
		419	393	15	16	15	13	12	12	14	14	15	17	18	21	23
		429	288	9	9	9	8	8	8	9	9	10	11	12	13	14
		Total	7799													
	Central	221	642	14	15	15	14	16	17	18	18	19	20	20	20	20
		222	412	19	21	20	19	21	21	23	22	24	24	22	23	23
		223	376	20	21	20	19	20	19	21	21	22	23	23	25	27
		224	48	23	24	24	24	28	29	33	36	39	43	45	48	56
		225	619	27	29	28	26	28	28	29	29	30	32	32	34	37
		Total	2097													
	Metro[b]	227	472	20	21	20	19	21	21	22	23	25	29	32	37	44
		235	33	21	22	21	20	24	29	34	40	53	70	85	110	144
		236	374	25	26	26	24	25	26	28	30	34	38	42	49	28
		338	452	7	7	7	6	6	7	7	8	10	12	15	18	23
		339	395	9	9	9	8	7	8	8	9	10	13	15	19	25
		Total	1726													

Table 2. (Continued)

DMU	DMSU	PA	Area mi^2	Pre-harvest density 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
BIG WOODS	*Southeast*	341	611	13	14	15	15	15	15	15	15	17	19	15	15	15
		342	352	17	17	17	17	18	19	20	19	21	25	28	17	14
		343	663	12	12	13	14	13	14	15	16	18	22	26	30	37
		344	189	28	28	28	26	24	23	24	25	28	34	39	47	61
		345	326	17	18	18	18	18	18	17	16	17	18	20	23	27
		346	319	26	27	29	30	29	30	31	31	33	38	40	44	47
		347	434	15	15	15	16	15	15	15	15	17	18	20	21	21
		348	332	25	26	27	27	27	26	26	24	24	26	27	27	24
		349	492	19	20	21	23	24	26	28	28	30	35	39	45	50
		Total	3718													
Big Wood Total			15340													
PRAIRIE	*North*	420	651	6	6	6	5	5	5	6	6	6	6	6	5	5
		421	749	5	5	5	4	4	4	5	5	5	6	6	7	8
		422	634	4	4	4	3	4	4	4	4	4	4	4	5	7
		423	531	6	6	6	6	5	5	5	5	5	6	6	7	8
		424	766	9	9	10	7	6	6	5	5	5	5	6	7	8
		425	779	4	3	3	2	2	2	2	2	2	2	2	3	4
		426	614	6	6	5	4	4	4	5	5	6	6	7	8	9
		427	837	4	3	3	2	2	2	3	3	3	4	4	5	6
		428	550	6	6	6	5	5	6	6	6	7	8	9	10	11
		Total	6111													
	River	431	360	11	10	12	10	9	8	7	6	6	6	6	6	7
		433	397	15	16	16	14	13	12	12	11	12	14	14	16	17
		435	575	9	9	9	8	8	7	7	7	7	8	9	10	13
		440	662	7	8	8	7	7	7	7	6	6	7	7	8	8
		442	806	7	7	7	6	6	6	7	7	7	8	9	11	12
		443	386	10	10	10	9	9	8	8	7	7	8	8	9	10
		Total	3186													

Table 2. (Continued)

DMU	DMSU	PA	Area mi^2	Pre-harvest density 1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
PRAIRIE	*Southwest*	446	345	9	10	10	9	9	9	8	8	8	8	8	8	9
		447	675	4	4	4	3	3	3	3	3	3	4	4	5	6
		448	447	5	5	5	4	4	4	5	6	7	8	9	10	12
		449	625	6	6	5	4	4	4	5	6	7	8	10	11	14
		450	816	3	3	3	2	2	2	2	2	2	3	3	3	4
		451	687	4	4	5	4	4	4	4	4	5	6	7	8	10
		452	637	4	5	5	5	5	5	5	5	6	6	7	8	9
		453	729	3	3	3	3	3	3	4	4	4	5	6	8	10
		454	840	6	6	6	5	5	5	5	5	6	7	7	8	10
		455	95	7	7	7	7	7	7	7	6	6	7	7	8	9
		456	712	5	5	5	5	5	5	5	5	6	7	8	9	11
		457	666	4	4	5	4	4	5	5	5	5	5	6	6	7
		458	715	4	5	5	4	4	4	4	4	4	5	5	6	7
		459	974	5	5	6	5	5	5	5	4	5	5	6	7	8
		Total	8963													
	Southeast	461	481	13	13	13	13	12	12	11	10	11	11	11	10	10
		462	506	12	13	13	12	13	13	12	11	11	12	12	13	13
		463	453	6	6	5	5	5	5	5	5	5	6	6	7	8
		464	377	7	7	7	6	6	6	6	6	7	8	9	10	12
		465	385	7	8	8	7	7	7	6	6	7	7	8	8	9
		466	931	6	6	7	6	6	6	6	5	6	7	8	8	9
		467	774	5	6	6	6	6	6	6	6	6	7	6	7	6
		Total	3907													
Prairie Total			22167													
Farmland Zone Total			46832													

[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 – 2006

Emily Dunbar, Farmland Populations and 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 simulate herd dynamics, 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 this survey were 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 class of the female, 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 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 116 deer were examined in 2006. Thirteen (11%) of these deer came from the Northwest Deer Management Unit (DMU; Table 1), 85 (73%) from the Big Woods DMU (Table 2), and 18 (16%) from the Prairie DMU (Table 3).

Pregnancy rates for fawns ranged from 0% in the Prairie DMU to 41% in the Big Woods DMU. Throughout the farmland/transition zone, 36% of fawns were pregnant. Pregnancy rates for adults ranged from 94% in the Prairie DMU to 100% in the Northwest DMU and averaged 97% across the farmland/transition zone.

Fetal rates for fawns ranged from 0.0 fetuses/fawn in the Prairie DMU to 0.5 fetuses/fawn in the Big Woods and Northwest DMUs, and averaged 0.4 fetuses/fawn across the farmland/transition zone. Fetal rates for adults ranged from 1.8 fetuses/adult in the Big Woods to 2.0 fetuses/adult in the Northwest DMU. Fetal rates averaged 1.8 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 – 2006.

	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
2006	4	25	0.5	9	100	2.0
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
2006	22	41	0.5	63	97	1.8
Mean (1980's)		47	0.5		95	1.8
Mean (1990's)		26	0.3		93	1.7
Mean (2000's)		24	0.3		93	1.7

[a]The majority of samples (approximately 59%) 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, 1978 – 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
2006	2	0	0	16	94	1.9
Mean (1980's)		47	0.5		93	1.7
Mean (1990's)		21	0.2		94	1.8
Mean (2000's)		15	0.2		90	1.7

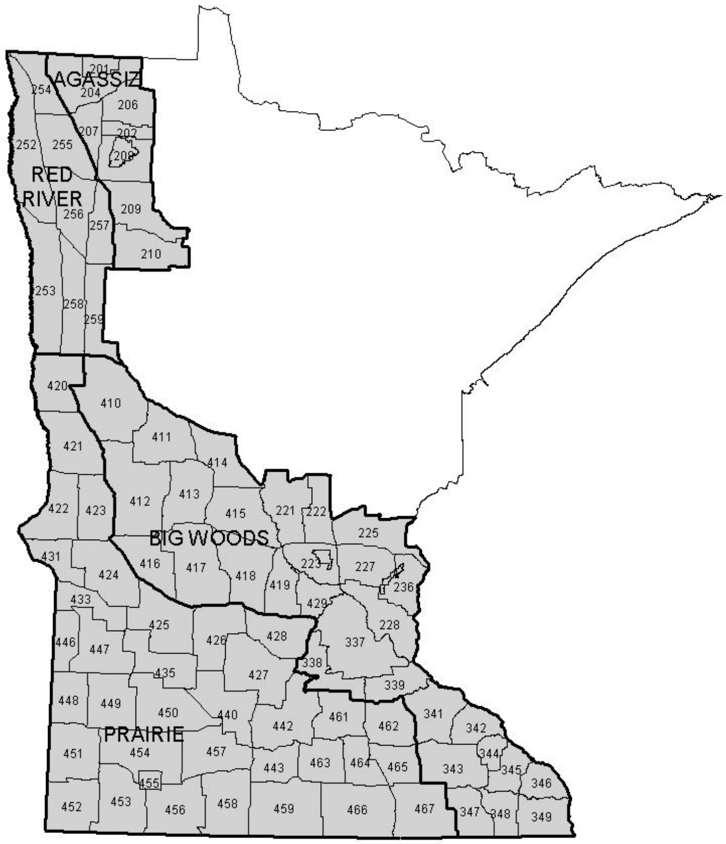

Figure 1. Permit areas within the Farmland Zone of Minnesota

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

NOTE: Wildlife damage complaint information is collected statewide from wildlife managers. The data is compiled and summarized by the Wildlife Damage Extension Specialist at the Brainerd area office.

WILDLIFE DAMAGE COMPLAINTS

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

Wildlife damage complaint information is collected statewide from wildlife managers. The 2005 information was compiled by MIS – GIS and summarized by the Wildlife Depredation Specialist, 1601 Minnesota Drive, Brainerd, MN 56401.

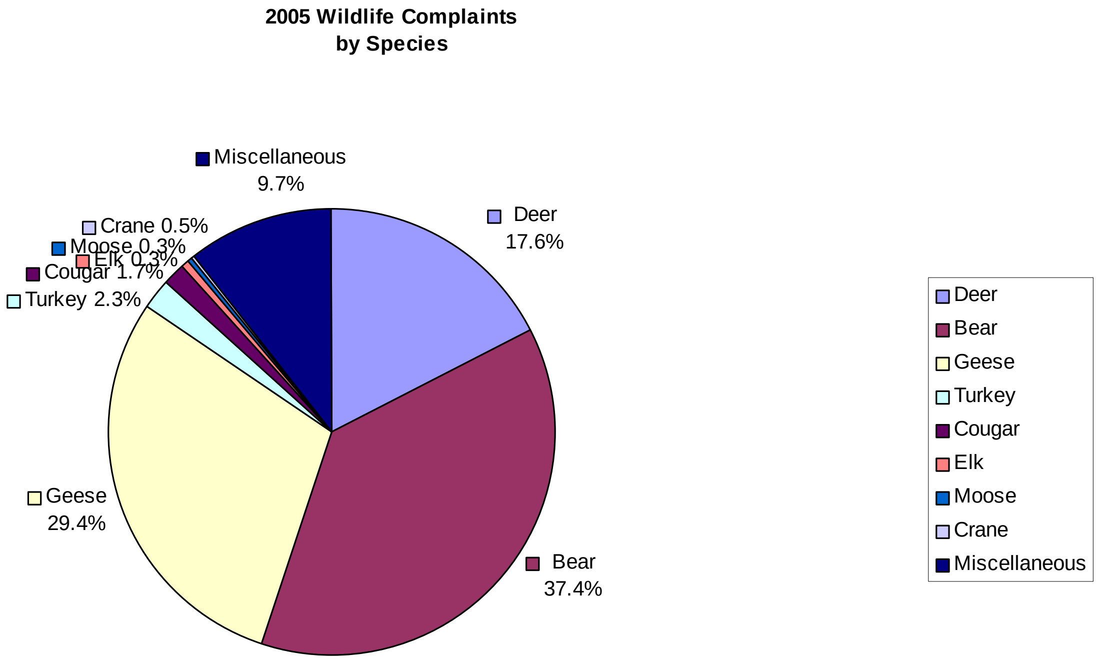

Figure 1. Wildlife complaints by species for the year 2005, in Minnesota.

Wildlife managers recorded a total of 649 wildlife complaints in 2005, down 1% when compared to the 2004 total of 656 complaints. Three species, black bear, white-tailed deer, and Canada geese account for 548, (84.4%) of the complaints received (Figure1). Five other species of special interest for wildlife damage; cougar, elk, moose, turkey, and sandhill crane, comprise an additional 33, (5.1 %) of the recorded complaints. Fourteen species are represented in 68 (10.5 %) of the complaints received.

The expenditure for depredation materials during FY05 was $83,550 (8% bear, 80% deer, 12% goose). The average expenditure for the previous five-year period, 2000-2004, was $78,880. During calendar year 2005 materials assistance for permanent deer exclusion fences was provided to seventeen growers; six vegetable, two orchard, three small berry, two tree nursery, one Christmas tree farm, and one hay yard for stored forage. Exclusion techniques included the installation of 12 woven wire and five energized permanent deer fences. Additional technical assistance was provided to the Divisions Wildlife and Forestry for jack pine, white pine, oak, and white cedar regeneration plots. Several different techniques were tried utilizing high-density polypropylene mesh as a physical barrier.

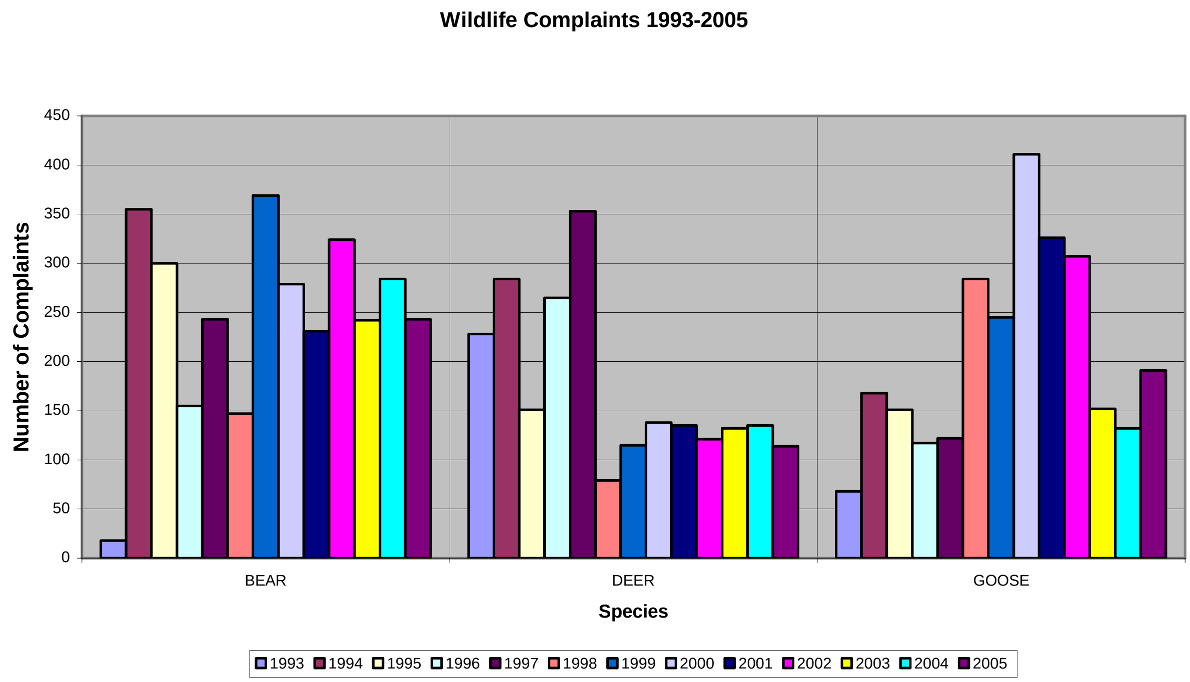

Figure 2. Number of wildlife complaints recorded by bear, deer & geese from 1993-2005, in Minnesota.

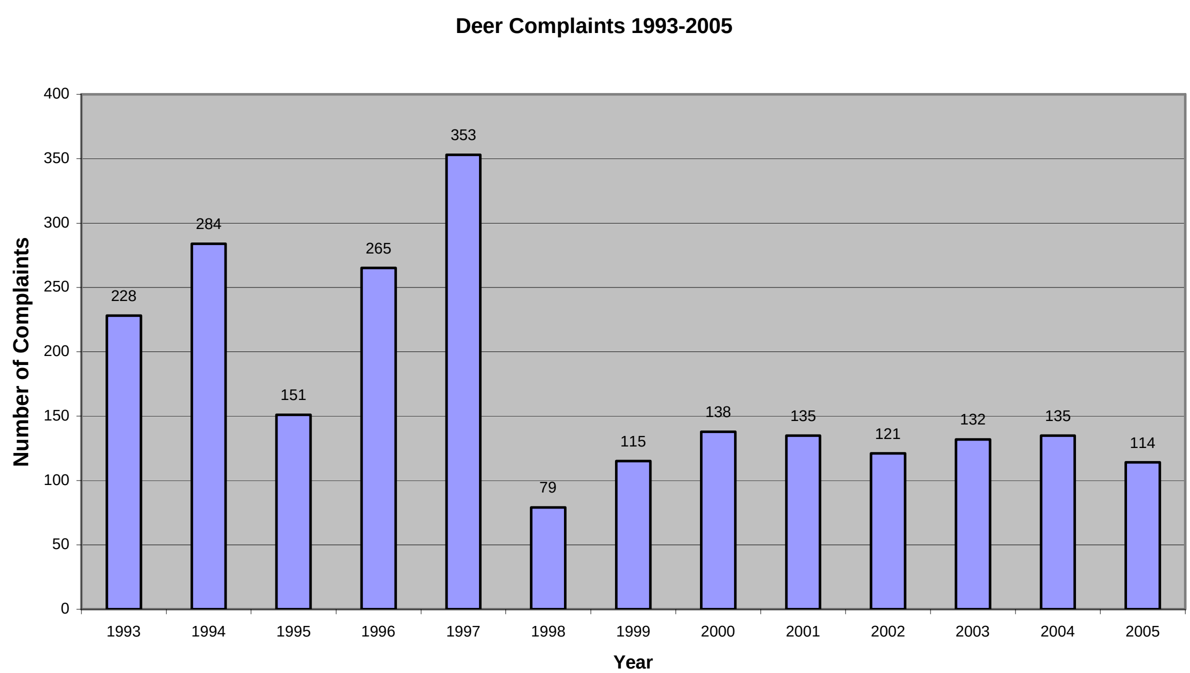

Figure 3. Number of deer complaints from 1993-2005, in Minnesota.

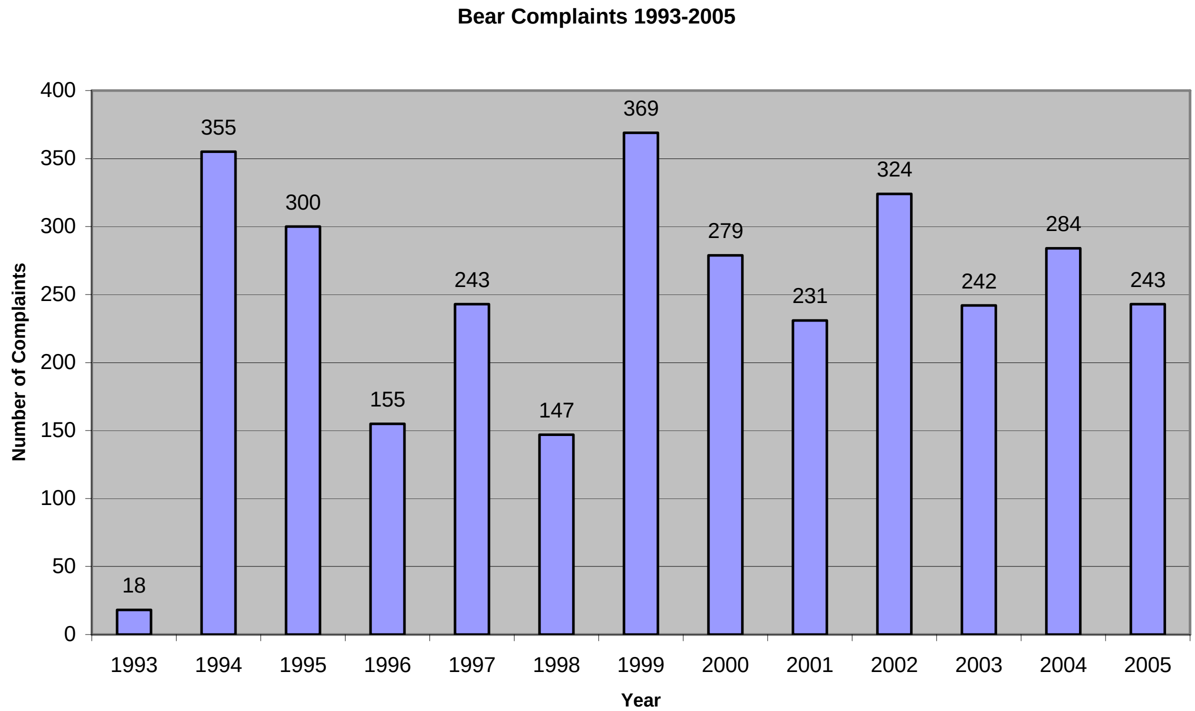

Figure 4. Number of bear complaints from 1993-2005 in Minnesota.

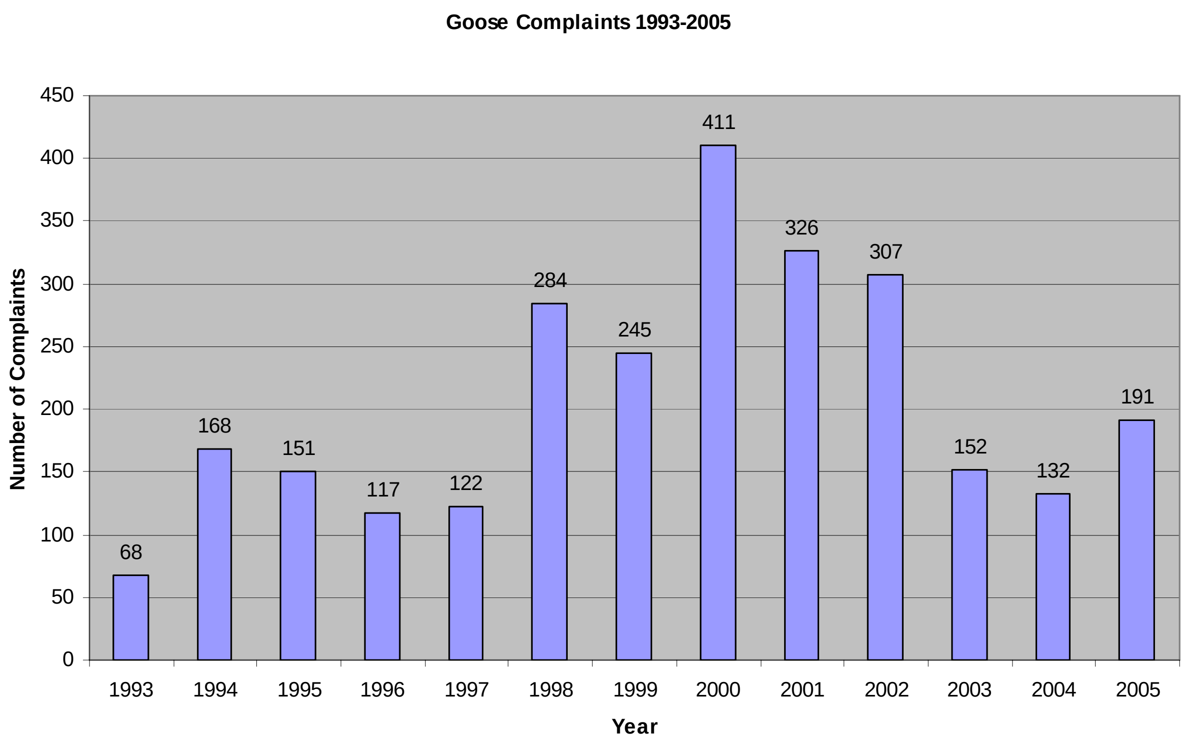

Figure 5. Number of goose complaints from 1993-2005, in Minnesota.

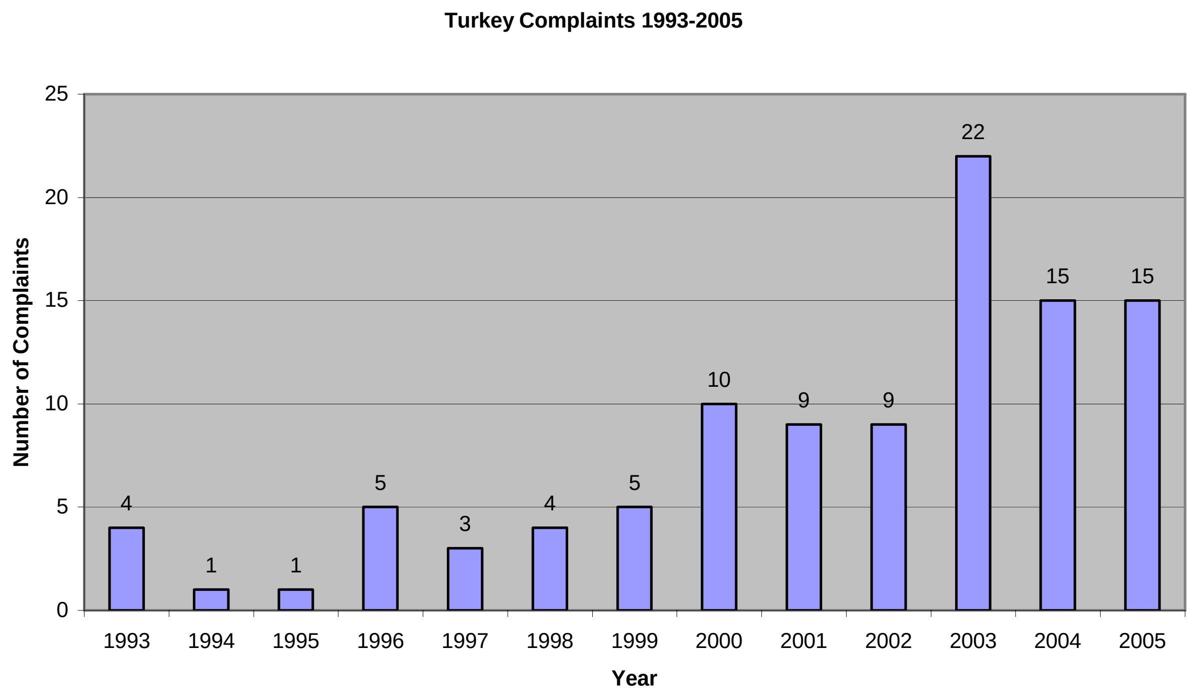

Figure 6. Number of turkey complaints from 1993-2005, in Minnesota.

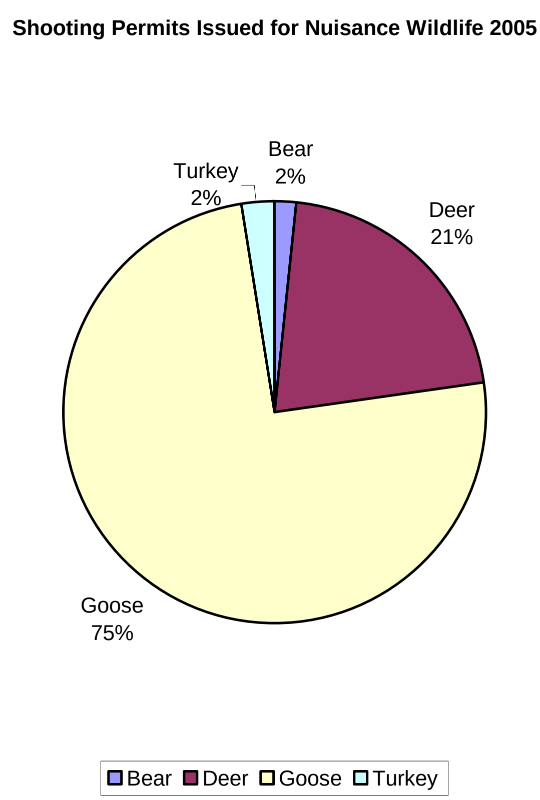

Figure 7. Shooting permits issued for nuisance wildlife control in Minnesota for 2005.

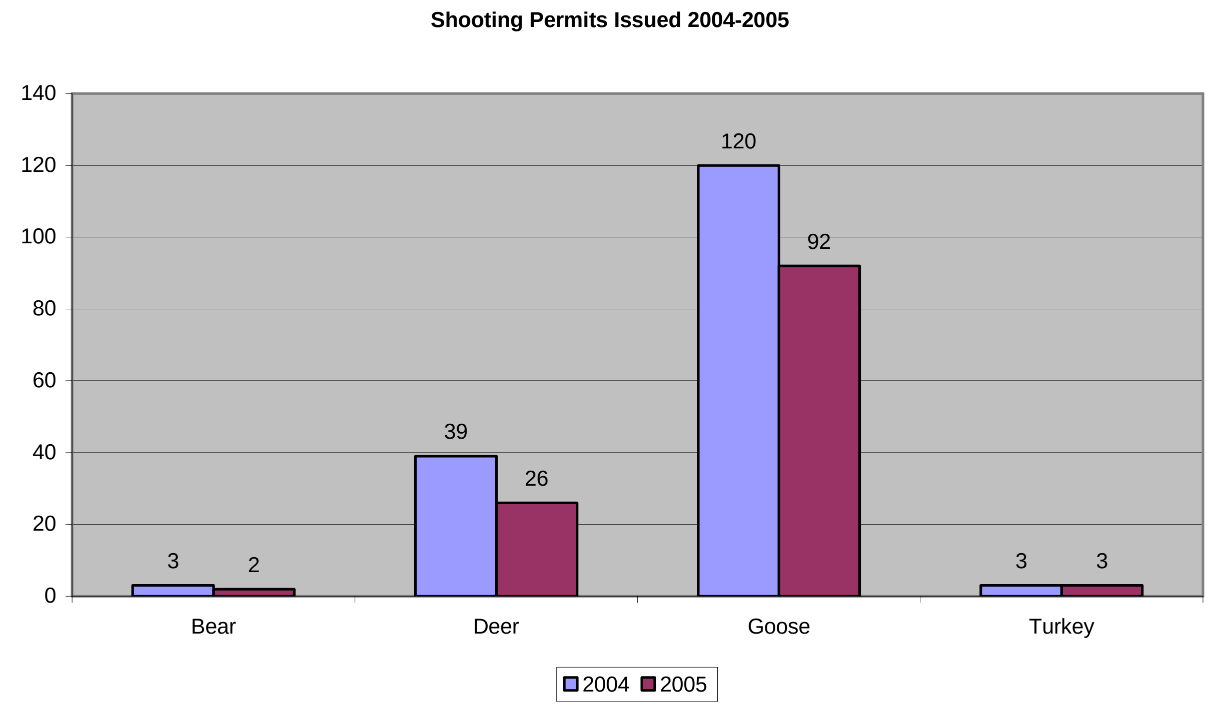

Figure 8. Shooting permits issued for nuisance wildlife control in Minnesota for 2004-2005.

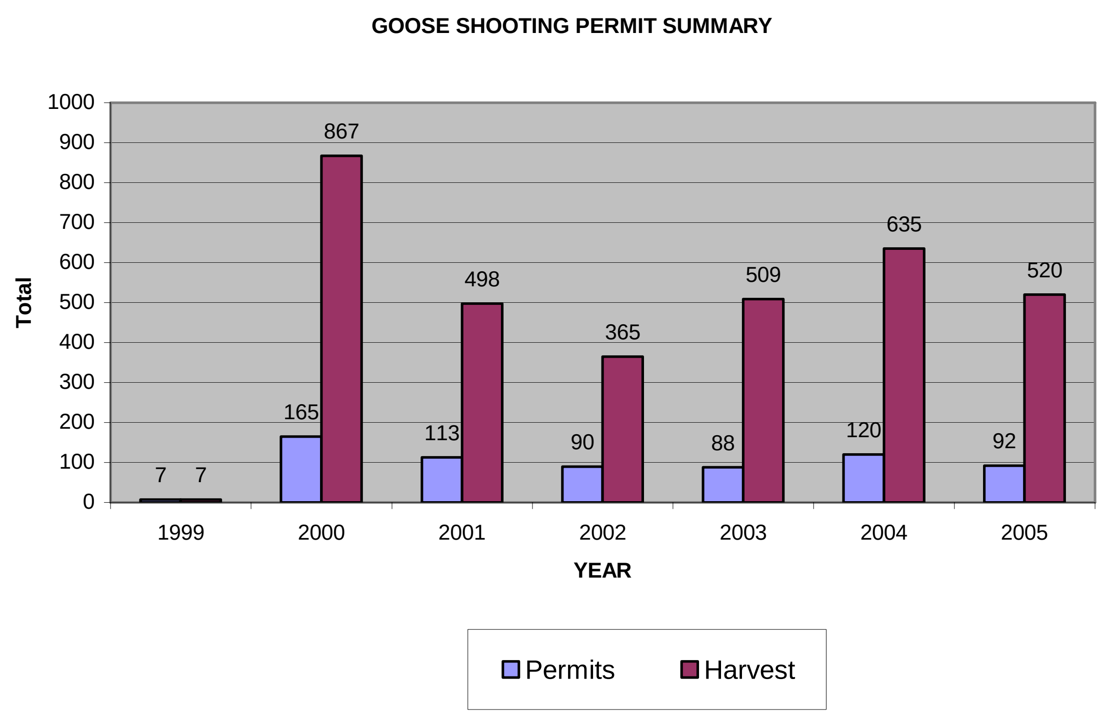

Figure 9. Comparison of nuisance goose shooting permits and harvest in Minnesota 1999-2005.

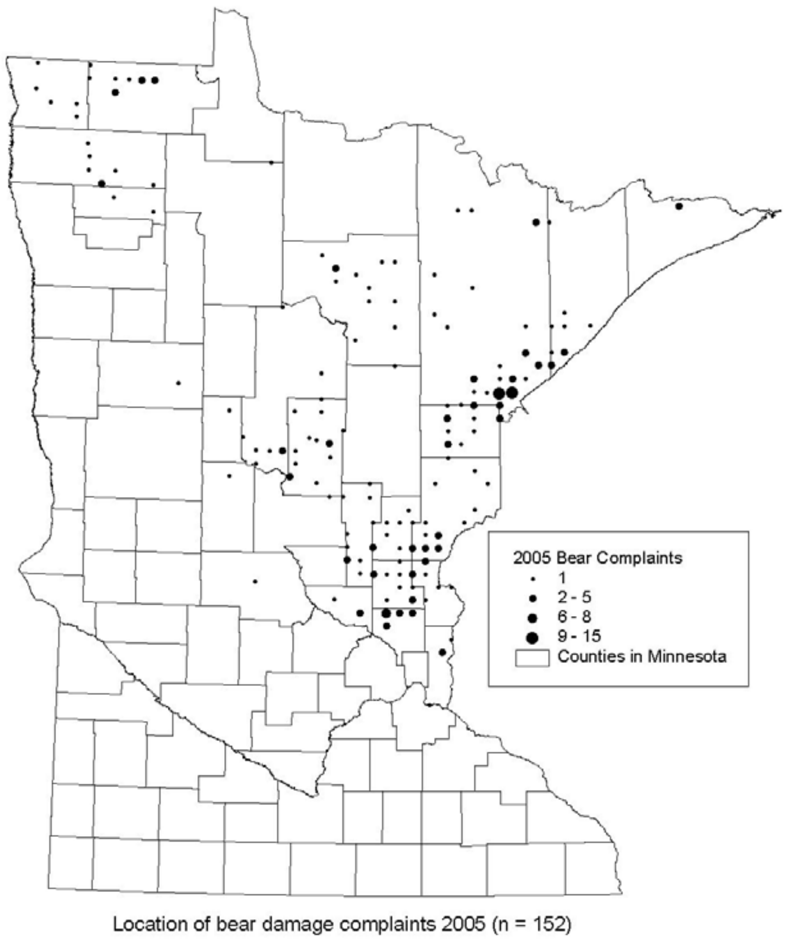

Figure 10. Location of bear damage complaints in 2005 (n=152).

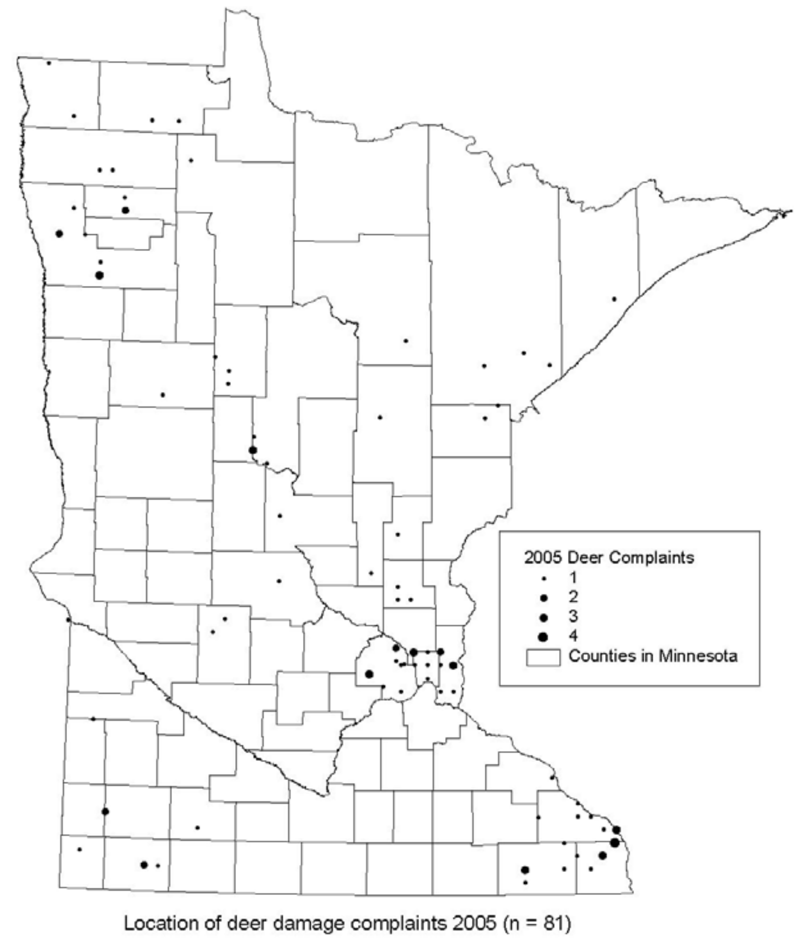

Figure 11. Location of deer damage complaints in 2005 (n=81).

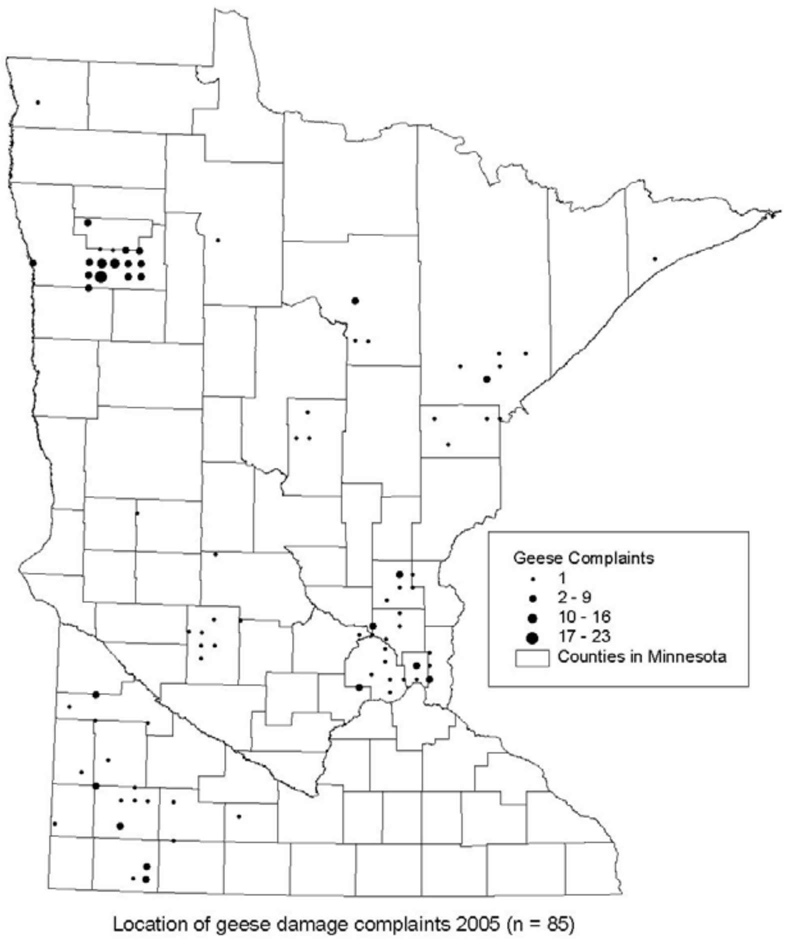

Figure 12. Location of goose damage complaints in 2005 (n=85).

PREDATOR SCENT POST SURVEY

AND

WINTER TRACK INDICES

NOTE: This survey is organized and coordinated by the Forest Wildlife Populations and Research Group, 1201 E. Hwy 2, Grand Rapids, MN 55744. Results are presented at this location in the book because of the statewide nature of the data.

Furbearer Winter Track Survey Summary, 2005

John Erb, Forest Wildlife Populations and 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, 52 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 typically from December through mid-February, and track counts are recorded for each 0.5-mile segment. When it is obvious the same animal crossed the road multiple times <u>within</u> 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 abundance (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. Hare survey data is also obtained via counts of animals observed on grouse drumming count surveys conducted in spring. Data for both the spring and winter indices are presented for comparison.

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 notable 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-three of the 52 routes were completed this year (Figure 2). Total snow depths averaged 11" for completed routes, with surveys taking an average of 2.1 hours to complete. Survey routes were completed between Nov. 30th and Feb. 23rd this year.

Following last year's notable decline, fisher track indices increased moderately but remain below recent peaks (Figure 3). Fisher were detected on 67 % of the routes, similar to previous years (Figure 3). For marten, track counts declined slightly compared to last year, with some suggestion of a slow but longer-term decline as well (Figure 3). Marten were detected on 53% of survey routes, within the bounds of previous results.

Bobcat indices have undergone the most notable change since the survey began. While tracks counts declined moderately this year, they remain above those observed prior to 1999 (Figure 3). Wolf track indices increased slightly from last year (Figure 3), with track indices suggestive of a slow increase since the survey began. Following an upswing through 1999, track indices for red fox subsequently declined (Figure 3), remaining stable in recent years. They remain one of the most ubiquitous species recorded on the survey. Coyote track indices have fluctuated periodically, but with no long-term trends (Figure 3). Weasel track indices declined to their lowest level, but 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, but they have yet to exhibit a multi-year cyclic decline (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 we have not yet computed confidence intervals on winter track indices, it is unlikely that any of this year's observed changes were statistically significant. Because electronic data entry for all previous years is now complete, confidence intervals can be computed and should be available by next year. We are also reviewing the 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).

While there is some indication of a slow decline in marten indices since 1994, it is possible that the decline 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 is underway.

ACKNOWLEDGEMENTS

I wish to thank all those who participated in this year's survey, including DNR field staff, numerous tribal participants from the Fond du Lac, Leech Lake, Red Lake, and Grand Portage Bands, and the 1854 Authority.

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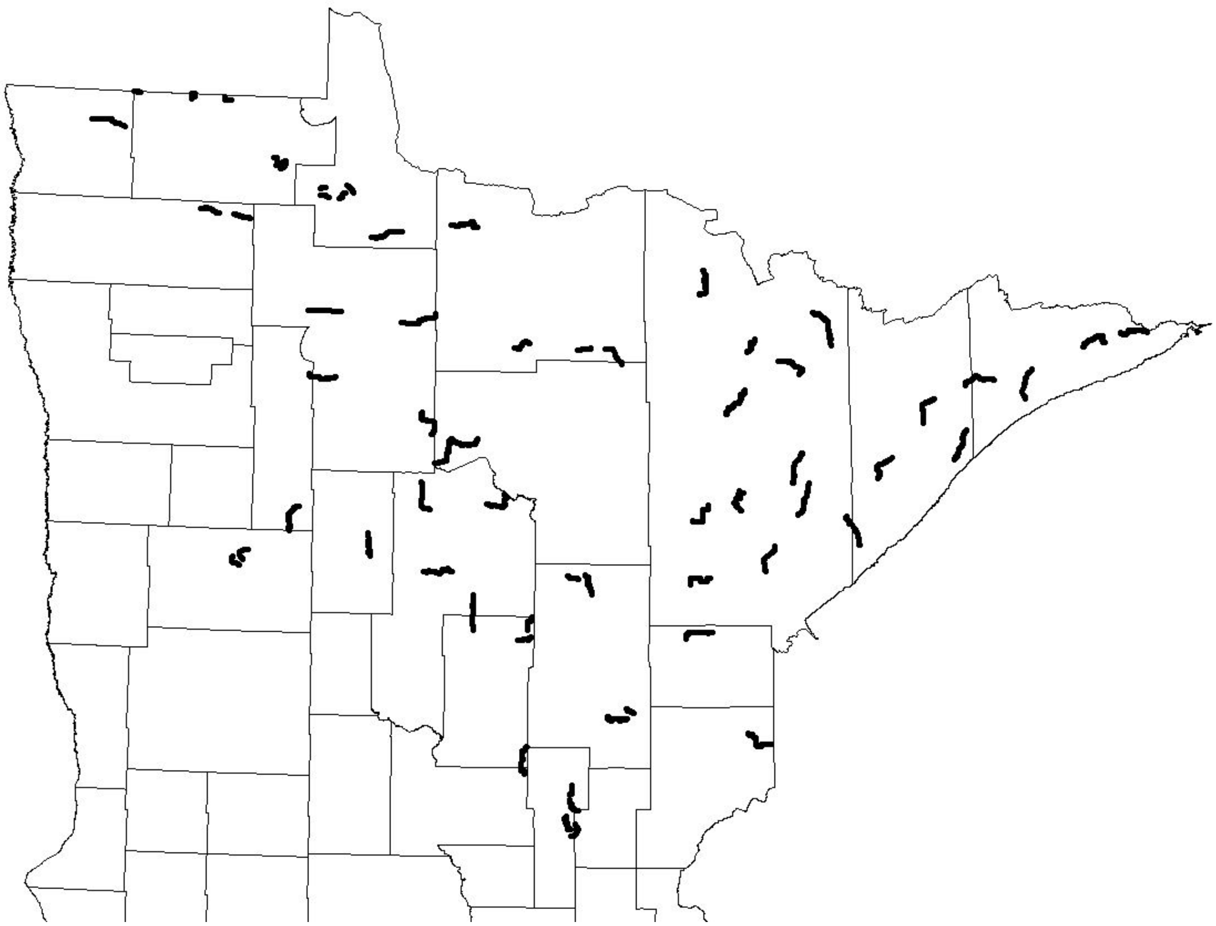

Figure 1. Locations of established furbearer winter track survey routes.

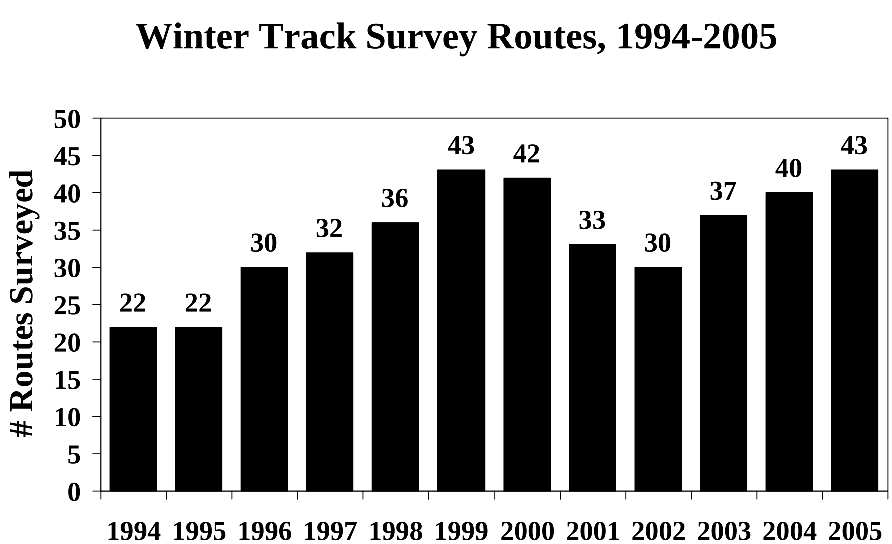

Figure 2. Number of winter track routes surveyed, 1994-2005.

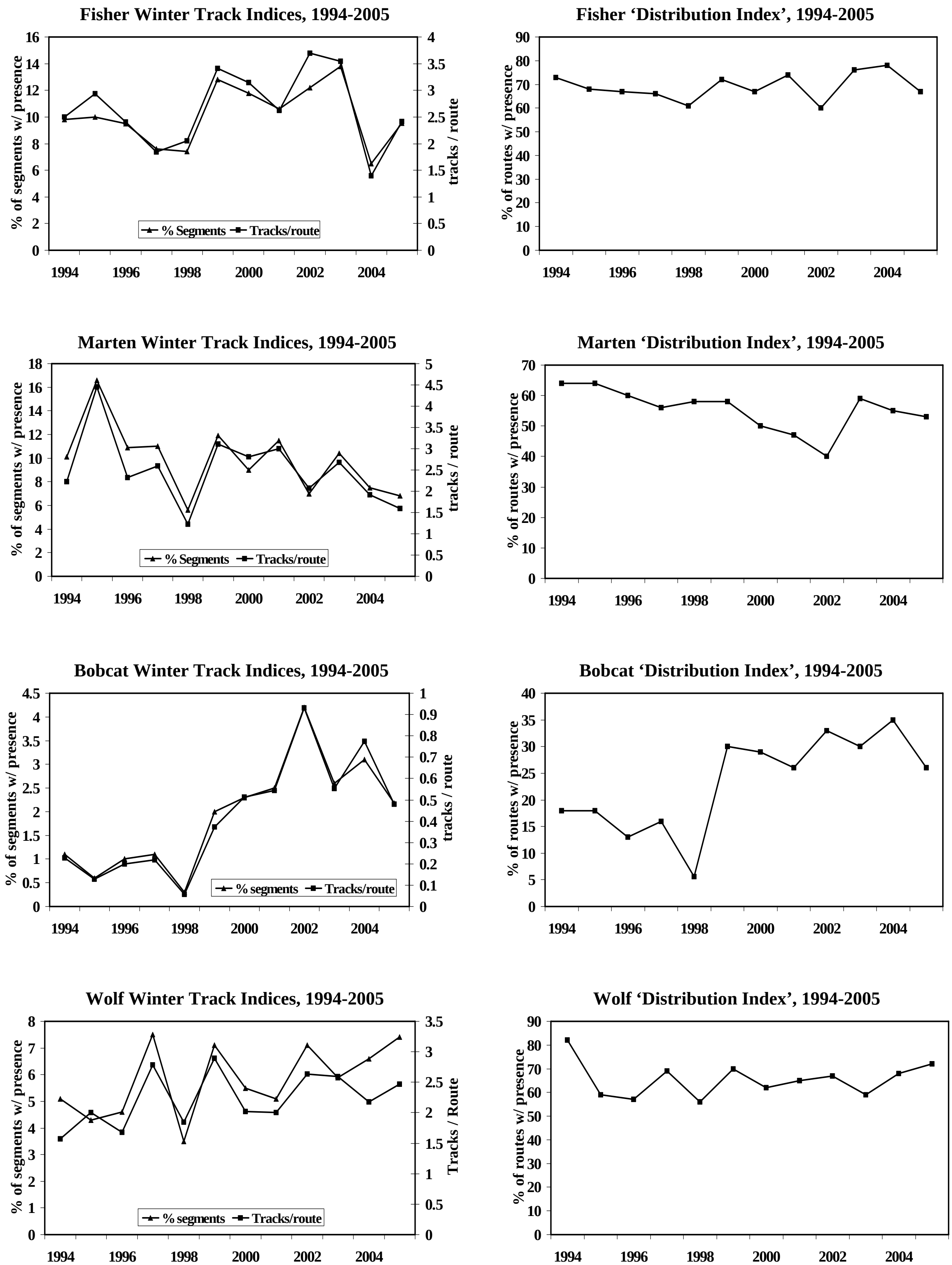

Figure 3. Winter track indices for selected species in Minnesota.

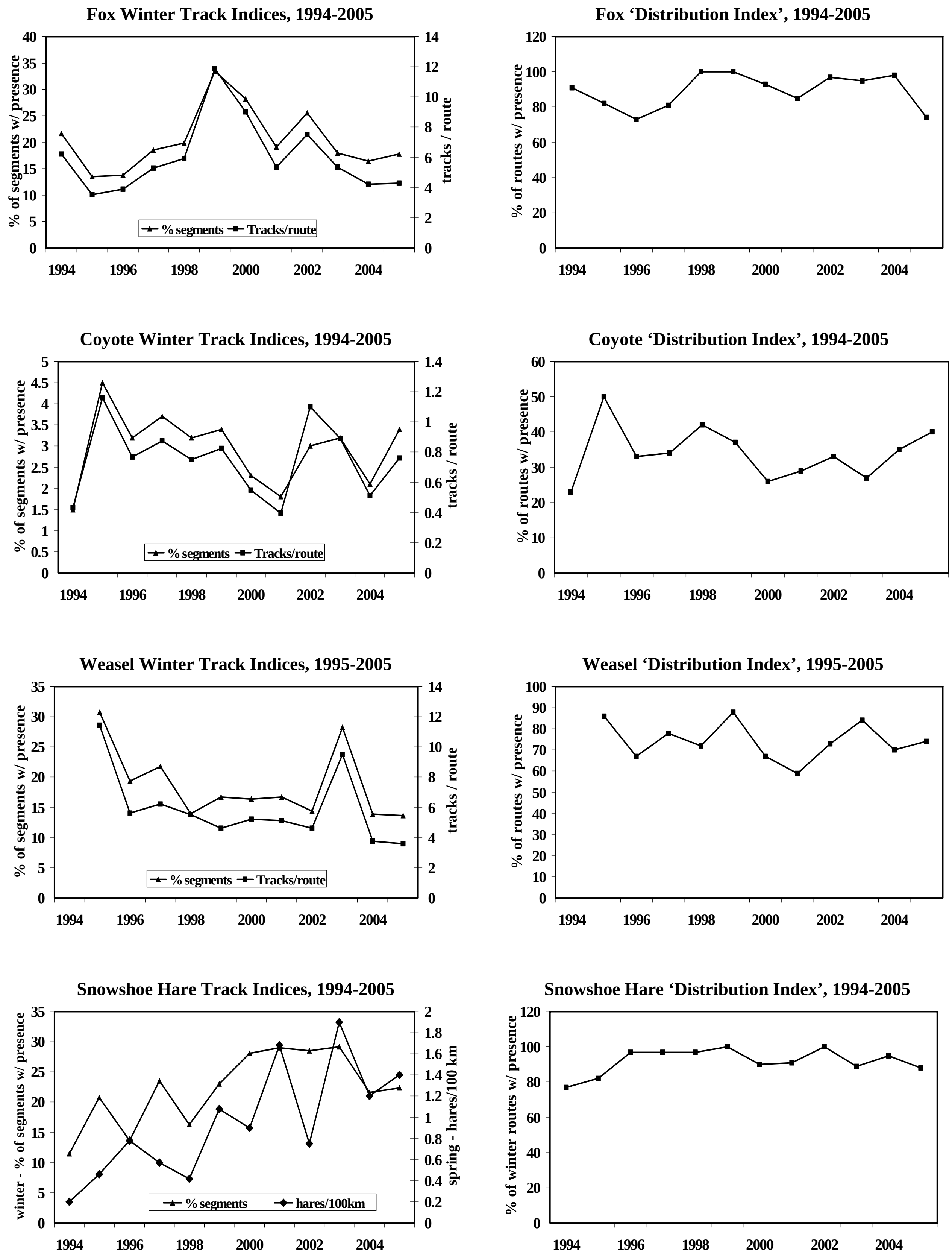

Figure 3. (continued).

Predator/Furbearer Scent Station Survey Summary, 2005

John Erb, Forest Wildlife Populations and 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 the early 1970's, the U.S. Fish and Wildlife Service initiated a carnivore survey designed primarily to monitor trends in coyote populations in the western U.S. (Linhart and Knowlton 1975). In 1975, the Minnesota DNR began to utilize similar survey methodology to monitor population trends for numerous terrestrial carnivores within the state. This year marks the 30th anniversary of the carnivore scent station survey.

METHODS

Scent station survey routes are composed of tracking stations (0.9 m diameter circle) of sifted soil with a fatty-acid scent tab placed in the middle. Scent stations are spaced at 0.5 km intervals on alternating sides of a road. During the initial years (1975-82), survey routes were 23.7 km long, with 50 stations per route. Stations were checked for presence/absence of tracks on 4 consecutive nights (old tracks removed each night), and the mean number of station visits per night was the basis for subsequent analysis. Starting in 1983, following suggestions by Roughton and Sweeny (1982), design changes were made whereby routes were shortened to 4.3 km, 10 stations/route (still with 0.5 km spacing between stations), and routes were surveyed only once on the day following route placement. The shorter routes and fewer checks allowed for an increase in the number and geographic distribution of survey routes. In either case, the design can be considered two-stage cluster sampling.

Survey routes were selected non-randomly, but with the intent of maintaining a minimum 5 km separation between routes, and encompassing the variety of habitat conditions within the work area of each survey participant. Most survey routes are placed on secondary (unpaved) roads/trails, and are completed from September through October. Survey results are currently stratified based on 3 'habitat zones' within the state (forest, farmland, and transition).

Track presence/absence is recorded at each station, and track indices are computed as the percentage of scent stations visited by each species. Confidence intervals (95%) are computed using bootstrap methods (percentile method; Thompson et al. 1998). For each of 1000 replicates, survey routes are randomly re-sampled according to observed zone-specific route sample sizes, and station visitation rates are computed for each replicate sample of routes. Replicates are ranked according to the magnitude of the calculated index, and the 25th and 975th values constitute the lower and upper bounds of the confidence interval. Pre-2001 data has not been electronically entered, so confidence intervals are not yet available for those years. When all data is electronically available, I will be considering the recommendations provided by Sargeant et al. (1998, 2003), particularly the value of utilizing route, rather than station, visitation rates. In addition, we continue to evaluate the merits of re-stratifying analysis based on ecological sections rather than the current 3-zone system.

RESULTS AND DISCUSSION

A total of 324 routes were completed this year (Figure 1). There were 3,055 operable scent stations examined on the 324 4.3 km routes. Route density varied from 1/500 km^2 in the Forest Zone to 1/1,155 km^2 in the Farmland (Figure 1).

For the first time in many years, red fox were no longer the most frequently detected species across routes. Statewide, route visitation rates (% of routes with detection) were highest for skunk (38% of all routes), followed by raccoon and domestic cat (35%), red fox (34%), dog (19%), and coyote (18%). Regionally, route visitation rates were as follows: red fox – Farmland (FA) 24%, Transition (TR) 26%, Forest (FO) 42%; coyote – FA 41%, TR 14%, FO 13%; skunk – FA 63%, TR 47%, FO 24%; raccoon – FA 68%, TR 48%, FO 16%; domestic cat – FA 54%, TR 55%, FO 17%; and dog – FA 34%, TR 30%, FO 7%. Figures 2-5 show station visitation indices (% of stations visited) from the survey's inception through the current year.

Although the survey is largely intended to document long-term trends in populations, confidence intervals improve interpretation of the significance of annual changes. Based on the presence/absence of interval overlap, the only significant change from last year was an increase in raccoon indices in the farmland zone. This follows a significant decrease observed last year.

Point estimates for red fox indices in the farmland and transition zones continue their steady decline that began in 1990 (Figure 2 and 3), while coyote indices continue to steadily increase (farmland zone only). Farmland raccoon indices increased for 15 years, then generally declined for 7, but significantly increased this year (Figure 2). In general, indices for most other species/zones have fluctuated but have not exhibited any notable long-term trends.

ACKNOWLEDGEMENTS

I wish to thank all of the cooperators who participated in the 2005 survey: DNR Division of Wildlife staff; Superior National Forest; Agassiz, Rydell, Sherburne, Tamarac, and Minnesota Valley National Wildlife Refuges; 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; St. Croix National Scenic Waterway; and Richard Nelles and Tom Stuber.

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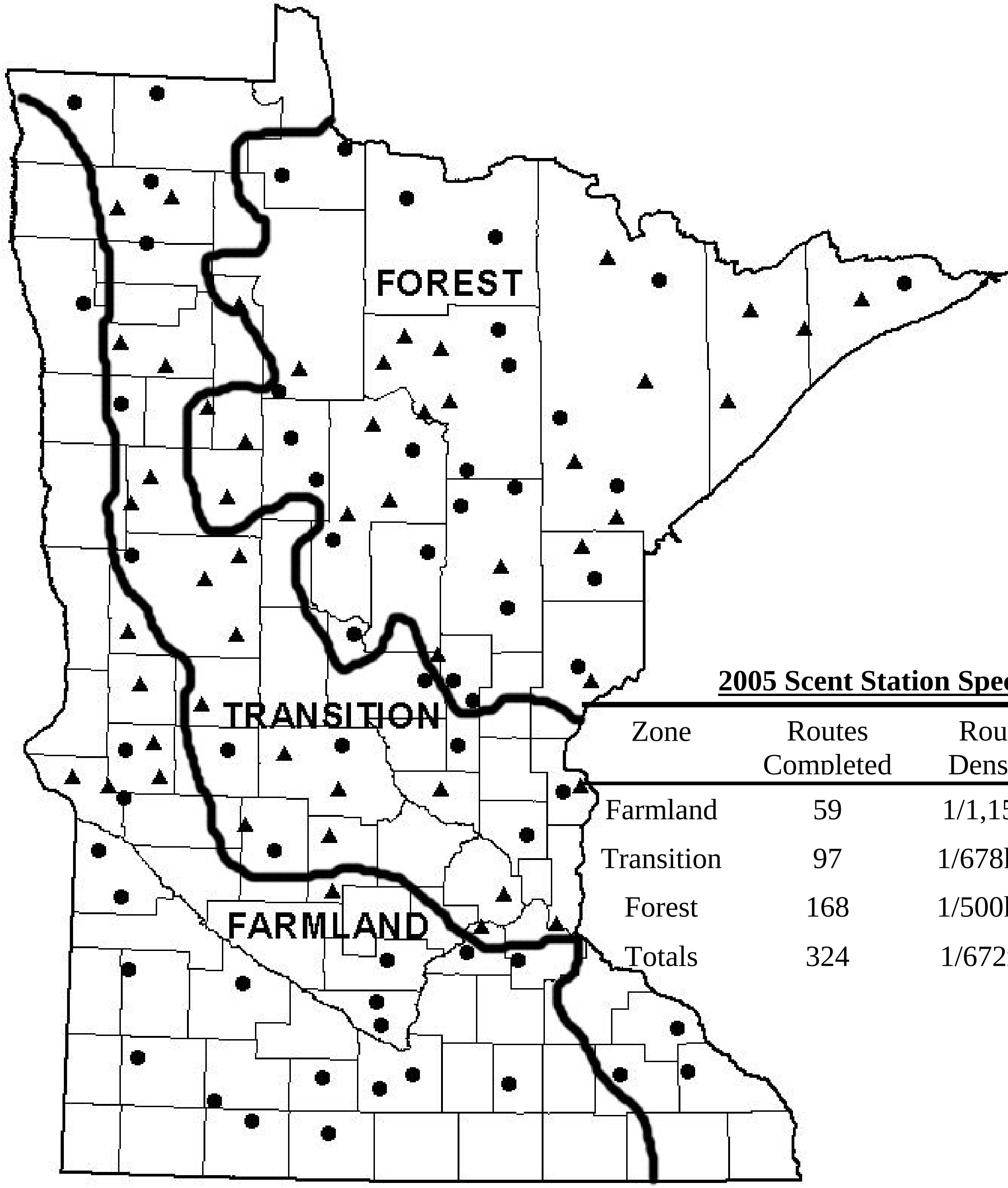


2005 Scent Station Specifics

Zone	Routes Completed	Route Density	Station Nights
Farmland	59	1/1,155k	565
Transition	97	1/678km^2	900
Forest	168	1/500km^2	1,590
Totals	324	1/672mi^2	3,055

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 2005 route specifics.

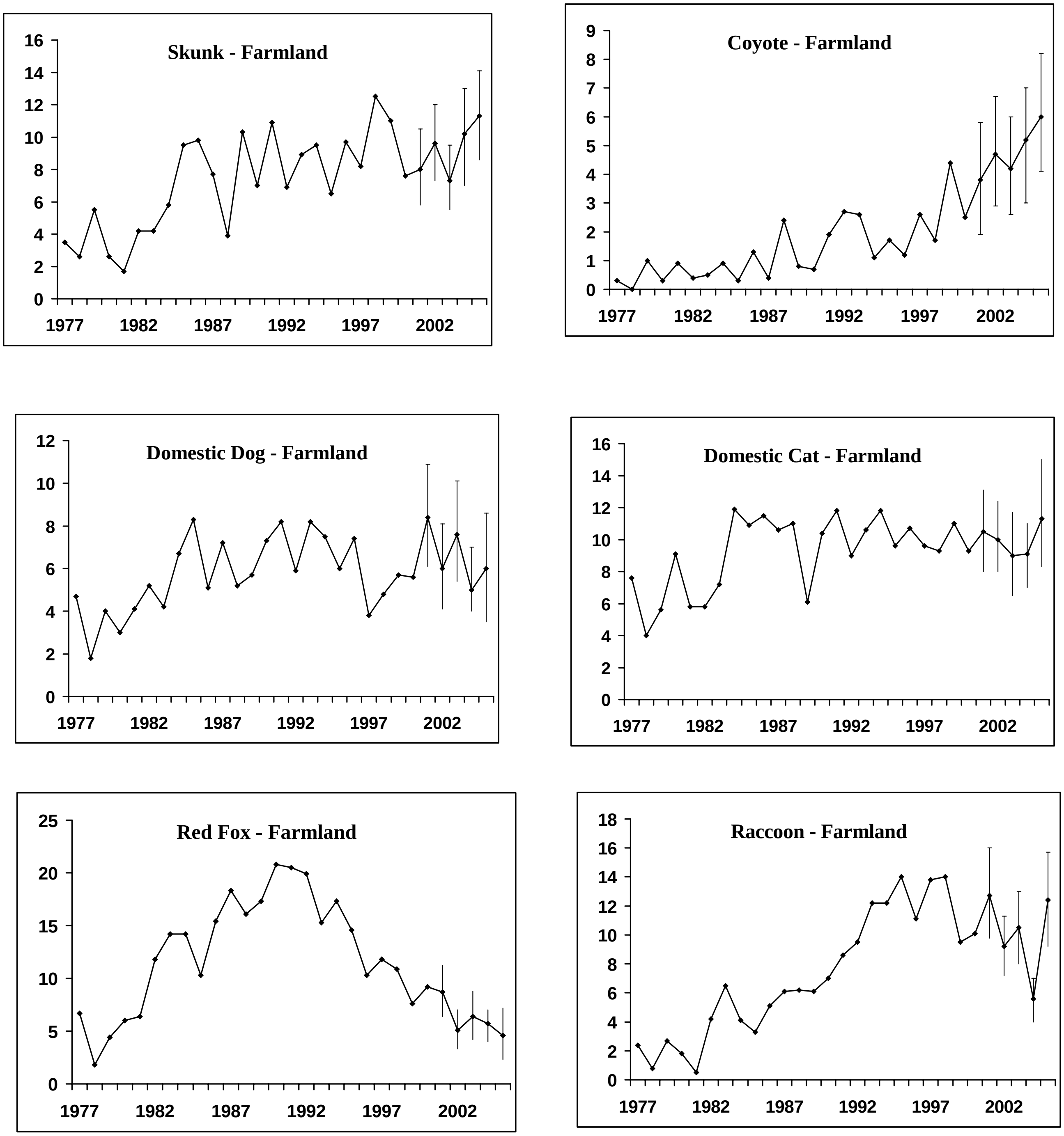


Figure 2. Percentage of scent stations visited by selected species in the Farmland Zone of Minnesota, 1977-2005.

