Status of Wildlife Populations

Fall 2008

Minnesota Department of Natural Resources
Division of Fish and Wildlife
St. Paul, Minnesota

STATUS OF WILDLIFE POPULATIONS, FALL 2008

(Including 1998-2008 Hunting and Trapping Harvest Statistics)

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

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This is the 32nd 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.

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.

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FARMLAND WILDLIFE POPULATIONS

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2008 MINNESOTA AUGUST ROADSIDE SURVEY

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ABSTRACT

This report is a summary of the 2008 Minnesota August roadside survey. Population indices for ring-necked pheasants and mourning doves in 2008 declined from last year. Gray partridge, cottontail rabbit, and white-tailed jackrabbit indices were similar to 2007, whereas white-tailed deer indices increased significantly. The winter of 2007-08 was moderate to mild throughout much of Minnesota's agricultural zone, but spring weather was cool and wet. Overwinter survival of farmland wildlife in 2008 was probably above average, but reproductive success of small game was below average in many areas.

The 2008 pheasant index (80.8 birds/100 mi) declined 24% from 2007, was similar to the 10-year average, but was 22% below the long-term average and 69% 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 pheasant indices in 2008 were significantly higher than the 10-year average, which reflected high overwinter survival associated with moderate winter weather. However, the number of broods observed was 31% below last year and average brood size was below the 10-year and long-term averages, which reflected poor nest success and chick survival. Overall, the size of the fall population will be close to the 10-year average, but with relatively more adults and fewer juveniles. 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, South Central, and East Central regions.

The gray partridge index was similar to last year, but 55% below the 10-year mean and 68% below the long-term average. Observed regional changes were not significant, but were based on small samples. The number of adults observed was similar to last year, but the proportion of adults with broods was down 31% from last year and the 10-year average. Average brood size also decreased in 2008. Gray partridge counts were highest in the Southwest region.

The cottontail rabbit index was similar to last year, the 10-year average, and the long-term average. Counts of cottontail rabbits were highest in the East Central and South Central regions. The jackrabbit index also did not change significantly in 2008, but was 56% below the 10-year average, and 92% below the long-term average. The range-wide jackrabbit population peaked in the late 1950's and declined to its lowest level in 1993 (and again this year), from which populations have not recovered. Counts of white-tailed jackrabbits were highest in the Southwest region.

The number of mourning doves observed in 2008 decreased 17% from last year, 14% from the 10-year average, and 25% from the long-term average. In contrast, the white-tailed deer index increased by 43% from last year, with a significant regional increase in the West Central region.

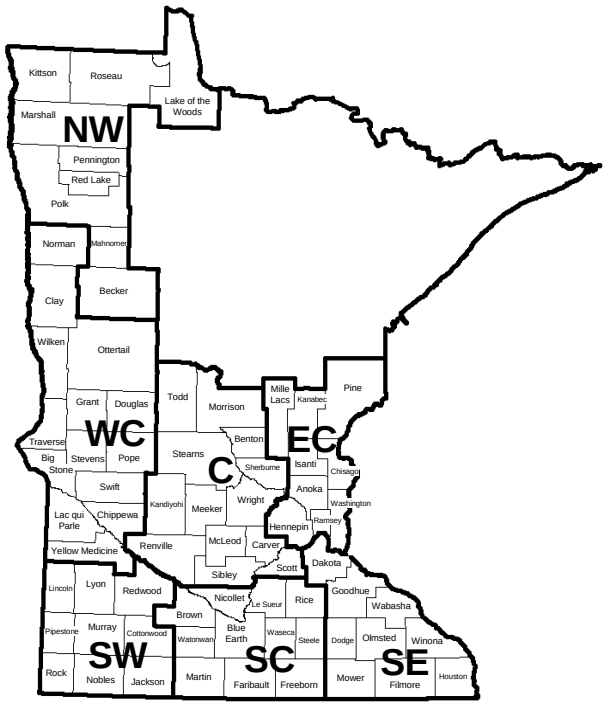


Figure 1. Survey regions for Minnesota's August roadside survey.

INTRODUCTION

This report is a summary of the 2008 Minnesota August roadside survey. The annual survey is conducted during the first 2 weeks in August by Minnesota Department of Natural Resource (MNDNR) enforcement and wildlife personnel throughout the farmland region of Minnesota (Figure 1). The August roadside survey consists of 171 25-mile routes (1-4 routes/county); 152 routes are located in the ring-necked pheasant range.

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 (Figure 1) and range-wide; however, population indices for species with low detection rates are imprecise and should be interpreted cautiously.

ACKNOWLEDGMENTS

We thank all cooperators for their efforts in completing routes in 2008; without their help the survey would not be possible. Janelle Grochowski and Tonya Klinkner provided assistance with data entry. John Giudice reviewed an early draft of this report. Tabor Hoek of the Minnesota Board of Water & Soil Resources (BWSR) provided enrollment data on cropland-retirement programs in Minnesota.

WEATHER SUMMARY

The severity of the winter of 2007-08, which is determined primarily by duration of snow cover, was moderate to mild throughout most of the farmland region in Minnesota (the seventh consecutive mild winter). Although much of the farmland zone was snow covered throughout December, an early January thaw opened croplands and gave food-stressed birds a reprieve (MCWG, http://climate.umn.edu/doc/snowmap.htm). However, the northern and southeastern pheasant range retained snow cover through at least mid-March. Regional temperatures averaged 3.0ºF below the long-term average for each month, December - March (range +1ºF to -8ºF), making the 2007-08 winter season the coldest since the winter of 2000-01 (Minnesota Climatology Working Group [MCWG], http://climate.umn.edu/cawap/monsum/monsum.asp). Below normal temperatures continued in all farmland regions from April - June. April was wetter than average and produced 4 major snow events. Furthermore, the first half of June (peak of hatch for most game birds) was plagued with frequent and heavy rains throughout the farmland zone. Thus, conditions for over-winter survival of farmland wildlife should have been above average throughout most of the pheasant range except possibly the northern and southeastern regions, but reproductive conditions were below average until after the normal peak of hatch.

HABITAT CONDITIONS

Conservation Reserve Program (CRP) enrollment in Minnesota's pheasant range declined by nearly 38,000 acres from 2007, reversing a trend of gradually increasing habitat abundance. However, gains in Wetlands Reserve Program (WRP) enrollment and acquisitions of Wildlife Management Areas (WMA) and Waterfowl Production Areas (WPA) in the pheasant range offset CRP losses, yielding a net loss of about 25,000 acres of protected habitat. Over 1 million acres of habitat are currently enrolled in farm programs (e.g., CRP, Conservation Reserve Enhancement Program, Reinvest In Minnesota, WRP), and another 671,000 acres of habitat are protected as WMAs and WPAs. Within the pheasant range, protected grasslands account for about 6.2% of the landscape (range: 2.9-10.5%; Table 1).

Farm programs make up the largest portion of protected grasslands in the state. Although the expiration of a large proportion of existing CRP contracts is still a major concern for future wildlife populations, re-enrollment and extension opportunities delayed the loss of many CRP contracts that were scheduled to expire during 2007-2010. Also, interest is high in Minnesota's new CRP SAFE practice, with offers or enrollments for nearly half of the acres available in the first 3 months of the program.

However, the future of farmland retirement programs remains under threat due to continued high commodity prices and competing economic opportunities (e.g., ethanol production).

The MNDNR continues to expand the habitat base through accelerated WMA acquisition with nearly 8,000 acres of new WMAs in the pheasant range in the last year. 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 all of the 171 routes in 2008. 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 98% of the survey routes, which was greater than for 2007 (89%) and the 8-year average (91%). Clear skies (<30% cloud cover) were present at the start of 86% of routes, with wind speeds <4 mph recorded for 88% of routes. The survey period was extended to July 30th - August 19th to allow all routes to be completed.

RING-NECKED PHEASANT

The average number of pheasants observed (80.8/100 mi) decreased 24% from 2007. The pheasant index was similar to the 10-year average (Table 2; Figure 2A) but was 22% below the long-term average (95% CI: -33 to -9%; Table 2), and 69% below the benchmark years of 1955-64. Total pheasants observed per 100 miles ranged from 16.6 in the Southeast to 158.5 in the Southwest (Table 3, Figure 5). Declines from last year were significant only for the South Central region (Table 3).

The range-wide hen index (hens/100 mi) was similar to last year, 24% (95% CI: 4 to 44%) above the 10-year average (Table 2), and varied from 1.7 hens/100 miles in the Southeast to 29.4 hens/100 miles in the Southwest. The cock index was up from 2007 by 26% (95% CI: 8 to 43%), and 76% (95% CI: 54 to 99%) above the 10-year average (Table 2). The 2008 hen:cock ratio was only 1.2, which was below the 10-year average (1.5) and the lowest value since 2001. A low sex ratio may reflect a delayed nesting effort (i.e., more hens than average may have been on nests or with young broods during the 2008 surveys).

The number of pheasant broods observed (12.0/100 mi) declined 31% from last year, and was similar to the 10-year and long-term averages (Table 2). The brood index remains far below the benchmark years of 1955-64 (34.7 broods/100 mi). Regional brood indices ranged from 2.7 broods/100 miles in the Southeast to 25.8 broods/100 miles in the Southwest. Average brood size in 2008 (4.5 ± 0.1 [SE] chicks/brood) was similar to last year (4.6 ± 0.1 [SE] chicks/brood), but below the 10-year mean (4.9 chicks/brood) and the long-term average (5.6 chicks/brood; Table 2). The median hatch date for pheasants was June 12 (n = 453), 1 day later than last year and 4 days later than the 10-year average (Table 2). The distribution of estimated hatch dates for observed broods was unimodal and approximately normally distributed, which suggests that many early nesting attempts were successful (vs. wide-spread nest failure, which often leads to an extensive renesting effort and a wide or bimodal peak in hatch dates). However, successful late-season nests will likely be underrepresented in roadside data. Median age of broods observed was 8 weeks (range: 1-16 weeks).

Although a mild winter throughout most of the pheasant range resulted in high hen counts, cool and wet spring weather reduced nest success and brood survival. Thus, a decrease in the range-wide pheasant index was not surprising, although the true population decrease may not be as great as indicated by the survey in areas where late reproductive effort was successful. Overall, the size of the fall population will be close to the 10-year average, but with relatively more adults and fewer juveniles. 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, South Central, and East Central regions.

GRAY PARTRIDGE

Rangewide, the gray partridge index (4.8 partridge/100 miles) was similar to last year but 55% below the 10-year average and 68% below the long-term average (Table 2, Figure 2B). Within regions,

the partridge index ranged from 0.0/100 miles in the East Central region to 15.8/100 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 47% below the 10-year mean and 64% below the long-term average (Table 2). The proportion of adult partridge observed with broods (23%) was 31% below 2007, 31% below the 10-year average, and 30% below the long-term average (Table 2). Average brood size in 2008 (9.3 chicks/brood) was smaller than in 2007 (9.9 chicks/brood), but larger than the 10-year average (7.8 chicks/brood) and the long-term average (8.9 chicks/brood). Total broods observed per 100 miles were 47% below 2007, 65% below the 10-year average, and 72% below the long-term average (Table 2). The median hatch date was June 25 (n = 15), which was 5 days later than in 2007 and 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. 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. The Southwest and Southeast regions offer the best opportunity for harvesting gray partridge in 2008.

COTTONTAIL RABBIT and WHITE-TAILED JACKRABBIT

The eastern cottontail rabbit index (6.3 rabbits/100 mi) was similar to last year, the 10-year average, and 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 0.4 rabbits/100 miles in the Northwest to 13.1 rabbits/100 miles in the East Central region (Table 3, Figure 7). The best opportunities for harvesting cottontail rabbits are in the East Central and South Central regions.

The index of white-tailed jackrabbits did not change significantly from 2007, but was 56% (95% CI: -95 to-17%) below the 10-year average and 92% (95% CI: -106 to -77%) below the long-term average (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, and again this year (Figure 3B). The long-term decline in jackrabbits probably reflects the loss of their preferred habitats (i.e., pasture, hayfields, and small grains). 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 for white-tailed deer (13.9/100 mi) increased by 43% (95% CI: 10 to 75%) from last year, was similar to the 10-year average, and increased 57% (95% CI: 28 to 86%) from the long-term average (Table 2, Figure 4A). Among regions, deer indices increased significantly from 2007 only in the West Central region (Table 3).

MOURNING DOVE

The number of mourning doves observed (192.9/100 mi) in 2008 decreased 17% (95% CI: -31 to -2%) from last year, 14% (95% CI: -24 to -4%) from the 10-year average, and 25% (95% CI: -36 to -15%) from the long-term average (Table 2, Figure 4B). The mourning dove index ranged from 85.2 doves/100 miles in the Northwest region to 353.4 doves/100 miles in the Southwest. The number of mourning doves heard along U.S. Fish and Wildlife Service call-count survey (CCS) routes (n = 8) in Minnesota was similar to last year. Trend analyses indicated the number of mourning doves heard along the CCS routes declined 1.2% per year (90% CI: -7.4 to 5.0%) during 1999-2008 and 1.9% per year (90% CI: -3.7 to -0.2%) during 1966-2008 (Dolton et al. 2008). In fall 2004, Minnesota held its first modern dove hunting season.

OTHER SPECIES

Notable incidental sightings: 1 bald eagle (Faribault County), 1 short-eared owl (Marshall County, 2 Coopers hawks (Le Sueur and Washington Counties), 1 American bittern (Marshall County), 112 sandhill cranes (Blue Earth, Chisago, Lake of the Woods, Le Sueur, Marshall, Pennington, Polk, Pope, Roseau, Stearns, and Waseca Counties), 9 great blue herons (Marshall and Watonwan Counties), 22 pied-billed grebes (Watonwan County), 2 prairie chickens (Clay County), 18 ruffed grouse (Chisago and Kittson counties), 14 sharp-tailed grouse (Kanabec, Marshall, Polk, and Roseau Counties), 165 wild turkeys (Blue Earth, Carver, Douglas, Grant, Le Sueur, Lincoln, Marshall, Mille Lacs, Mower, Nicollet, Olmsted, Pennington, Polk, Pope, Renville, Todd, Washington, Wilkin, and Waseca Counties), 3 coyotes (Martin County), and 5 red fox (Mower, Murry, Norman, and Scott Counties).

LITERATURE CITED

Dolton, D.D., K. Parker, and R.D. Rau. 2008. Mourning dove population status, 2008. Pages 1-21 *in* Mourning dove, white-winged dove, and band-tailed pigeon population status, 2008. U.S. Fish and Wildlife Service, Laurel, Maryland. USA.

[MCWG] Minnesota Climatology Working Group. 2008. MCWG Home Page http://climate.umn.edu/. Accessed on August 25, 2008.

Table 1. Abundance (total acres) and density (acres/mi^2) of undisturbed grassland habitat within pheasant range, 2008[a].

	Cropland Retirement									Density
AGREG	CRP	CREP	RIM	RIM-WRP	WRP	USFWS[c]	MNDNR[d]	Total	%	ac/mi^2
WC[b]	360,542	37,450	17,079	822	19,659	171,925	104,174	711,650	10.5	67.0
SW	121,297	24,549	12,214	579	830	17,127	53,629	230,225	6.1	38.9
C	145,664	14,490	17,028	714	3,212	84,100	45,541	310,750	5.1	32.9
SC	96,440	27,610	11,813	3,730	9,367	8,095	30,438	187,491	4.6	29.7
SE	91,133	2,262	5,554	554	620	18,384	50,469	168,975	4.6	29.2
EC	4,666	0	1,265	0	4	2,504	84,314	92,753	2.9	18.5
Total	819,742	106,360	64,953	6,398	33,692	302,134	368,565	1,701,844	6.2	39.5

[a] Unpublished data, Tabor Hoek, BWSR, 15 August 2008.

[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. Rangewide trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2008.

Species	Change from 2007[a]					Change from 10-year average[b]				Change from long-term average[c]			
Subgroup	*n*	2007	2008	%	95% CI	*n*	1998-07	%	95% CI	*n*	LTA	%	95% CI
Ring-necked pheasant													
Total pheasants	151	106.2	80.8	-24	±14	149	79.8	3	±13	151	102.8	-22	±13
Cocks	151	10.0	12.5	26	±17		7.2	76	±23		11.5	9	±17
Hens	151	16.2	14.4	-11	±16		11.8	24	±20		14.8	-3	±19
Broods	151	17.5	12.0	-31	±14		12.5	-3	±14		13.4	-11	±16
Chicks per brood	453	4.6	4.5	-2			4.9	-9			5.6	-20	
Broods per 100 hens	453	107.5	83.1	-23			108.2	-23			101.7	-18	
Median hatch date	453	Jun 11	Jun 12				Jun 08						
Gray partridge													
Total partridge	170	8.4	4.8	-43	±48	168	10.7	-55	±29	151	16.4	-68	±19
Adults	170	1.9	1.5	-22	±51		2.9	-47	±28		4.1	-64	±17
Broods	170	0.7	0.4	-47	±42		1.0	-65	±28		1.4	-72	±19
Chicks per brood	15	9.9	9.3	-6			7.8	19			8.9	5	
Broods per 100 adults	15	34.1	23.4	-31			33.9	-31			33.2	-30	
Median hatch date	15	Jun 20	Jun 25				Jun 20						
Eastern cottontail	170	7.1	6.3	-12	±21	168	6.7	-5	±15	151	6.8	5	±16
White-tailed jackrabbit	170	0.3	0.2	-39	±69	168	0.4	-56	±39	151	1.9	-92	±15
White-tailed deer	170	9.8	13.9	43	±32	168	13.4	5	±17	168	8.5	57	±29
Mourning dove	170	231.5	192.9	-17	±15	168	225.1	-14	±10	151	276.5	-25	±11

[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 = 1955-2007, except for deer = 1974-2007. Does not include Northwest region (8 counties in Northwest were added to survey in 1982). Estimates for all species except deer based on routes (*n*) surveyed ≥40 years; estimates for deer based on routes surveyed ≥25 years.

Table 3. Regional trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2008.

Region / Species	Change from 2007[a]					Change from 10-year average[b]				Change from long-term average[c]			
	n	2007	2008	%	95% CI	*n*	1998-07	%	95% CI	*n*	LTA	%	95% CI
Northwest[d]													
Gray partridge	19	1.7	1.7	-0.1	±247	19	0.2	788	±1656	19	4.0	-58	±113
Eastern cottontail		0.4	0.4	0.4	±306		1.1	-61	±114		0.9	-55	±95
White-tailed jackrabbit		0.0	0.4				0.5	-18	±125		0.7	-41	±93
White-tailed deer		34.4	45.1	31	±73		41.8	8	±36		27.5	64	±61
Mourning dove		102.2	85.2	-17	±80		86.1	-1	±41		129.5	-34	±24
West Central													
Ring-necked pheasant	37	117.8	90.4	-23	±27	36	68.2	36	±25	37	104.1	-13	±20
Gray partridge		1.5	1.6	7	±64		2.8	-40	±72		10.7	-85	±29
Eastern cottontail		4.1	3.6	-13	±57		3.4	8	±57		4.2	-15	±43
White-tailed jackrabbit		0.3	0.1	-67	±135		0.7	-85	±50		2.5	-96	±22
White-tailed deer		5.1	11.6	128	±80		11.0	7	±35		8.1	43	±49
Mourning dove		225.9	185.0	-18	±25		287.8	-35	±15		385.4	-52	±11
Central													
Ring-necked pheasant	30	72.8	61.2	-16	±37	29	65.5	-3	±39	29	76.7	-17	±32
Gray partridge		3.2	2.3	-29	±173		5.1	-54	±69		10.5	-78	±37
Eastern cottontail		5.6	6.9	23	±57		6.6	9	±38		6.5	10	±33
White-tailed jackrabbit		0.1	0.0	-100	±205		0.2	-100	±56		1.4	-100	±22
White-tailed deer		4.3	6.2	46	±112		6.2	4	±70		3.9	64	±112
Mourning dove		215.7	159.8	-26	±35		195.8	-17	±20		237.5	-31	±20
East Central													
Ring-necked pheasant	14	61.7	78.3	27	±50	14	57.0	37	±41	14	87.5	-11	±33
Gray partridge		0.0	0.0				0.1	-100	±147		0.2	-100	±133
Eastern cottontail		20.0	13.1	-34	±57		10.7	23	±42		8.6	53	±51
White-tailed jackrabbit		0.0	0.0				0.0				0.3	-100	±59
White-tailed deer		10.6	18.0	71	±84		14.2	27	±88		7.4	142	±145
Mourning dove		143.4	87.1	-39	±47		99.3	-12	±33		128.9	-32	±37

Table 3. Continued.

Region / Species	Change from 2007					Change from 10-year average				Change from long-term average			
	n	2007	2008	%	95% CI	*n*	1998-07	%	95% CI	*n*	LTA	%	95% CI
Southwest													
Ring-necked pheasant	19	222.5	158.5	-29	±34	19	154.3	3	±31	19	119.2	33	±48
Gray partridge		25.7	15.8	-39	±113		40.7	-61	±50		44.2	-64	±39
Eastern cottontail		5.7	3.8	-34	±44		9.5	-60	±14		8.4	-55	±20
White-tailed jackrabbit		1.3	0.8	-34	±111		0.9	-11	±123		4.1	-80	±35
White-tailed deer		8.8	11.8	33	±53		11.3	4	±39		7.5	58	±65
Mourning dove		353.8	353.4	-0.1	±29		340.1	4	±29		315.4	12	±28
South Central													
Ring-necked pheasant	32	121.4	81.1	-33	±24	32	94.9	-15	±25	32	137.5	-41	±25
Gray partridge		13.5	5.0	-63	±70		19.7	-75	±35		20.1	-75	±32
Eastern cottontail		12.6	10.9	-14	±34		9.4	15	±35		7.7	41	±41
White-tailed jackrabbit		0.3	0.1	-50	±179		0.3	-54	±108		1.9	-93	±24
White-tailed deer		4.9	4.9	0	±74		5.2	-6	±49		3.2	51	±84
Mourning dove		310.5	266.6	-14	±43		254.6	5	±27		256.9	4	±36
Southeast													
Ring-necked pheasant	19	27.4	16.6	-40	±64	19	40.4	-59	±34	20	78.2	-80	±34
Gray partridge		17.5	10.3	-41	±98		7.1	46	±146		14.7	-33	±72
Eastern cottontail		4.8	6.3	30	±75		8.3	-24	±27		7.9	-16	±39
White-tailed jackrabbit		0.2	0.0	-100	±210		0.2	-100	±98		0.7	-100	±42
White-tailed deer		11.6	13.8	20	±59		15.4	-10	±45		9.5	43	±79
Mourning dove		206.3	161.7	-22	±26		218.3	-26	±30		229.2	-31	±26

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

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

[c] LTA = 1955-2007, except for Northwest region (1982-2007) and white-tailed deer (1974-2007). Estimates based on routes (*n*) surveyed ≥40 years (1955-2007), except for Northwest (≥20 years) and white-tailed deer (≥25 years).

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

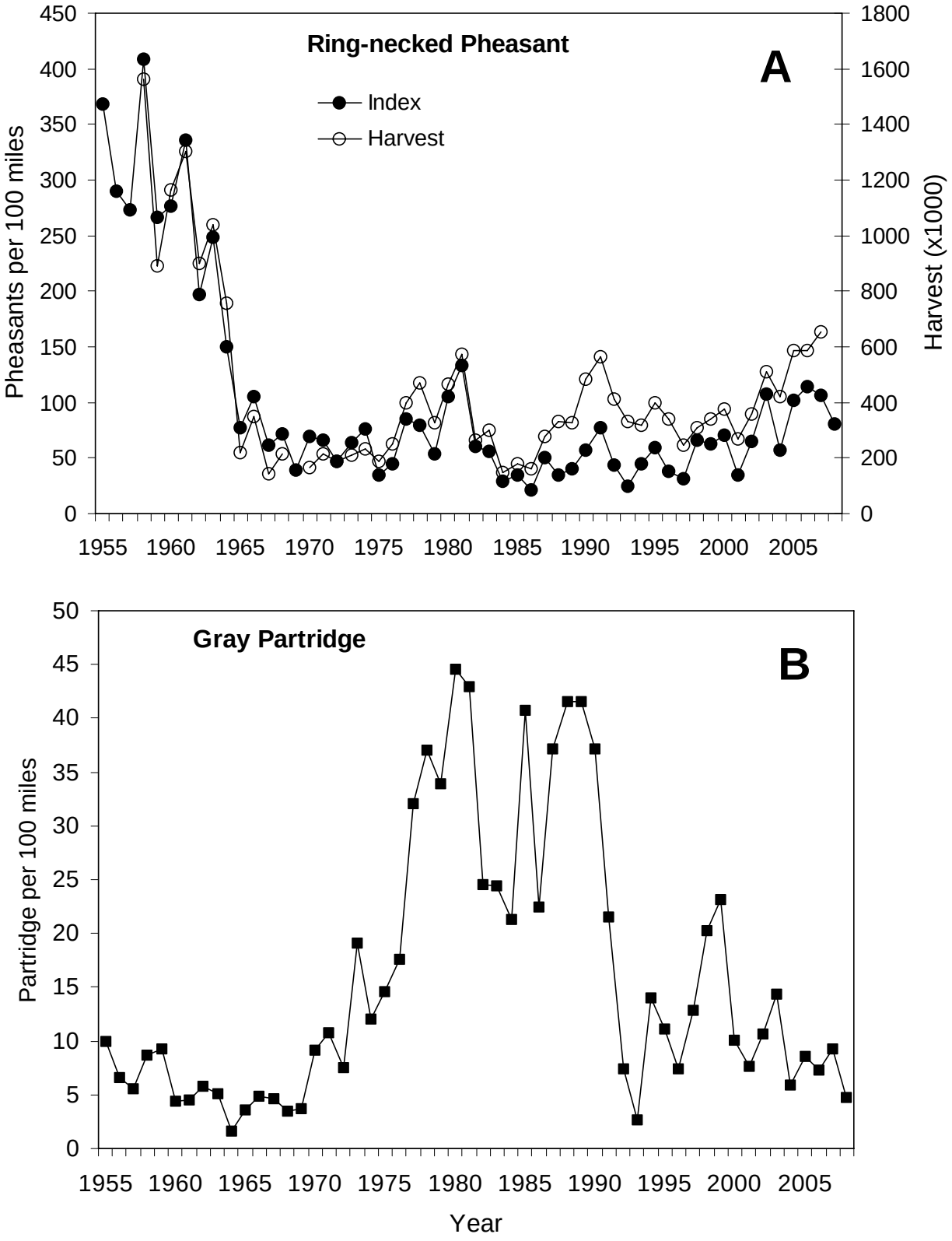


Figure 2. Rangewide index of ring-necked pheasants (A) and gray partridge (B) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.