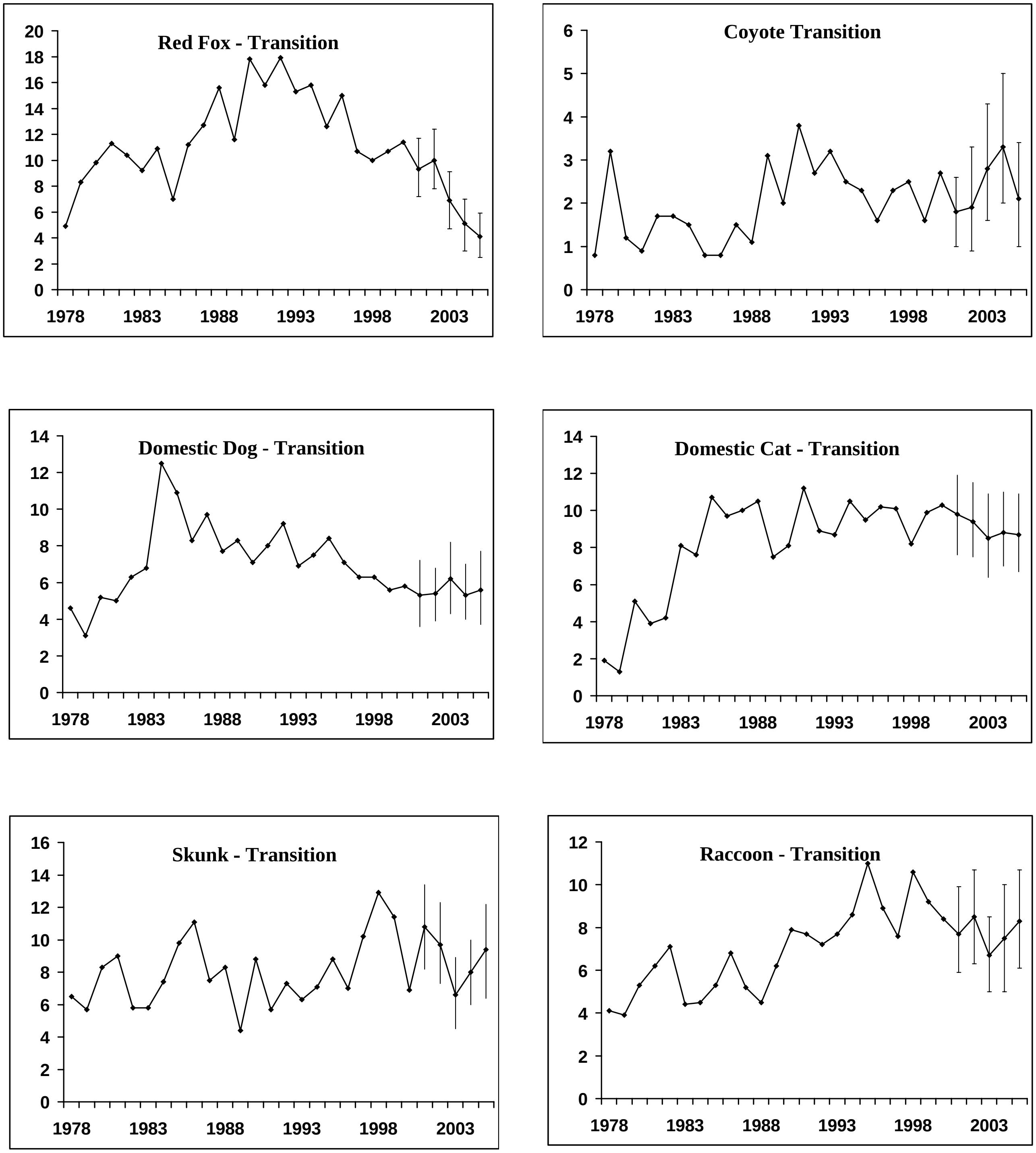


Figure 3. Percentage of scent stations visited by selected species in the Transition Zone of Minnesota, 1978-2005.

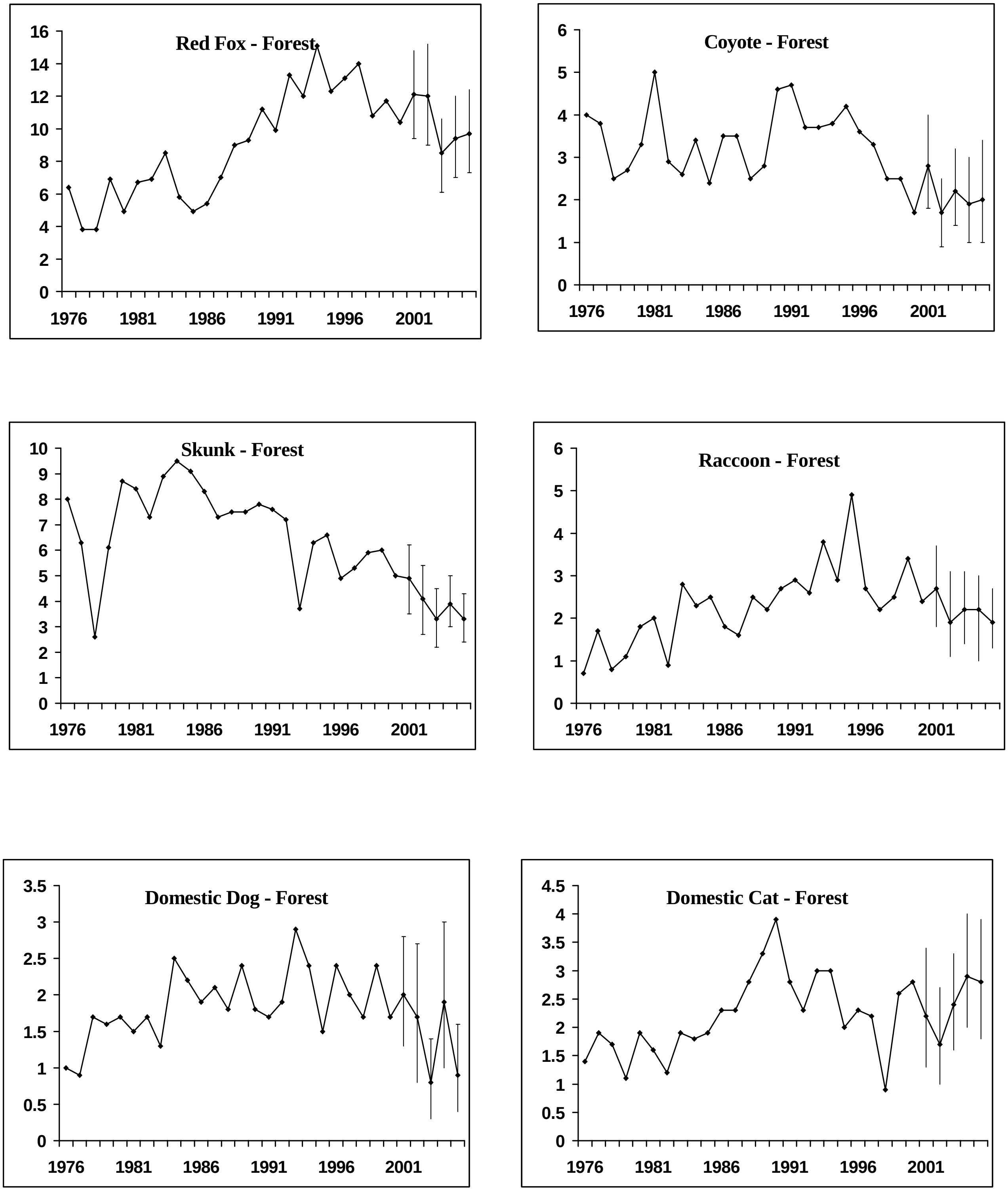
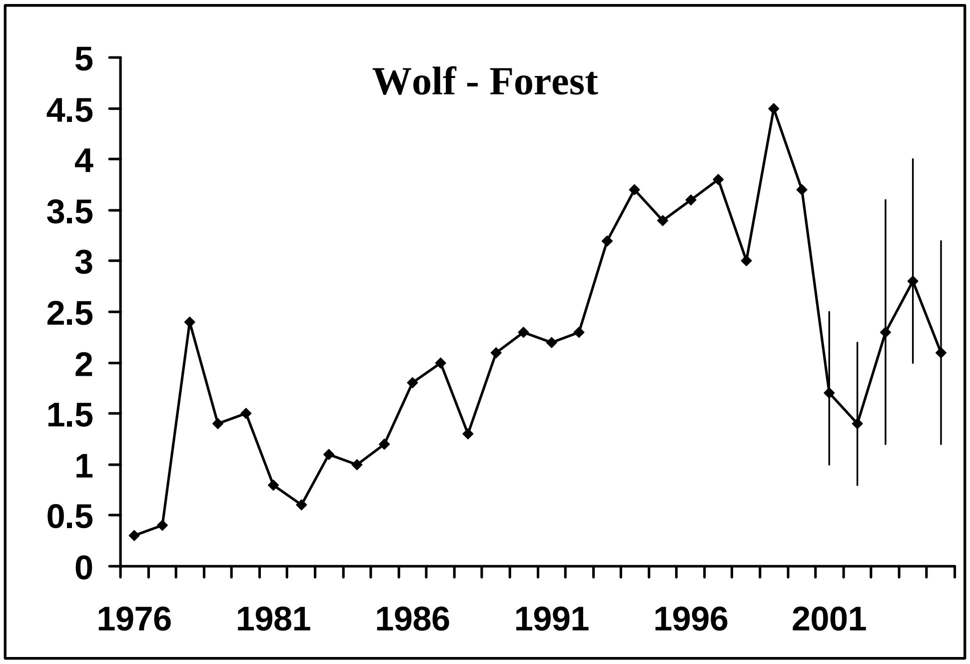


Figure 4. Percentage of scent stations visited by selected species in the Forest Zone of Minnesota, 1976-2005.



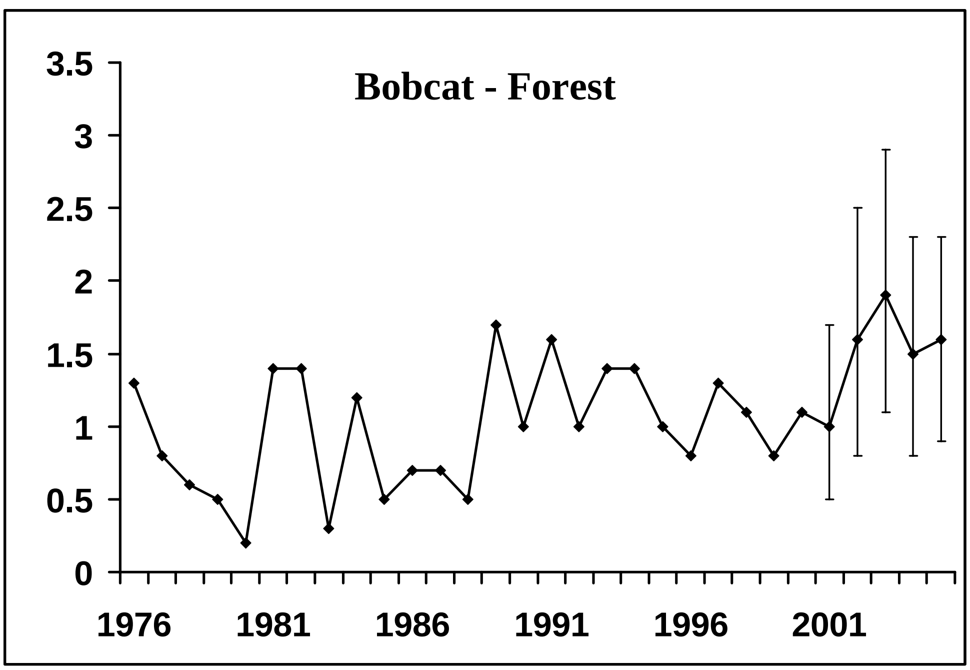


Figure 5. Percentage of scent stations visited by wolves and bobcat in the Forest Zone of Minnesota, 1976-2005.

FOREST WILDLIFE POPULATIONS

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Grouse Surveys in Minnesota During Spring 2006

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SUMMARY OF FINDINGS

Surveys for ruffed grouse (*Bonasa umbellus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and greater prairie-chickens (*Tympanuchus cupido pinnatus*) were conducted during April and May 2006. Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 1.0 (95% confidence interval = 0.9–1.1) drums/stop (dps). That was significantly greater than the 0.8 (0.7–0.9) dps observed during 2005 and similar to counts from 2001.

During the spring 2006 survey 1,463 sharp-tailed grouse were observed at 159 dancing grounds. The mean number of sharp-tailed grouse per dancing ground was 8.2 (6.9–9.7) in the East Central survey region, 9.9 (8.7–11.1) in the Northwest region, and 9.2 (8.3–10.1) statewide. Index values in the Northwest and statewide were significantly less during 2006 than during 2005, but the statewide index value was near the most recent 20-year mean.

We counted 1,766 male prairie-chickens and located 152 booming grounds. Within survey blocks we observed 0.29 leks/mi^2 (0.11 leks/km^2) and 13.9 males/lek. Approximately 21% fewer males and 18% fewer leks were counted in survey blocks during spring 2006 than during spring 2005. Densities observed during 2006, however, were greater than the means observed for 1993–2002.

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 (Figure 1). 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 grouse 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.

Greater Prairie-Chickens

During the early 1800s greater prairie-chickens (*Tympanuchus cupido pinnatus*) were present along the southern edge of Minnesota. Their range expanded and contracted dramatically during the next 150 years. Currently, most prairie-chickens in Minnesota occur along the beach ridges of glacial Lake Agassiz in the west (Figure 1). The population of prairie-chickens there was expanded southward to the upper Minnesota River valley by a series of relocations during 1998–2005. Hunters in Minnesota have harvested approximately 100 prairie-chickens annually since 2003 when a limited-entry hunting season was opened for the first time since 1942.

Like sharp-tailed grouse, prairie-chickens gather at leks during spring. The leks of prairie-chickens are also called booming grounds because males make a low-frequency, booming vocalization during their displays. From 1974 to 2003 the Minnesota Prairie Chicken Society coordinated annual counts of prairie-chickens. During 2004 the Minnesota Department of Natural Resources (DNR) began coordinating the annual prairie-chicken surveys, and a standardized survey design was adopted.

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 4 survey regions and for the entire state. To determine regional boundaries, I evaluated Spearman's rank correlations among annual mean drum counts in the 7 forested sections of the Ecological Classification System (ECS) in Minnesota. Drum counts during the last 2 full cycles of the ruffed grouse population (i.e., 1984–2004) were highly correlated among the 4 sections comprising the Laurentian Mixed Forest province (i.e., Northeast region), which covers the core and bulk of the range of ruffed grouse in Minnesota (Figure 2). Apparent long-term population dynamics were noticeably different and correlations were lower for the other 3 ECS sections (i.e., Northwest, Southwest, and Southeast regions), which are along the periphery of ruffed grouse range. The new survey regions are similar to the traditional ruffed grouse zones. The Southeast region and zone are identical, the Southwest region is analogous to the Central Hardwoods zone, the Northwest region consists of the western half of the Northwest zone, and the Northeast region includes the Northeast and North Central zones (Figure 2).

As an intermediate step to summarizing survey results by region, I calculated the mean number of dps for each route. Mean index values for survey regions were calculated as the mean of route-level means for all routes occurring within the region. Some routes crossed regional boundaries, so data from those routes were included in the means for both regions. The number of routes within regions was not proportional to any meaningful characteristic of the regions or ECS section upon which they were based. Therefore, mean index values for the Northeast region and the state were calculated as the weighted mean of index values for the 4 and 7 ECS sections, respectively, they included. 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 2 caption for full section names). Only approximately half of the Minnesota and Northeast Iowa Morainal (MIM) and Paleozoic Plateau (PP) sections were within the ruffed grouse range, so the area used to weight drum index means for those sections was reduced accordingly using subsection boundaries.

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 CIs for mean index values for survey regions and the whole state. Limits of each CI were defined as the 2.5th and 97.5th percentiles of the bootstrap frequency distribution.

I calculated mean index values and CIs for 1982–2006. Data from earlier years were not analyzed because they were not available in a digital form.

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 Area staff and their volunteers between sunrise and 2.5 hours after sunrise during April and early-May 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.

I calculated the mean number of sharp-tailed grouse per dancing ground (i.e., index value), averaged across dancing grounds within the NW and EC regions and statewide for spring 2006. The number of grouse included those recorded as males and those recorded as being of unknown sex. 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 2 years, therefore, I analyzed separately sets of data that included counts of birds only from dancing grounds that were surveyed during both years. Although the dancing grounds in the separate data sets 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 a separate data set of comparable leks to calculate the mean difference in the number of birds counted per dancing ground between 2005 and 2006.

I ran a similar analysis for survey data from 2004 and 2005, including calculating mean index values and differences between years, because there was an error in the results I presented in the 2005 Grouse Survey Report. I had not removed dancing grounds with <2 male grouse before calculating the means, so the reported index values were less than they should have been. For example, although observers counted 1,824 grouse while visiting 193 lek sites, only 1,818 grouse were observed at the 161 leks with ≥2 males (i.e., a conservative definition of a dancing ground).

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 regions and the whole state.

The current delineation between the NW and EC survey regions was based on ECS section boundaries (Figure 1), with the NW region consisting of the Lake Agassiz & Aspen Parklands and Northern Minnesota & Ontario Peatlands sections and the EC region consisting of selected subsections of the Northern Minnesota Drift & Lake Plains, Western Superior Uplands, and Southern Superior Uplands sections. The 2005 Grouse Survey Report detailed the transition from the former to the current delineation of regions.

Greater Prairie-Chickens

During the few hours near sunrise from late-March until mid-May cooperating biologists 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 3). 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 3).

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. Females are also more difficult to detect because they do not vocalize or display like males. Counts of males and unknowns, rather than females, therefore, were used to make comparisons between core and peripheral ranges and between years.

RESULTS & DISCUSSION

Ruffed Grouse

Observers from 16 cooperating organizations surveyed 128 routes between 9 April and 19 May 2006. Most routes (87%) were run between 20 April and 8 May. Cooperators included the DNR Divisions of Fish & Wildlife and Ecological Services; Chippewa and Superior National Forests (USDA Forest Service); Fond du Lac, Grand Portage, 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 52%, 35%, and 13% of 122 routes, respectively. Survey conditions during 2005 were Excellent, Good, and Fair on 48%, 39%, and 12% of routes, respectively.

Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 1.0 (95% confidence interval = 0.9–1.1) drums/stop (dps) during 2006. That was similar to counts during 2001 and significantly greater than the 0.8 (0.7–0.9) dps observed last year (Figure 4). Increases of 0.2–0.3 dps from 2005 means were observed in the Northeast, Northwest, and Southwest regions but not in the Southeast region (Figure 5). Drum counts by survey region were 1.1 (0.9–1.2) dps in the Northeast, 1.0 (0.8–1.4) dps in the Northwest, 0.8 (0.4–1.2) dps in the Southwest, and 0.6 (0.2–1.1) dps in the Southeast. Median index values for bootstrap samples were similar to observed means, so no bias-correction was necessary.

Based upon the drum count index, ruffed grouse densities throughout most of Minnesota during spring 2006 were likely greater than spring densities during 2004 and 2005. This year, therefore, could mark the beginning of the next cyclical increase in the population. Given the variability in the cycle and uncertainties about the survey results, however, such a conclusion cannot be made until at least next year.

Sharp-tailed Grouse

A total of 1,463 sharp-tailed grouse was observed at 159 dancing grounds with ≥2 male grouse (or grouse of unknown sex) during spring 2006. The resulting index value was similar to the mean from the last 26 years (Figure 6). Leks with ≥2 grouse were visited a mean of 1.9 times, and 125 historic lek sites with ≤1 male were also surveyed at least once.

The index value in the EC region has remained the same at 8–9 grouse/lek since at least 2004 (Table 1). The index values among comparable leks in the NW region and statewide declined by 3.6 (95% CI = 1.9–5.3) and 2.5 (95% CI = 1.3–3.7) grouse/lek, respectively, between 2005 and 2006. Somewhat smaller declines also occurred in the NW and statewide between 2004 and 2005, despite annual means that increased slightly that year. The apparent paradox was caused by differences in the leks included in each annual data set compared to the set of “comparable” leks. The discrepancies highlight the problems with making inferences from samples that cannot be assumed to be representative of the population of interest.

Table 1. Number of sharp-tailed grouse observed per dancing ground in Minnesota during spring.

	Statewide			Northwest[a]			Eastcentral[a]		
Year[b]	Mean	95% CI[c]	*n*[d]	Mean	95% CI[c]	*n*[d]	Mean	95%CI[c]	*n*[d]
2004	11.2	10.1–12.3	183	12.7	11.3–14.2	116	8.5	7.2– 9.9	67
2005	11.3	10.2–12.5	161	13.1	11.5–14.7	95	8.8	7.3–10.2	66
2006	9.2	8.3–10.1	159	9.9	8.7–11.1	95	8.2	6.9– 9.7	64
$\text{Difference}_{04\text{-}05}$	-1.3	-2.2– -0.3	186	-2.1	-3.5– -0.8	112	0.0	-1.0– 1.1	74
$\text{Difference}_{05\text{-}06}$	-2.5	-3.7– -1.3	126	-3.6	-5.3– -1.9	70	-1.1	-2.6– 0.6	56

[a] Survey regions; see Figure 1.
[b] Year or the mean difference between comparable leks during consecutive years.
[c] 95% CI = 95% confidence interval for the mean. It is an estimate of the uncertainty in the value of the mean.
[d] *n* = number of dancing grounds in the sample.

Greater Prairie-Chickens

Observers from at least 4 cooperating organizations counted prairie-chickens during spring 2006. Cooperators included the DNR Division of Fish and Wildlife, Fergus Falls and Detroit Lakes Wetland Management Districts (U.S. Fish & Wildlife Service), University of Minnesota–Crookston, and The Nature Conservancy. Observers located 152 booming grounds and counted 1,766 male prairie-chickens (Table 2). Within hunting permit areas we observed 0.09 leks/mi^2 (0.04 leks/km^2) and 12.2 males/lek. Minimum counts in Table 2 and the densities calculated from them are not comparable among permit areas or years because they included surveys that were conducted outside of the survey blocks and did not follow a spatial sampling design.

Table 2. Minimum abundance of prairie-chickens within and outside of hunting permit areas in western Minnesota during spring 2006. 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	4	0	66
407A	295.1	7	58	22
407B	171.9	28	282	0
407C	161.1	25	467	0
420A	168.1	24	347	0
420B	101.3	17	182	0
421A	236.6	11	77	42
PA subtotal[b]	1,236.0	116	1,413	130
Outside PAs[c]	NA[d]	36	353	38
Grand total	NA	152	1,766	168

[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.

Each booming ground was observed on a median of 2 (mean = 1.9) different days, but 39% of leks were observed only once. Attendance of males at prairie-chicken leks varies among days and by time of day. 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 untested 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.

Within survey blocks we counted 1,110 males (includes birds of unknown sex) on 80 leks (Table 3). That was 21% fewer males and 18% fewer leks than were counted in survey blocks during spring 2005. Leks were defined as having ≥2 males, so observations of single males were excluded from summaries by survey block. During spring 2006 we observed 0.35 leks/mi^2 (0.13 leks/km^2) and 15.1 males/lek in survey blocks in the core of the range, whereas we observed 0.21 leks/mi^2 (0.08 leks/km^2) and 11.0 males/lek in peripheral blocks (Table 3). The densities of prairie-chickens observed during 2006 were greater than the means of 0.2 leks/mi^2 and 11.5 males/lek observed in survey blocks from 1993 until 2002.

Table 3. Counts of prairie-chickens within survey blocks in Minnesota.

Range[b]	Survey Block	Area	2006		Change from 2005[a]	
		(miles^2)	Leks	Males[c]	Leks	Males[c]
Core	Polk 2	16.2	4	65	-5	-54
	Norman 1	16.1	3	42	-2	13
	Norman 3	16.0	6	90	1	22
	Clay 1	17.6	9	155	1	10
	Clay 2	16.0	2	101	-1	-7
	Clay 3	16.1	9	143	0	-25
	Clay 4	14.9	5	57	-1	-11
	Wilkin 1	15.4	9	93	-1	-87
	Wilkin 3	16.1	6	71	0	-30
	Otter Tail 1	15.9	3	30	1	-1
	Core subtotal	160.2	56	847	-7	-170
Periphery	Polk 1	15.9	4	48	-6	-41
	Norman 2	16.3	5	62	-3	-37
	Mahnomen	16.1	3	48	-2	-19
	Becker 1	16.0	3	24	-1	-17
	Becker 2	16.1	4	42	0	-1
	Wilkin 2	16.1	2	16	0	-7
	Otter Tail 2	15.7	3	23	1	-5
	Periphery subtotal	112.2	24	263	-11	-127
Grand total		272.4	80	1,110	-18	-297

[a] The 2005 count was subtracted from the 2006 count, so a negative value indicates a decline.
[b] Survey blocks were classified as either mostly within the hunting permit areas (core) or mostly outside the permit areas (periphery).
[c] Includes birds recorded as being of unknown sex but excludes lone males not observed at a booming ground.

ACKNOWLEDGEMENTS

I sincerely appreciate the efforts of all the DNR staff and volunteer cooperators who conducted and helped coordinate the grouse surveys. I also thank Laura Gilbert for helping with data entry and archiving and Mark Lenarz for reviewing an earlier draft of this report.

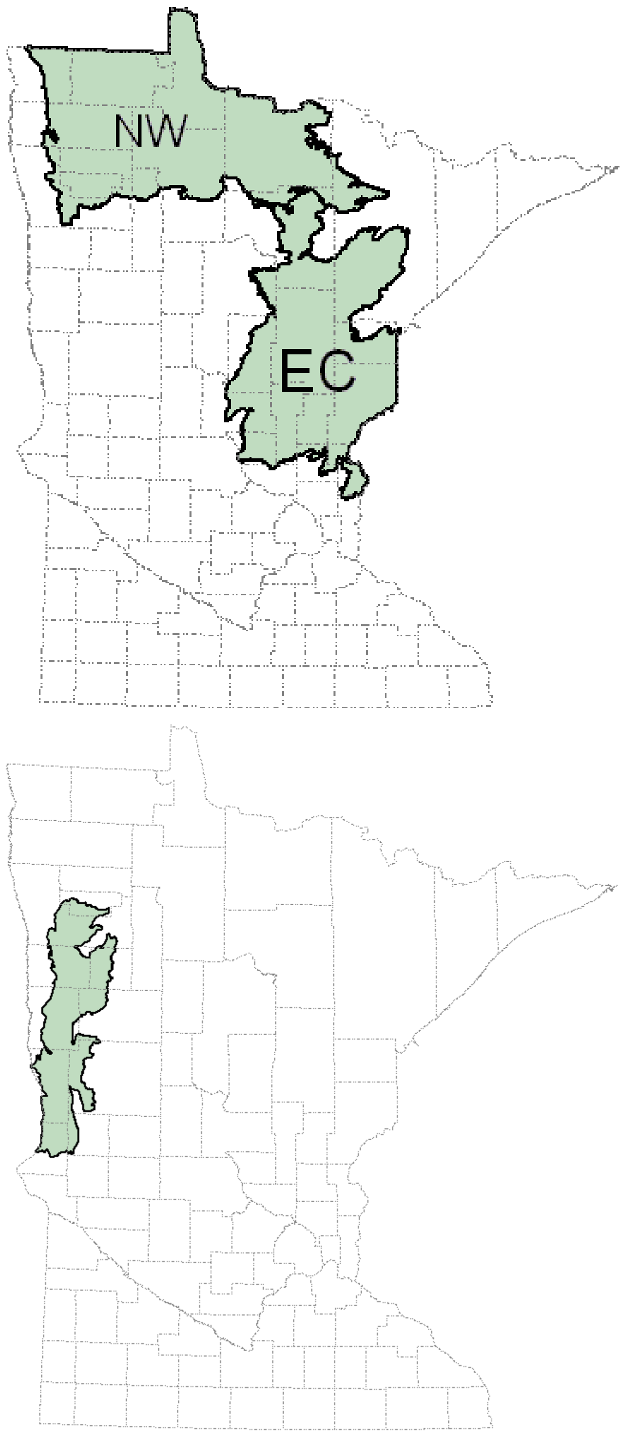


Figure 1. Northwest (NW) and East Central (EC) survey regions for **sharp-tailed grouse** (top panel) and primary range of **greater prairie-chickens** (bottom panel) relative to county boundaries in Minnesota. The sharp-tailed grouse regions were based largely on boundaries of ECS Subsections, whereas the prairie-chicken range was based on ECS Land Type Associations.

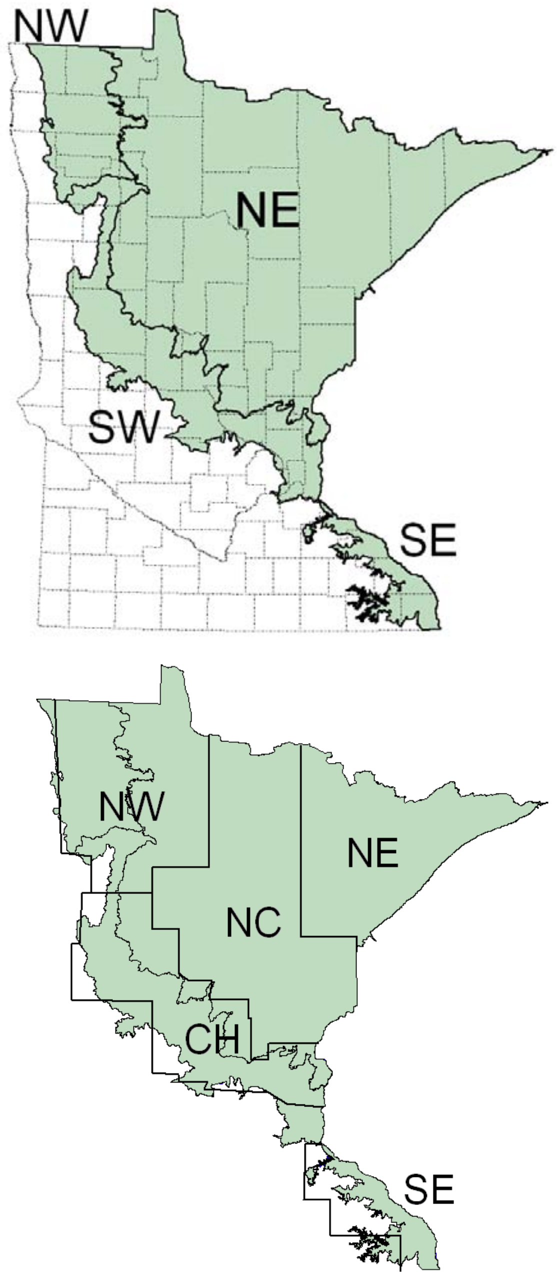


Figure 2. **Ruffed grouse** survey regions (shaded, curved boundaries). Top panel: regions are labeled and overlaid on counties (dashed lines). Bottom panel: former survey zones (straight boundaries) are labeled and overlaid on regions. The northeast (NE) region corresponds to the northeast (NE) and northcentral (NC) zones. It includes the Northern Minnesota & Ontario Peatlands, Northern Superior Uplands, Northern Minnesota Drift & Lake Plains, and Western Superior Uplands sections, including a small portion of the Southern Superior Uplands in eastern Carlton County. The northwest (NW) region corresponds to the northwest (NW) zone and consists of the Lake Agassiz & Aspen Parklands section. The southwest (SW) region is similar to the central hardwoods (CH) zone and consists of the northern half of the Minnesota and Northeast Iowa Morainal section. The southeast (SE) region is identical to the southeast (SE) zone and consists of the eastern half of the Paleozoic Plateau section.

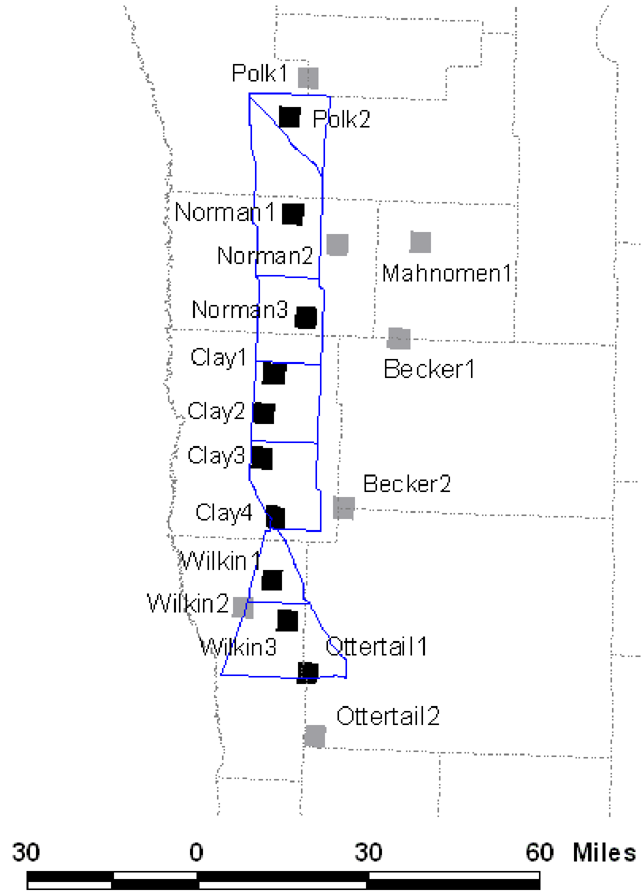
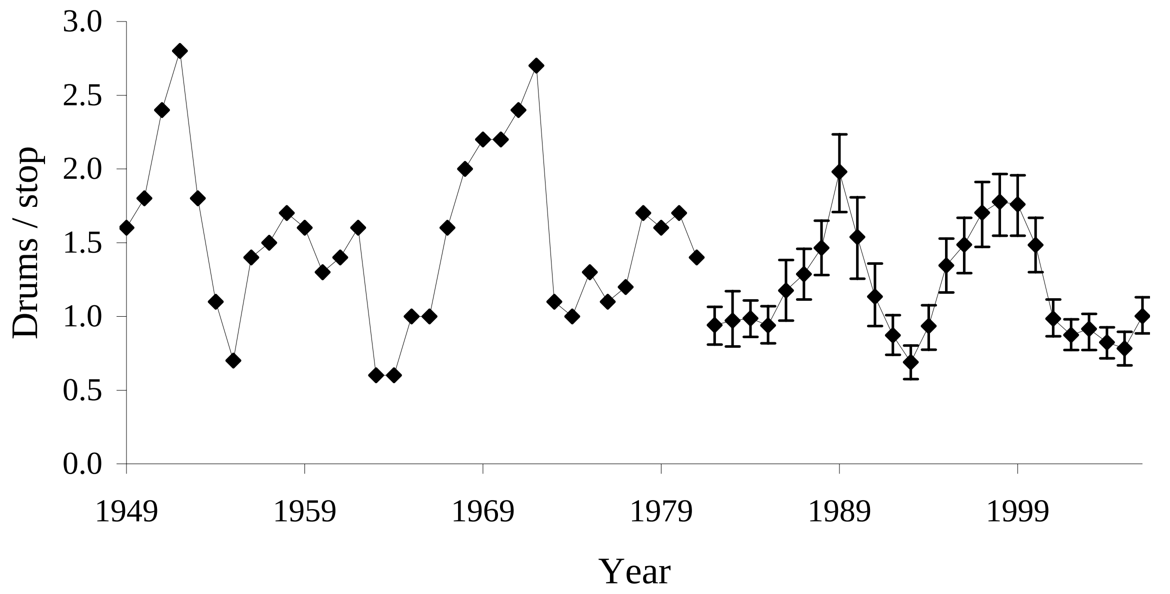


Figure 3. Survey blocks (labeled squares) and hunting permit area boundaries (solid lines) for **prairie-chickens** in western Minnesota. Survey blocks were designated as being in either the core (black) or periphery (gray) of the range. Blocks were named after the counties (dashed lines) in which they were primarily located. Permit areas are ordered from north to south: 405A, 407A, 407B, 407C, 420A, 420B, and 421A.



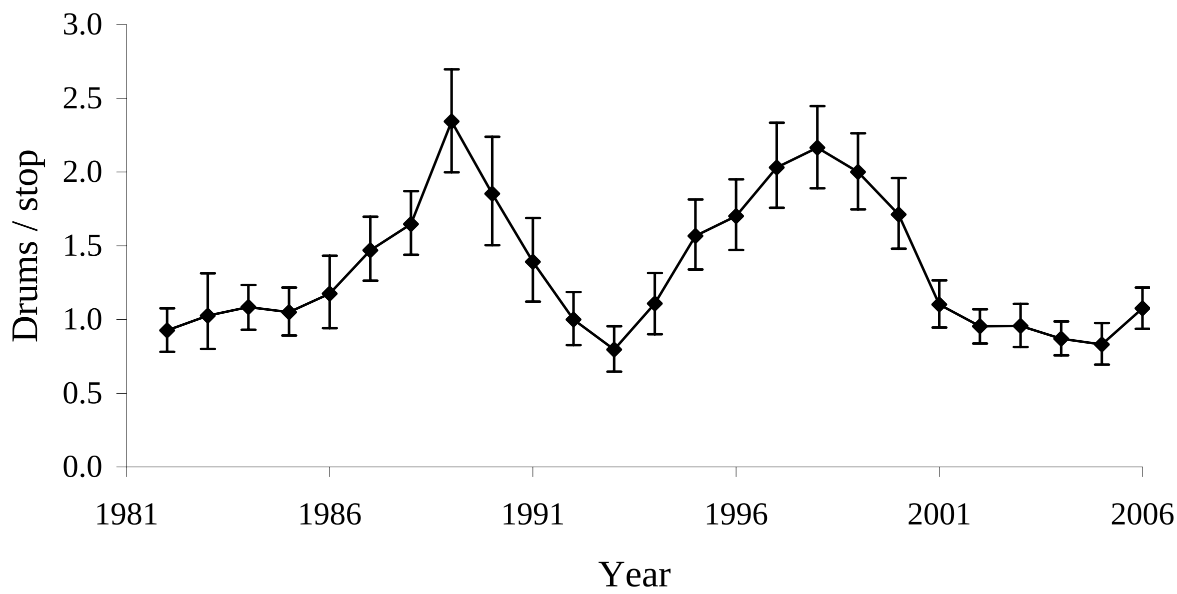


Figure 4. Ruffed grouse drum count index values in **Minnesota** (top) and just the **Northeast** region (bottom). Vertical error bars represent 95% confidence intervals based on bootstrap samples. Statewide means before 1982 were not re-analyzed with the current methods, so confidence intervals were not available. The difference in index values between 1981 and 1982 reflected a real decrease in drums counted, not an artifact of the change in analysis methods.

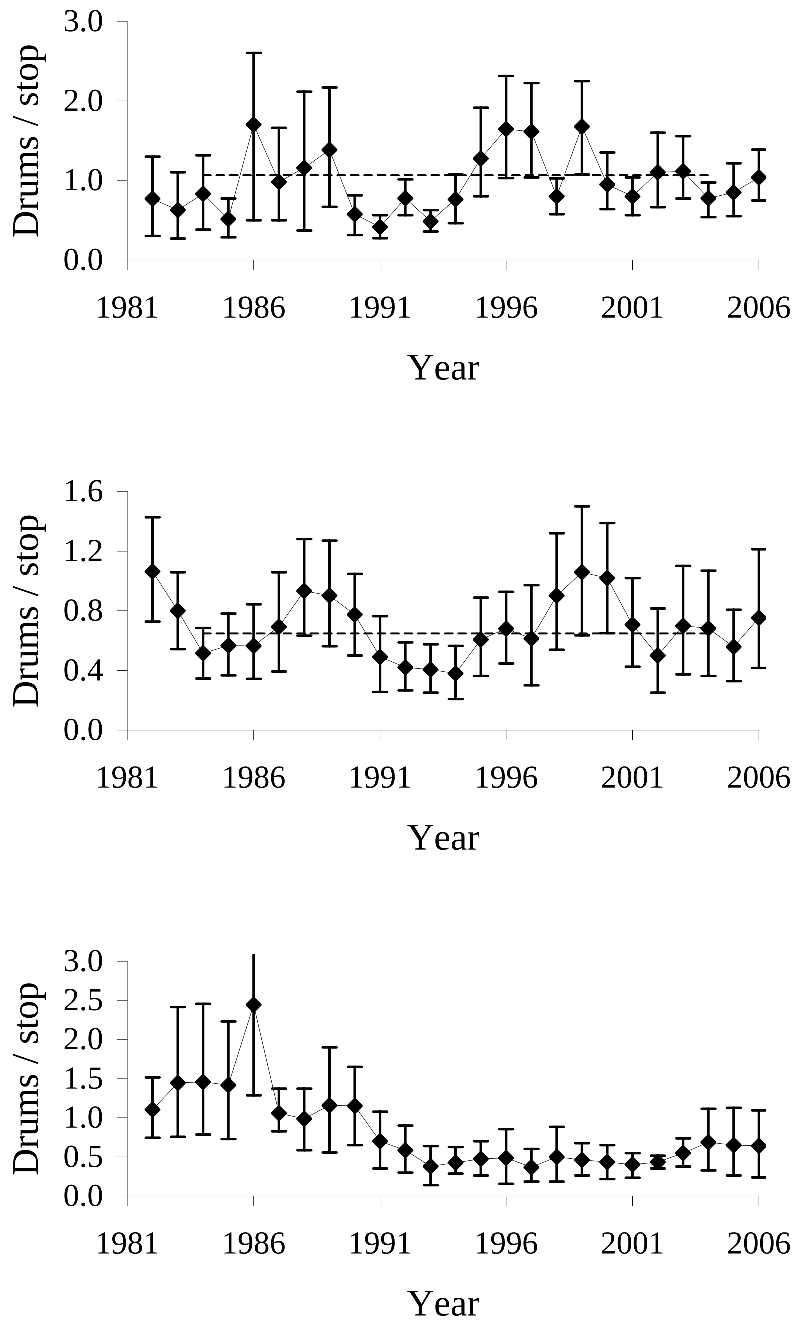


Figure 5. Ruffed grouse drum count index values in the **Northwest** (top), **Southwest** (middle), and **Southeast** (bottom) survey regions of Minnesota. Dashed horizontal lines indicate the mean from 1984 to 2004. Vertical error bars represent 95% confidence intervals based on bootstrap samples. One error bar in the bottom panel was truncated.

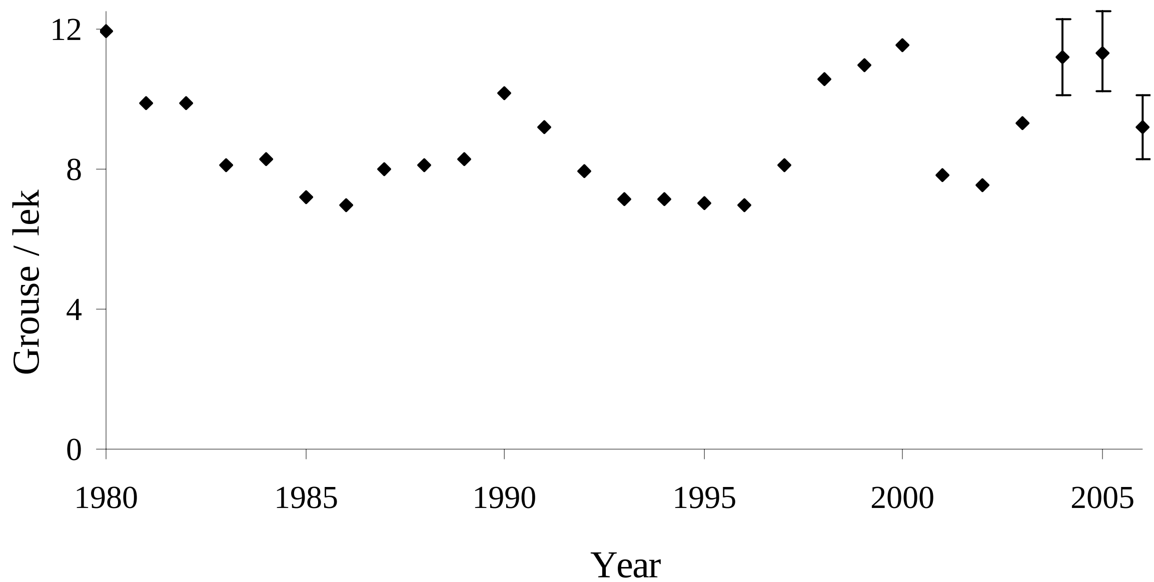
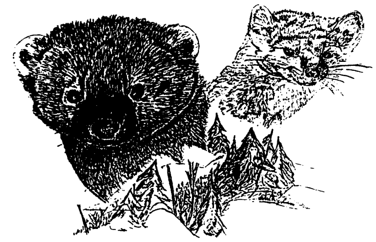


Figure 6. Mean number of **sharp-tailed grouse** observed in Minnesota during spring surveys of dancing grounds. Vertical error bars, which were not calculated for 1980–2003, represent 95% confidence intervals based on bootstrap samples. No line connects the annual means because they are not based on comparable samples of leks.



Registered Furbearer Population Modeling
2006 Report

John Erb, Forest Wildlife Populations and 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. However, juvenile survival adjustments are made for bobcats and fisher during cyclic lows in hare abundance and following severe winters, particularly those where northern deer populations decline. For juvenile marten, survival is adjusted downward during apparent lows in small mammal abundance. 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 1980s, 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, but are periodically adjusted as noted above. In some cases, parameter adjustments for previous years are delayed until additional data on prey abundance trends is available. Hence, population estimates reported in previous reports may not always match those reported in current reports. 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 2005 registered DNR trapping and hunting harvest was 590, down ~ 6% from last year's record of 631 (Table 1). Trapping harvest declined 20%, while hunting harvest increased 66%. Modeled harvest, which includes tribal take, was 638. Based on population modeling estimates, 19% of the fall population was harvested. The juvenile to adult female ratio in the harvest (0.8) was on the low end of previously observed values (Table 1), apparently a result of a large proportion of 2 year olds in the harvest (Figure 1). This follows last year's record proportion of yearlings in the harvest.

Based on examination of reproductive tracts, pregnancy rate of yearlings was estimated at 26%, and has ranged from 16 to 51% the last 3 years. Average litter size for pregnant yearlings was 2.3. Pregnancy rate for 2+ year olds averaged 74%, with a mean litter size of 2.9.

Modeling predicts a slow but continued decline in this spring's bobcat population (Figure 2), but the estimated population remains above pre-2001 levels. Averaged winter track counts also declined, but as with population estimates, track counts remain above pre-2001 levels. The estimated 2006 spring population is ~ 2,400.

Fisher

Harvest under the DNR framework was 2,388, down 7% from last year (Table 2). Modeled harvest was 2,481. An estimated 21% 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 stable to slightly declining fisher population in recent years (Figure 3). Modeling estimates a current spring population of ~8,800.

Pine Marten

After 3 years of successive records, marten harvests declined 18% in 2005 (DNR framework – 2,653; modeled harvest – 2,873) (Table 3). Although juveniles clearly predominate in the marten harvest, 'older' marten are evident in the harvest as well (Figure 4). The maximum age observed has declined slightly the last 3 years (13, 12, and 11). Maximum ages from Ontario marten rarely exceed 13 (Fryxell et al. 2001). Based on modeling, 20% of the fall population was harvested. Following last year's record lows, the percent juveniles (53%) and the juvenile:adult female ratio (4.9) in the harvest both increased, but remain below averages recorded prior to 2002 (Table 3).

Following 3 years of increased harvest, both modeling and averaged winter track counts suggest the population has been declining, with an estimated spring population of ~11,000 (Figure 5). Nevertheless, population estimates remain above the long-term average.

Otter

After successive record harvests, the DNR framework otter harvest declined 18% to 2,846, and the modeled harvest total was 2,884 (Table 4). An estimated 21% of the fall population was harvested. 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 ~ 10,800.

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Hochachka, W. M., K. Martin, F. Doyle, and C. J. Krebs. 2000. Monitoring vertebrate populations using observational data. Canadian Journal of Zoology 78:521-529.

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Table 1. Bobcat harvest data, 1977 to 2005.

Year	Season	Limit	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[3]
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	15	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	13	230	37	23	40	2.1	59	63	55	58	$73
1982	12/1-1/23	5	274	320	15	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	15	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	12	163	33	16	51	1.4	44	52	48	48	$101
1988	11/26-1/1	5	140	143	7	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	4	62	20	34	46	0.8	58	80	44	59	$43
1991	11/30-1/5	5	106	110	5	93	35	33	32	3.6	59	55	70	61	$37
1992	11/28-1/3	5	167	167	7	151	28	22	50	1.2	55	45	53	53	$28
1993	12/4-1/9	5	201	210	8	161	32	20	48	1.4	51	45	52	50	$43
1994	12/3-1/8	5	238	270	11	187	26	16	58	0.8	64	43	45	50	$36
1995	12/2-1/7	5	134	152	6	96	31	15	54	2.7	57	71	79	71	$34
1996	11/30 -1/5	5	223	250	10	164	35	20	45	1.5	51	30	49	46	$33
1997	11/29-1/4	5	364	401	17	270	35	16	49	1.2	60	37	43	48	$30
1998	11/28-12/13	5	103	107	5	77	29	26	45	1.6	59	60	60	60	$28
1999	12/4-1/9	5	206	228	8	163	18	24	58	0.8	55	59	62	60	$24
2000	12/2-1/7	5	231	250	8	183	31	26	43	1.5	54	59	50	53	$33
2001	11/24-1/6	5	259	278	9	213	30	21	49	1.3	52	51	53	52	$35
2002	11/30-1/5	5	544	621	18	475	27	25	48	1.0	66	49	46	52	$46
2003	11/29-1/4	5	483	518	16	425	25	13	62	0.9	61	46	53	54	$96
2004	11/27 – 1/9	5	631	709	20	524	28	34	38	1.6	51	40	54	49	$99
2005	11/26-1/8	5	590	638	19	485	25	13	62	0.8	51	48	46	48	

[1] Includes DNR and Tribal harvests
[2] Estimated from population model; includes estimated accidental harvests of 10%.
[3] Average pelt price based on a survey of in-state fur buyers only.

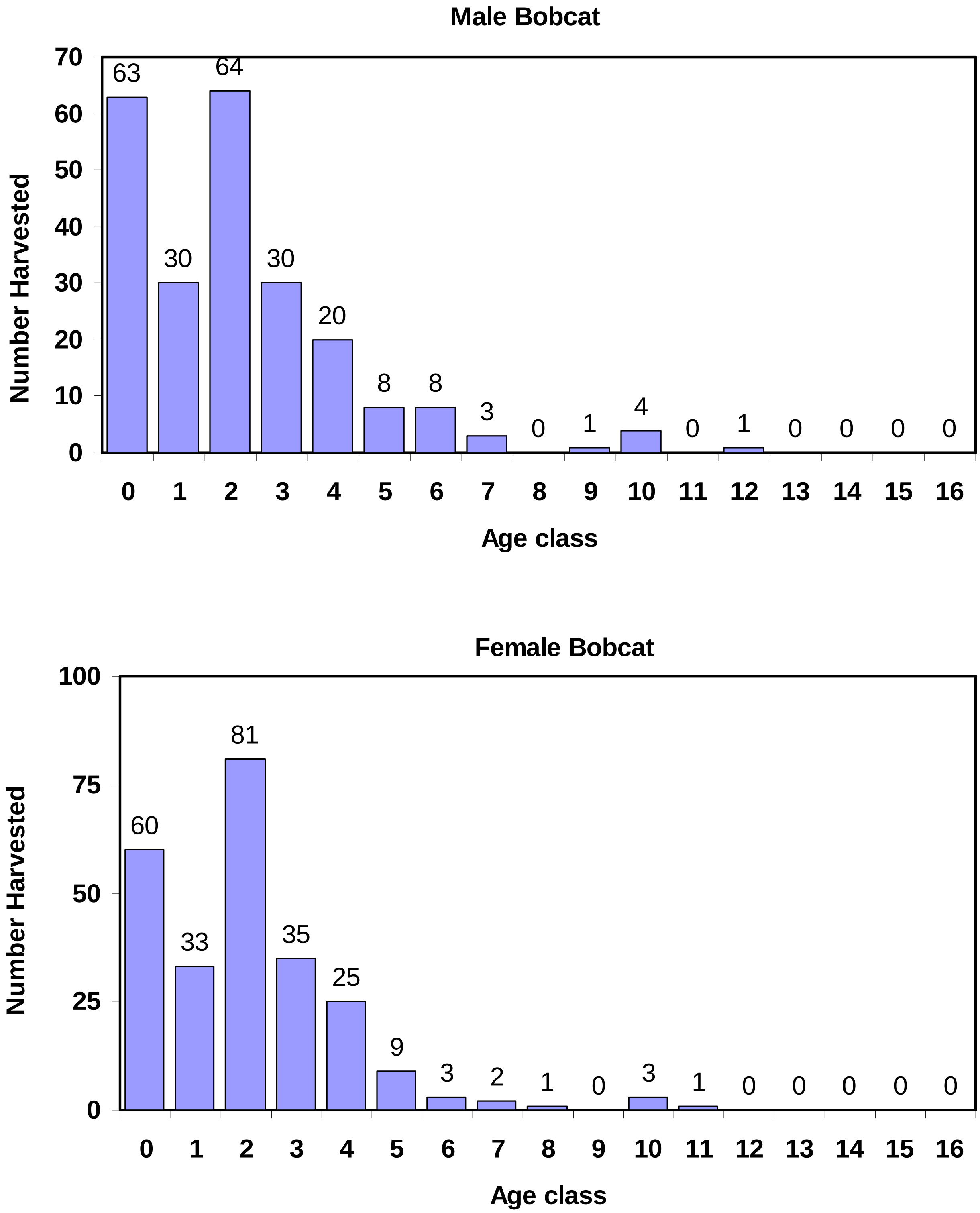


Figure 1. Age structure of male and female bobcats in the 2005-06 harvest.

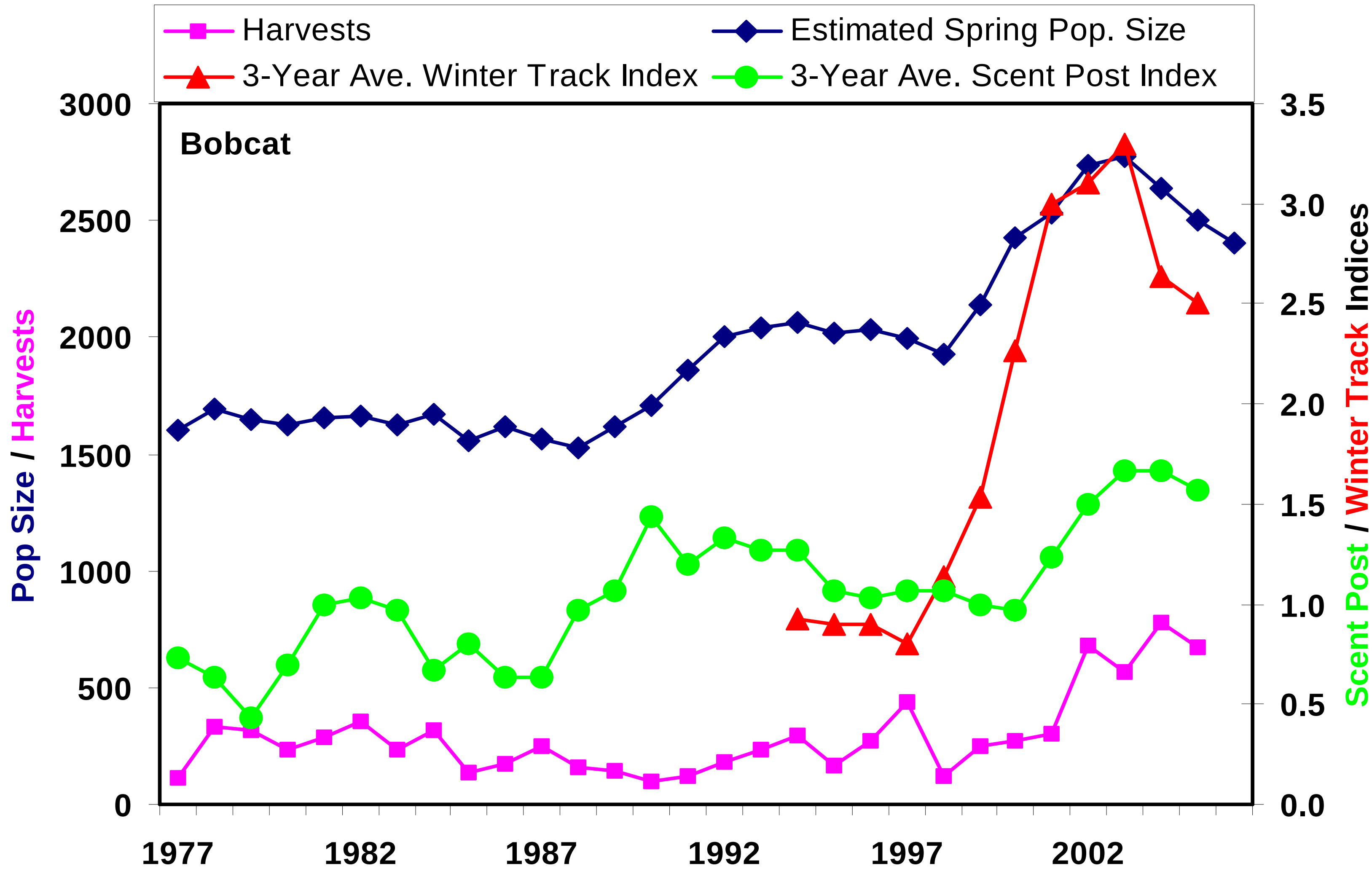


Figure 2. Bobcat populations, harvests, and survey indices, 1977-2005. Harvests include estimated accidental take.

Table 2. Fisher harvest data, 1977 to 2005. Season closed in 1980. Carcass collections ended in 1994.

Year	Season	Limit[1]	DNR harvest	Modeled Harvest[2]	% Autumn Pop. Harvested[3]	Carcasses examined	% juveniles	% yearlings	% adults	Juv:ad. females	% male juveniles	% male yearlings	% male adults	% males overall	Pelt price Males[4]	Pelt price Females[4]
1977	12/1-1/31	3	2150	2150	25	562	69	16	14	8.4	54	28	43	48	$71	$71
1978	12/1-1/31	3	2426	2426	29	577	70	16	14	7.1	44	35	28	40	$132	$147
1979	12/1-1/31	3	3032	3032	41	467	65	15	21	5.6	54	46	44	50	$108	$128
1980	CLOSED															
1981	12/1-12/10	1	862	1022	16	843	66	24	10	10.5	48	43	37	47	$94	$110
1982	12/1-12/10	1	912	1073	16	1073	66	19	15	9.4	46	41	52	46	$70	$99
1983	12/1-12/11	1	631	735	11	662	69	18	13	8.8	45	40	40	44	$71	$121
1984	12/1-12/16	1	1285	1332	19	1270	63	20	17	7.2	52	45	45	49	$70	$122
1985	11/30-12/15	1	678	735	11	712	63	20	18	5.4	46	40	34	43	$74	$130
1986	11/29-12/4	1	1068	1186	17	1186	59	24	18	5.3	48	50	37	46	$84	$162
1987	11/28-12/13	1	1642	1749	24	1534	63	15	22	4.7	46	40	37	43	$84	$170
1988	11/26-12/11	1	1025	1050	15	805	70	15	15	6.8	48	45	33	45	$54	$100
1989	12/2-12/17	1	1243	1243	17	1024	64	19	17	5.8	47	47	36	45	$26	$53
1990	12/1-12/16	1	746	756	10	592	65	14	21	4.5	44	55	30	43	$35	$46
1991	11/30-12/15	1	528	528	7	410	66	21	13	7.8	50	52	35	48	$21	$48
1992	11/28-12/13	1	778	782	9	629	58	21	21	4.9	42	55	45	46	$16	$29
1993	12/4-12/19	2	1159	1192	11	937	59	22	19	5.3	47	37	42	44	$14	$28
1994	12/3-12/18	2	1771	1932	16	1360	56	18	26	4.0	47	54	44	48	$19	$30
1995	12/2-12/17	2	942	1060	9	-	-	-	-	-	-	-	-	45	$16	$25
1996	11/30-12/15	2	1773	2000	16	-	-	-	-	-	-	-	-	45	$25	$34
1997	11/29-12/14	2	2761	2974	23	-	-	-	-	-	-	-	-	45	$31	$34
1998	11/28-12/13	2	2695	2987	24	-	-	-	-	-	-	-	-	45	$19	$22
1999	12/4-12/19	2	1725	1880	16	-	-	-	-	-	-	-	-	45	$19	$20
2000	12/2-12/17	4	1674	1900	16	-	-	-	-	-	-	-	-	45	$20	$19
2001	11/24-12/9	4	2145	2362	19	-	-	-	-	-	-	-	-	54	$20	$19
2002	11/30-12/15	5	2660	3028	24	-	-	-	-	-	-	-	-	54	$23	$23
2003	11/29-12/14	5	2521	2728	23	-	-	-	-	-	-	-	-	55	$27	$26
2004	11/27-12/12	5	2552	2753	23	-	-	-	-	-	-	-	-	52	$30	$27
2005	11/26-12/11	5	2388	2454	21	-	-	-	-	-	-	-	-	52		

[1] 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.

[2] Includes DNR and Tribal harvests

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

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

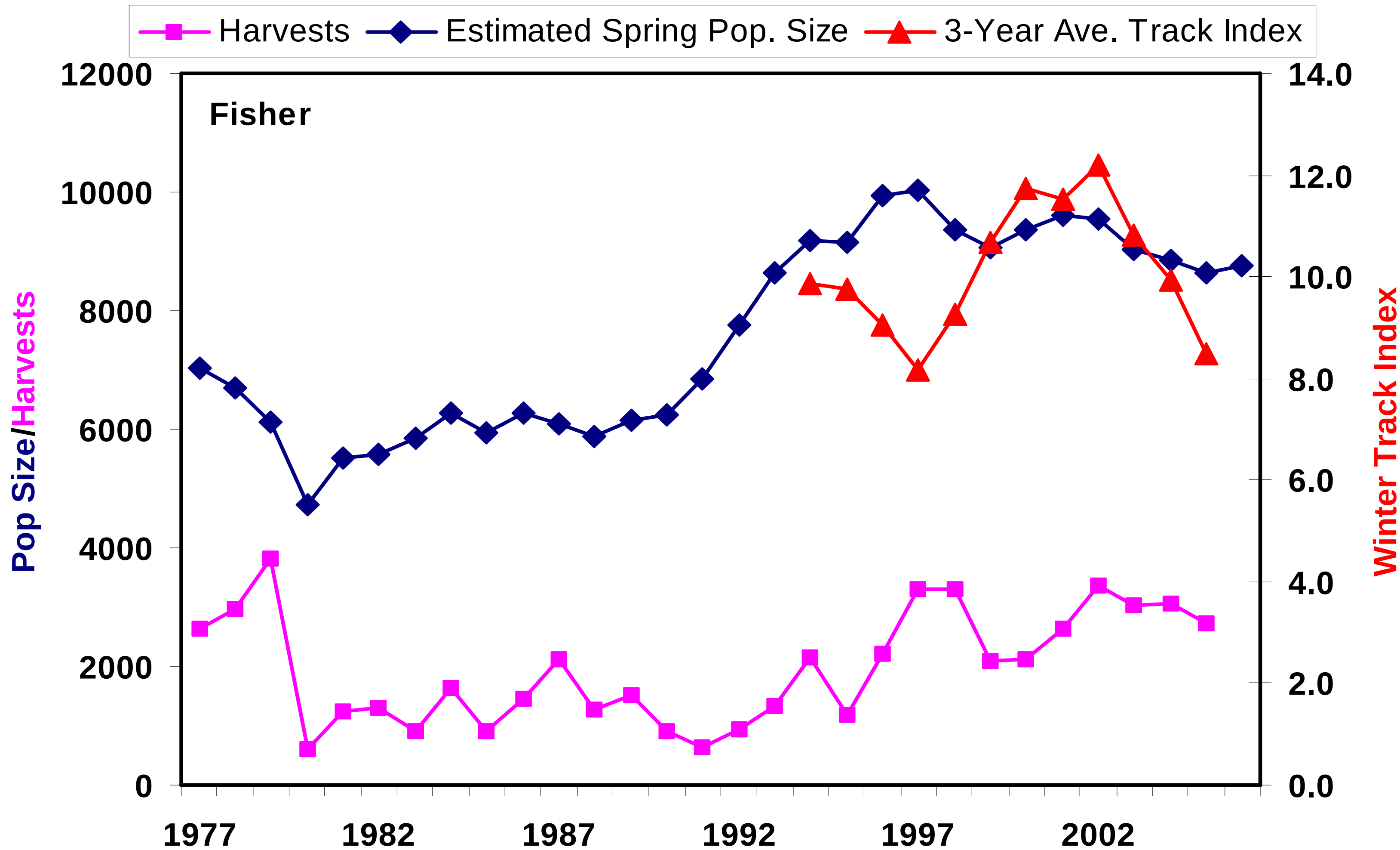


Figure 3. Fisher populations, harvests, and survey indices, 1977-2005. Harvests include estimated accidental take.

Table 3. Pine marten harvest data, 1985 to 2005.

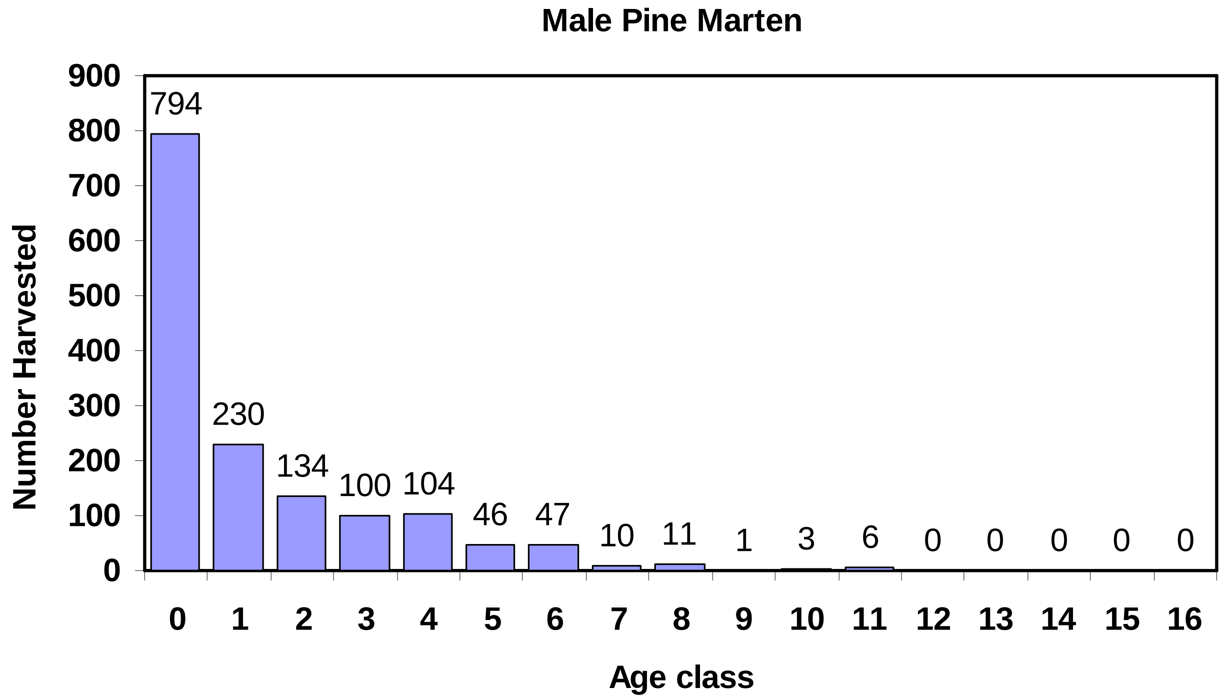
Year	Season	Limit[1]	DNR harvest	Modeled harvest[2]	% Autumn Pop. Taken[3]	Carcasses examined	% juveniles	% yearlings	% adults	Juv:ad females	% male juveniles	% male yearlings	% male adults	% males overall	Pelt price Males[4]	Pelt price Females[4]
1985	11/30-12/15	1	430	430	6	507	73	18	9	17.2	69	68	82	70	$30	$28
1986	11/29-12/14	1	798	798	10	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	20	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	22	2391	48	17	35	4.0	57	65	66	62	$30	$27
2004	11/27-12/12	5	3241	3592	24	2776	26	28	46	1.3	52	64	57	58	$31	$27
2005	11/26-12/11	5	2653	2873	20	2369	53	16	31	4.9	64	63	65	64		

[1] 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.

[2] Includes DNR and Tribal harvests

[3] 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.

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



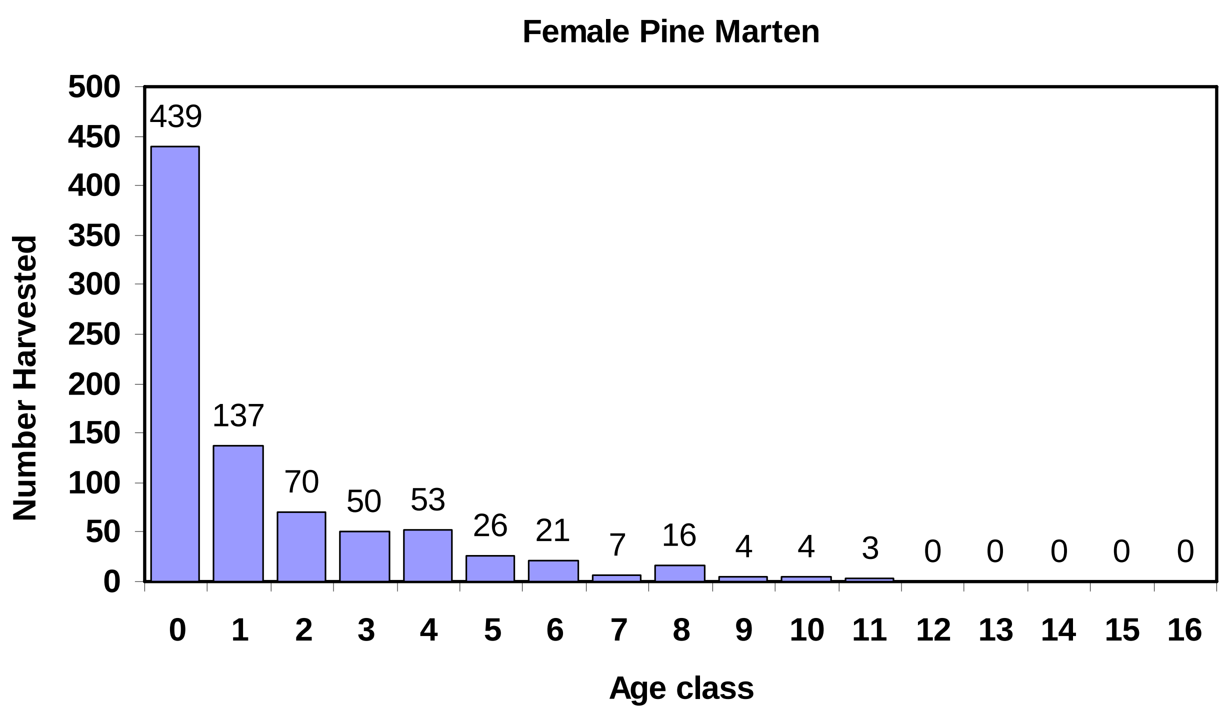


Figure 4. Age structure of male and female pine marten in the 2005-06 harvest.

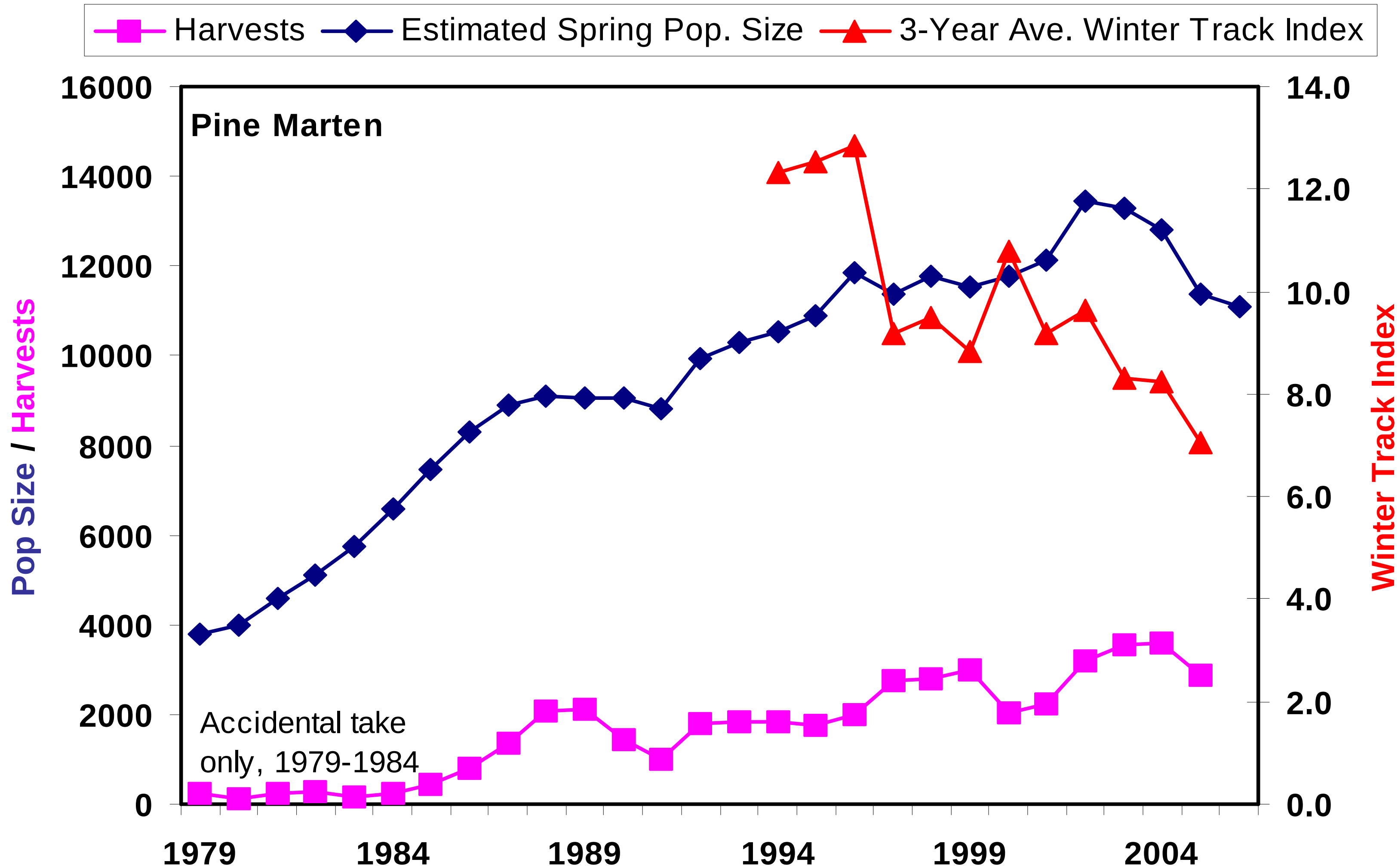


Figure 5. Pine marten populations, harvests, and survey indices, 1979-2005. Harvests include estimated accidental take.

Table 4. Otter harvest data, 1977 to 2005. Carcasses were only collected from 1980-86.

Year	Season	Limit	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 Otter[3]	Pelt price Beaver[3]
1977	2/1-2/15	3	492	492	8	-	-	-	-	-	-	-	-	52	$41	$13
1978	12/1-12/15	3	636	636	10	-	-	-	-	-	-	-	-	52	$59	$22
1979	11/15-1/29	3	1186	1186	17	-	-	-	-	-	-	-	-	52	$63	$29
1980	11/15-1/29	2	1111	1111	16	88	55	15	30	3.4	40	62	56	48	$33	$18
1981	11/14-1/28	2	485	762	11	471	55	20	25	4.3	56	53	48	52	$30	$14
1982	11/13-1/27	2	385	625	9	389	51	26	23	6.0	57	65	65	60	$26	$11
1983	11/12-1/26	2	408	614	8	433	42	31	27	3.7	56	57	57	56	$25	$12
1984	11/17-2/01	2	513	561	7	549	48	23	29	3.2	47	50	49	49	$22	$12
1985	11/16-2/15	3	559	572	7	572	43	23	34	2.2	53	50	43	51	$21	$15
1986	10/24-1/29	3	777	777	8	745	45	23	32	2.7	45	48	46	47	$24	$20
1987	10/27-1/29	3	1386	1484	15	-	-	-	-	-	-	-	-	52	$23	$17
1988	10/29-1/27	3	922	922	9	-	-	-	-	-	-	-	-	52	$22	$14
1989	10/28-2/17	3	1294	1294	12	-	-	-	-	-	-	-	-	52	$22	$12
1990	10/27-1/6	3	888	903	8	-	-	-	-	-	-	-	-	52	$24	$9
1991	10/26-1/5	3	855	925	8	-	-	-	-	-	-	-	-	51	$25	$9
1992	10/24-1/3	4	1368	1368	10	-	-	-	-	-	-	-	-	52	$30	$7
1993	10/23-1/9	4	1459	1646	10	-	-	-	-	-	-	-	-	52	$43	$11
1994	10/29-1/8	4	2445	2708	19	-	-	-	-	-	-	-	-	52	$48	$14
1995	10/28-1/7	4	1435	1466	12	-	-	-	-	-	-	-	-	52	$38	$13
1996	10/26-1/5	4	2219	2500	18	-	-	-	-	-	-	-	-	52	$39	$19
1997	10/25-1/4	4	2145	2313	17	-	-	-	-	-	-	-	-	52	$39	$19
1998	10/24-1/3	4	1946	2139	16	-	-	-	-	-	-	-	-	52	$34	$11
1999	10/23-1/9	4	1635	1717	13	-	-	-	-	-	-	-	-	52	$41	$12
2000	10/28-1/7	4	1578	1750	13	-	-	-	-	-	-	-	-	52	$51	$15
2001	10/27-1/6	4	2323	2531	18	-	-	-	-	-	-	-	-	57	$51	$14
2002	10/26-1/5	4	2145	2390	16	-	-	-	-	-	-	-	-	59	$46	$13
2003	10/25-1/4	4	2766	2966	20	-	-	-	-	-	-	-	-	57	$85	$13
2004	10/23-1/9	4	3450	3700	25	-	-	-	-	-	-	-	-	56	$87	$14
2005	10/29-1/8	4	2846	2884	21	-	-	-	-	-	-	-	-	58		

[1] Includes DNR and Tribal harvests

[2] Estimated from population model. Incl. estimated accidental harvests of 30% to 1991, 22% from 1992-2001, and 15% after 2001.

[3] Weighted average of spring (beaver only) and fall prices based on a survey of in-state fur buyers.

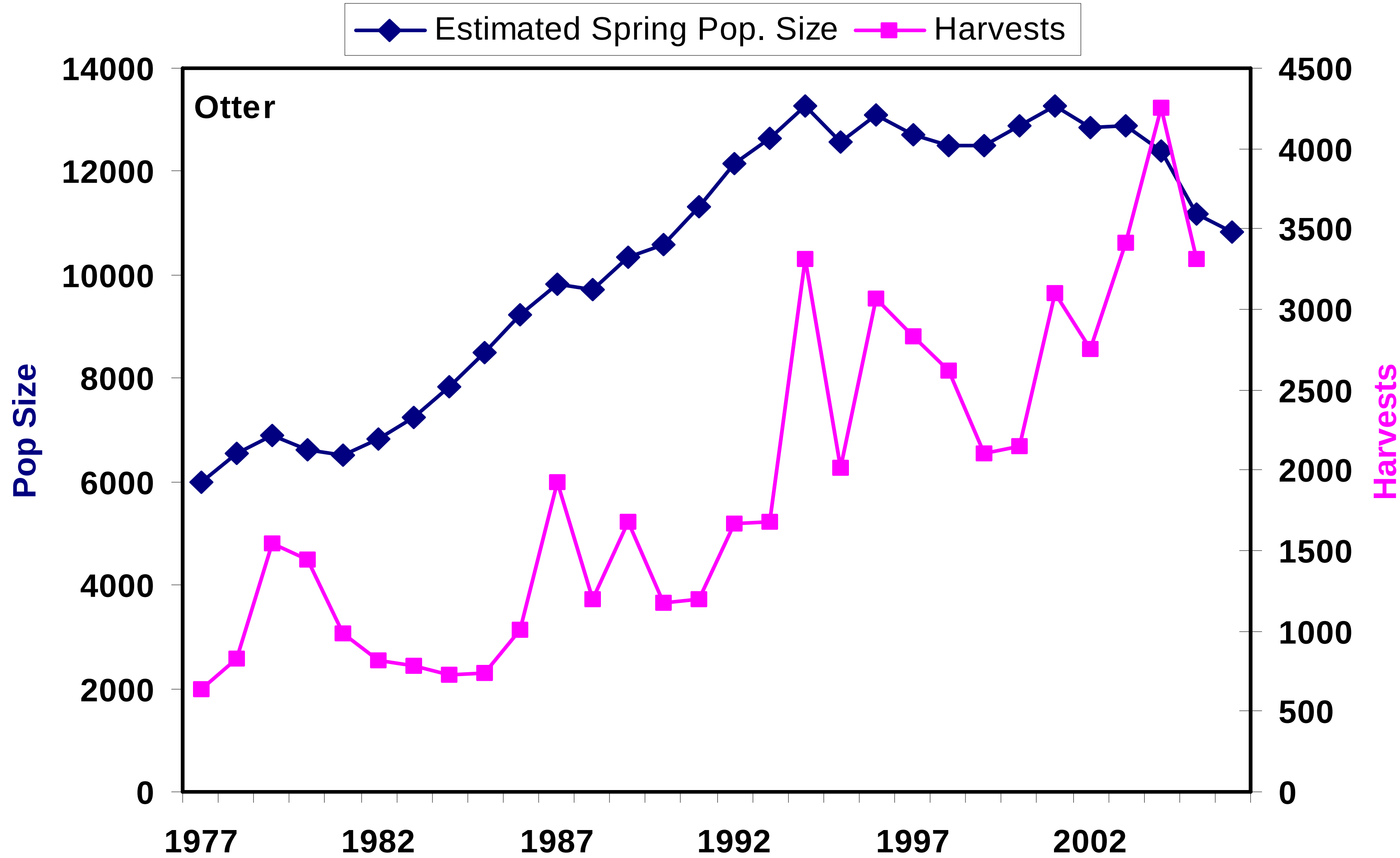


Figure 6. Otter populations and harvests, 1977-2005. Harvests include estimated accidental take.

Population Trends of White-Tailed Deer in the Forest Zone, 2006

Mark S. Lenarz, Forest Wildlife Populations and 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 2005 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.

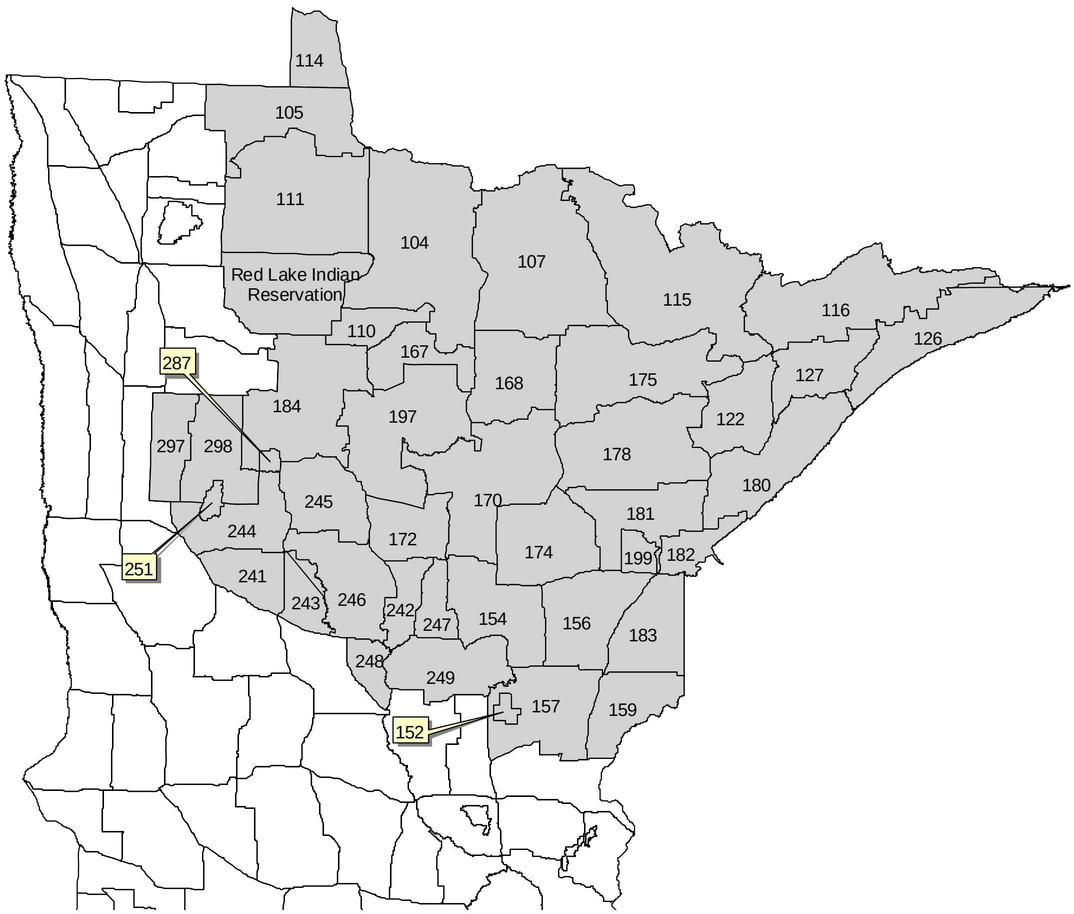


Figure 1. Either-sex permit areas in the forested zone, 2006. Permit areas 114, 152, 182, 287, and Red Lake Indian Reservation were not modeled.

HARVEST

In 2005, hunters registered 255,736 deer, the third highest harvest ever recorded in Minnesota. Of that number, 51% or 130,307 deer were harvested in the forested zone (Figure 1, Table 1). The 2005 forest zone harvest declined 7% from the 2004 harvest. The following discussion applies to the subset of deer harvested in the forest zone.

The buck harvest decreased or remained stable in 39 of the 41 permit areas (Table 2) suggesting that deer density has declined throughout the forest zone. This inference was corroborated by the fact that modeled pre-harvest deer density declined between 2004 and 2005 in 37 of the 38 permit areas simulated. The total forest zone buck harvest declined 11%. Results of the simulation modeling suggest that deer density declined 7% forest-wide, between 2004 and 2005 (Table 4). The decline in buck harvest was not reflected in the buck hunter success rate (buck harvest/licenses), which remained at historically high levels in 2005 in both Zones 1 and 2 (Figure 2).

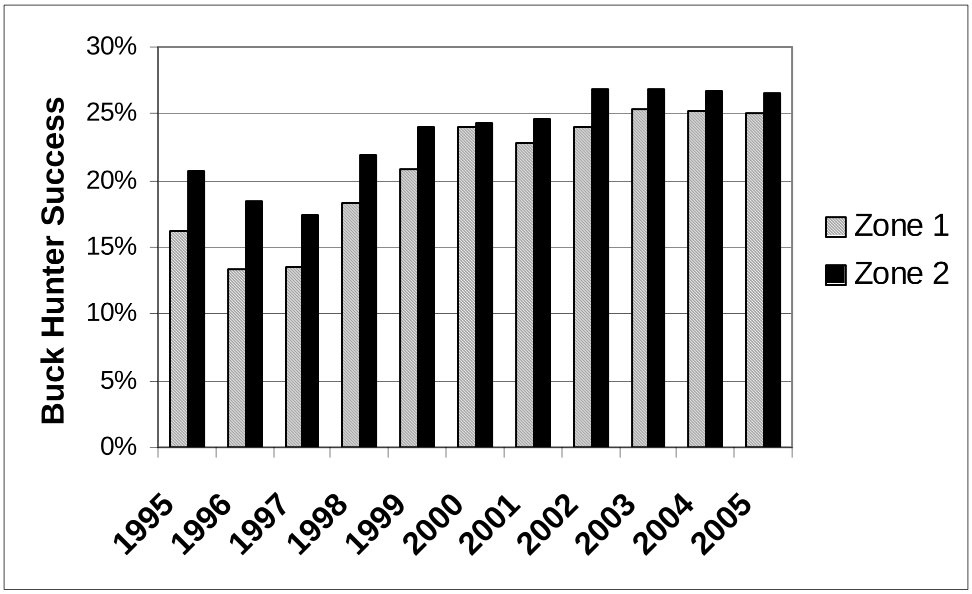


Figure 2. Success of licensed hunters at killing a buck, 1994-2004.

The antlerless harvest declined in 21 of the 41 permit areas (Table 3) and the total antlerless harvest declined only 3%. The greatest declines occurred in Permit Area 168 (48%) and Permit Area 175 (47%), which shifted from “managed” status in 2004 to “lottery” in 2005. Similarly, the greatest increase in antlerless harvest took place in permit area Permit Area 180 (129%), which shifted from “lottery” in 2004 to “managed” in 2005.

The decline in the antlerless harvest was likely caused by a reduction in the number of deer in the forest. Model simulations indicated that pre-harvest density in the forest zone dropped 7% between 2004 and 2005 (Table 4). Sales of bonus permits were roughly the same as in 2004.

The harvest by archers and muzzleloader hunters accounted for over 9% of the total harvest in the forest zone. The archery harvest increased 18% over the previous year while the muzzleloader harvest increased by 237%. Increased sales of All Season Licenses (up 28%) likely account for these increases.

<u>Population Trends And Model Projections</u>

Based on the winter severity index (WSI), the winter of 2005-06 was relatively mild throughout most of the forest zone except in the Brimson area and along the Canadian border (Figure 3). Warm temperatures in early April caused a rapid melt-off of deep snow in the “Arrowhead” and minimized the WSI.

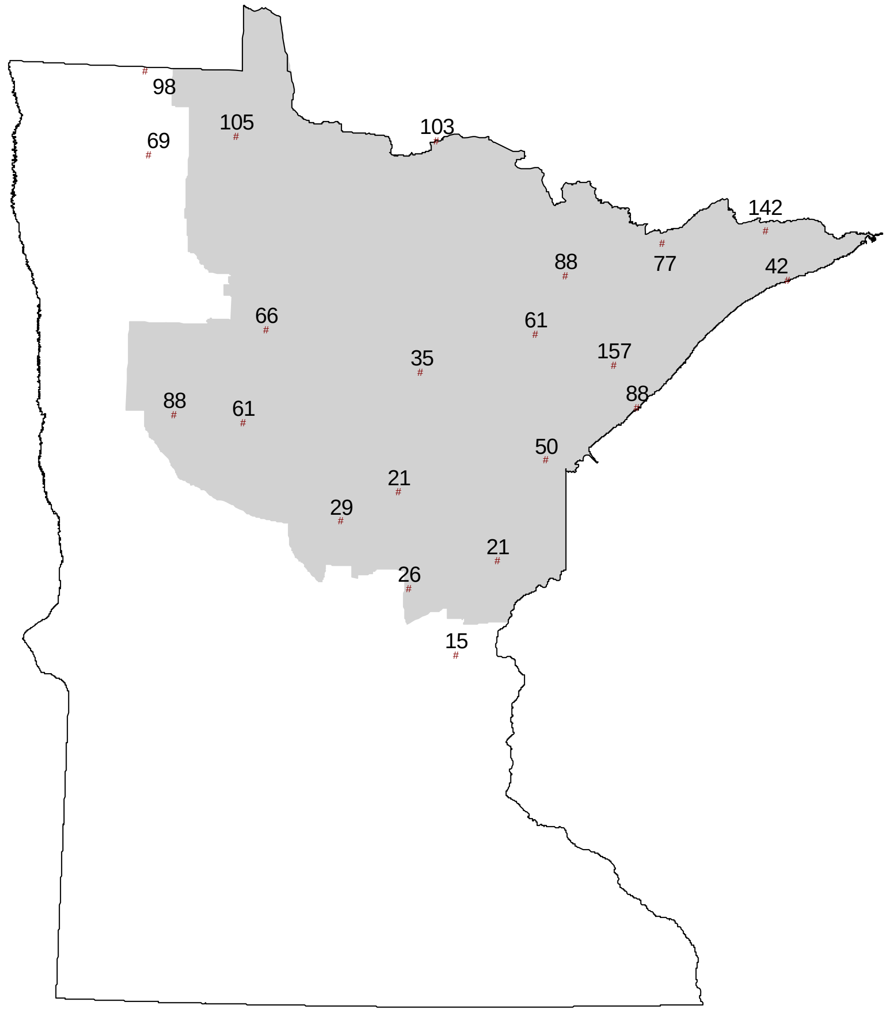


Figure 3. Winter Severity Index (WSI) readings from winter 2004-2005. WSI readings between 100 and 180 are considered moderate.

Simulation modeling was used in 38 permit areas (Figure 1, Table 4) to approximate deer density, identify trends, and project the effect of the 2006-hunting season. To better summarize the results for this report, permit areas were lumped in to one of 5 regions (Figures 4 and 5). Deer density varied according to region 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 to peak density in 2003 in response to low (or no) antlerless permits and mild winters. Since 2003, the declines in the South (S), NW, and WC were a response to the high antlerless harvest. A reduced antlerless harvest (-9%) in the Central (C) region resulted in a slight increase. 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.

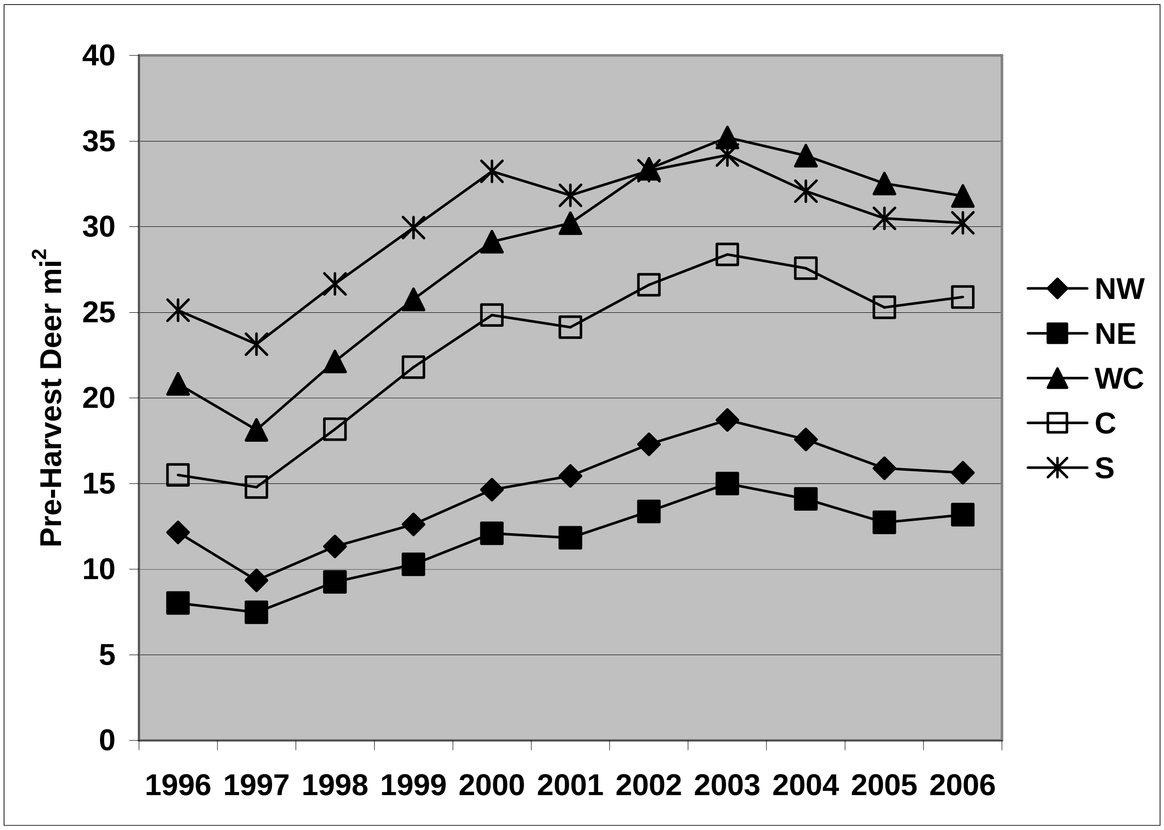


Figure 4. Population trends of deer in forest zone. Trend lines represent the groups of permit areas as illustrated in figure 5. Density represents pre-harvest density.

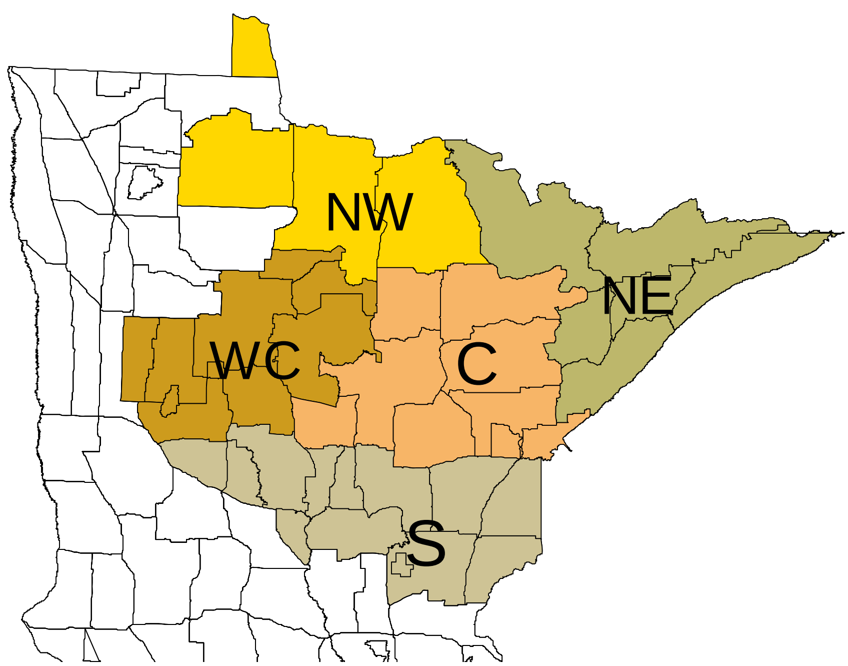


Figure 5. Groups of permit areas discussed in text and in figure 4.

After simulation modeling, wildlife managers in the forest zone came to consensus on the status of permit areas for the 2006 deer-hunting season. The availability of either sex permits has increased or remained liberal in an attempt to reach the tentative deer population goals identified by stakeholder groups this past spring. Managers recommended that only 4 permit areas be designated as "Lottery" areas with a total of 800 permits. These areas included 2 areas in the Northeast, the Fond du Lac Indian Reservation, and Mille Lacs WMA (Figure 6). Nineteen permit areas were designated as "Intensive" and the remaining 20 areas were designated as "Managed".

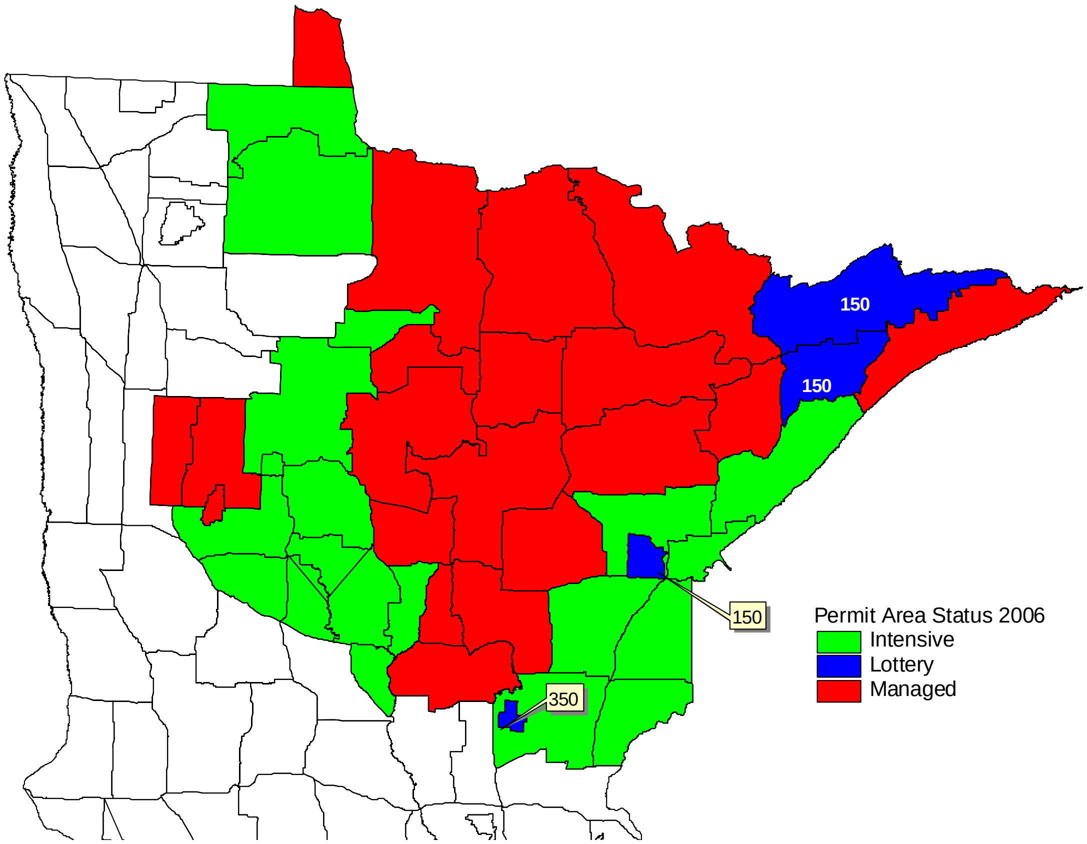


Figure 6. Final designation of permit areas in Minnesota's Forested Zone. The number of either-sex permits is listed within each lottery area.

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

Permit Area	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Change
104	756	567	897	1,372	1,837	1,940	2,253	3,421	2,902	2,483	-14%
105	1224	876	1153	1,389	1,821	1,962	2,385	3,740	3,106	3,557	15%
107	1,090	948	1,176	1,994	2,846	3,550	3,499	5,206	4,027	3,936	-2%
110	636	397	571	1,678	1,719	1,745	1,940	2,744	2,869	1,945	-32%
111	1,598	580	733	1,198	1,861	2,353	2,264	3,064	2,621	2,687	3%
115	1,216	1,029	1,347	2,334	3,170	3,589	3,815	5,373	4,417	4,365	-1%
116	113	100	146	138	150	162	157	264	295	261	-12%
122	273	251	457	296	551	622	564	685	716	657	-8%
126	210	197	268	306	445	470	595	690	837	901	8%
127	54	63	83	176	81	99	108	146	165	148	-10%
152	129	143	213	225	283	264	217	235	246	271	10%
154	1,334	1,370	1,952	2,977	4,415	4,168	5,032	5,717	5,176	4,571	-12%
156	1,500	1,546	2,109	2,646	3,753	3,036	3,246	4,935	4,583	4,466	-3%
157	2,892	3,293	4,709	5,385	6,985	7,196	7,727	9,001	7,606	6,901	-9%
159	1,881	2,312	3,493	3,971	5,070	4,167	3,934	5,028	3,871	3,672	-5%
167	476	338	599	1,452	1,601	1,971	2,488	1,572	1,463	1,257	-14%
168	785	552	988	2,410	2,686	2,379	3024	3,218	3,978	2,521	-37%
170	1,152	1,143	2,220	2,857	4,938	4,833	4,716	8,460	7,154	7,221	1%
172	859	979	1,443	2,960	4,253	4,624	4,910	7,004	5,490	5,227	-5%
174	755	754	1,371	1,927	2,436	2,141	2,678	3,811	3,346	3,091	-8%
175	2,684	2,685	2,686	2,320	3,029	3,339	3184	5,034	4,254	3,103	-27%
178	914	1,532	2,190	2,344	3,064	3,343	3,650	5,486	5,267	5,363	2%
180	565	550	932	927	1,471	1,654	1,811	3,030	2,278	2,802	23%
181	759	761	1,273	1,910	2,531	2,623	2,583	3,739	3,716	3,943	6%
182	238	240	405	614	827	862	869	1,309	1,206	1,256	4%
183	596	598	1,003	2,147	2,748	2,743	2,771	3,960	3,533	3,449	-2%
184	3,585	1,977	2,777	5,803	6,940	7,389	8,424	12,488	11,560	11,482	-1%
197	442	407	597	933	1,372	1,167	1,413	1,652	1,723	1,594	-7%
241	3697	3568	2919	2651	4284	3927	3857	4549	4449	4,288	-4%
242	998	1,112	1,316	1,572	1,849	2,069	2,426	2,767	2,244	2,116	-6%
243	1,435	1,268	1,602	1,908	2,634	2,864	3,238	4,131	3,684	3,165	-14%
244	2,449	2,034	2,396	2,952	3,862	4,841	5,805	7,452	6,702	6,162	-8%
245	1,607	1,021	1,657	3,524	4,838	5,056	5,626	8,231	6,377	5,737	-10%
246	2,550	2,254	2,847	3,358	4,760	5,150	5,149	7,530	6,782	5,835	-14%
247	1,022	1,139	1,348	1,611	1,894	2,119	2101	2,744	2,582	2,115	-18%
248	756	564	943	850	1,039	881	1,352	1,897	1,864	1,670	-10%
249	1,474	1,110	1,514	2,217	2,826	3,149	3,238	4,223	3,800	3,211	-16%
251	234	231	255	246	326	254	298	470	387	325	-16%
287	312	313	314	368	376	460	470	529	425	280	-34%
297	153	138	220	201	244	296	313	343	563	609	8%
298	465	326	516	704	803	826	932	1988	1733	1664	-4%
Total	45,868	41,265	55,639	76,850	102,618	106,284	115,062	157,866	139,997	130,307	-7%

Note: Permit area totals prior to 1999 are estimates that assume an evenly distributed harvest in the old permit areas and may be biased. Harvest in permit areas such as 182 (created in 2005) were calculated in a similar manner.

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

Permit Area	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Change
104	747	565	887	1,137	1,240	1,266	1,332	1,589	1,586	1,250	-21%
105	609	484	730	846	945	813	1,138	1,489	1,326	1,364	3%
107	1,085	942	1,160	1,706	1,948	2,174	2,119	2,523	2,277	1,861	-18%
110	461	372	511	818	904	926	914	1,089	1,119	694	-38%
111	1,109	552	719	1,113	1,350	1,474	1,463	1,467	1,408	1,312	-7%
115	1,207	1,009	1,316	1,898	2,036	2,145	2,371	2,894	2,663	2,254	-15%
116	112	100	144	138	150	156	157	238	249	230	-8%
122	267	242	447	293	415	452	441	490	567	534	-6%
126	210	183	250	306	390	417	493	582	587	594	1%
127	54	62	81	176	80	82	93	126	145	126	-13%
152	76	89	127	173	191	182	130	106	152	141	-7%
154	935	984	1,437	2,017	2,304	2,142	2,169	2,071	2,049	1,783	-13%
156	1,037	1,081	1,531	1,836	2,066	1,680	1,645	1,989	1,996	1,793	-10%
157	1,748	1,988	2,675	3,099	3,327	3,143	3,047	3,207	3,030	2,745	-9%
159	1,194	1,428	1,867	1,980	2,412	1,773	1,605	1,916	1,514	1,467	-3%
167	466	327	585	906	1,036	968	1,211	821	819	709	-13%
168	774	543	973	1,579	1,653	1,454	1,675	1,698	1,889	1,432	-24%
170	1,121	1,135	2,109	1,609	3,106	2,787	2,611	3,435	3,233	2,987	-8%
172	791	896	1,175	1,820	2,292	2,260	2,200	2,359	2,147	1,853	-14%
174	741	702	1,224	1,234	1,446	1,255	1,361	1,541	1,596	1,367	-14%
175	831	810	1,273	1,917	2,107	2,072	2,113	2,463	2,319	2,072	-11%
178	905	895	1,363	1,945	2,052	2,012	2,212	2,638	2,756	2,698	-2%
180	557	497	854	922	1,169	1,325	1,357	1,775	1,781	1,664	-7%
181	749	683	1,147	1,442	1,733	1,685	1,722	2,047	2,070	1,930	-7%
182	234	214	364	484	577	564	568	685	684	511	-25%
183	587	537	902	1,633	1,919	1,650	1,575	1,661	1,654	1,514	-8%
184	2,282	1,873	2,421	3,680	3,952	3,673	4,095	4,287	4,542	4,161	-8%
197	442	403	585	923	1,142	953	998	1,040	1,143	999	-13%
241	1118	1008	1175	1030	1382	1396	1477	1559	1621	1,460	-10%
242	534	583	704	880	1,071	959	824	912	740	721	-3%
243	734	752	957	1,082	1,192	1,169	1,247	1,343	1,217	1,066	-12%
244	1,295	1,159	1,452	1,848	2,105	2,040	2,300	2,540	2,390	2,170	-9%
245	1,122	973	1,480	2,216	2,492	2,180	2,430	2,743	2,449	2,036	-17%
246	1,306	1,338	1,701	1,954	2,300	2,041	2,384	2,599	2,527	2,082	-18%
247	547	598	722	902	1,098	982	948	1,047	955	861	-10%
248	284	176	365	541	550	430	720	694	739	641	-13%
249	756	668	1,045	1,310	1,590	1,479	1,429	1,479	1,327	1,261	-5%
251	105	94	110	129	134	152	132	176	183	128	-30%
287	118	70	127	167	189	201	184	207	182	106	-42%
297	118	106	161	154	169	213	225	266	307	308	0%
298	465	326	492	601	648	685	654	952	894	810	-9%
Total	29,833	27,447	39,348	50,445	58,862	55,411	57,769	64,743	62,832	55,695	-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. Harvest in permit areas such as 182 (created in 2005) were calculated in a similar manner.

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

Permit Area	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Change
104	9	2	10	235	597	674	921	1,832	1,316	1,233	-6%
105	615	392	423	543	876	1,149	1,247	2,251	1,780	2,193	23%
107	5	6	16	288	898	1,376	1,380	2,683	1,750	2,075	19%
110	175	26	60	860	815	819	1,026	1,655	1,750	1,251	-29%
111	489	28	14	85	511	879	801	1,597	1,213	1,375	13%
115	9	20	31	436	1,134	1,444	1,444	2,479	1,754	2,111	20%
116	1	0	2	0	0	6	0	26	46	31	-33%
122	6	9	10	3	136	170	123	195	149	123	-17%
126	0	14	18	0	55	53	102	108	250	307	23%
127	0	1	2	0	1	17	15	20	20	22	10%
152	53	54	86	52	92	82	87	129	94	130	38%
154	399	386	515	960	2,111	2,026	2,863	3,646	3,127	2,788	-11%
156	463	465	578	810	1,687	1,356	1,601	2,946	2,587	2,673	3%
157	1,144	1,305	2,034	2,286	3,658	4,053	4,680	5,794	4,576	4,156	-9%
159	687	884	1,626	1,991	2,658	2,394	2,329	3,112	2,357	2,205	-6%
167	10	11	14	546	565	1,003	1,277	751	644	548	-15%
168	11	9	15	831	1,033	925	1,349	1,520	2,089	1,089	-48%
170	31	8	111	1,248	1,832	2,046	2,105	5,025	3,921	4,234	8%
172	68	83	268	1,140	1,961	2,364	2,710	4,645	3,343	3,374	1%
174	14	52	147	693	990	886	1,317	2,270	1,750	1,724	-1%
175	1,853	1,875	1,413	403	922	1,267	1,071	2,571	1,935	1,031	-47%
178	9	637	827	399	1,012	1,331	1,438	2,848	2,511	2,665	6%
180	8	53	79	5	302	329	454	1,255	497	1,138	129%
181	11	78	126	468	798	938	860	1,692	1,646	2,013	22%
182	4	26	41	130	250	298	301	624	521	745	43%
183	8	62	101	513	829	1,093	1,197	2,299	1,879	1,935	3%
184	1,303	103	356	2,123	2,988	3,716	4,329	8,201	7,018	7,321	4%
197	0	4	12	10	230	214	415	612	580	595	3%
241	2,579	2,560	1,744	1,621	2,902	2,531	2,380	2,990	2,828	2,828	0%
242	464	528	612	692	778	1,110	1,602	1,855	1,504	1,395	-7%
243	701	516	645	826	1,442	1,695	1,991	2,788	2,467	2,099	-15%
244	1,154	875	944	1,104	1,757	2,801	3,505	4,912	4,312	3,992	-7%
245	485	48	177	1,308	2,346	2,876	3,196	5,488	3,928	3,701	-6%
246	1,244	916	1,146	1,404	2,460	3,109	2,765	4,931	4,255	3,753	-12%
247	475	541	626	709	796	1,137	1,153	1,697	1,627	1,254	-23%
248	472	388	578	309	489	451	632	1,203	1,125	1,029	-9%
249	718	442	469	907	1,236	1,670	1,809	2,744	2,473	1,950	-21%
251	129	137	145	117	192	102	166	294	204	197	-3%
287	194	243	187	201	187	259	286	322	243	174	-28%
297	35	32	59	47	75	83	88	77	256	301	18%
298	0	0	24	103	155	141	278	1,036	839	854	2%
Total	16,035	13,818	16,291	26,405	43,756	50,873	57,293	93,123	77,165	74,612	-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. Harvest in permit areas such as 182 (created in 2005) were calculated in a similar manner.

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

Permit Area	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Change
104	2,078	7	9	9	10	11	12	13	12	11	11	0%
105	766	22	27	31	36	40	45	49	49	46	45	-2%
107	1,895	10	12	14	17	16	18	20	18	15	15	-1%
110	300	20	25	30	32	32	35	36	35	32	31	-6%
111	1,707	6	7	7	9	10	11	11	10	9	9	-4%
115	1,872	12	15	17	21	21	23	26	24	22	23	7%
116	1,158	3	4	4	4	4	5	6	6	5	5	-2%
122	620	4	4	5	6	5	6	7	6	5	6	6%
126	941	9	10	10	12	11	12	13	13	11	10	-7%
127	561	4	4	5	6	5	6	7	6	5	6	6%
154	760	16	19	22	25	25	26	26	24	22	22	-2%
156	826	16	18	20	22	22	23	25	24	23	22	-3%
157	889	23	27	30	34	33	34	34	32	30	31	2%
159	568	27	31	33	34	31	31	31	29	29	30	2%
167	432	21	25	26	27	28	29	27	26	24	24	1%
168	724	14	18	21	22	21	23	23	23	20	22	8%
170	1,315	17	21	25	29	28	31	34	33	31	32	2%
172	451	27	35	45	52	51	55	57	52	47	46	-2%
174	836	12	14	17	19	18	20	21	20	19	19	2%
175	1,276	11	14	16	18	17	19	20	19	17	18	7%
178	1,267	13	16	20	23	23	26	28	29	27	27	2%
180	982	8	9	11	13	13	15	17	16	16	17	4%
181	856	16	19	22	25	24	27	29	28	25	25	0%
183	663	18	21	25	27	26	27	29	26	22	21	-6%
184	1,232	19	24	29	33	35	40	43	42	40	37	-6%
197	975	11	13	15	16	16	19	19	20	20	21	3%
241	417	43	45	48	55	54	58	61	62	61	62	2%
242	215	32	37	41	44	43	45	45	41	39	38	-2%
243	314	33	38	44	50	48	51	52	48	44	42	-4%
244	586	28	33	38	44	47	52	54	51	48	46	-3%
245	583	24	31	39	44	45	49	50	45	42	40	-5%
246	772	25	29	33	37	34	35	36	34	32	32	-1%
247	231	32	37	41	44	43	45	45	41	39	38	-2%
248	212	23	27	29	32	30	33	35	34	32	31	-3%
249	502	17	21	24	27	26	27	28	26	25	25	1%
251	55	22	24	27	30	29	32	35	33	33	34	2%
297	439	10	11	13	14	15	18	20	22	23	25	7%
298	619	16	19	21	23	24	26	29	29	28	28	0%
Forest Zone	30,895	15	17	20	23	22	24	26	25	23	23	0%

Aerial Moose Survey, 2006

Mark S. Lenarz, Forest Wildlife Populations and 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). As in 2005, all survey plots were rectangular (5 x 2.67 mi.) and all transects were oriented east to 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.

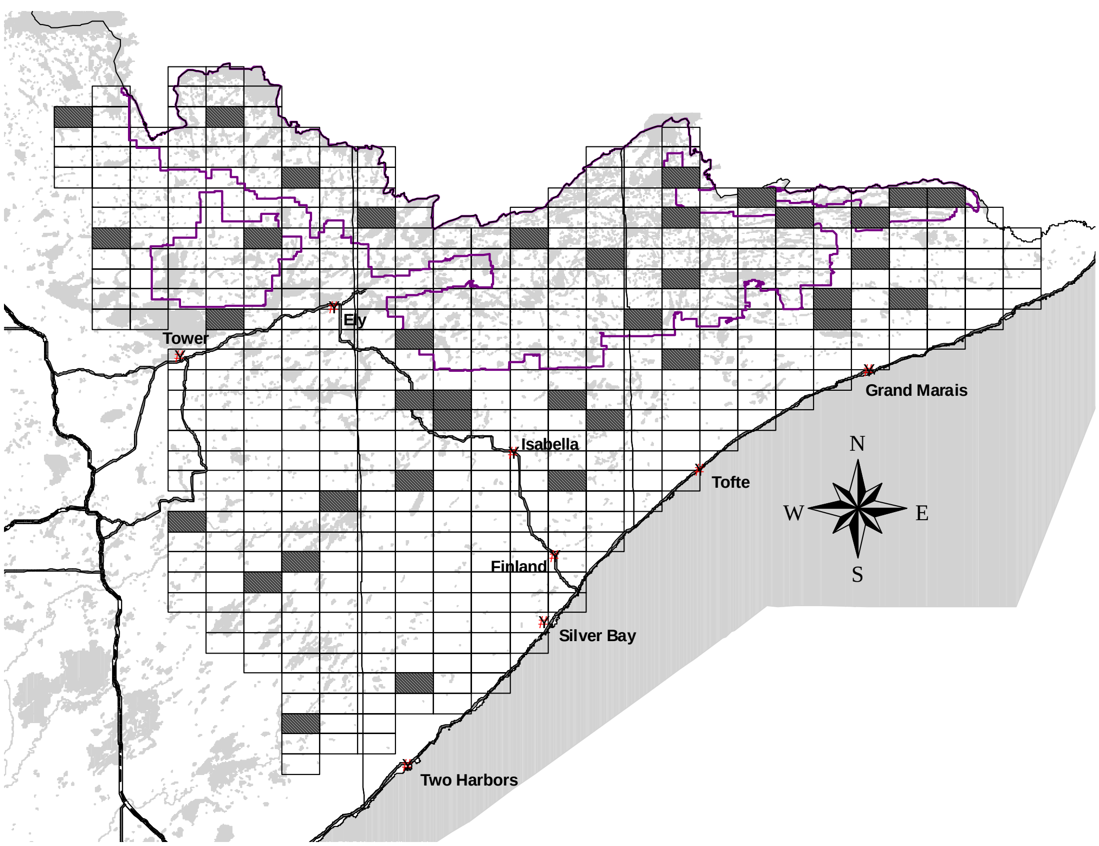


Figure 1. Northeast moose survey area and sample plots (diagonal lines) flown in the 2006 aerial moose survey.

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 and 2005 surveys.

RESULTS

The survey was initiated on 6 January and completed on 26 January. Survey conditions were rated as "Good" (highest rank) on all 37 plots, in part because snow depth was greater than 16". During the survey flights, 388 moose were located on the 37 plots (492 mi^2) and included 158 bulls, 154 cows, 60 calves, and 16 unidentified moose.

Thirty-eight radio-collared moose were located in 29 test plots; 20 were observed from transects and 18 were located using telemetry. A sightability model was developed from locations of radio-collared moose observed in 2004 and 2005. The model with the highest predictive reliability incorporated a single covariate, the amount of visual obstruction (VOC) (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

Based on the moose observed on the survey plots and "corrected" by the sightability model, the estimated moose population in northeastern Minnesota numbered 7,272±1,917 (Table 1). Estimates of the calf:cow and bull:cow ratio were 0.33 and 1.06, 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	9,489 ±35%	0.42	1.19	4
2005	6,519±30%	0.50	0.91	9
2006	7,272±26%	0.33	1.06	5

DISCUSSION

We have used the sightability model approach for 3 years to estimate moose numbers in northeastern Minnesota. In the first year, 3 observers equated VOC to crown closure on some observations and this tended to over-estimate VOC. As a result, the 2004 population estimate was biased high (Table 1). In 2005 and 2006, observations of VOC were not significantly different (n_{2005} =173, n_{2006} = 164, t=0.77, P=4393) and population estimates were more comparable. Although the 2006 population estimate was 12% higher than the 2005 estimate, the overlap in confidence intervals (Table 1) implies that there was no statistical difference between these point estimates. The 2005 and 2006 estimates are likely more accurate than estimates prior to 2004.

Use of a sightability model to "correct" observations assumes that the detection probability does not differ among years. The model coefficients and odds ratios were similar between 2005 and 2006 (Giudice and Fieberg, unpubl.), which suggests a consistent detection function. "The sightability model built on the 2005-06 data should perform reasonably well in future years if the relationship between VOC and detection probability is similar over time" (Giudice and Fieberg, Unpubl.). We intend to collect additional information for the sightability model for at least two 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 and 2006 population estimates represent an increase from 2003 (Table 1). 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 indicated, however, that estimated population size declined as a function of the starting date (Lenarz 1998). 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. Estimates in 2005 and 2006 better account for differences in visibility during the survey, and corroborate the inference that population estimates between 1998 and 2003 were biased low.

The estimated bull:cow ratio (Table 1) was not significantly different from the average estimated for the previous 21 years($\bar{x}$ = 1.18, t=1.72, $P=0.10$). The hunter harvest has been heavily biased towards bulls in recent years (Lenarz, unpubl.), but still represents less than 6% of the estimated number of bulls in the population in most years. This harvest of bulls appears to have little impact on the bull:cow ratio at the population level. It has been speculated that reproduction would decline if the bull:cow ratio declines below some unspecified level (e.g. Rausch 1974). Thompson (1991), however, found no relationship between calf:cow and bull:cow ratios. With a bull:cow ratio consistently near 1 as has been estimated for northeastern Minnesota, it is likely that there should be sufficient numbers of bulls to breed cows.

The estimated calf:cow ratio (Table 1) was significantly lower than the average estimated in the previous 21 years ($\bar{x}$ = 0.58, t=7.02, P<0.001) and may be related to low calf production. Gross production for radio collared cows in 2004 and 2005 was only 0.82 and 0.84 calves:cow, respectively (Lenarz, unpubl.). The proportion of twins, was also lower, but not significantly different ($\bar{x}$=6.4%, t =7.2, P=0.085). Only 11% of the radio-collared moose had new born twin calves in May of 2005 (Lenarz unpubl.). Twinning rates vary widely across North America, and may be related to habitat quality and the relationship between a moose population and the carrying capacity of its habitat (Gasaway et al. 1992).

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. Normally, hair loss associated with winter ticks doesn't become noticeable until later in the winter.

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

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2006 Waterfowl Breeding Population Survey Minnesota

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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 2006 aerial survey portion was flown from 4-24 May. Pond numbers decreased 12% compared to 2005 and were 15% below the long-term average. Estimated numbers of temporary (Type 1) wetlands increased 85% from 2005 but remained below (-22%) the long-term average. The mallard breeding population (161,000) declined significantly (-33%, P = 0.04) from 2005 (238,500). Mallard numbers were well below the 10-year average (-51%) and the long-term average (-28%) and were the lowest recorded since 1983. The blue-winged teal breeding population (174,000) was below the 2005 estimate (194,000) and both the 10-year (-27%) and long-term (-24%) averages. Populations of "other" ducks (187,000), excluding scaup, decreased 6% and remained below the 10-year average (-24%) but similar to the long-term average (+5%). Wood ducks (30%), ring-necked ducks (29%), and gadwalls (19%) accounted for most (78%) of the total population of "other" ducks. Wood duck numbers were the lowest recorded since 1985. The estimates of canvasback, redhead and scaup abundance were the lowest on record. The estimate of total ducks (521,000), which excludes scaup, decreased 18% compared to 2005 and was 36% below the 10-year average and 17% below the long-term average (630,000). Canada goose numbers (uncorrected for visibility) decreased 9% compared to 2005, were 8% below the 10-year average but remained 90% above the long-term average. Survey timing in 2006, or other factors, may have contributed to lower estimates of duck abundance. Spring phenology (ice-out, leaf-out, duck migration) was well advanced in 2006, up to 10 days earlier than normal. Weather delays resulted in most (80%) of the survey being flown after 15 May. During most years, some migrant ducks are counted during the survey. Few migrant ducks were in the state this spring during the time when most of the survey was flown.

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.

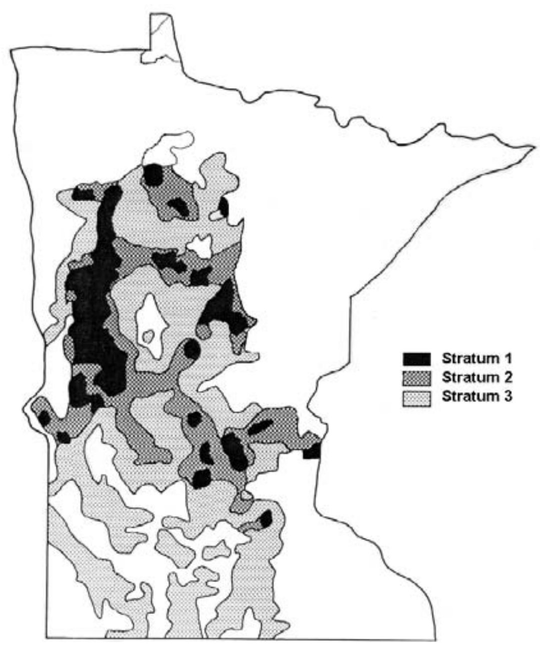

Figure 1. Location of waterfowl breeding population survey strata in Minnesota.

Dept. 1968:12). Standard procedures for the survey follow those outlined in "Standard Operating Procedures for Aerial Waterfowl 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 2006 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 2005 and 2006 were compared using two-tailed Z-tests.

Survey Chronology

The 2006 aerial survey began on 4 May in southern Minnesota and concluded in northern Minnesota on 24 May. The survey was completed in 13 days of flight time. Transects were flown on 4-7 and 16-24 May. Flights began no earlier than 7 AM and were completed by 12 PM each day. No flights were conducted from 8-15 May due to low ceilings, high winds (>20 mph) or precipitation events. Most (80%) of the survey was completed after 15 May; the entire survey spanned 21 days, which was similar to both 2004 (22 days) and 2005 (27 days) but one of the longer periods on record.

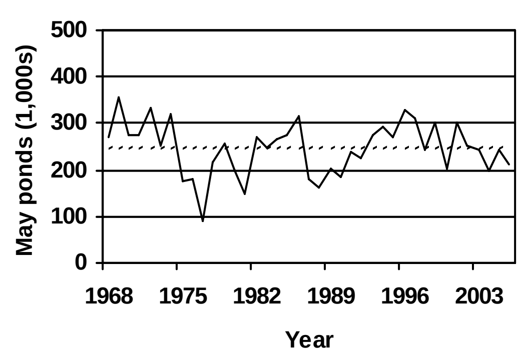

Figure 2. Number of May ponds (Types II-V) and long-term average (dashed line) in Minnesota, 1968-2006.

Weather And Habitat Conditions

Wetland conditions in spring 2006 were similar to 2005. Ice out on most lakes across the state occurred 10+ days earlier than average. April temperatures averaged 6.3°F above normal statewide; regional temperatures ranged from 7.5°F above average in northwest Minnesota to 5.5°F above average the southwest portion of Minnesota (http://climate.umn.edu/cawap/monsum/0604.txt). April precipitation was 1.0 inch above normal statewide and ranged from 0.38 inches below normal in the northeast to 2.3 inches above normal in the southwest. May temperatures averaged about 1.3°F above normal statewide. May precipitation was 0.73 inches below normal statewide and ranged from 1.76 inches below normal in southwest Minnesota to 0.36 inches above normal in northeast Minnesota (http://climate.umn.edu/cawap/monsum/0605.txt). Additional temperature and precipitation data are provided in Appendix A.

In late April 2006, statewide topsoil moisture indices were rated as 12% very short or short, 75% adequate, and 13% surplus moisture. On June 2, statewide indices were rated as 22% short, 72% adequate and 6% surplus moisture. (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, http://www.nass.usda.gov/mn/). For comparison, in late April 2005 statewide topsoil moisture indices were rated as 4% very short or short, 84% adequate, and 12% surplus moisture.

Planting dates for row crops were earlier in 2006 than previous years. By May 1, 48% of the corn acres had been planted statewide compared to 36% in 2005 and 35% for the previous 5-year average. Dry conditions later in May allowed for a much earlier initial cutting of alfalfa hay across the state. By June 4, 56% of alfalfa hay had been cut compared to 8% in 2005 and a 5-year average of 17% (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, http://www.nass.usda.gov/mn/).

Wetland numbers (Type II-V) decreased 12% from 2005 and were 20% below the 10-year average (Table 2) and 15% below the long-term average (Table 2; Figure 2). The numbers of temporary (Type 1) wetlands increased 85% from 2005, were 8% above the 10-year average but remained 22% below the long-term average.

Leaf-out dates were considerably earlier than 2005, even during the early portion of the survey, which made visibility from the air extremely difficult throughout the survey period.

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 2006 waterfowl breeding population estimate of mallards was 160,715 (SE = 24,230), which was 33% lower and significantly different (Z = 2.08, P = 0.04) than 2005

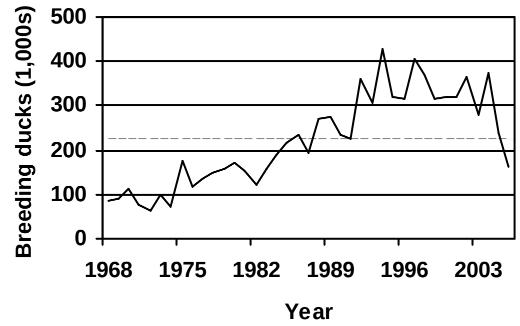

Figure 3. Mallard population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2006.

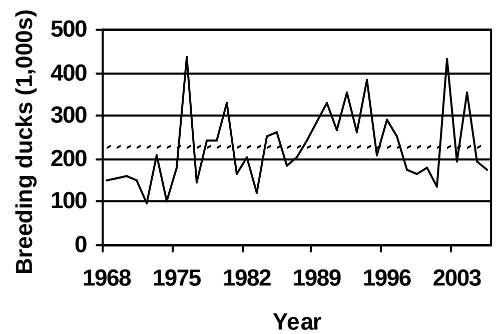

Figure 4. Blue-winged teal population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2006.

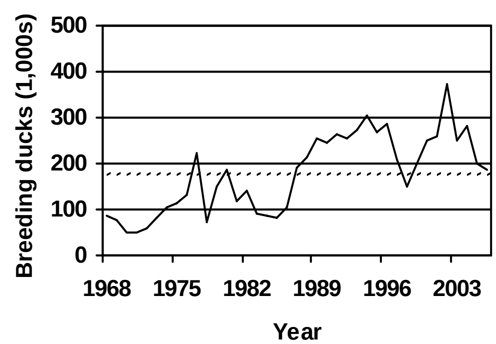

Figure 5. Other duck (excluding scaup) populations (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2006.

(Table 7, Figure 3). Mallard numbers were below (-51%) the 10-year average and the long-term average (-28%). Mallard abundance in 2006 was the lowest recorded since 1983. In 2006, 7% of the indicated mallards were in flocks compared to 3 % in both 2004 and 2005. Most of the flocked mallards consisted of groups >5 of male mallards, including some groups >20. Pairs comprised 12% of the mallards observed, compared to 29% and 33% in 2004 and 2005, respectively.

The estimated blue-winged teal population was 173,674 (SE = 60,353), which was lower than 2005 (194,000) but statistically unchanged from the 2005 estimate ($Z = 0.39$, $P = 0.77$). Blue-winged teal numbers were 27% below the 10-year average and 24% below the long-term average (Table 7, Figure 4). In 2006, 20% of the indicated blue-winged teal were in flocks compared to 29% and 25% in 2004 and 2005, respectively. Pairs comprised 57% of the blue-winged teal observed, compared to 47% and 55% in 2004 and 2005, respectively.

Other duck numbers (excluding scaup) declined 6% to 186,719 and were 24% below the 10-year average and 5% above the long-term average (Table 7, Figure 5). Scaup numbers (8,300) were 83% lower than in 2005 and the lowest estimate on record. The total duck population, excluding scaup, was 521,000, which was 18% lower than 2005, 36% below the 10-year average and 17% below the long-term average (Table 7, Figure 6). This was the lowest total duck estimate since 1986.

Visibility Correction Factors (VCFs) were lower in 2006 for mallards (-24%) but higher for blue-winged teal (+13%) and similar for "other" ducks (+4%) compared to 2005 (Table 7). Mallard VCFs were similar (+4%) to the long-term average. The blue-winged teal VCF was 17% above the long-term average. The VCF for "other" ducks was 40% above the long-term average and the 3rd highest on record. Early leaf-out conditions decreased visibility on many transects. In addition, due to improved safety standards, the pilot and observer were required to wear flight helmets while conducting surveys this year, which decreased visibility, particularly for the observer.

Canada goose numbers (uncorrected for visibility) decreased 9% compared to 2005 and were 90% above the long-term average (Table 7, Figure 7). The VCF for Canada geese was 2.73, 35% higher than 2005 and 13% above the long-term average. The population estimate of Canada geese, adjusted for visibility, increased 23% (Table 7, Figure 8).

The estimated coot population was 15,600, which was 65% below the long-term average.

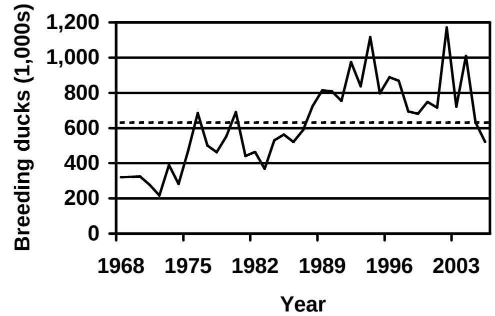

Figure 6. Total duck (excluding scaup) population estimate and long-term average (dashed line) in Minnesota, 1968-2006.

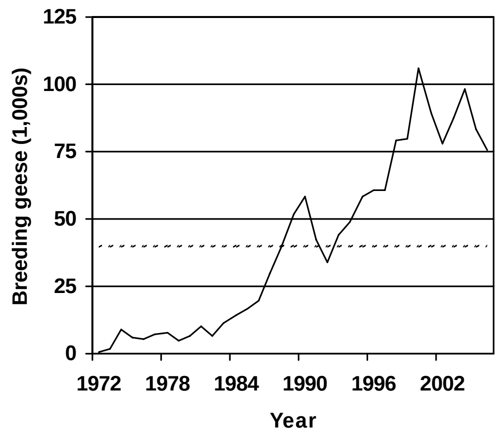

Figure 7. Canada goose population estimates (not adjusted for visibility bias) and long-term average in Minnesota, 1972-2006.

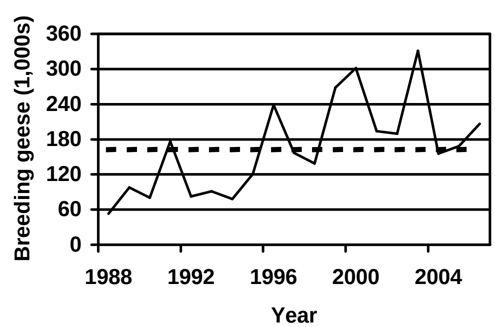

Figure 8. Canada goose population estimates (adjusted for visibility bias) and long-term average in Minnesota, 1988-2006.

SUMMARY

Overall wetland conditions were slightly below average but similar to 2005. Numbers of Type 1 wetlands increased but numbers of Types II-V declined. Mallard abundance (161,000) declined significantly from 2005 (238,500) (P=0.04) and was 51% below the 10-year (331,000) and 28% below the long-term average (223,000). Blue-winged teal abundance (174,000) was similar to 2005 (194,000) (P=0.77) but 27% below the 10-year average (237,000) and 24% below the long-term average (229,000). Duck abundance for most other species declined relative to 2005. Total duck abundance (521,000), excluding scaup, declined 18% from 2005 and was 36% below the 10-year average and 17% below the long-term average. Canada goose numbers, unadjusted for visibility bias, decreased 9% from 2005 and were 8% below the 10-year average.

ACKNOWLEDGMENTS

Special thanks to the pilot and all the efforts of the ground crews. Tom Pfingsten, Conservation Officer Pilot, MNDNR, Division of Enforcement; Steve Cordts, Waterfowl Staff Specialist, MNDNR, Division of Wildlife; Sean Kelly, Asst. Chief, Migratory Bird & Refuge Biology, USFWS, Region III, Twin Cities; Wayne Brininger, Wildlife Biologist, USFWS, Tamarac National Wildlife Refuge; Jeanne Holler, Wildlife Biologist, USFWS, Sherburne National Wildlife Refuge; Rich Papasso, Refuge Operations Specialist, USFWS, Big Stone National Wildlife Refuge; Tony Rondeau, Wildlife Biologist, USFWS, HAPET, Fergus Falls; Jim Kelley, USFWS, Region III, Twin Cities; Dan Hertel, Wildlife Biologist, USFWS, HAPET, Fergus Falls; Sally Zodrow, Biological Science Technician, USFWS, Sherburne National Wildlife Refuge; Kim Bousquet, USFWS, Big Stone National Wildlife Refuge; Lowell Deede, USFWS, Tamarac National Wildlife Refuge; Dawn Johnson, USFWS, HAPET, Fergus Falls; Mick Hanan, USFWS, HAPET, Fergus Falls; Paul Richert, USFWS, Region III, Twin Cities; Lori Wolff, USFWS, Private Lands Office, St. Cloud; Barbara Boyle, USFWS, Tamarac National Wildlife Refuge; Rudy Martinez, USFWS, Tamarac National Wildlife Refuge.

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Table 1. Survey design for Minnesota, May 2006.[1]

	Stratum 1	Stratum 2	Stratum 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, 1968-2006.

	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
	2006	56,798	211,000
10-year average (1996-2005)		52,832	263,000
Long-term average (1968-2005)		72,364	247,000
Change from:			
2005		+85%	-12%
10-year average		+8%	-20%
Long-term average		-22%	-15%

[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, 1990-2006.

	Year																
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Dabblers:																	
Mallard	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	16,829
Black Duck	0	56	0	0	56	0	0	0	0	0	0	0	0	0	0	56	0
Gadwall	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	1,444
American Wigeon	222	0	56	0	0	194	0	0	56	56	56	111	0	56	555	167	0
Green-winged Teal	0	56	0	111	278	0	278	56	333	0	278	56	278	222	444	56	56
Blue-winged Teal	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	5,665
Northern Shoveler	778	1,777	1,000	111	278	111	1,277	1,500	500	555	1,055	305	1,277	278	1,166	333	167
Northern Pintail	444	389	222	611	167	167	167	111	111	167	167	389	56	111	56	0	56
Wood Duck	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	3,555
Dabbler Subtotal	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	27,772
Divers:																	
Redhead	3,305	2,555	3,499	1,416	1,972	639	722	778	944	500	583	1,444	750	333	805	666	666
Canvasback	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	833
Scaup	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	111
Ring-necked Duck	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	2,055
Goldeneye	56	0	222	111	222	111	167	0	111	56	56	333	111	0	222	222	56
Bufflehead	0	333	722	0	444	56	278	0	56	111	56	111	222	111	389	167	222
Ruddy Duck	1,500	361	500	1,250	639	167	139	528	11,052	972	0	83	1,305	417	305	1,222	305
Hooded Merganser	139	0	444	222	111	278	611	555	389	722	500	722	555	333	278	333	555
Large Merganser	0	56	111	0	56	0	0	56	0	0	0	111	0	972	0	111	0
Diver Subtotal	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	4,803
Total Ducks	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	32,575
Other:																	
Coot	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	639
Canada Goose	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	21,633

Table 4. Minnesota waterfowl breeding populations by species for Stratum II (medium wetland density), expanded for area but not visibility, 1990-2006.