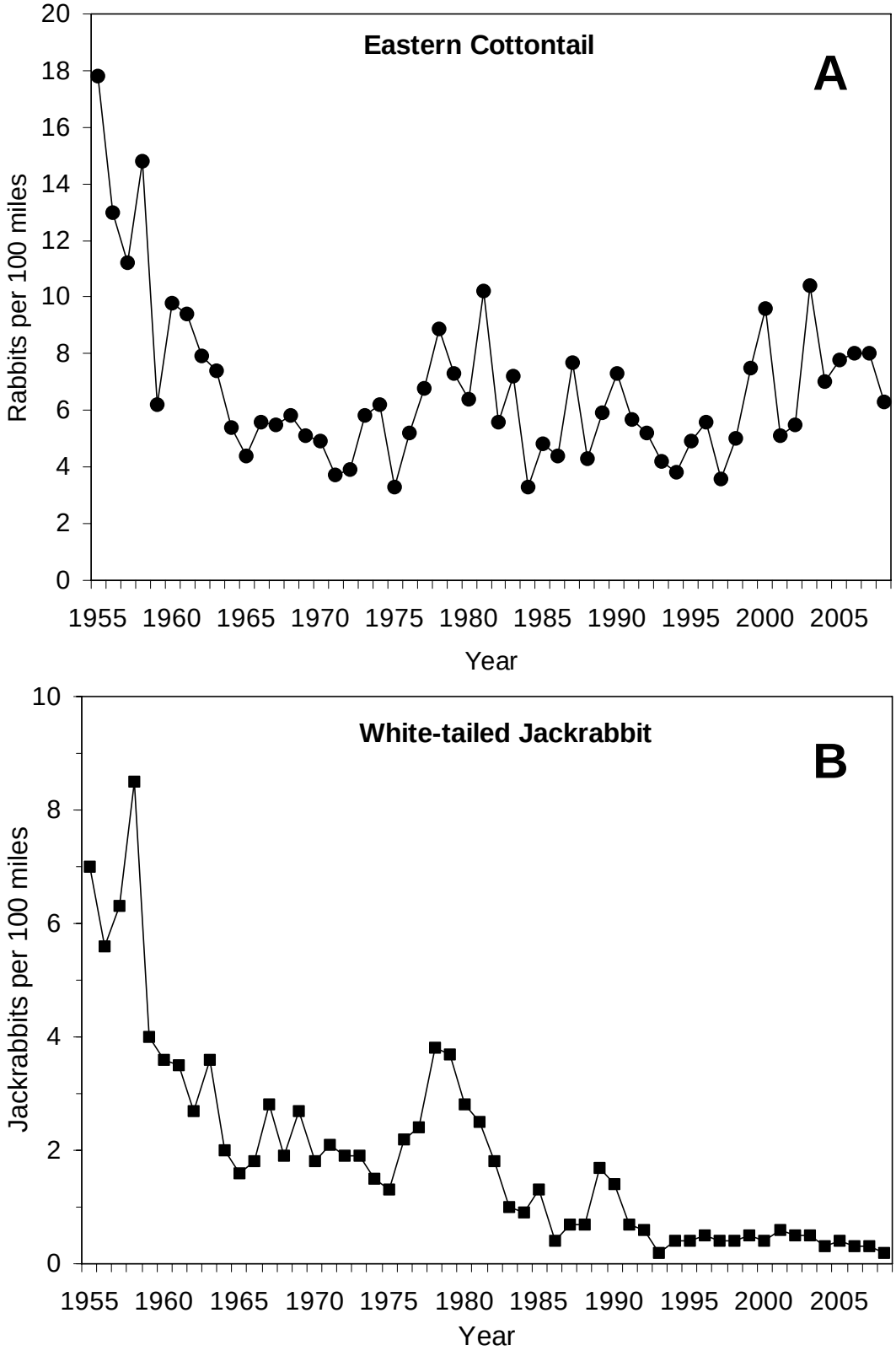


Figure 3. Rangewide index of eastern cottontail (**A**) and white-tailed jackrabbits (**B**) seen per 100 miles driven. Does not include the Northwest region. Based on all survey routes completed.

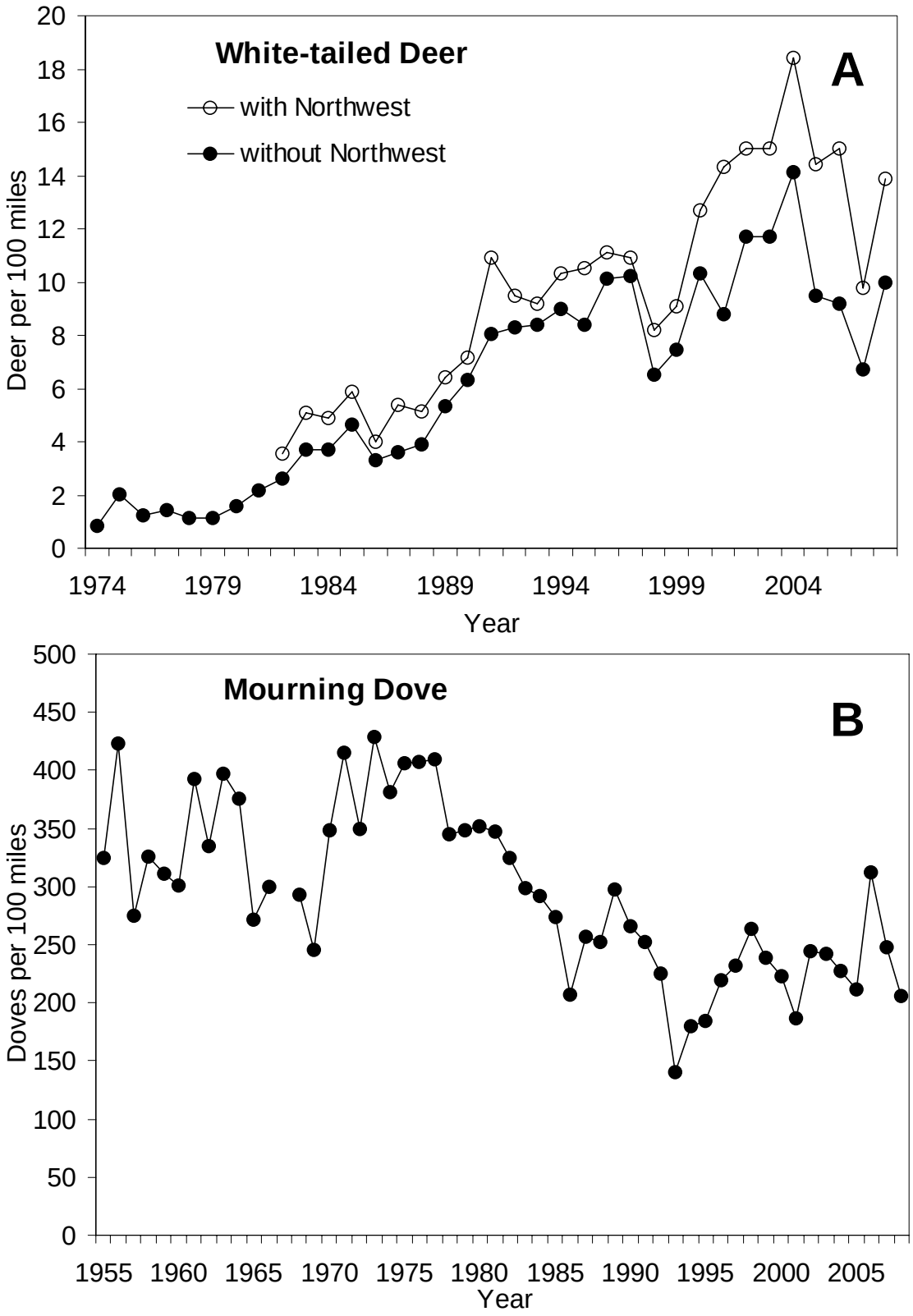
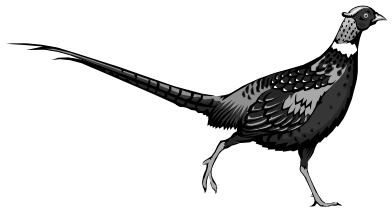


Figure 4. Rangewide index of white-tailed deer (**A**) and mourning doves (**B**) seen per 100 miles driven. Doves were not counted in 1967 and the dove index does not include the Northwest region. Based on all survey routes completed.



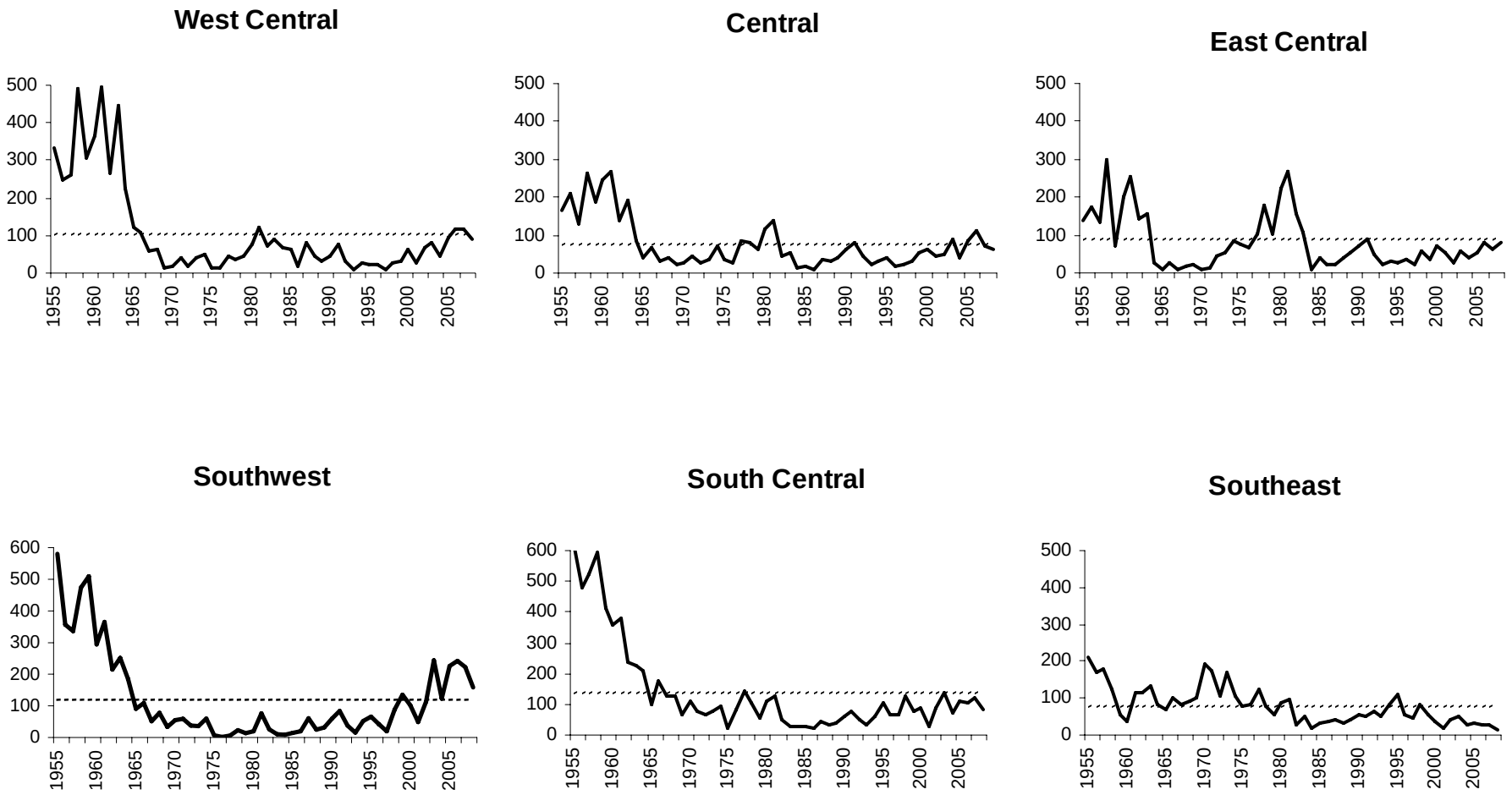


Figure 5. Regional index (——) and long-term average (·····) of **ring-necked pheasants seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same scale among survey regions.

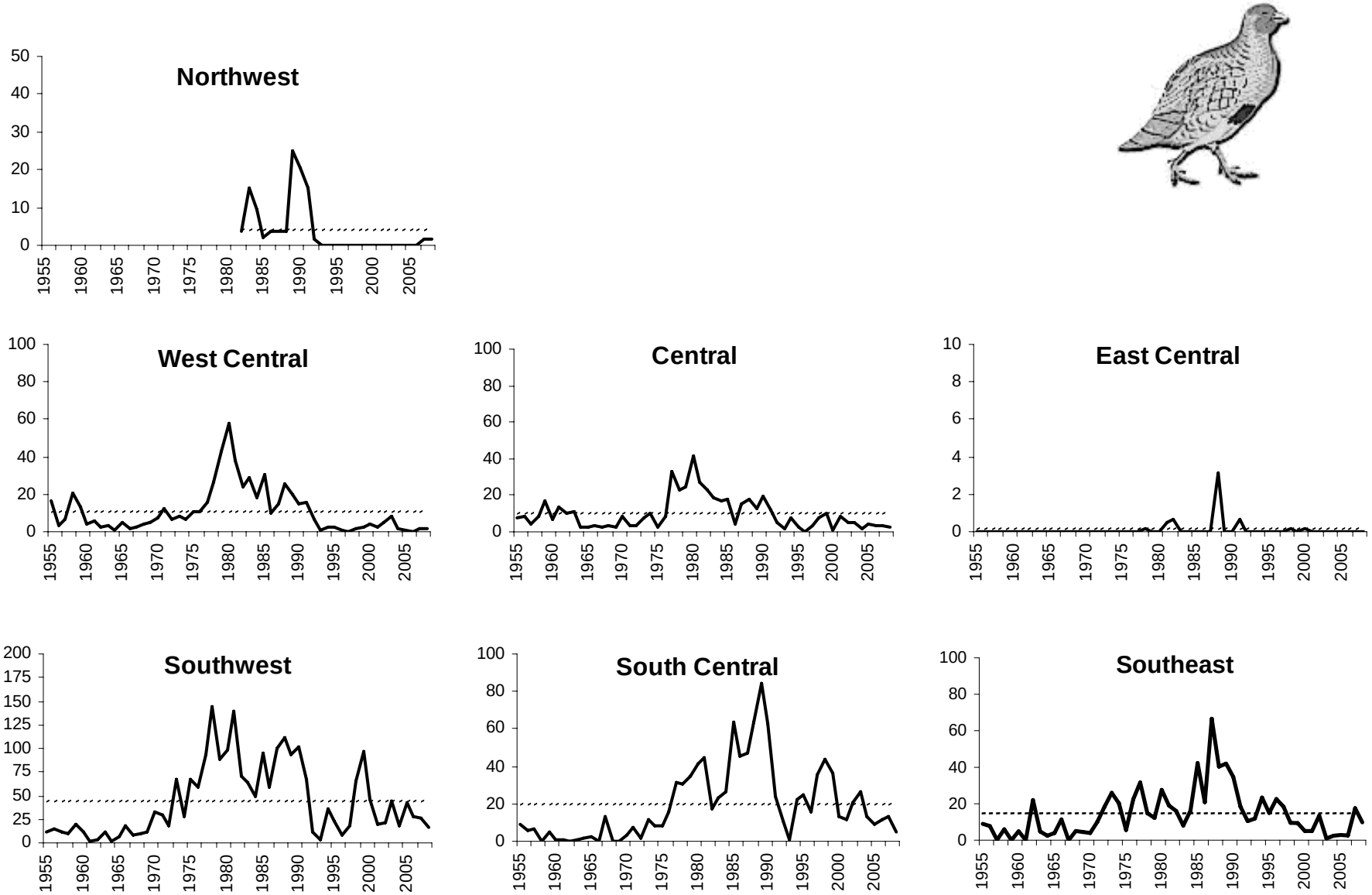


Figure 6. Regional index (——) and long-term average (·····) of **gray partridge seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

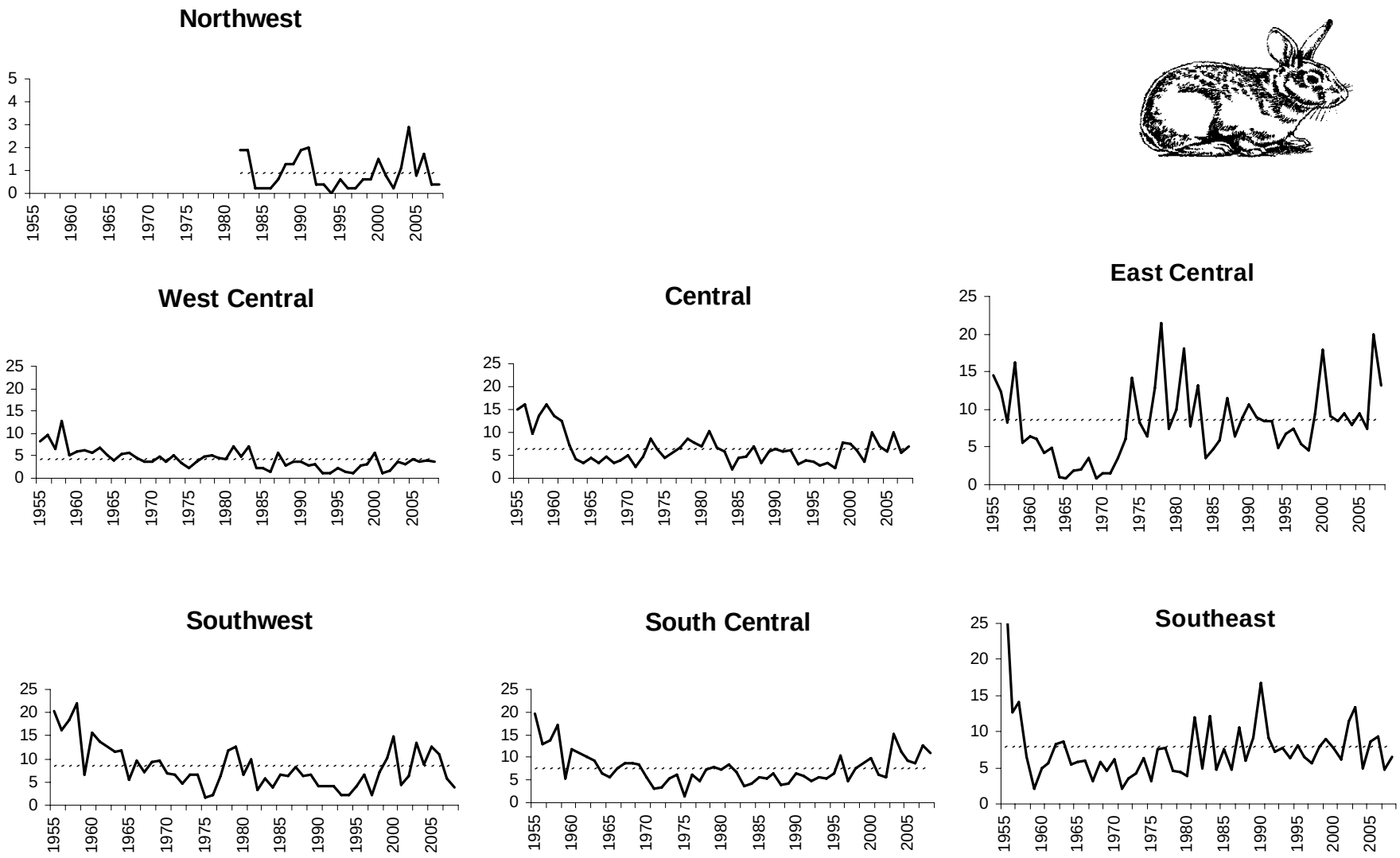


Figure 7. Regional index (——) and long-term average (••••••) of **cottontail rabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

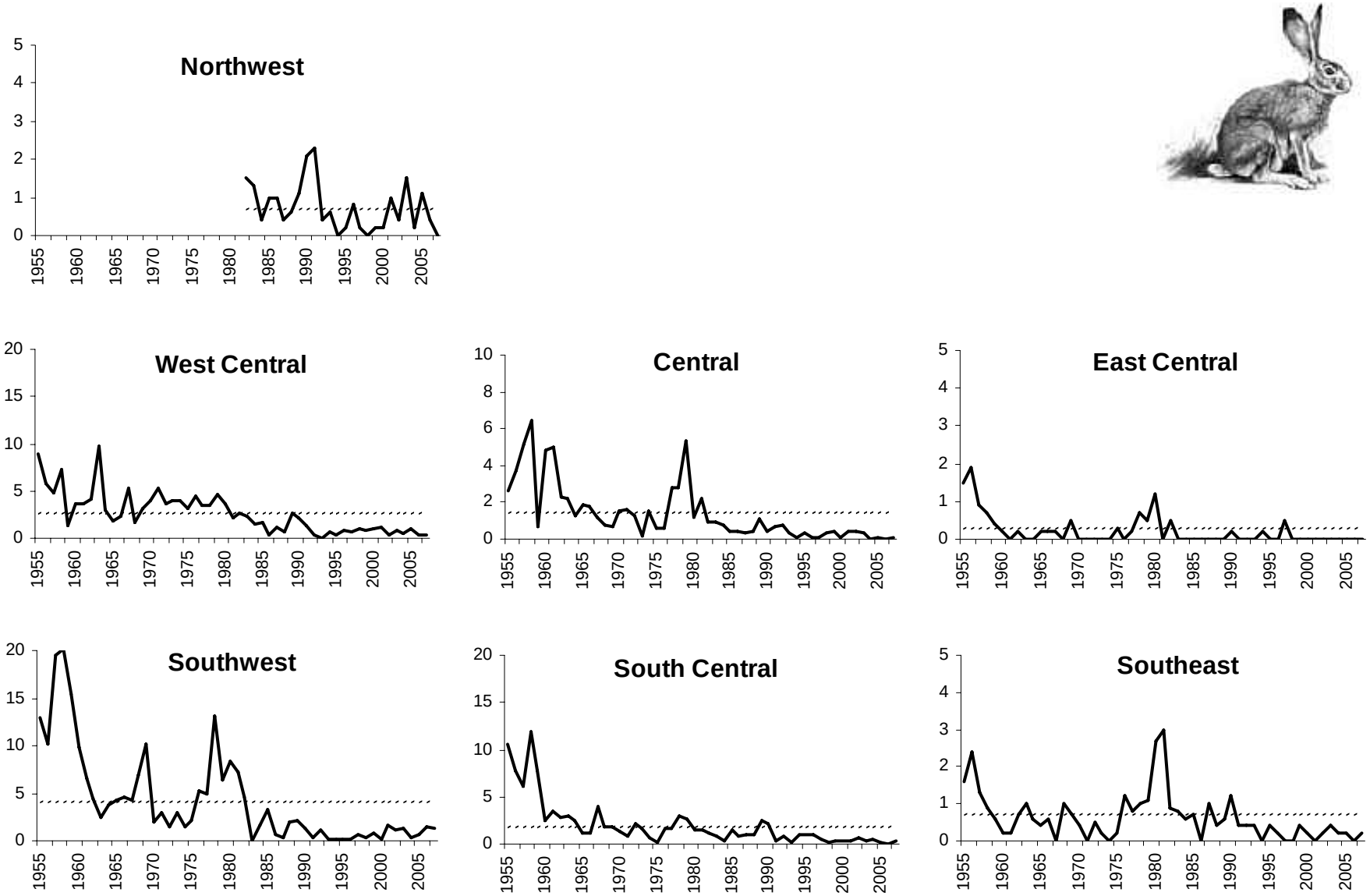


Figure 8. Regional index (——) and long-term average (••••••) of **white-tailed jackrabbits seen per 100 miles driven**, Minnesota August roadside survey (1955-present). Based on all survey routes completed. **Note:** scale of vertical axis is not the same among survey regions.