	Year																
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Dabblers:																	
Mallard	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	25,130
Black Duck	0	0	0	0	0	0	0	0	0	0	0	117	0	0	0	0	0
Gadwall	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	1,052
American Wigeon	234	701	351	0	117	0	468	351	818	0	468	0	0	0	2,513	117	0
Green-winged Teal	0	0	0	351	117	0	935	234	351	117	117	117	468	234	234	0	117
Blue-winged Teal	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	9,000
Northern Shoveler	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	584
Northern Pintail	701	701	234	351	468	234	117	234	468	117	117	117	0	117	0	0	0
Wood Duck	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	1,753
Dabbler subtotal	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	37,636
Divers:																	
Redhead	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	175
Canvasback	234	117	0	584	1,052	0	234	701	117	117	935	0	468	1,052	234	0	0
Scaup	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	468
Ring-necked Duck	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	3,331
Goldeneye	351	818	351	584	701	701	1,753	818	234	935	584	468	234	234	351	117	117
Bufflehead	234	0	526	117	234	0	117	117	0	0	0	0	1,169	117	468	351	117
Ruddy Duck	1,227	4,558	1,227	3,390	409	117	58	117	0	468	0	0	1,870	2,688	0	351	58
Hooded Merganser	0	0	351	584	468	117	234	468	117	701	935	1,403	701	701	234	234	351
Large Merganser	0	0	117	0	0	0	0	0	0	0	117	117	0	0	234	351	0
Diver subtotal	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	4,617
Total Ducks	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	42,253
Other:																	
Coot	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	292
Canada Goose	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	26,825

Table 5. Minnesota waterfowl breeding populations by species for Stratum III (low wetland density), expanded for area but not visibility, 1990-2006.

	Year																
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Dabblers:																	
Mallard	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	30,884
Black Duck	174	0	0	0	0	0	0	0	0	0	0	0	0	0	174	0	0
Gadwall	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	5,568
American Wigeon	957	696	522	348	1,218	0	1,044	348	696	0	522	174	1,218	174	1,566	1,044	174
Green-winged Teal	0	348	0	348	174	0	957	348	174	0	1,218	1,392	522	174	0	174	522
Blue-winged Teal	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	23,663
Northern Shoveler	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	522
Northern Pintail	696	1,914	870	1,218	696	174	870	522	870	870	696	522	0	174	348	174	174
Wood Duck	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	7,308
Dabbler subtotal	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	68,815
Divers:																	
Redhead	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	0
Canvasback	1,044	696	0	348	696	174	1,392	0	3,306	174	3,915	522	696	1,131	2,784	0	0
Scaup	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	1,392
Ring-necked Duck	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	6,699
Goldeneye	609	696	1,044	696	783	1,479	1,914	522	696	696	1,044	1,566	3,132	1,305	696	1,044	1,044
Bufflehead	0	552	696	348	696	0	1,044	174	348	0	0	0	1,218	783	2,088	0	174
Ruddy Duck	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	696
Hooded Merganser	174	348	348	348	696	1,044	1,566	696	696	1,218	957	174	2,175	174	1,740	1,218	870
Large Merganser	0	0	348	0	174	174	0	0	0	0	0	0	522	0	0	261	957
Diver subtotal	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	11,832
Total Ducks	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	80,647
Other:																	
Coot	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	14,702
Canada Goose	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	27,230

Table 6. Minnesota waterfowl breeding populations by species for Stratum I-III combined, expanded for area coverage but not for visibility, 1990-2006.

Species	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Dabblers:																	
Mallard	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	72,843
Black Duck	174	56	0	0	56	0	0	0	0	0	0	117	0	0	174	56	0
Gadwall	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	8,064
American Wigeon	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	174
Green-winged Teal	0	404	0	810	569	0	2,170	638	858	117	1,613	1,564	1,267	630	678	230	694
Blue-winged Teal	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	38,328
Northern Shoveler	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	1,273
Northern Pintail	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	230
Wood Duck	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	12,616
Dabbler subtotal	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	134,222
Divers:																	
Redhead	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	842
Canvasback	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	833
Scaup	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	1,971
Ring-necked Duck	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	12,085
Goldeneye	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	1,216
Bufflehead	234	885	1,944	465	1,374	56	1,439	291	404	111	56	111	2,609	1,011	2,944	517	513
Ruddy Duck	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	1,060
Hooded Merganser	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	1,776
Large Merganser	0	56	576	0	230	174	0	56	0	0	117	228	522	972	234	723	957
Diver subtotal	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	21,253
Total Ducks	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	155,475
Other:																	
Coot	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	15,633
Canada Goose	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	75,688

Table 7. Estimated waterfowl populations during the Minnesota Waterfowl breeding population survey, 1968-2006.

	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	3.30	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	3.80	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	2.90	265,138	42,057	93,784	2.81	263,619
1992	144,126	2.50	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	4.40	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	2.20	320,560	39,541	37,706	3.60	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
2006	72,843	2.21	160,715	24,230	38,328	4.53	173,674	60,353	42,333	4.41	186,719
Averages:											
10-year (1996-2005)	147,823	2.28	330,672	47,580	56,587	4.19	236,600	47,077	84,877	3.10	245,580
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:											
2005	-12%	-24%	-33%	-15%	-21%	13%	-11%	62%	-10%	4%	-6%
10-year average	-51%	-3%	-51%	-49%	-32%	8%	-27%	28%	-50%	42%	-24%
Long-term average	-31%	+4%	-28%	-34%	-38%	17%	-24%	41%	-30%	40%	5%

[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. Cont.

Year	Scaup Unad. PI	Scaup VCF	Scaup PI	Total ducks (ex. scaup) Unad. PI	Total ducks (ex. scaup) PI	Total Ducks Unad. PI	Total Ducks PI	Canada geese Unad. PI	Canada geese VCF	Canada geese 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
2006	1,971	4.22	8,322	153,504	521,109	155,475	529,431	75,688	2.73	206,757
Averages:										
10-year (1996-2005)	24,874	3.07	67,214	289,086	812,852	313,962	880,066	82,341	2.64	214,216
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:										
2005	-84%	6%	-83%	-14%	-18%	-18%	-22%	-9%	35%	23%
10-year average	-92%	37%	-88%	-47%	-36%	-50%	-40%	-8%	3%	-3%
Long-term average	-92%	34%	-88%	-33%	-17%	-38%	-24%	90%	13%	27%

[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 2006 (Source: Minnesota Climatological Working Group, http://climate.umn.edu/cawap/nwssum/nwssum.asp).

		Temperature (F) for week ending:										Total weekly precipitation (inches)					Precipitation departure from normal
		30-April		7-May		14-May		21-May		28-May							
Region	City	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	30-April	7-May	14-May	21-May	28-May	1 Apr-28 May
NW	Crookston	48.8	0.8	48.8	-2.7	52.6	-2.0	53.8	-3.6	66.4	6.5	0.57	0.64	1.78	0.00	0.07	0.01
NC	Grand Rapids	47.6	1.0	51.0	1.2	50.6	-2.1	54.4	-0.8	67.4	9.9	0.75	0.42	1.82	0.04	0.28	-0.52
	Itasca	46.8	3.0	47.6	0.2	49.3	-1.4	51.0	-2.6	62.2	6.1	1.20	0.78	2.01	0.07	0.23	0.93
WC	Alexandria	49.6	1.2	51.6	-0.1	52.0	-2.6	54.9	-2.4	68.6	9.0	1.40	0.23	0.82	0.02	0.50	-0.75
	Fergus Falls	50.6	1.8	48.6	-3.5	51.8	-3.3	54.6	-3.2	66.2	6.1	1.49	0.13	1.25	0.00	3.20	3.01
	Montivideo	47.8	-2.2	51.0	-2.3	52.2	-4.2	57.2	-2.0	71.9	10.2	1.61	0.62	0.75	0.10	0.61	0.28
	Morris	49.3	-0.6	49.3	-3.9	52.4	-3.8	56.4	-2.5	66.8	5.5	1.14	0.45	1.33	0.00	1.16	1.12
C	Becker	51.8	2.7	53.0	0.8	53.2	-1.8	55.8	-1.7	67.2	7.5	2.30	1.24	1.03	0.22	0.01	0.68
	Hutchinson	52.0	1.1	51.6	-2.5	53.8	-3.3	56.7	-3.1	67.2	5.0	2.04	0.86	0.85	0.02	0.63	1.32
	St. Cloud	48.1	-1.0	53.7	1.5	51.8	-3.2	55.4	-2.1	70.6	10.9	2.83	0.63	0.71	0.03	0.10	0.71
	Staples	47.5	-0.1	49.0	-1.7	51.1	-2.3	53.3	-2.6	64.2	6.1	1.07	0.78	1.27	0.15	0.01	-0.62
	Willmar	50.8	0.8	51.0	-2.3	54.4	-1.9	57.8	-1.3	67.7	6.1	2.23	0.72	0.57	0.16	0.17	0.44
EC	Aitkin	47.8	1.5	51.4	2.1	51.0	-1.1	52.2	-2.4	62.3	5.4	0.94	0.74	2.32	0.00	0.25	0.26
	Cambridge	Missing															
	Msp Airport	53.4	1.5	56.0	1.2	54.3	-3.3	58.6	-1.6	72.2	9.7	1.97	0.47	0.81	0.07	0.31	2.46
SW	Pipestone	48.4	-1.5	48.8	-4.2	51.8	-4.1	56.8	-1.8	66.6	5.5	1.80	0.41	0.14	0.16	0.92	-0.13
	Redwood Falls	51.0	-1.4	52.5	-3.0	53.4	-5.1	58.8	-2.4	72.1	8.4	2.57	0.03	0.61	0.06	0.16	-0.28
	Worthington	50.5	1.5	50.2	-2.0	53.2	-2.1	58.8	0.6	66.2	5.4	2.68	0.68	0.25	0.76	0.78	4.07
SC	Faribault	51.5	2.0	51.0	-1.6	53.2	-2.3	56.1	-2.2	65.8	4.9	1.20	0.76	1.70	0.05	0.07	-0.86
	Waseca	52.0	1.6	52.0	-1.6	53.0	-3.6	57.9	-1.4	68.2	6.3	1.43	0.53	1.92	0.05	0.30	0.41
	Winnebago	52.3	1.7	52.8	-0.9	54.2	-2.5	58.5	-1.0	68.6	6.5	2.06	0.34	0.98	0.02	0.19	2.62
Statewide		49.8	1.1	50.9	-0.8	51.8	-2.9	55.8	-1.8	66.1	6.4	1.35	0.56	1.19	0.13	0.35	

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

Waterfowl information is taken from the U.S. Fish and Wildlife Service report Waterfowl Population Status, 2006 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, 1971-2006 (from: U.S. Fish and Wildlife Service. 2006. Waterfowl population status, 2006. 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
2005-06	185,000

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

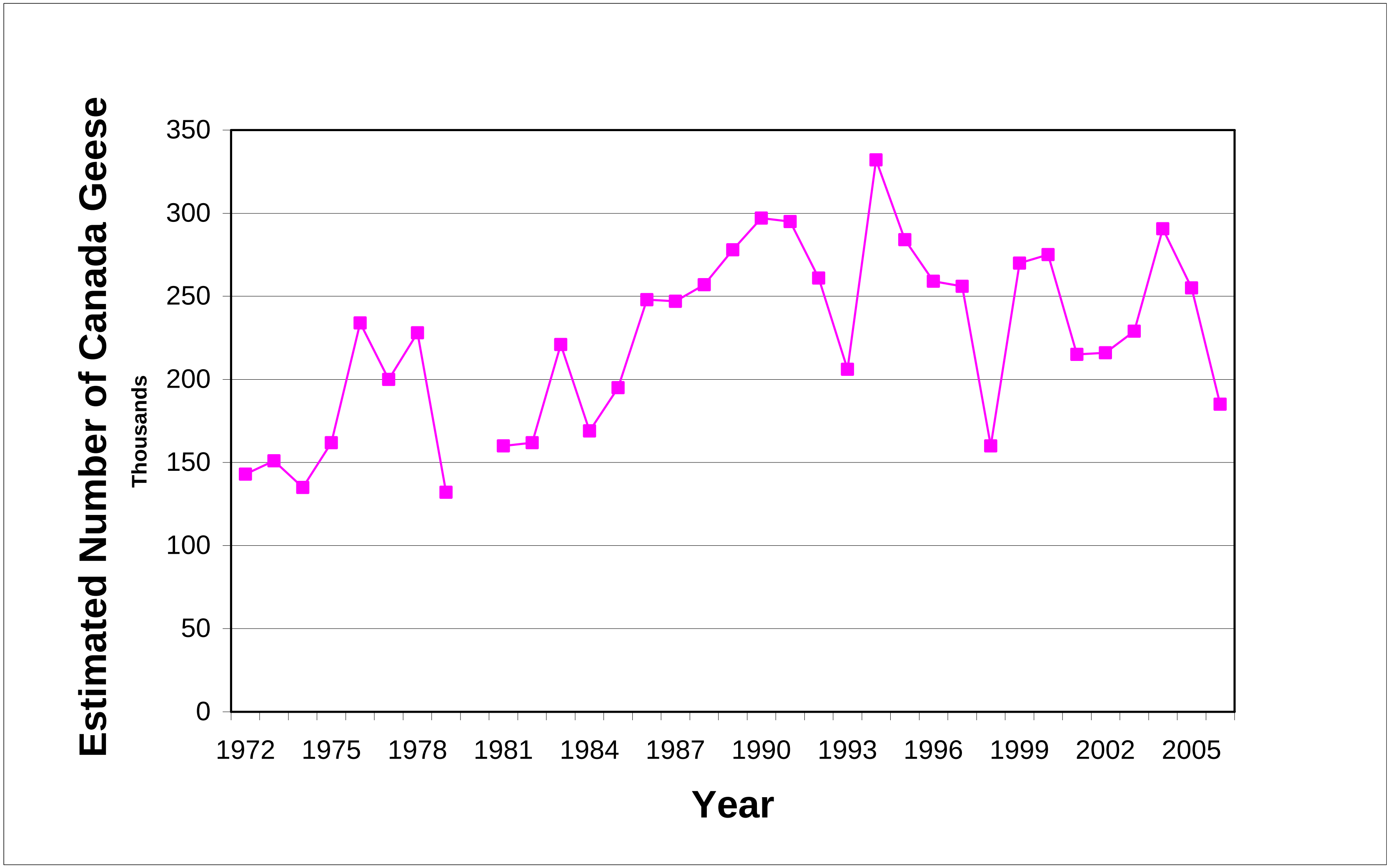


Figure 1. Breeding ground survey estimates of the Eastern Prairie Population of Canada geese, 1972-2006. (from: U.S. Fish and Wildlife Service. 2006. Waterfowl population status, 2006. U.S. Department of the Interior, Washington, D.C. U.S.A.). Surveys conducted in spring. Indirect or preliminary estimates. Data not available for 1980.

Table 2. Estimated number of May ponds (adjusted for visibility) in Prairie Canada (portions of Alberta, Saskatchewan and Manitoba) 1961-2006 and north-central U.S. (North Dakota, South Dakota and Montana) 1974-2006. (from: U.S. Fish and Wildlife Service. 2006. Waterfowl population status, 2006. 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
2006	4,449	1,644
Average	3,382	1,525
% Change in 2006 from:		
2005	+ 13	+ 13
Long term Average	+ 32	− 8

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

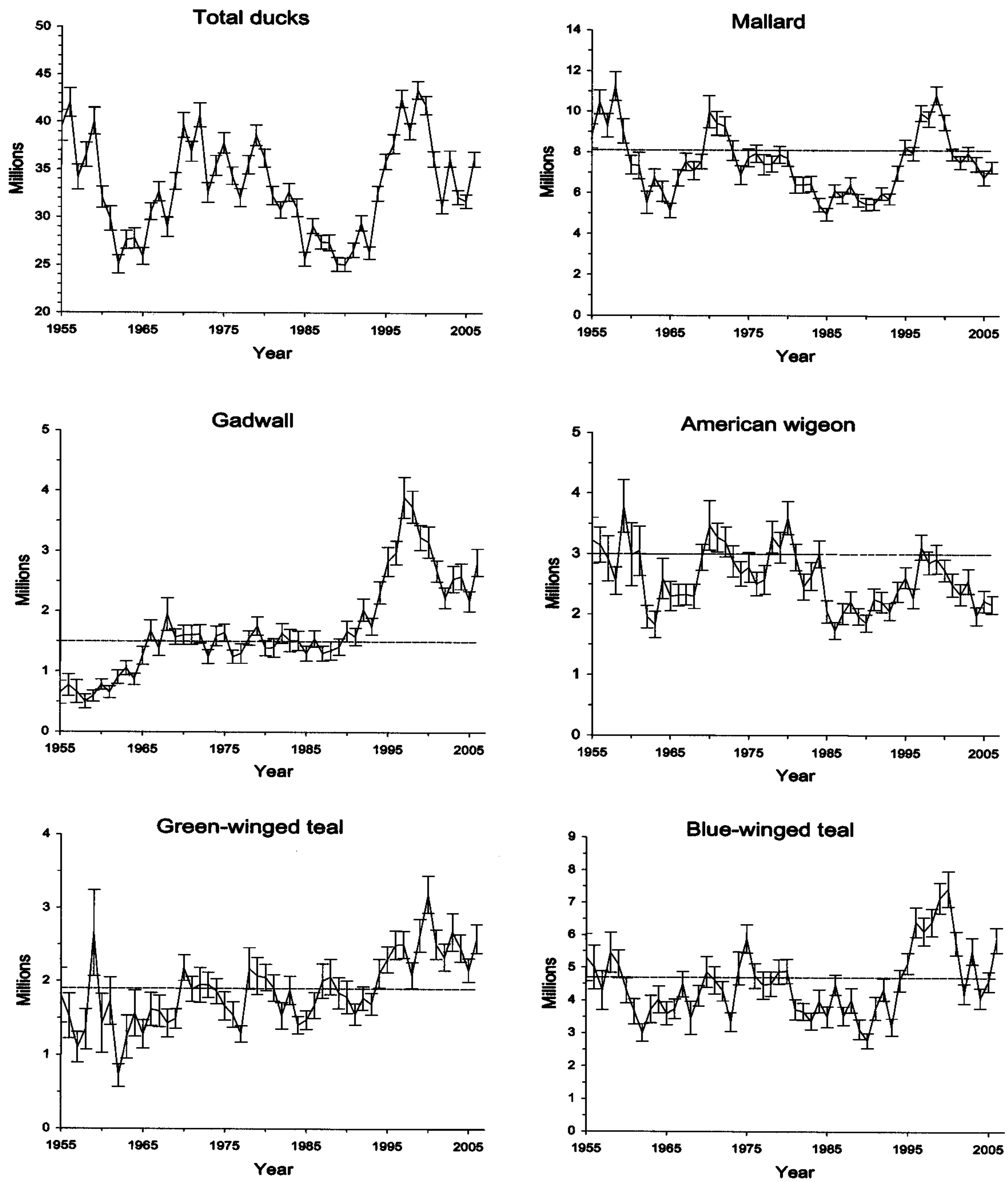


Figure 2. Estimates of North American breeding populations, 95% confidence intervals, and North American Waterfowl Management Plan population goal (dashed line) for selected species and number of water areas in May in Prairie Canada and Northcentral U.S. (from: U.S. Fish and Wildlife Service. 2006. Waterfowl population status, 2006. U.S. Department of the Interior, Washington, D.C. U.S.A.)

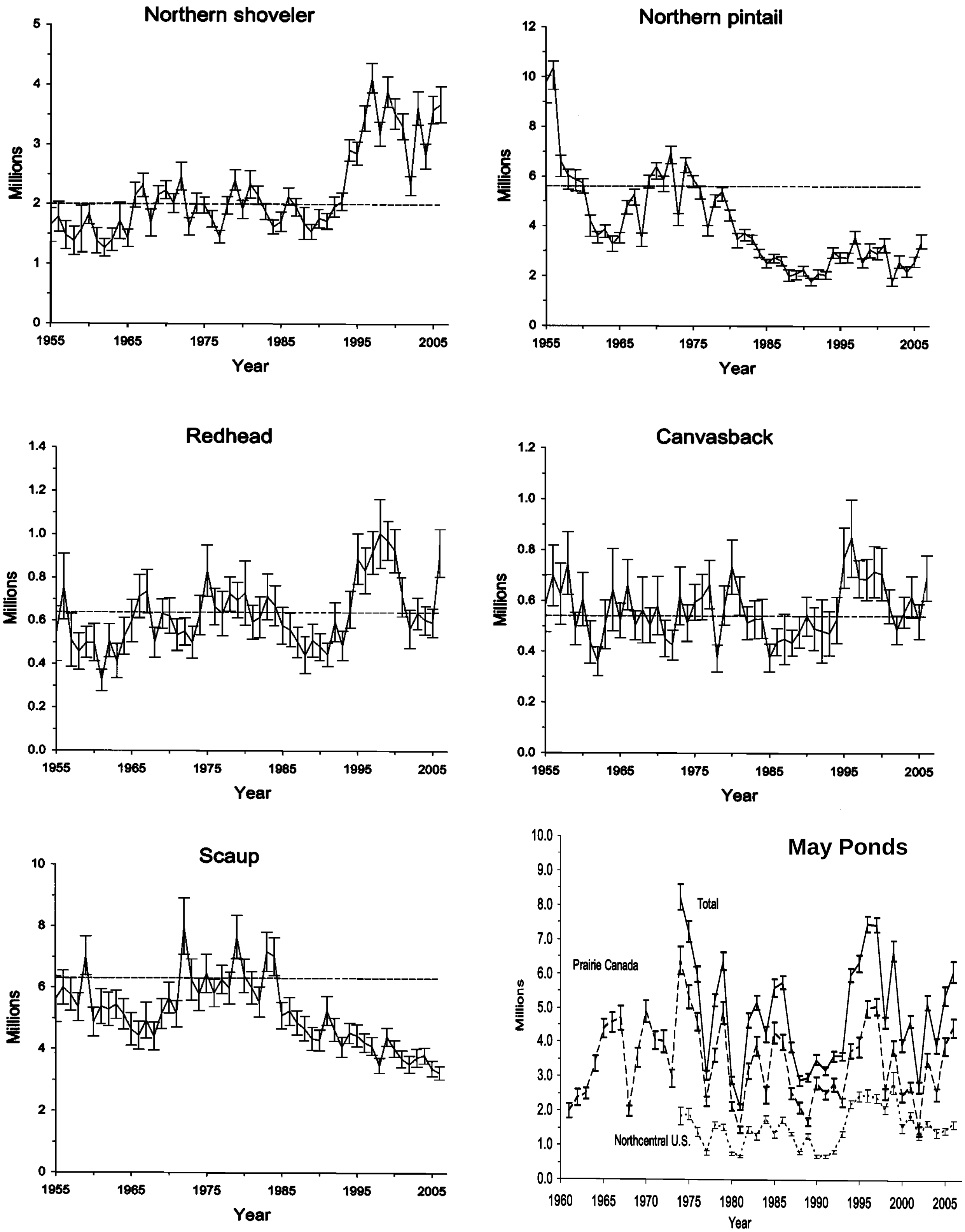


Figure 2. (continued).

Minnesota Spring Canada Goose Survey, 2006

Stephen Maxson, Wetland Wildlife Populations and Research Group

INTRODUCTION

This report presents results from the sixth 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 24-27 April, 2-3 May and 5 May 2006. 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 in the surveyed area was 358,071 (±108,436). Adding 17,500 for the Twin Cities metro area (Cooper 2004) yields a statewide estimate of **375,571** (Table 1). Confidence Intervals were 30.3% of the estimate which is somewhat above the target of 25.0%. The survey tallied 43.5% singles (after doubling, as noted above), 45.9% pairs, and 10.6% 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 2006, 50.3% 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 in the surveyed area has been increasing over the 6 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. Based on habitat conditions and the relatively high proportion of productive geese observed, I would expect average to above-average Canada goose production in 2006.

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, 2001-2006.

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**
2006	126,042	164,085	67,994	358,071	108,436	17,500	**375,571**

Table 2. Percent of Canada Geese seen as singles, pairs, groups, and productive geese on the Minnesota Spring Canada Goose Survey, 2001-2006.

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
2006	43.5	45.9	10.6	50.3

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

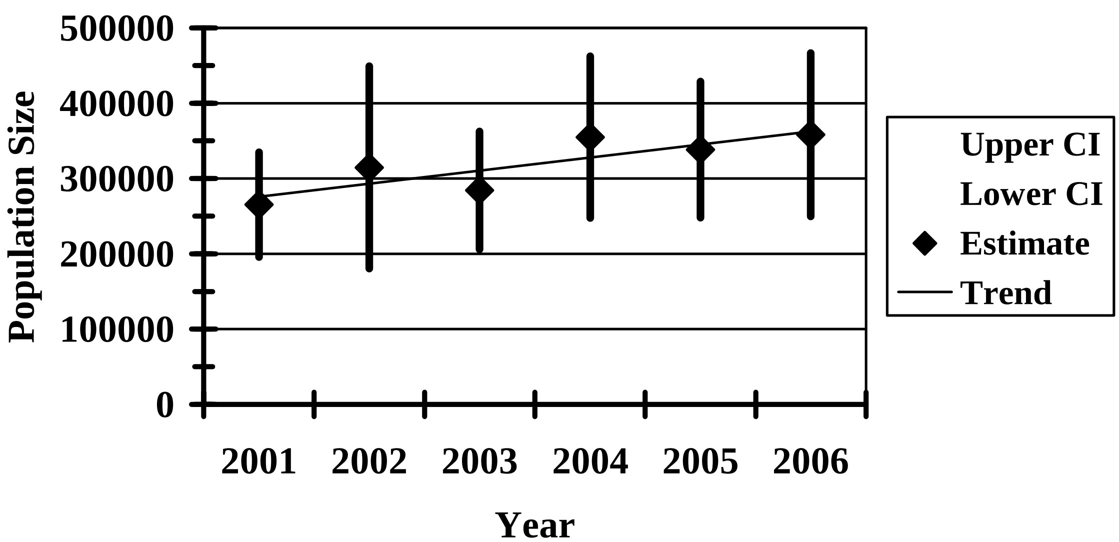


Figure 1. Spring Canada goose population estimates (±95% CI) in Minnesota, 2001-2006. (Does not include Metro area.)

Mourning dove information is taken from the U.S. Fish and Wildlife Service report by Dolton, D.D. and R.D. Rau. 2006. Mourning dove population status, 2006. 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).

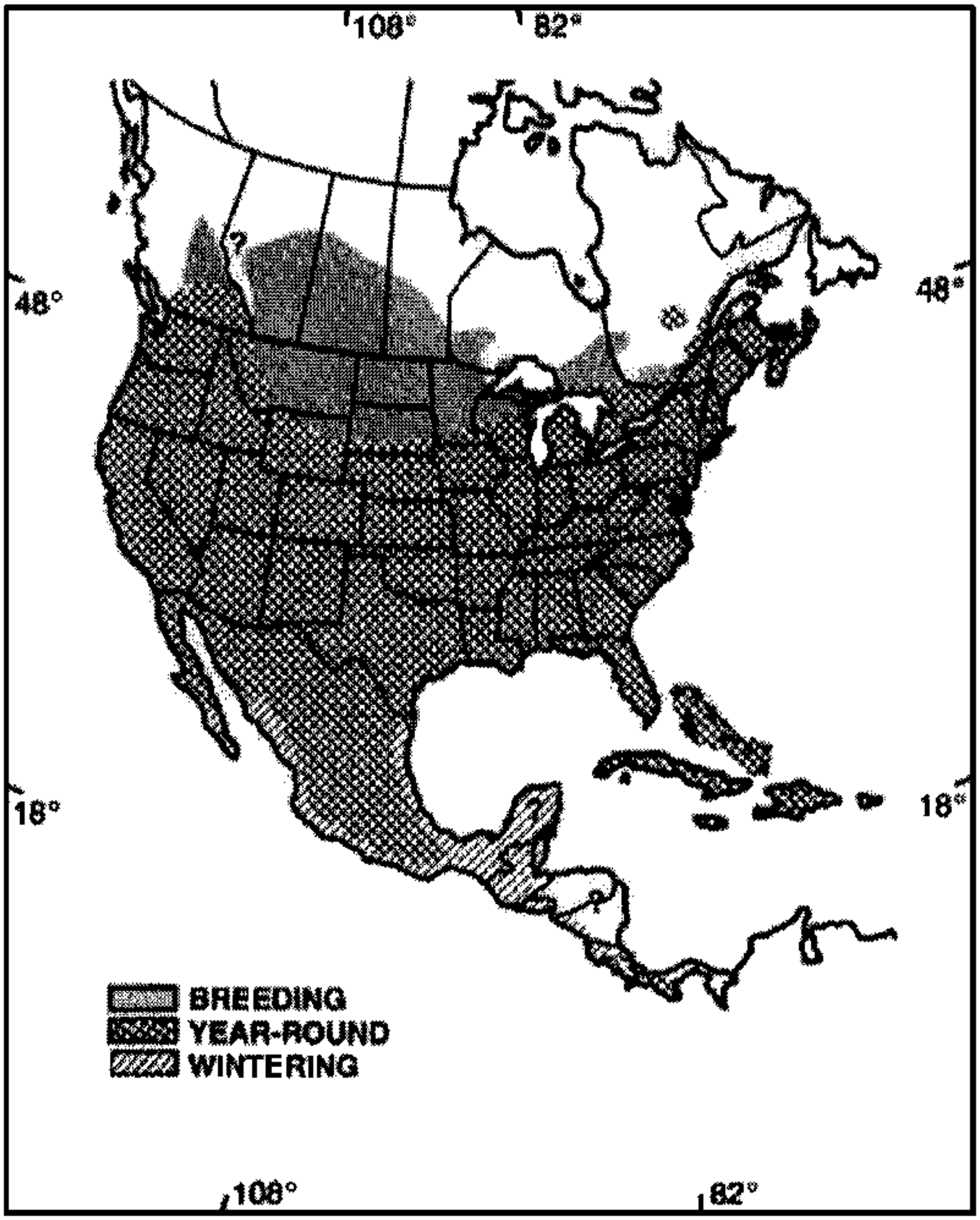


Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994). From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp.

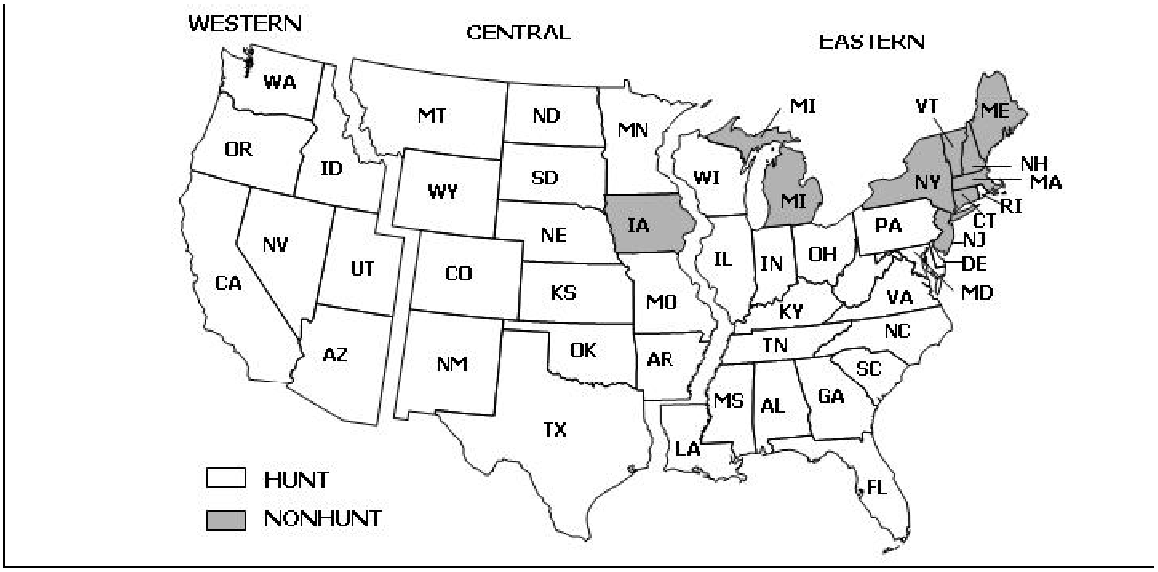


Figure 2. Mourning dove management units with 2005 hunting and nonhunting states. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

Table 1. Preliminary estimates of the number of hunters, days hunted, and total bag from Harvest Information Program surveys for the 2005-06 season. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

Management unit / State	Hunters	Days Hunted	Birds bagged
CENTRAL	473,900	1,729,800 ± 8%	9,891,400 ± 9%
AR	43,400 ± 15%	147,300 ± 24%	861,600 ± 20%
CO	18,400 ± 7%	48,700 ± 9%	263,400 ± 10%
KS	32,400 ± 8%	109,500 ± 12%	680,400 ± 11%
MN	6,000 ± 34%	14,700 ± 43%	48,800 ± 61%
MO	40,200 ± 10%	113,400 ± 16%	641,800 ± 20%
MT	2,000 ± 34%	4,800 ± 38%	17,800 ± 44%
NE	17,800 ± 10%	64,300 ± 14%	361,100 ± 15%
NM	9,300 ± 17%	42,000 ± 20%	250,100 ± 22%
ND	3,100 ± 27%	11,800 ± 38%	55,500 ± 48%
OK	34,500 ± 9%	111,500 ± 16%	828,500 ± 20%
SD	7,100 ± 18%	25,200 ± 26%	127,700 ± 28%
TX	257,200 ± 10%	1,030,000 ± 13%	5,710,700 ± 15%
WY	2,500 ± 27%	6,600 ± 27%	34,100 ± 31%

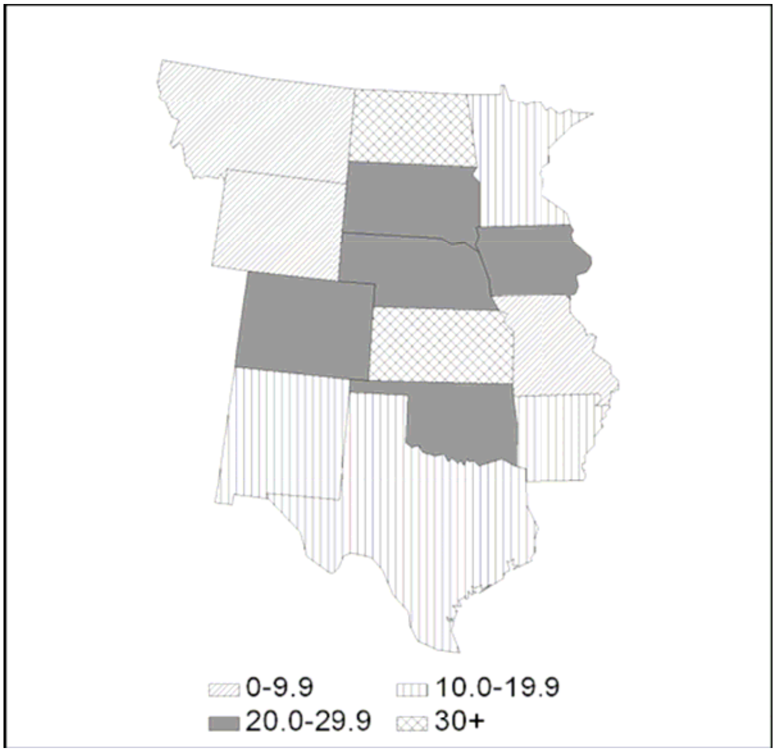


Figure 3. Mean number of mourning doves heard per route by state in the Central Management Unit, 2005-06. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

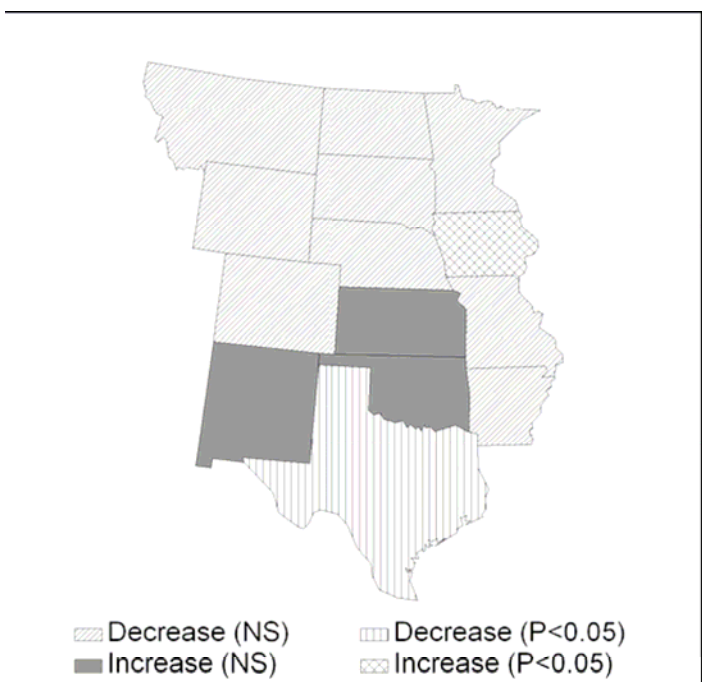


Figure 4. Trends in number of mourning doves heard per route by state in the Central Management Unit, 1997-2006. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

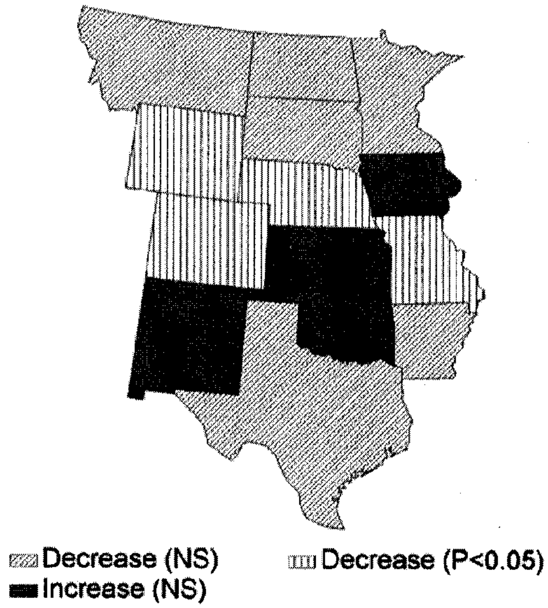


Figure 5. Trends in mourning doves heard per route by state in the Central Management Unit, 1966-2006. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

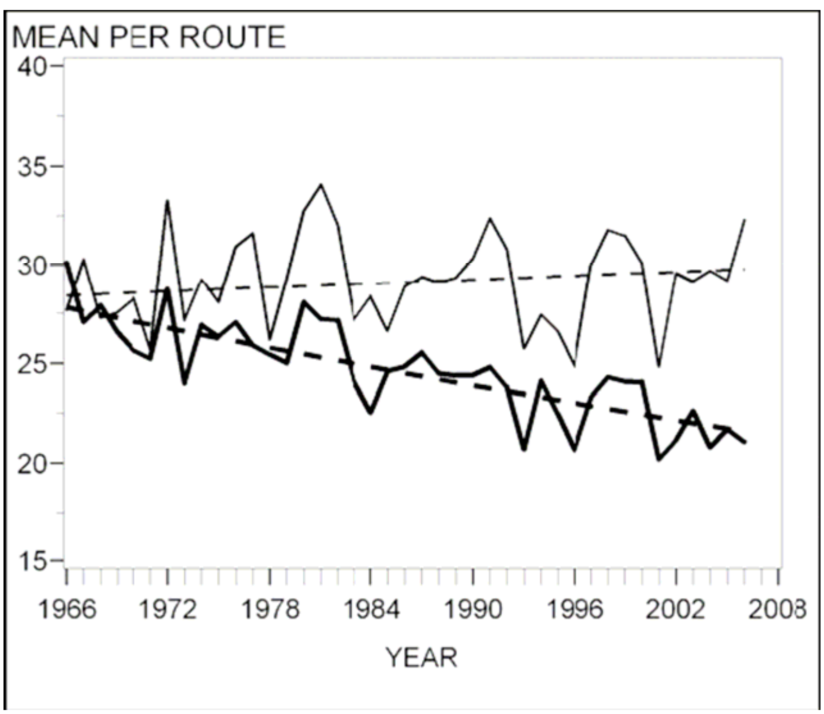


Figure 6. Population indices and trends of breeding mourning doves in the Central Management Unit, 1966-2006. Heavy solid line = doves heard; light solid line = doves seen. Light and heavy dashed lines = predicted trends. (From: Mourning dove population status, 2006. Dolton, D.D. and R.D. Rau. 2006. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 19 pp).

American Woodcock information is taken from the U.S. Fish and Wildlife Service report American Woodcock Population Status, 2006 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).

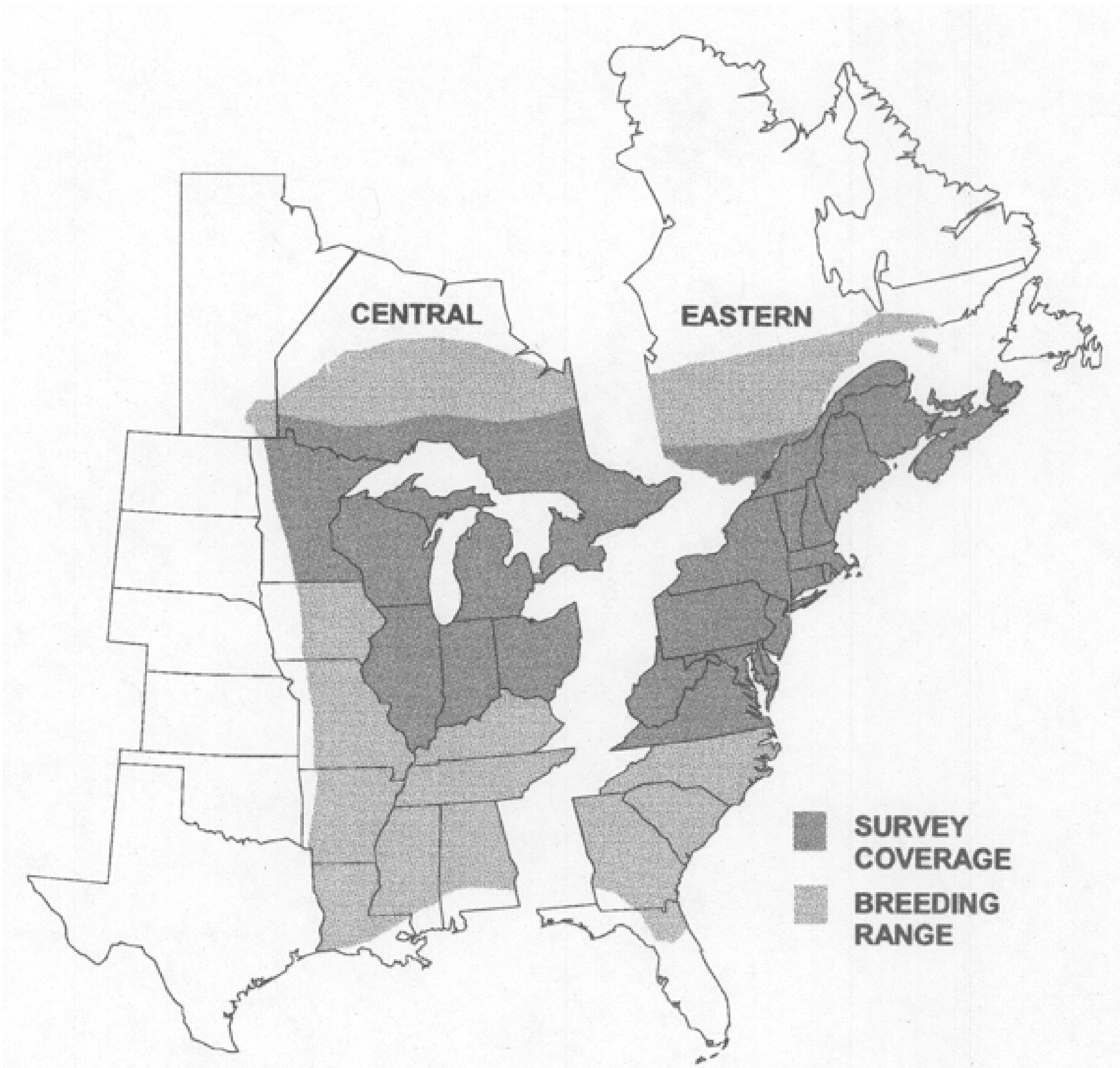


Figure 1. Woodcock management regions, breeding range, singing-ground survey coverage, (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.)

Table 1. Trends (% change per year [a]) in number of American woodcock heard in singing-ground survey during 1968-2006, as determined by the estimating equations technique (Link and Sauer, 1994) (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Office of Migratory Bird Management, Laurel, MD. 15pp).

Management Unit/State	2 year N[c]	(2005-06) % Change	Routes Run[b]	10 year N	(1996-06) % Change	38 year N	(1968-06) % Change
CENTRAL	201	- 8.0**	335	381	-0.1	631	- 1.8***
IL	0		8	5	13.2	25	24.5
IN	2	-96.1 ***	16	7	- 5.1	39	- 7.1**
MB[e]	4	-27.4 *	11	21	0.0	22	- 2.4
MI	68	- 7.9	95	108	- 1.0	147	- 1.7***
MN	52	- 8.3	74	79	0.5	102	- 1.0*
OH	15	-12.7	32	27	- 6.7	57	- 6.2***
ON	12	- 5.5	31	60	3.1	138	- 1.9***
WI	47	- 5.2	68	74	0.1	101	- 1.9***

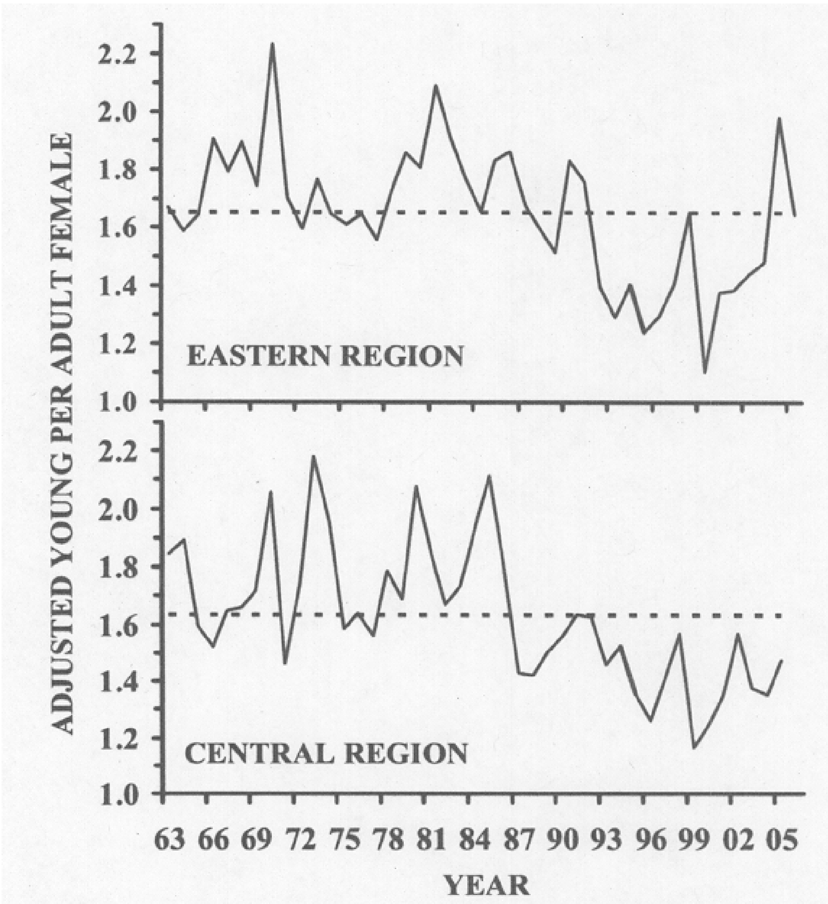
[a] Mean of weighted route trends within each State, Province, or Region. To estimate the total percent change over several years, use: $100(\% \text{ change}/100+1)^{y}-100$ where y is the number of years. Note: extrapolating the estimated trend statistic (% change per year) over time (e.g., 30 years)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

[b] Total number of routes surveyed in 2006 for which data were received by 1 June.

[c] Number of comparable routes (2005 versus 2006) 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.



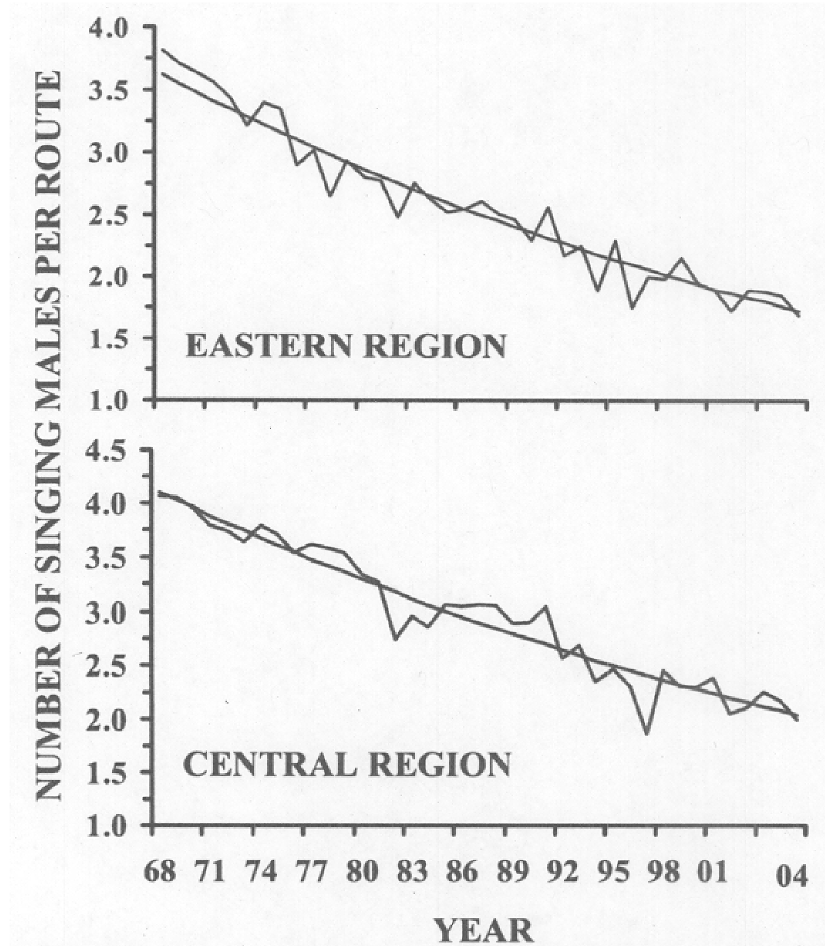


Figure 2. Adjusted index of American woodcock recruitment, 1963-2005. Dashed line is the index based on all 1963-2004 average. (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Laurel, MD. 15pp).

Figure 3. American woodcock singing ground survey long term trends and annual indices, 1968-2006. (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. 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, 2004-05, and 2005-06. Harvest Information Program surveys. (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Laurel, MD. 15pp).

Management Unit / State	Active woodcock hunters				Days afield				Harvest			
	2002-03	2003-04	2004-05	2005-06	2002-03	2003-04	2004-05	2005-06	2002-03	2003-04	2004-05	2005-06
Central Region	n.a. [a]	n.a.	n.a.	n.a.	428,200 ± 26%	369,900 ± 16%	366,100 ± 15%	356,100 ± 14%	187,500 ± 24%	213,500 ± 23%	234,800 ± 20%	225,000 ± 19%
IL	3,000 ± 90%	2,400 ± 79%	1,200 ± 74%	2,100 ± 79%	6,400 ± 88%	12,200 ± 112%	3,500 ± 78%	5,300 ± 89%	9,000 ± 110%	2,200 ± 90%	1,900 ± 96%	3,900 ± 196%
IN	1,700 ± 114%	700 ± 97%	1,100 ±104%	2,100 ± 55%	24,200 ± 172%	6,000 ± 134%	5,300 ±124%	7,400 ± 69%	6,900 ± 161%	1,800 ± 31%	7,900 ± 145%	4,400 ± 91%
MI	25,200 ± 18%	35,100 ± 14%	31,200 ± 13%	28,000 ± 13%	135,400 ± 23%	159,000 ± 18%	147,000 ± 14%	151,200 ±17%	78,300 ± 26%	121,500 ± 30%	102,500 ± 21%	106,800 ± 27%
MN	8,200 ± 66%	14,300 ± 38%	14,500 ± 27%	12,000 ± 31%	49,300 ± 92%	48,700 ± 43%	67,000 ± 33%	60,200 ± 42%	9,200 ± 31%	29,900 ± 84%	38,500 ± 53%	42,200 ± 54%
OH	5,200 ± 108%	3,400 ± 88%	2,600 ± 82%	4,700 ± 65%	23,200 ± 138%	10,300 ± 86%	18,200 ± 126%	15,800 ± 79%	3,100 ± 45%	2,500 ± 78%	4,600 ±101%	6,900 ± 83%
WI	17,600 ± 30%	16,100 ± 30%	15,700 ± 30%	15,600 ± 25%	58,900 ± 26%	65,600 ± 33%	61,100 ± 30%	73,100 ± 31%	33,900 ± 34%	30,300 ± 35%	47,300 ±50%	37,600 ± 28%

[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.

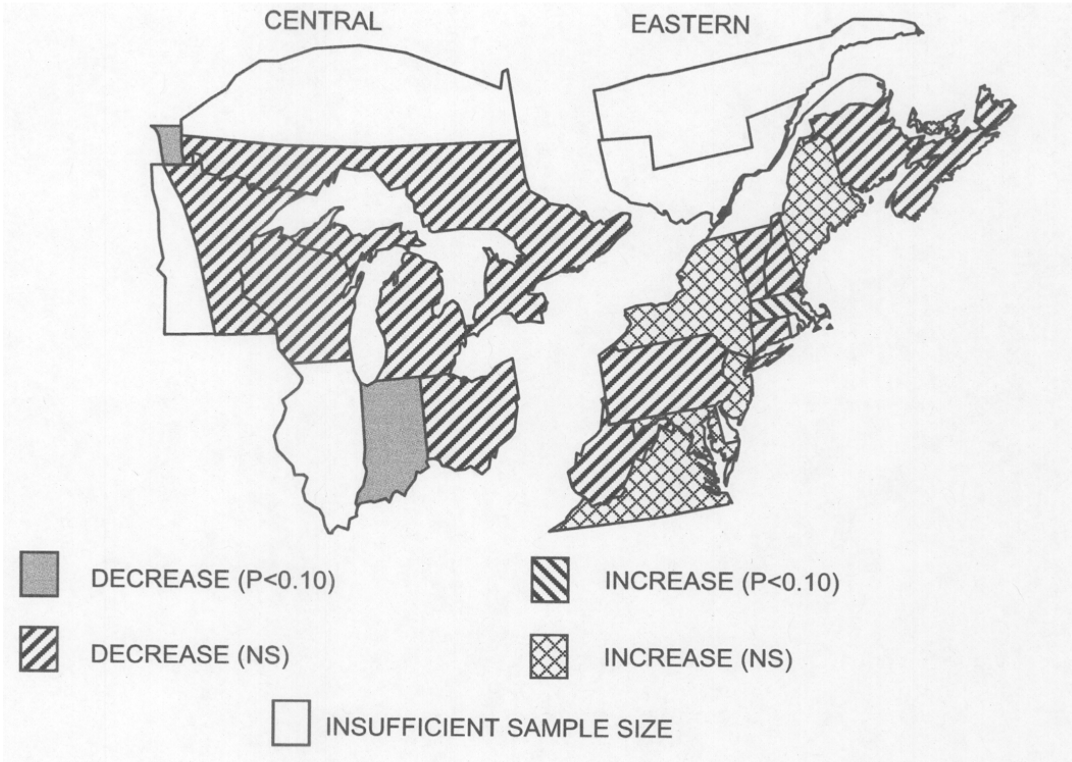


Figure 4. Short-term trends in number of American woodcock heard on the Singing-ground Survey; 2005-06. (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Laurel, MD. 15pp)

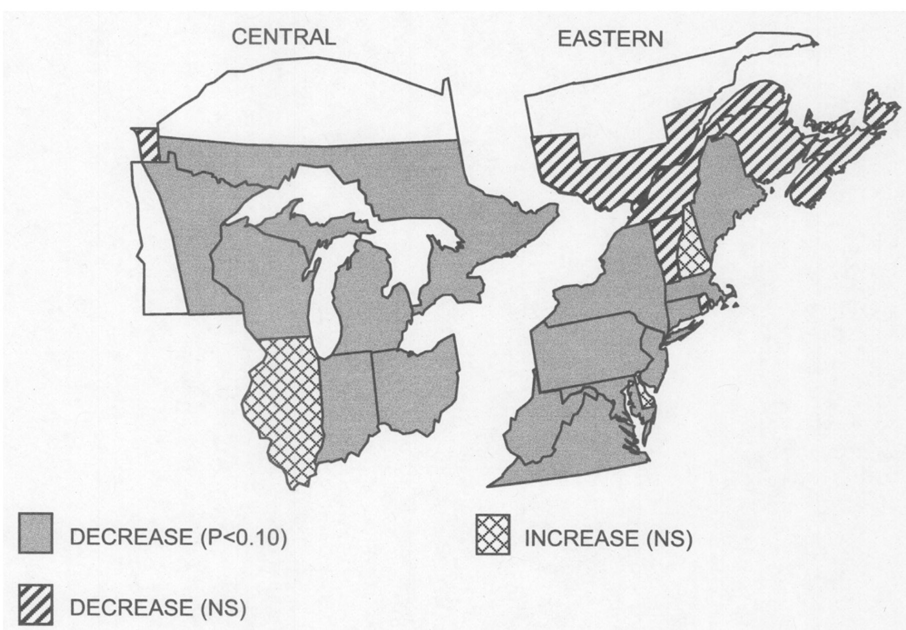


Figure 5. Long-term trends in number of American woodcock heard on the Singing-ground Survey; 1968-06. (from: Kelley, J.R., Jr., and R.D. Rau. 2006. American woodcock population status, 2006. U.S. Fish and Wildlife Service, Laurel, MD. 15pp)

HUNTING HARVEST STATISTICS

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2005 SMALL GAME HUNTER MAIL SURVEY

Margaret Dexter, Wildlife Policy and Research Unit

INTRODUCTION

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

METHODS

The Wildlife Policy and Research 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 consisted of 6,280 (approximately 2%) Small Game License holders, drawn proportionately from each of the Small Game license types available.

Hunters 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 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 2005 - 06.

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
2005 - 06	6,280	142	3,946	64.3

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

Table 2. Use of small game hunter licenses, 1995-96 through 2005-2006.

		Returns from mail survey	Projections from license sales
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
2005-06	Hunted	3,035 (77.1%)	216,000
	Did not hunt	900 (22.9%)	64,156
		3,935 (100.0%)	280,156

Includes resident and non-resident information. Excludes duplicates.

2005 Small Game Hunter Report

1. Did you hunt small game, listed below, in Minnesota this year (March 2005 - Feb 2006)? ☐No ☐Yes (Please check box)
2. Indicate the **total number of days** spent hunting small game of all species listed below, in Minnesota.________
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			
Coots (mud hens)	50			
Canada geese	40			
Other geese	41			
Snipe (jacksnipe)	51			
Rails and gallinules	52			
Crows	53			
Woodcock	60			
Mourning Dove	65			
Pheasants	70			
Ruffed grouse (Forest partridge)	71			
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 05)	24			
Raccoon (Sept 05-Feb 06)	94			
Red fox (Mar-Aug 05)	25			
Red fox (Sept 05-Feb 06)	95			

Dear Small Game Hunter:

You have been selected at random from among Minnesota's small game hunting license buyers to assist us in evaluating the 2005-2006 small game hunting season **(March 2005-February 2006)**. We need information to estimate the season's harvest and to help set future small game seasons. Answer only for your Minnesota 2005 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.
A reminder will be sent to individuals not returning the questionnaire within three weeks. No envelope or stamp is necessary; just tear along the perforation and drop into a mailbox.

THANK YOU FOR YOUR COOPERATION

Dave Schad, 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

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 171 ST. PAUL, MN

POSTAGE WILL BE PAID BY ADDRESSEE

Department of Natural Resources - Wildlife
STATE OF MINNESOTA
395 JOHN IRELAND BLVD
SAINT PAUL MN 55101-9799

Figure 1. Sample of Small Game Hunter survey card

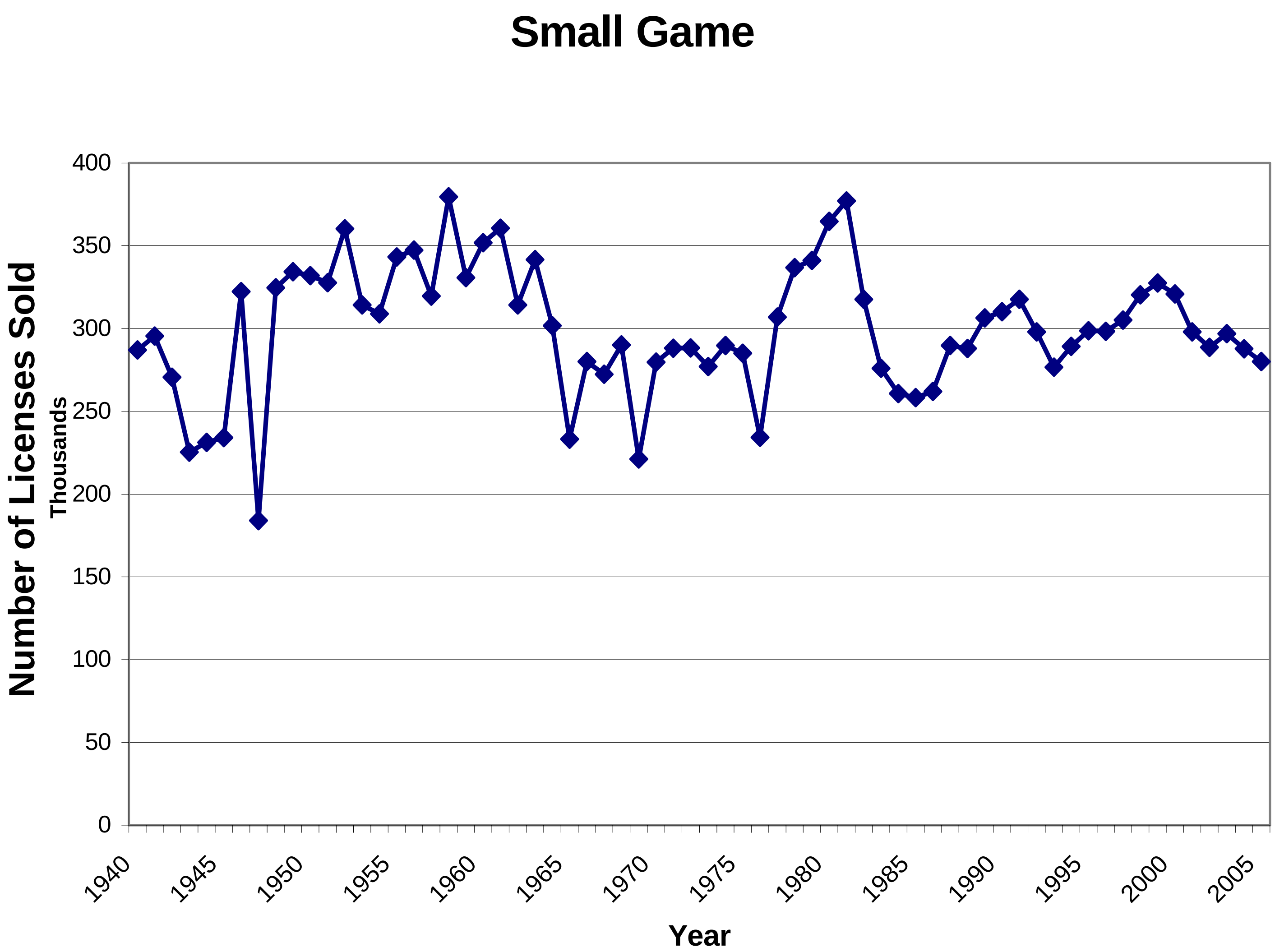

Figure 2. Number of Minnesota small game licenses sold. 1940 – 2005.

Table 3. Estimated number of hunters (thousands) for various species, 1993-94 through 2005-06.

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Ducks	109	118	119	114	122	117	122	109	109	112	101	105	92
Canada goose	62	70	73	75	79	77	80	77	76	79	75	75	69
Other geese	9	7	10	6	5	6	5	7	7	6	7	5	5
American coot	6	7	9	6	7	5	6	4	4	4	4	5	4
Common snipe	2	2	2	2	2	2	2	2	1	2	1	2	1
Rails / gallinules	1	1	1	<1	<1	<1	<1	<1	<1	1	<1	<1	0
Crow *	10	12	15	13	11	11	14	14	11	13	12	12	12
American woodcock	17	21	21	18	17	19	19	16	11	12	13	12	11
Mourning dove												16	11
Ring-necked pheasant	88	92	96	88	80	88	93	100	85	91	105	104	111
Ruffed grouse	102	107	116	118	127	142	139	121	101	91	94	79	76
Spruce grouse	11	12	14	11	11	11	11	9	9	7	9	7	7
Sharp-tailed grouse	8	7	8	7	8	8	8	10	8	6	7	6	5
Gray partridge	15	14	12	11	8	10	10	8	7	7	8	5	6
Gray squirrel	32	35	35	33	27	30	31	27	26	25	29	23	25
Fox squirrel	23	24	23	20	16	18	20	17	15	15	20	15	15
Eastern cottontail	21	21	23	19	14	19	18	20	17	16	21	19	20
White-tailed jackrabbit	4	4	5	4	3	3	3	2	3	2	3	3	2
Snowshoe hare	5	6	5	4	4	7	7	5	6	6	6	4	3
Raccoon (Sept 05 - Feb 06)	9	10	10	10	9	9	6	6	6	6	6	6	5
Raccoon‡ (March 05-Aug 05)		3	5	4	3	4	3	5	4	4	5	3	3
Red fox (Sept 05-Feb 06)	16	15	15	11	9	9	8	10	6	7	7	6	6
Red fox‡ (March 05-Aug 05)		3	4	3	2	3	2	2	3	2	2	1	1
Gray fox	3	2	3	n.a.	2	2	2	1	1	1	2	2	1
Coyote	14	11	15	13	10	11	11	16	11	12	15	16	19
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, 1992-93 through 2005-06.

	Estimated take per hunter													
	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	2005-06
Ducks	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	7.3
Canada geese	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	4.1
Other geese	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	1.9
American coot	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	3.9
Common snipe	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	4.4
Rails/gallinules	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	0
Crow *	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	7.8
American woodcock	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	2.5
Mourning dove													6.2	7
Ring-necked pheasant	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	5.3
Ruffed grouse	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	2.9
Spruce grouse	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	1.4
Sharp-tailed grouse	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	1.3
Gray partridge	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	2.6
Gray squirrel	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	5.0
Fox squirrel	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	4.1
Eastern cottontail	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	4.5
White-tailed jackrabbit	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	2.7
Snowshoe hare	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	3.1
Raccoon (Sept 05 - Feb 06)	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	6.0
Raccoon‡ (March 05-Aug 05)			8.0	11.3	24.4	5.1	5.8	6.4	7.8	4.4	5.4	4.7	6.1	2.7
Red fox (Sept 05-Feb 06)	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	1.7
Red fox‡ (March 05-Aug 05)			1.4	1.5	1.3	0.8	1.2	0.6	0.9	1.5	1.7	0.6	0.6	0.9
Gray fox	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	0.9
Coyote	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	2.1
Badger	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	1.2

*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 (%), 1995 - 96 through 2005 - 06.

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Ducks	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)	8.9 (82.5)
Canada geese	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)	5.5 (73.7)
Other geese	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)	4.5 (43.1)
American coot	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)	5.1 (75.9)
Common snipe	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)	4.7 (94.1)
Rails / gallinules	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)	0.0 (0.0) *
Crow	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)	9.1 (85.6)
American woodcock	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)	3.6 (70.3)
Mourning dove										7.9 (78.9)	8.7 (80.1)
Ring-necked pheasant	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)	7.0 (75.9)
Ruffed grouse	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)	4.4 (67.5)
Spruce grouse	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)	2.4 (60.6)
Sharp-tailed grouse	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)	2.4 (55.1)
Gray partridge	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)	5.0 (52.3)
Gray squirrel	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)	5.8 (86.1)
Fox squirrel	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)	5.0 (82.5)
Eastern cottontail	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)	5.4 (83.4)
White-tailed jackrabbit	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)	3.2 (82.8)
Snowshoe hare	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)	4.6 (68.1)
Raccoon (Sept 04-Feb 05)	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)	6.5 (92.6)
Raccoon[‡] (March 04-Aug 04)	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)	3.1 (86.8)
Red fox (Sept 04-Feb 05)	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)	3.7 (46.4)
Red fox[‡] (March 04-Aug 04)	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)	1.6 (55.6)
Gray fox	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)	1.9 (50.0)
Coyote	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)	4.11 (50.4)
Badger	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)	1.2 (100.0 0

‡ Raccoon and red fox season changed to year round beginning May 1994. Mourning dove season added 2004. * No hunters surveyed reported Rails/Gallinules in bag.