MONITORING POPULATION TRENDS OF WHITE-TAILED DEER IN MINNESOTA'S FARMLAND/TRANSITION ZONE – 2008

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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 serious 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 to determine appropriate harvest levels 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 these DMUs are partitioned into Sub-DMUs for discussion in this report (Table 1). Permit areas (PAs) delineated within DMUs served as the basis for population modeling and managing antlerless harvests. Several management strategies are available, the management strategies employed during a given year depends on where the population density is relative the population goal (Figure 2). There were 86 PAs in Minnesota's farmland zone in 2007. However, the 2 PAs encompassing the Twin Cities metro region were not modeled, and PAs 224 and 235 were not modeled due to their small size (Grund 2001).

Marked changes in the season format occurred between 2007 and 2008. The most notable change was that the Zone 4 season had been a split 2-day season with the 2-day season beginning on the Saturday nearest to 6 November; a 4-day season would occur the following weekend. In 2008, the Zone 4 season was eliminated and a continuous 9-day season will be used, similar to the season format used in Zone 2 during 2007. Consequently, all Zone 4 PAs were identified with new numbers in the 200 series. The split season format did not change in Zone 3, so no changes were made to the PA numbering system in Zone 3.

Population Modeling

The population model used to analyze past trends and test harvest strategies can be best 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 farmland deer populations through population analysis, 3) provide population estimates and simulate vital rates for farmland deer populations, and 4) assist with

management efforts through simulations, projections, and predictions of different management prescriptions.

The 3 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) were 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.

Population Trends and Densities

Deer densities continue to increase throughout most of the 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 are presented in Table 1.

In the Northwest DMUs, simulated deer densities indicated a slight downward trend over the last couple of years in some permit areas. Efforts to reduce deer in this area may be having an impact in these areas. However, current deer densities remain well above goal in most northwestern permit areas.

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

In the Prairie DMU, the farmland model suggests that deer densities have increased slowly over the last couple of years. Rate of increase is fastest in the North and Southwest permit areas. This trend reflects management strategies used to accommodate the established population goal density (Figure 2).

Harvest Trends and Model Performance

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. I use antlered and antlerless harvest trends as an ancillary index to measure population dynamics over time. In most situations, the trend in harvests agreed with what I would expect from simulated population densities. The efforts the DNR have made to recalibrate the farmland model in the northwest have improved model performance thereby making the ancillary population indices logical. Consequently, the farmland model has become a more useful management tool in these Northwest DMU permit areas.

Harvest densities fluctuated substantially across the Big Woods DMU and across years. Trends in harvest densities have been most stable in the Metro and most variable in the Southeast permit areas of

the Big Woods DMU. Harvest densities have generally increased in the central and northern portions of the Big Woods DMU over the past 4-6 years. In the southeastern and metro portions of the Big Woods DMU, trends in harvest densities agreed with output generated by the farmland model. The DNR has recalibrated the farmland model in most southeastern and metro PAs thereby improving model performance. In almost all PAs located in the northern and central areas of the Big Woods DMU, trends in harvest densities did not agree with simulated estimates. In most of these areas, the farmland model is performing so poor that it cannot be used to make science-based management recommendations. Thus, I highly recommend recalibrating the farmland model in these permit areas.

In the Prairie DMU, harvest densities have substantially declined over the past decade. However, the farmland model indicated that populations have increased in most Prairie DMU permit areas. Based on my interpretation of these trends, the farmland model is performing very poorly in most Prairie PAs and I highly recommend recalibrating the farmland model in these areas. Based on the marked declines in harvests over the past 10-15 years and the fact that current densities are 25-50% below newly established goals, antlerless harvest quotas have generally been reduced by 50-75% from over the past 2 to 3 years in most permit areas in the Prairie DMU.

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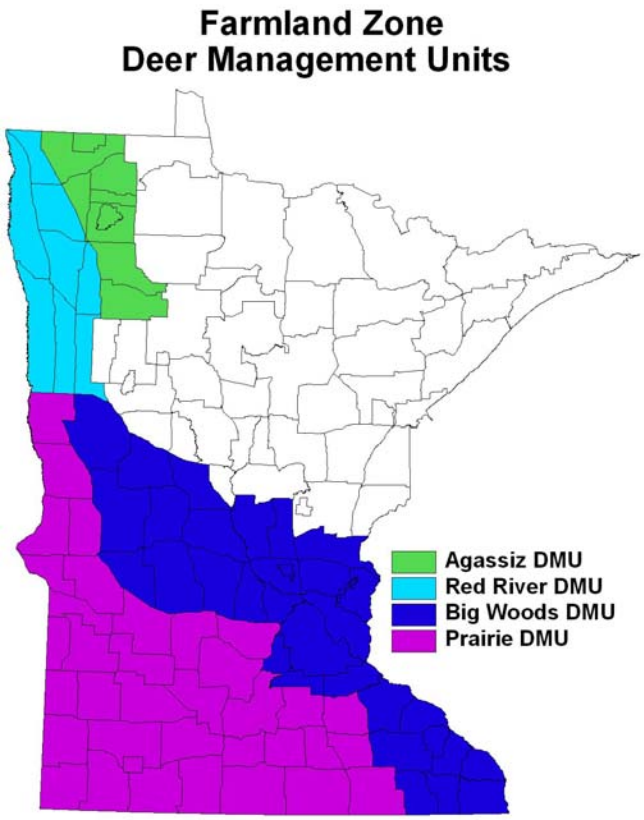

Figure 1. Deer management units in the farmland zone of Minnesota, 2008.

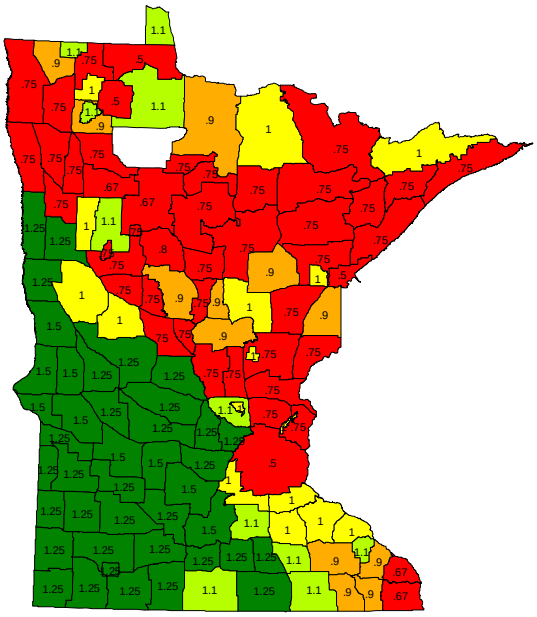

Figure 2. Population density goals in deer permit areas in Minnesota, 2008.

Table 1. Pre-fawning deer density estimates[a] (deer/mi^2) by Deer Management Unit (DMU), sub-unit (DMSU), and permit area (PA) in Minnesota's Farmland/Transition Zone, 1996-2008.

DMU	DMSU	PA	Area mi^2	Pre-fawning density												
				1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
RED RIVER		260	1249	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4[a]	4
		261	795	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3[a]	4
		262	677	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	3	3[a]
AGASSIZ		201	155	2	2	3	3	4	5	5	5	5	5	6	6	6
		203	108	3	2	2	3	4	5	6	7	7	7	4[a]	4	4
		209	576	5	5	6	6	6	7	7	7	7	7	6[a]	7[a]	6[a]
		210	485	11	10	10	11	11	11	11	12	11	11	11[a]	11[a]	10[a]
		256	654	6	6	6	7	7	8	8	8	7	7	3[a]	3[a]	3[a]
		257	413	11	10	10	10	11	11	10	8	9	8	9[a]	10[a]	9[a]
		263	512	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	5
		264	669	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7	7
		265	494	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	9[a]
		266	617	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	6[a]
		267	472	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5	4
		268	230	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9	9
		297	438	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6	6
BIG WOODS	*North*	213[c]	644	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	13	13
		214	557	17	17	17	17	18	19	19	19	20	19	18	18	16
		215	702	9	9	9	9	9	9	9	10	9	8	9	8	8
		218[c]	813	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6	6
		219	393	10	10	9	8	8	9	9	9	10	11	11	12	14
		229	288	5	5	5	5	5	6	6	6	7	6	7	7	7
		239	924	14	14	13	13	15	16	15[a]	14	14	13	12	11	10
		240	642	21	21	20	21	23	25	26	27	29	25[a]	26	27	28
		273[c]	575	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7	8

		276	544	10	10	9	9	9	8	8	8	8	7	8	7	9
		277	885	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8	10[a]
	Central	221	642	9	9	9	10	11	12	11	12	13	13	13	13	12
		222	412	13	13	13	13	14	14	14	15	15	14	14	13	11
		223	376	13	13	13	13	13	13	13	14	14	12[a]	13	14	14
		225	619	19	18	18	18	18	19	19	19	20	22	24	14[a]	14
	Metro[b]	227	472	13	13	13	13	13	14	15	15	18	20	14[a]	14	13
		236	374	17	16	16	16	17	17	19	23	26	31	18[a]	19	18
		338	452	5	4	4	4	4	5	6	7	4[a]	4	4	4	4
		339	409	6	6	5	4	5	5	6	8	10	4[a]	5	6	7
	Southeast	341	596	9	9	9	9	9	9	10	11	10	10	9	9	9
		342	352	10	10	11	11	12	11	13	15	17	13[a]	13	13	14
		343	663	8	8	8	8	9	9	11	13	16	19	23	11[a]	11
		344	189	17	16	15	14	14	15	17	20	24	28	37	12	12
		345	326	10	11	11	11	11	10	10	11	12	14	17	19	21
		346	319	17	18	18	18	19	19	20	23	25	27	29	23[a]	22
		347	434	10	10	9	9	9	9	10	11	12	13	13	13	13
		348	332	17	17	17	17	16	15	15	16	17	17	16	13	13
		349	492	13	14	15	16	17	17	18	21	24	28	31	21[a]	21
PRAIRIE	*North*	269	651	4	3	3	3	4	4	4	4	4	4	3	3	3
		270	749	3	3	3	3	3	3	3	4	4	3[a]	3	3	4
		271	634	2	2	2	2	2	2	2	3	3	3	4	2[a]	2
		272	531	4	4	3	3	3	3	3	4	4	3[a]	3	4	5
		275	766	7	5	4	4	4	3	3	3	4	4	3	4	4
		282	779	2	1	1	1	1	1	1	1	2	2[a]	1	1	1
		283	614	3	3	3	3	3	3	3	4	4	3[a]	3	4	4
		284	837	2	2	1	1	2	2	2	2	2	3	2[a]	2	2
		285	550	4	4	3	4	4	4	4	5	6	4	4	3	3

River	274	360	8	7	6	6	5	4	4	4	4	4	4[a]	4	5
	278	397	10	9	9	8	8	8	8	9	9	10	7[a]	8	8
	281	575	6	5	5	5	5	5	4	5	5	6	4[a]	4	5
	290	662	5	4	4	4	4	4	4	4	4	4	4	5	5
	291	806	5	4	4	4	4	4	4	5	6	4[a]	4	4	5
	299	386	7	6	6	5	5	5	5	5	5	5	6	5[a]	6
Southwest	279	345	7	7	6	6	6	6	5	5	5	4[a]	4	4	5
	280	675	3	2	2	2	2	2	2	2	3	3	2[a]	3	3
	286	447	3	3	2	2	3	4	4	4	4	4[a]	4	4	5
	288	625	3	3	3	2	3	4	4	4	4	4[a]	4	5	6
	289	816	2	2	1	2	1	1	1	2	2	1[a]	2	2	2
	294	687	3	3	3	3	3	3	3	3	4	3[a]	3	3	4
	234	637	3	3	3	3	4	4	4	4	5	4[a]	4	4	4
	237	729	2	2	2	2	2	2	2	3	4	3[a]	3	3	3
	295	840	4	3	3	3	3	3	3	4	4	3[a]	3	3	4
	238	95	5	4	4	4	4	4	4	4	4	5	5	5[a]	5
	250	712	4	3	3	3	3	4	4	4	5	4[a]	4	4	4
	296	666	3	2	2	3	3	3	3	3	3	3	3	4[a]	5
	252	715	3	3	2	2	2	2	2	3	3	3	3[a]	3	4
	253	974	3	3	3	3	3	3	3	3	4	3[a]	3	3	4
Southeast	292	481	9	9	8	8	8	7	7	8	7	7	8[a]	7	6
	293	506	8	9	8	8	8	8	7	8	7[a]	7	7	7	7
	230	453	3	3	3	3	3	3	3	4	4	4[a]	4	5	6
	232	377	5	4	4	4	4	4	4	4	4[a]	4	5	5	5
	233	385	5	5	4	4	4	4	4	5	5	4[a]	4	4	4
	254	931	4	4	4	4	4	4	4	4	5[a]	4	4	5	5
	255	774	4	4	3	4	4	4	4	4	4	4	4	4[a]	3

[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.
[c] New permit area so no historical information is available

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 Specialists at the Brainerd area office.

WILDLIFE DAMAGE COMPLAINTS

Nick Reindl, Wildlife Damage Program Coordinator
Kathleen Koelbl-Crews, Wildlife Damage Extension Specialist
Steve Benson, Wildlife GIS Coordinator

Wildlife damage complaint information is collected statewide from wildlife managers. The 2007 information was compiled by MIS – GIS and summarized by the Wildlife Damage Program Coordinator, 1601 Minnesota Drive, Brainerd, MN 56401.

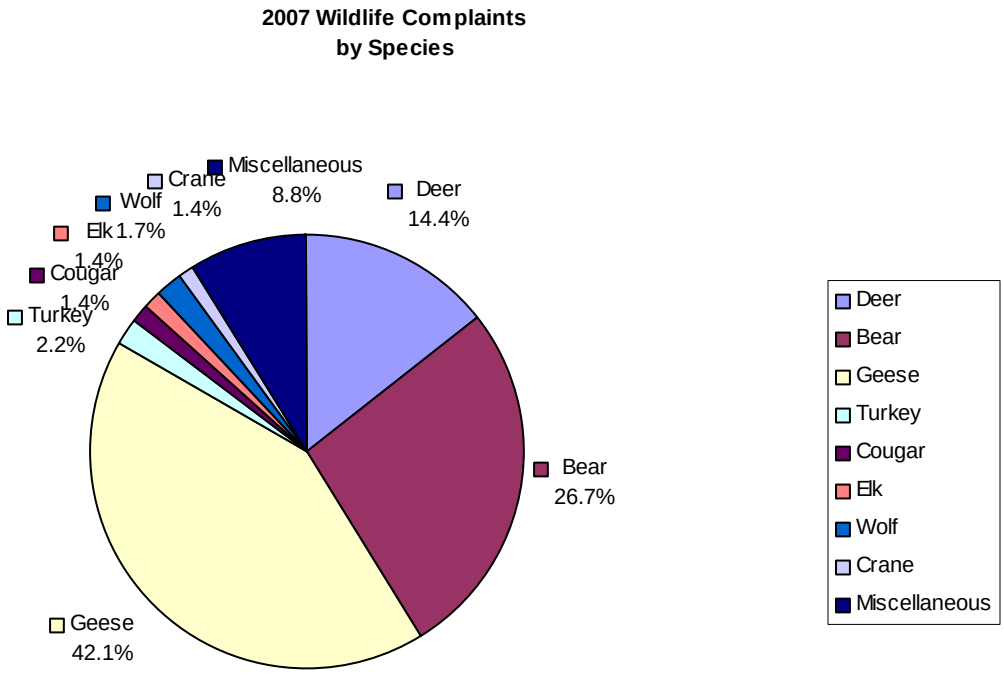

Figure 1. Wildlife complaints by species for the year 2007, in Minnesota.

Wildlife managers recorded a total of 651 wildlife complaints in 2007, down 28% when compared to the 2006 total of 907 complaints. Three species; black bear, white-tailed deer, and Canada geese account for 542, (83%) of the complaints received (Figure1). Five other species of special interest for wildlife damage; cougar, elk, turkey, sandhill crane, and wolf comprise an additional 52, (8 %) of the recorded complaints. Twenty species are represented in 57 (9 %) of the miscellaneous complaints received.

During calendar year 2007 materials assistance for permanent deer exclusion fences was provided to 24 growers and livestock producers (TB management); seven vegetable, three orchards, one flower, one vineyard, one tree nursery and 11 hay yards. Exclusion techniques included the installation of 18 woven-wire and six energized deer exclusion fences.

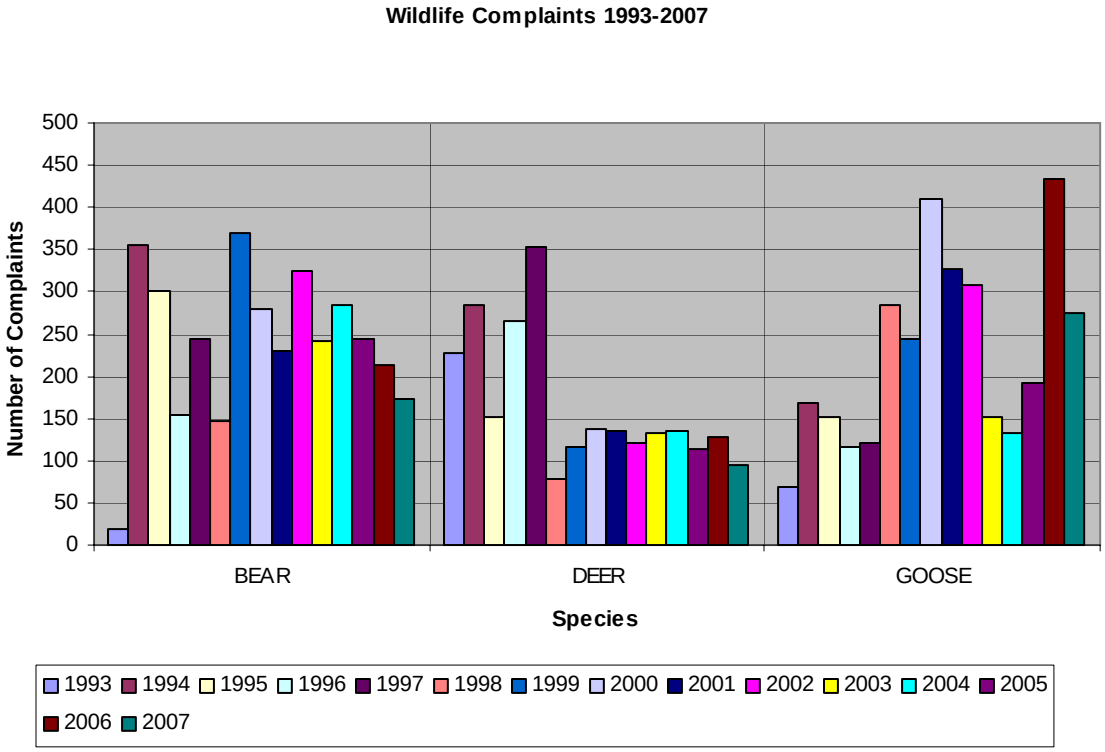

Figure 2. Number of wildlife complaints recorded by bear, deer & geese from 1993-2006, in Minnesota.

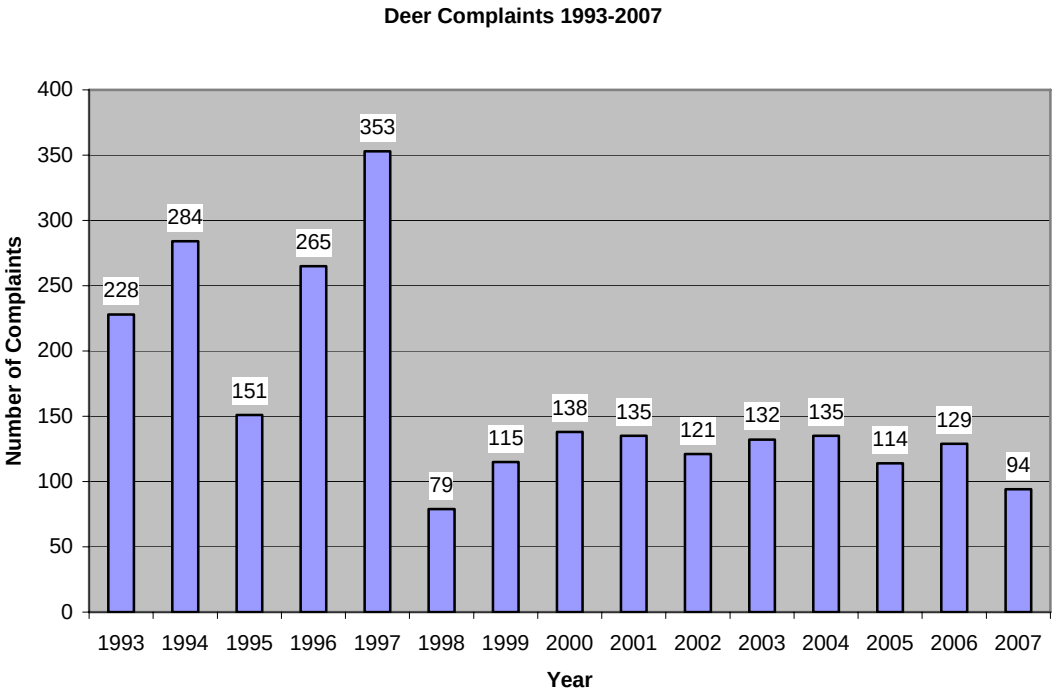

Figure 3. Number of deer complaints from 1993-2007, in Minnesota.

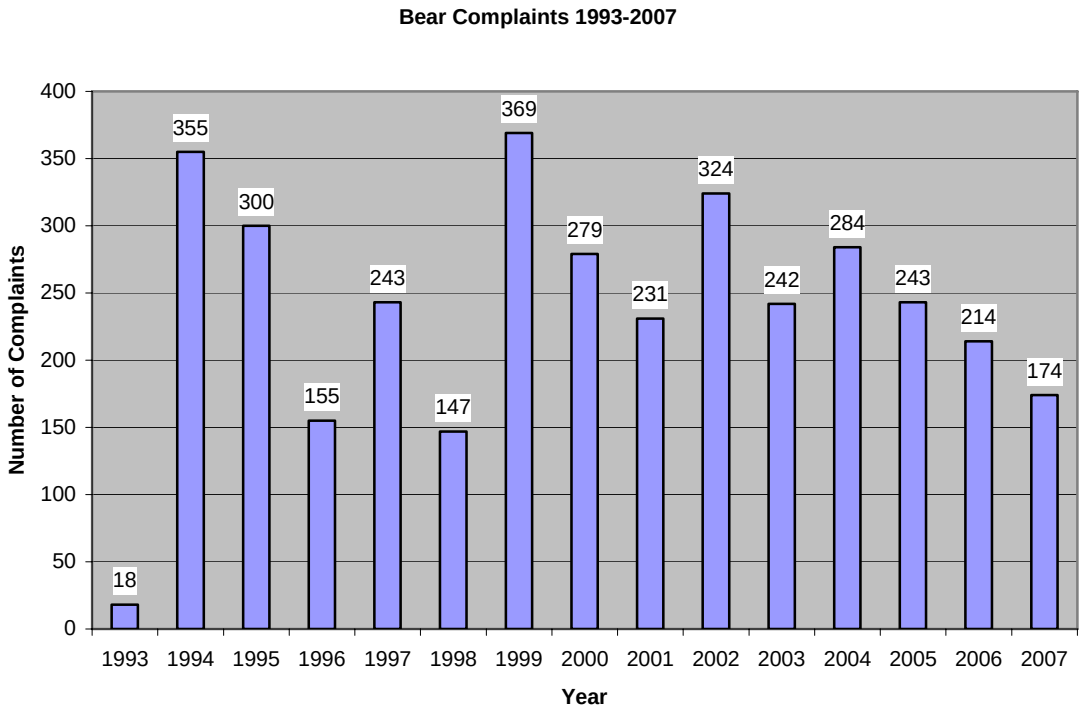

Figure 4. Number of bear complaints from 1993-2007 in Minnesota.

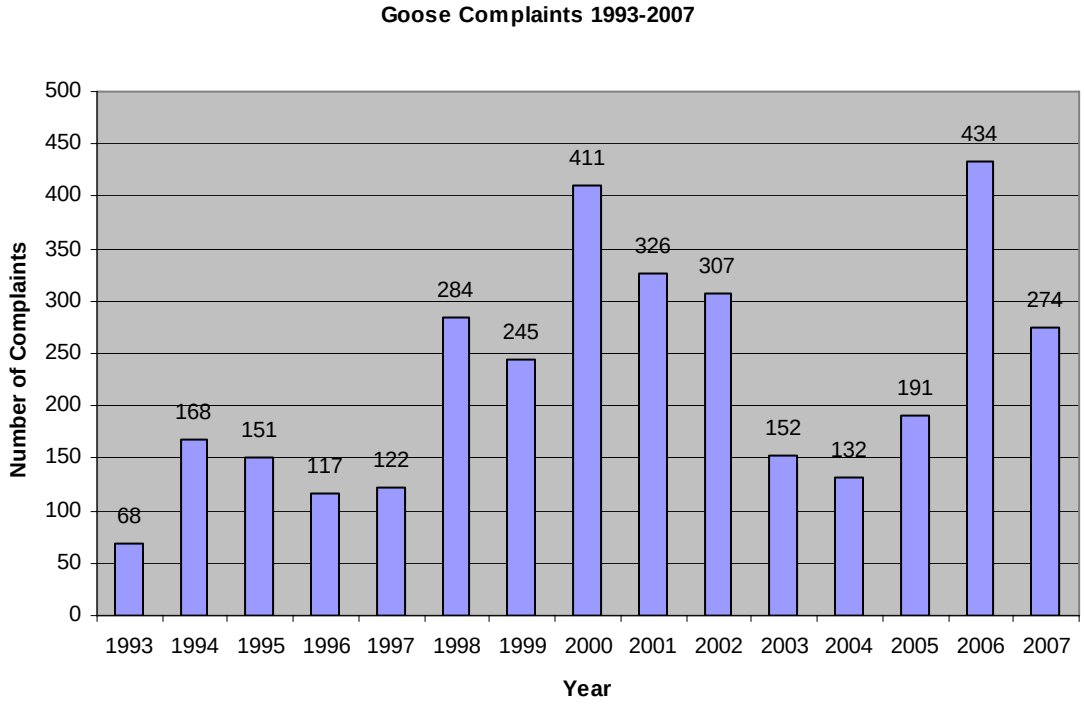

Figure 5. Number of goose complaints from 1993-2007, in Minnesota.