Table 6. Statewide small game hunting license sales and estimated hunter harvest, 1994-95 through 2005-06.

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Small game license sales[a]	289,189	298,425	298,337	305,186	320,308	327,431	320,862	298,055	288,729	296,939	287,725	280,156
Federal duck stamp sales	149,428	132,546	132,738	138,331	134,098	134,138	135,884	140,980[e]	144,851[e]			
State duck stamp sales	116,346	122,092	122,634	126,009	126,488	128,245	121,709	118,590	119,677	118,757	114,003	102,143
Pheasant stamp sales	104,621	105,093	95,866	85,093	99,664	106,945	114,440	97,665	102,097	121,456	114,653	117,301
Estimated harvest[b] (thousands)												
Ducks[c]	955	1,162	1,098	1,206	1,119	1,021	969	990	1,024	914	727	676
Canada geese[c]	166	180	241	230	218	285	301	308	257	290	284	282
Other geese[c]	6	9	8	11	6	6	15	8	11	13	8	9
American coot [c]	22	28	23	29	25	25	10	17	20	11	20	16
Common snipe	2	3	5	4	5	3	3	2	3	3	2	5
Rails / gallinules	1	1	<1	<1	<1	<1	1	<1	2	<1	<1	0
Crow	114	130	96	74	106	60	96	88	72	82	72	93
American woodcock	74	82	58	58	63	54	45	27	28	30	41	28
Mourning dove[f]											97	78
Ring-necked pheasant	319	398	341	248	309	339	375	267	358	511	420	585
Ruffed grouse	371	457	533	654	946	685	619	332	249	351	194	224
Spruce grouse	23	25	16	25	27	19	23	9	12	18	9	10
Sharp-tailed grouse	9	10	8	13	22	14	16	10	9	12	10	6
Gray partridge	26	26	24	16	24	19	17	10	11	22	13	16
Gray squirrel	187	169	158	131	149	132	140	146	134	175	133	122
Fox squirrel	99	105	75	68	57	71	65	63	67	85	62	62
Eastern cottontail	77	100	65	65	89	59	78	63	52	93	87	90
White-tailed jack rabbit	7	7	10	4	7	6	7	8	4	7	7	5
Snowshoe hare	19	11	10	8	25	21	27	22	11	12	8	10
Raccoon (Sept 05-Feb 06)	163	155	207	124	143	65	49	59	60	50	57	29
Raccoon[d] (Mar 05–Aug 05)	24	55	99	17	2	16	36	18	19	22	20	7
Red fox (Sept 05-Feb 06)	42	48	33	13	13	10	19	7	11	13	6	10
Red fox [d] (Mar 05–Aug 05)	4	6	4	2	3	1	2	4	4	1	1	1
Gray fox	1	3	n.a.	3	1	2	1	1	1	1	2	1
Coyote	13	26	30	16	14	13	29	12	14	20	18	39
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, 1993-94 through 2005-06.

	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Nonresident licenses issued[a]	3,809	4,435	4,993	5,488	6,361	7,155	7,572	7001	5,843	5,852	6,291	6,385	5,897
Questionnaires:													
Number mailed	229	182	205	51	269	200	199	98	124	130	123	182	210
Number not delivered	21	7	14	4	18	17	16	6	9	9	17	13	10
Number (percent) returned	149 (72)	128 (73)	140 (73)	32 (68)	183 (73)	117 (64)	136 (74)	56 (61)	77 (67)	75 (66)	68 (64)	114 (67)	134 (67)
Estimated nonresidents and (percent) of all nonresidents hunting:													
Ducks	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)	2,040 (35)
Canada goose	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)	1,818 (31)
Ruffed grouse	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)	1,774 (30)
Ring-necked pheasant	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)	2,572 (44)
Raccoon [b]	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)	44 (0.7)
Estimated nonresident take:													
Ducks	13,574	15,696	26,713	6,346	15,967	26,663	26,391	18,253	42,225	17,556	17,855	19,269	12,149
Canada goose	2,122	2,287	4,173	1,544	4,905	4,587	6,960	5,001	13,400	5,852	5,736	6,214	3,946
Ruffed grouse	4,985	7,242	9,415	23,153	16,072	27,886	23,384	24,003	6,622	9,207	9,437	7,924	6,429
Ring-necked pheasant	3,042	4,366	3,638	1,887	2,505	1,712	4,844	4,001	3,740	7,647	9,344	11,174	13,656
Raccoon	26	0	3,638	8,061	70	0	724	3,375	0	0	0	0	887

[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, 2003, and 2004 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
2005	6	20	44

The following information has been excerpted from: U.S. Fish and Wildlife Service. Migratory bird hunting activity and harvest during the 2004 and 2005 hunting seasons: 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, 2004 and 2005. (from: Padding, P.I., Richkus, K.D, Moore, M.T., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Hunting activity and harvest during the 2004 and 2005 hunting seasons: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2006. 63 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	2004	% of Harvest	2005	% of Harvest	Percent change in Harvest 04-05	2004	2005	Percent change Harvest 04-05
Mallard	179,277	26.23	169,582	31.9	− 5	2,199,931	2,049,383	− 7
Domestic mallard	838	0.12	240	.04	− 71	5,015	4,539	− 10
American black duck	279	0.04	719	.13	+ 158	35,692	36,365	+ 2
Black x mallard	558	0.08	0	0	− 100	2,651	2,849	+ 7
Gadwall	31,276	4.57	15,090	2.84	− 52	654,488	635,321	− 3
American wigeon	24,574	3.59	13,174	2.48	− 46	149,793	121,240	− 19
Green-winged teal	44,959	6.58	27,545	5.18	− 39	498,019	513,850	+ 3
Blue-winged /cinnamon teal	106,114	15.52	50,539	9.51	− 52	365,488	314,079	− 14
Northern shoveler	17,313	2.53	13,174	2.48	− 24	158,905	195,542	+ 23
Northern pintail	14,242	2.08	9,820	1.85	− 31	90,542	107,276	+ 18
Wood duck	127,616	18.67	98,204	18.48	− 23	729,608	673,507	− 8
Redhead	9,494	1.39	16,767	3.15	+ 77	35,334	62,051	+ 76
Canvasback	4,747	0.69	8,623	1.62	+ 82	10,824	32,786	+ 203
Greater scaup	3,072	0.45	1,437	0.27	− 53	28,056	24,812	− 12
Lesser scaup	12,008	1.76	12,934	2.43	+ 8	108,534	111,357	+ 3
Ring-necked duck	75,118	10.99	75,689	14.24	+ 1	233,979	240,090	+ 3
Goldeneye	9,494	1.39	7,186	1.35	− 24	30,290	23,420	− 23
Bufflehead	8,936	1.31	3,832	0.72	− 57	59,789	42,024	− 30
Ruddy duck	1,955	0.28	479	0.09	− 75	5,227	4,235	− 19
Scoters	838	0.12	719	0.13	− 14	4,286	4,921	+ 15
Hooded merganser	9,215	1.35	4,790	0.90	− 48	47,469	30,454	− 36
Other mergansers	1,117	0.16	958	0.18	− 14	8,808	4,164	− 53
Total Duck Harvest (retrieved kill)	683,600 ± 10%		531,500 ± 12%		− 22	5,505,500 ± 5%	5,270,000 ± 5%	− 4

[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**, 2005, and number of hunter-days and retrieved duck kill, in each (from: Padding, P.I., Richkus, K.D, Moore, M.T., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Hunting activity and harvest during the 2004 and 2005 hunting seasons: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2006. 63 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**
Texas	91,500 ± 18%	488,500 ± 25%	1,255,400± 23%	13.7 ± 29%
Minnesota	71,000 ± 8%	404,100 ± 11%	531,500 ± 12%	7.5 ± 15%
Arkansas	64,900 ± 9%	462,700 ± 13%	1,080,400 ± 14%	16.7 ± 17%
Wisconsin	56,100 ± 10%	393,900 ± 16%	375,100 ± 12%	6.7 ± 16%
Louisiana	48,400 ± 11%	333,000 ± 15%	877,800 ± 14%	18.2 ±18%
California	47,000 ± 10%	486,700 ± 15%	1,327,200 ± 15%	28.3 ± 18%
Michigan	40,900 ± 10%	225,200 ± 11%	284,400 ±12%	7.0 ± 16%
North Dakota	36,300 ± 5%	186,700 ± 7%	519,400 ± 8%	14.3 ± 9%
Illinois	31,600 ± 9%	260,900 ± 10%	380,400 ± 11%	12.0 ± 15%
Missouri	28,700 ± 13%	221,700 ± 20%	465,400 ± 28%	16.2 ± 31%
Mississippi Flyway		3,075,500 ± 5%	5,270,000 ± 5%	
United States		6,479,200 ± 3%	12,510,800 ± 4%	

Table 3. Top 10 states in number of **adult goose hunters**, 2005, and number of hunter-days and retrieved goose kill, in each (from: Padding, P.I., Richkus, K.D, Moore, M.T., Martin, E.M., Williams, S.S., and Spriggs, H.L. Migratory Bird Hunting activity and harvest during the 2004 and 2005 hunting seasons: preliminary estimates. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Branch of Harvest Surveys, Laurel, Maryland. July 2006. 63 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
Texas	58,800 ± 18%	183,500 ± 26%	457,300 ± 24%	7.8 ± 30%
Minnesota	58,600 ± 9%	366,300 ± 12%	207,500 ± 13%	3.5 ± 16%
Wisconsin	51,100 ± 9%	327,600 ± 15%	108,000 ± 17%	2.1 ± 19%
Michigan	38,000 ± 10%	186,600 ± 12%	141,800 ± 16%	3.7 ± 18%
Pennsylvania	37,000 ± 10%	189,800 ± 11%	189,300 ± 13%	5.1 ± 17%
California	32,300 ± 11%	248,300 ± 17%	146,900 ± 21%	4.5 ± 24%
North Dakota	26,500 ± 6%	132,900 ± 9%	153,300 ± 13%	5.8 ± 14%
Illinois	26,400 ± 10%	187,900 ± 13%	110,800 ± 21%	4.2 ± 23%
Maryland	25,600 ± 7%	143,900 ± 10%	177,500 ± 11%	6.9 ± 13%
Arkansas	24,000 ± 15%	108,800 ± 25%	135,300 ± 23%	5.6 ± 27%
Mississippi Flyway		1,928,500 ± 6%	1,275,300 ± 6%	
United States [b]		4,143,100 ± 4%	3,660,700 ± 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.

Hunter Activity and Goose Harvest During the September 2004 Canada Goose Hunt in Minnesota

Stephen J. Maxson, Wetland Wildlife Populations & Research
Margaret H. Dexter, Wildlife Surveys & Statistical Unit

INTRODUCTION

This report documents results of the 2004 September goose hunter mail questionnaire survey. The objectives of the survey are to determine the number of hunters participating in the September hunt, their hunting effort and success, the number of geese harvested by goose zone, and the proportion of geese taken while hunting within 100 yards of water in the West and Remainder of State Zones.

METHODS

The Canada goose season in the four zones encompassing the majority of Minnesota was 4-22 September 2004 (19 days). A 12-day (4-15 Sep) season was held in the Northwest Goose Zone (Fig. 1). The daily bag limit was 5 geese per day, except in the Northwest and Southeast Goose Zones where the daily bag was two. Shooting hours were 1/2 hour before sunrise to sunset. Taking of Canada geese was prohibited on or within 100 yards of all surface waters in the Northwest, Southeast, and Twin Cities Metro Goose Zones, in the Carlos Avery Wildlife Management Area and in the Swan Lake Area. In the Twin Cities Metro Zone and goose refuges open to goose hunting, hunting was not allowed from public road rights-of-way. Goose hunters were required to obtain a $4.00 permit to participate in the September season.

Permittees were randomly selected to receive a post-season hunter survey. Questionnaires were sent to 3,100 permittees following the season. Questionnaires were individually numbered, and up to 3 questionnaires were mailed to individuals who had not responded. Completed questionnaires were double key-punched to reduce errors.

The questionnaire asked hunters which zone they hunted, number of days they hunted, number of geese taken, and number of geese knocked down and not retrieved for the season as a whole. The questionnaire also asked whether hunters in the West or Remainder of State Zones had hunted over water or within 100 yards of water and if so, how many geese they had taken.

Statistical Analysis Systems (SAS Institute Inc. 1999-2001, Version 8.2) computer programs were written to summarize responses to the questionnaire survey.

RESULTS AND DISCUSSION

The DNR License Bureau reported that 42,235 Special Canada Goose Season permits were sold prior to 22 September, 2004. Response rate to the survey was 72.4% and 70.2% of the respondents indicated that they hunted during the September season. The majority of the hunters indicated they hunted in the Remainder Zone, followed by the West, Twin Cities Metro, Northwest, and Southeast goose zones (Table 1). The Remainder and West zones are the largest zones. Active hunters were afield an average of 3.0 to 3.9 days, and retrieved 1.5 to 3.3 geese, when totaled according to their hunt zone. Success was lowest for hunters hunting in the Southeast Zone (43.2%) and highest in the Northwest Zone (74.3%) (Table 1).

A total of 89,936 Canada geese was harvested with approximately 59% of the harvest in the Remainder Zone and 21% in the West Zone (Table 1). This pattern has remained rather consistent during the 2000-2004 September seasons (Table 2). The U.S. Fish and Wildlife Service adjusts their mail survey statistics by a memory and prestige response bias factor of 0.848 for geese bagged in the Mississippi Flyway (Voezler et al. 1982:56). Multiplying September Canada goose harvest by the adjustment factor would indicate a 2004 harvest of 76,266.

Of those hunters who indicated that they hunted in the West or Remainder of State Zones (23,764 hunters, Table 1), 39.6% reported that they hunted over water or within 100 yards of water. Of the 73,323 geese harvested in these two Zones (Table 1), 28.97% were taken over water or within 100 yards of water. This was similar to the proportion of geese taken over water in the West Zone during the 2000-2002 September seasons (Table 3) and in the West and Remainder Zones in 2003 (Table 4).

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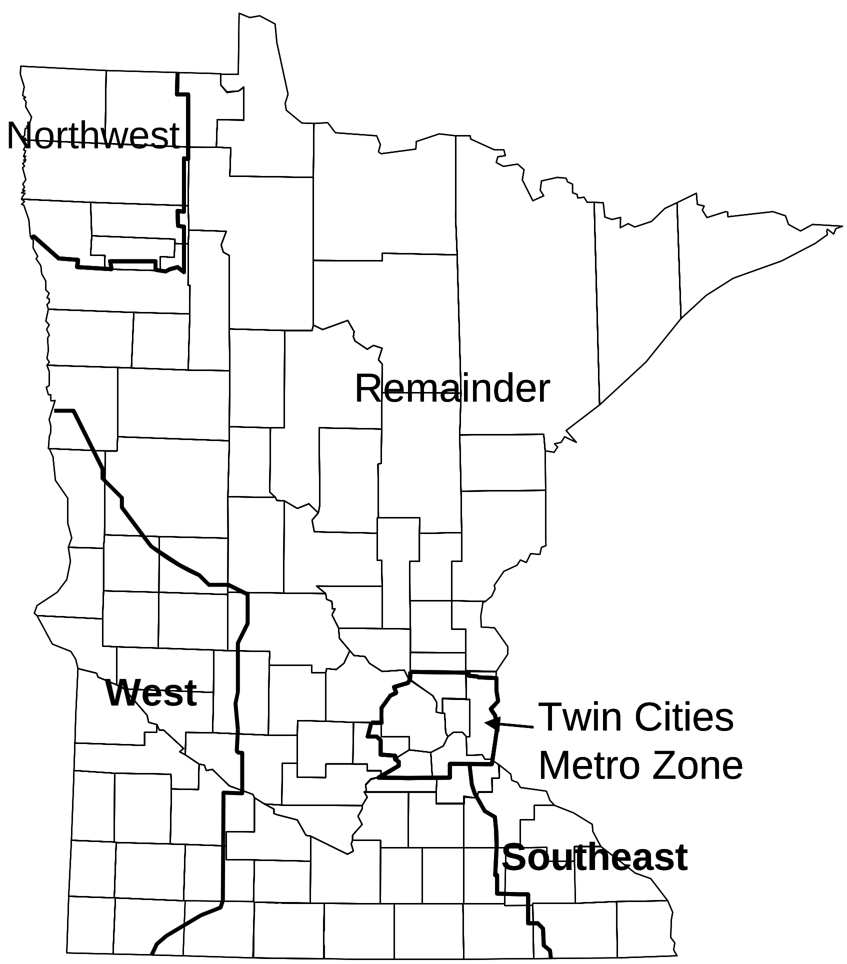

Figure 1. September season Goose Zones in Minnesota.

Table1. Permit sales, hunter activity, and harvest[a] by zone during the September Canada Goose season (4-22 September) in Minnesota, 2004.

Parameter	Northwest	West	Southeast	Twin Cities Metro	Remainder	Total
ALL ZONES						
Total permits sold						42,235
Questionnaires delivered						3,059
Useable questionnaires returned						2,214
% responding						72.4
Active hunters						1,554
% active hunters						70.22
BY ZONE						
% Distribution of hunters by primary hunt zone	4.46	21.35	2.69	12.72	58.78	100
%successful	74.3	60.9	43.2	63.1	65.7	64.1
Days/active hunter	3.52	3.51	3.00	3.70	3.95	
Geese/active hunter	3.27	2.66	1.50	2.94	3.24	
Unretrieved harvest/active hunter	0.37	0.29	0.20	0.29	0.46	
% unretrieved harvest	9.9	9.8	11.7	9.0	12.4	
EXPANDED:						
Active hunters	1,323	6,332	798	3,772	17,432	29,657
Hunter days	4,657	22,225	2,394	13,956	68,856	112,088
Retrieved harvest	4,326	16,843	1,197	11,090	56,480	**89,936**
Est. unretrieved harvest	490	1,836	160	1,094	8,019	11,599
Total harvest	4,935	18,679	1,357	12,184	64,499	101,654

[a]Harvest estimates not adjusted for memory/exaggeration bias.

Table 2. Retrieved harvest estimates by zone during the September Canada Goose season in Minnesota, 2000 – 2004.

Year	Northwest	West	Southeast	Twin Cities Metro	Remainder	Total
2000	2,750	18,909	1,183	15,594	51,685	**90,121**
2001	2,047	27,663	538	8,164	62,608	**101,021**
2002	1,568	22,075	848	8,504	50,769	**83,764**
2003	2,805	17,779	2,357	9,890	48,157	**80,988**
2004	4,326	16,843	1,197	11,090	56,480	**89,936**

Table 3. Proportion of hunters hunting over water[1] and the proportion of Canada geese taken over water in the **West Zone** during the September season 2000 – 2002.

Year	% Hunting over water	% Geese taken over water
2000	46.7	30.6
2001	43.2	37.4
2002	44.9	35.1

[1]Over water or within 100 yards of water.

Table 4. Proportion of hunters hunting over water[1] and the proportion of Canada geese taken over water in the **West and Remainder Zones** during the September season 2003 – 2004.

Year	% Hunting over water	% Geese taken over water
2003	43.1	31.7
2004	39.6	28.9

[1]Over water or within 100 yards of water.

Hunter Activity and Goose Harvest During the September 2005 Canada Goose Hunt in Minnesota

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Margaret H. Dexter, Wildlife Surveys & Statistical Unit

This report documents results of the 2005 September goose hunter mail questionnaire survey.

METHODS

The Canada goose season in the four zones encompassing the majority of Minnesota was 3-22 September 2005 (20 days). A 13-day (3-15 Sep) season was held in the Northwest Goose Zone (Fig. 1). The daily bag limit was 5 geese per day, except in the Southeast Goose Zone where the daily bag was two. Shooting hours were 1/2 hour before sunrise to sunset. Taking of Canada geese was prohibited on or within 100 yards of all surface waters in the Northwest, Southeast, and Twin Cities Metro Goose Zones, in the Carlos Avery Wildlife Management Area and in the Swan Lake Area. In the Twin Cities Metro Zone and goose refuges open to goose hunting, hunting was not allowed from public road rights-of-way. Goose hunters were required to obtain a $4.00 permit to participate in the September season.

Permittees were randomly selected to receive a post-season hunter survey. Questionnaires were sent to 3,094 permittees following the season. Questionnaires were individually numbered, and up to 3 questionnaires were mailed to individuals who had not responded. Completed questionnaires were double key-punched to reduce errors.

The questionnaire asked hunters which zone they hunted, number of days they hunted, number of geese taken, and number of geese knocked down and not retrieved for the season as a whole. The questionnaire also asked whether hunters in the West or Remainder of State Zones had hunted over water or within 100 yards of water and if so, how many geese they had taken. In addition, two new questions, described in Results, were asked this year.

Statistical Analysis Systems (SAS Institute Inc. 1999-2001, Version 8.2) computer programs were written to summarize responses to the questionnaire survey.

RESULTS AND DISCUSSION

The DNR License Bureau reported that 38,051 (down from 42,235 in 2004) Special Canada Goose Season permits were sold prior to 23 September 2005. Response rate to the survey was 66.9% and 73.2% of the respondents indicated that they hunted during the September season. Following the usual pattern, the majority of the hunters indicated they hunted in the Remainder Zone, followed by the West, Twin Cities Metro, Northwest, and Southeast goose zones (Table 1). The Remainder and West zones are the largest zones (Fig. 1). Active hunters were afield an average of 3.3 to 4.0 days, and retrieved 2.7 to 3.6 geese, when totaled according to their hunt zone. Overall, the success rate for active hunters was 68.6%. The success rate and the number of geese harvested per active hunter (Table 1) was up slightly in all zones compared to 2004.

The survey estimates that 94,266 Canada geese were harvested with approximately 65% of the harvest in the Remainder Zone and 16% in the West Zone (Table 1). This harvest pattern has remained rather consistent during the 2000-2005 September seasons (Table 2). The U.S. Fish and Wildlife Service adjusts their mail survey statistics by a memory and prestige response bias factor of 0.848 for geese bagged in the Mississippi Flyway (Voelzer et al. 1982:56). Multiplying September Canada goose harvest by the adjustment factor would indicate a 2005 harvest of 79,938.

Of those hunters who indicated that they hunted in the West or Remainder of State Zones (22,579 hunters, Table 1), 32.8% reported that they hunted over water or within 100 yards of water. Of the 76,522 geese harvested in these two Zones (Table 1), 22.3% were taken over water or within 100 yards of water.

The pattern during 2000-2005 suggests that both the proportion of hunters hunting over water and the proportion of geese harvested over water are declining (Tables 3 and 4).

Two new questions were asked on the survey this year:

1. “Would you favor a reduced bag limit (for example, from 5 to 3) during the September Canada goose season in exchange for an increase in bag limit (for example, from 1 to 2 or 2 to 3) during the regular Canada goose season (October-November)?” The response of 1,479 people was Yes = 49.7%, No = 36.8%, and Don’t Know = 13.5% suggesting moderate support for this idea.

2. “Closing goose hunting at noon is used in some areas to allow geese to feed undisturbed in the afternoon and is intended to increase goose harvest. Would you favor a noon closure during the September Canada goose season?” The response of 1,482 people was Yes = 29.9%, No = 58.1%, and Don’t know = 12.0% suggesting fairly strong opposition to this idea.

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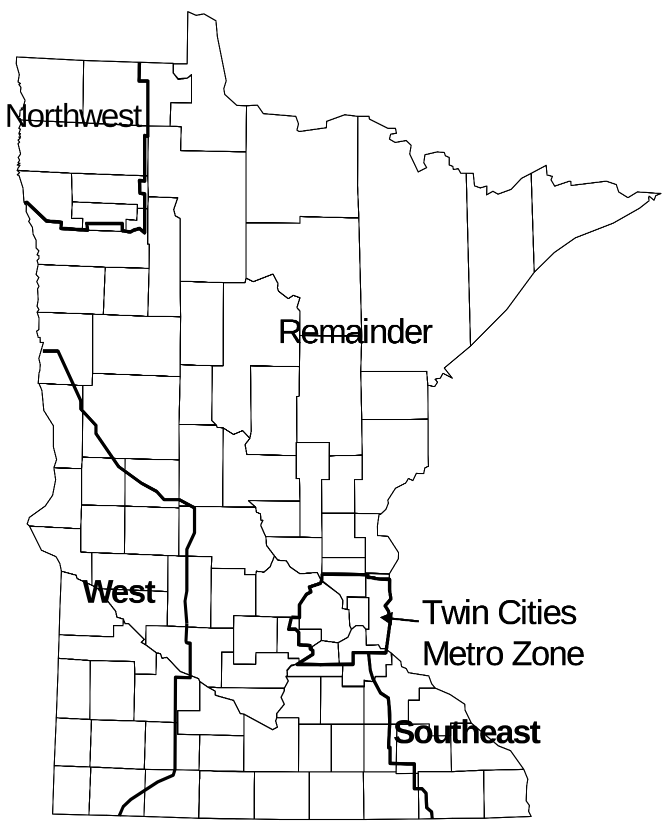

Figure 1. September season Goose Zones in Minnesota.

Table1. Permit sales, hunter activity, and harvest[a] by zone during the September Canada Goose season (3-22 September) in Minnesota, 2005.

Parameter	Northwest	West	Southeast	Twin Cities Metro	Remainder	Total
ALL ZONES						
Total permits sold						38,051
Questionnaires delivered						3,002
Useable questionnaires returned						2,010
% responding						66.9
Active hunters						1,472
% active hunters						73.23
BY ZONE						
% Distribution of hunters by primary hunt zone	5.10	20.34	1.90	11.97	60.69	100
%successful	75.3	64.0	48.3	65.6	70.7	68.6
Days/active hunter	3.27	3.34	4.24	3.52	4.02	
Geese/active hunter	3.44	2.70	3.24	3.34	3.62	
Unretrieved harvest/active	0.29	0.31	0.21	0.20	0.35	
% unretrieved harvest	7.8	10.3	6.1	5.6	8.8	
EXPANDED:						
Active hunters	1,421	5,668	530	3,335	16,911	27,865
Hunter days	4,647	18,931	2,247	11,739	67,982	105,546
Retrieved harvest	4,888	15,304	1,717	11,139	61,218	**94,266**
Est. unretrieved harvest	412	1,757	111	667	5,919	8,866
Total harvest	5,300	17,061	1,828	11,806	67,137	103,132

[a]Harvest estimates not adjusted for memory/exaggeration bias.

Table 2. Retrieved harvest estimates by zone during the September Canada Goose season in Minnesota, 2000 – 2005.

Year	Northwest	West	Southeast	Twin Cities Metro	Remainder	Total
2000	2,750	18,909	1,183	15,594	51,685	**90,121**
2001	2,047	27,663	538	8,164	62,608	**101,021**
2002	1,568	22,075	848	8,504	50,769	**83,764**
2003	2,805	17,779	2,357	9,890	48,157	**80,988**
2004	4,326	16,843	1,197	11,090	56,480	**89,936**
2005	4,888	15,304	1,717	11,139	61,218	**94,266**

Table 3. Proportion of hunters hunting over water[1] and the proportion of Canada geese taken over water in the West Zone during the September season, 2000 – 2002.

Year	% Hunting over water	% Geese taken over water
2000	46.7	30.6
2001	43.2	37.4
2002	44.9	35.1

[1]Over water or within 100 yards of water.

Table 4. Proportion of hunters hunting over water[1] and the proportion of Canada geese taken over water in the **West and Remainder Zones** during the September season 2003-2005.

Year	% Hunting over water	% Geese taken over water
2003	43.1	31.7
2004	39.6	28.9
2005	32.8	22.3

[1]Over water or within 100 yards of water.

2006 Light Goose Conservation Order Harvest In Minnesota

Stephen Maxson, Wetland Wildlife Populations & Research Group
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INTRODUCTION

This report documents results of the 2006 Light Goose Conservation Order hunter mail questionnaire survey.

METHODS

Minnesota held a light goose Conservation Order harvest from 1 March - 30 April, 2006. Participants were required to obtain a $3.50 permit. No other license, stamp, or permit was required. Shooting hours were 1/2 hour before sunrise to 1/2 hour after sunset. There were no daily or possession limits. Use of electronic calls and unplugged shotguns were allowed.

All permit holders were sent a questionnaire after the season. Survey questions are listed in Figure 1. Second and third mailings were sent to non-respondents after one month had elapsed.

RESULTS AND DISCUSSION

A total of 1,363 permits was issued and 955 responses (70.1%) to the questionnaire were obtained (Table 1). In calculating harvest estimates, we assumed that the 408 non-respondents participated in the conservation action and took light geese in the same manner as respondents (i.e., tallies were expanded by 1.43). Relatively few light geese were present in Minnesota again this year and harvest was again concentrated in the southwest portion of the state with some also being taken in west-central Minnesota. 516 people attempted to take light geese during the 61-day conservation order period. Active participants pursued light geese for 2,665 days and 1,360 light geese were shot and retrieved. This was an average retrieved take of 2.6 geese per active participant. Another 163 light geese were reported wounded and not retrieved.

Unplugged shotguns were used by 215 (41.7%) individuals to take 689 (50.1%) geese. 287 (41.7%) of these were taken with the 4^{th}, 5^{th}, or 6^{th} shell. Electronic calls were used by 73 (14.1%) participants to take 280 (20.6%) light geese. 223 (43.2%) of the active participants hunted during the 1/2 hour after sunset period to take 246 (18.1%) geese.

Figure 1. Questionnaire mailed to Light Goose Conservation Order license holders.

MINNESOTA 2006 LIGHT GOOSE HARVEST SURVEY
For the Period of March 1 - April 30, 2006 ONLY

You are being asked to provide information to help us evaluate the harvest of light geese (snow, blue, and Ross' geese) in Minnesota during March 1 - April 30, 2006. Your cooperation is important. Please return this survey card even if you did not hunt light geese. Please answer the following questions to the best of your ability.
Please answer only for your Minnesota 2006 hunting experience.
THANK YOU! Dave Schad, Director, Division of Fish and Wildlife, MN DNR.

1. Did you hunt light geese in Minnesota during March 1 - April 30, 2006? Yes / No

If NO, please disregard all remaining questions and return this survey card.

2. How many days did you hunt light geese in Minnesota during March 1 - April 30, 2006? ________
3. In what county did you hunt light geese most often during March 1 - April 30, 2006? ________
4. How many light geese did you personally shoot and retrieve in Minnesota? ________
5. How many light geese did you personally shoot, but were UNABLE to retrieve? ________
6. Did you hunt light geese in Minnesota with a gun(s) that was holding more than 3 shells? Yes / No
7. If yes, how many light geese did you shoot with a gun holding more than 3 shells? ________
8. How many light geese did you shoot and retrieve with the 4th, 5th, or 6th shell? ________
9. Did you hunt light geese in Minnesota with the aid of an electronic caller? Yes / No
10. If yes, how many light geese did you shoot and retrieve with the aid of an electronic caller? ________
11. Did you hunt light geese in Minnesota during the 1/2 hour after sunset period? Yes / No
12. If yes, how many light geese did you shoot and retrieve during the 1/2 hour after sunset period? ____

Dear Light Goose Permit holder:

You are being asked to assist us in evaluating the March 1 - April 30, 2006 Light Goose Conservation Order. Please answer only for your Minnesota 2006 hunting experience.

YOUR RESPONSE IS NEEDED EVEN IF YOU DID NOT HUNT THIS YEAR.

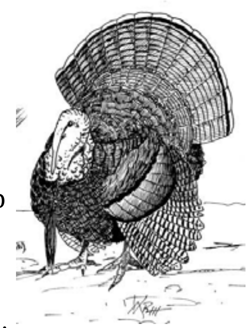
Please fill out the attached questionnaire and mail as soon as possible.
A reminder will be sent to individuals not returning the questionnaire within three weeks. No envelope or stamp is necessary; just tear along the perforation and drop into a mailbox.

THANK YOU FOR YOUR COOPERATION

Dave Schad, Director
Division of Fish and Wildlife
Department of Natural Resources

Table 1. Summary of Light Goose Conservation Order harvest in Minnesota, 2000 – 2006.

Parameter	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Total permits sold	1,982	1,128	1,997	1,438	1,424	1,383	1,363
Usable questionnaires returned	1,457	769	1,375	1,071	1,095	998	955
% Responding	73.5	68.2	68.9	74.4	76.9	72.2	70.1
Active hunters	1,461	393	1,209	553	690	618	516
% Active hunters	73.7	34.8	60.5	38.5	48.5	44.7	37.3
Total hunter days	8,244	2,112	5,517	2,600	3,372	2,643	2,665
Days/active hunter	5.6	5.4	4.6	4.7	4.9	4.3	5.2
Retrieved harvest	6,290	316	3,516	2,005	2,735	1,395	1,360
Geese/active hunter	4.3	0.8	2.9	3.6	4.0	2.3	2.6
Unretrieved harvest	904	19	637	253	315	150	163
No. using unplugged guns	830	193	560	280	333	272	215
Take w/unplugged guns	4,416	129	2,137	996	1,385	777	689
Take w/shell 4-5-6	1,316	68	615	401	491	269	287
No. using electronic calls	218	56	142	87	133	110	73
Take w/electronic calls	854	103	512	474	326	268	280
No. hunting ½ hr after sunset	696	141	550	228	265	264	223
Take ½ hr after sunset	1,185	43	841	267	311	242	246



2005 Fall Wild Turkey Harvest Report

Sharon Goetz and Allison Boies, Farmland Wildlife Populations and 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 2005 fall turkey season took place from 12 October through 23 October (2, 5-day periods). There were 4,410 permits available in the 24 permit areas open to fall hunting, with a total of 4,542 applicants (Table 1). Available permits increased by 30 permits from 2004 (4,380). 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 AND DISCUSSION

This year's harvest of 681 was down from 2004 (758), and from the 5-year average of 721 (Table 1). The highest harvest occurred in permit area 341 with a total of 88 turkeys registered (Table 2, Figure 1). Hunter success rate was 25% overall, which is below the long-term average of 32%. Half of the harvest occurred during Season A (October 12-16), and half during Season B (October 19-23). Hunter numbers were down 299 this year, but were still greater than the 5-year average of 2,789 fall turkey hunters. Hunter effort is one factor that impacts fall turkey harvest, and could have contributed to lower harvest levels in 2005.

Females comprised 65% of the overall reported harvest, with adult females accounting for 45% of the harvest alone (Table 3 and 4). Juveniles made up 35% of the harvest (Table 4), this is higher than 2004 (23%). Harvest age ratios are biased by hunter preference for taking adult turkeys. 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, 1990-2005.

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
2005	4,542	4,410	2,978	681	25

[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, 2005.

Permit Area	# Permits Available	# Permits Issued	# Turkeys Registered	Hunter Success (%)[1]
228	70	47	14	30
236	100	78	17	22
337	100	76	13	17
338	140	106	23	22
339	140	93	16	17
341	500	339	88	26
342	450	238	38	16
343	130	112	31	28
344	200	160	36	23
345	250	82	15	18
346	390	232	53	23
347	150	118	29	25
348	300	233	61	26
349	560	348	73	21
442	250	205	43	21
443	100	64	9	14
448	10	10	4	40
449	10	8	4	50
461	160	123	40	33
462	160	126	31	25
464	40	28	3	11
465	50	28	7	25
466	80	66	21	32
467	70	58	12	21
Total	4,410	2,978	681	23

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

Table 3. Age and sex structure of fall wild turkey harvest by permit area, 2005.
Note: Age and sex are hunter reported and subject to error.

Permit Area	Male		Female		Unknown	Total
	Juvenile	Adult	Juvenile	Adult		
228	2	5	2	5	0	14
236	5	8	0	4	0	17
337	0	3	1	9	0	13
338	7	3	2	11	0	23
339	2	3	0	11	0	16
341	12	22	14	40	0	88
342	6	6	9	17	0	38
343	2	9	6	11	3	31
344	4	4	13	15	0	36
345	2	0	4	9	0	15
346	2	5	16	30	0	53
347	3	4	3	18	1	29
348	9	9	15	28	0	61
349	14	10	11	38	0	73
442	12	10	5	16	0	43
443	0	2	5	2	0	9
448	0	0	1	3	0	4
449	1	1	0	2	0	4
461	6	8	10	15	1	40
462	4	6	8	13	0	31
464	1	0	0	2	0	3
465	1	2	2	2	0	7
466	6	3	7	5	0	21
467	2	6	1	3	0	12
Total	103	129	135	309	5	681

Table 4. Age and sex structure of fall wild turkey harvest in Minnesota, 1990-2005.
Note: Age and sex are hunter reported and subject to error.

	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 (37%)		82 (11%)	296 (40%)		1 (<1%)	745
2005	103 (15%)	129 (19%)		135 (20%)	309 (45%)		5(<1%)	681

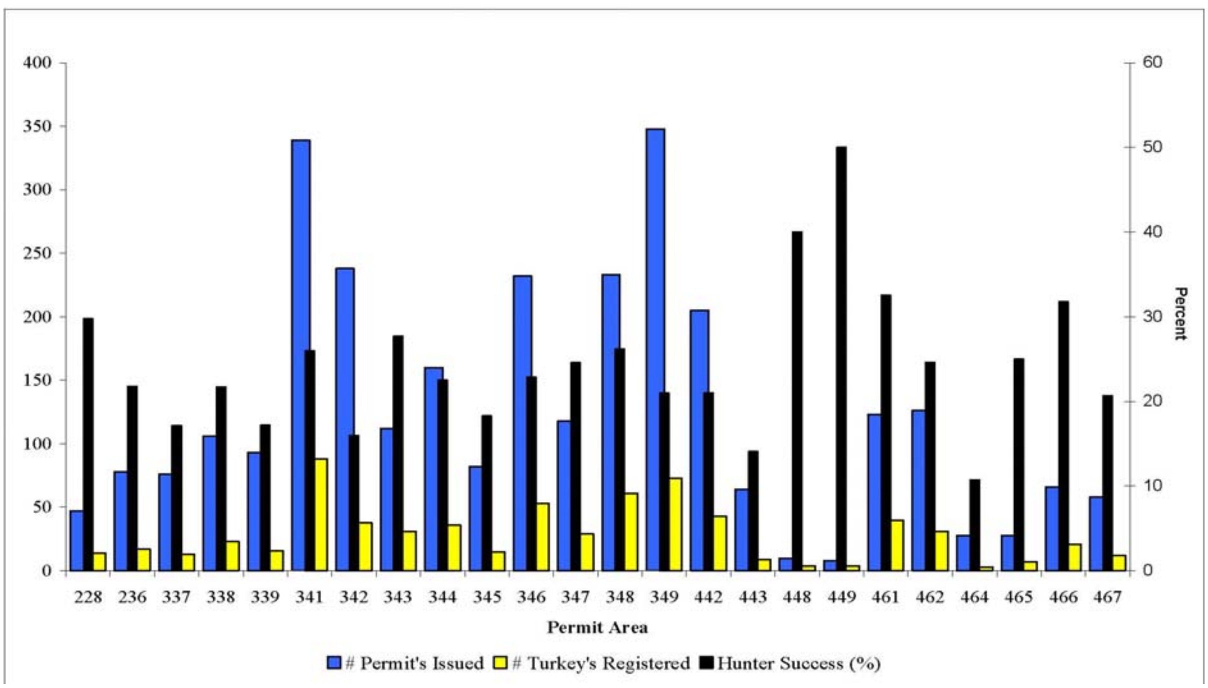


Figure 1. Total harvest, permits issued, and hunter success rate for the 2005 fall wild turkey hunting season in Minnesota.

2006 Spring Turkey Harvest Report

Sharon Goetz, Farmland Wildlife Populations and Research Group
Allison Boies, Minnesota State University - Mankato

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 (Figure 1). The 2006 spring turkey season took place from 12 April through 25 May (6 5-day time periods and 2 7-day time periods). An archery permit was offered the last 2 time 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 45,704 applications were received for the 32,624 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 27,876 total regular permits and 2,801 archery permits issued. Surplus permits that were sold after the initial lottery drawing accounted for 7% (1,908) of regular permit sales (Figure 2).

A total of 8,241 turkeys were registered in spring 2006 compared to 7,800 in 2005 (Table 1, Figure 3). Overall hunter success was 29.6%, slightly higher than last year (28.2%) and slightly lower than the 5-year average of 31.1%. The highest harvest occurred in PA 349 where 552 turkeys were registered (Table 3). Most PAs (64%) showed increased (n = 38) or identical (n = 4) harvests from 2005. Hunter success by PA ranged from 9.1% (recently split PA 456) to 60.4% (PA 221; Table 3). Hunters in the first 2 time periods had the highest success rates (39.3% and 39.1%, respectively), with lower success rates in subsequent time periods, following the 5-year trend (Table 4, Figure 4).

Juveniles made up 29% of the harvest (Table 5, Figure 5), which is higher than the past 3 years (10% in 2005, 20% in 2004, and 23% in 2003). Wisconsin reported similar juvenile harvest of 28% for spring 2006 (12% in 2005, 22% in 2004, and 24% in 2003). 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 0.05 (PA 456) to 4.61 (PA 343) with an average of 0.99 statewide (Table 6).

No new turkey hunting accidents were reported during spring 2006. Thirteen spring hunting accidents have been reported since 1978, none of which has been fatal.

DISCUSSION

Total harvest for spring 2006 (8,241) was slightly up from spring 2005 (7,800). The increase occurred mostly from harvest in time period G, with about twice as many birds harvested in 2006. Time period G was cold and rainy in 2005 that likely led to decreased hunter effort and possibly gobbler activity as well. Weather conditions for spring hunting in 2006 were good, with one rainy spell over the weekend in the 4th time period (D), and some cooler weather during portions of time periods F and G.

Table 1. Spring and fall wild turkey applications, permits, and harvest in Minnesota, 1978-2006.

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	4,542	4,410	681
2006	45,704	32,624	27,876	85.4	8,241	29.6			

[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, 2006.

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	29	5	1	4	14%
	B	34	5	1	4	12%
	C	48	5	1	4	8%
	D	35	5	1	4	11%
	E	16	5	1	4	25%
	F	7	5	0	5	71%
	G	11	5	0	5	45%
	H	3	5	0	5	100%
159	A	35	5	1	4	11%
	B	32	5	1	4	13%
	C	35	5	1	4	11%
	D	26	5	1	4	15%
	E	16	5	0	5	31%
	F	10	5	0	5	50%
	G	18	5	0	5	28%
	H	6	5	0	5	83%
221	A	101	20	2	18	18%
	B	74	20	4	16	22%
	C	92	20	1	19	21%
	D	64	20	3	17	27%
	E	19	20	1	19	100%
	F	15	20	0	20	100%
	G	26	20	1	19	73%
	H	7	20	0	20	100%
222	A	39	5	1	4	10%
	B	21	5	1	4	19%
	C	33	5	1	4	12%
	D	21	5	1	4	19%
	E	10	5	1	4	40%
	F	4	5	0	5	100%
	G	18	5	1	4	22%
	H	2	5	0	5	100%
223	A	334	80	6	74	22%
	B	168	80	7	73	43%
	C	239	80	5	75	31%
	D	176	80	4	76	43%
	E	97	80	4	76	78%
	F	30	80	0	80	100%
	G	62	80	0	80	100%
	H	28	80	0	80	100%
225	A	254	100	20	80	31%
	B	158	100	10	90	57%
	C	256	100	13	87	34%
	D	169	100	6	94	56%
	E	75	100	5	95	100%
	F	33	100	1	99	100%
	G	83	100	1	99	100%
	H	20	100	0	100	100%

Table 2. (Continued)

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	216	60	8	52	24%
	B	145	60	7	53	37%
	C	210	60	4	56	27%
	D	149	60	4	56	38%
	E	61	60	2	58	95%
	F	28	60	1	59	100%
	G	44	60	0	60	100%
	H	26	60	0	60	100%
228	A	125	50	2	48	38%
	B	83	50	1	49	59%
	C	90	50	1	49	54%
	D	87	50	0	50	57%
	E	35	50	0	50	100%
	F	18	50	0	50	100%
	G	30	50	2	48	100%
	H	17	50	0	50	100%
235	A	73	15	0	15	21%
	B	48	15	0	15	31%
	C	76	15	0	15	20%
	D	33	15	0	15	45%
	E	23	15	0	15	65%
	F	10	15	0	15	100%
	G	29	15	0	15	52%
	H	10	15	0	15	100%
236	A	285	105	6	99	35%
	B	186	105	4	101	54%
	C	304	105	7	98	32%
	D	260	105	5	100	38%
	E	97	105	2	103	100%
	F	51	105	3	102	100%
	G	93	105	1	104	100%
	H	36	105	1	104	100%
244	A	77	35	4	31	40%
	B	47	35	1	34	72%
	C	67	35	2	33	49%
	D	59	35	2	33	56%
	E	29	35	1	34	100%
	F	10	35	0	35	100%
	G	19	35	0	35	100%
	H	10	35	0	35	100%
248	A	33	5	1	4	12%
	B	27	5	1	4	15%
	C	34	5	0	5	15%
	D	27	5	0	5	19%
	E	7	5	1	4	57%
	F	7	5	1	4	57%
	G	12	5	0	5	42%
	H	3	5	0	5	100%

Table 2. (Continued)

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	48	20	1	19	40%
	B	33	20	2	18	55%
	C	38	20	3	17	45%
	D	41	20	1	19	46%
	E	21	20	0	20	95%
	F	7	20	0	20	100%
	G	6	20	0	20	100%
	H	9	20	0	20	100%
337	A	154	55	4	51	33%
	B	119	55	7	48	40%
	C	129	55	3	52	40%
	D	84	55	1	54	64%
	E	38	55	0	55	100%
	F	17	55	0	55	100%
	G	47	55	0	55	100%
	H	8	55	0	55	100%
338	A	207	85	17	68	33%
	B	137	85	12	73	53%
	C	195	85	16	69	35%
	D	131	85	3	82	63%
	E	81	85	1	84	100%
	F	46	85	0	85	100%
	G	67	85	1	84	100%
	H	35	85	0	85	100%
339	A	165	80	9	71	43%
	B	94	80	1	79	84%
	C	142	80	8	72	51%
	D	100	80	3	77	77%
	E	85	80	0	80	94%
	F	24	80	1	79	100%
	G	65	80	0	80	100%
	H	25	80	0	80	100%
341	A	536	225	26	199	37%
	B	347	225	14	211	61%
	C	562	225	25	200	36%
	D	494	225	21	204	41%
	E	197	225	5	220	100%
	F	127	225	1	224	100%
	G	236	225	3	222	94%
	H	80	225	2	223	100%
342	A	350	225	32	193	55%
	B	242	225	10	215	89%
	C	432	225	22	203	47%
	D	355	225	8	217	61%
	E	200	225	0	225	100%
	F	71	225	1	224	100%
	G	138	225	4	221	100%
	H	36	225	1	224	100%

Table 2. (Continued)

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	408	160	32	128	31%
	B	328	160	22	138	42%
	C	559	160	32	128	23%
	D	338	160	8	152	45%
	E	188	160	3	157	84%
	F	96	160	6	154	100%
	G	195	160	1	159	100%
	H	94	160	5	155	100%
344	A	397	140	15	125	31%
	B	299	140	10	130	43%
	C	387	140	9	131	34%
	D	257	140	6	134	52%
	E	173	140	0	140	81%
	F	73	140	1	139	100%
	G	132	140	4	136	100%
	H	36	140	0	140	100%
345	A	217	200	35	165	76%
	B	213	200	11	189	89%
	C	252	200	4	196	78%
	D	204	200	7	193	95%
	E	97	200	1	199	100%
	F	34	200	0	200	100%
	G	82	200	1	199	100%
	H	17	200	1	199	100%
346	A	510	325	48	277	54%
	B	315	325	9	316	100%
	C	441	325	18	307	70%
	D	388	325	8	317	82%
	E	173	325	2	323	100%
	F	89	325	1	324	100%
	G	151	325	0	325	100%
	H	14	325	0	325	100%
347	A	306	150	24	126	41%
	B	204	150	10	140	69%
	C	320	150	27	123	38%
	D	245	150	7	143	58%
	E	129	150	0	150	100%
	F	59	150	1	149	100%
	G	92	150	1	149	100%
	H	34	150	1	149	100%
348	A	422	175	23	152	36%
	B	294	175	12	163	55%
	C	434	175	12	163	38%
	D	333	175	9	166	50%
	E	161	175	1	174	100%
	F	95	175	0	175	100%
	G	158	175	2	173	100%
	H	47	175	0	175	100%

Table 2. (Continued)

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	862	450	71	379	44%
	B	570	450	21	429	75%
	C	855	450	32	418	49%
	D	665	450	17	433	65%
	E	346	450	3	447	100%
	F	189	450	0	450	100%
	G	283	450	2	448	100%
	H	130	450	1	449	100%
410	A	183	75	15	60	33%
	B	142	75	4	71	50%
	C	269	75	11	64	24%
	D	212	75	8	67	32%
	E	90	75	4	71	79%
	F	38	75	1	74	100%
	G	80	75	5	70	88%
	H	38	75	4	71	100%
411	A	144	60	8	52	36%
	B	70	60	8	52	74%
	C	189	60	7	53	28%
	D	156	60	12	48	31%
	E	42	60	2	58	100%
	F	26	60	1	59	100%
	G	51	60	0	60	100%
	H	25	60	0	60	100%
412	A	152	45	9	36	24%
	B	105	45	9	36	34%
	C	201	45	9	36	18%
	D	204	45	8	37	18%
	E	52	45	5	40	77%
	F	37	45	4	41	100%
	G	92	45	2	43	47%
	H	33	45	0	45	100%
413	A	40	10	2	8	20%
	B	39	10	2	8	21%
	C	71	10	2	8	11%
	D	44	10	2	8	18%
	E	26	10	0	10	38%
	F	16	10	0	10	63%
	G	22	10	2	8	36%
	H	5	10	0	10	100%
414	A	57	20	3	17	30%
	B	51	20	2	18	35%
	C	44	20	4	16	36%
	D	44	20	4	16	36%
	E	20	20	2	18	90%
	F	3	20	0	20	100%
	G	18	20	0	20	100%
	H	3	20	4	16	100%

Table 2. (Continued)

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	194	70	6	64	33%
	B	123	70	4	66	54%
	C	248	70	7	63	25%
	D	184	70	9	61	33%
	E	85	70	6	64	75%
	F	59	70	3	67	100%
	G	63	70	4	66	100%
	H	38	70	0	70	100%
416	A	45	10	2	8	18%
	B	34	10	1	9	26%
	C	47	10	0	10	21%
	D	43	10	0	10	23%
	E	21	10	0	10	48%
	F	13	10	0	10	77%
	G	28	10	0	10	36%
	H	13	10	1	9	69%
417	A	139	40	7	33	24%
	B	90	40	4	36	40%
	C	121	40	3	37	31%
	D	92	40	3	37	40%
	E	41	40	3	37	90%
	F	25	40	0	40	100%
	G	53	40	1	39	74%
	H	18	40	0	40	100%
418	A	217	65	13	52	24%
	B	145	65	13	52	36%
	C	281	65	12	53	19%
	D	187	65	9	56	30%
	E	74	65	0	65	88%
	F	51	65	1	64	100%
	G	84	65	6	59	70%
	H	28	65	1	64	100%
419	A	109	40	5	35	32%
	B	67	40	3	37	55%
	C	100	40	3	37	37%
	D	63	40	2	38	60%
	E	34	40	0	40	100%
	F	19	40	0	40	100%
	G	17	40	1	39	100%
	H	9	40	0	40	100%
420	A	17	7	0	7	41%
	B	7	7	0	7	100%
	C	7	7	0	7	100%
	D	5	7	1	6	100%
	E	6	7	0	7	100%
	F	1	7	0	7	100%
	G	2	7	0	7	100%
	H	1	7	0	7	100%

Table 2. (Continued)

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	17	5	0	5	29%
	B	12	5	0	5	42%
	C	13	5	0	5	38%
	D	14	5	1	4	29%
	E	7	5	0	5	71%
	F	7	5	0	5	71%
	G	10	5	0	5	50%
	H	3	5	0	5	100%
424	A	8	5	0	5	63%
	B	5	5	0	5	100%
	C	4	5	0	5	100%
	D	7	5	0	5	71%
	E	6	5	0	5	83%
	F	0	5	0	5	100%
	G	6	5	0	5	83%
	H	0	5	0	5	100%
425	A	212	60	12	48	23%
	B	132	60	8	52	39%
	C	194	60	7	53	27%
	D	184	60	3	57	31%
	E	46	60	1	59	100%
	F	27	60	0	60	100%
	G	72	60	2	58	81%
	H	38	60	3	57	100%
426	A	10	5	1	4	40%
	B	3	5	0	5	100%
	C	5	5	0	5	100%
	D	10	5	0	5	50%
	E	2	5	0	5	100%
	F	1	5	0	5	100%
	G	1	5	0	5	100%
	H	0	5	0	5	100%
427	A	21	10	1	9	43%
	B	11	10	2	8	73%
	C	12	10	1	9	75%
	D	20	10	2	8	40%
	E	4	10	1	9	100%
	F	1	10	0	10	100%
	G	7	10	0	10	100%
	H	1	10	0	10	100%
428	A	58	15	3	12	21%
	B	43	15	2	13	30%
	C	39	15	1	14	36%
	D	40	15	1	14	35%
	E	29	15	0	15	52%
	F	12	15	0	15	100%
	G	20	15	0	15	75%
	H	7	15	0	15	100%

Table 2. (Continued)

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	46	30	2	28	61%
	B	26	30	0	30	100%
	C	47	30	3	27	57%
	D	50	30	1	29	58%
	E	15	30	0	30	100%
	F	3	30	0	30	100%
	G	4	30	0	30	100%
	H	4	30	0	30	100%
431	A	13	5	1	4	31%
	B	13	5	1	4	31%
	C	17	5	1	4	24%
	D	31	5	0	5	16%
	E	10	5	0	5	50%
	F	4	5	0	5	100%
	G	1	5	0	5	100%
	H	1	5	0	5	100%
433	A	44	5	1	4	9%
	B	19	5	1	4	21%
	C	19	5	1	4	21%
	D	26	5	1	4	15%
	E	17	5	1	4	24%
	F	6	5	0	5	83%
	G	7	5	1	4	57%
	H	7	5	0	5	71%
440	A	140	75	15	60	43%
	B	101	75	11	64	63%
	C	145	75	9	66	46%
	D	104	75	3	72	69%
	E	48	75	0	75	100%
	F	16	75	0	75	100%
	G	41	75	0	75	100%
	H	11	75	0	75	100%
442	A	430	160	32	128	30%
	B	301	160	16	144	48%
	C	513	160	27	133	26%
	D	320	160	11	149	47%
	E	169	160	11	149	88%
	F	66	160	1	159	100%
	G	141	160	2	158	100%
	H	60	160	2	158	100%
443	A	109	70	10	60	55%
	B	96	70	6	64	67%
	C	143	70	4	66	46%
	D	110	70	0	70	64%
	E	67	70	1	69	100%
	F	32	70	0	70	100%
	G	35	70	0	70	100%
	H	10	70	0	70	100%

Table 2. (Continued)

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	17	5	1	4	24%
	B	3	5	1	4	100%
	C	17	5	1	4	24%
	D	13	5	1	4	31%
	E	5	5	1	4	80%
	F	4	5	0	5	100%
	G	7	5	0	5	71%
	H	3	5	1	4	100%
447	A	13	5	1	4	31%
	B	8	5	0	5	63%
	C	7	5	0	5	71%
	D	8	5	0	5	63%
	E	9	5	1	4	44%
	F	1	5	0	5	100%
	G	3	5	0	5	100%
	H	3	5	1	4	100%
448	A	12	7	1	6	50%
	B	11	7	1	6	55%
	C	29	7	1	6	21%
	D	14	7	1	6	43%
	E	15	7	0	7	47%
	F	4	7	1	6	100%
	G	6	7	0	7	100%
	H	7	7	1	6	86%
449	A	36	7	1	6	17%
	B	26	7	1	6	23%
	C	29	7	1	6	21%
	D	27	7	0	7	26%
	E	5	7	0	7	100%
	F	6	7	0	7	100%
	G	15	7	1	6	40%
	H	16	7	0	7	44%
450	A	21	7	1	6	29%
	B	8	7	0	7	88%
	C	15	7	0	7	47%
	D	6	7	1	6	100%
	E	6	7	0	7	100%
	F	4	7	0	7	100%
	G	4	7	0	7	100%
	H	1	7	0	7	100%
451	A	16	5	0	5	31%
	B	14	5	0	5	36%
	C	30	5	0	5	17%
	D	19	5	1	4	21%
	E	4	5	1	4	100%
	F	7	5	0	5	71%
	G	15	5	0	5	33%
	H	4	5	0	5	100%

Table 2. (Continued)

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	23	5	0	5	22%
	B	10	5	1	4	40%
	C	15	5	1	4	27%
	D	12	5	1	4	33%
	E	8	5	1	4	50%
	F	2	5	0	5	100%
	G	12	5	0	5	42%
	H	6	5	1	4	67%
456	A	2	5	0	5	100%
	B	3	5	1	4	100%
	C	11	5	1	4	36%
	D	2	5	0	5	100%
	E	3	5	0	5	100%
	F	3	5	0	5	100%
	G	0	5	0	5	100%
	H	0	5	0	5	100%
457	A	15	5	0	5	33%
	B	11	5	1	4	36%
	C	25	5	0	5	20%
	D	11	5	0	5	45%
	E	3	5	0	5	100%
	F	2	5	0	5	100%
	G	0	5	0	5	100%
	H	0	5	0	5	100%
458	A	4	5	0	5	100%
	B	2	5	0	5	100%
	C	6	5	0	5	83%
	D	1	5	0	5	100%
	E	2	5	0	5	100%
	F	2	5	0	5	100%
	G	2	5	0	5	100%
	H	0	5	0	5	100%
459	A	53	25	1	24	45%
	B	33	25	5	20	61%
	C	43	25	1	24	56%
	D	45	25	1	24	53%
	E	29	25	0	25	86%
	F	13	25	1	24	100%
	G	12	25	0	25	100%
	H	4	25	0	25	100%
461	A	244	80	16	64	26%
	B	128	80	4	76	59%
	C	250	80	11	69	28%
	D	179	80	6	74	41%
	E	85	80	4	76	89%
	F	32	80	0	80	100%
	G	62	80	0	80	100%
	H	14	80	1	79	100%

Table 2. (Continued)

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	208	90	21	69	33%
	B	148	90	13	77	52%
	C	203	90	4	86	42%
	D	179	90	5	85	47%
	E	84	90	0	90	100%
	F	46	90	0	90	100%
	G	76	90	5	85	100%
	H	28	90	0	90	100%
463	A	56	20	4	16	29%
	B	31	20	1	19	61%
	C	62	20	3	17	27%
	D	40	20	3	17	43%
	E	16	20	0	20	100%
	F	3	20	0	20	100%
	G	12	20	2	18	100%
	H	4	20	0	20	100%
464	A	52	25	5	20	38%
	B	28	25	0	25	89%
	C	61	25	1	24	39%
	D	31	25	1	24	77%
	E	24	25	0	25	100%
	F	6	25	0	25	100%
	G	11	25	0	25	100%
	H	7	25	0	25	100%
465	A	41	30	0	30	73%
	B	35	30	0	30	86%
	C	49	30	0	30	61%
	D	46	30	0	30	65%
	E	5	30	0	30	100%
	F	0	30	0	30	100%
	G	1	30	0	30	100%
	H	4	30	0	30	100%
466	A	124	50	5	45	36%
	B	62	50	6	44	71%
	C	116	50	2	48	41%
	D	71	50	1	49	69%
	E	39	50	6	44	100%
	F	29	50	3	47	100%
	G	38	50	0	50	100%
	H	11	50	0	50	100%
467	A	95	40	8	32	34%
	B	63	40	4	36	57%
	C	150	40	8	32	21%
	D	72	40	3	37	51%
	E	33	40	2	38	100%
	F	10	40	0	40	100%
	G	38	40	2	38	100%
	H	24	40	1	39	100%

Table 3. Spring wild turkey harvest and hunter success rates by permit area in Minnesota, 2006.

Permit Area	**Permits Available**	**Permits Issued**[a]	**Registered Harvest**	**% Hunter Success (2006)**[b]	**% Hunter Success (2-5 Yr Ave)**[c]
157	40	34	16	47.1	36.6 (3)
159	40	34	17	50.0	33.0 (3)
221	160	144	87	60.4	51.8 (4)
222	40	32	17	53.1	48.6 (2)
223	640	567	190	33.5	35.7 (5)
225	800	673	197	29.3	25.4 (5)
227	480	413	184	44.6	35.7 (5)
228	400	326	139	42.6	41.0 (5)
235	120	110	40	36.4	36.6 (5)
236	840	755	292	38.7	38.8 (5)
244	280	220	67	30.5	30.7 (5)
248	40	62	33	53.2	48.0 (3)
249	160	134	38	28.4	27.9 (4)
337	440	389	115	29.6	33.2 (5)
338	680	580	184	31.7	31.5 (5)
339	640	551	196	35.6	34.1 (5)
341	1,800	1598	472	29.5	33.8 (5)
342	1,800	1555	342	22.0	25.5 (5)
343	1,280	1177	443	37.6	40.2 (5)
344	1,120	967	191	19.8	24.7 (5)
345	1,600	1169	204	17.5	20.5 (5)
346	2,600	1964	423	21.5	24.3 (5)
347	1,200	1098	280	25.5	26.0 (5)
348	1,400	1196	276	23.1	24.9 (5)
349	3,600	3026	552	18.2	23.7 (5)
410	600	511	221	43.2	44.1 (5)
411	480	405	145	35.8	38.9 (5)
412	360	318	149	46.9	43.4 (5)
413	80	74	34	45.9	40.4 (2)
414	160	143	49	34.3	37.2 (3)
415	560	499	222	44.5	39.2 (5)
416	80	79	22	27.8	37.1 (5)
417	320	286	115	40.2	39.7 (5)
418	520	474	204	43.0	41.3 (5)
419	320	274	99	36.1	28.0 (5)
420	56	45	17	37.8	43.8 (3)
422	40	34	19	55.9	43.1 (5)
424	40	27	13	48.1	48.9 (2)
425	480	436	164	37.6	39.1 (5)
426	40	26	4	15.4	19.6 (5)
427	80	69	17	24.6	34.7 (5)
428	120	109	43	39.4	37.4 (5)
429	240	214	61	28.5	23.0 (5)

Table 3. (Continued)

Permit Area	Permits Available	Permits Issued[a]	Registered Harvest	% Hunter Success (2006)[b]	% Hunter Success (2-5 Yr Ave)[c]
431	40	36	19	52.8	43.8 (5)
433	40	41	23	56.1	48.8 (3)
440	600	517	134	25.9	31.3 (5)
442	1,280	1079	328	30.4	34.5 (5)
443	560	502	128	25.5	30.4 (5)
446	40	39	18	46.2	43.4 (2)
447	40	32	5	15.6	30.3 (2)
448	56	53	27	50.9	55.3 (3)
449	56	54	18	33.3	50.0 (3)
450	56	50	15	30.0	29.6 (5)
451	40	37	18	48.6	56.8 (4)
454	40	37	14	37.8	32.4 (2)
456	40	33	3	9.1	5.9 (2)
457	40	24	13	54.2	30.3 (5)
458	40	15	7	46.7	36.6 (2)
459	200	179	41	22.9	25.6 (5)
461	640	552	210	38.0	34.1 (5)
462	720	637	231	36.3	36.4 (5)
463	160	141	52	36.9	32.2 (5)
464	200	171	47	27.5	25.8 (5)
465	240	216	66	30.6	26.1 (5)
466	400	356	116	32.6	36.6 (5)
467	320	278	95	34.2	34.8 (5)
Unknown			20		
Total	32,624	27,876	8,241	29.6	31.1 (5)

[a] 2,801 permits were issued to archery hunters and not included in these figures.
[b] Success rate not adjusted for non-participants.
[c] Number in parenthesis equals the number of years data was available.

Table 4. Spring wild turkey hunter success by time period in Minnesota, 2006.

Time Period	Permits Issued	Registered Harvest	% Hunter Success (2006)[a]	% Hunter Success (5 Yr Ave)[a]
A) April 14-18	3,762	1,478	39.3	42.3
B) April 19-23	3,609	1,411	39.1	39.9
C) April 24-28	3,744	1,107	29.6	30.7
D) April 29-3	3,543	839	23.7	26.6
E) May 4-8	3,607	1,113	30.9	32.0
F) May 9-13	3,190	822	25.8	29.1
G) May 14-20	3,406	834	24.5	22.3
H) May 21-27	3,015	637	21.1	24.8
Total	27,876	8,241	29.6	31.1

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

Table 5. Age structure of spring wild turkey harvest by permit area in Minnesota, 2006.
Note: Age is hunter reported and is subject to error.

Permit Area	Adults	Juveniles	Unknown	% Juveniles	Total Harvest
157	14	2	0	12.5	16
159	13	4	0	23.5	17
221	65	22	0	25.3	87
222	13	4	0	23.5	17
223	141	49	0	25.8	190
225	133	64	0	32.5	197
227	144	38	2	20.7	184
228	108	29	2	20.9	139
235	31	9	0	22.5	40
236	225	67	0	22.9	292
244	37	30	0	44.8	67
248	27	6	0	18.2	33
249	24	14	0	36.8	38
337	80	35	0	30.4	115
338	119	65	0	35.3	184
339	130	65	1	33.2	196
341	342	130	0	27.5	472
342	234	107	1	31.3	342
343	340	100	3	22.6	443
344	123	66	2	34.6	191
345	120	84	0	41.2	204
346	245	175	3	41.4	423
347	187	92	1	32.9	280
348	194	80	2	29.0	276
349	360	187	5	33.9	552
410	173	48	0	21.7	221
411	101	42	2	29.0	145
412	109	40	0	26.8	149
413	26	8	0	23.5	34

Table 5. (Continued)

Permit Area	Adults	Juveniles	Unknown	% Juveniles	Total Harvest
414	37	12	0	24.5	49
415	171	49	2	22.1	222
416	13	9	0	40.9	22
417	72	41	2	35.7	115
418	156	48	0	23.5	204
419	64	35	0	35.4	99
420	14	3	0	17.6	17
422	14	5	0	26.3	19
424	12	1	0	7.7	13
425/435	124	39	1	23.8	164
426	3	1	0	25.0	4
427	10	7	0	41.2	17
428	31	12	0	27.9	43
429	42	19	0	31.1	61
431	14	5	0	26.3	19
433	20	3	0	13.0	23
440	91	42	1	31.3	134
442	228	99	1	30.2	328
443	82	46	0	35.9	128
446	16	2	0	11.1	18
447	4	1	0	20.0	5
448	24	3	0	11.1	27
449	17	1	0	5.6	18
450	12	3	0	20.0	15
451/452/453	15	3	0	16.7	18
454/455	13	1	0	7.1	14
456	3	0	0	0.0	3
457	11	2	0	15.4	13
458	7	0	0	0.0	7
459	32	9	0	22.0	41
461	148	60	2	28.6	210
462	150	80	1	34.6	231
463	35	17	0	32.7	52
464	29	18	0	38.3	47
465	36	30	0	45.5	66
466	100	16	0	13.8	116
467	66	29	0	30.5	95
Unknown			20		
Total	5,774	2,413	54	29.3	8,241

Table 6. Spring wild turkey harvest per square mile of huntable habitat[a] in Minnesota, 2006.

Permit Area	Total Huntable Habitat[a] (Square Miles)	Turkeys Harvested Per Square Mile
157	269	0.06
159	294	0.06
221	93	0.94
222	NA	NA
223	90	2.11
225	233	0.85
227	111	1.66
228	43	3.23
235	15	2.67
236	169	1.73
244	353	0.19
248	115	0.29
249	207	0.18
337	60	1.92
338	99	1.86
339	92	2.13
341	232	2.03
342	159	2.15
343	96	4.61
344	93	2.05
345	137	1.49
346	216	1.96
347	140	2.00
348	159	1.74
349	277	1.99
410	392	0.56
411	184	0.79
412	275	0.54
413	NA	NA
414	252	0.19
415	264	0.84
416	88	0.25
417	192	0.60
418	222	0.92
419	163	0.61
420	61	0.28
422	44	0.43
424	NA	NA
425/435	128	1.28
426	46	0.09
427	64	0.27
428	110	0.39
429	108	0.56
431	42	0.45

Table 6. (Continued)

Permit Area	**Total Huntable Habitat[a] (Square Miles)**	**Turkeys Harvested Per Square Mile**
433	51	0.45
440	97	1.38
442	164	2.00
443	80	1.60
446	91	0.20
447	54	0.09
448	44	0.61
449	59	0.31
450	56	0.27
451/452/453	97	0.19
454/455/456/458	178	0.08
456	58	0.05
457	68	0.19
458	65	0.11
459	104	0.39
461	131	1.60
462	118	1.96
463	70	0.74
464	60	0.78
465	48	1.38
466	115	1.01
467	80	1.19
Unknown	20	NA
Total	8,295	0.99

[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, 2006.