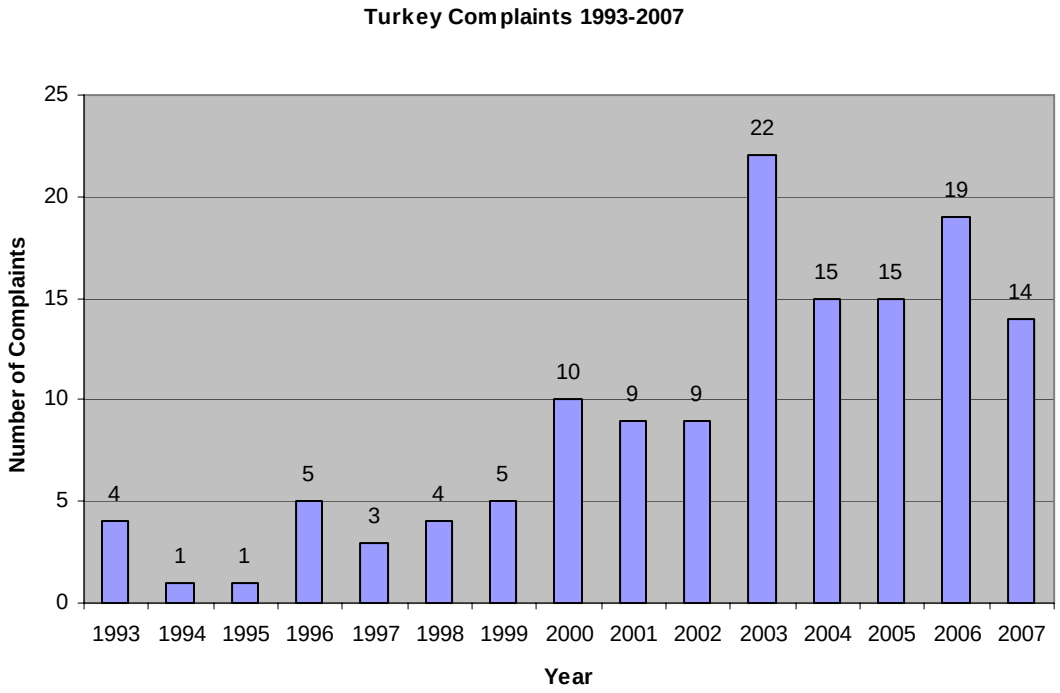

Figure 6. Number of turkey complaints from 1993-2007, in Minnesota.

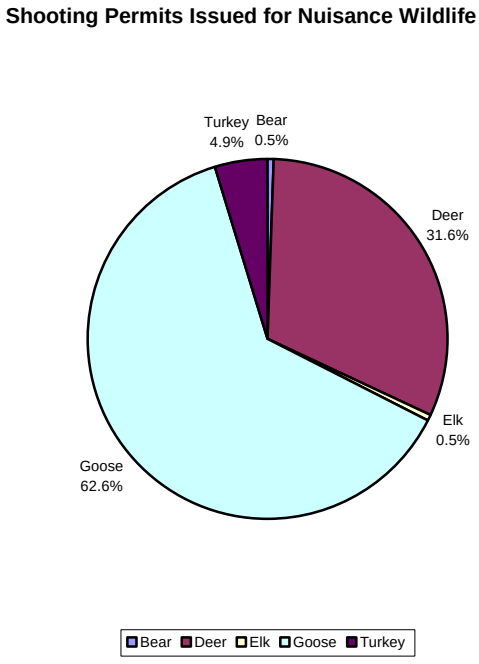

Figure 7. Shooting permits issued for nuisance wildlife control in Minnesota for 2007.

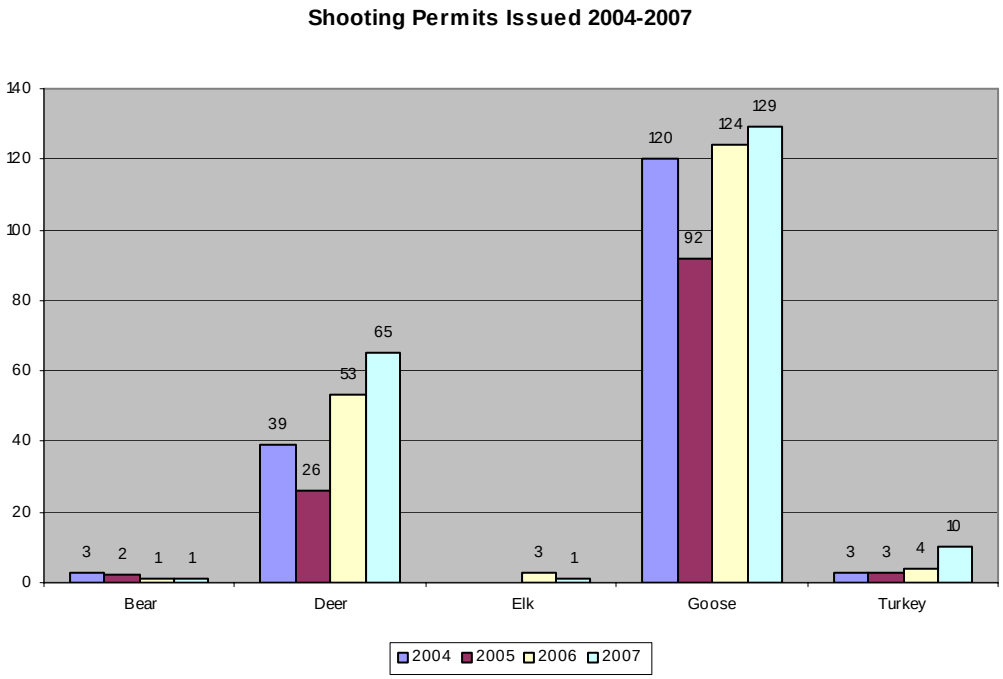

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Figure 8. Shooting permits issued for nuisance wildlife control in Minnesota for 2004-2007.

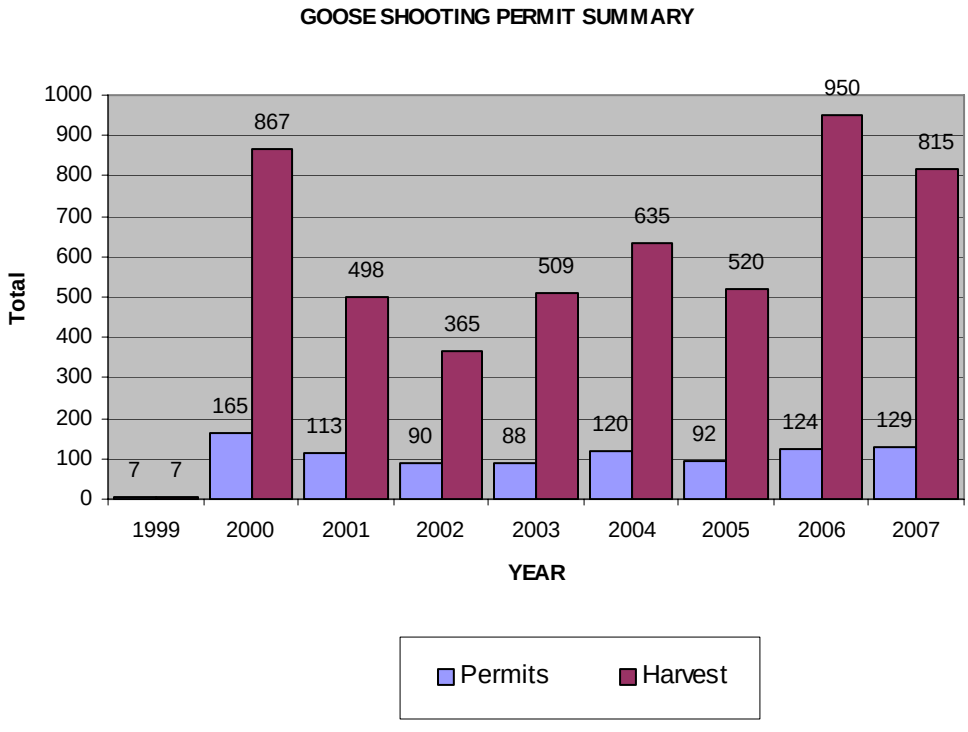

Figure 9. Comparison of nuisance goose shooting permits and harvest in Minnesota 1999-2007.

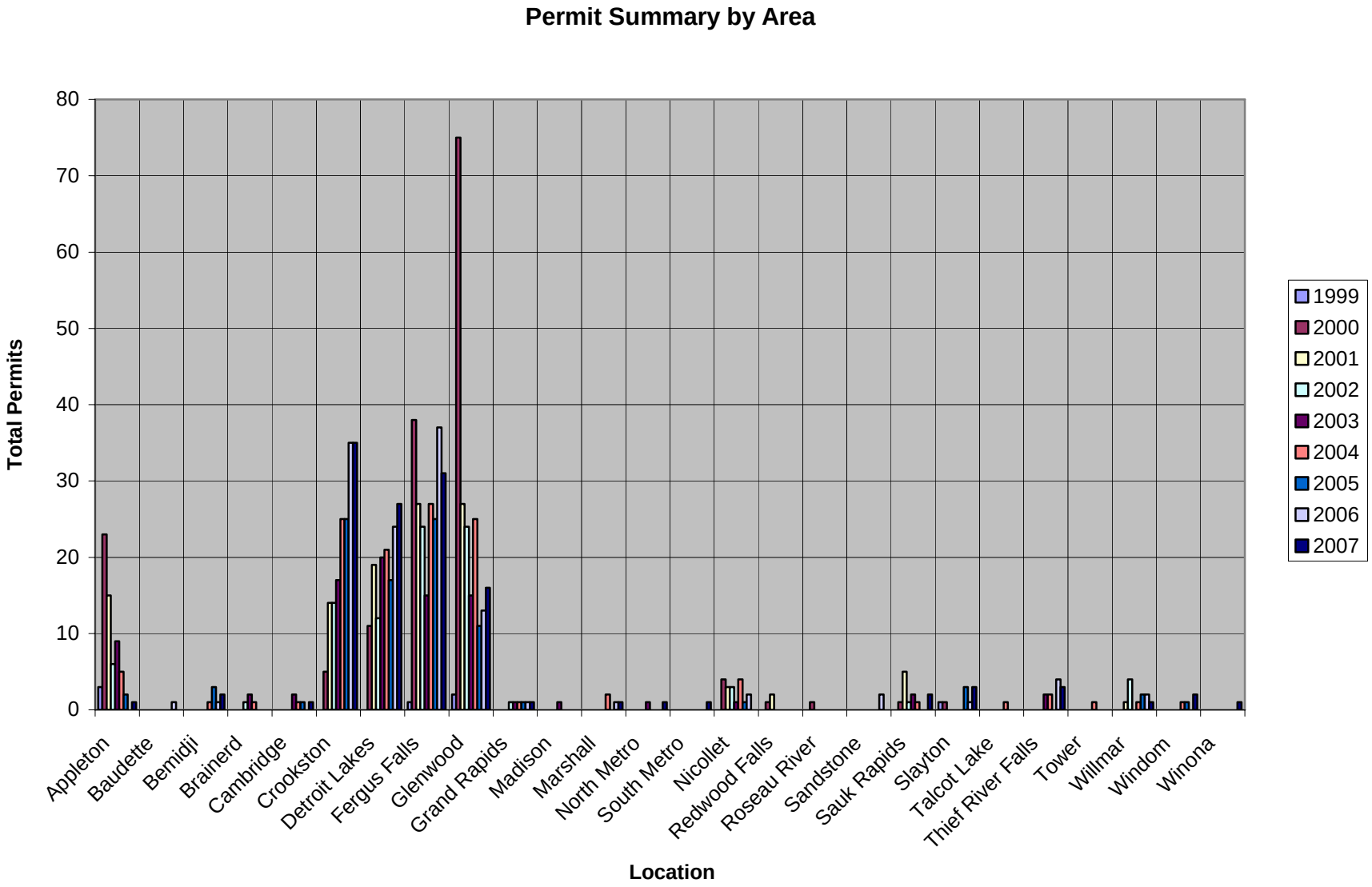

Figure 10. Nuisance goose permits issued by area wildlife offices in Minnesota 1999-2007.

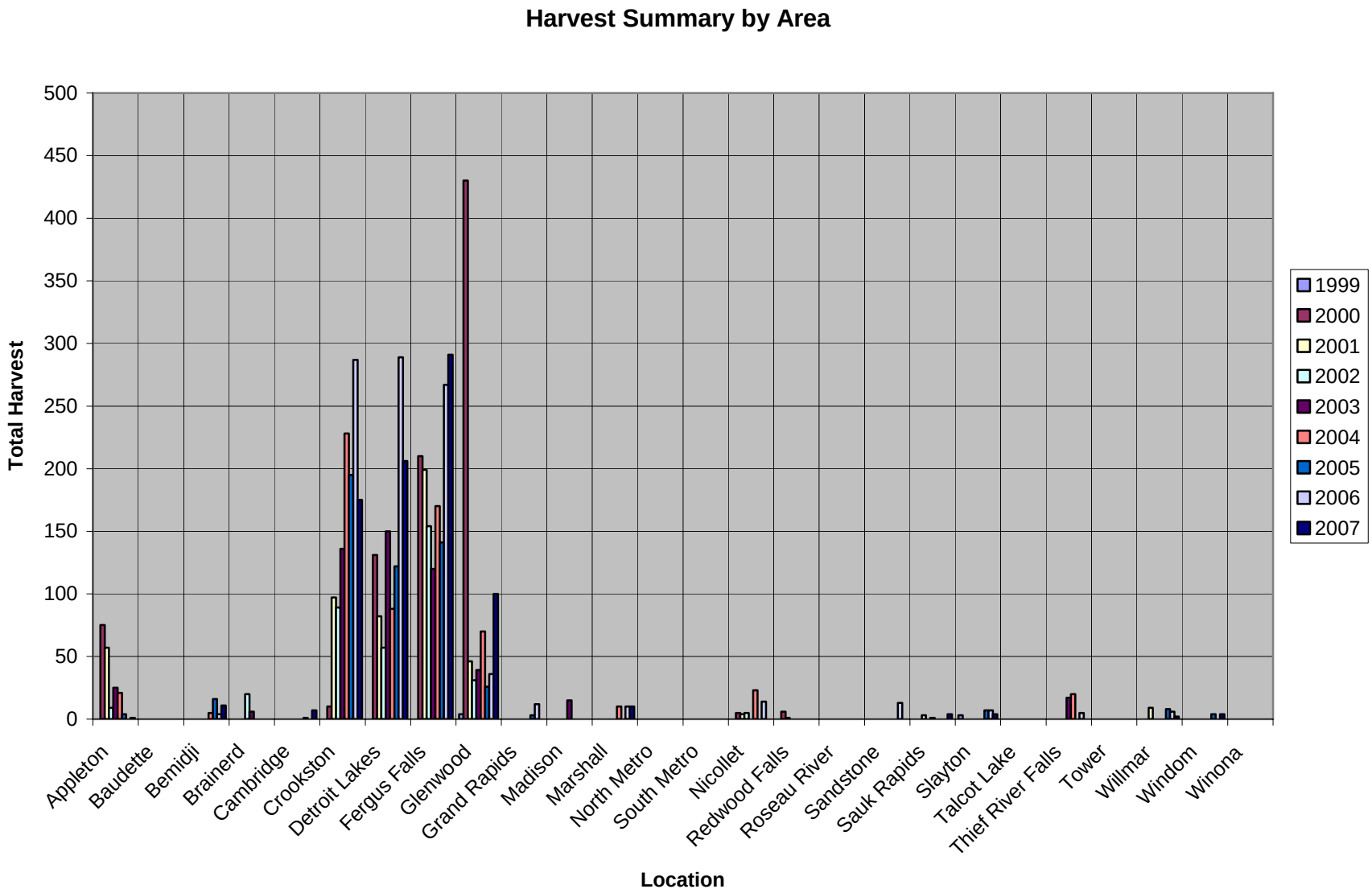

Figure 11. Nuisance goose harvest by area wildlife office in Minnesota 1999-2007.

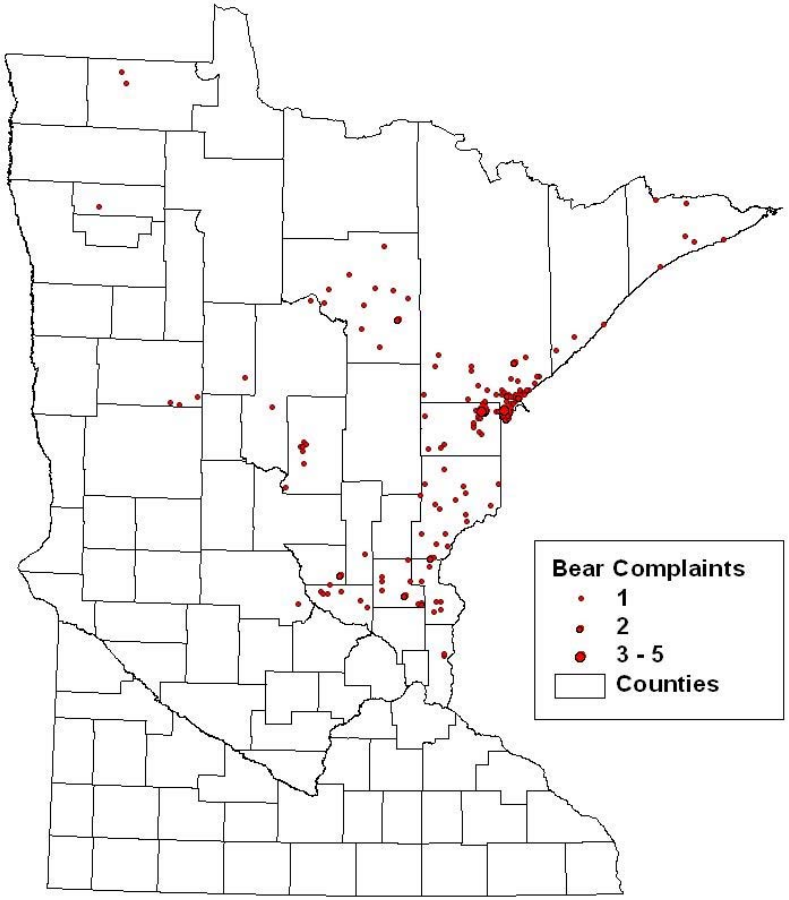

Figure 12. Location of bear damage complaints in 2007 (n=175). Note: number of points mapped differs from the total number of complaints received due to insufficient location information provided in the complaint reports to accurately map.

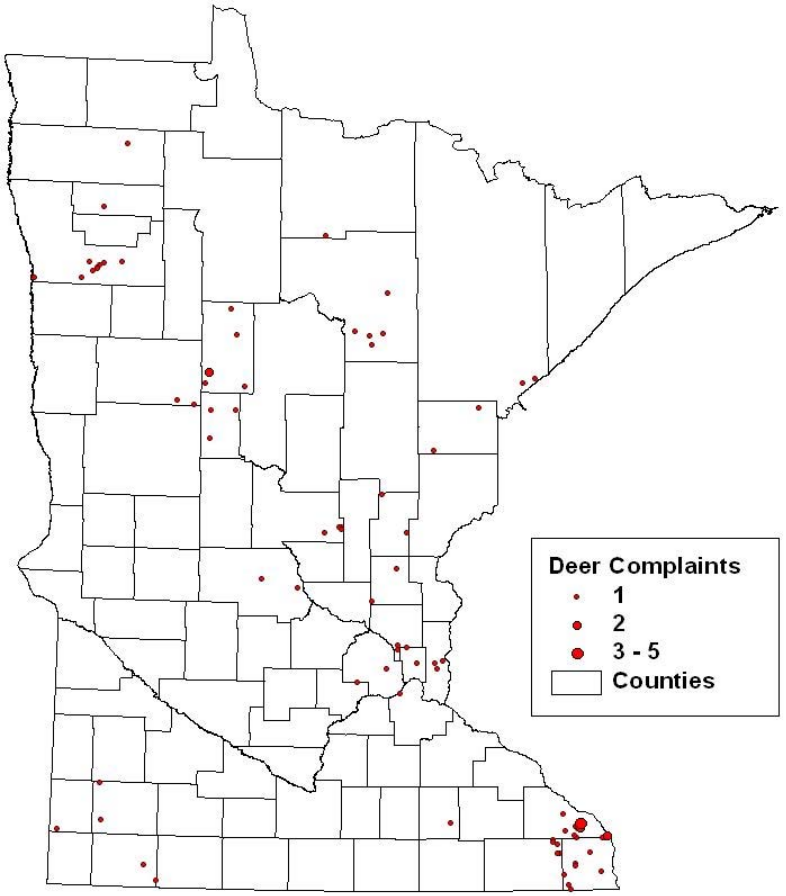

Figure 13. Location of deer damage complaints in 2007 (n= 94). Note: number of points mapped differs from the total number of complaints received due to insufficient location information provided in the complaint reports to accurately map.

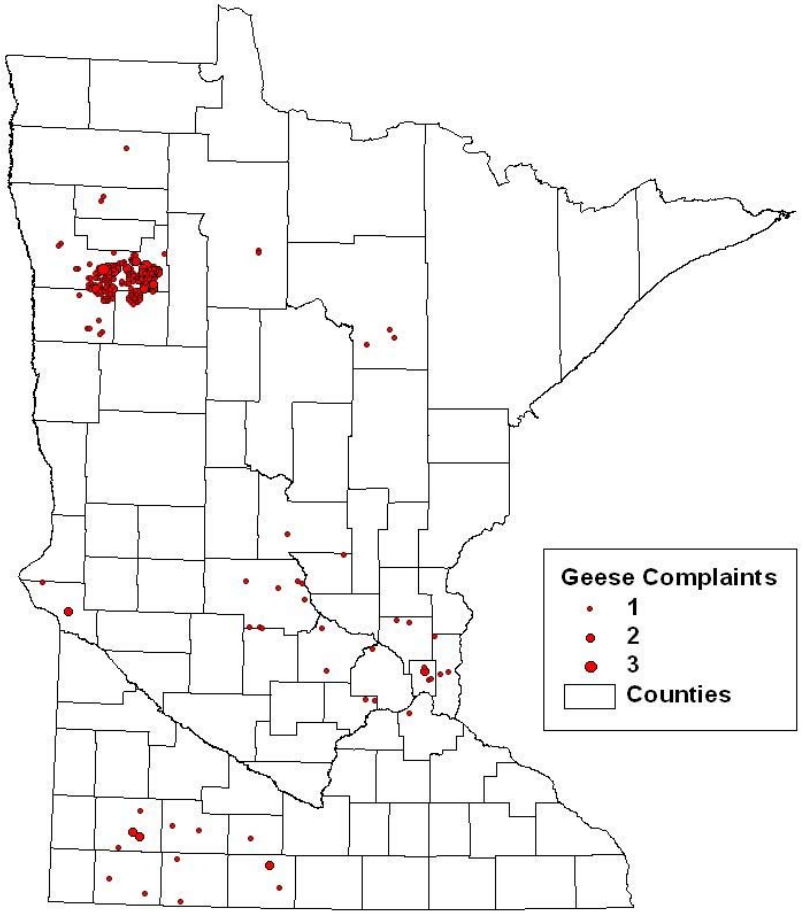

Figure 14. Location of goose damage complaints in 2007 (n=273). Note: number of points mapped differs from the total number of complaints received due to insufficient location information provided in the complaint reports to accurately map.

CARNIVORE SCENT STATION 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.

CARNIVORE SCENT STATION SURVEY SUMMARY, 2007

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 (Sargeant et al. 1998, 2003, 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 32nd 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. We continue to electronically enter previous data so confidence intervals on pre-2001 can be computed.

RESULTS AND DISCUSSION

A total of 274 routes were completed this year (Figure 1). There were 2,571 operable scent stations examined on the 274 4.3 km routes. This was the fewest number of operable stations since the survey design was modified in 1983, a result of poor weather conditions and time or funding constraints that limited

participation by numerous cooperating agencies. Route density varied from 1/512 km^2 in the Forest Zone to 1/1,309 km^2 in the Farmland (Figure 1).

Statewide, route visitation rates (% of routes with detection) were highest for red fox and skunk (35%), followed by domestic cat (30%), raccoon (28%), dog (22%), and coyote (19%). Regionally, route visitation rates were as follows: red fox – Farmland (FA) 23%, Transition (TR) 25%, Forest (FO) 43%; coyote – FA 33%, TR 18%, FO 14%; skunk – FA 42%, TR 43%, FO 29%; raccoon – FA 63%, TR 33%, FO 15%; domestic cat – FA 58%, TR 40%, FO 18%; and dog – FA 54%, TR 30%, FO 8%. 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, there were no significant changes from last year.