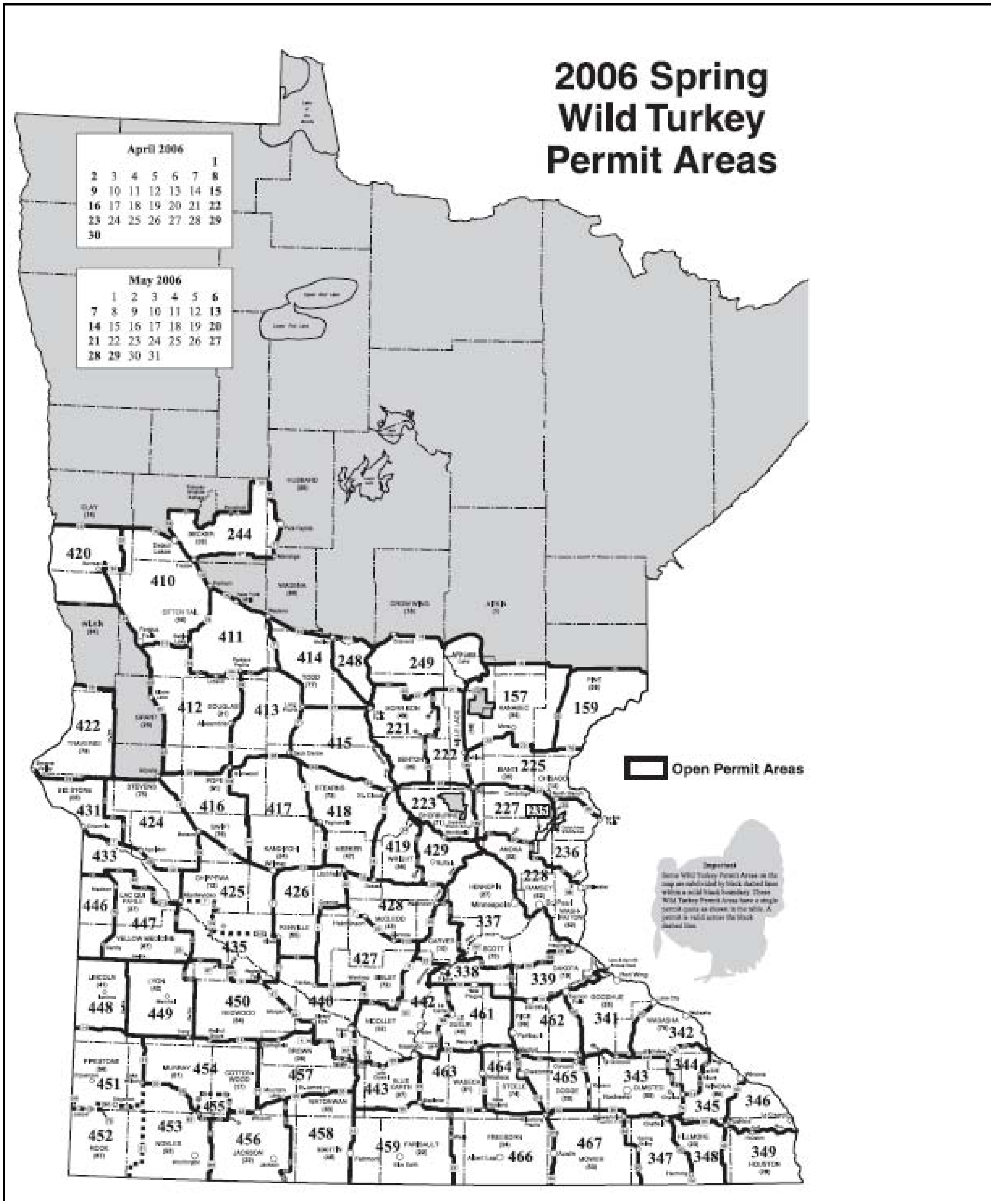


Figure 2. Lottery permits issued for the spring wild turkey hunting season by category in Minnesota, 2006.

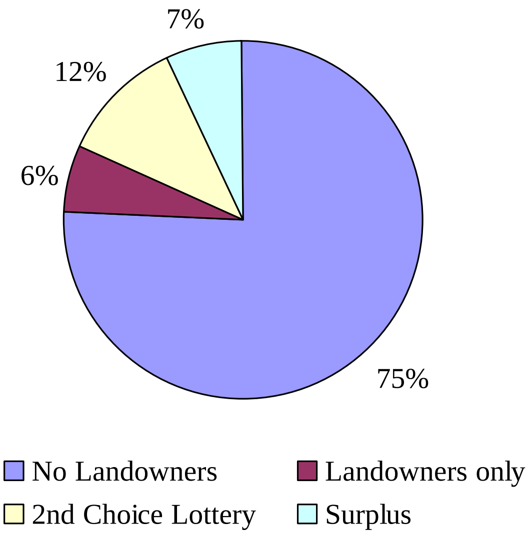


Figure 3. Total harvest and hunter success rate for the spring wild turkey hunting season in Minnesota from 1978 to 2006.

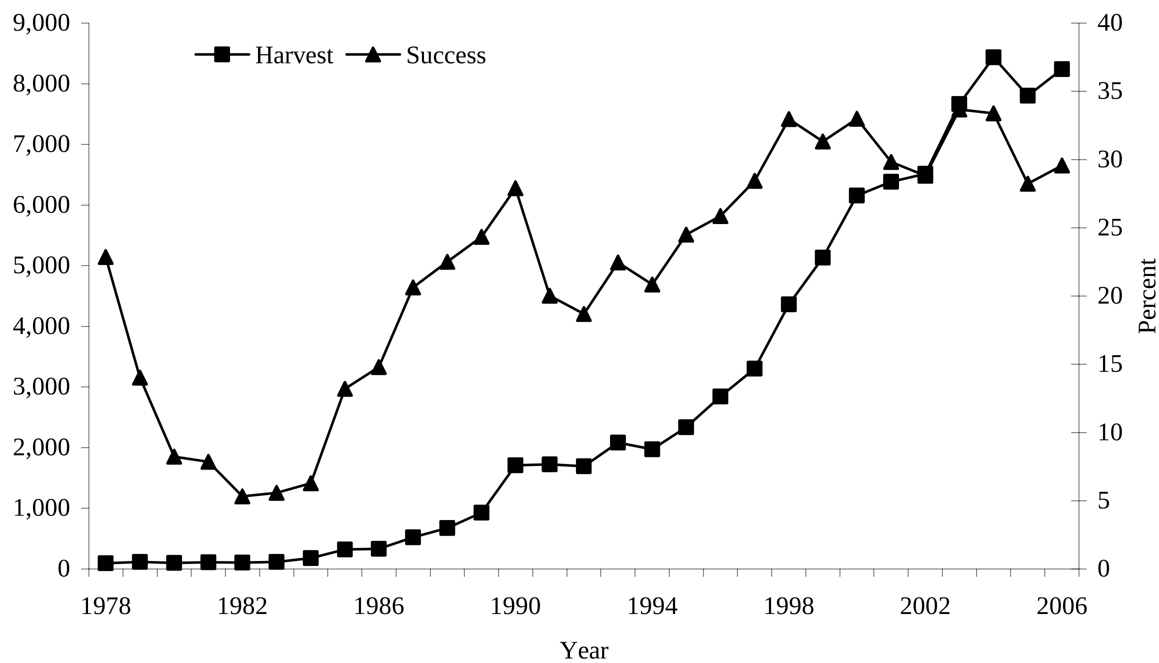


Figure 4. Permits issued, registered harvest, and hunter success by time period for the spring wild turkey hunting season in Minnesota, 2006.

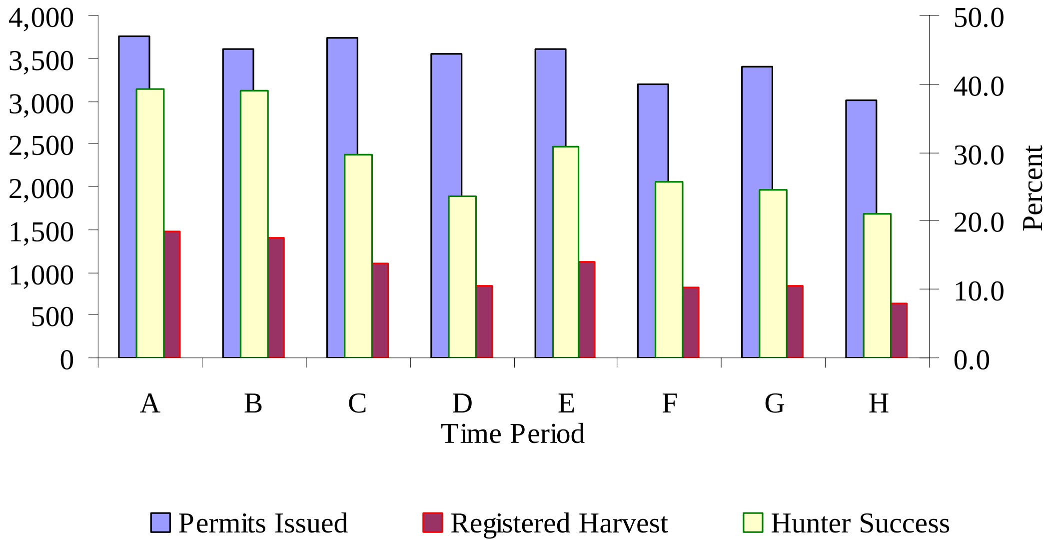
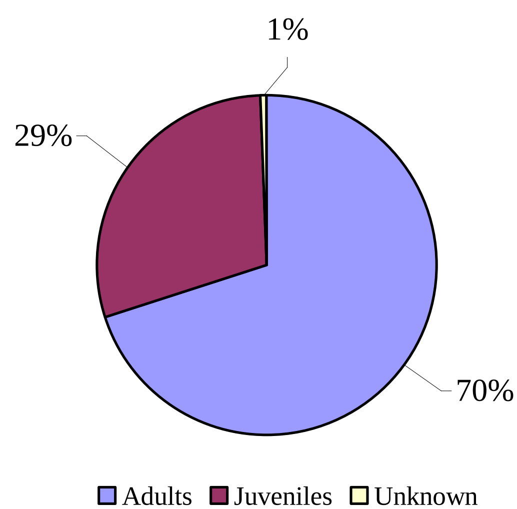


Figure 5. Hunter reported age structure of spring wild turkey harvest in Minnesota, 2006.
Note: Age is hunter reported and is subject to error.



2005 Minnesota Prairie-Chicken Hunter Survey Report

Michael A. Larson, Forest Wildlife Populations and Research Group

INTRODUCTION

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). Permits were awarded through a lottery system, and each hunter could harvest a maximum of 2 prairie-chickens. The same format was implemented for prairie-chicken hunting seasons during 23–27 October 2004 and 22–26 October 2005.

The prairie-chicken permit areas are located in a portion of Minnesota that is closed to the hunting of sharp-tailed grouse (*T. phasianellus campestris*). A new rule effective during the 2005 hunting season allowed permitted prairie-chicken hunters who were also properly licensed for taking sharp-tailed grouse to take sharp-tailed grouse while hunting prairie-chickens. The new rule eliminated the need for prairie-chicken hunters to distinguish between the 2 species, which are similar in appearance.

METHODS

Results of the 2005 hunting season came from 2 sources. First, the Electronic Licensing System (ELS) recorded all permit applications, lottery results, and the mandatory registration of each prairie-chicken that was harvested. Second, I sent a post-season survey by mail to all hunters who purchased a prairie-chicken permit. The survey consisted of 14 questions. Twelve of the questions were identical to those in surveys sent to prairie-chicken hunters during 2003 and 2004. The other 2 questions were new and were related to the harvest of sharp-tailed grouse during the prairie-chicken hunt.

RESULTS AND DISCUSSION

One hundred ten prairie-chicken hunting permits were available during 2005; 100 were available during 2003 and 2004. Ninety-two (19%) of 487 regular applicants were awarded permits (Table 1). The number of regular applicants declined from 835 in 2003 and 734 in 2004. During 2005 an additional 12 permits were awarded through a separate lottery to hunters who applied as landowners or tenants of ≥40 acres of grassland within a permit area (92% success). There were 18 and 25 landowner applicants during 2003 and 2004, respectively.

Harvest results from the ELS and hunter survey differ for several reasons. First, not all hunters returned a survey. Eighty-two hunters responded to the first mailing of the survey, and 3 responded to the second mailing, so the response rate was 92.4%. Second, 6 (7.1% of) hunters who purchased a permit and responded to the survey reported that they did not hunt. Third, hunters who registered prairie-chickens in ELS may not have been the same hunters who reported killing them.

The number of prairie-chicken hunters, amount of time spent hunting, hunting methods, and number of prairie-chickens flushed have been similar during the last 3 years (Figures 2–5). Hunters killed and retrieved approximately 89, 55, and 129 prairie-chickens during 2005, 2004, and 2003, respectively (Table 2). Six percent of hunters (n = 79) reported knocking down a prairie-chicken and not being able to retrieve it during 2005. Approximately 60% of hunters harvested at least 1 prairie-chicken during 2005, which was similar to the success rate during 2003 (68%) but not 2004 (46%). Only 18% of prairie-chicken hunters (n = 78) reported also flushing sharp-tailed grouse, but 7 of them flushed 10–25 sharp-tailed grouse each. No hunters reported wounding or retrieving a sharp-tailed grouse while hunting prairie-chickens.

Thirty-two percent of prairie-chicken hunters (n = 79) hunted only on public land, 25% hunted only on private land, and 43% hunted on both public and private land during 2005. The percentages were nearly identical during 2004. Of the 45 hunters who reported their ease of gaining access to private land

and who had not applied for a permit as a landowner or tenant, 47%, 49%, 4%, and 0% reported it being very easy, somewhat easy, somewhat difficult, and very difficult, respectively. This distribution was only slightly different than when landowners themselves were added to the sample (Figure 6).

Hunter satisfaction with the 2005 prairie-chicken hunting season was reported as a median of 8.0 (mean = 7.7) on a 1–10 scale (n = 79, Figure 7), and 88% of hunters (n = 77) reported that they would apply for a prairie-chicken permit again in the future. Twelve prairie-chicken hunters (15.6%, n = 77) reported being interfered with by other hunters a total of 16 times during 2004.

ACKNOWLEDGMENTS

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. I thank all the hunters who responded to the survey for their cooperation and Mark Lenarz for reviewing a draft of the report.

Table 1. Results of the lottery for prairie-chicken hunting permits in Minnesota during 2005.

Permit type	Permit area	Permits avail.	No. of applicants	Lottery winners no.[a]	Lottery winners prop.[b]	Permits purchased no.	Permits purchased prop.[b]
Regular	405A	11	85	11	0.13	11	1.00
	407A	9	51	9	0.18	8	0.89
	407B	14	61	14	0.23	12	0.86
	407C	11	40	14	0.35	13	0.93
	420A	12	65	12	0.18	11	0.92
	420B	17	110	18	0.16	14	0.78
	421A	14	75	14	0.19	13	0.93
	All	88	487	92	0.19	82	0.89
Landowner	405A	3	1	1	1.00	1	1.00
	407A	3	5	4	0.80	3	0.75
	407B	3	1	1	1.00	1	1.00
	407C	3	2	2	1.00	2	1.00
	420A	3	2	2	1.00	2	1.00
	420B	4	1	1	1.00	0	0.00
	421A	3	1	1	1.00	1	1.00
	All	22	13	12	0.92	10	0.83
Both	All	110	500	104	0.21	92	0.88

[a] In 3 permit areas more permits were awarded than were available because the last hunter selected in the lottery had applied as a member of a hunting party.

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

Table 2. Hunter harvest of prairie-chickens in Minnesota during 2005.

Permit area	Permit type	No. of hunters[b]	Birds retrieved		Birds / hunter		Success rate[a]	
			ELS[c]	Survey[d]	ELS[b]	Survey	ELS	Survey
405A	Both	12	11	11	0.9	0.9	0.50	0.50
407A	Both	10	11	11	1.0	1.1	0.55	0.60
407B	Both	11	11	10	0.8	0.9	0.54	0.55
407C	Both	13	12	11	0.8	0.8	0.53	0.46
420A	Both	10	15	15	1.2	1.5	0.77	1.00
420B	Both	13	23	20	1.6	1.5	0.79	0.77
421A	Both	10	7	7	0.5	0.7	0.36	0.50
All	Regular	72	84	80	1.0	1.1	0.60	0.64
	Landowner	7	5	5	0.5	0.7	0.30	0.43
	All	79	90[e]	85	1.0	1.1	0.58	0.62

[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.
[e] A person without a permit registered a prairie-chicken from permit area 407B, so that bird was not included in either the Regular or Landowner subtotal.

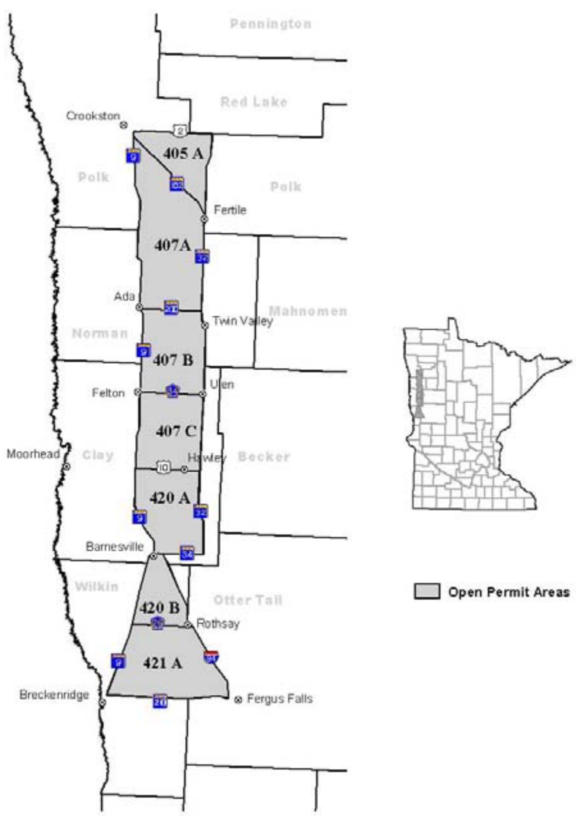


Figure 1. Map of permit areas for prairie-chicken hunting in Minnesota during 2003–2005.

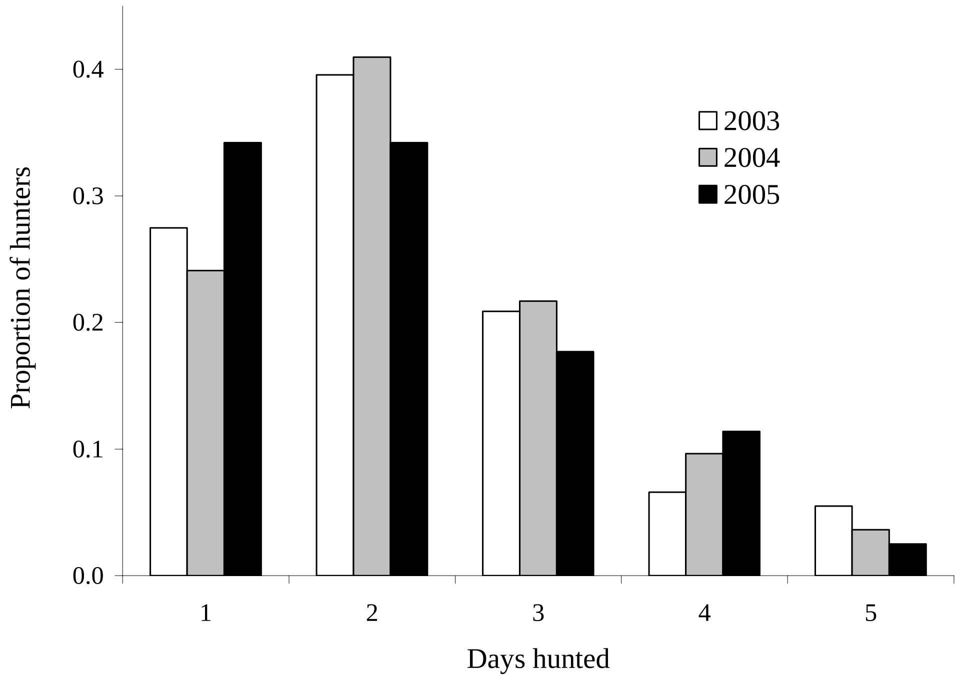


Figure 2. Number of days hunters pursued prairie-chickens in Minnesota during 2003 (*n* = 91 survey respondents), 2004 (*n* = 83), and 2005 (*n* = 79).

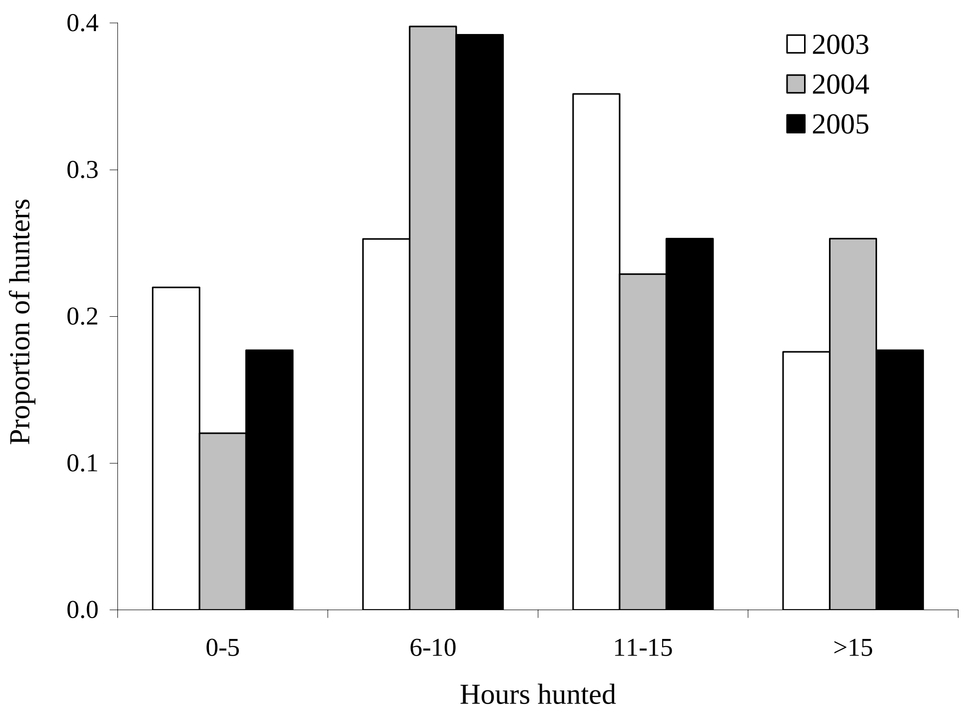


Figure 3. Number of hours hunters pursued prairie-chickens in Minnesota during 2003 (*n* = 91 survey respondents), 2004 (*n* = 83), and 2005 (*n* = 79).

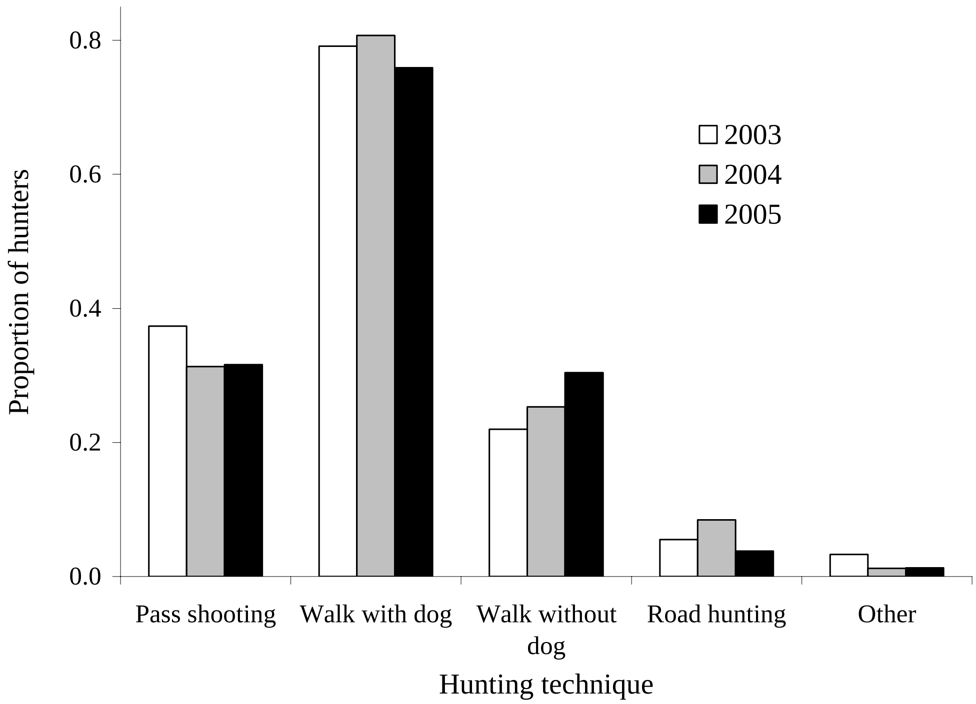


Figure 4. Methods used by prairie-chicken hunters in Minnesota during 2003 (*n* = 91 survey respondents), 2004 (*n* = 83), and 2005 (*n* = 79). The sum of proportions may be >1.

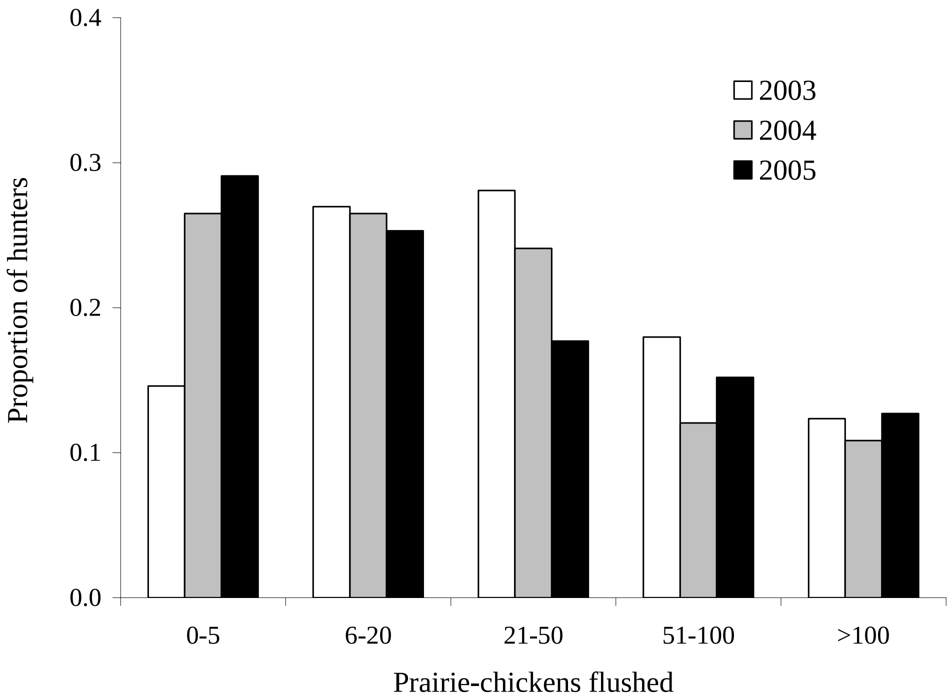


Figure 5. Number of prairie-chickens flushed by prairie-chicken hunters in Minnesota during 2003 (*n* = 89 survey respondents), 2004 (*n* = 83), and 2005 (*n* = 79).

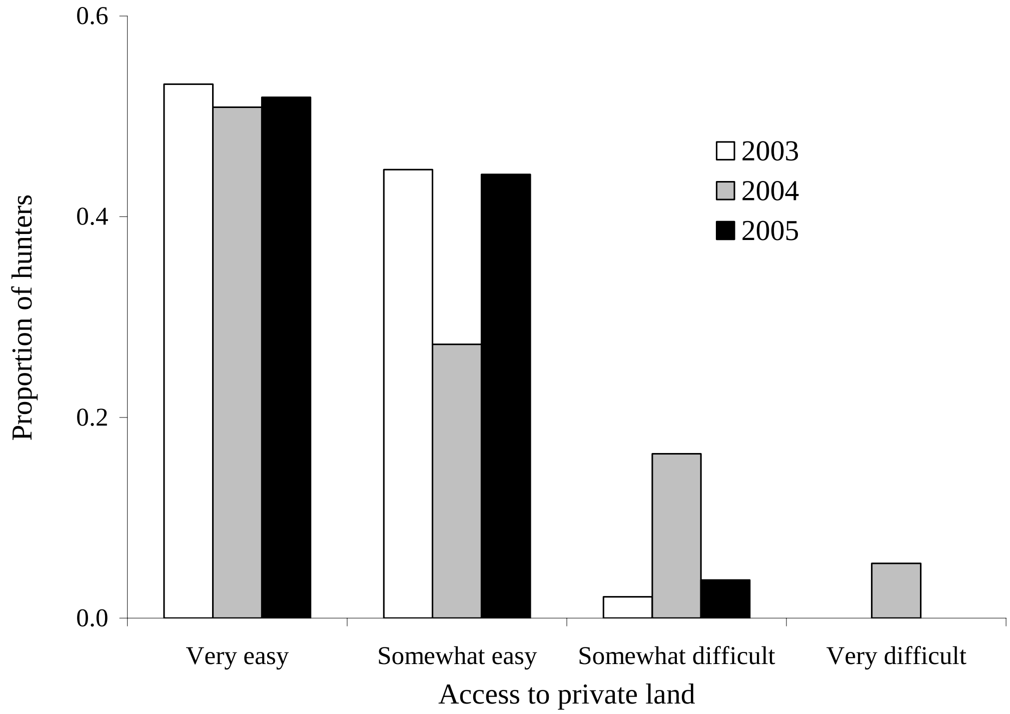


Figure 6. Ease of acquiring permission to access private land for prairie-chicken hunters in Minnesota during 2003 (*n* = 47 survey respondents), 2004 (*n* = 55), and 2005 (*n* = 52).

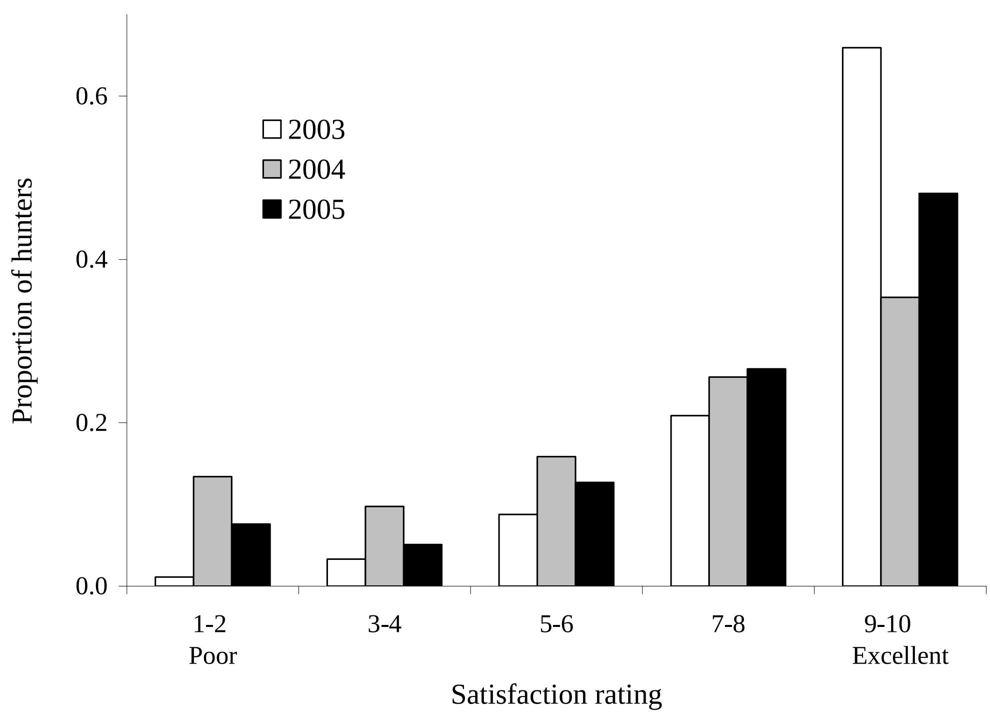


Figure 7. Degree of overall satisfaction of hunters with the prairie-chicken season during 2003 (*n* = 91 survey respondents), 2004 (*n* = 82), and 2005 (*n* = 79)

2005 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 2005, hunters registered 255, 736 deer. This harvest marked the third 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 of kill, deer permit area, and season.

RESULTS

Outcome of the 2005 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											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Resident License Sales	419,965	389,745	369,190	378,320	395,745	400,814	401,005	367,964	344,875	309,698	291,298
Non-Resident License Sales	9,339	8,535	7,830	8,852	9,970	10,595	10,972	10,835	11,334	12,036	12,523
Antlerless Permit Sales	22,603	27,148	32,229	20,884	23,785	34,802	59,013	105,699	194,201	183,186	184,566
Multi-Zone Buck License Sales	29,902	38,806	42,803	44,739	43,903	42,669	41,921	35,658	32,929	32,359	28,233
Resident Youth License Sales	1,835	2,964	3,844	3,445	2,038	3,215	4,011	2,884	34,463	51,347	50,501
All Season Deer License Sales						2,384	3,986	22,125	30,998	46,008	59,090
Total License Sales	483,644	467,198	455,896	456,240	475,441	495,289	519,601	545,165	648,800	634,634	626,211
Registered Buck Harvest[1]	88,997	71,242	64,867	82,921	92,584	102,961	98,894	101,333	110,440	116,612	95,594
Antlerless Permits Offered	201,525	154,195	150,195	140,280	177,380	232,595	286,540	365,667	31,625	30,760	28,830
Antlerless Permits Issued	162,761	116,650	105,481	108,016	135,852	180,490	196,603	192,907	25,386	24,111	25,656
Antlerless Permits App.	257,653	174,329	142,260	151,148	214,597	237,571	225,341	202,086	30,253	28,454	31,403
Registered AL Harvest[1]	109,196	68,106	62,038	60,475	71,681	88,492	98,169	102,280	147,420	123,278	119,363
Registered Total Harvest[1]	198,193	139,348	126,905	143,396	164,265	191,453	197,063	203,613	257,860	239,890	214,957
Registered % Successful[2]	40.1	29.8	27.8	31.4	34.8	38.6	37.9	37.3	39.7	37.8	34.3
ARCHERY											
Resident License Sales	70,056	67,058	63,499	63,826	66,226	68,947	69,608	57,532	59,339	50,601	50,293
Non-Resident License Sales	1,171	1,098	980	1,029	1,073	1,271	1,288	1,275	1,428	1,144	1,207
Youth Archery Sales									3748	7261	7,489
Mgmt Permit License Sales	15,387	15,632	17,478	15,846	16,945	20,393	22,141	18,126	N/A	N/A	N/A
Total License Sales	86,614	83,788	81,957	80,701	84,244	90,611	93,037	76,933	60,767	51,745	58,989
Registered Harvest	14,521	14,338	13,258	12,306	13,376	15,776	15,884	14,744	21,720	17,237	18,975
Registered Harvest - AS license										3,489	4,563
Total Archery Harvest	14,521	14,338	13,258	12,306	13,376	15,776	15,884	14,744	21,691	20,726	23,538
Registered % Successful [2]	16.8	17.1	16.2	15.2	15.8	17.4	17.1	19.2	31.8	29.2	24.6
MUZZLELOADER											
Total Muzzleloader License Sales						11,972	13,043	11,764	9,142	10,512	9,226
Estimated All-Season Hunters									12,020	14,168	23,293
Total Muzzleloader Harvest	2,452	3,367	3,164	3,152	2,928	4,548	4,494	3,505	9,466	9,289	15,421
Registered % Successful [2]						38	34.5	29.8	44.7	37.6	47.4
Total Registered Harvest	215,166	157,317	143,327	158,854	180,569	211,777	217,452	222,050	290,525	260,604	255,736

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

Zone	Dates
Zone 1	Nov. 5-20
Zone 2	Nov. 5-13
Zone 3A	Nov. 5-11
Zone 3B	Nov. 19-27
Zone 4A	Nov. 5-6
Zone 4B	Nov. 12-15
Muzzleloader	Nov. 26- Dec. 11

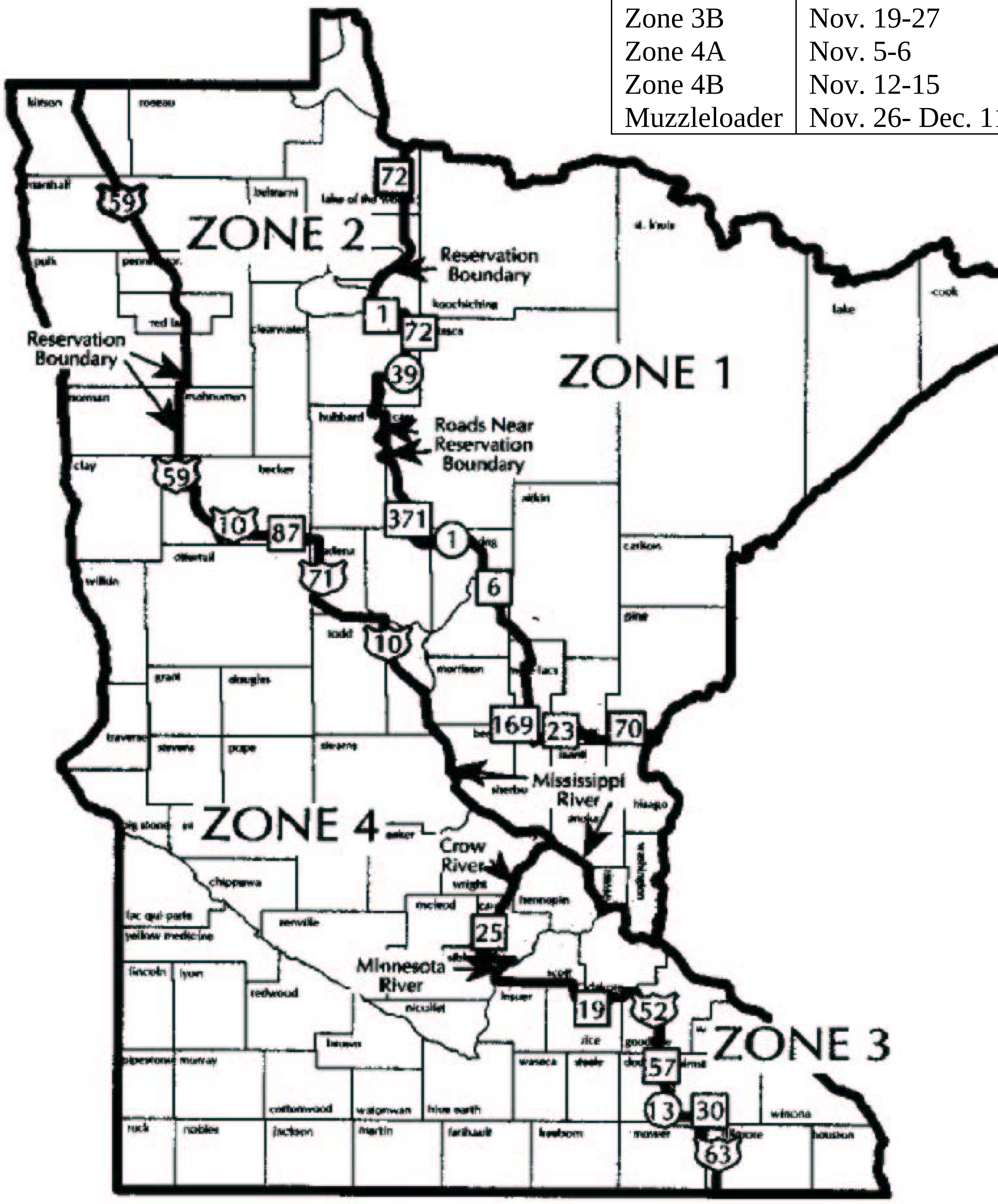


Figure 1. 2005 Firearms and Archery Deer Seasons.

Northeast Border Zone (Permit Areas 116 and 127): September 17-November 20.
Remainder of State: September 17-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, 2005.

Firearms/Zone	Hunters	Bucks	Harvest Antlerless	Total	Overall Success
1	169,184	40,412	45,967	86,379	51.1%
2	107,754	25,443	36,623	62,066	57.6%
3A	18,454	5,440	2,424	7,864	42.6%
3B	20,685	2,840	8,252	11,092	53.6%
4A	66,578	14,255	15,316	29,571	44.4%
4B	30,193	7,204	10,781	17,985	59.6%
Multi-Zone Buck	28,233	5,830	0	5,830	20.6%
Free Landowner[1]	4,196	0	1,314	1,314	31.3%
All-Season Deer[1]	59,090	14,957	18,099	33,056	55.9%
Muzzleloader	32,519	3,613	11,808	15,421	47.4%
Archery[2]	75,989	7,236	16,302	23,538	24.6%
TOTAL[3, 4]	**474,044**	**106,700**	**149,036**	**255,736**	53.9%

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

[2] Includes Camp Ripley and all-season harvest. Total number of people who bought only an archery license was 23,737.

[3] Due to the fact that a hunter can buy multiple licenses, hunter numbers are an estimate.

[4] Column totals do not add to 255,736 because all-season firearm harvest was placed in appropriate zone.

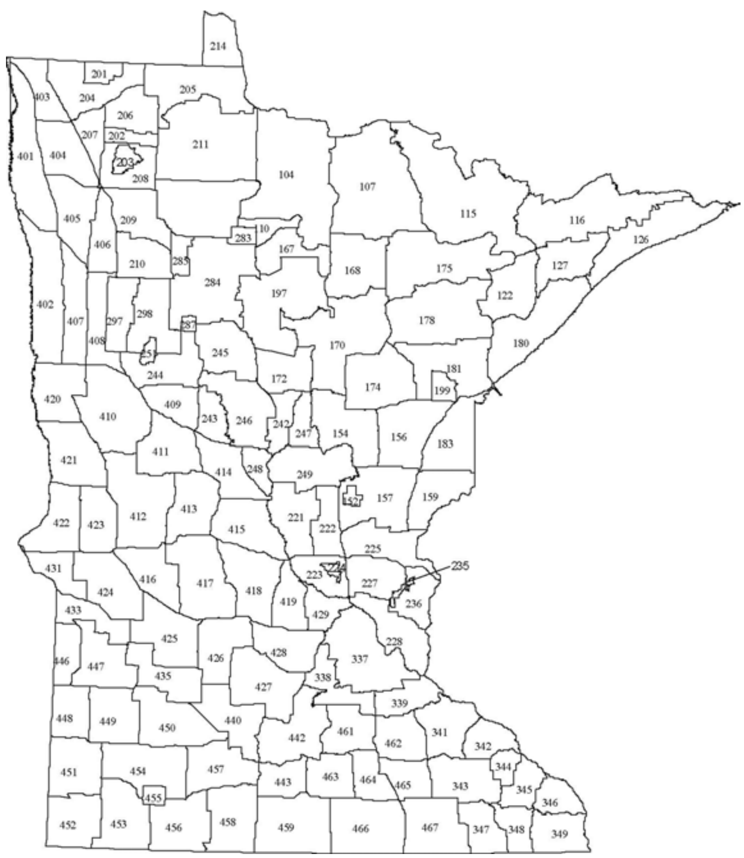


Figure 2. 2005 Deer Permit Areas.

Table 3. Firearms Harvest and Harvest per Square Mile by Permit Area, 2005.
Includes regular, youth, and bonus permits.

Permit Area	Zone	Season	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
104	1		1,214	193	802	156	2,365	2,084	0.58	0.55	1.13
105	1		1,290	365	1,165	313	3,133	958	1.35	1.92	3.27
105	1	Youth	0	3	10	3	16	958	0.00	0.02	0.02
107	1		1,808	352	1,318	250	3,728	1,963	0.92	0.98	1.90
110	1		672	226	713	203	1,814	301	2.23	3.79	6.02
111	1		1,277	197	841	181	2,496	1,710	0.75	0.71	1.46
111	1	Youth	0	1	7	3	11	1,710	0.00	0.01	0.01
114	1		67	11	30	1	109	412	0.16	0.10	0.26
115	1		2,201	351	1,365	254	4,171	2,234	0.99	0.88	1.87
116	1		219	4	20	2	245	1,419	0.15	0.02	0.17
122	1		521	21	78	11	631	642	0.81	0.17	0.98
126	1		585	45	221	30	881	978	0.60	0.30	0.90
127	1		124	6	14	1	145	587	0.21	0.04	0.25
152	1		137	17	85	19	258	62	2.22	1.96	4.19
154	1		1,708	559	1,618	409	4,294	814	2.10	3.18	5.27
156	1		1,701	508	1,512	426	4,147	834	2.04	2.93	4.97
157	1		2,585	868	2,169	611	6,233	904	2.86	4.04	6.89
159	1		1,385	400	1,244	295	3,324	575	2.41	3.37	5.78
167	1		698	108	324	72	1,202	455	1.53	1.11	2.64
168	1		1,383	217	647	120	2,367	791	1.75	1.24	2.99
170	1		2,865	845	2,429	567	6,706	1,416	2.02	2.71	4.74
172	1		1,763	719	1,867	516	4,865	523	3.37	5.93	9.31
174	1		1,317	347	987	270	2,921	870	1.51	1.84	3.36
175	1		2,019	170	665	110	2,964	1,306	1.55	0.72	2.27
178	1		2,612	501	1,666	324	5,103	1,305	2.00	1.91	3.91
180	1		1,561	156	764	94	2,575	999	1.56	1.01	2.58
181	1		1,807	353	1,031	259	3,450	746	2.42	2.20	4.62
182	1		361	75	224	40	700	280	1.29	1.21	2.50
183	1		1,457	370	1,174	250	3,251	674	2.16	2.66	4.82
184	1		3,886	1,424	3,696	1,192	10,198	1,318	2.95	4.79	7.74
197	1		957	116	354	76	1,503	1,355	0.71	0.40	1.11
199	1		143	14	17	5	179	152	0.94	0.24	1.18
201	2		66	16	56	15	153	169	0.39	0.51	0.90
201	2	Youth	0	0	1	0	1	169	0.00	0.01	0.01
202	2		199	42	174	50	465	167	1.19	1.60	2.79
202	2	Youth	0	0	5	1	6	167	0.00	0.04	0.04
203	2		93	19	45	6	163	131	0.71	0.54	1.25
204	2		564	132	512	151	1,359	719	0.78	1.11	1.89
204	2	Youth	0	2	10	2	14	719	0.00	0.02	0.02
206	2		504	149	464	128	1,245	471	1.07	1.57	2.64
206	2	Youth	0	2	21	3	26	471	0.00	0.06	0.06
207	2		338	92	360	83	873	303	1.12	1.77	2.88
207	2	Youth	0	2	1	2	5	303	0.00	0.02	0.02
208	2		255	76	242	87	660	443	0.58	0.91	1.49
208	2	Youth	0	0	3	1	4	443	0.00	0.01	0.01
209	2		570	181	482	144	1,377	641	0.89	1.26	2.15
209	2	Youth	0	1	1	0	2	641	0.00	0.00	0.00
209	2	Early	0	29	112	33	174	641	0.00	0.27	0.27
210	2		1,107	303	719	241	2,370	636	1.74	1.99	3.73
210	2	Early	0	63	221	60	344	636	0.00	0.54	0.54
221	2		973	382	765	329	2,449	647	1.50	2.28	3.79
222	2		830	302	612	225	1,969	413	2.01	2.76	4.77
223	2		439	142	313	108	1,002	385	1.14	1.46	2.60
224	2		117	33	81	31	262	49	2.39	2.96	5.34
225	2		1,276	373	808	252	2,709	635	2.01	2.26	4.27
225	2	Early	0	75	203	83	361	635	0.00	0.57	0.57
227	2		790	205	504	151	1,650	491	1.61	1.75	3.36
227	2	Early	0	50	104	45	199	491	0.00	0.40	0.40

Table 3. (Continued).

Permit Area	Zone	Season	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
228	2		243	56	174	27	500	647	0.38	0.40	0.77
235	2		67	5	35	21	128	37	1.82	1.66	3.48
236	2		749	167	443	123	1,482	403	1.86	1.82	3.68
236	2	Early	0	24	95	37	156	403	0.00	0.39	0.39
241	2		1,370	609	1,288	495	3,762	433	3.17	5.53	8.70
242	2		585	206	553	165	1,509	307	1.91	3.01	4.91
243	2		979	398	1,029	315	2,721	316	3.10	5.52	8.62
244	2		2,040	882	1,786	732	5,440	631	3.23	5.39	8.62
245	2		1,888	724	1,797	574	4,983	659	2.87	4.70	7.56
246	2		1,954	871	1,791	637	5,253	796	2.46	4.15	6.60
247	2		765	236	578	186	1,765	263	2.90	3.80	6.70
248	2		391	129	349	97	966	229	1.71	2.52	4.23
249	2		1,163	425	956	316	2,860	729	1.59	2.33	3.92
251	2		125	45	104	36	310	68	1.84	2.72	4.55
252	2		278	28	183	26	515	1,044	0.27	0.23	0.49
252	2	Youth	0	1	1	0	2	1,044	0.00	0.00	0.00
252	2	Early	0	13	62	11	86	1,044	0.00	0.08	0.08
253	2		415	92	379	106	992	1,023	0.41	0.56	0.97
254	2		317	70	293	85	765	396	0.80	1.13	1.93
254	2	Youth	0	0	1	1	2	396	0.00	0.01	0.01
255	2		678	192	609	179	1,658	631	1.07	1.55	2.63
255	2	Youth	0	3	20	1	24	631	0.00	0.04	0.04
256	2		542	137	465	134	1,278	655	0.83	1.12	1.95
256		Early	0	21	105	19	145	655	0.00	0.22	0.22
257	2		491	139	426	156	1,212	426	1.15	1.69	2.84
257	2	Youth	0	0	1	1	2	426	0.00	0.00	0.00
257	2	Early	0	25	83	25	133	426	0.00	0.31	0.31
258	2		528	171	546	156	1,401	619	0.85	1.41	2.26
259	2		520	133	425	145	1,223	501	1.04	1.40	2.44
287	2		105	47	94	33	279	51	2.07	3.43	5.51
297	2		294	62	173	40	569	450	0.65	0.61	1.27
298	2		789	177	472	141	1,579	677	1.17	1.17	2.33
337	3	A	221	39	118	22	400	1,111	0.20	0.16	0.36
337	3	B	125	47	139	25	336	1,111	0.11	0.19	0.30
338	3	A	168	11	38	11	228	469	0.36	0.13	0.49
338	3	B	78	43	114	27	262	469	0.17	0.39	0.56
339	3	A	165	14	29	9	217	405	0.41	0.13	0.54
339	3	B	84	29	81	17	211	405	0.21	0.31	0.52
341	3	A	566	37	110	19	732	626	0.90	0.27	1.17
341	3	B	275	198	564	140	1,177	626	0.44	1.44	1.88
342	3	A	434	30	62	11	537	373	1.16	0.28	1.44
342	3	B	263	153	493	138	1,047	373	0.70	2.10	2.80
343	3	A	511	29	94	18	652	664	0.77	0.21	0.98
343	3	B	291	225	470	120	1,106	664	0.44	1.23	1.67
344	3	A	327	28	78	22	455	190	1.72	0.67	2.40
344	3	B	90	42	134	31	297	190	0.47	1.09	1.56
345	3	A	301	19	64	16	400	335	0.90	0.30	1.19
345	3	B	203	110	308	101	722	335	0.61	1.55	2.15
346	3	A	702	78	227	50	1,057	328	2.14	1.08	3.23
346	3	B	359	208	628	190	1,385	328	1.10	3.13	4.23
347	3	A	509	62	162	28	761	434	1.17	0.58	1.75
347	3	B	256	169	465	123	1,013	434	0.59	1.74	2.33
348	3	A	530	70	256	31	887	332	1.59	1.07	2.67
348	3	B	259	189	584	140	1,172	332	0.78	2.75	3.53
349	3	A	1000	87	339	84	1,510	499	2.00	1.02	3.03
349	3	B	486	314	970	256	2,026	499	0.97	3.09	4.06

Table 3. (Continued).

Permit Area	Zone	Season	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
410	4	A	1299	404	927	326	2,956	1,110	1.17	1.49	2.66
410	4	B	512	220	586	199	1,517	1,110	0.46	0.91	1.37
411	4	A	1267	426	955	335	2,983	694	1.83	2.47	4.30
411	4	B	541	197	552	164	1,454	694	0.78	1.32	2.09
412	4	A	877	212	652	194	1,935	1,123	0.78	0.94	1.72
412	4	B	338	125	347	106	916	1,123	0.30	0.51	0.82
413	4	A	796	275	586	218	1,875	671	1.19	1.61	2.79
413	4	B	326	145	403	142	1,016	671	0.49	1.03	1.51
414	4	A	944	292	754	256	2,246	566	1.67	2.30	3.97
414	4	B	328	209	426	162	1,125	566	0.58	1.41	1.99
415	4	A	599	229	454	175	1,457	730	0.82	1.17	1.99
415	4	B	270	180	302	107	859	730	0.37	0.81	1.18
416	4	A	311	76	218	42	647	575	0.54	0.58	1.12
416	4	B	179	45	193	26	443	575	0.31	0.46	0.77
417	4	A	680	160	543	133	1,516	1,000	0.68	0.84	1.52
417	4	B	353	99	381	102	935	1,000	0.35	0.58	0.93
418	4	A	469	189	347	111	1,116	788	0.60	0.82	1.42
418	4	B	223	96	244	89	652	788	0.28	0.54	0.83
419	4	A	259	77	192	80	608	427	0.61	0.82	1.42
419	4	B	157	70	169	54	450	427	0.37	0.69	1.05
420	4	A	206	35	161	41	443	652	0.32	0.36	0.68
420	4	B	162	53	116	29	360	652	0.25	0.30	0.55
421	4	A	165	39	105	29	338	759	0.22	0.23	0.45
421	4	B	84	20	76	23	203	759	0.11	0.16	0.27
422	4	A	150	21	46	14	231	647	0.23	0.13	0.36
422	4	B	70	4	25	3	102	647	0.11	0.05	0.16
423	4	A	142	22	90	27	281	544	0.26	0.26	0.52
423	4	B	91	29	60	18	198	544	0.17	0.20	0.36
424	4	A	216	19	86	24	345	777	0.28	0.17	0.44
424	4	B	131	15	81	17	244	777	0.17	0.15	0.31
425	4	A	80	6	29	6	121	780	0.10	0.05	0.16
425	4	B	50	2	32	6	90	780	0.06	0.05	0.12
426	4	A	139	18	70	8	235	640	0.22	0.15	0.37
426	4	B	64	13	53	7	137	640	0.10	0.11	0.21
427	4	A	141	6	61	13	221	853	0.17	0.09	0.26
427	4	B	67	10	47	8	132	853	0.08	0.08	0.15
428	4	A	181	43	142	36	402	580	0.31	0.38	0.69
428	4	B	134	52	133	28	347	580	0.23	0.37	0.60
429	4	A	137	17	91	33	278	314	0.44	0.45	0.89
429	4	B	70	30	57	18	175	314	0.22	0.33	0.56
431	4	A	125	4	32	4	165	381	0.33	0.10	0.43
431	4	B	63	7	25	0	95	381	0.17	0.08	0.25
433	4	A	275	27	136	22	460	422	0.65	0.44	1.09
433	4	B	131	22	103	15	271	422	0.31	0.33	0.64
435	4	A	239	32	127	24	422	579	0.41	0.32	0.73
435	4	B	135	10	86	11	242	579	0.23	0.18	0.42
440	4	A	293	26	203	14	536	666	0.44	0.37	0.81
440	4	B	83	12	71	11	177	666	0.12	0.14	0.27
442	4	A	396	38	178	28	640	832	0.48	0.29	0.77
442	4	B	157	32	117	22	328	832	0.19	0.21	0.39
443	4	A	164	18	83	19	284	389	0.42	0.31	0.73
443	4	B	73	19	69	18	179	389	0.19	0.27	0.46
446	4	A	153	16	63	12	244	346	0.44	0.26	0.70
446	4	B	88	5	66	8	167	346	0.25	0.23	0.48
447	4	A	162	14	80	10	266	676	0.24	0.15	0.39
447	4	B	56	10	54	5	125	676	0.08	0.10	0.18

Table 3. (Continued).

Permit Area	Zone	Season	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
448	4	A	210	32	131	24	397	459	0.46	0.41	0.87
448	4	B	112	3	42	7	164	459	0.24	0.11	0.36
449	4	A	298	34	169	23	524	630	0.47	0.36	0.83
449	4	B	95	16	74	22	207	630	0.15	0.18	0.33
450	4	A	116	15	67	10	208	820	0.14	0.11	0.25
450	4	B	46	5	33	5	89	820	0.06	0.05	0.11
451	4	A	167	26	75	11	279	689	0.24	0.16	0.40
451	4	B	163	23	66	12	264	689	0.24	0.15	0.38
452	4	A	129	19	89	25	262	637	0.20	0.21	0.41
452	4	B	138	27	119	20	304	637	0.22	0.26	0.48
453	4	A	185	18	73	11	287	738	0.25	0.14	0.39
453	4	B	97	6	47	8	158	738	0.13	0.08	0.21
454	4	A	289	21	164	18	492	855	0.34	0.24	0.58
454	4	B	167	28	99	26	320	855	0.20	0.18	0.37
455	4	A	28	3	15	1	47	98	0.29	0.19	0.48
455	4	B	24	3	13	0	40	98	0.25	0.16	0.41
456	4	A	210	30	124	28	392	731	0.29	0.25	0.54
456	4	B	184	28	142	24	378	731	0.25	0.27	0.52
457	4	A	164	19	102	18	303	675	0.24	0.21	0.45
457	4	B	96	10	74	14	194	675	0.14	0.15	0.29
458	4	A	147	14	64	7	232	736	0.20	0.12	0.32
458	4	B	109	8	85	14	216	736	0.15	0.15	0.29
459	4	A	224	31	137	27	419	987	0.23	0.20	0.42
459	4	B	113	23	126	17	279	987	0.11	0.17	0.28
461	4	A	197	67	155	46	465	517	0.38	0.52	0.90
461	4	B	115	56	164	32	367	517	0.22	0.49	0.71
462	4	A	273	51	156	46	526	507	0.54	0.50	1.04
462	4	B	135	39	147	28	349	507	0.27	0.42	0.69
463	4	A	118	23	74	14	229	464	0.25	0.24	0.49
463	4	B	71	16	39	18	144	464	0.15	0.16	0.31
464	4	A	125	17	70	10	222	380	0.33	0.26	0.58
464	4	B	70	31	103	25	229	380	0.18	0.42	0.60
465	4	A	88	16	49	4	157	391	0.22	0.18	0.40
465	4	B	83	26	93	17	219	391	0.21	0.35	0.56
466	4	A	218	59	150	36	463	946	0.23	0.26	0.49
466	4	B	198	65	217	47	527	946	0.21	0.35	0.56
467	4	A	204	45	139	28	416	774	0.26	0.27	0.54
467	4	B	252	72	227	46	597	774	0.33	0.45	0.77
901	1		6	3	2	1	12				
902	1		52	56	100	51	259				
903	1		12	3	18	4	37				
904	1		3	5	4	2	14				
905	1		4	0	0	1	5				
906	1		5	4	7	0	16				
907	1		3	3	4	3	13				
908	1		0	1	9	2	12				
909	1		0	4	11	4	19				
910	1		0	4	11	3	18				
911	2		28	32	36	39	135				
912	2		11	2	6	4	23				
913	2		4	1	1	1	7				
914	2		14	4	27	11	56				
917	3	A	0	5	9	4	18				
918	3	B	13	3	18	9	43				
919	3	B	5	5	11	0	21				
920	3	B	12	22	49	14	97				
921	3	B	3	4	13	4	24				
922	3	B	27	12	68	14	121				

Table 3. (Continued).

Permit Area	Zone	Season	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks/ Sq. Mile	Antlerless/ Sq. Mile	Total/ Sq. Mile
923	3	B	0	5	11	5	21				
926	4	B	17	12	47	25	101				
927	4	B	0	2	12	1	15				
TOTAL			**95,601**	**26,221**	**74,391**	**20,546**	**216,759**				

Table 4a. Firearm Bonus Permit Harvest by Permit Area, 2005. Managed Permit Areas

Permit Area	A or B Season	Zone	Fawn Male	Adult Female	Fawn Female	Total
104		1	91	431	83	605
107		1	166	633	143	942
111		1	91	423	89	603
114		1	0	1	0	1
115		1	173	656	123	952
126		1	19	117	15	151
154		1	248	780	217	1,245
170		1	384	1,183	299	1,866
172		1	334	864	278	1,476
174		1	145	470	123	738
178		1	225	729	140	1,094
180		1	64	366	57	487
181		1	157	518	137	812
183		1	162	537	124	823
201		2	8	28	6	42
203		2	13	14	3	30
224		2	12	45	11	68
235		2	2	20	12	34
247		2	111	267	83	461
249		2	191	416	153	760
257		2	73	255	103	431
297		2	31	88	23	142
298		2	105	219	71	395
338	B	3	20	43	5	68
339	B	3	17	31	6	54
346	A	3	32	130	25	187
347	A	3	27	95	17	112

Permit Area	A or B Season	Zone	Fawn Male	Adult Female	Fawn Female	Total
345	B	3	36	95	36	167
348	A	3	31	148	16	195
349	A	3	45	203	55	303
416	A	4	22	65	7	94
416	B	4	17	59	6	82
417	A	4	40	125	29	194
417	B	4	35	130	28	193
418	A	4	45	106	42	193
418	B	4	31	92	36	159
423	A	4	9	24	9	42
423	B	4	12	18	7	37
428	A	4	7	40	8	55
428	B	4	17	42	13	72
452	A	4	6	32	11	49
452	B	4	8	40	3	51
456	A	4	15	40	10	65
456	B	4	16	52	13	81
461	A	4	20	43	22	85
461	B	4	22	66	15	103
462	A	4	11	47	16	74
462	B	4	14	56	14	84
464	A	4	2	16	0	18
464	B	4	10	34	9	53
465	A	4	2	15	0	17
465	B	4	9	36	7	52
466	A	4	19	56	16	91
466	B	4	23	85	12	120
Total			**3,389**	**11,029**	**2,750**	**17,168**

Table 4b. Firearm Bonus Permit Harvest by Permit Area, 2005. Intensive Permit Areas

Permit Area	A or B Season	Zone	Fawn Male	Adult Female	Fawn Female	Total
105		1	189	643	176	1,008
110		1	150	419	132	701
156		1	276	835	264	1,375
157		1	463	1,173	366	2,002
159		1	224	658	188	1,070
182		1	43	129	26	198
184		1	928	2,374	834	4,136
202		2	34	115	33	182
204		2	64	285	78	427
206		2	82	260	86	428
207		2	50	219	59	328
208		2	46	135	60	241
209		2	128	312	98	538
210		2	165	406	147	718
221		2	190	364	176	730
222		2	144	289	133	566
223		2	60	155	50	265
225		2	190	422	159	771
227		2	121	282	107	510
228		2	37	111	20	168
236		2	99	261	84	444
241		2	382	823	341	1,546
242		2	127	301	111	539
243		2	226	578	194	998
244		2	541	1,054	508	2,103
245		2	424	992	342	1,758
246		2	469	971	377	1,817
248		2	62	183	50	295
252		2	16	123	20	159
253		2	56	252	66	374
254		2	52	190	67	309
255		2	118	360	132	610
256		2	87	298	82	467
257		2	73	255	103	431
258		2	102	341	112	555
259		2	80	245	89	414
287		2	22	52	23	97
337	A	3	26	90	20	136
337	B	3	33	102	20	155
341	B	3	85	249	59	393
342	B	3	59	222	70	351
343	B	3	116	246	69	431
346	B	3	92	313	116	521
347	B	3	101	271	78	450
348	B	3	94	274	74	442
349	B	3	164	528	158	850
410	A	4	210	463	184	857
410	B	4	150	366	140	656
411	A	4	204	463	184	851
411	B	4	111	363	119	593
412	A	4	82	213	87	382
412	B	4	59	175	57	291
413	A	4	95	234	84	413
413	B	4	71	230	89	390
414	A	4	124	341	128	593
414	B	4	112	254	98	464
415	A	4	72	144	64	280
415	B	4	93	124	50	267
419	A	4	29	70	28	127
419	B	4	30	89	24	143
420	A	4	16	74	21	111
420	B	4	26	60	16	102
421	A	4	15	47	13	75
421	B	4	7	29	12	48
429	A	4	8	40	16	64
429	B	4	14	29	9	52
467	A	4	26	62	14	102
467	B	4	35	111	24	170
Total			**8,879**	**23,141**	**8,018**	**40,038**

Table 5. Multi-Zone Buck Harvest by Permit Area, 2005.