While multiple factors influence abundance, fox indices are lowest in the zone with the highest coyote index (Farmland), while coyote indices are lowest in the zones where wolves are present (Transition and Forest). Point estimates for the red fox index in the Farmland and Transition zones remain well below their long-term average (Figure 2 and 3), likely a combined result of increasing coyote numbers, mange, and habitat alteration. The Farmland coyote index continues it's upward trend (Figure 2), while the coyote index in the Forest zone remains below the long-term average (Figure 4). After several years of apparent decline in the Farmland zone, raccoon indices are back near peak levels previously observed. While wolf and bobcat indices in the Forest zone are below peak levels, they have not changed appreciably in the last 3 years, and both remain above their long-term average (Figure 5).

ACKNOWLEDGEMENTS

I wish to thank all of the cooperators who participated in the 2007 survey: DNR Division of Wildlife staff; Superior National Forest; Agassiz, Rydell, Minnesota Valley, and Tamarac National Wildlife Refuges; USFWS Wetland Management Districts; White Earth, Red Lake, and Leech Lake Reservations; 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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2007 Scent Station Specifics

Zone	Routes Completed	Route Density	Station Nights
Farmland	52	1/1,309 km^2	468
Transition	60	1/1,096 km^2	554
Forest	162	1/512 km^2	1,549
Totals	274	1/791 km^2	2,571

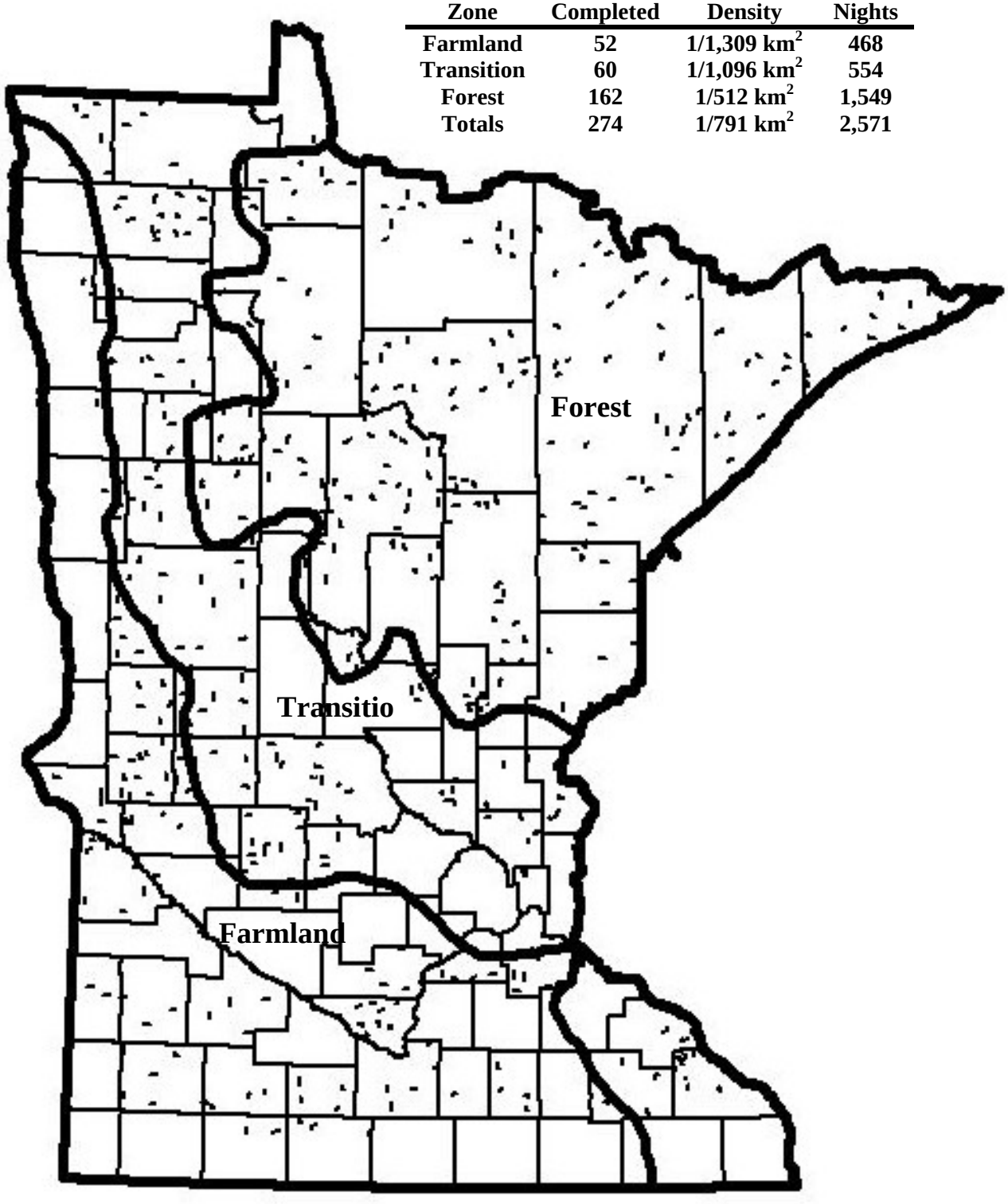
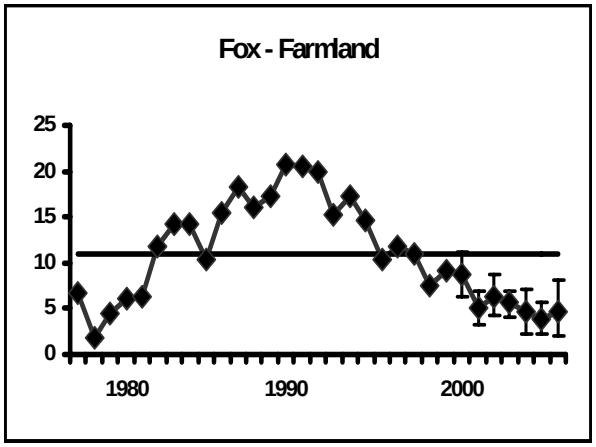
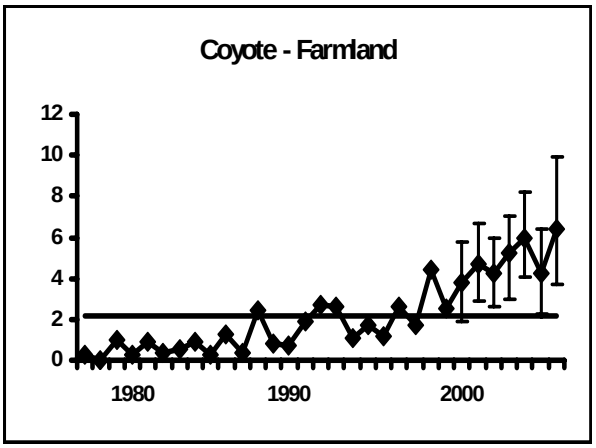
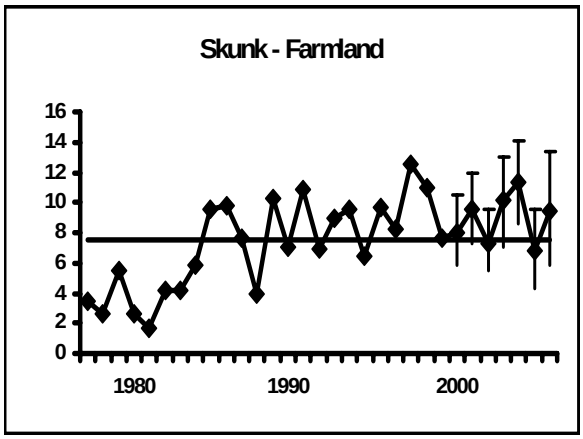
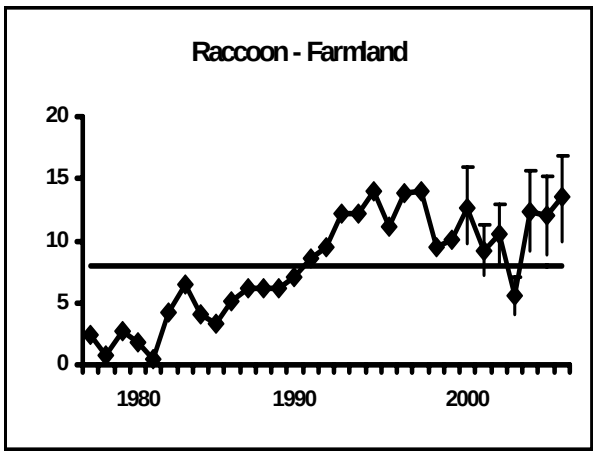


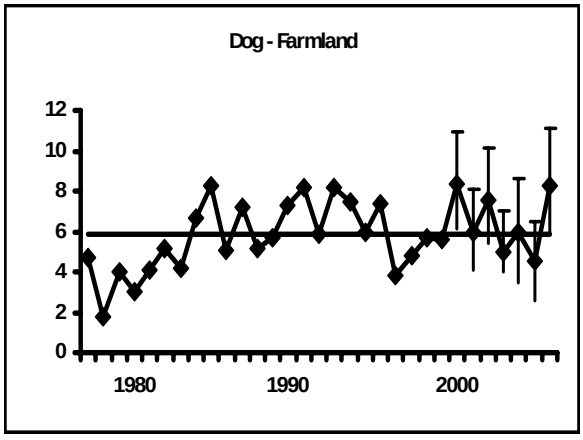
Figure 1. Locations of scent station routes. Inset shows 2007 route specifics.











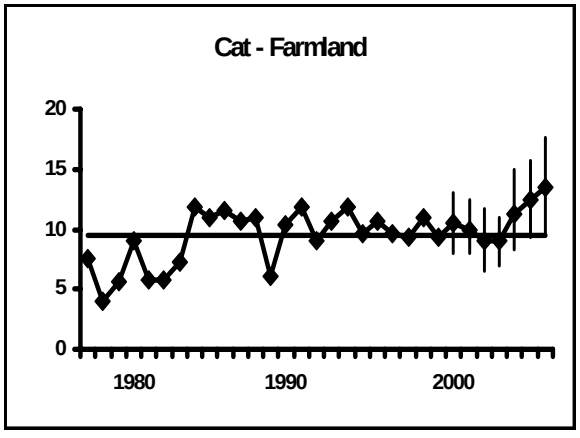
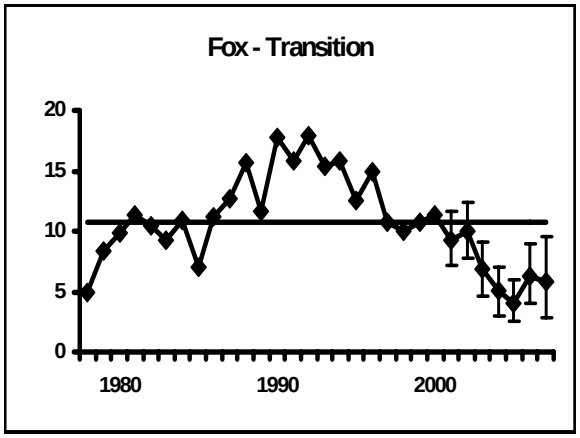
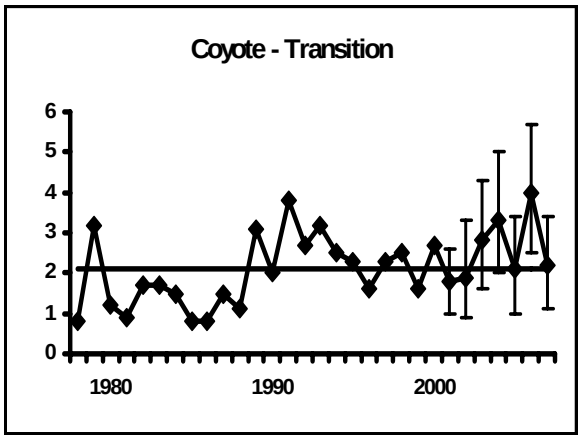
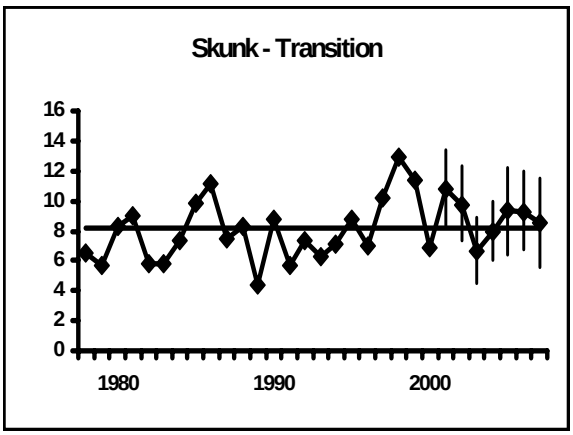
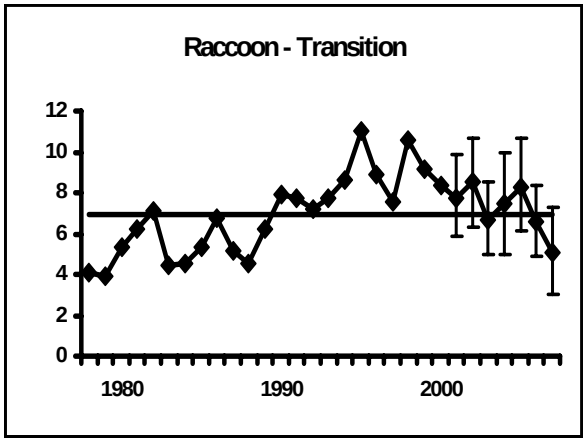


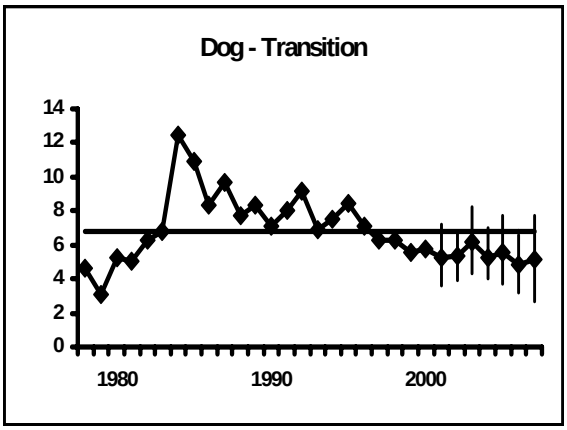
Figure 2. Percentage of scent stations visited by selected species in the Farmland Zone of Minnesota, 1977-2007. Horizontal line represents long-term mean.











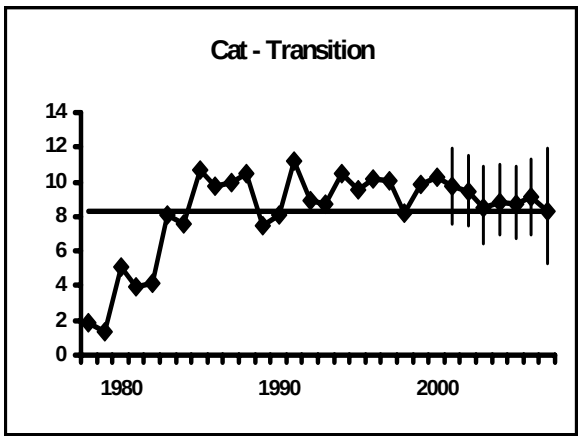


Figure 3. Percentage of scent stations visited by selected species in the Transition Zone of Minnesota, 1978-2007. Horizontal line represents long-term mean.

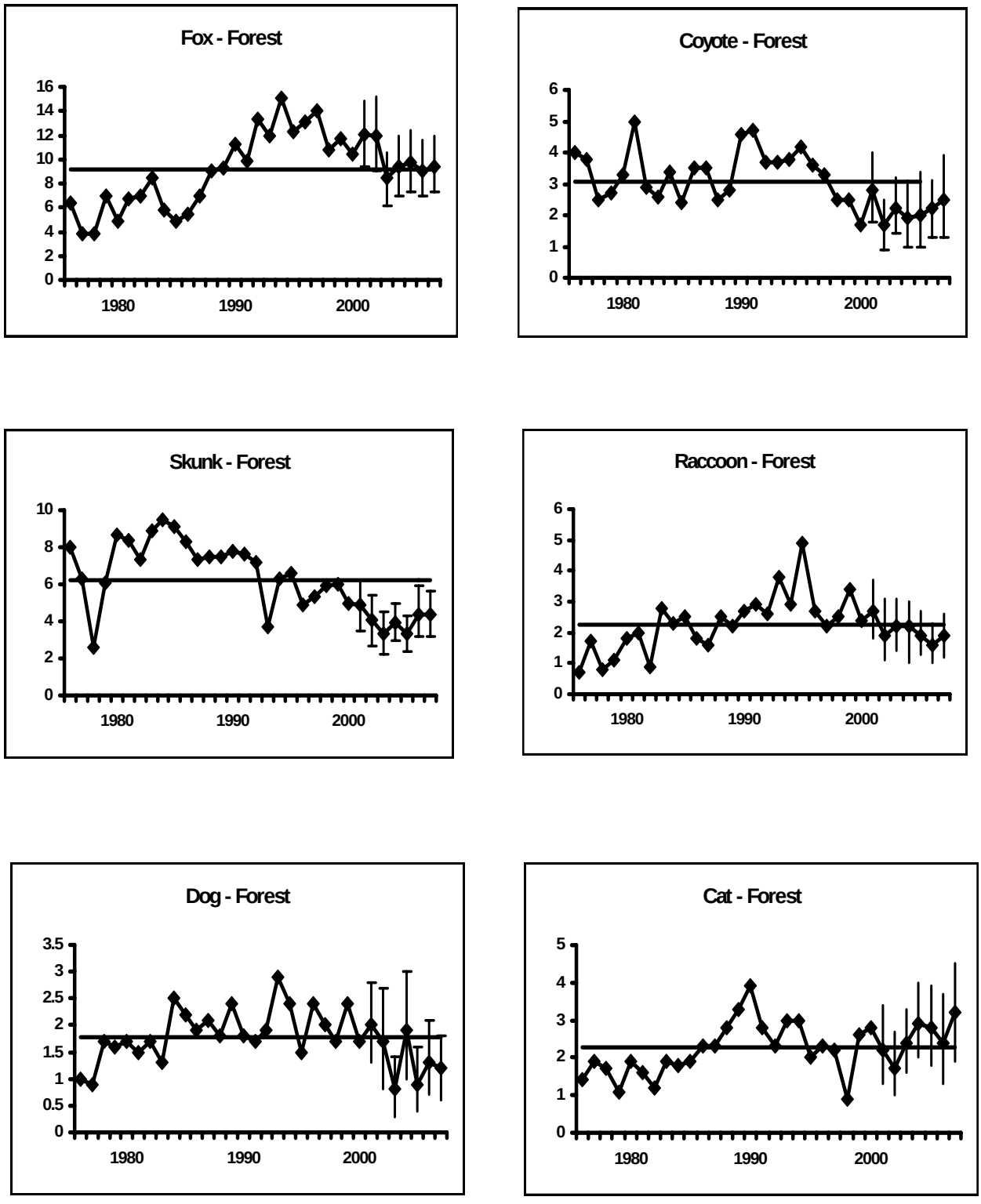
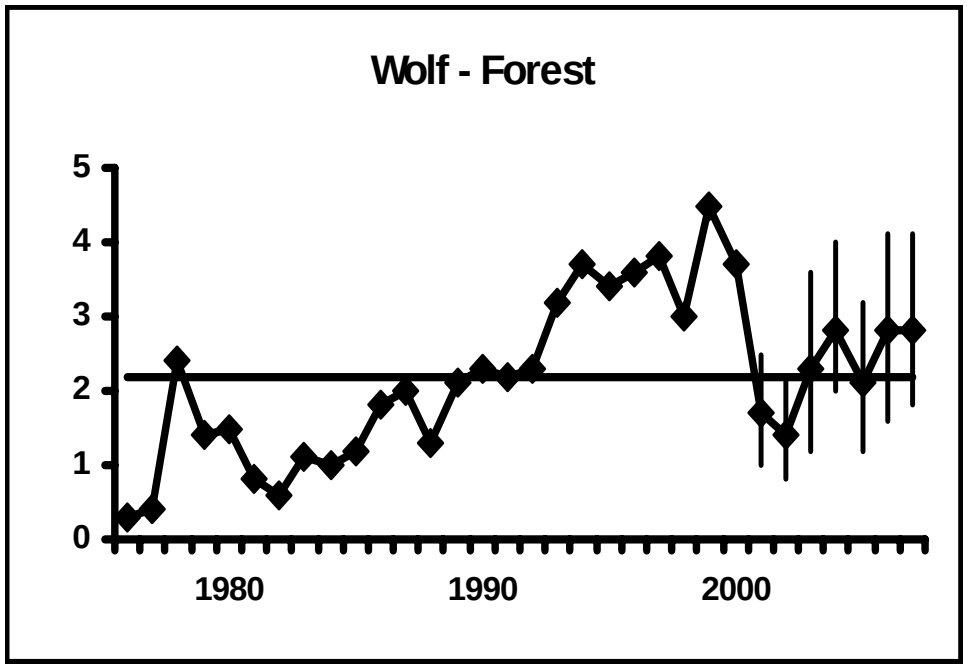


Figure 4. Percentage of scent stations visited by selected species in the Forest Zone of Minnesota, 1976-2007. Horizontal line represents long-term mean.



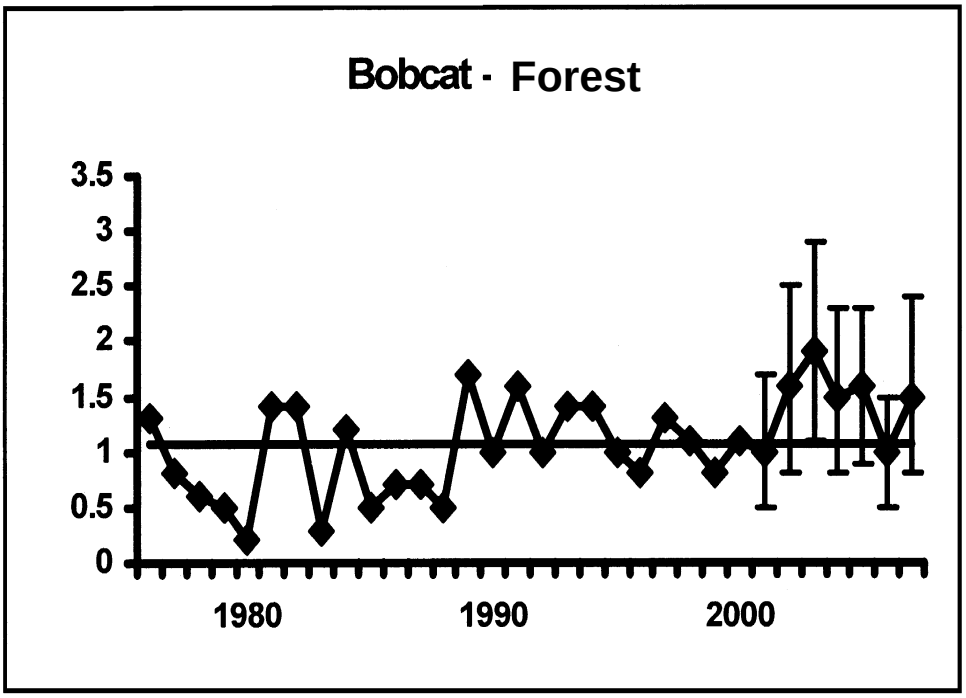


Figure 5. Percentage of scent stations visited by wolves and bobcat in the Forest Zone of Minnesota, 1976-2007. Horizontal line represents long-term mean.

FURBEARER WINTER TRACK SURVEY SUMMARY, 2007

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 (*Martes pennanti*) and marten (*Martes Americana*), 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, 56 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 within a 0.5-mile segment, the animal is only recorded once. If it is obvious that an animal ran along the road and entered multiple 0.5 mile segments (which often occurs with canids), its' tracks are recorded in all segments, but circled to denote it was the same animal. While such duplicate tracks are not included in calculation of track indices (see below), recording data in this manner allows for future analysis of animal activity in relation to survey 'plot' size and habitat. Snowshoe hare are recorded only as present or absent in the first 0.1 miles of each 0.5-mile segment. While most routes are surveyed 1 day after the conclusion of a snowfall (ending by 6:00 pm), thereby allowing 1 night for track 'registry', a few routes are usually completed 2 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' red fox ((*Vulpes vulpes*) 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 (*Canis lupus*) 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 red fox and coyotes (*Canis latrans*) 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 (*Lepus americanus*) 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.

Using bootstrap methods, I compute confidence intervals (90%) only for the percent of segments with species presence. For each of 1000 replicates, survey routes are randomly re-sampled according to the observed route sample size. Replicates are ranked according to the magnitude of the calculated index, and the 50th and 950th values constitute the lower and upper bounds of the confidence interval.

RESULTS

Forty-two of the 56 routes were completed this year (Figure 2). Total snow depths averaged 11" for completed routes, with surveys taking an average of 2 hours to complete. Survey routes were completed between November 29th and February 15th this winter, with a mean survey date of December 28th.

While remaining similar to the previous 3 years, the fisher track index dropped to the second lowest level recorded since 1994. Fishers were detected on 60% of the routes, the lowest since the survey began. Marten track indices changed little, but remain near the low end of previous indices. Marten were detected on 45% of the survey routes, a marginal increase from last year's low of 40%.

Bobcat (*Lynx rufus*) track and distribution indices decreased from the record levels observed last winter, but remain noticeably above the pre-2000 average (Figure 3). Wolf indices have not changed appreciably in recent years. Wolves were detected on 67% of the routes, with an average of 2.4 wolves detected per route. Although red fox remain one of the most commonly detected species, this year's track index dropped significantly to its' lowest level since the survey began (Figure 3). Coyote track indices were within bounds of previous years. No long-term trends are apparent, and coyotes remain one of the least common species on the survey (Figure 3). Based on known cyclic tendencies, I continue to expect a decline in snowshoe hare indices. Nevertheless, no multi-year decline is yet apparent in either the spring or winter index (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.

I have computed confidence intervals only for the current year, but results for previous years should be available soon. Based on current information, the only significant change in track indices from last year is a decline in red fox abundance. Fisher and marten harvest seasons were reduced from 16 days to 9 days this year. In spite of an estimated 50% reduction in fisher and marten harvest, post-harvest tracks indices for these species did not increase.

While we have added several track routes in recent years, I continue to review the adequacy of survey route sample size and distribution, and have initiated fisher and marten research that, among other things,

should provide some evaluation of track survey assumptions and possible approaches for estimating, and hence correcting for, any differences in the probability of detecting animals across years (e.g., MacKenzie et al. 2004).

ACKNOWLEDGEMENTS

I wish to thank all those who participated in this year's survey, including DNR field staff, tribal participants from the Leech Lake, Red Lake and Grand Portage Bands, and Tamarac National Wildlife Refuge.

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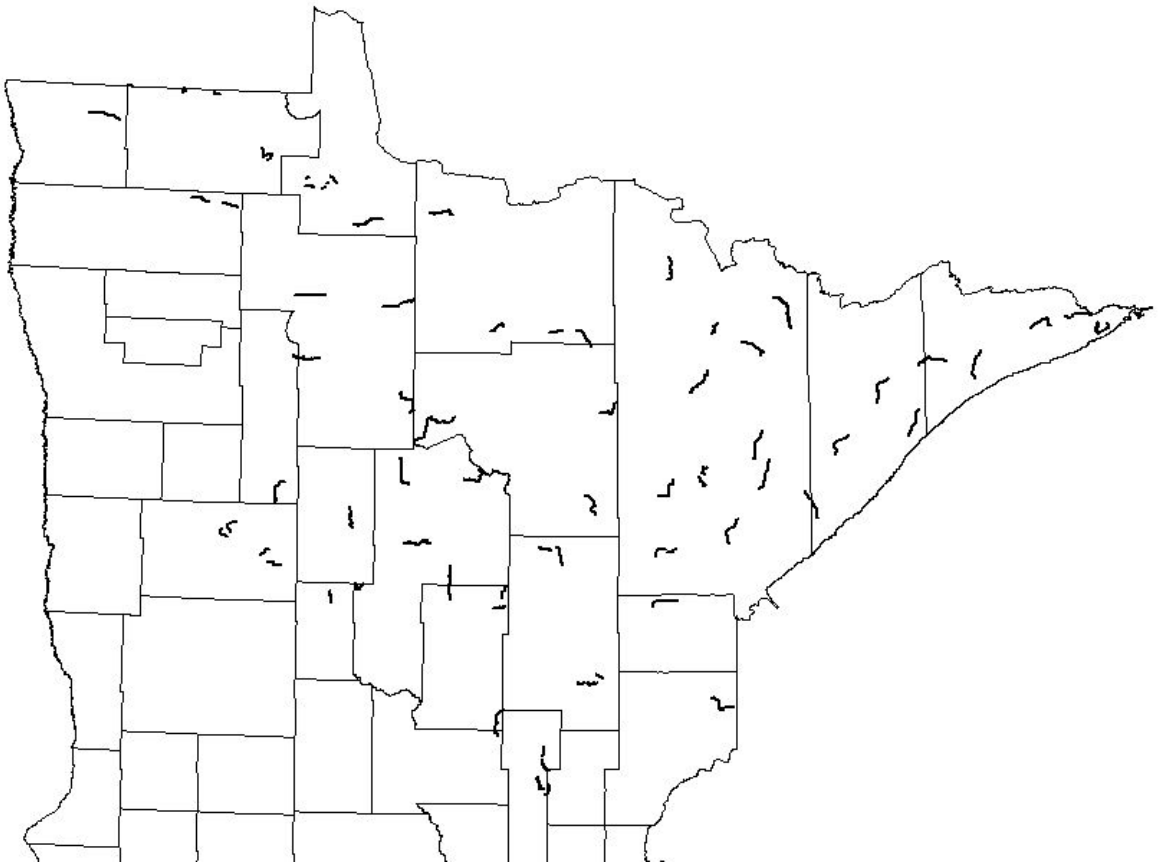

Figure 1. Locations of established furbearer winter track survey routes.

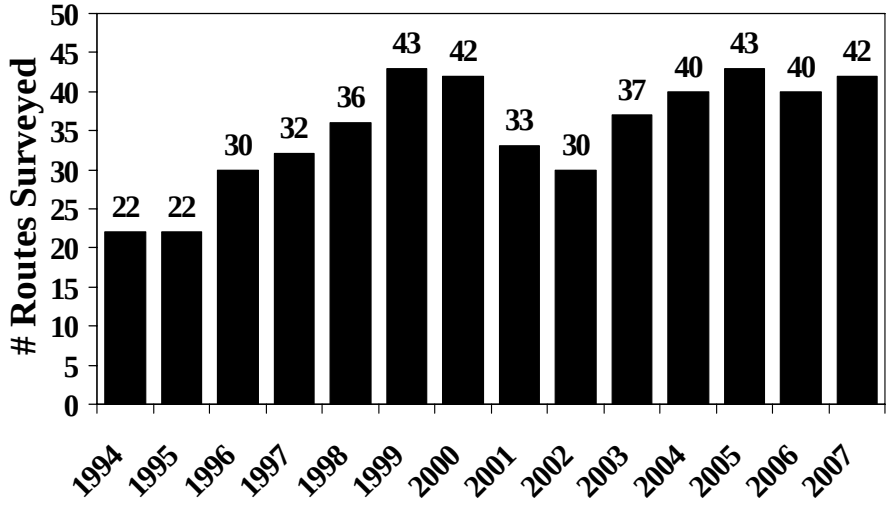

Figure 2. Number of winter track routes surveyed, 1994-2007.

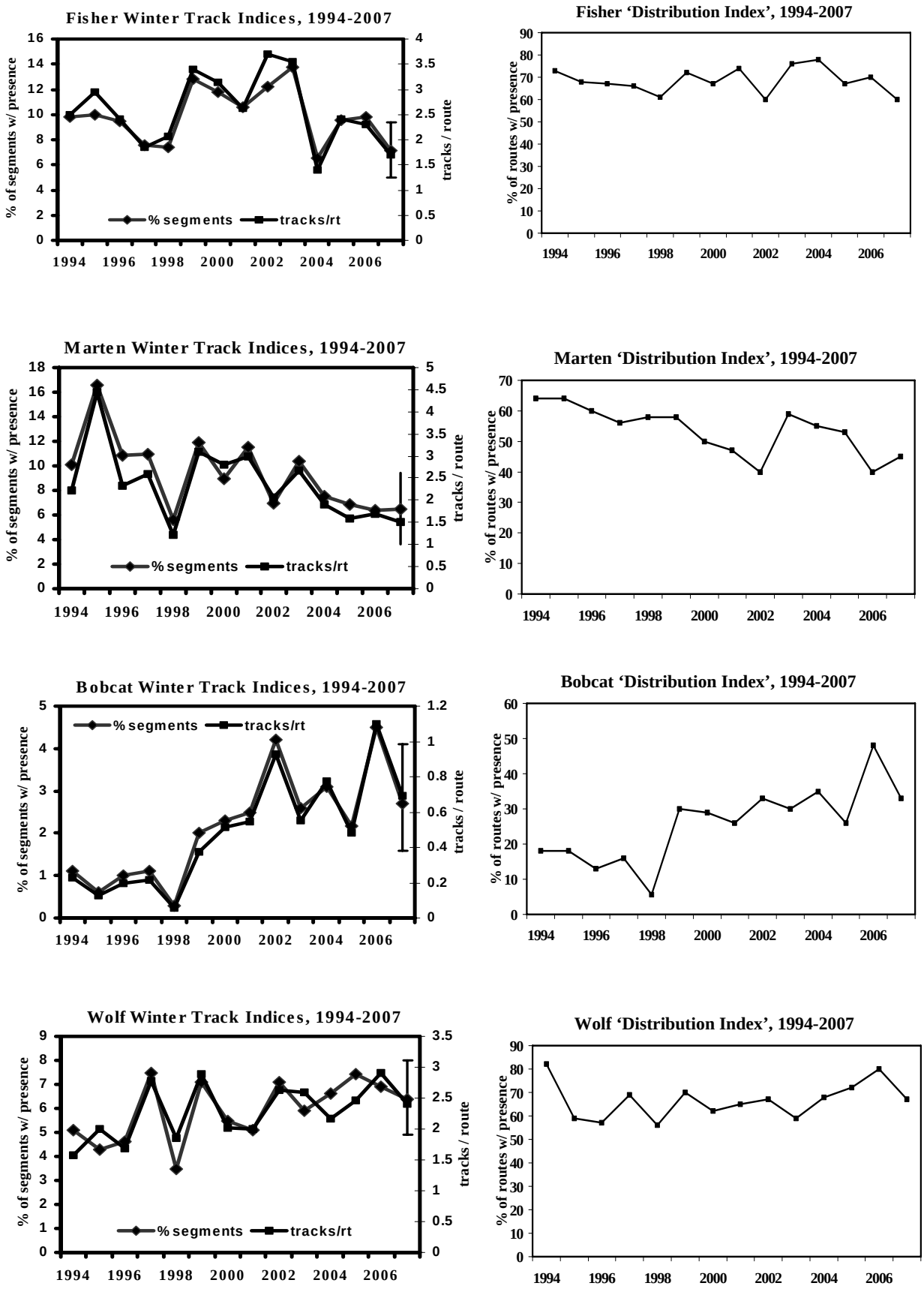

Figure 3. Winter track indices for selected species in Minnesota.

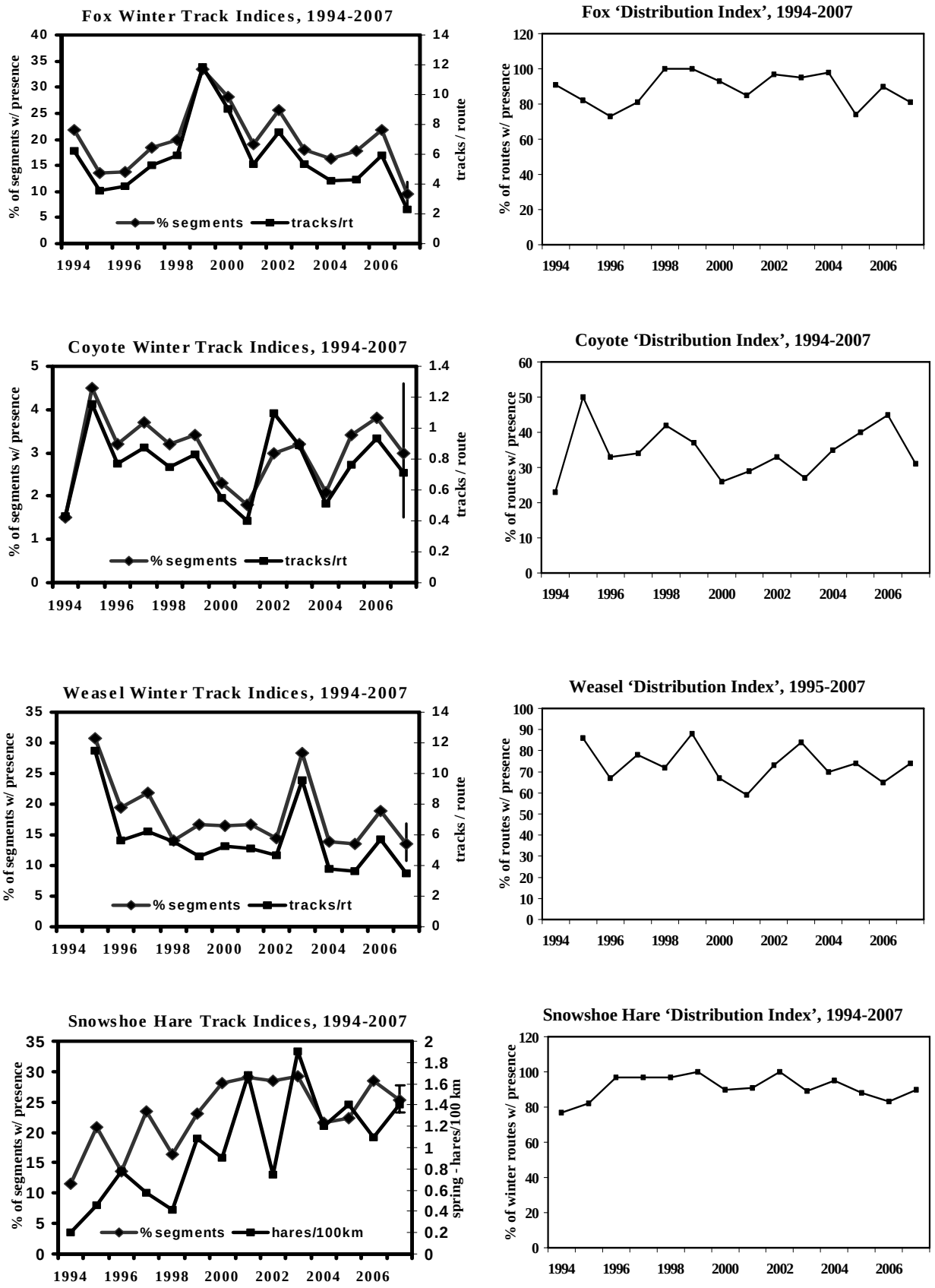

Figure 3 (continued). Winter track indices for selected species in Minnesota.

FOREST WILDLIFE POPULATIONS

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GROUSE SURVEYS IN MINNESOTA DURING SPRING 2008

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SUMMARY OF FINDINGS

Surveys for ruffed grouse (*Bonasa umbellus*) and sharp-tailed grouse (*Tympanuchus phasianellus*) were conducted during April and May 2008. Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 1.4 (95% confidence interval = 1.2–1.6) drums/stop (dps). That was similar to the 1.3 (1.1–1.5) dps observed during 2007 but consistent with a positive trend since 2005. The slight increase between 2007 and 2008 was similar to the third year of increases during the last 2 population cycles (1987–1988 and 1995–1996).

During the spring 2008 survey 2,383 sharp-tailed grouse were observed at 192 dancing grounds. The mean number of sharp-tailed grouse per dancing ground was 10.4 (8.7–12.3) in the East Central survey region, 13.6 (12.0–15.3) in the Northwest region, and 12.4 (11.2–13.7) statewide. Index values in the East Central region were 14% (1–31%) greater during 2008 than during 2007. Index values in the Northwest region were similar to last year, but were as high as any year since 1980.

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 and fields 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.

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 (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). 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 2.5^{th} and 97.5^{th} percentiles of the bootstrap frequency distribution. I calculated mean index values and CIs for 1982–2008. 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, 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 were 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 2008. The number of grouse included those recorded as males and those recorded as being of unknown sex, and only leks with ≥2 grouse were included when calculating mean index values. 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 consecutive 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.

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, Northern Minnesota & Ontario Peatlands, and Red River Valley 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.

RESULTS & DISCUSSION

Ruffed Grouse

Observers from 13 cooperating organizations surveyed 125 routes between 8 April and 15 May 2008. Most routes (78%) were run between 29 April and 9 May. The median date this year (5 May) was 6 days later than the most recent 10-year average (29 April). Cooperators included the DNR Section of Wildlife; Chippewa and Superior National Forests (USDA Forest Service); Fond du Lac, Leech Lake, Red Lake, and White Earth Reservations; 1854 Treaty Authority; Agassiz and Tamarac National Wildlife Refuges (U.S. Fish & Wildlife Service); Vermilion Community College; Cass County Land Department; and UPM Blandin Paper Mill. Observers reported survey conditions as Excellent, Good, and Fair on 63%, 36%, and 1% of 123 routes, respectively. Survey conditions during 2007 were very similar.

Mean counts of ruffed grouse drums throughout the forested regions of Minnesota were 1.4 (95% confidence interval = 1.2–1.6) drums/stop (dps) during 2008. That was similar to the 1.3 (1.1–1.5) dps observed last year (Figure 3), but mean drum counts increased 0.03–0.28 dps (3–37%) in all survey regions. Drum counts during 2008 by survey region were 1.6 (1.4–1.9) dps in the Northeast (n = 104 routes), 0.9 (0.4–1.4) dps in the Northwest (n = 8), 1.0 (0.5–1.6) dps in the Central Hardwoods (n = 12), and 0.6 (0.3–0.9) dps in the Southeast (n = 8) (Figures 3 and 4). Median index values for bootstrap samples were similar to observed means, so no bias-correction was necessary.

Although increases in the drum count index this year were not significant, they are consistent with a positive trend in the spring population of males since 2005. The results are also similar to the third year of increases during the previous 2 population cycles (1987–1988 and 1995–1996). Reports from hunters during 2007 indicated that recruitment of juvenile birds into the fall population may have been poor. If so, it appears to have not substantially affected the size of this spring's breeding population.

Sharp-tailed Grouse

A total of 2,383 sharp-tailed grouse was observed at 192 dancing grounds with ≥2 male grouse (or grouse of unknown sex) during spring 2008. Leks with ≥2 grouse were visited a mean of 1.7 times. There were 726 grouse on 70 leks in the EC survey region and 1,657 grouse on 122 leks in the NW region. The index values for the Northwest region and statewide range (Table 1) were greater than they have been since 1980 (Figure 5), but they did not change substantially from 2007 (Table 2). For the subset of dancing grounds that were surveyed during both 2007 and 2008, index values in the EC region increased 14% (95% CI = 1–31%, Table 2) to a mean value that is similar to those observed during 1998–2000.

Table 1. Number of sharp-tailed grouse observed per active lek (≥2 males) during spring in Minnesota.

	Statewide			Northwest[a]			East Central[a]		
Year	Mean	95% CI[b]	n[c]	Mean	95% CI[b]	n[c]	Mean	95%CI[b]	n[c]
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	161	9.8	8.7–11.1	97	8.2	6.9– 9.7	64
2007	11.6	10.5–12.8	188	12.7	11.3–14.1	128	9.4	8.0–11.0	60
2008	12.4	11.2–13.7	192	13.6	12.0–15.3	122	10.4	8.7–12.3	70

[a] Survey regions; see Figure 1.
[b] 95% CI = 95% confidence interval for the mean. It is an estimate of the uncertainty in the value of the mean.
[c] n = number of leks in the sample.

Table 2. Difference in the number of sharp-tailed grouse per lek on dancing grounds that were observed during consecutive spring surveys in Minnesota.

	Statewide			Northwest[a]			East Central[a]		
Comparison[b]	Mean	95% CI[c]	*n*[d]	Mean	95% CI[c]	*n*[d]	Mean	95%CI[c]	*n*[d]
2004 - 2005	-1.3	-2.2– -0.3	186	-2.1	-3.5– -0.8	112	0.0	-1.0– 1.1	74
2005 - 2006	-2.5	-3.7– -1.3	126	-3.6	-5.3– -1.9	70	-1.1	-2.6– 0.6	56
2006 - 2007	2.6	1.5– 3.8	152	3.3	1.7– 5.1	99	1.2	0.1– 2.3	53
2007 - 2008	0.4	-0.8– 1.5	166	0.0	-1.6 – 1.6	115	1.2	0.1– 2.5	51

[a] Survey regions; see Figure 1.
[b] Consecutive years for which comparable leks were compared.
[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.

ACKNOWLEDGEMENTS

I sincerely appreciate the efforts of all the DNR staff and volunteer cooperators who conducted and helped coordinate the grouse surveys. The ruffed grouse survey data for 1982–2004 were entered into a database by Doug Mailhot and another volunteer through a special effort organized by Gary Drotts, John Erb, and Rick Horton. I also thank Laura Gilbert for helping with data entry and archiving and Mark Lenarz and Wes Bailey for reviewing earlier drafts of this report.

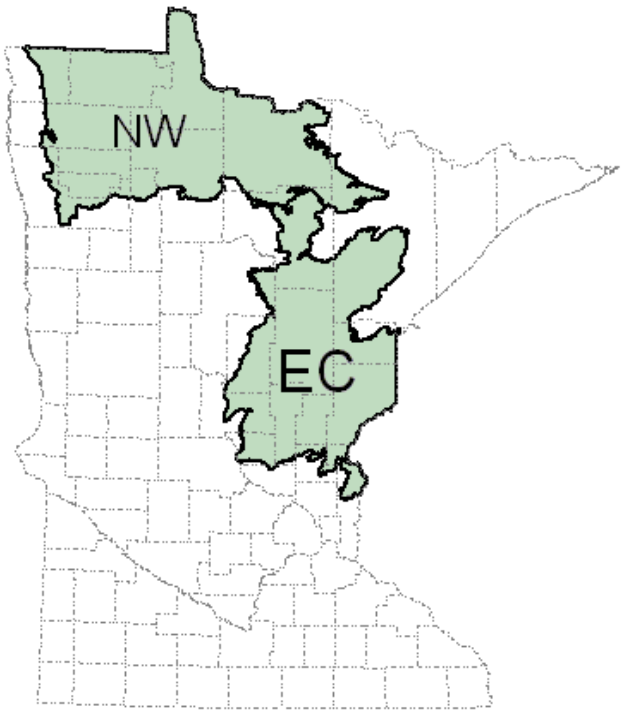


Figure 1. Northwest (NW) and East Central (EC) survey regions for **sharp-tailed grouse** relative to county boundaries in Minnesota. The regions were based largely on boundaries of ECS Subsections.

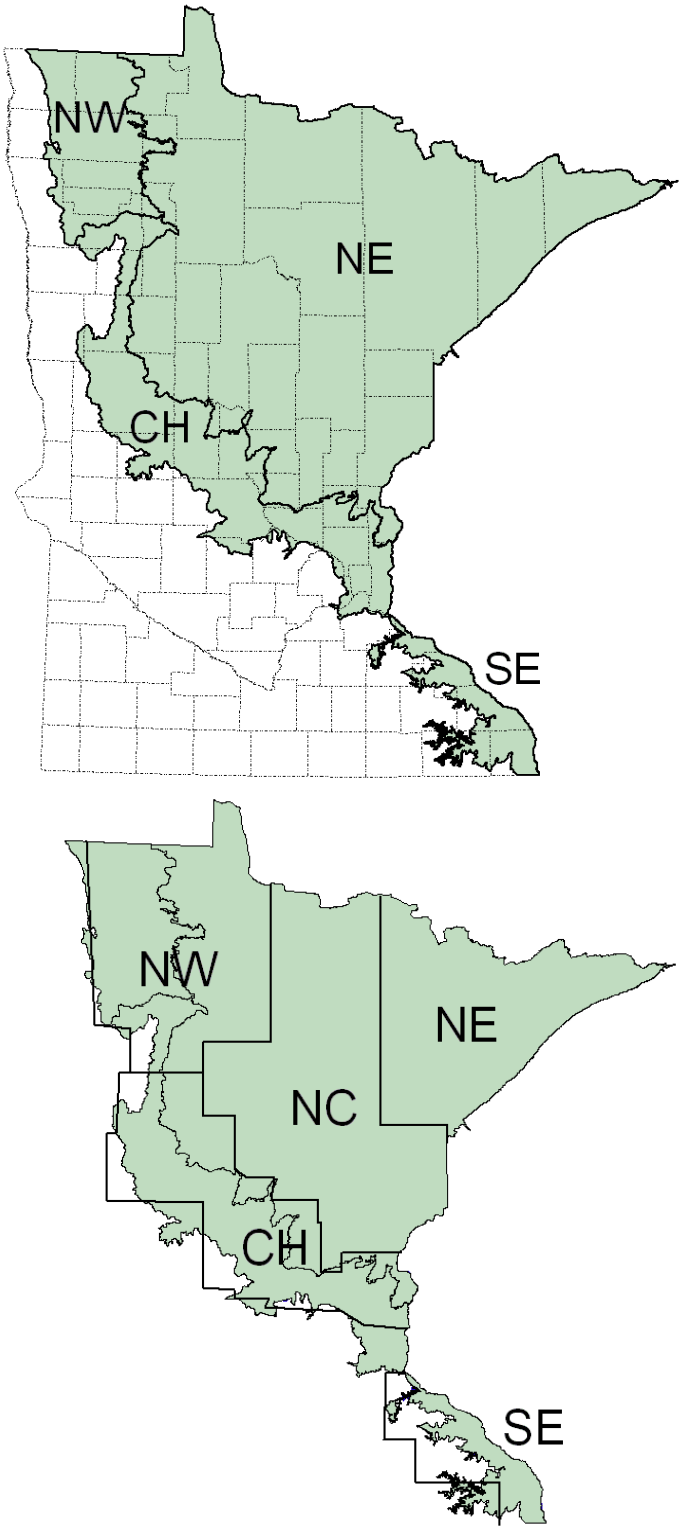


Figure 2. **Ruffed grouse** survey regions (shaded, curved boundaries) are based on the Ecological Classification System. Top panel: regions are labeled and overlaid on counties (dashed lines). Bottom panel: former survey zones (straight boundaries) are labeled and overlaid on regions.