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	15	201	2	337	30		
105	25	202	4	338	10		
107	20	203	5	339	5		
110	9	204	10	341	12		
111	40	206	23	342	4		
114	1	207	3	343	13		
115	32	208	8	344	9		
116	1	209	16	345	1		
126	5	210	36	346	3		
152	5	221	27	347	20	410	480
154	42	222	30	348	8	411	507
156	25	223	21	349	9	412	276
157	65	224	5	**Zone 3 Total**	**124**	413	322
159	21	225	39			414	338
167	15	227	40			415	201
168	28	228	9			416	99
170	36	235	2			417	203
172	60	236	23			418	111
174	25	241	70			419	107
175	14	242	12			420	87
178	18	243	32			421	52
180	6	244	63			422	59
181	9	245	51			423	53
182	7	246	30			424	69
183	14	247	23			425	16
184	132	248	20			426	32
197	33	249	13			427	21
199	2	251	6			428	48
Zone 1 Total	**705**	252	11			429	62
		253	24			431	25
		254	9			433	54
		255	28			435	31
		256	14			440	42
		257	17			442	40
		258	27			443	11
		259	24			446	40
		287	6			447	20
		297	14			448	42
		298	24			449	35
		Zone 2 Total	**821**			450	9
						451	55
						452	17
						453	12
						454	65
						455	11
						456	68
						457	60
						458	33
						459	18
						461	48
						462	54
						463	19
						464	37
						465	22
						466	72
						467	97
						Zone 4 Total	**4,180**

Grand Total	**5,830**

Table 6. Summary of Firearms Special Hunts, 2005. 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	11/12 - 11/20	1A	70*	6	3	2	1	12
902 - St. Croix State Park1	11/12 - 11/15	1A	550**	52	56	100	51	259
903 - Savanna Portage State Park1	11/12 - 11/20	1A	55***	12	3	18	4	37
904 - Gooseberry Falls State Park1	11/5 - 11/20	1A	25*	3	5	4	2	14
905 - Split Rock Lighthouse State Park1	11/5 - 11/20	1A	25*	4	0	0	1	5
906 - Tettegouche State Park1	11/5 - 11/20	1A	125*	5	4	7	0	16
907 - Scenic State Park1	11/5 - 11/20	1A	30*	3	3	4	3	13
908 - Hayes Lake State Park1	11/5 - 11/20	1A	25#	0	1	9	2	12
909 - Lake Bemidji State Park1	11/5 - 11/8	1A	35#	0	4	11	4	19
910 - Zippel Bay State Park1	11/5 - 11/20	2A	55#	0	4	11	3	18
911 - Wild River State Park1	11/5 - 11/8	2A	150**	28	32	36	39	135
912 - Old Mill State Park1	11/5 - 11/13	2A	7#	0	0	1	0	1
913 - William O'Brien State Park1	11/5 - 11/6	2A	65*	4	1	1	1	7
914 - Lake Elmo Park Reserve1	11/5,6,12,13	2A	50**	14	4	27	11	56
915 - Rydell NWR1	11/5-7,11-13	2A	5*	0	0	0	0	0
916 - Prairie Smoke Dunes SNA1	11/5 - 11/13	2A	50#	0	0	0	0	0
917 - Zumbro Falls SNA1	11/5 - 11/11	3A	12#	0	5	9	4	18
918 - Carver Park Reserve1	11/19 - 11/20	3B	105*	20	29	10	11	70
919 - Baker Park Reserve1	11/26 - 11/27	3B	75*	5	20	10	6	41
920 - Forestville/Mystery Cave SP1	11/19 - 11/21 11/25 - 11/27	3B	110***	12	22	49	14	97
921 - Frontenac SP1	11/19 - 11/21	3B	50*	14	6	18	8	46
922 - Great River Bluffs SP1	11/19 - 11/21 11/25 - 11/27	3B	100**	27	12	68	14	121
923 - Whitewater Refuge	11/19 - 11/27	3B	75**	0	5	11	5	21
924 - Kellogg - Weaver Dunes SNA1	11/19 - 11/27	3B	15#	0	0	0	0	0
925 - Zumbro Falls SNA1	11/19 - 11/27	3B	12#	0	0	0	0	0
926 - Maplewood State Park1	11/12 - 11/15	4B	100***	17	12	47	25	101
927 - Glacial Lakes State Park	11/12 - 11/15	4B	30#	0	2	12	1	15
TOTAL				226	233	465	210	1,134

[1] Bonus permits available *Either sex ** Earn –A-Buck ***Antler Point Restriction # Antlerless Only

Table 7. Free Landowner Firearms Harvest by Permit Area, 2005.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
104	2	7	0	9
105	2	5	1	8
107	0	1	1	2
110	3	8	3	14
111	0	6	0	6
154	1	1	1	3
156	0	3	0	3
157	8	23	5	36
159	1	2	0	3
170	3	3	2	8
172	0	1	1	2
174	1	1	1	3
178	3	4	2	9
181	1	5	0	6
182	1	3	0	4
183	0	2	0	2
184	20	35	7	62
197	0	1	0	1
202	0	2	0	2
204	1	4	1	6
206	2	2	0	4
207	0	2	0	2
208	0	4	2	6
209	3	6	2	11
210	5	8	7	20
221	8	21	5	34
222	1	7	0	8
223	0	0	2	2
225	4	7	3	14
227	0	2	1	3
236	0	1	1	2
241	9	28	5	42
242	0	2	0	2
243	6	20	4	30
244	11	20	9	40
245	2	6	0	8
246	3	6	2	11
247	0	2	1	3
248	3	3	0	6
249	8	15	6	29
252	0	1	1	2
253	7	14	3	24
254	0	4	3	7
255	3	11	1	15
256	2	7	5	14
257	3	8	5	16
258	4	16	3	23
259	3	7	3	13
297	1	0	0	1
298	1	6	2	9
337	0	3	0	3
338	1	2	0	3
339	2	3	0	5
341	3	17	9	29
342	4	20	1	25
343	4	17	3	24
344	1	0	0	1
345	7	13	11	31
346	5	36	7	48
347	2	9	1	12
348	4	16	3	23
349	6	45	11	62
410	9	22	9	40
411	12	16	3	31
412	3	8	3	14
413	13	25	16	54
414	27	56	13	96
415	17	25	10	52
416	1	0	0	1
417	0	3	0	3
418	2	5	3	10
419	1	3	2	6
420	2	10	6	18
421	0	1	0	1
423	0	5	1	6
428	2	2	0	4
429	1	2	1	4
452	0	8	1	9
453	0	1	0	1
456	1	1	1	3
461	3	11	2	16
462	0	2	0	2
464	0	1	0	1
465	1	1	0	2
466	0	6	1	7
467	1	5	4	10
TOTAL	271	753	223	1,247

Table 8. Archery Harvest by Permit Area, 2005. Includes regular, youth, and bonus permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	19	2	33	5	59
105	36	15	167	32	250
107	27	8	72	8	115
110	13	7	50	4	74
111	14	2	39	6	61
114	2	1	4	2	9
115	23	9	50	6	88
116	9	0	4	1	14
122	13	2	8	0	23
126	9	2	9	0	20
127	2	0	1	0	3
152	3	2	2	1	8
154	61	17	118	19	215
156	74	23	125	25	247
157	125	59	262	34	480
159	74	35	158	26	293
167	7	1	18	1	27
168	30	7	44	3	84
170	86	37	186	25	334
172	73	29	143	16	261
174	37	13	55	9	114
175	38	12	40	3	93
178	65	14	94	12	185
180	91	16	79	7	193
181	110	19	117	12	258
182	138	58	294	44	534
183	52	14	85	16	167
184	199	143	482	91	915
197	27	3	19	2	51
199	7	1	0	0	8
201	0	1	4	0	5
202	5	1	22	1	29
203	0	0	0	1	1
204	20	6	36	5	67
206	19	5	36	10	70
207	6	4	26	5	41
208	4	5	19	2	30
209	21	11	39	7	78
210	29	11	64	14	118
221	58	36	135	35	264
222	59	29	105	23	216
223	109	42	151	33	335
224	16	6	15	4	41
225	117	47	217	47	428
227	150	58	249	60	517
228	277	81	375	88	821
235	12	8	22	7	49
236	279	74	343	71	767
241	54	46	163	38	301
242	117	76	258	40	491
243	56	33	159	32	280
244	65	54	212	39	370
245	66	51	205	41	363
246	73	52	154	34	313
247	69	35	105	27	236
248	221	74	281	41	617
249	66	31	100	16	213
251	1	1	3	2	7

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
252	22	6	27	5	60
253	39	13	61	13	126
254	16	6	38	4	64
255	13	6	50	3	72
256	20	10	31	8	69
257	13	15	54	8	90
258	35	15	66	8	124
259	9	5	24	3	41
297	3	1	12	0	16
298	4	4	20	3	31
337	282	98	375	60	815
338	56	8	48	10	122
339	61	12	59	8	140
341	140	45	193	35	413
342	77	22	144	25	268
343	225	81	382	55	743
344	52	5	21	9	87
345	70	21	70	16	177
346	120	44	260	41	465
347	103	33	191	17	344
348	85	34	183	28	330
349	121	31	243	39	434
410	96	49	165	42	352
411	69	48	187	48	352
412	78	28	135	24	265
413	74	28	149	34	285
414	95	54	147	37	333
415	130	45	169	45	389
416	37	8	51	2	98
417	91	20	151	16	278
418	99	30	121	20	270
419	73	39	131	42	285
420	37	14	71	12	134
421	24	5	41	4	74
422	14	2	8	3	27
423	14	2	11	2	29
424	26	3	18	2	49
425	13	1	9	1	24
426	17	1	20	2	40
427	25	4	16	2	47
428	48	16	61	13	138
429	44	20	69	9	142
431	12	4	20	4	40
433	46	4	60	4	114
435	28	6	24	5	63
440	52	5	40	9	106
442	122	19	121	14	276
443	48	2	49	6	105
446	17	2	10	0	29
447	14	6	9	1	30
448	21	4	20	2	47
449	66	7	42	4	119
450	14	2	18	1	35
451	22	5	26	6	59
452	24	4	30	5	63
453	27	2	13	0	42
454	47	10	45	9	111
455	4	1	8	1	14

Table 8. (continued).

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
456	49	9	47	6	111
457	34	0	23	1	58
458	33	6	26	4	69
459	43	6	46	4	99
461	59	15	68	12	154
462	94	22	109	10	235
463	32	5	24	2	63
464	32	4	27	6	69
465	45	8	59	7	119
466	62	7	77	10	156
467	86	19	132	18	255
951	0	1	1	0	2
953	0	0	1	0	1
954	0	1	0	0	1
Total	**7,236**	**2,547**	**11,713**	**2,042**	**23,538**

*Includes Camp Ripley

Table 9. Archery Harvest using Bonus Permits by Permit Area, 2005.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
104	1	20	2	23
105	10	132	28	170
107	5	43	3	51
110	6	29	3	38
111	2	25	5	32
114	0	1	0	1
115	5	24	5	34
116	0	1	0	1
122	0	3	0	3
126	1	4	0	5
127	0	1	0	1
154	12	67	12	91
156	16	81	21	118
157	40	185	27	252
159	25	116	21	162
167	0	2	0	2
168	0	3	1	4
170	18	90	13	121
172	19	75	9	103
174	10	29	7	46
175	0	11	0	11
178	12	42	8	62
180	7	41	5	53
181	13	68	8	89
182	43	247	38	328
183	11	52	8	71
184	108	362	70	540
197	1	0	0	1
199	1	0	0	1
201	1	1	0	2
202	1	17	1	19
204	2	30	5	37
206	5	22	5	32
207	2	18	3	23
208	3	14	2	19
209	8	27	4	39
210	9	38	7	54
221	23	95	29	147
222	21	79	16	116
223	34	113	23	170
224	4	13	3	20
225	33	174	34	241
227	46	179	48	273
228	67	304	76	447
235	6	17	6	29
236	60	284	57	401
241	31	87	26	144
242	61	189	30	280
243	25	114	25	164
244	36	151	25	212
245	35	144	28	207
246	35	95	27	157
247	25	65	19	109
248	51	209	26	286
249	14	60	8	82
251	0	3	2	5
252	4	22	3	29
253	10	42	12	64
254	2	27	3	32
255	3	38	2	43
256	6	25	6	37
257	13	34	8	55
258	11	42	7	60
259	5	17	1	23
297	0	8	0	8
298	1	13	3	17
337	80	310	52	442
338	6	30	8	44
339	8	44	4	56
341	41	162	30	233
342	13	108	22	143
343	62	325	47	434
344	1	12	5	18
345	16	60	14	90

Table 9. (Continued)

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
346	32	225	35	292
347	24	149	14	187
348	26	150	26	202
349	19	201	24	244
410	37	103	30	170
411	29	113	26	168
412	15	89	13	117
413	18	88	28	134
414	32	88	25	145
415	29	112	32	173
416	3	28	2	33
417	7	81	8	96
418	13	62	9	84
419	25	85	33	143
420	7	51	5	63
421	4	31	3	38
422	1	2	0	3
423	1	9	1	11
424	1	1	0	2
426	0	0	1	1
428	8	19	6	33
429	17	47	6	70
431	2	8	2	12
433	0	8	1	9
435	1	1	3	5
440	3	8	5	16
442	4	31	5	40
443	0	6	1	7
452	2	14	5	21
456	4	23	1	28
457	0	1	0	1
461	9	45	7	61
462	15	60	7	82
463	0	3	0	3
464	4	13	4	21
465	5	42	7	54
466	5	46	6	57
467	13	103	15	131
TOTAL	**1,701**	**7,761**	**1,452**	**10,914**

Table 10. Summary of Archery Special Hunts, 2005. 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	100	37	144	15	296
Camp Ripley	10/25-10/26	2,250	85	8	73	13	179
Cleary Lake	11/14-11/16	55	3	2	1	0	6
Crow-Hassan Park Reserve	11/14-11/16	130	5	4	3	2	14
Murphy-Hanrahan Park Reserve	11/14-11/16	185	8	15	4	3	30
City of New Ulm	10/11-12/31	50	5	4	13	2	24
City of Mankato	10/23-12/31	30	1	0	14	0	15
City of Red Wing	9/18-12/31	85**	6	3	18	7	34
Camp Ripley - Youth	10/9 - 10/10	150	8	0	12	0	20
Arden Hills - Site A	10/21 - 10/22	30	Unknown				6
Arden Hills - Site B	10/23 - 10/24	30	Unknown				5
Whitewater Youth*	10/21 - 10/24	50	5	1	3	0	9

*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, 2005.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
157	0	0	1	0	1
184	0	1	1	0	2
223	0	0	1	0	1
225	0	0	1	1	2
227	0	1	0	0	1
244	0	1	0	0	1
254	0	0	1	0	1
298	0	0	1	0	1
341	0	1	1	0	2
343	0	5	3	0	8
346	0	0	1	0	1
347	0	0	1	0	1
TOTAL	0	9	12	1	22

Table 12. Muzzleloader Harvest by Permit Area, 2005. Includes regular muzzleloader, youth, and bonus permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	17	2	37	3	59
105	37	16	83	21	157
107	23	9	51	7	90
110	8	7	28	13	56
111	23	12	73	9	117
114	2	1	1	0	4
115	29	8	58	8	103
122	0	0	3	0	3
152	0	2	2	0	4
154	13	6	32	9	60
156	17	6	39	7	69
157	34	27	105	17	183
159	8	7	30	5	50
167	4	4	15	3	26
168	18	7	33	9	67
170	35	26	100	18	179
172	17	11	55	17	100
174	13	6	32	5	56
175	14	2	25	3	44
178	19	7	40	7	73
180	10	3	17	1	31
181	12	8	19	6	45
182	8	0	7	2	17
183	5	6	17	2	30
184	67	59	710	52	888
197	13	2	18	5	38
199	1	0	0	0	1
201	5	0	5	0	10
202	10	2	14	3	29
203	0	0	1	0	1
204	26	9	43	4	82
206	30	15	54	13	112
207	14	1	15	8	38
208	15	2	23	0	40
209	22	6	24	3	55
210	35	16	49	11	111
221	32	22	84	21	159
222	10	17	38	4	69
223	17	16	51	10	94
224	0	0	1	0	1
225	27	23	82	23	155
227	30	23	66	22	141
228	17	6	39	6	68
235	7	2	5	0	14
236	35	15	73	14	137
241	35	28	124	35	222
242	19	19	55	18	111
243	30	28	79	23	160
244	56	69	158	53	336
245	77	66	185	54	382
246	52	41	135	36	264
247	26	16	52	18	112
248	21	6	32	11	70
249	29	29	57	15	130
251	2	1	3	2	8
252	30	10	47	14	101
253	28	18	60	13	119

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
254	22	8	38	11	79
255	22	7	30	5	64
256	38	9	57	8	112
257	17	7	23	9	56
258	54	40	88	33	215
259	17	3	33	10	63
297	11	3	9	1	24
298	15	3	28	5	51
337	13	3	28	11	55
338	15	10	27	5	57
339	11	2	18	5	36
341	32	17	74	10	133
342	36	20	75	18	149
343	43	31	121	22	217
344	17	8	37	3	65
345	20	10	44	6	80
346	25	11	75	14	125
347	36	34	110	10	190
348	24	28	128	19	199
349	45	29	118	26	218
410	70	55	169	50	344
411	60	49	155	31	295
412	71	34	117	26	248
413	49	46	161	49	305
414	36	45	115	47	243
415	37	39	113	30	219
416	40	10	91	14	155
417	85	40	182	30	337
418	44	35	109	18	206
419	38	34	104	25	201
420	50	38	80	17	185
421	17	7	45	11	80
422	30	4	24	4	62
423	14	5	24	5	48
424	41	18	69	5	133
425	22	3	23	3	51
426	20	6	35	5	66
427	35	7	46	5	93
428	39	17	62	4	122
429	17	8	31	6	62
431	33	11	43	12	99
433	76	27	159	22	284
435	31	7	45	8	91
440	43	20	98	15	176
442	72	31	150	23	276
443	22	11	62	10	105
446	31	8	42	3	84
447	31	8	50	7	96
448	42	14	52	7	115
449	60	21	89	10	180
450	14	2	22	5	43
451	60	17	74	17	168
452	33	13	69	3	118
453	43	4	47	13	107
454	68	22	113	20	223
455	10	1	16	2	29
456	43	17	87	10	157

Table 12. (continued)

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
457	31	13	53	5	102
458	34	9	63	17	123
459	63	16	108	11	198
461	32	27	91	20	170
462	34	14	81	18	147
463	17	7	28	1	53
464	16	14	36	1	67
465	26	4	48	9	87
466	62	24	96	22	204
467	51	30	129	27	237
912	1	0	0	0	1
917	0	0	1	0	1

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
919	3	1	3	0	7
922	2	1	3	1	7
923	0	0	0	1	1
931	8	8	18	7	41
932	4	2	10	4	20
933	0	9	12	8	29
934	0	2	5	4	11
935	0	3	11	2	16
936	5	4	6	5	20
937	0	1	2	1	4
TOTAL	**3,613**	**1,956**	**8,222**	**1,630**	**15,421**

Table 13. Muzzleloader Harvest using Bonus Permits by Permit Area, 2005.

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
104	1	1	7	0	8
105	1	6	43	13	62
107	1	3	15	4	22
110	1	5	16	4	25
111	1	2	23	0	25
115	1	3	17	1	21
154	1	3	5	3	11
156	1	1	17	3	21
157	1	13	61	14	88
159	1	2	14	1	17
170	1	11	37	6	54
172	1	6	21	5	32
174	1	1	9	1	11
175	1	0	2	1	3
178	1	3	15	2	20
180	1	2	5	1	8
181	1	1	6	3	10
182	1	0	4	0	4
183	1	1	5	0	6
184	1	35	95	25	155
197	1	1	3	1	5
201	2	0	1	0	1
202	2	1	8	1	10
204	2	3	21	2	26
206	2	8	27	9	44
207	2	0	4	4	8
208	2	0	14	0	14
209	2	3	10	2	15
210	2	9	27	6	42
221	2	8	39	13	60
222	2	7	20	4	31
223	2	7	22	4	33
225	2	11	41	10	62
227	2	17	34	14	65
228	2	3	23	1	27
235	2	0	5	0	5
236	2	11	34	12	57
241	2	15	77	20	112
242	2	8	24	10	42
243	2	17	48	10	75
244	2	42	83	26	151
245	2	39	96	35	170
246	2	17	66	14	97
247	2	5	23	8	36
248	2	2	14	5	21
249	2	11	21	8	40
251	2	0	1	2	3
252	2	5	29	10	44
253	2	10	36	11	57
254	2	5	15	6	26
255	2	3	18	1	22
256	2	4	36	5	45
257	2	4	10	6	20
258	2	21	42	18	81
259	2	2	21	5	28
297	2	1	3	0	4
298	2	1	9	3	13
337	3	2	13	6	21
338	3	4	10	2	16
339	3	0	4	3	7
341	3	11	27	6	44
342	3	9	36	10	55
343	3	13	64	11	88
345	3	3	16	3	22
346	3	6	42	9	57
347	3	19	58	4	81
348	3	19	75	8	102
349	3	21	64	15	100
410	4	26	89	21	136
411	4	22	78	19	119
412	4	16	50	10	76
413	4	23	74	23	120
414	4	24	61	26	111
415	4	19	46	16	81
416	4	4	18	6	28
417	4	17	47	8	72
418	4	12	34	10	56
419	4	16	41	12	69
420	4	18	37	12	67
421	4	1	28	5	34
423	4	2	5	3	10
428	4	5	13	2	20
429	4	2	9	3	14
452	4	8	27	1	36
456	4	5	27	0	32
461	4	11	30	10	51
462	4	3	30	7	40
464	4	5	16	0	21
465	4	0	11	5	16
466	4	9	31	8	48
467	4	18	49	15	82
919		1	2	0	3
922		1	3	1	5
931		4	11	4	19
932		1	9	2	12
933		5	7	5	17
935		3	9	1	13
936		3	5	4	12
937		0	2	0	2
TOTAL		**791**	**2,730**	**689**	**4,210**

Table 14. Summary of Muzzleloader Special Hunts, 2005. 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	11/26 - 11/30	90*	8	8	18	7	41
932 - Crow Wing SP1	12/2 - 12/4	40**	4	2	10	4	20
933 - Lake Shetek SP1	12/3 - 12/6	22***	0	9	12	8	29
934 - Sibley SP	12/3 - 12/4	50**	0	2	5	4	11
935 - Myre-Big Island SP1	11/26 - 11/28	40***	0	3	11	2	16
936 - Nerstrand Woods SP1	11/26 - 11/28	40***	5	4	6	5	20
937 - Interstate SP	11/26 - 12/11	15***	0	1	2	1	4
TOTAL			17	29	64	31	141

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

Table 15. Free Landowner Muzzleloader Harvest by Permit Area, 2005.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
157	0	1	0	1	2
159	0	0	1	0	1
170	0	0	1	0	1
208	0	0	2	0	2
209	0	0	1	0	1
210	0	0	0	2	2
221	0	0	1	0	1
225	0	0	2	0	2
228	0	0	1	0	1
236	0	0	0	1	1
244	0	1	1	0	2
245	0	0	1	0	1
246	0	1	0	1	2
247	0	0	1	0	1
249	0	0	1	1	2
253	0	1	0	0	1
341	0	0	0	3	3
342	0	1	4	0	5
343	0	0	1	1	2
344	0	0	1	0	1
346	0	1	2	0	3
349	0	0	2	0	2
411	0	0	0	1	1
414	0	1	0	0	1
415	0	1	3	0	4
418	0	0	1	0	1
462	0	0	3	1	4
466	0	0	1	0	1
Total	**0**	**8**	**26**	**11**	**45**

Table 16. Firearms All-Season Deer Harvest by Permit Area, 2005.

Zone 1					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	94	9	50	6	159
105	69	13	42	10	134
107	104	15	65	9	193
110	49	10	54	6	119
111	119	10	68	15	212
115	136	18	70	12	236
116	13	0	2	0	15
122	34	2	5	0	41
126	37	3	19	3	62
127	6	0	0	0	6
152	10	1	6	2	19
154	125	26	80	20	251
156	67	17	59	14	157
157	138	41	124	21	324
159	89	12	65	9	175
167	72	9	45	7	133
168	115	19	56	11	201
170	196	34	115	36	381
172	166	40	149	20	375
174	73	24	48	8	153
175	83	12	37	5	137
178	98	20	68	4	190
180	97	9	32	5	143
181	84	13	37	10	144
182	19	2	11	2	34
183	81	18	50	11	160
184	348	94	254	72	768
197	103	16	55	11	185
199	9	1	0	0	10
Zone 1 Total	**2,634**	**488**	**1,666**	**329**	**5,117**

Zone 2					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
201	9	0	4	1	14
202	15	1	12	4	32
203	8	0	4	1	13
204	58	5	41	5	109
206	36	9	37	4	86
207	26	5	20	1	52
208	25	4	28	1	58
209	39	6	39	8	92
210	78	13	46	16	153
221	107	28	76	27	238
222	72	18	48	17	155
223	54	13	37	18	122
224	11	1	5	1	18
225	84	21	67	10	182
227	49	19	47	6	121
228	26	3	18	2	49
235	3	1	1	1	6
236	59	10	41	5	115
241	180	57	137	39	413
242	41	17	32	5	95
243	102	24	90	29	245
244	200	50	158	43	451
245	124	38	127	25	314
246	148	46	114	32	340
247	78	12	34	10	134
248	41	10	26	9	86
249	88	26	70	21	205
251	12	6	9	5	32
252	34	2	23	1	60
253	46	3	29	6	84
254	32	1	17	1	51
255	54	8	46	4	112
256	44	5	24	7	80
257	26	17	30	9	82
258	85	17	58	15	175
259	58	13	41	11	123
287	8	5	7	1	21
297	21	4	11	1	37
298	65	11	28	7	111
Zone 2 Total	**2,246**	**529**	**1,682**	**409**	**4,866**

Zone 3					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
337	44	5	18	2	69
338	30	3	6	3	42
339	30	0	4	0	34
341	75	4	14	3	96
342	63	3	11	3	80
343	78	8	18	2	106
344	42	5	13	4	64
345	39	2	9	2	52
346	48	8	24	7	87
347	83	12	26	3	124
348	65	8	25	3	101
349	88	3	33	5	129
Zone 3 Total	**685**	**61**	**201**	**37**	**984**

Table 16. (Continued).

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
410	294	74	245	70	683
411	289	98	248	58	693
412	215	57	194	40	506
413	207	78	185	54	524
414	220	83	190	55	548
415	192	80	171	59	502
416	95	18	77	15	205
417	259	40	184	42	525
418	191	58	114	39	402
419	112	33	73	31	249
420	90	9	47	9	155
421	52	17	47	4	120
422	50	6	13	5	74
423	37	7	32	6	82
424	65	7	32	5	109
425	35	0	6	2	43
426	46	3	23	1	73
427	57	2	21	2	82
428	95	15	76	8	194
429	48	12	29	13	102
431	50	2	5	0	57
433	106	13	40	8	167
435	107	6	22	2	137
440	106	5	42	6	159
442	172	11	63	9	255
443	68	4	29	6	107
446	38	4	21	0	63
447	43	1	9	3	56
448	50	3	8	3	64
449	117	7	44	5	173
450	34	0	12	4	50
451	66	7	18	2	93
452	53	7	23	5	88
453	88	3	26	1	118
454	111	11	51	6	179
455	9	2	6	0	17
456	85	7	66	6	164
457	57	3	33	9	102
458	63	2	14	0	79
459	94	9	34	9	146
461	104	25	72	13	214
462	123	17	69	13	222
463	63	3	33	6	105
464	52	10	48	9	119
465	54	10	34	4	102
466	129	33	71	17	250
467	107	20	78	15	220
Zone 4 Total	4,798	922	2,978	679	9,377

Special Hunts					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
901	1	0	0	0	1
902	12	4	8	3	27
903	1	0	1	0	2
904	1	0	0	0	1
906	1	0	0	0	1
907	1	1	0	0	2
908	0	0	1	0	1
909	0	1	0	0	1
911	10	0	6	4	20
913	1	0	0	0	1
914	2	0	1	0	3
926	7	0	0	0	7
927	0	0	1	0	1
Special Hunts Total	**37**	**6**	**18**	**7**	**68**

GRAND TOTAL	**10,400**	**2,006**	**6,545**	**1,461**	**20,412**

Table 17. Archery All-Season Deer Harvest by Permit Area, 2005.

Zone 1					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	8	0	3	2	13
105	12	1	11	1	25
107	11	0	13	3	27
110	3	0	8	0	11
111	1	0	2	0	3
115	5	1	12	1	19
116	1	0	2	0	3
122	1	0	3	0	4
126	1	0	1	0	2
152	0	0	1	0	1
154	7	2	10	4	23
156	13	1	10	1	25
157	12	5	25	1	43
159	14	3	16	2	35
167	1	0	8	1	10
168	14	2	13	1	30
170	22	4	31	1	58
172	21	3	26	0	50
174	5	1	12	1	19
175	8	3	5	0	16
178	7	0	17	0	24
180	18	6	12	0	36
181	13	0	13	2	28
182	12	4	17	2	35
183	9	2	5	3	19
184	45	13	55	12	125
197	12	2	6	0	20
199	1	0	0	0	1
Zone 1 Total	**277**	**53**	**337**	**38**	**705**

Zone 2					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
202	3	0	4	0	7
204	3	0	3	0	6
206	7	0	8	2	17
207	2	0	3	0	5
208	0	2	1	0	3
209	2	1	3	0	6
210	10	0	15	5	30
221	17	8	24	6	55
222	21	1	15	1	38
223	25	2	16	6	49
224	6	0	2	1	9
225	25	7	16	5	53
227	30	6	33	7	76
228	33	3	21	3	60
235	1	1	1	0	3
236	31	4	23	8	66
241	20	10	51	9	90
242	20	7	24	5	56
243	14	2	28	5	49
244	24	11	36	10	81
245	17	5	26	7	55
246	17	8	27	2	54
247	11	4	18	3	36
248	70	10	45	4	129
249	13	8	15	3	39
252	9	1	3	1	14
253	9	1	13	1	24
254	2	1	10	0	13
255	2	1	6	0	9
256	4	2	4	2	12
257	4	1	13	0	18
258	12	4	14	0	30
259	4	0	4	2	10
297	1	0	1	0	2
298	3	2	1	0	6
Zone 2 Total	**472**	**113**	**527**	**98**	**1,210**

Zone 3					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
337	45	8	24	1	78
338	14	1	9	2	26
339	8	2	5	0	15
341	18	1	12	3	34
342	9	4	17	0	30
343	33	2	26	5	66
344	9	1	3	1	14
345	9	1	4	0	14
346	19	3	10	2	34
347	33	5	29	2	69
348	18	1	19	1	39
349	16	2	16	7	41
Zone 3 Total	**231**	**31**	**174**	**24**	**460**

Table 17. (Continued).

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
410	37	9	51	9	106
411	29	12	63	17	121
412	29	9	30	4	72
413	26	4	43	3	76
414	40	13	45	10	108
415	53	11	36	9	109
416	14	3	14	0	31
417	44	7	44	3	98
418	44	14	37	6	101
419	27	9	28	6	70
420	8	5	18	6	37
421	8	0	5	1	14
422	3	0	4	0	7
423	6	0	2	1	9
424	11	0	13	1	25
425	7	1	5	0	13
426	7	1	14	0	22
427	14	3	11	2	30
428	18	6	22	4	50
429	13	2	13	1	29
431	7	0	9	1	17
433	21	3	37	3	64
435	18	3	11	1	33
440	27	1	23	3	54
442	52	9	52	7	120
443	25	1	35	1	62
446	9	2	5	0	16
447	7	5	8	1	21
448	8	4	9	0	21
449	30	2	28	1	61
450	6	2	14	1	23
451	9	3	15	3	30
452	7	1	9	0	17
453	11	2	8	0	21

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
454	19	3	29	7	58
455	0	1	5	0	6
456	19	2	12	4	37
457	21	0	14	0	35
458	11	2	10	1	24
459	20	4	28	3	55
461	20	4	14	4	42
462	26	5	34	1	66
463	13	3	17	1	34
464	13	0	6	2	21
465	13	2	8	0	23
466	24	1	23	2	50
467	26	3	18	2	49
Zone 4 Total	**900**	**177**	**979**	**132**	**2,188**

GRAND TOTAL	**1,880**	**374**	**2,017**	**292**	**4,563**

Table 18. Muzzleloader All-Season Deer Harvest by Permit Area, 2005.

Zone 1					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	16	0	26	2	44
105	28	3	26	6	63
107	21	6	34	3	64
110	4	2	9	6	21
111	17	5	43	5	70
114	0	1	0	0	1
115	24	5	32	6	67
122	0	0	3	0	3
152	0	1	1	0	2
154	12	1	25	5	43
156	13	3	18	4	38
157	29	11	32	2	74
159	8	5	10	4	27
167	3	3	9	2	17
168	13	4	24	9	50
170	28	8	50	9	95
172	15	4	31	11	61
174	10	5	14	3	32
175	11	2	22	1	36
178	15	4	21	5	45
180	7	1	10	0	18
181	10	5	9	3	27
182	7	0	3	1	11
183	5	3	8	2	18
184	62	21	69	21	173
197	12	1	13	4	30
199	1	0	0	0	1
Zone 1 Total	**371**	**104**	**542**	**114**	**1,131**

Zone 3					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
337	12	0	11	4	27
338	10	5	14	3	32
339	9	2	12	1	24
341	23	4	34	3	64
342	27	5	28	5	65
343	28	7	40	8	83
344	8	6	25	1	40
345	14	7	23	2	46
346	17	3	31	5	56
347	27	11	44	4	86
348	17	5	35	11	68
349	30	5	44	10	89
Zone 3 Total	**222**	**60**	**341**	**57**	**680**

Zone 2					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
201	4	0	2	0	6
202	10	1	6	2	19
203	0	0	1	0	1
204	19	5	20	2	46
206	22	5	23	4	54
207	11	1	8	3	23
208	12	2	8	0	22
209	15	2	12	1	30
210	24	6	19	3	52
221	28	11	42	6	87
222	9	7	16	0	32
223	15	9	27	5	56
224	0	0	1	0	1
225	23	11	31	12	77
227	23	6	27	7	63
228	9	0	11	3	23
235	1	0	0	0	1
236	31	3	34	2	70
241	34	12	46	15	107
242	14	8	21	5	48
243	27	9	26	11	73
244	45	26	66	26	163
245	55	19	79	16	169
246	46	21	53	16	136
247	18	10	20	10	58
248	17	4	17	4	42
249	24	15	29	7	75
251	1	1	2	0	4
252	19	3	18	4	44
253	21	7	20	2	50
254	16	2	18	5	41
255	16	3	10	2	31
256	32	3	21	3	59
257	14	3	13	3	33
258	45	17	43	13	118
259	11	1	11	3	26
297	11	1	4	0	16
298	12	2	16	2	32
Zone 2 Total	**734**	**236**	**821**	**197**	**1,988**

Table 18. (Continued).

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
410	63	25	74	27	189
411	56	26	76	12	170
412	63	14	61	14	152
413	46	17	76	25	164
414	30	20	50	19	119
415	34	16	63	14	127
416	36	4	61	7	108
417	68	19	119	18	224
418	41	23	65	7	136
419	35	14	56	13	118
420	42	20	40	5	107
421	14	6	17	6	43
422	27	4	22	3	56
423	9	2	18	2	31
424	38	14	56	5	113
425	18	2	22	2	44
426	15	3	27	1	46
427	32	6	43	4	85
428	36	10	36	2	84
429	15	5	17	3	40
431	27	7	35	8	77
433	58	20	106	16	200
435	29	6	41	8	84
440	36	12	75	9	132
442	53	23	119	12	207
443	16	9	46	7	78
446	22	6	35	2	65
447	27	5	36	7	75
448	30	8	35	5	78
449	46	14	70	10	140
450	12	2	15	4	33
451	38	8	45	13	104
452	21	3	30	2	56
453	31	2	31	9	73
454	48	14	81	18	161
455	9	1	12	2	24
456	28	6	34	4	72
457	26	11	43	4	84
458	16	5	41	11	73
459	40	11	73	4	128
461	24	14	51	8	97
462	25	10	41	9	85
463	15	4	23	1	43
464	14	7	15	1	37
465	20	2	26	2	50
466	43	10	41	11	105
467	36	10	58	5	109
Zone 4 Total	**1,508**	**480**	**2,257**	**381**	**4,626**

Special Hunts					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
912	1	0	0	0	1
931	5	2	4	3	14
932	3	1	1	2	7
933	0	2	3	0	5
934	0	0	1	0	1
936	2	1	0	1	4
937	0	1	0	1	2
Special Hunts Total	**11**	**7**	**9**	**7**	**34**

GRAND TOTAL	**2,846**	**887**	**3,970**	**756**	**8,459**

Table 19. Total All-Season Deer Harvest by Permit Area, 2005.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
104	118	9	79	10	216
105	109	17	79	17	222
107	136	21	112	15	284
110	56	12	71	12	151
111	137	15	113	20	285
114	0	1	0	0	1
115	165	24	114	19	322
116	14	0	4	0	18
122	35	2	11	0	48
126	38	3	20	3	64
127	6	0	0	0	6
152	10	2	8	2	22
154	144	29	115	29	317
156	93	21	87	19	220
157	179	57	181	24	441
159	111	20	91	15	237
167	76	12	62	10	160
168	142	25	93	21	281
170	246	46	196	46	534
172	202	47	206	31	486
174	88	30	74	12	204
175	102	17	64	6	189
178	120	24	106	9	259
180	122	16	54	5	197
181	107	18	59	15	199
182	38	6	31	5	80
183	95	23	63	16	197
184	455	128	378	105	1,066
197	127	19	74	15	235
199	11	1	0	0	12
Zone 1 Total	**3,282**	**645**	**2,545**	**481**	**6,953**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	13	0	6	1	20
202	28	2	22	6	58
203	8	0	5	1	14
204	80	10	64	7	161
206	65	14	68	10	157
207	39	6	31	4	80
208	37	8	38	1	83
209	56	9	54	9	128
210	112	19	80	24	235
221	152	47	142	39	380
222	102	26	79	18	225
223	94	24	8/0	29	227
224	17	1	8	2	28
225	132	39	114	27	312
227	102	31	107	20	260
228	68	6	50	8	132
235	5	2	2	1	10
236	121	17	98	15	251
241	234	79	234	63	610
242	75	32	77	15	199
243	143	35	144	45	367
244	269	87	260	79	695
245	196	62	232	48	538
246	211	75	194	50	530
247	107	26	72	23	228
248	128	24	88	17	257
249	125	49	114	31	319
251	13	7	11	5	36
252	62	6	44	6	118
253	76	11	62	9	158
254	50	4	45	6	105
255	72	12	62	6	152
256	80	10	49	12	151
257	44	21	56	12	133
258	142	38	115	28	323
259	73	14	56	16	159
287	8	5	7	1	21
297	33	5	16	1	55
298	80	15	45	9	149
Zone 2 Total	**3,452**	**878**	**3,030**	**704**	**8,064**

Table 19. (Continued)

Zone 3					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
337	101	13	53	7	174
338	54	9	29	8	100
339	47	4	21	1	73
341	116	9	60	9	194
342	99	12	56	8	175
343	139	17	84	15	255
344	59	12	41	6	118
345	62	10	36	4	112
346	84	14	65	14	177
347	143	28	99	9	279
348	100	14	79	15	208
349	134	10	93	22	259
Zone 3 Total	**1,138**	**152**	**716**	**118**	**2,124**

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
410	394	108	370	106	978
411	374	136	387	87	984
412	307	80	285	58	730
413	279	99	304	82	764
414	290	116	285	84	775
415	279	107	270	82	738
416	145	25	152	22	344
417	371	66	347	63	847
418	276	95	216	52	639
419	174	56	157	50	437
420	140	34	105	20	299
421	74	23	69	11	177
422	80	10	39	8	137
423	52	9	52	9	122
424	114	21	101	11	247
425	60	3	33	4	100
426	68	7	64	2	141
427	103	11	75	8	197
428	149	31	134	14	328
429	76	19	59	17	171
431	84	9	49	9	151
433	185	36	183	27	431
435	154	15	74	11	254
440	169	18	140	18	345
442	277	43	234	28	582
443	109	14	110	14	247
446	69	12	61	2	144
447	77	11	53	11	152
448	88	15	52	8	163
449	193	23	142	16	374
450	52	4	41	9	106
451	113	18	78	18	227
452	81	11	62	7	161
453	130	7	65	10	212
454	178	28	161	31	398

Zone 4					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
455	18	4	23	2	47
456	132	15	112	14	273
457	104	14	90	13	221
458	90	9	65	12	176
459	154	24	135	16	329
461	148	43	137	25	353
462	174	32	144	23	373
463	91	10	73	8	182
464	79	17	69	12	177
465	87	14	68	6	175
466	196	44	135	30	405
Zone 4 Total	**7,037**	**1,546**	**6,060**	**1,170**	**15,813**

Special Hunts					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
901	1	0	0	0	1
902	12	4	8	3	27
903	1	0	1	0	2
904	1	0	0	0	1
906	1	0	0	0	1
907	1	1	0	0	2
908	0	0	1	0	1
909	0	1	0	0	1
911	10	0	6	4	20
912	1	0	0	0	1
913	1	0	0	0	1
914	2	0	1	0	3
926	7	0	0	0	7
927	0	0	1	0	1
931	5	2	4	3	14
932	3	1	1	2	7
933	0	2	3	0	5
934	0	0	1	0	1
936	2	1	0	1	4
937	0	1	0	1	2
Special Hunts Total	**48**	**13**	**27**	**14**	**102**

GRAND TOTAL	**14,957**	**3,234**	**12,378**	**2,487**	**33,056**

Table 20. Total Deer Harvest by Permit Area, 2005.
Includes all license types, permits, and special hunts.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
104	1,250	197	872	164	2,483
105	1,364	399	1,425	369	3,557
107	1,861	369	1,441	265	3,936
110	694	240	791	220	1,945
111	1,316	212	960	199	2,687
114	72	13	35	3	123
115	2,254	368	1,474	269	4,365
116	230	4	24	3	261
122	534	23	89	11	657
126	594	47	230	30	901
127	126	6	15	1	148
152	141	21	89	20	271
154	1,783	582	1,769	437	4,571
156	1,793	537	1,678	458	4,466
157	2,745	955	2,538	663	6,901
159	1,467	445	1,433	327	3,672
167	709	113	359	76	1,257
168	1,432	231	726	132	2,521
170	2,987	908	2,716	610	7,221
172	1,853	759	2,065	550	5,227
174	1,367	366	1,074	284	3,091
175	2,072	184	731	116	3,103
178	2,698	522	1,800	343	5,363
180	1,664	175	861	102	2,802
181	1,930	380	1,168	277	3,755
182	511	133	526	86	1,256
183	1,514	390	1,277	268	3,449
184	4,161	1,630	4,355	1,336	11,482
197	999	121	391	83	1,594
199	151	15	17	5	188
201	71	17	66	15	169
202	214	45	216	55	530
203	93	19	46	7	165
204	610	149	602	162	1,523
206	553	171	575	154	1,453
207	358	99	403	98	958
208	275	83	289	90	737
209	620	230	664	187	1,701
210	1,176	395	1,067	330	2,968
221	1,063	440	985	385	2,873
222	901	350	755	253	2,259
223	567	200	516	151	1,434
224	133	39	97	35	304
225	1,425	518	1,316	406	3665
227	973	337	926	282	2518
228	543	143	588	121	1395
235	86	15	62	29	192
236	1,067	281	955	247	2550
241	1,460	685	1,575	568	4288
242	721	301	871	223	2,116
243	1,066	462	1,267	370	3,165
244	2,170	1,009	2,159	824	6,162
245	2,036	842	2,190	669	5,737
246	2,082	965	2,080	708	5,835
247	861	287	736	231	2,115
248*	641	211	667	151	1,670
249	1,261	486	1,115	349	3,211

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
251	128	47	110	40	325
252	332	58	321	56	767
253	487	124	502	132	1,245
254	356	84	372	101	913
255	714	209	710	188	1,821
256	602	181	669	178	1,630
257	521	189	595	199	1,504
258	618	226	705	197	1,746
259	546	141	482	158	1,327
287	106	47	94	33	280
297	308	66	194	41	609
298	810	184	521	149	1,664
337	644	187	660	118	1,609
338	317	72	227	53	669
339	323	57	187	39	606
341	1,015	299	945	207	2,466
342	811	227	779	192	2,009
343	1,076	371	1,072	216	2,735
344	488	83	272	65	908
345	597	160	486	139	1,382
346	1,220	342	1,196	295	3,053
347	906	299	930	178	2,313
348	900	321	1,155	218	2,594
349	1,684	462	1,678	406	4,230
410	1,978	728	1,849	618	5,173
411	1,941	720	1,851	579	5,091
412	1,364	399	1,251	350	3364
413	1,245	494	1,299	443	3481
414	1,408	601	1,442	502	3953
415	1,036	494	1,043	357	2930
416	567	139	554	84	1344
417	1,211	320	1,257	281	3069
418	838	350	822	238	2248
419	527	221	596	201	1545
420	459	140	430	99	1128
421	293	71	267	67	698
422	265	31	105	27	428
423	262	58	185	52	557
424	415	56	258	49	778
425	165	12	93	16	286
426	240	38	178	22	478
427	268	27	171	28	494
428	402	128	398	81	1009
429	268	76	248	66	658
431	235	28	121	20	404
433	531	80	461	63	1135
435	433	55	282	48	818
440	471	63	412	49	995
442	747	120	566	87	1520
443	308	50	263	53	674
446	291	31	182	23	527
447	264	38	193	23	518
448	387	53	245	40	725
449	522	78	375	59	1034
450	190	24	142	21	377
451	415	72	245	46	778
452	327	64	310	53	754

Table 20. (Continued).

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
453	352	30	180	32	594
454	575	82	424	73	1154
455	66	8	52	4	130
456	487	84	401	68	1040
457	325	42	253	38	658
458	325	37	239	42	643
459	443	76	417	59	995
461	403	165	479	110	1157
462	540	126	497	103	1266
463	238	51	165	35	489
464	243	66	237	42	588
465	242	54	249	37	582
466	541	155	541	115	1,352
467	595	167	629	119	1510
901	6	3	2	1	12
902	52	56	100	51	259
903	12	3	18	4	37
904	3	5	4	2	14
905	4	0	0	1	5
906	5	4	7	0	16
907	3	3	4	3	13
908	0	1	9	2	12
909	0	4	11	4	19
910	0	4	11	3	18
911	28	32	36	39	135
912	11	2	6	4	23
913	4	1	1	1	7
914	14	4	27	11	56
917	0	5	9	4	18
918	13	3	18	9	43
919	5	5	11	0	21
920	12	22	49	14	97
921	3	4	13	4	24
922	27	12	68	14	121
923	0	5	11	5	21
926	17	12	47	25	101
927	0	2	12	1	15
931	8	8	18	7	41
932	4	2	10	4	20
933	0	9	12	8	29
934	0	2	5	4	11
935	0	3	11	2	16
936	5	4	6	5	20
937	0	1	2	1	4
951	0	1	1	0	2
953	5	1	3	0	9
954	0	1	0	1	2
956	4	4	6	1	15
TOTAL	**106,700**	**30,790**	**93,984**	**24,262**	**255,736**

*Includes Camp Ripley data

Table 21. Estimated firearm hunter numbers and density by permit area, 2005.

Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ sq mile	Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ sq mile	Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ sq mile
104	5,160	2,084	2.5	225	7,043	635	11.1	415	7,317	730	10.0
105	4,397	958	4.6	227	4,762	491	9.7	416	4,103	575	7.1
107	8,082	1,963	4.1	228	1,173	647	1.8	417	8,067	1,000	8.1
110	2,834	301	9.4	235	540	37	14.7	418	5,761	788	7.3
111	4,986	1,710	2.9	236	3,697	403	9.2	419	3,681	427	8.6
114	172	412	0.4	241	5,779	433	13.4	420	2,141	652	3.3
115	9,386	2,234	4.2	242	2,874	307	9.4	421	1,525	759	2.0
116	728	1,419	0.5	243	5,421	316	17.2	422	1,279	647	2.0
122	1,741	642	2.7	244	9,065	631	14.4	423	1,550	544	2.9
126	1,926	978	2.0	245	10,025	659	15.2	424	2,646	777	3.4
127	517	587	0.9	246	10,787	796	13.6	425	1,119	780	1.4
152	986	62	16.0	247	4,002	263	15.2	426	1,740	640	2.7
154	9,743	814	12.0	248	2,304	229	10.1	427	1,735	853	2.0
156	9,127	834	10.9	249	5,941	729	8.1	428	2,720	580	4.7
157	13,712	904	15.2	251	728	68	10.7	429	1,510	314	4.8
159	7,914	575	13.8	252	1,157	1,044	1.1	431	1,249	381	3.3
167	3,888	455	8.5	253	1,802	1,023	1.8	433	2,993	422	7.1
168	7,618	791	9.6	254	1,176	396	3.0	435	2,901	579	5.0
170	14,292	1,416	10.1	255	2,684	631	4.3	440	2,958	666	4.4
172	10,536	523	20.2	256	2,630	655	4.0	442	4,467	832	5.4
174	7,087	870	8.1	257	2,205	426	5.2	443	1,862	389	4.8
175	8,091	1,306	6.2	258	2,568	619	4.1	446	1,379	346	4.0
178	9,801	1,305	7.5	259	1,919	501	3.8	447	1,635	676	2.4
180	6,018	999	6.0	287	709	51	14.0	448	1,597	459	3.5
181	6,705	746	9.0	297	1,456	450	3.2	449	2,481	630	3.9
182	1,552	280	5.5	298	3,621	677	5.3	450	1,024	820	1.2
183	7,607	674	11.3	337	1,595	1,111	1.4	451	1,611	689	2.3
184	15,724	1,318	11.9	338	1,766	469	3.8	452	1,231	637	1.9
197	4,648	1,355	3.4	339	1,683	405	4.2	453	1,311	738	1.8
199	432	152	2.8	341	5,164	626	8.3	454	2,926	855	3.4
201	322	169	1.9	342	4,001	373	10.7	455	354	98	3.6
202	1,017	167	6.1	343	4,637	664	7.0	456	2,212	731	3.0
203	384	131	2.9	344	2,839	190	15.0	457	2,236	675	3.3
204	2,765	719	3.8	345	3,138	335	9.4	458	1,719	736	2.3
206	2,260	471	4.8	346	4,548	328	13.9	459	2,620	987	2.7
207	1,699	303	5.6	347	3,672	434	8.5	461	3,256	517	6.3
208	1,371	443	3.1	348	4,169	332	12.5	462	3,171	507	6.3
209	2,664	641	4.2	349	6,314	499	12.7	463	1,604	464	3.5
210	4,450	636	7.0	410	9,662	1,110	8.7	464	1,584	380	4.2
221	5,200	647	8.0	411	9,342	694	13.5	465	1,328	391	3.4
222	4,842	413	11.7	412	7,756	1,123	6.9	466	3,174	946	3.4
223	3,043	385	7.9	413	7,379	671	11.0	467	2,613	774	3.4
224	844	49	17.2	414	8,042	566	14.2				

Table 22. Antlerless Lottery Distribution Report, 2005.

Permit Area Numbers	Preference Level	Applications				Permits Available	% Under-Subscribed
		Total	Rejected	Unsuccessful	Winners		
116	1	113	5	105	8	**50**	**0.0 %**
	2	41	1	0	41		
	3	1	0	0	1		
		155	**6**	**105**	**50**		
122	1	468	14	365	103	**250**	**0.0 %**
	2	141	2	0	141		
	3	4	0	0	4		
	4	1	2	0	1		
	9 (military)	1	0	0	1		
		615	**18**	**365**	**250**		
127	1	79	4	47	32	**50**	**0.0 %**
	2	17	1	0	17		
	3	1	0	0	1		
		97	**5**	**47**	**50**		
152	1	248	10	0	248	**300**	**4.3 %**
	2	38	2	0	38		
	3	0	1	0	0		
	4	1	1	0	1		
		287	**14**	**0**	**287**		
167	1	1,628	29	486	1,142	**1,200**	**0.0%**
	2	51	18	0	51		
	3	7	8	0	7		
	4	0	2	0	0		
	5	0	1	0	0		
	6	0	1	0	0		
		1,686	**59**	**486**	**1,200**		
168	1	2,640	95	0	2,640	**3,000**	**8.3 %**
	2	97	11	0	97		
	3	11	10	0	11		
	4	2	1	0	2		
	5	0	1	0	0		
		2,750	**118**	**0**	**2,750**		
175	1	2,594	94	0	2,594	**3,500**	**22.3 %**
	2	96	14	0	96		
	3	24	0	0	24		
	4	3	0	0	3		
	9 (military)	1	0	0	1		
		2,718	**108**	**0**	**2,718**		
197	1	1,550	37	0	1,550	**1,800**	**9.4 %**
	2	75	16	0	75		
	3	5	6	0	5		
	4	0	2	0	0		
	5	1	0	0	0		
		1,631	**61**	**0**	**1,630**		
199	1	117	3	0	117	**150**	**16.7%**
	2	7	2	0	7		
	3	1	0	0	1		
		125	**5**	**0**	**125**		
338A	1	154	5	22	132	**150**	**0.0%**
	2	17	3	0	17		
	3	0	1	0	0		
	4	1	0	0	1		
		172	**9**	**22**	**150**		
339A	1	139	8	1	138	**150**	**0.0%**
	2	12	1	0	12		
	3	0	1	0	0		
		151	**10**	**1**	**150**		

Table 22. (Continued).

Permit Area Numbers	Preference Level	Applications					
		Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
341A	1	407	17	0	407	**600**	**31.8%**
	2	2	6	0	2		
	3	0	4	0	0		
	4	0	1	0	0		
		409	**28**	**0**	**409**		
342A	1	279	6	0	279	**500**	**43.6%**
	2	3	4	0	3		
	3	4	6	0	0		
		282	**16**	**0**	**282**		
343A	1	313	5	0	313	**600**	**47.8%**
	2	0	6	0	0		
		313	**11**	**0**	**313**		
344A	1	352	14	0	352	**400**	**9.3%**
	2	11	11	0	11		
	3	0	2	0	0		
		363	**27**	**0**	**363**		
344B	1	443	35	0	443	**800**	**43.3%**
	2	9	3	0	9		
	3	2	0	0	2		
		454	**38**	**0**	**454**		
345A	1	217	6	0	217	**400**	**45.8%**
	2	0	2	0	0		
	3	0	3	0	0		
		217	**11**	**0**	**217**		
422A	1	209	10	0	209	**400**	**47.0%**
	2	3	1	0	3		
		212	**11**	**0**	**212**		
422B	1	72	10	0	72	**200**	**63.0%**
	2	2	1	0	2		
		74	**11**	**0**	**74**		
424A	1	300	12	158	142	**300**	**0.0%**
	2	158	6	0	158		
	3	0	3	0	0		
	4	0	1	0	0		
	5	0	1	0	0		
		458	**23**	**158**	**300**		
424B	1	284	9	8	276	**300**	**0.0%**
	2	24	3	0	24		
	3	0	3	0	0		
	4	0	2	0	0		
	5	0	1	0	0		
		308	**18**	**8**	**300**		
425A	1	113	6	16	97	**150**	**0.0%**
	2	52	2	0	52		
	3	1	2	0	1		
	5	0	1	0	0		
		166	**11**	**16**	**150**		
425B	1	114	1	0	114	**150**	**6.7 %**
	2	26	1	0	26		
		140	**2**	**0**	**140**		
426A	1	303	16	0	303	**400**	**21.5 %**
	2	9	3	0	9		
	3	2	1	0	2		
	4	0	2	0	0		
		314	**22**	**0**	**314**		
426B	1	175	8	0	175	**300**	**40.3%**
	2	4	2	0	4		
		179	**10**	**0**	**179**		

Table 22. (Continued).

Permit Area Numbers	Preference Level	Applications Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
427A	1	131	9	131	0	**100**	**0.0 %**
	2	137	9	134	3		
	3	96	2	0	96		
	4	1	3	0	1		
	5	0	1	0	0		
		365	**24**	**265**	100		
427B	1	120	11	120	0	**100**	**0.0 %**
	2	82	2	0	82		
	3	18	1	0	18		
		220	**14**	**120**	**100**		
431A	1	131	8	131	0	**50**	**0.0 %**
	2	75	3	25	50		
	3	0	2	0	0		
		206	**13**	**156**	**50**		
431B	1	100	3	96	4	**50**	**0.0 %**
	2	46	0	0	46		
		146	**3**	**96**	**50**		
433A	1	396	16	181	215	**400**	**0.0 %**
	2	185	17	0	185		
	3	0	7	0	0		
	4	0	4	0	0		
		581	**44**	**181**	**400**		
433B	1	345	8	0	345	**400**	**3.3 %**
	2	41	3	0	41		
	3	0	3	0	0		
	4	1	1	0	1		
	5	0	1	0	0		
		387	**16**	**0**	**387**		
435A	1	575	25	127	448	**500**	**0.0 %**
	2	51	8	0	51		
	3	1	11	0	1		
	4	0	1	0	0		
	5	0	1	0	0		
		627	**46**	**127**	**500**		
435B	1	303	5	10	293	**300**	**0.0 %**
	2	6	9	0	6		
	3	1	1	0	1		
		310	**15**	**10**	**300**		
440A	1	473	26	284	189	**450**	**0.0 %**
	2	258	17	0	258		
	3	2	4	0	2		
	4	0	4	0	0		
	5	1	0	0	1		
		734	**51**	**284**	**450**		
440B	1	243	6	0	243	**300**	**10.0 %**
	2	25	3	0	25		
	3	1	4	0	1		
	4	1	0	0	1		
	5	0	1	0	0		
		270	**14**	**0**	**270**		
442A	1	477	25	364	113	**550**	**0.0 %**
	2	400	14	0	400		
	3	37	7	0	37		
	4	0	4	0	0		
	5	0	1	0	0		
		914	**51**	**364**	**550**		
442B	1	385	16	0	385	**550**	**6.0 %**
	2	127	8	0	127		
	3	5	0	0	5		
	4	0	1	0	0		
		517	**25**	**0**	**517**		
443A	1	228	9	98	130	**275**	**0.0 %**
	2	145	2	0	145		
	3	0	2	0	0		
		373	**13**	**98**	**275**		

Table 22. (Continued).

Permit Area Numbers	Preference Level	Applications Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
443B	1	210	5	0	210	**275**	**13.5 %**
	2	28	8	0	28		
	3	0	1	0	0		
	4	0	1	0	0		
	5	0	1	0	0		
		238	**16**	**0**	**238**		
446A	1	189	12	77	112	**150**	**-0.7 %**
	2	39	8	0	39		
	3	0	3	0	0		
	4	0	1	0	0		
		228	**24**	**77**	**151**		
446B	1	153	4	22	131	**150**	**0.0 %**
	2	19	5	0	19		
	4	0	2	0	0		
		172	**11**	**22**	**150**		
447A	1	216	11	98	118	**200**	**0.0 %**
	2	80	7	0	80		
	3	2	1	0	2		
	5	0	1	0	0		
		298	**20**	**98**	**200**		
447B	1	127	2	0	127	**200**	**29.5 %**
	2	13	2	0	13		
	3	1	0	0	1		
	4	0	1	0	0		
		141	**5**	**0**	**141**		
448A	1	392	9	0	392	**450**	**9.6 %**
	2	15	8	0	15		
	3	0	3	0	0		
		407	**20**	**0**	**407**		
448B	1	128	1	0	128	**250**	**48.4 %**
	3	1	1	0	1		
	4	0	1	0	0		
		129	**3**	**0**	**129**		
449A	1	466	23	0	466	**525**	**8.4 %**
	2	13	9	0	13		
	3	2	7	0	2		
	4	0	2	0	0		
	5	0	1	0	0		
		481	**42**	**0**	**481**		
449B	1	215	10	0	215	**275**	**20.4 %**
	2	4	3	0	4		
	3	0	3	0	0		
	5	0	2	0	0		
		219	**18**	**0**	**219**		
450A	1	224	13	0	224	**350**	**33.1 %**
	2	10	4	0	10		
	3	0	4	0	0		
		234	**21**	**0**	**234**		
450B	1	130	5	0	130	**250**	**47.6 %**
	2	1	0	0	1		
	3	0	2	0	0		
		131	**7**	**0**	**131**		
451A	1	196	9	0	196	**300**	**30.0 %**
	2	13	5	0	13		
	3	1	2	0	1		
	4	0	3	0	0		
		210	**19**	**0**	**210**		
451B	1	171	8	0	171	**300**	**39.3 %**
	2	9	2	0	9		
	3	2	3	0	2		
	4	0	1	0	0		
	5	0	1	0	0		
		182	**15**	**0**	**182**		

Table 22. (Continued).

Permit Area Numbers	Preference Level	Applications Total	Rejected	Unsuccessful	Winners	Permits Available	% Under-Subscribed
453A	1	215	10	0	215	**300**	**25.7 %**
	2	8	8	0	8		
	3	0	3	0	0		
	4	0	1	0	0		
		223	**22**	**0**	**223**		
453B	1	112	6	0	112	**300**	**61.0 %**
	2	5	2	0	5		
		117	**8**	**0**	**117**		
454A	1	467	13	0	467	**800**	**38.8 %**
	2	20	9	0	20		
	3	2	2	0	2		
	4	0	1	0	0		
	9 (military)	1	0	0	1		
		490	**25**	**0**	**490**		
454B	1	311	8	0	311	**400**	**17.8 %**
	2	14	2	0	14		
	3	4	0	0	4		
	4	0	1	0	0		
		329	11	0	329		
455A	1	49	4	0	49	**65**	**18.5 %**
	2	4	2	0	4		
		53	**6**	**0**	**53**		
455B	1	46	1	0	46	**65**	**27.7 %**
	2	1	0	0	1		
		47	**1**	**0**	**47**		
457A	1	321	20	0	321	**450**	**12.9 %**
	2	70	9	0	70		
	3	1	10	0	1		
		392	**39**	**0**	**392**		
457B	1	161	8	0	161	**250**	**9.6 %**
	2	65	3	0	65		
	3	0	2	0	0		
		226	**13**	**0**	**226**		
458A	1	249	4	0	249	**400**	**34.3 %**
	2	14	6	0	14		
	3	0	3	0	0		
	4	0	2	0	0		
		263	**15**	**0**	**263**		
458B	1	223	4	35	188	**200**	**0.0 %**
	2	12	2	0	12		
	3	0	3	0	0		
	4	0	2	0	0		
		235	**11**	**35**	**200**		
459A	1	452	22	0	452	**650**	**29.1 %**
	2	9	7	0	9		
	3	0	2	0	0		
	4	0	2	0	0		
		461	**33**	**0**	**461**		
459B	1	350	15	0	350	**450**	**21.1 %**
	2	5	5	0	5		
		0	2	0	0		
		355	**22**	**0**	**355**		
463A	1	310	11	0	310	**350**	**4.6 %**
	2	24	7	0	24		
	3	0	1	0	0		
	4	0	1	0	0		
		334	**20**	**0**	**334**		
463B	1	169	5	0	169	**350**	**50.6 %**
	2	4	0	0	4		
		173	**5**	**0**	**173**		
TOTAL		**26,694**	**1,433**	**3,141,**	**23,552**	**28,830**	

Table 23. 2005 Special Permit Areas for Firearms Hunters.

Permit Area Number	Preference Level	Applications Total	Rejected	Unsuccessful	Winners	Permits Available	Bonus Permits
901 - Rice Lake Nat. Wildlife Refuge	1 2	50 3 **53**	0 0 **0**	0 0 **0**	50 3 **53**	**40**	**No**
902 - St. Croix State Park	1 2 3	623 33 1 **657**	0 0 0 **0**	105 0 0 **105**	518 33 1 **552**	**550**	**Yes**
903 - Savanna Portage State Park	1 2	64 3 **67**	0 0 **0**	10 0 **10**	54 3 **57**	**55**	**Yes**
904 - Gooseberry Falls State Park	1	26 **26**	0 **0**	1 **1**	25 **25**	**25**	**Yes**
905 - Split Rock Lighthouse State Park	1 2	20 3 **23**	0 0 **0**	0 0 **0**	20 3 **23**	**25**	**Yes**
906 - Tettegouche State Park	1 2	59 4 **63**	0 0 **0**	0 0 **0**	59 4 **63**	**125**	**Yes**
907 - Scenic State Park	1	13 **13**	0 **0**	0 **0**	13 **13**	**30**	**Yes**
908 - Hayes Lake State Park	1 2	15 1 **16**	0 0 **0**	0 0 **0**	15 1 **16**	**60**	**Yes**
909 - Lake Bemidji State Park	1	22 **22**	0 **0**	0 **0**	22 **22**	**35**	**Yes**
910 - Zippel Bay State Park	1	50 **50**	0 **0**	0 **0**	50 **50**	**55**	**Yes**
911 - Wild River State Park	1 2	191 68 **259**	0 0 **0**	109 0 **109**	82 68 **150**	**150**	**Yes**
912 - Old Mill State Park	1	2 **2**	0 **0**	0 **0**	2 **2**	**7**	**Yes**
913 -William O'Brien State Park	1 2	59 28 **87**	0 0 **0**	20 0 **20**	39 28 **67**	**65**	**Yes**
914 - Lake Elmo Park Reserve	1 2	86 13 **99**	0 0 **0**	49 0 **49**	37 13 **50**	**50**	**Yes**
915 - Rydell National Wildlife Refuge	1	16 **16**	0 **0**	11 **11**	5 **5**	**5**	**Yes**
916 - Prairie Smoke Dunes SNA	1 2	14 1 **15**	0 0 **0**	0 0 **0**	14 1 **15**	**50**	**Yes**
917 - Zumbro Falls SNA - 3A	1 4	2 1 **3**	0 0 **0**	0 0 **0**	2 1 **3**	**12**	**Yes**

Table 23. (Continued).

Permit Area Number	Preference Level	Applications Total	Rejected	Unsuccessful	Winners	Permits Available	Bonus Permits
918 - Carver Park Reserve	1	125	0	33	92	**105**	**Yes**
	2	13	0	0	13		
		138	**0**	**33**	**105**		
919 - Baker Park Reserve	1	60	0	0	60	**75**	**Yes**
		60	**0**	**0**	**60**		
920 - Forestville/Mystery Cave State Park	1	113	0	5	108	**110**	**Yes**
	2	3	0	0	3		
		116	**0**	**5**	**111**		
921 - Frontenac State Park	1	63	0	16	47	**50**	**Yes**
	2	6	0	0	6		
		69	**0**	**16**	**53**		
922 - Great River Bluffs State Park	1	90	0	0	90	**100**	**Yes**
	2	7	0	0	7		
	3	1	0	0	1		
		98	**0**	**0**	**98**		
923 - Whitewater Game Refuge	1	58	0	0	58	**75**	**No**
		58	**0**	**0**	**58**		
924 - Kellogg-Weaver Dunes SNA	1	4	0	0	4	**15**	**Yes**
		4	**0**	**0**	**4**		
925 - Zumbro Falls SNA - 3B	1	9	0	3	6	**12**	**Yes**
	2	6	0	0	6		
		15	**0**	**3**	**12**		
926 - Maplewood State Park	1	180	0	180	0	**100**	**Yes**
	2	99	0	0	99		
	3	1	0	0	1		
		280	**0**	**180**	**100**		
927 - Glacial Lakes State Park	1	36	0	9	27	**30**	**Yes**
	2	3	0	0	3		
		39	**0**	**9**	**30**		
TOTAL		**2,348**	**0**	**551**	**1,797**	**1,981**	

Table 24. 2005 Special Permit Areas for Muzzleloader Hunters.

Permit Area Number	Preference Level	Applications Total	Applications Rejected	Unsuccessful	Winners	Permits Available	Bonus Permits
931 - Jay Cooke SP	1	151	0	102	49	**90**	**Yes (4)**
	2	35	0	0	35		
	3	6	0	0	6		
		192	**0**	**102**	**90**		
932 - Crow Wing SP	1	122	0	122	0	**40**	**Yes (4)**
	2	40	0	15	25		
	3	17	0	0	17		
	4	1	0	0	1		
		180	**0**	**137**	**43**		
933 - Lake Shetek SP	1	40	0	28	12	**22**	**Yes (1)**
	2	12	0	0	12		
		52	**0**	**28**	**24**		
934 - Sibley SP	1	57	0	27	30	**40**	**No**
	2	11	0	0	11		
		68	**0**	**27**	**41**		
935 - Myre Big Island SP	1	48	0	26	22	**40**	**Yes (1)**
	2	16	0	0	16		
	3	2	0	0	2		
		66	**0**	**26**	**40**		
936 - Nerstrad Woods SP	1	153	0	153	0	**40**	**Yes (1)**
	2	52	0	19	33		
	3	7	0	0	7		
		212	**0**	**172**	**40**		
937 - Interstate SP	1	16	0	7	9	**15**	**Yes (4)**
	2	6	0	0	6		
		22	**0**	**7**	**15**		
TOTAL		**792**	**0**	**499**	**293**	**287**	

2005 Minnesota Bear Harvest Report

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

INTRODUCTION

Out of concern that the Minnesota bear population was being overharvested, a quota on hunting licenses was instituted within the primary range in 1982. 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, and beginning in 2005 hunters could purchase both a quota and no-quota license (although only 3 people shot bears in both areas). 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 are a simple tally of these registrations, partially corrected for non-compliance (and in 2005 corrected for some lost registration data). Hunters also were required to submit a tooth from harvested bears (compliance ≈ 70%) from which an age estimate was obtained. In some years hunters 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 and again in 2005 (Table 2) in accordance with the diminishing level of interest and hunter complaints of overcrowding in some BMUs, but 6 BMUs remained undersubscribed (Table 3). 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%. Harvests during the past 3 years have been similar (3340–3600), and hunting success has been steady at 26% (Table 1). Harvest sex ratios, uncorrected for misreporting (Table 1, footnote e) averages 57% male, but varies by BMU (Table 4). In 2005, harvests (Table 4) and hunting success (Table 5) were about average for most BMUs, except the western no-quota area (designated BMU 11, Figure 1), which had a record harvest. Generally about 70% of the harvest occurs during the first week of the season (Table 6).

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 in hunting bears seems to have waned as permit availability peaked, corresponding with complaints by hunters of overcrowding and thus less hunting enjoyment. Another contributing factor may have been the availability of electronic licenses, enabling hunters to delay purchase until they assessed bear visitation to their baits and hence probable hunting success.

Despite concern over this trend, harvests have remained high and apparently sufficient to stabilize the bear population at an acceptable level (nuisance complaints have remained low). 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, population composition 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, 1987–2005.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Permit applications	19687	25879	24096	24861	25890	26428	27365	30127	29922	30405	27353	30245	29384	29275	26824	21886	16431	16466	16153
Permits available	4810	5310	5520	6370	7140	7920	8630	9400	11950	12030	11370	18210	20840	20710	20710	20610	20110	16450	15950
Licenses purchased (total) [a]	6054	5643	5901	7094	7757	8485	9224	9826	12448	12414	11440	16737	18355	19304	16510	14639	14409	13669	13199
Quota area [a]	4213	4297	4628	5568	6257	6845	7528	8125	10304	10592	9655	14941	16563	17021	13632	12350	9833	10063	9340
Quota surplus/military [a]															235	209	2554	1356	1591
No-quota area [a]	1841	1346	1273	1526	1500	1640	1696	1701	2144	1822	1785	1796	1792	2283	2643	2080	2022	2238	2268
% Licenses bought [b]																			
Of permits available[b]	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	68.5
Of permits issued [b]												84.4	87.2	83.9	69.8	66.3	65.7	68.3	67.1
Estimated no. hunters [c]	5600	5100	5500	6600	7200	7900	8600	9100	11600	11500	10300	14500	15900	16800	15500	13700	13500	12800	12400
Harvest	1577	1509	1930	2381	2143	3175	3003	2329	4956	1874	3212	4110	3620	3898	4936	1915	3598	3391	3340[d]
Harvest sex ratio (%M)[e]	60	58	57	52	59	50	56	62	47	62	55	55	53	58	56	61	58	57	59
Success rate (%) [f]																			
Total harvest/hunters	28	30	35	36	30	40	35	26	43	16	31	28	23	23	29	14	26	26	26
Quota harvest/licenses	33	28	36	35	30	41	34	26	42	15	29	25	20	20	28	14	25	26	25

[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] Harvest estimated from 2993 tallied registration + 347 lost registration data (includes 137 estimated from the ratio of envelopes received without matching registration data)..

[e] 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.

[f] 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. This was complicated even more in 2005 because the total harvest was estimated (footnote d), and for the first time, hunters could take 1 bear in the quota area plus 2 bears in the no-quota area. From the registration tally and tooth envelopes received (n = 3203), 51 hunters took 2 bears (2 hunters took 1 quota and 1 NQ bear) and 1 hunter took 3 bears (1 quota, 2 NQ).

Table 2. Number of bear hunting permits available per year, 2001–2005 (columns aligned with permit applications in Table 3 below).

	2005	2004	2003	2002	2001
12	550	700	700	700	700
13	900	900	1100	1100	1100
22	150	150	250	250	250
24	1200	1200	1500	1500	1500
25	1900	1900	2400	2400	2400
26	1500	1500	1500	1500	1500
31	2100	2100	2660	2660	2660
41	450	500	500	500	600
44	1700	2000	2500	3000	3000
45	1500	1500	2000	2000	2000
51	4000	4000	5000	5000	5000
Total	15950	16450	20110	20610	20710

Table 3. Number of bear hunting license applicants, and number and percent of available surplus licenses bought, 2001–2005[a].

BMU	2005			2004			2003			2002			2001		
	Apps	Surplus bought		Apps	Surplus bought		Apps	Surplus bought		Apps	Surplus bought		Apps	Surplus bought	
12	864			808			837			1061			1187		
13	714	186	100%	670	129	56%	668	167	39%	831	41	18%	924	66	38%
22	65	46	54%	73	47	61%	88	26	16%	124	5	4%	121	10	8%
24	749	270	60%	766	259	60%	756	193	26%	979	40	8%	1216	77	27%
25	1923			1793	111	100%	1716	317	46%	1985	41	11%	2149	82	32%
26	1997			2110			2280			2873			3530		
31	2097	4	100%	2006	92	100%	1996	412	62%	2503	26	23%	2985		
41	653			601			688			810			863		
44	2884			2934			2855			4043			5054		
45	927	346	60%	1092	332	81%	1069	461	50%	1535	56	14%	2349		
51	3276	726	100%	3613	386	100%	3467	978	64%	5141			6443		
None	0			0			2			1			3		
Total	16149	1578	78%	16466	1356	78%	16431	2554	50%	21886	209	12%	26824	235	28%

[a] Surplus licenses available beginning in 2001, but restricted to permit applicants in 2001 & 2002.