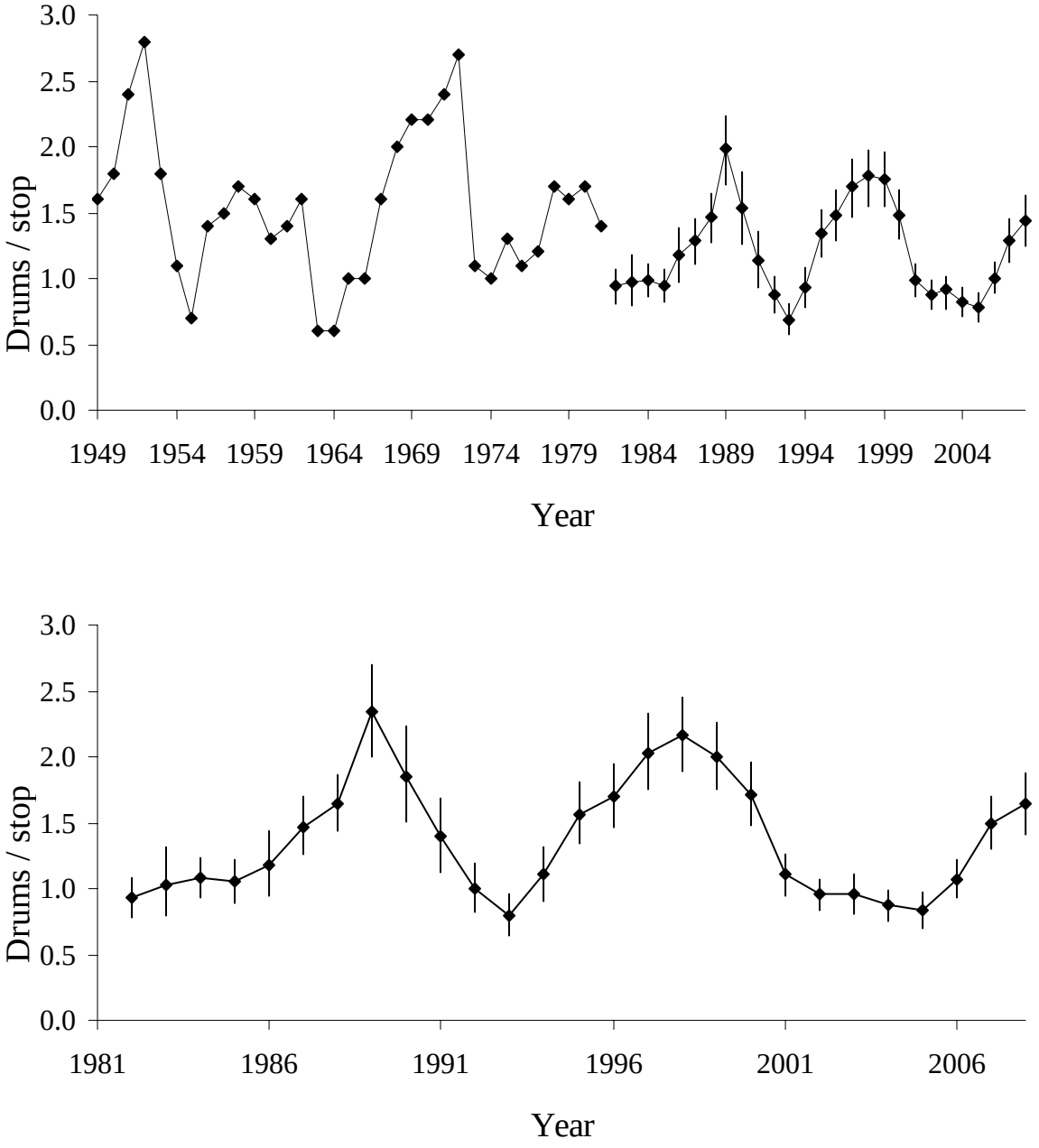


Figure 3. Ruffed grouse drum count index values in **Minnesota** (top) and just the **Northeast** region (bottom). Vertical error bars represent 95% confidence intervals based on bootstrap samples. Statewide means before 1982 were not re-analyzed with the current methods, so confidence intervals were 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.

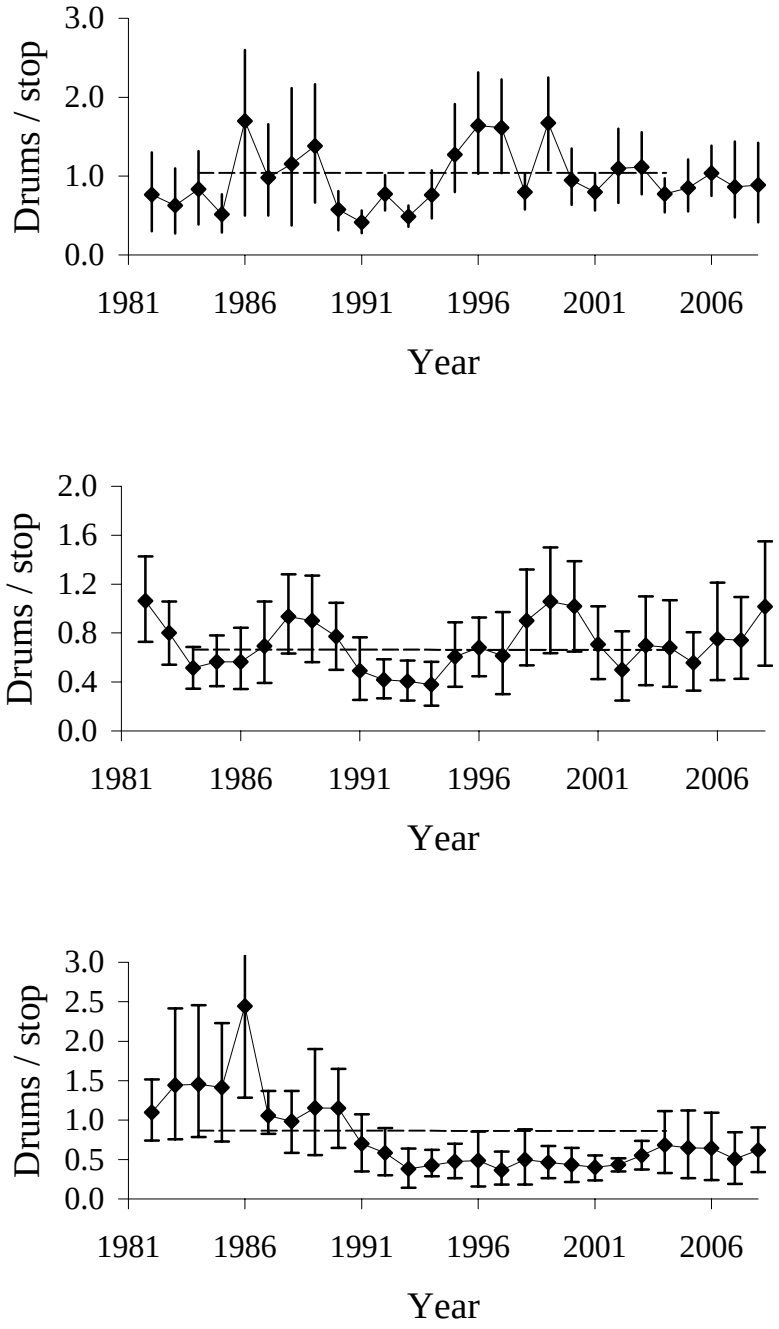


Figure 4. Ruffed grouse drum count index values in the **Northwest** (top), **Central Hardwoods** (middle), and **Southeast** (bottom) survey regions of Minnesota. Dashed horizontal lines indicate the mean from 1984 to 2004. Vertical error bars represent 95% confidence intervals based on bootstrap samples. The highest error bar in the bottom panel was truncated.

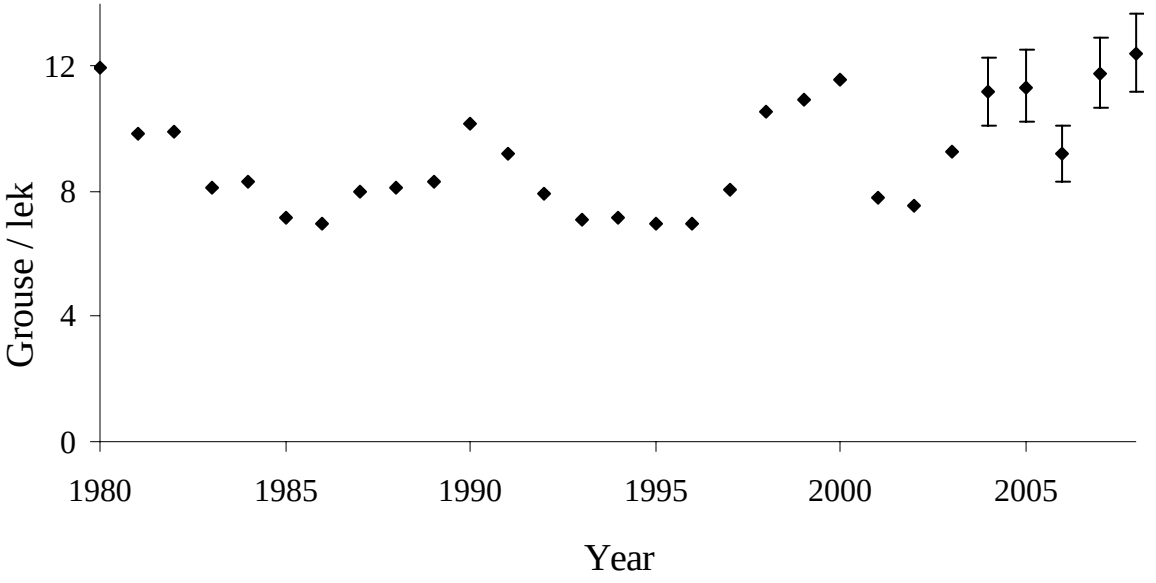
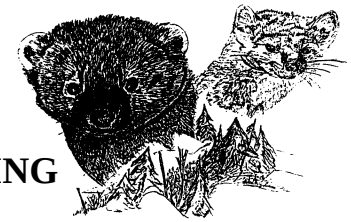


Figure 5. Mean number of **sharp-tailed grouse** observed in Minnesota during spring surveys of dancing grounds, 1980–2008. Vertical error bars, which were calculated only for recent years, represent 95% confidence intervals based on bootstrap samples. No line connects the annual means because they are not based on comparable samples of leks.



REGISTERED FURBEARER POPULATION MODELING
2008 Report

John Erb, Forest Wildlife Populations and Research Group

Drawing by Gilbert Proulx

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 or 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 2007 harvest information is available in a separate report. Bobcat and pine marten age data is obtained via x-ray examination of pulp cavity width or 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. This year, marten teeth were classified only into age-classes (juvenile, yearling, adult), while all bobcat teeth were sectioned to determine specific year-classes. 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 2007 registered DNR trapping and hunting harvest was 702, down 21% from last year (Table 1). Trapping harvest declined 33%, though still accounting for 75% of the total harvest. Hunting harvest increased 60% to 178, setting a new record. Total modeled harvest, which includes reported tribal take, was 758. Based on population modeling estimates, 24% of the fall population was harvested. The juvenile to adult female ratio in the harvest (1.2; Table 1) was below the long-term average (1.5), but similar to the recent 10-year average (1.2). A total of 633 bobcat carcasses were examined (Table 1), with a mean age of 2.8 and 2.4 for females and males, respectively. Approximately 9% of the harvested bobcats were 6.5+ years old (Figure 1).

Based on examination of reproductive tracts, 15% of yearling females produced a litter in 2007, less than the 5-year average of 26% (Figure 2). Average litter size for pregnant yearlings was 2.0, similar to the 5-year average of 2.1. Pregnancy rate for 2+ year olds was 66%, also below the 5-year mean (73%). Mean litter size for pregnant adults was 2.7 (5-year mean = 2.8). For both yearlings and adults, pregnancy rate has generally declined since a 'peak' in 2004 (Figure 2).

Population modeling predicts a 14% decline in this spring's bobcat population (Figure 3), though the estimated population remains above pre-1998 levels. While 3-year-averaged fall scent station indices have declined slightly the past 2 years, averaged winter track counts have remained stable. The estimated 2008 spring population is ~ 2,200.

Fisher. In 2007, the fisher harvest season was shortened 44% from 16 days to 9 days. Harvest under the DNR framework was 1,682, down 48% from last year (Table 2). Modeled harvest, which includes reported tribal take, was 1,811. An estimated 17% of the fisher population was harvested this past winter. Carcass collections ended in 1994, so no current age or reproductive data are available. In spite of the reduced harvest, the fisher winter track index did not increase this winter, with the 3-year-averaged track index continuing its recent downward trend (Figure 4). However, population modeling projects a 3% increase in the spring population, currently estimated at ~8,000.

Marten. In 2007, the marten harvest season was also shortened 44% from 16 days to 9 days. Harvest under the DNR framework was 2,221, down 41% from last year (Table 3). Modeled harvest, which includes reported tribal take, was 2,481. A total of 1,355 marten carcasses were examined this year. In spite of a reduction in harvest pressure, juveniles comprised only 30% of the total harvest, well below the long-term average of 57% (Figure 5). While year-class data was not collected this year, the maximum age observed had declined slightly in each of the previous 4 years for females (13, 12, 11, and 10), with a similar pattern for males (13, 12, 11, 11). Similarly, over the last 4 years the mean age of female marten harvested has declined from 2.6 to 1.4, while the mean age of male marten harvested has declined from 2.4 to 1.3. This year's juvenile:adult female ratio (1.5) in the harvest was the second lowest since data collection began (Table 3).

Based on modeling, 18% of the fall population was harvested. Corresponding in time with recent record harvests, both modeling projections and averaged winter track counts suggest the population has been declining the past 5 years. Track survey results from this past winter were stable compared to last year, though the 3-year-averaged track index continues to suggest a slight decline. The population model projects a 2% increase to a 2008 spring population of ~ 10,600 (Figure 6).

Otter. The north otter-trapping zone was expanded southward this year. Harvest under the DNR framework in the north zone was 1,847, of which ~ 55 were harvested in the expanded portion of the north zone. Total harvest in the north zone was down 32% from last year (Table 4). Modeled harvest, including reported tribal take, was 1,955 (Table 4). An estimated 16% of the fall population was

harvested. Carcass collections ended in 1986, so no age or reproductive data are available. After several years of projected declines, modeling this year indicates the population increased by ~ 4% (Figure 7). No independent otter survey data are currently available for comparison. The current estimated spring population in the north zone is ~ 10,600.

A new otter-trapping zone was also established in southeast Minnesota. A total of ~ 45 otter were harvested in the southeast zone. While we have established an otter survey in this region to assist with population monitoring, weather conditions and pilot scheduling conflicts did not allow us to complete the survey this winter. I am also currently developing a population model specific to the southeast zone, but initial projections are not yet available.

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Table 1. Bobcat harvest data, 1979 to 2007.

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]
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	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	$96
2006	11/25-1/7	5	890	983	26	813	26	17	57	1.1	61	50	58	57	$101
2007	11/24-1/6	5	702	758	24	633	34	14	52	1.2	55	60	47	52	

[1] Includes DNR and Tribal harvests

[2] Estimated from population model; includes estimated non-reported harvest of 10%.

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

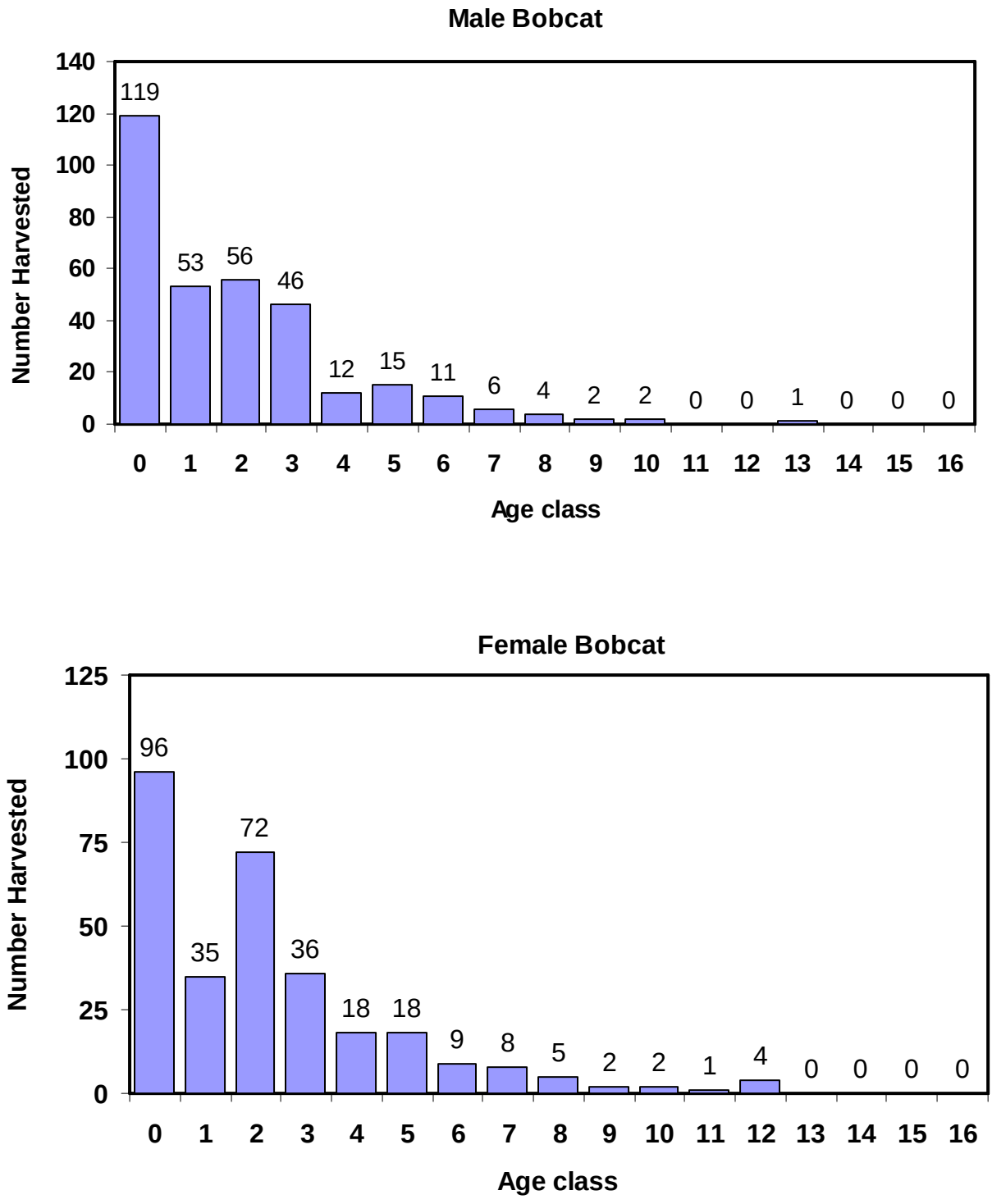


Figure 1. Age structure of male and female bobcats in the 2007-08 harvest.

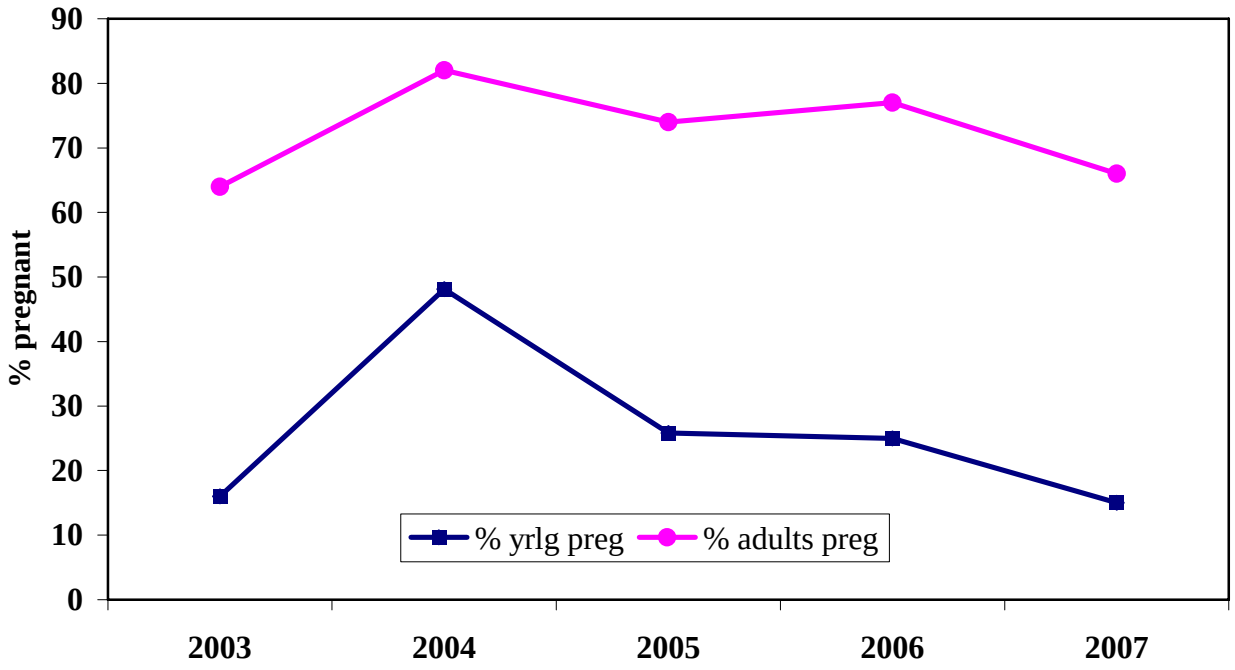


Figure 2. Pregnancy rates for yearling and adult bobcats in Minnesota, 2003-2007.

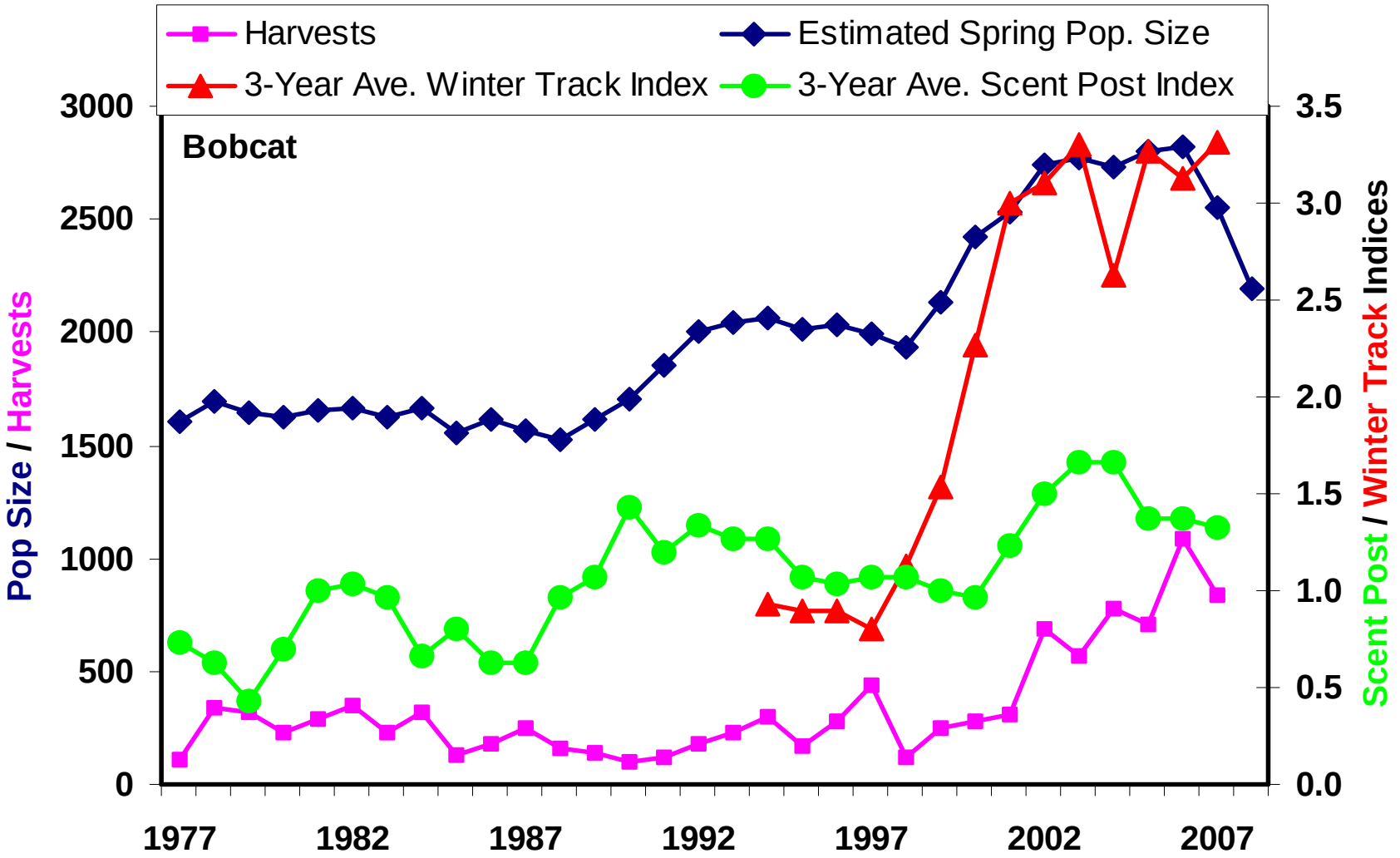


Figure 3. Bobcat populations, harvests, and survey indices, 1977-2007. Harvests include an estimate of non-reported take.