Undersubscribed

Table 4. Minnesota bear harvest tally[a] for 2005 by Bear Management Unit (BMU) and sex compared to harvests during 2000-2004 and record high harvests.

BMU	2005 M	(%M)	F	U	Total	% data lost [b]	**2004**	**2003**	**2002**	**2001**	**2000**	**5 year mean**	**Record high harvest** (yr)
Quota													
12	96	(58)	69	0	165	6%	165	174	104	263	186	178	263 (01)
13	126	(61)	79	0	205	6%	197	185	116	241	211	190	258 (95)
22	5	(63)	3	0	8	0%	10	3	7	6	4	6	41 (89)
24	86	(60)	58	0	144	11%	212	163	101	273	168	183	288 (95)
25	233	(58)	168	3	404	3%	546	510	328	584	387	471	584 (01)
26	157	(55)	127	1	285	19%	320	303	171	397	284	295	513 (95)
31	282	(63)	163	0	445	2%	484	436	301	697	413	466	697 (01)
41	52	(50)	52	0	104	3%	83	100	51	201	171	121	201 (01)
44	141	(52)	130	2	273	12%	283	444	183	553	556	404	643 (95)
45	60	(57)	46	1	107	13%	118	143	36	178	150	125	178 (01)
51	301	(60)	203	1	505	3%	544	667	300	895	795	640	895 (01)
Total	1539	(58)	1098	8	2645 (2759)[c]	7%	2962	3128	1698	4288	3325	3080	4288 (01)
No Quota [d]													
11	225	(67)	110	0	335	6%	177	200	112	321	244	211	351[c] (05)*
52	133	(60)	89	1	223	5%	252	270	105	327	329	257	382 (93)
Total	358	(64)	199	1	558 (581)[c]	6%	429	470	217	648	573	467	678 (95)
State	1897	(59)	1297	9	**3203 (3340)**[c]	7%	3391	3598	1915	4936	3898	3548	4956 (95)

[a] Harvest data were obtained from registration slips (or electronic registration, especially in 2005) 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 data were lost.

Year	Quota area	No-quota area
2000	39	16
2001	56	7
2002	46	7
2003	84	13
2004	96	39
2005	179	31

* Record high harvest in BMU 11 in 2005.

[b] Some registration data were lost from bears registered at 83 different registration stations (tooth envelopes received with no corresponding registration data). The minimum percent lost = (known number of unmatched envelopes)/(total registration tally + total unmatched envelopes). The actual percent loss is higher because only 68% of hunters turned in envelopes.

[c] The estimated registered harvest, including those in which registration data were lost and no tooth envelope was received (Table 1, footnote d). Record harvest for BMU 11.

[d] 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*=15 in 2005). 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.

Table 5. Bear hunting success (%) by BMU, measured as the registered harvest (excluding second bear) divided by the number of licenses sold[a], 2000–2005.

BMU	Mean success 2000-2004	2005[b]		2004		2003		2002		2001		2000
		% Success	% Taking 2 bears[c]	% Success	% Taking 2 bears[c]	% Success	% Taking 2 bears[c]	% Success	% Taking 2 bears[c]	% Success	% Taking 2 bears[c]	
Quota	**23**	**25**	**—**	**26**	**—**	**25**	**—**	**14**	**—**	28	(11)	20
12	33	41	—	33	—	35	—	22	—	44	(17)	32
13	28	32	—	33	—	31	—	19	—	31	(9)	26
22	7	10	—	11	—	4	—	8	—	7	(0)	3
24	22	20	—	27	—	25	—	15	—	28	(8)	15
25	30	30	—	38	—	34	—	23	—	34	(11)	19
26	26	34	—	31	—	29	—	17	—	32	(10)	23
31	26	31	—	33	—	25	—	17	—	34	(15)	19
41	28	31	—	23	—	29	—	14	—	40	(16)	34
44	20	24	—	20	—	26	—	9	—	23	(10)	22
45	10	13	—	12	—	13	—	4	—	13	(7)	9
51	19	18	—	19	—	21	—	9	—	24	(10)	19
No Quota[d]	**19**	**23**	**(9)**	**18**	**(7)**	**21**	**(10)**	**10**	**(7)**	23	(9)	25
Statewide	**22**	**25**	**—**	**25**	**—**	**25**	**—**	**13**	**—**	27	(11)	20

[a] Harvest/licenses instead of harvest/hunters because BMU-year-specific estimates for the rate of hunting by licensed hunters are unreliable. Statewide estimates of harvest/hunters are presented in Table 1.

[b] For 2005, estimated registered harvest was used instead of known registered harvest due to a large loss of registration data.

[c] 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 2002–2005. Three people took bears in both quota and NQ areas in 2005.

[d] Although BMU 11 had a record harvest, there is no way to split BMUs 11 and 52 to examine hunting success because the number of hunters in each area is unknown (a single NQ license covers both BMUs.

Table 6. Cumulative bear harvest (% of total harvest) by date, 1990–2005.

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
2005	Thu		72	81	94

[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.

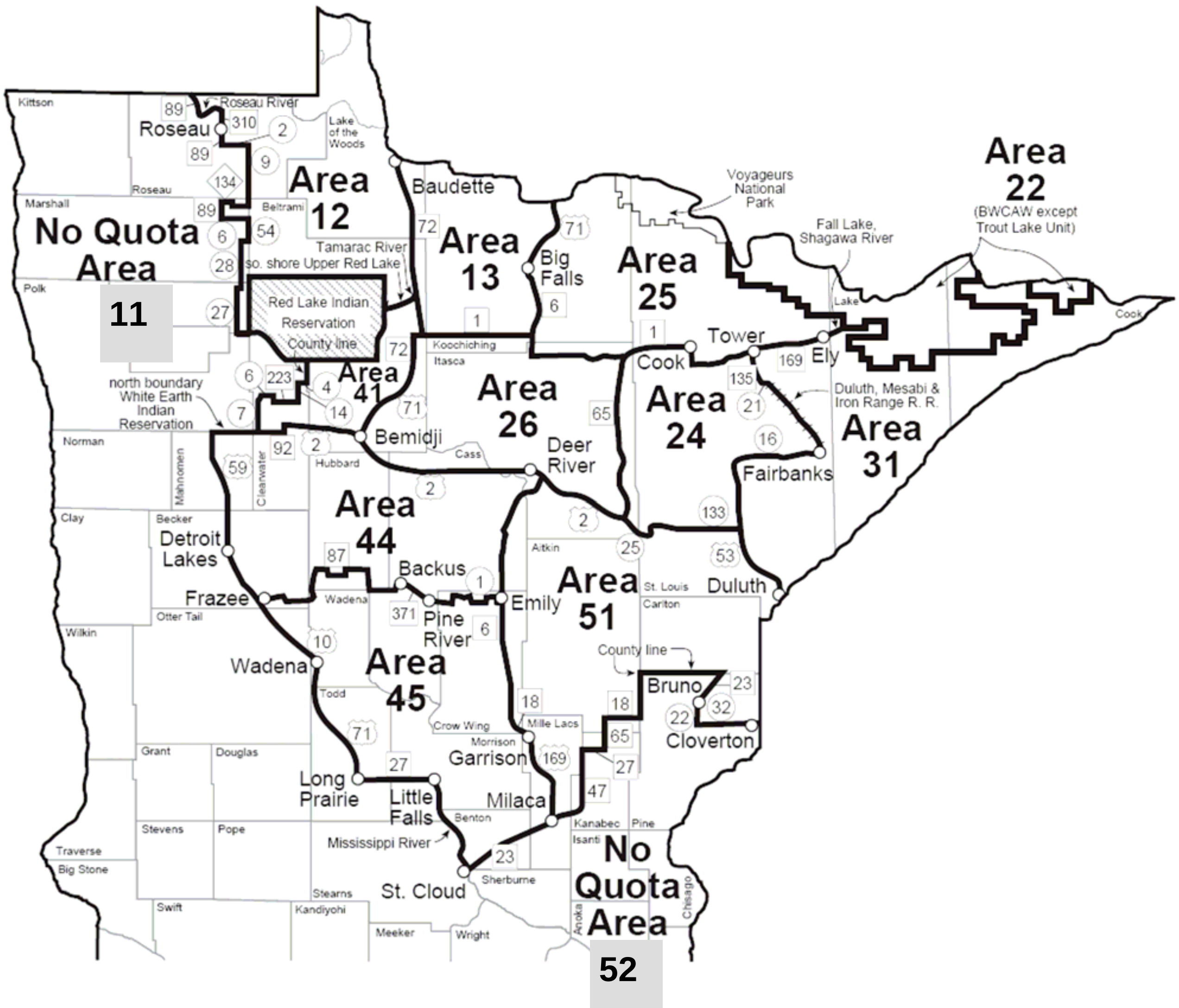


Figure 1. Bear management units (BMUs or areas) within the Minnesota bear range. Within the primary bear range (shown in white) license numbers are limited by a quota. Hunters can hunt in only one area, except with a no-quota license they can hunt anywhere in the shaded zone (and beginning in 2005 hunters could posses both a no-quota and quota area license).

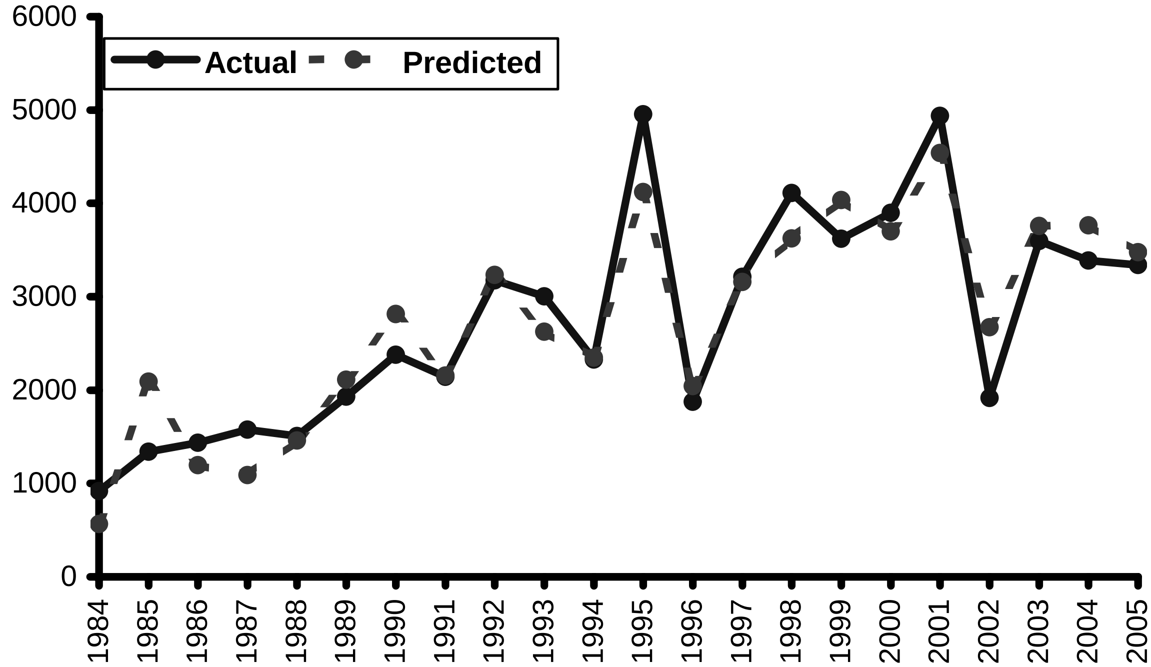


Figure 2. Number of Minnesota bears actually killed versus the number predicted killed based on fall food abundance and hunter numbers. Prediction for 2005 was from 1984–2004 regression ($R^2 = 0.88$).

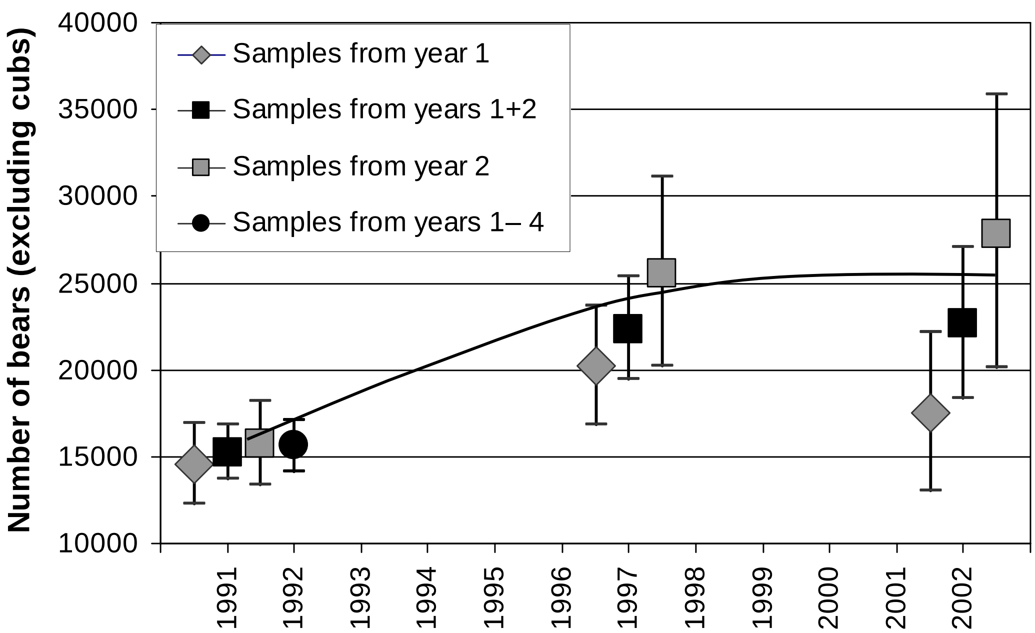


Figure 3. Population estimates (± 95% Confidence Interval) of Minnesota black bears from tetracycline-marking. Three clusters of points correspond with different estimates for the years of marking, 1991, 1997 & 2002. Curve approximates probable population trajectory.

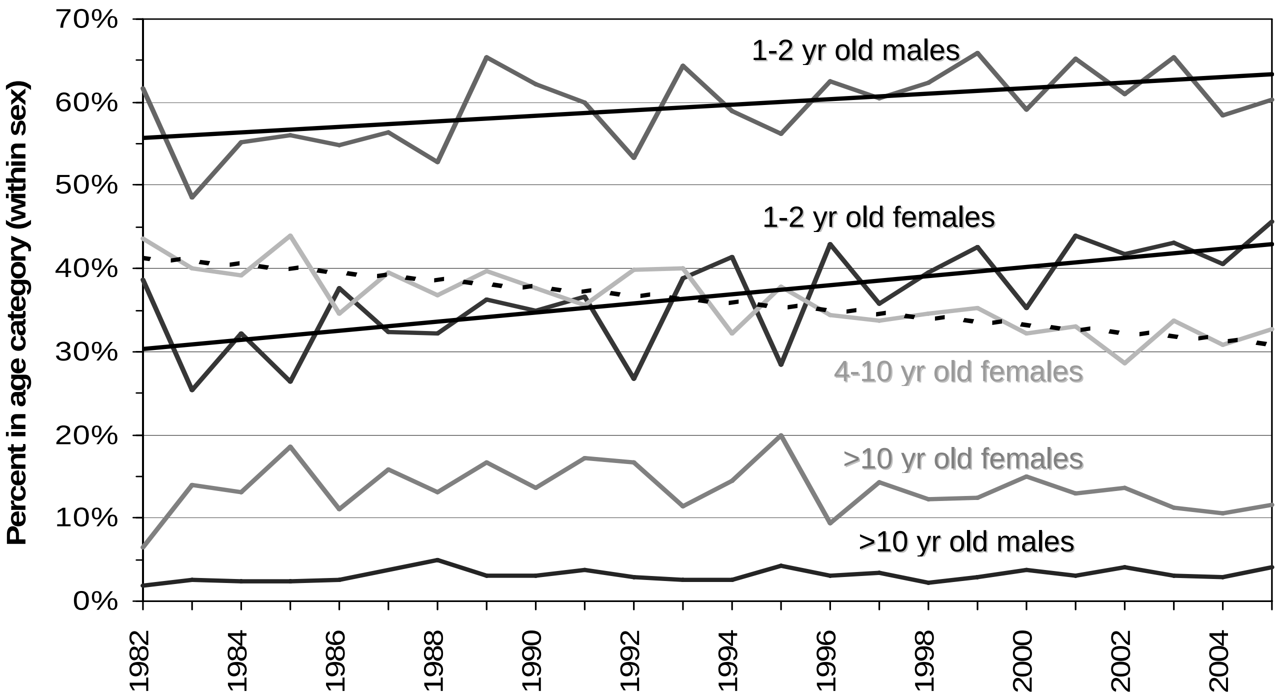


Figure 4. Statewide harvest age structure for Minnesota black bears showing proportion of each sex in age category. Increasing proportion of yearling bears of each sex (and corresponding decline in the proportion of medium-aged females) are shown by regression lines.

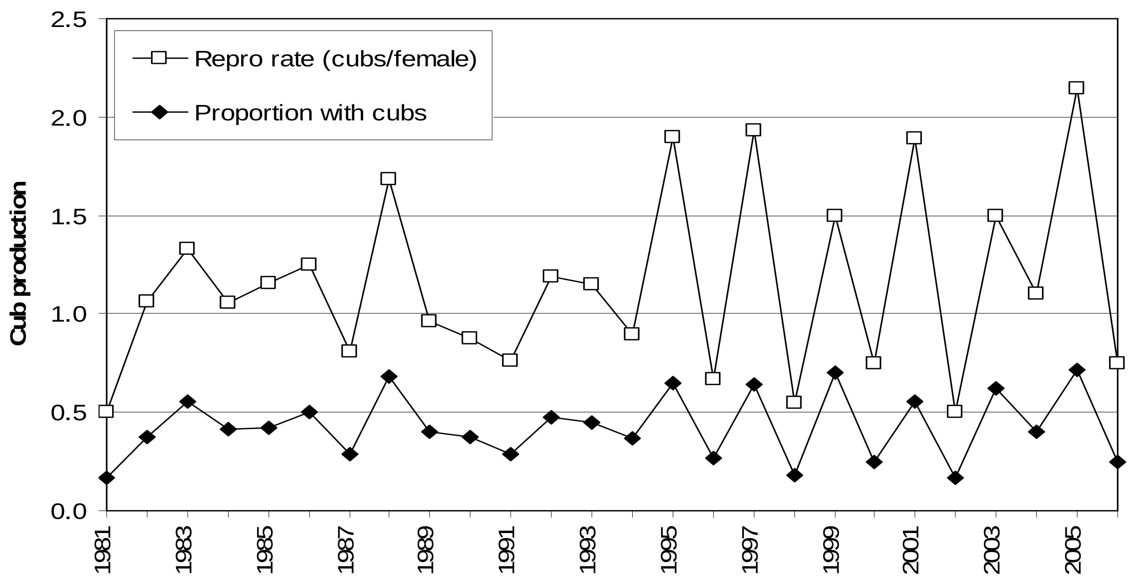


Figure 5. Year-specific cub production of bears near the center of the Minnesota bear range measured as the proportion of denning adult (4+ year-old) females with cubs and cubs/female. Sample sizes vary from 5–25 adult females monitored per year (mean = 16). Dens are visited in March, so 2006 data are included.

2005 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 8 registration stations and provide information on the location where they killed their moose, date of kill, and sex of moose harvested.

RESULTS

In 2005, 219 moose were harvested in northeastern Minnesota. No season was held in northwestern Minnesota. The State of Minnesota licensed 284 hunting parties and hunters killed 163 moose including 136 bulls and 27 cows (Table 1). Data on the number of permits offered, chance of being selected for a permit, hunter success, and percent bulls in the harvest, are also listed (Table 1). The 1854 Authority issued 50 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 83 permits and the preliminary harvest (as of 11/10/2005) was 28 moose (19 bulls and 9 cows). The Fond du Lac season closes 12/4/2005.

DISCUSSION

The success rate of State hunters in 2005 was 57% and represents an all time low for moose hunts in northeastern Minnesota (Tables 1 and 2). In 2004, the success rate for State hunters was 62%. The success rate for 1854 Authority was 52%. The preliminary success rate for the Fond du Lac band was 34%, as of 11/10/2005.

Table 1. Breakdown by sex, permit numbers, party success, and percent bulls in 2005 moose harvest by State hunters in northeastern Minnesota.

Zone	Bulls	Cows	Total	Permits	Party* Applications	Chances for Permit	% Success	% Bulls
20	7	1	8	25	154	16%	32%	88%
21	3		3	6	46	13%	50%	100%
22	3	3	6	9	71	13%	67%	50%
23	4		4	5	59	8%	80%	100%
24	6		6	8	299	3%	75%	100%
25	3		3	5	179	3%	60%	100%
26	1		1	10	53	19%	10%	100%
27	3	1	4	10	28	36%	40%	75%
28	4		4	6	76	8%	67%	100%
29	6		6	7	120	6%	86%	100%
30	9	1	10	10	179	6%	100%	90%
31	14	1	15	16	326	5%	94%	93%
32	3	1	4	7	38	18%	57%	75%
33	4	1	5	8	74	11%	63%	80%
34	3		3	9	81	11%	33%	100%
35	3		3	5	50	10%	60%	100%
36	6		6	15	64	23%	40%	100%
60	3		3	4	28	14%	75%	100%
61	3	3	6	12	67	18%	50%	50%
62	6	4	10	17	104	16%	59%	60%
63	3	3	6	7	49	14%	86%	50%
64	3		3	25	63	40%	12%	100%
70	5		5	6	134	4%	83%	100%
72	6	1	7	8	97	8%	88%	86%
73	6	2	8	8	85	9%	100%	75%
74	4	1	5	8	73	11%	63%	80%
76	3	2	5	9	147	6%	56%	60%
77	6	2	8	10	163	6%	80%	75%
79	5		5	6	67	9%	83%	100%
80	2		2	3	86	3%	67%	100%
Total	136	27	163	284	3060	9%	57%	83%

* 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%
2005	No Season				3060	284	164	58%

*Number of 2, 3, or 4 person parties

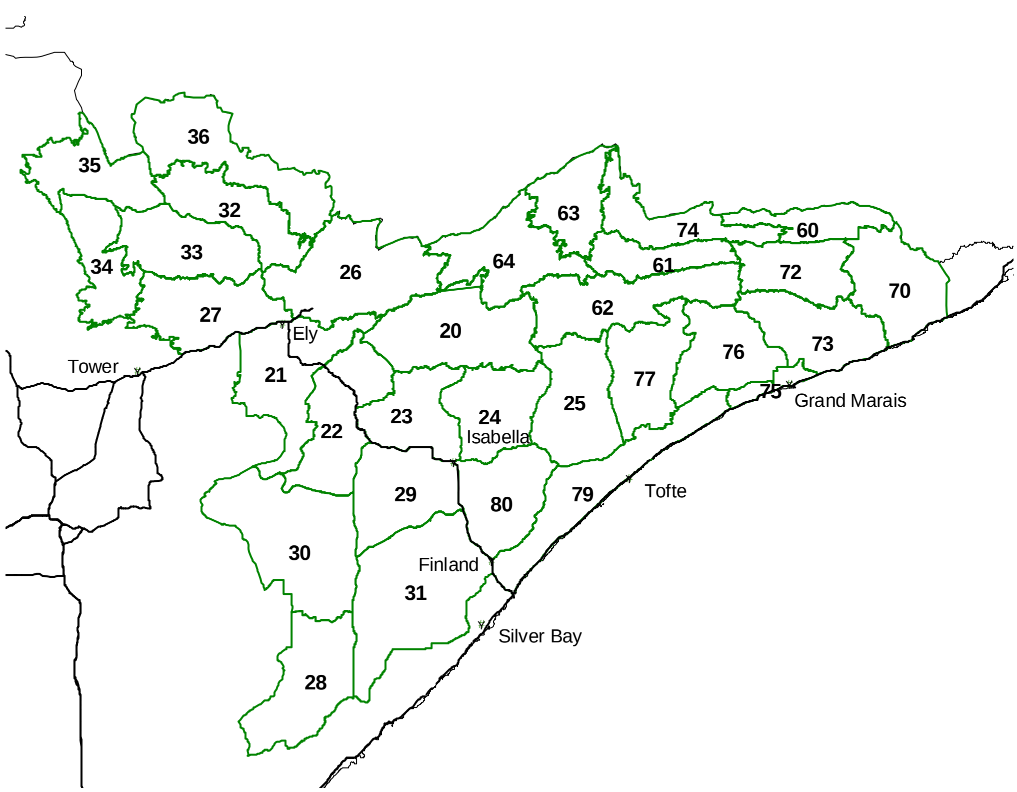


Figure 1. Moose hunting zones in northeastern Minnesota, 2005.

TRAPPING HARVEST STATISTICS

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2005 Trapper Harvest Survey

Margaret Dexter, Wildlife Policy and Research Unit

INTRODUCTION

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

METHODS

The Wildlife Policy and Research 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 2005-06 trapping season there were 5,456 Resident Regular Trappers, 704 Resident Junior Trappers, and 3 Nonresident (MN landowners) Trappers surveyed. Of the 6,163 valid licenses, 6060 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 the survey 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, 1980-81 through 2005-06.

Year	Number mailed	Number not delivered	Delivered questionnaires completed and returned	
			Number	Percent
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
2005-06	6,060	88	4,396	73.6

Table 2. Use of trapper licenses, 1993-94 through 2005-06.

		Return from mail survey	Projections from license sales
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]
2005-06	Trapped	3,495 (80.0%)	4,930
	Did not trap	875 (20.0%)	1,233
		4,370 (100.0%)	6,163[a]

[a] excludes duplicates.

Table 3. Estimated number of trappers of various furbearers, 1991-92 through 2005-06.

	Estimated number of trappers (thousands)														
	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	2005-06
Muskrat	2	3	3	4	3	4	4	3	2	2	2	2	2	2	2
Mink	2	3	3	3	2	3	3	3	2	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 05-Feb 06)	2	2	3	3	2	3	3	3	2	2	2	2	2	3	2
Raccoon (Mar 05-Aug 05)[a]				<1	<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	Closed	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 05Feb 06)	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
Red fox (Mar 05-Aug 05)[a]				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Gray fox	<1	<1	<1	<1	<1	n.a.	<1	<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 05- Feb 06)	2	2	2	3	2	2	3	3	2	2	2	2	2	2	2
Beaver (Mar 05- Apr 05)	1	1	1	2	1	2	2	2	1	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, 1991-92 through 2005-2006.

	Estimated take per successful trapper reporting that 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	2005-06
Muskrat	20	36	64	90	70	55	58	42	46	42	42	35	33	32	39
Mink	8	12	12	12	11	11	11	13	14	12	14	10	9	10	10
Short-tailed weasel	4	5	6	12	10	9	10	7	5	8	10	7	7	6	6
Long-tailed weasel	5	4	4	6	5	5	5	5	5	5	7	4	5	3	3
Raccoon (Sept 05-Feb 06)	14	16	5	20	23	23	24	23	20	20	27	25	22	23	21
Raccoon (Mar 05Aug 05)[a]				15	15	13	14	15	14	11	19	12	15	12	11
Striped skunk	9	8	9	8	8	10	10	9	8	8	8	8	8	8	7
Eastern spotted skunk	3	2	6	4	5	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Badger	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
Opossum	9	10	8	9	9	9	9	11	13	11	8	11	12	14	12
Red fox (Sept 05-Feb 06)	14	11	11	11	9	7	7	5	6	6	6	6	5	4	4
Red fox (Mar 05-Aug 05)[a]				9	5	4	4	3	4	4	5	5	6	3	3
Gray fox	2	4	3	2	2	n.a.	3	3	2	2	2	2	2	2	2
Coyote	4	5	5	4	5	4	3	3	4	4	4	4	5	4	5
Beaver (Oct 05-Feb 06)	15	13	16	18	14	16	16	16	16	15	18	13	12	13	13
Beaver (Mar 05 - Apr 05)	27	29	29	37	29	31	32	29	27	26	31	26	21	26	24

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

Table 5. Minnesota trapper license sales and estimated annual harvest, 1991-92 through 2005-2006[a]

	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	2005-06
Trapper license sales[b]	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	6,163
Estimated harvest[c] (thousands)															
Muskrat	45	92	202	355	195	202	194	131	97	86	101	75	69	72	91
Mink	21	32	33	40	26	35	34	36	27	23	29	20	17	21	18
Short-tailed weasel	1	1	2	6	4	4	4	2	2	3	4	3	4	3	2
Long-tailed weasel	1	1	1	3	2	2	2	2	2	1	2	1	2	1	1
Raccoon (Sept 05- Feb 06)	31	34	56	58	53	69	66	64	37	32	60	61	54	57	49
Raccoon (Mar 05-Aug 05)[f]				1	5	5	5	7	4	4	6	4	5	5	4
Striped skunk	10	7	9	9	8	11	11	9	5	5	7	8	8	9	7
Eastern spotted skunk[g]	<1	<1	<1	<1	<1	Closed	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	5	6	5	5	6	6	6	7	6	5	5	8	11	14	12
Red fox (Sept 05- Feb 06)	25	23	22	24	14	13	12	6	7	6	7	8	7	5	4
Red fox (Mar 05-Aug 05)[f]				1	1	1	1	<1	<1	<1	<1	1	1	<1	<1
Gray fox	1	1	1	1	1	n.a.	1	1	1	<1	1	1	1	1	1
Coyote	3	4	4	5	3	3	3	2	2	2	2	4	4	4	4
Beaver (Oct 05- Feb 06)	25	22	29	49	25	38	36	39	31	25	36	24	23	29	26
Beaver (Mar 05-Apr 05)	26	34	32	64	41	48	47	55	36	37	42	34	26	38	35
Registered harvest															
Otter	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	2,846
Lynx[g]	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Bobcat[e]	106	168	201	238	134	223	359	103	206	231	250	544	483	631	590
Fisher	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	2,388
Marten	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	2,653

[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, 2006 6,163 trapping licenses were sold in 2005 704 (11.4%) were juvenile licenses and 5,456 (88.5%) 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 which 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 2005-06 Hunting and Trapping Season

Conrad Christianson, Wildlife Furbearer / Depredation Program Consultant
Margaret Dexter, Wildlife Policy and Research 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 2006, questionnaires were mailed to the 32 licensed furbuyers in Minnesota. The survey asked them to report the number and type of fur purchased from Minnesota trappers and hunters in 2005-06 and the "average price" paid to those hunters and trappers based on all furs purchased. A total of 30 usable surveys were received, for a return rate of 93.8%.

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 15 years are summarized in Table 2. Total estimated value of the furbearer harvest to trappers and hunters in 2005-06 was $1,593,737, an increase of 62.5% from 2004-05.

RESULTS

Survey summaries are presented in the following tables.

Table 1. Minnesota fur prices as reported by licensed fur dealers, 2005-06.

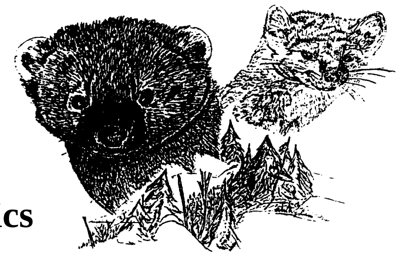
Species	Number Buyers	Number Pelts	Minimum Price	Maximum Price	Weighted Mean
Muskrat	19	36308	$2.00	$4.50	$2.81
Mink, female	17	3759	$5.50	$13.95	$10.23
Mink, male	18	5262	$9.00	$18.00	$14.29
Raccoon	19	33465	$6.00	$12.00	$9.61
Red fox	18	2038	$11.00	$20.00	$16.96
Gray fox	14	259	$8.00	$20.00	$15.00
Coyote	16	3108	$8.00	$20.00	$13.57
Bobcat	9	185	$80.00	$120.00	$95.74
River Otter	16	1287	$50.00	$100.00	$88.89
Beaver, fall	17	14625	$7.75	$20.00	$14.48
Beaver, spring	15	18698	$9.00	$22.00	$16.49
LT weasel	4	55	$2.00	$10.00	$2.56
ST weasel	10	533	$1.00	$3.50	$2.60
Striped skunk	11	316	$1.00	$6.00	$3.77
Badger	12	143	$6.00	$20.00	$13.40
Opossum	9	372	$0.50	$2.00	$1.40
Fisher, male	14	501	$30.00	$60.00	$36.03
Fisher, female	14	435	$25.00	$65.00	$31.46
Marten, male	11	391	$32.60	$50.00	$37.47
Marten, female	10	300	$30.00	$38.20	$31.53
Deer Hides	17	62449	$3.00	$5.00	$4.14
Bear Hides	7	101	$30.00	$41.00	$39.30

Table 2. Average price per pelt paid to hunters and trappers in Minnesota, 1991-92 through 2005-06.

		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	2005-06
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	2.81
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	14.29
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	10.23
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	2.60
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	2.56
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	9.61
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	3.77
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	13.40
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	1.40
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	16.96
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	15.00
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	13.57
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	95.74
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	14.48
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	16.49
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	88.89
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	36.03
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	31.46
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	37.47
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	31.53
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	4.14
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	39.30

REGISTERED FURBEARER HARVEST STATISTICS

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



Registered Furbearer Harvest Statistics
2005-06 Report

John Erb, Forest Wildlife Populations and 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 28 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. Fur-harvesters are required to bring pelts from harvested animals (fisher, 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, 1981-2005.

Year	Bobcat		Fisher		Marten		Otter	
	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1981-82	--	259	--	862	--	--	--	484
1982-83	--	274	--	912	--	--	--	385
1983-84	--	208	--	631	--	--	--	408
1984-85	--	280	--	1,289	--	--	--	529
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
2005-06	--	590	--	2,388	--	2,653	--	2,846

[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.

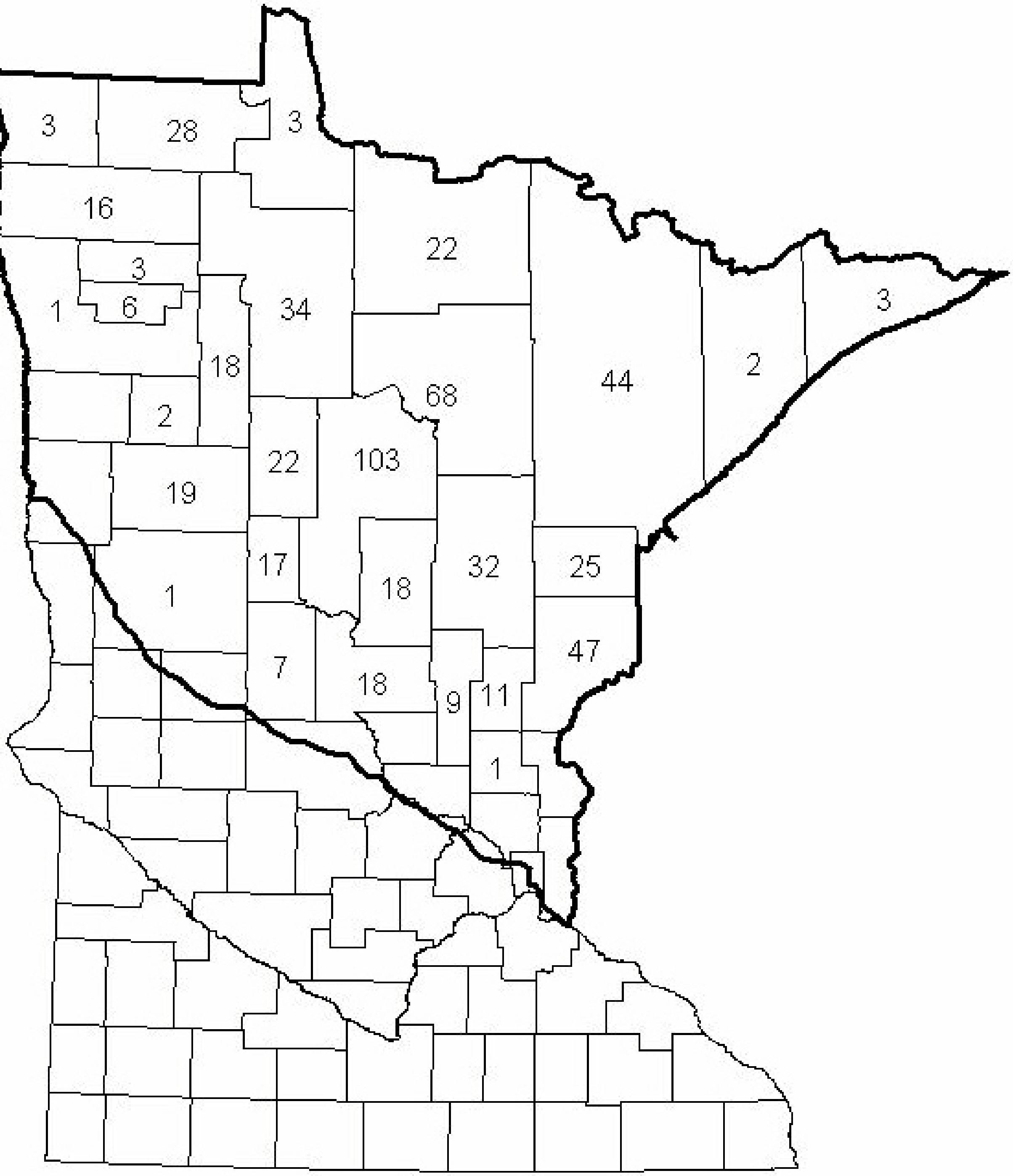


Figure 1. Bobcat harvest by county, 2005-06.

Table 2. Bobcat harvest by county and sex, 2005-06.

County	Sex* Male	Female	Unknown	Total
Aitkin	21	11		32
Becker	11	8		19
Beltrami	17	17		34
Benton	0	0		0
Carlton	11	14		25
Cass	43	59	1	103
Chisago	0	0		0
Clay	0	0		0
Clearwater	8	10		18
Cook	0	3		3
Crow Wing	7	11		18
Hubbard	11	11		22
Isanti	0	1		1
Itasca	21	47		68
Kanabec	4	7		11
Kittson	0	3		3
Koochiching	7	15		22
Lake	0	2		2
LOW	1	2		3
Mahnomen	0	2		2
Marshall	9	7		16
Mille Lacs	3	6		9
Morrison	6	12		18
Ottertail	1	0		1
Pennington	2	1		3
Pine	23	24		47
Polk	1	0		1
Red Lake	3	3		6
Roseau	11	17		28
St. Louis	20	24		44
Todd	5	2		7
Wadena	9	8		17
Unknown	5	2		7
Total	261	329	1	590

* 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, 1995-2005.

County	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Aitkin	12	20	19	6	25	32	20	35	19	37	32
Becker	5	4	10	1	8	6	28	26	19	28	19
Beltrami	6	20	37	7	13	16	26	63	47	66	34
Benton	1	0	0	0	0	0	0	0	0	0	0
Carlton	5	14	18	4	10	12	14	11	20	27	25
Cass	10	22	64	16	24	11	17	59	48	56	103
Chisago	0	0	0	0	0	0	0	1	0	0	0
Clay	0	0	0	0	0	0	0	0	1	0	0
Clearwater	6	3	14	1	4	0	6	24	19	18	18
Cook	2	0	0	0	0	0	0	1	1	2	3
Crow Wing	5	5	8	15	21	13	4	20	15	19	18
Hubbard	2	4	19	1	7	4	10	31	21	35	22
Isanti	0	0	0	0	2	0	0	0	2	0	1
Itasca	20	51	45	10	23	40	33	74	76	93	68
Kanabec	1	6	13	3	4	11	8	10	9	17	11
Kittson	3	1	0	0	7	6	7	5	8	6	3
Kooch	1	23	14	2	8	11	12	23	25	14	22
Lake	2	0	0	1	0	1	0	0	0	1	2
LOW	0	2	0	2	2	3	0	6	4	6	3
Mahnomen	1	0	2	0	1	1	1	0	3	7	2
Marshall	2	5	28	4	10	2	4	24	14	20	16
Mille Lacs	3	0	0	0	1	2	0	10	4	11	9
Morrison	6	5	1	2	6	8	4	6	14	18	18
Ottertail	0	0	2	0	0	0	1	0	0	5	1
Pennington	0	2	1	0	0	1	1	1	0	6	3
Pine	23	20	23	12	15	21	23	49	44	59	47
Polk	0	1	1	0	0	1	0	2	2	4	1
Red Lake	0	0	0	0	0	2	0	1	1	0	6
Roseau	1	5	15	3	7	12	18	22	28	27	28
St. Louis	7	7	14	10	5	9	7	30	25	37	44
Todd	0	0	0	2	1	0	1	3	6	5	7
Wadena	2	1	5	1	2	0	5	7	8	3	17
Unknown	8	2	4	0	0	4	0	0	0	4	7
Total	134	223	357	103	206	229	250	544	483	631	590

Table 4. Bobcat harvest by sex and week, 2005-06 season.

Date	Sex* Male	Female	Unknown	Total	% of Total	Cumulative %
Nov.26 - Dec.2	23	50		73	12.37	12.37
Dec.3 - Dec.9	58	101		159	26.95	39.32
Dec.10 - Dec.16	46	65	1	112	18.98	58.31
Dec.17 - Dec.23	37	40		77	13.05	71.36
Dec.24 - Dec.30	31	22		53	8.98	80.34
Dec.31 - Jan.8**	54	42		96	16.27	96.61
Unknown	11	9		20	3.39	100%
Total	260	329	1	590	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, 1984-2005.

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
2005-06	198 (60)	67 (20)	33 (10)	15 (5)	18 (5)	331

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

Table 6. Bobcat harvest by method of take, 1982-2005.

	Total	Trapping					Hunting				
Year	Harvest[a]	Harvest	% of Total	# Takers	Ave. Take	% Males[b]	Harvest	% of Total	# Takers	Ave. Take	% Males[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	30	28	1.4	
1990-91	83	61	73	43	1.4		22	27	17	1.3	
1991-92	102	59	58	31	1.9		43	42	33	1.3	
1992-93	168	133	79	85	1.6		35	21	23	1.5	
1993-94	201	147	73	88	1.7		54	27	41	1.3	
1994-95	238	189	79	120	1.6		49	21	31	1.6	
1995-96	134	73	54	53	1.4		61	46	38	1.6	
1996-97	203	133	66	91	1.5		70	34	53	1.3	
1997-98	357	313	88	176	1.8		44	12	34	1.3	
1998-99	103	95	92	67	1.4		8	8	8	1.0	
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	41	42	17	27	1.6	68
2002-03	544	500	92	279	1.8	38	44	8	32	1.4	57
2003-04	483	415	86	230	1.8	46	68	14	40	1.7	65
2004-05	631	542	86	279	1.9	43	89	14	53	1.7	60
2005-06	583	435	75	250	1.7	37	148	25	85	1.7	65

[a] Total harvest reported here may not be equal to total harvest in other tables due to incomplete method-of-take data.
[b] Trapper/hunter reported sex ratios in this table are **NOT** adjusted according to results from DNR carcass analyses

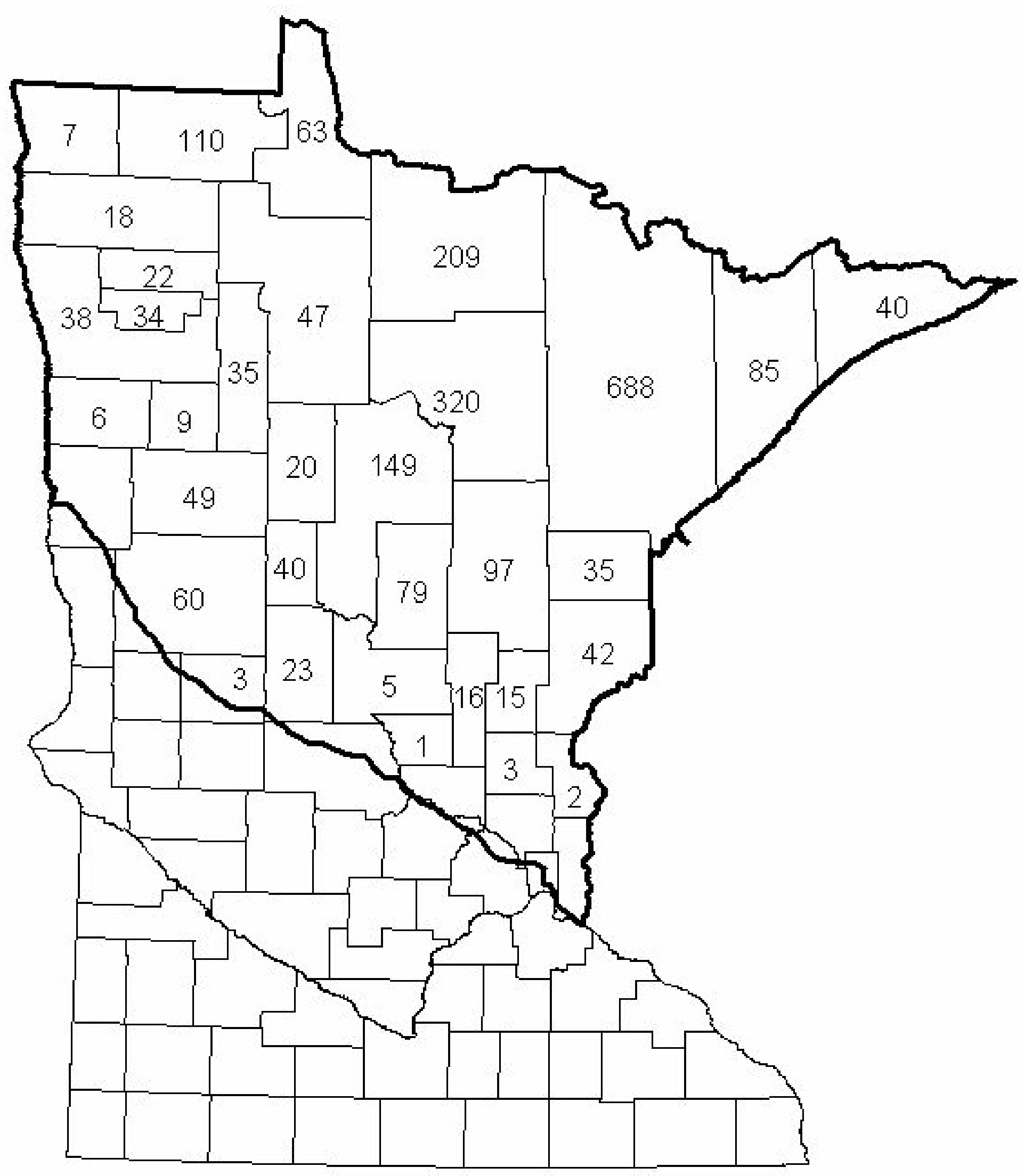


Figure 2. Fisher harvest by county, 2005-06.

Table 7. Fisher harvest by county and sex, 2005-06 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	50	47		97
Anoka	0	0		0
Becker	28	21		49
Beltrami	26	21		47
Benton	1	0		1
Carlton	24	11		35
Cass	85	64		149
Chisago	2	0		2
Clearwater	21	14		35
Cook	21	19		40
Crow Wing	49	30		79
Douglas	2	1		3
Hubbard	14	6		20
Isanti	2	1		3
Itasca	158	162		320
Kanabec	11	4		15
Kittson	5	2		7
Koochiching	90	119		209
Lake	40	45		85
LOW	34	29		63
Mahnomen	7	2		9
Marshall	12	6		18
Mille Lacs	6	10		16
Morrison	1	4		5
Norman	3	3		6
Ottertail	36	24		60
Pennington	8	14		22
Pine	24	18		42
Polk	27	11		38
Red Lake	21	13		34
Roseau	56	54		110
St. Louis	337	351		688
Sherburne	0	0		0
Stearns	0	0		0
Todd	11	12		23
Wadena	19	21		40
Unknown	8	10		18
Total	1,239	1,149	0	2,388

Table 8. Comparison of fisher harvest by county, 1994-2005.

County	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Aitkin	23	26	58	86	105	84	68	103	122	124	96	97
Anoka	0	0	0	0	0	0	0	0	0	1	0	0
Becker	22	17	15	25	15	32	42	46	96	88	92	49
Beltrami	103	27	84	140	105	70	60	73	117	74	71	47
Benton	0	0	0	0	0	0	0	0	0	1	0	1
Carlton	14	14	10	45	25	23	27	37	48	42	40	35
Cass	100	58	142	212	133	123	122	134	225	205	186	149
Chisago	0	0	0	0	1	0	3	2	6	5	6	2
Clearwater	13	0	6	31	18	13	15	45	45	52	41	35
Cook	16	12	12	24	26	19	19	33	27	28	24	40
Crow Wing	30	24	32	65	75	53	71	82	106	106	113	79
Douglas	0	0	0	0	0	0	1	0	0	3	3	3
Hubbard	8	15	30	66	38	34	34	64	59	62	32	20
Isanti	0	0	0	0	0	0	0	0	0	0	2	3
Itasca	299	116	291	477	441	248	288	298	354	319	323	320
Kanabec	1	0	6	7	3	11	4	4	19	21	13	15
Kittson	1	0	0	7	3	3	3	7	3	11	2	7
Koochiching	250	92	232	386	369	150	159	156	178	171	179	209
Lake	99	43	60	123	84	46	62	54	72	74	87	85
LOW	43	4	30	59	99	83	71	48	115	78	33	63
Mahnomen	1	0	0	0	0	3	0	12	16	14	13	9
Marshall	9	2	4	21	7	10	27	19	18	21	25	18
Mille Lacs	0	0	6	0	3	0	4	3	16	22	14	16
Morrison	0	0	0	0	0	2	0	1	6	3	7	5
Norman	0	0	0	0	0	6	0	0	1	1	11	6
Ottertail	0	0	0	0	1	0	0	1	12	40	52	60
Pennington	1	0	1	1	0	2	4	4	10	18	42	22
Pine	23	20	24	34	55	36	37	29	44	54	56	42
Polk	2	3	3	6	5	6	8	24	46	65	47	38
Red Lake	0	0	2	5	0	2	18	16	15	16	29	34
Roseau	93	26	89	134	171	111	157	180	106	141	114	110
St. Louis	616	153	604	783	880	546	369	608	734	611	740	688
Sherburne	0	0	0	0	0	0	0	0	0	2	0	0
Stearns	0	0	0	0	0	0	0	0	0	0	1	0
Todd	0	0	0	2	0	0	0	2	5	14	18	23
Wadena	0	1	2	10	5	8	0	31	39	32	31	40
Unknown	5	289	30	12	28	2	1	1	0	2	9	18
Total	1,772	942	1,773	2,761	2,695	1,726	1,674	2,117	2,660	2,521	2,552	2,388

Table 9. Fisher harvest by date and sex, 2005-06 season.

Date	Sex: Male	Sex: Female	Sex: Unknown	Total	% of Known Total	Cumulative %
Nov. 26	2	2		4	0.17	0.17
Nov. 27	43	40		83	3.48	3.64
Nov. 28	88	59		147	6.16	9.80
Nov. 29	85	61		146	6.11	15.91
Nov. 30	112	73		185	7.75	23.66
Dec. 1	98	69		167	6.99	30.65
Dec. 2	73	62		135	5.65	36.31
Dec. 3	117	116		233	9.76	46.06
Dec. 4	61	67		128	5.36	51.42
Dec. 5	67	58		125	5.23	56.66
Dec. 6	52	76		128	5.36	62.02
Dec. 7	88	88		176	7.37	69.39
Dec. 8	58	61		119	4.98	74.37
Dec. 9	77	64		141	5.90	80.28
Dec. 10	91	80		171	7.16	87.44
Dec. 11	64	78		142	5.95	93.38
Unknown	63	95		158	6.62	100%
Total	1,239	1,149	0	2,388	100%	

Table 10. Distribution of fisher harvest* among trappers, 1993-2005.

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)	----	----	----	1046
1995-96	232 (40)	355 (60)	----	----	----	587
1996-97	321 (31)	726 (69)	----	----	----	1047
1997-98	351 (23)	1205 (77)	----	----	----	1556
1998-99	443 (28)	1141 (72)	----	----	----	1584
1999-00	397 (37)	664 (63)	----	----	----	1061
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)	1024
2004-05	390 (37)	260 (25)	184 (17)	95 (9)	132 (12)	1061
2005-06	407 (40)	251 (24)	150 (15)	102 (10)	118 (11)	1028

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

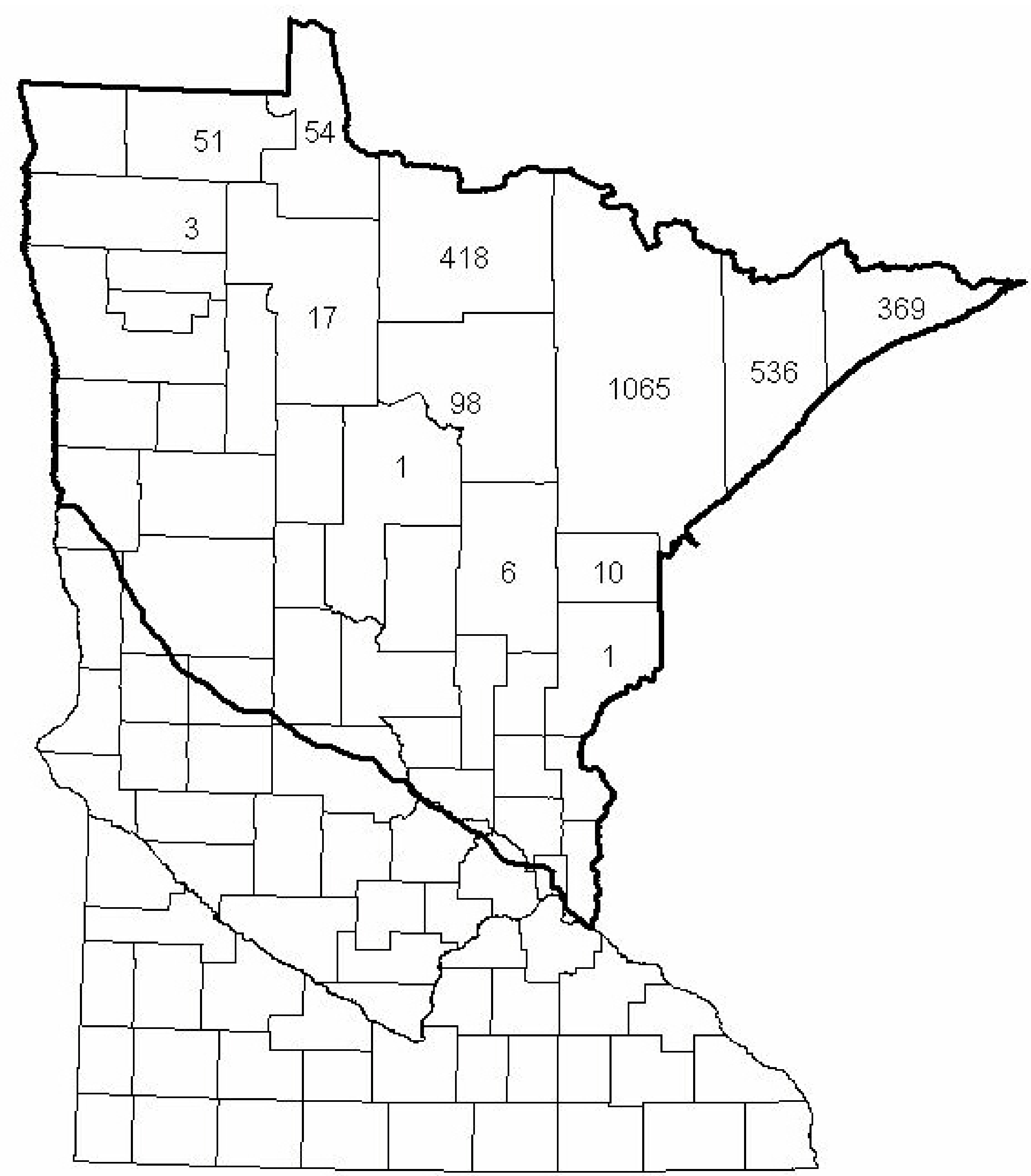


Figure 3. Marten harvest by county, 2005-06.

Table 11. Marten harvest by county and sex, 2005-06 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	4	2		6
Beltrami	11	6		17
Carlton	6	4		10
Cass	1	0		1
Clearwater	0	0		0
Cook	264	105		369
Crow Wing	0	0		0
Itasca	63	34	1	98
Koochiching	263	150		418
Lake	362	174		536
Lake of the Woods	38	15	1	54
Mahnomen	0	0		0
Marshall	0	3		3
Pennington	0	0		0
Pine	0	1		1
Red Lake	0	0		0
Roseau	34	17		51
St. Louis	690	375		1065
Unknown	16	8		24
Total	1,755	896	2	2,653

Table 12. Comparison of marten harvest by county in Minnesota, 1994-2005.

County	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Aitkin	0	0	0	0	1	2	2	3	5	6	6	6
Beltrami	1	0	2	12	12	37	2	24	30	38	65	17
Carlton	0	0	0	0	3	6	5	11	4	11	1	10
Cass	0	0	0	0	1	2	3	1	3	2	3	1
Clearwater	0	0	0	0	0	0	0	0	0	1	1	0
Cook	164	156	116	195	208	240	190	164	228	411	318	369
Crow Wing	0	0	0	0	0	3	0	0	0	0	0	0
Itasca	41	26	83	164	155	114	82	102	147	141	136	98
Koochiching	313	251	382	597	517	492	306	327	525	534	549	418
Lake	299	252	234	287	284	284	323	243	492	541	551	536
LOW	2	0	0	12	26	58	15	13	104	71	122	54
Mahnomen	0	0	0	0	0	0	0	0	0	0	2	0
Marshall	0	0	0	0	0	1	1	1	1	1	5	3
Pennington	0	0	0	0	0	0	2	0	0	0	0	0
Pine	0	0	0	0	0	0	0	0	0	1	2	1
Red Lake	0	0	0	0	0	0	3	0	0	0	0	0
Roseau	0	0	0	0	41	51	98	48	116	104	127	51
St. Louis	707	396	797	980	1,020	1,131	596	991	1,184	1,352	1,346	1065
Unknown	0	419	11	14	31	2	1	0	0	0	7	24
Total	1,527	1,500	1,625	2,261	2,299	2,423	1,629	1,928	2,839	3,214	3,241	2,653

Table 13. Marten harvest by date and sex, 2005-06 season.

Date	Sex			Total	% of Known	Cumulative
	Male	Female	Unknown		Total	%
Nov. 26	12	1		13	0.49	0.49
Nov. 27	201	71		272	10.25	10.74
Nov. 28	139	55		194	7.31	18.06
Nov. 29	106	61		167	6.29	24.35
Nov. 30	136	57		193	7.27	31.62
Dec. 1	86	44		130	4.90	36.52
Dec. 2	98	47		145	5.47	41.99
Dec. 3	145	90		235	8.86	50.85
Dec. 4	100	72		172	6.48	57.33
Dec. 5	62	38		100	3.77	61.10
Dec. 6	69	41		110	4.15	65.25
Dec. 7	93	59		152	5.73	70.98
Dec. 8	57	28		85	3.20	74.18
Dec. 9	59	21	1	81	3.05	77.23
Dec. 10	89	52		141	5.31	82.55
Dec. 11	58	35	1	94	3.54	86.09
Unknown	245	124		369	13.91	100%
Total	1,755	896	2	2,653	100%	

Table 14. Distribution of marten harvest* among trappers, 1993-2005.

Number (%) of Takers	Number Taken					Total Takers
	1	2	3	4	5	
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)	----	----	----	1211
1998-99	187 (15)	1056 (85)	----	----	----	1243
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
2005-06	191 (22)	158 (18)	139 (16)	156 (18)	215 (25)	859

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

Table 15. Number of trappers with different fisher/marten combinations, 2005-06. (Combined limit = 5)

Number of Takers		Number of Marten					
		0	1	2	3	4	5
Number of Fisher	0		64	49	34	45	211
	1	207	35	26	28	111	
	2	120	34	20	77		
	3	69	19	62			
	4	63	39				
	5	118			Total takers of at least 1 fisher or marten		1431

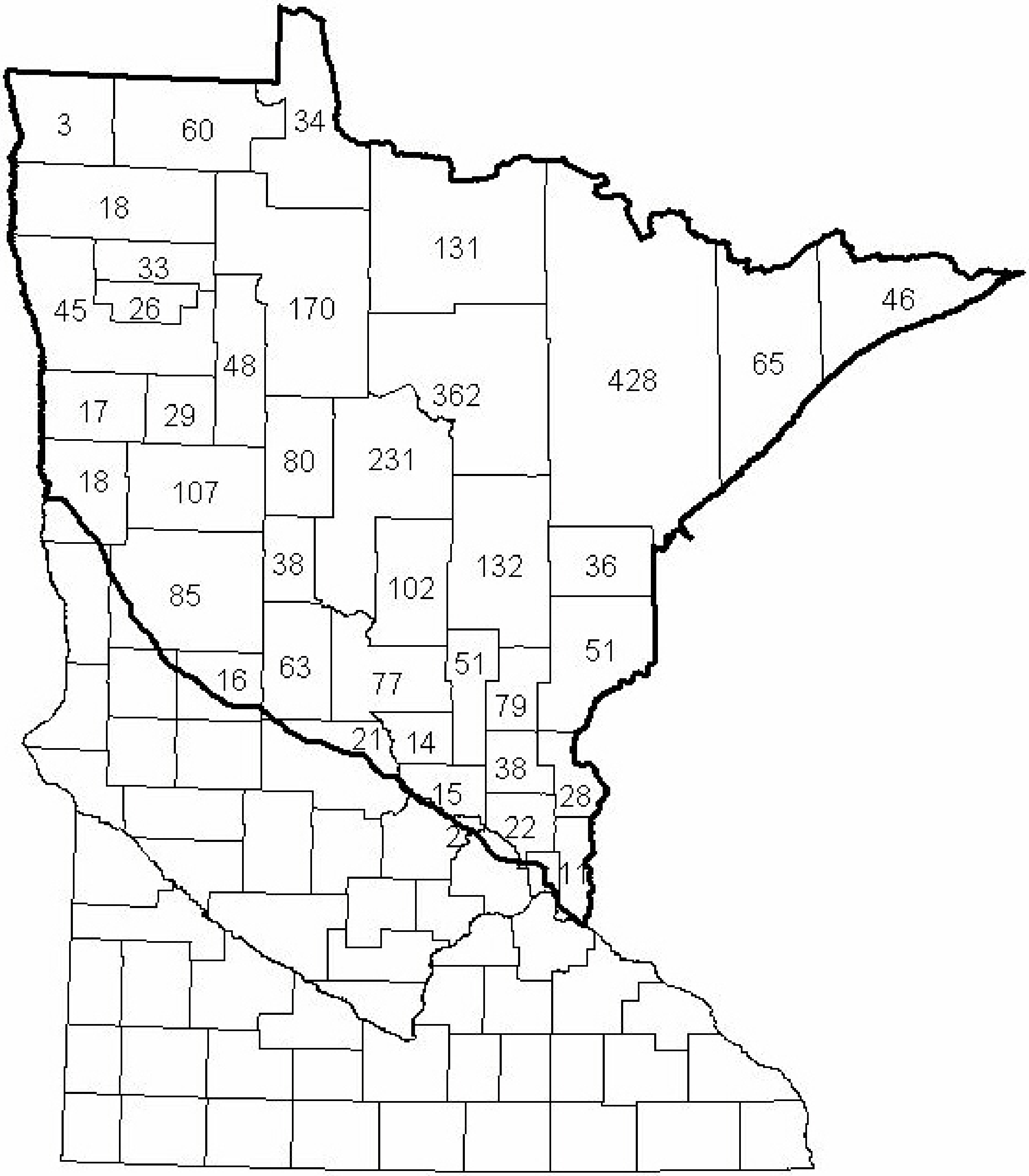


Figure 4. Otter harvest by county, 2005-06.

Table 16. Otter harvest by county and sex, 2005-06 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	78	54		132
Anoka	11	11		22
Becker	60	47		107
Beltrami	103	67		170
Benton	9	5		14
Carlton	20	16		36
Cass	130	101		231
Chisago	17	11		28
Clay	11	7		18
Clearwater	21	27		48
Cook	28	18		46
Crow Wing	67	35		102
Douglas	12	4		16
Hubbard	43	37		80
Isanti	24	14		38
Itasca	214	148		362
Kanabec	48	31		79
Kittson	3	0		3
Koochiching	76	55		131
Lake	38	27		65
Lake of the Woods	24	10		34
Mahnomen	20	9		29
Marshall	11	7		18
Mille Lacs	31	20		51
Morrison	45	32		77
Norman	7	10		17
Ottertail	49	36		85
Pennington	18	15		33
Pine	27	24		51
Polk	26	19		45
Red Lake	14	12		26
Roseau	36	24		60
St. Louis	247	181		428
Sherburne	6	9		15
Stearns	11	9	1	21
Todd	36	27		63
Wadena	19	19		38
Washington	5	6		11
Wright	2	0		2
Unknown	7	7		14
Total	1,654	1,191	1	2,846

Table 17. Comparison of otter harvest by county, 1994-2005.

County	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Aitkin	83	57	78	95	87	103	82	100	78	87	113	132
Anoka	20	13	13	21	23	25	14	17	17	13	32	22
Becker	62	64	54	85	30	64	45	125	104	105	178	107
Beltrami	166	59	133	133	81	103	74	108	127	173	216	170
Benton	5	0	1	4	6	2	7	10	6	7	19	14
Carlton	40	17	33	43	39	45	29	33	40	38	53	36
Cass	184	124	184	189	149	109	107	197	189	198	255	231
Chisago	26	9	13	20	20	13	12	26	18	22	20	28
Clay	0	0	2	7	0	7	3	1	7	7	15	18
Clearwater	52	13	57	25	18	29	25	47	61	52	62	48
Cook	53	37	28	29	48	30	26	26	31	41	56	46
Crow Wing	111	59	73	84	81	77	76	96	108	119	141	102
Douglas	0	2	5	7	7	1	1	1	0	12	27	16
Hubbard	43	48	89	95	28	23	19	61	64	70	91	80
Isanti	20	10	17	29	26	20	28	33	33	27	35	38
Itasca	432	245	383	371	339	220	296	337	310	382	483	362
Kanabec	57	13	20	43	24	29	32	56	40	38	57	79
Kittson	1	1	0	2	1	0	0	1	2	3	3	3
Koochiching	147	68	139	109	126	63	107	118	96	164	167	131
Lake	76	33	62	57	77	44	70	57	57	81	88	65
LOW	20	9	16	24	32	36	18	17	21	42	31	34
Mahnomen	21	18	11	6	9	10	10	17	7	23	24	29
Marshall	13	3	14	14	5	8	16	13	35	34	29	18
Mille Lacs	40	7	27	18	17	15	12	20	22	33	48	51
Morrison	34	12	20	25	18	30	17	45	36	46	64	77
Norman	0	4	3	1	0	2	4	3	4	1	16	17
Ottertail	10	19	14	41	29	20	14	51	32	45	113	85
Pennington	0	0	5	6	2	10	2	6	12	16	18	33
Pine	92	59	72	73	62	21	35	42	61	78	99	51
Polk	33	36	45	35	23	21	34	60	63	72	104	45
Red Lake	8	1	9	9	7	8	22	18	27	35	58	26
Roseau	29	3	24	41	40	37	40	36	27	72	69	60
St. Louis	507	148	473	332	421	353	255	453	316	483	508	428
Sherburne	11	10	12	15	13	14	10	11	11	24	25	15
Stearns	0	3	15	15	11	7	5	5	17	13	22	21
Todd	1	19	22	22	23	16	22	24	30	49	53	63
Wadena	3	9	14	8	6	13	3	23	23	35	34	38
Washington	1	0	7	4	6	4	4	4	12	10	8	11
Wright	0	0	0	0	0	0	0	0	1	2	3	2
Unknown	44	203	32	8	12	3	2	3	0	14	13	14
Totals	2,445	1,435	2,219	2,145	1,946	1,635	1,578	2,301	2,145	2,766	3,450	2,846

Table 18. Otter harvest by sex and week, 2005-06 season.

Date	Sex: Male	Sex: Female	Sex: Unknown	Total Harvest	% of Known Total	Cumulative %
Oct.29 - Nov.4	257	184		441	15.50	15.50
Nov.5 - Nov.11	296	219		515	18.10	33.59
Nov.12 - Nov.18	252	183		435	15.28	48.88
Nov.19 - Nov.25	178	134	1	313	11.00	59.87
Nov.26 - Dec.2	209	117		326	11.45	71.33
Dec.3 - Dec.9	130	93		223	7.84	79.16
Dec.10 - Dec.16	82	73		155	5.45	84.61
Dec.17 - Dec.23	62	57		119	4.18	88.79
Dec.24 - Dec.30	60	35		95	3.34	92.13
Dec.31 - Jan.8*	69	44		113	3.97	96.10
Unknown	59	52		111	3.90	100%
Total	1,654	1,191	1	2,846	100%	

* 9-day interval.

Table 19. Distribution of otter harvest* among trappers, 1993-2005.

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)	1217
2005-06	291 (27)	213 (20)	186 (17)	386 (36)	1076

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