Table 2. Fisher harvest data, 1979 to 2007. 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]
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	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	$36	$31
2006	11/25-12/10	5	3250	3500	30	-	-	-	-	-	-	-	-	51	$76	$68
2007	11/24-12/2	5	1682	1811	17	-	-	-	-	-	-	-	-	51		

[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 non-reported harvest of 22% 1977-1992, and 11% in 1993-1999

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

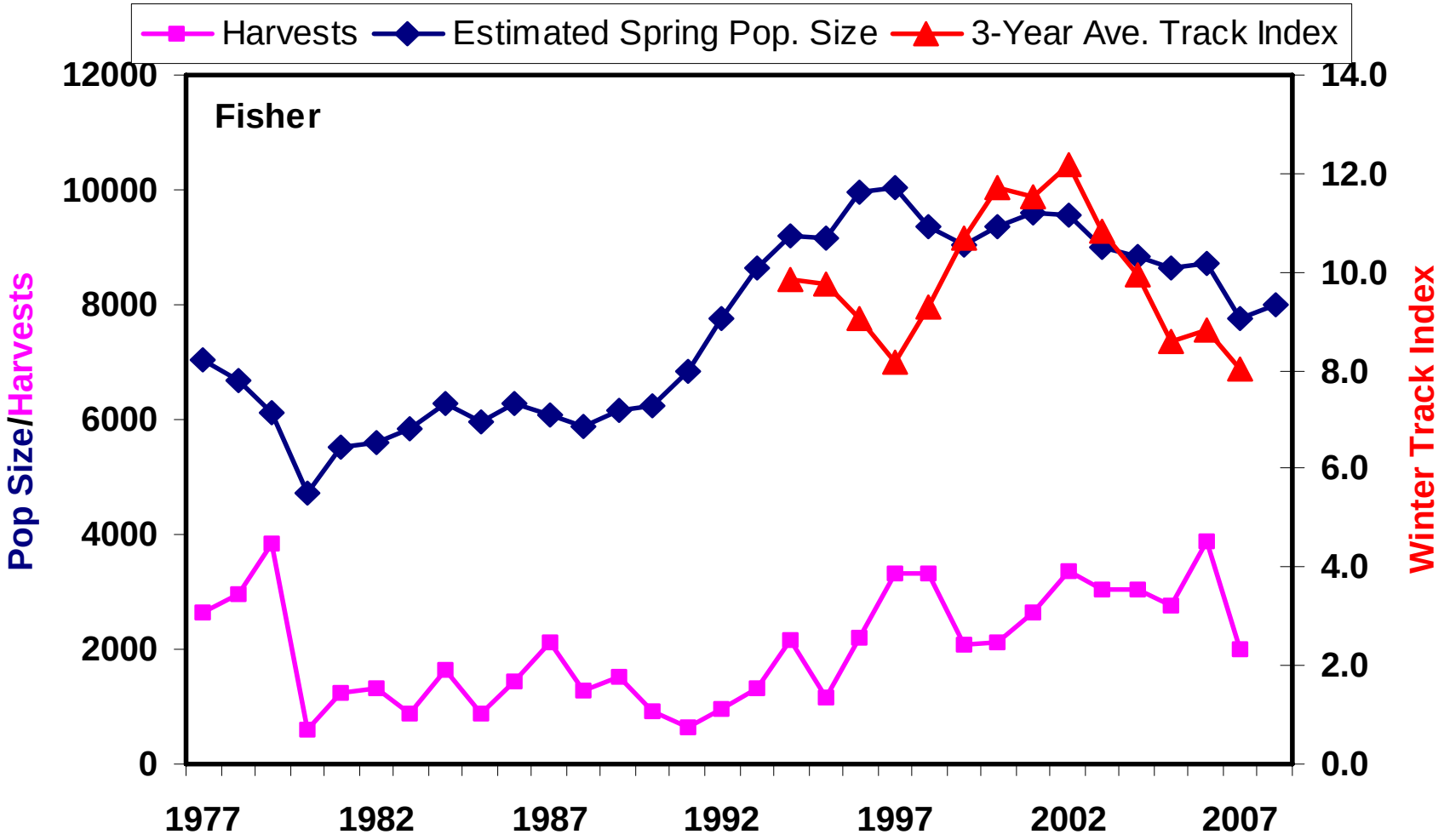


Figure 4. Fisher populations, harvests, and survey indices, 1977-2007. Harvests include an estimate of non-reported take.

Table 3. Marten harvest data, 1985 to 2007.

Year	Season	Limit[1]	DNR harvest	Modeled harvest[2]	% Autumn Pop. Taken[3]	Carcasses examined[4]	% juveniles	% yearlings	% adults	Juv:ad females	% male juveniles	% male yearlings	% male adults	% males overall	Pelt price Males[5]	Pelt price Females[5]
1985	11/30-12/15	1	430	430	6	507	73	18	9	17.2	69	68	82	70	$30	$28
1986	11/29-12/14	1	798	798	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	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	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	1992	53	16	31	4.9	64	63	65	64	$37	$32
2006	11/25-12/10	5	3788	4120	28	1914	64	17	20	9.2	66	67	65	66	$74	$66
2007	11/24-12/2	5	2221	2481	19	1355	30	29	41	1.5	56	64	50	56		

[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 non-reported harvest of 40% in 1985-1987 and 1991, 20% in 1988-1990 and 1992-1998, and 15% from 1999-present.

[4] Starting in 2005, the number of carcasses examined represents a random sample of ~ 70% of the carcasses collected in each year.

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

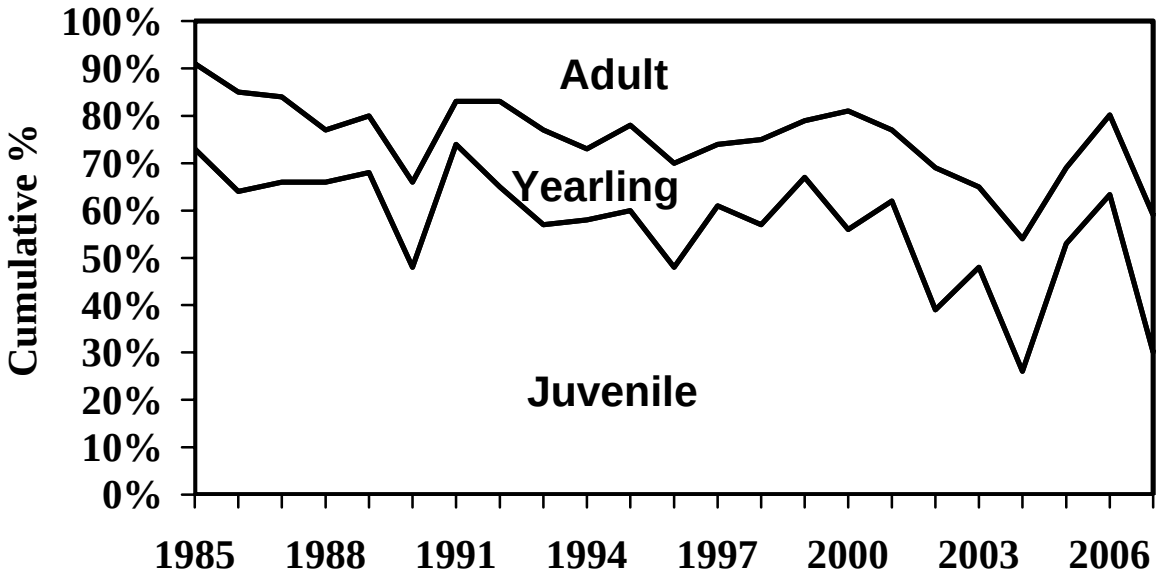


Figure 5. Marten age-class proportions in the harvest, 1985-2007.

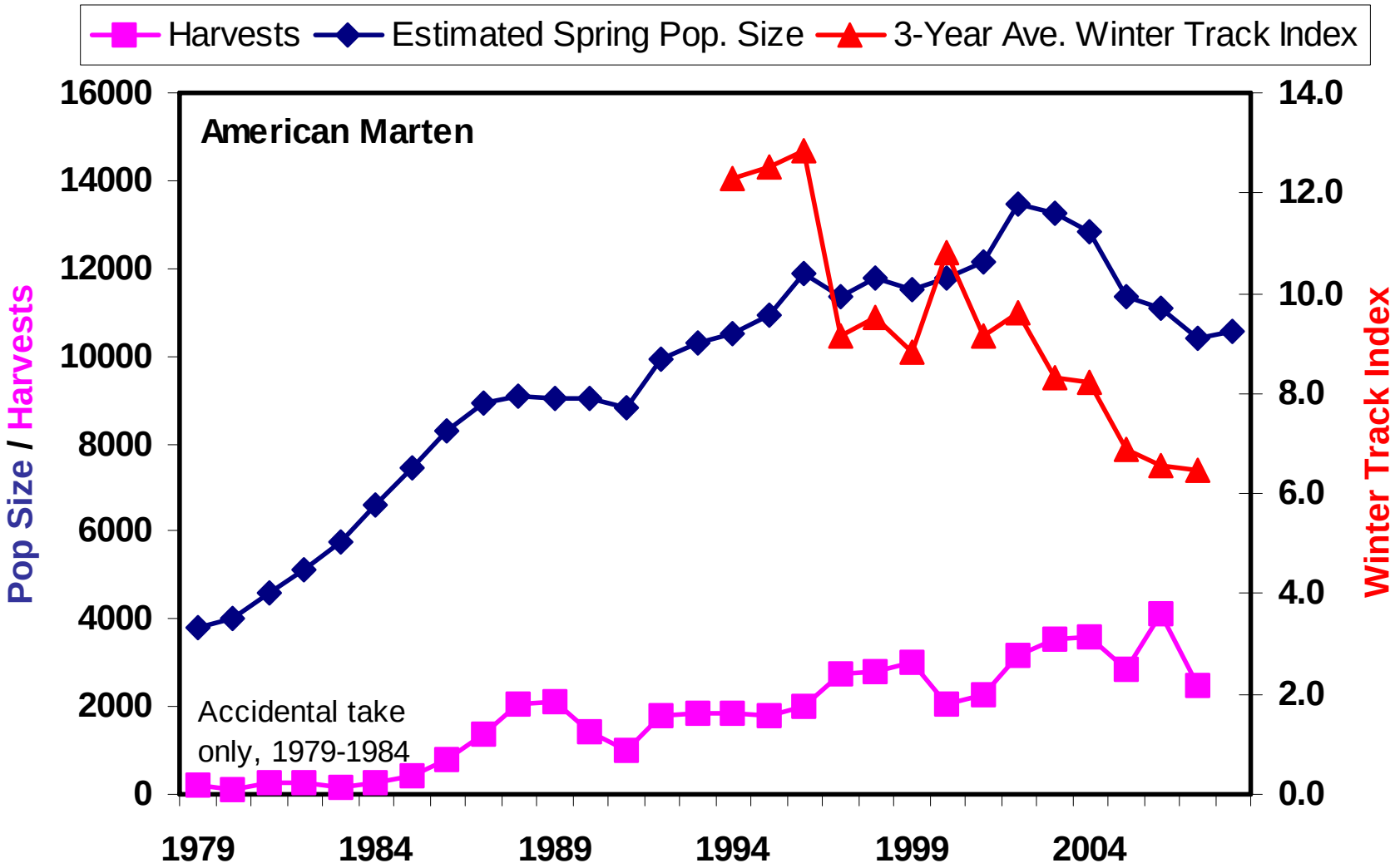


Figure 6. American marten populations, harvests, and survey indices, 1979-2007. Harvests include an estimate of non-reported take.

Table 4. Otter harvest data, 1979 to 2007. 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]
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	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	$89	$16
2006	10/28-1/7	4	2720	2872	22	-	-	-	-	-	-	-	-	56	$43	$16
2007	10/27-1/6	4	1847	1955	16	-	-	-	-	-	-	-	-	55		

[1] Includes DNR and Tribal harvests

[2] Estimated from population model. Incl. estimated non-reported harvest 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.

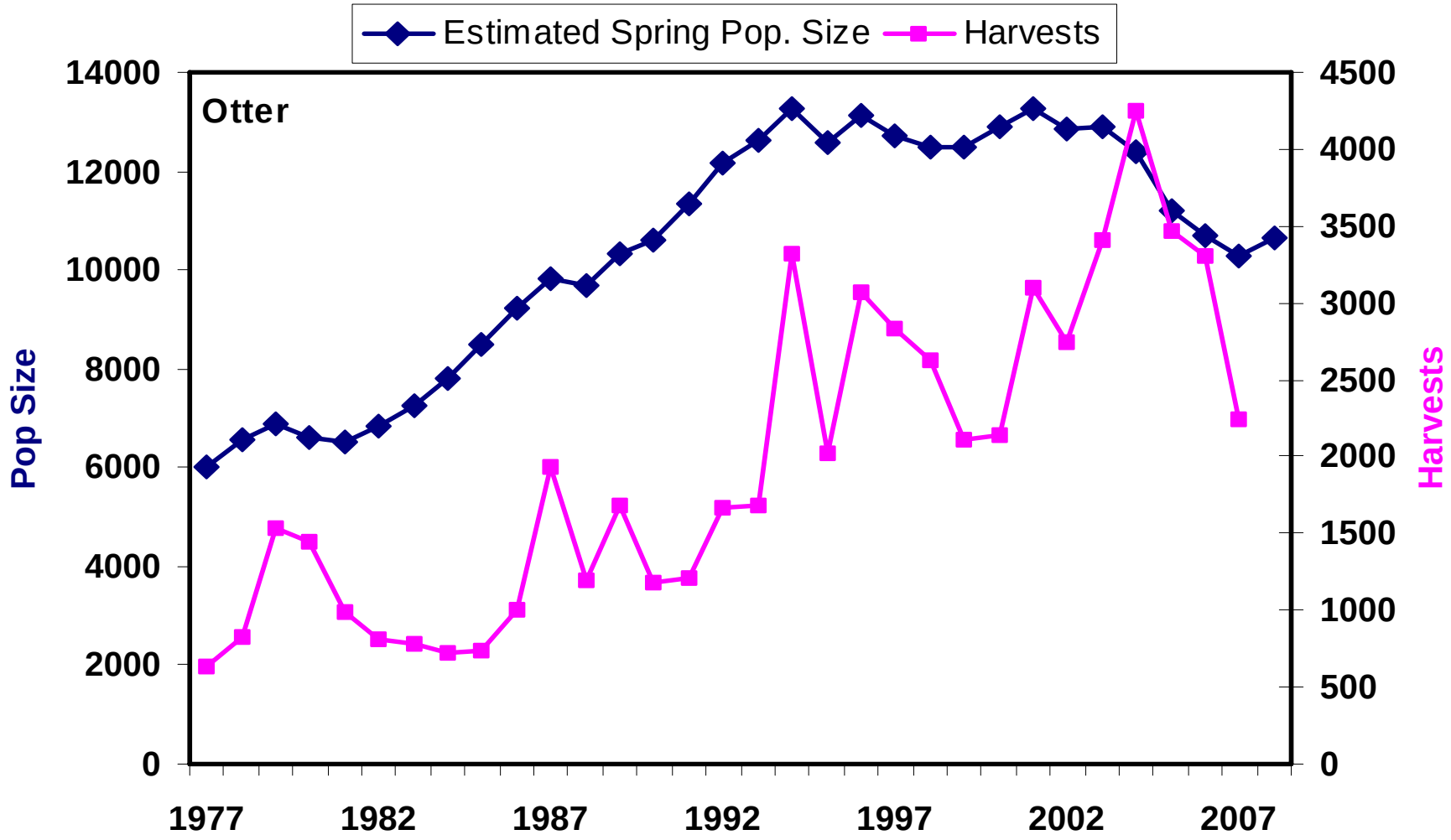


Figure 7. Otter populations and harvests, 1977-2007. Harvests include an estimate of non-reported take.

POPULATION TRENDS OF WHITE-TAILED DEER IN THE FOREST ZONE – 2008

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 2007 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.

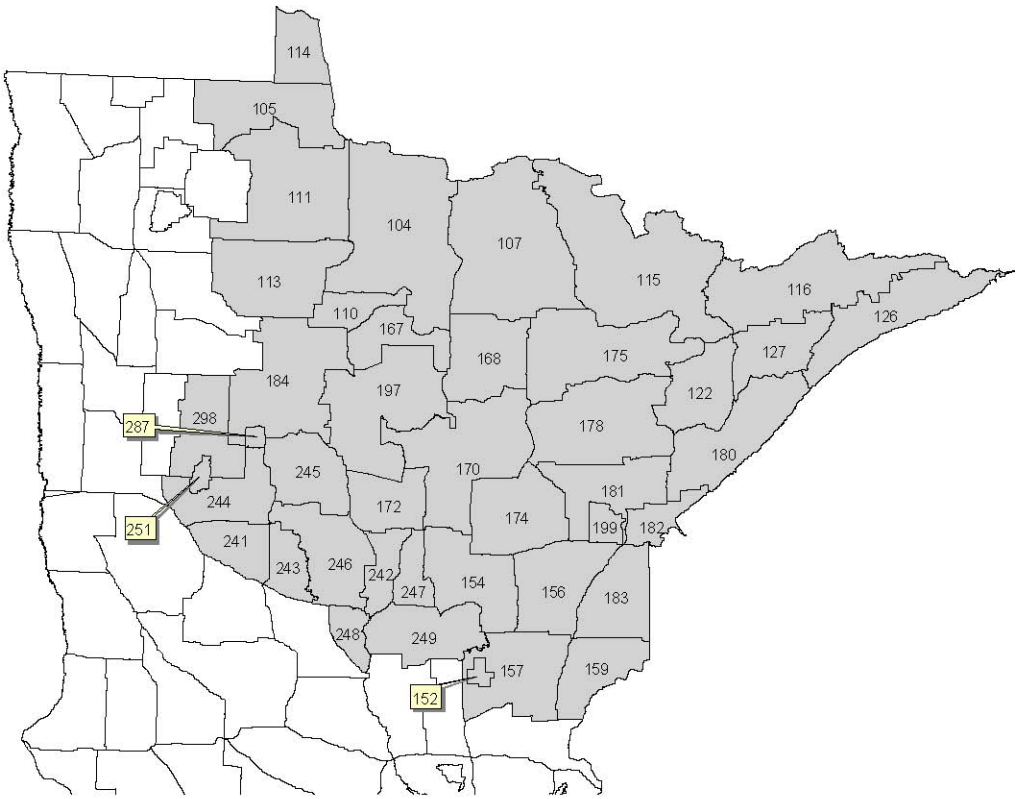


Figure 1. Permit areas in the forested zone, 2007. Permit areas 114, 152, 182, 287, and Red Lake Indian Reservation were not modeled.

HARVEST

In 2007, hunters registered 260,434 deer, the 4th highest harvest ever recorded in Minnesota. Of that number, 54% or 141,121 deer were harvested in the forested zone (Figure 1, Table 1). The 2007 forest zone harvest increased 2% from the 2006 harvest. The following discussion applies to the subset of deer harvested in the forest zone.

The buck harvest decreased in 16 of the 42 permit areas (Figure 2, Table 2). Most of the decrease in buck harvest occurred in the west central and southern portions of the forest zone (Figure 3). The total buck harvest declined 3% compared with a 1% decline the previous year (Table 2).

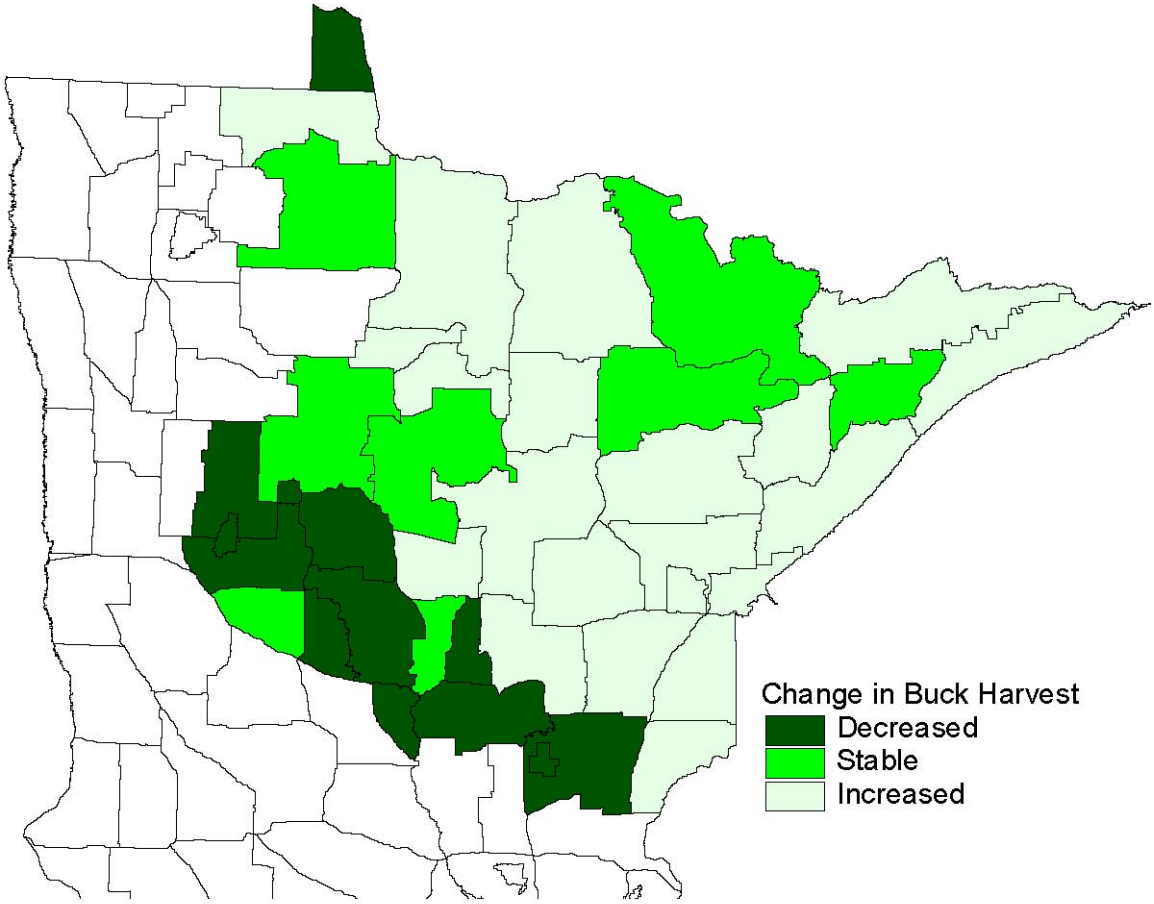


Figure 2. Change in buck harvest in forest zone permit areas between 2006 and 2007.

The antlerless harvest increased in 22 of the 42 permit areas (Table 3) but the total antlerless harvest increased by only 1%. The greatest increases occurred in permit areas that shifted from "lottery" into the "managed" category (mean=49%, n = 2, range 33-66%), which allowed all hunters the option of harvesting 2 antlerless deer. Permit areas that shifted from "managed" into the "intensive" category, which allowed hunters to harvest up to 5 antlerless deer, also experienced increased antlerless harvests (mean = 21%, n = 4, range 11-29%). Permit areas that stayed "intensive", but added an early antlerless hunt had a 9% (-2% to 24%, n = 6) increase in the antlerless harvest. Permit areas that remained in the "managed" category saw an average change of -12% (-44% to 5%, n = 15) and permit areas that remained "intensive" averaged a 7% change (-8% to 12%, n = 9). Finally, the opportunity to harvest antlerless deer was reduced in 4 permit areas (i.e. changed from "intensive" to "managed") and the harvest declined an average of 25% (-11 to –53%).

The proportion of bucks in the harvest (forest-wide) was stable at 40%, the lowest proportion in recent history. This decline was expected because of the increased opportunity to harvest antlerless deer.

The archery harvest in the forest zone declined 5% in 2007, the first decline since 2001. Between 1992 and 1999, the archery harvest increased 12% to 2,954, an average of less than 2% per year. Between 1999 and 2006, the archery harvest increased 225%, an average of 32% per year. The archery harvest is a linear function of the number of "All Season Licenses" sold ($r^2 = 0.94$, $P<0.001$).

The muzzleloader harvest appears to have leveled out. In 2007, the muzzleloader harvest increased 28% to 4,105 deer but this was still 4% lower that the record harvest in 2005. The muzzleloader harvest increased dramatically with the introduction of the "All Season License" in 2003 and is a linear function of the number of licenses sold ($r^2 = 0.74$, $P=0.006$). Statewide sales of this license increased by only 1% in 2007.

POPULATION TRENDS AND MODEL PROJECTIONS

Based on the winter severity index (WSI), the winter of 2007-08 was "mild" throughout most of the forest zone (43 to 86, Figure 3). In northeastern Minnesota, however, the WSI was generally "moderate" (116-158), or even "severe" (189). Deep snow between early January and mid-April combined with cold temperatures resulted in the higher than normal WSI indices. In the remainder of the forest zone, the WSI was based primarily on cold temperatures with an average of 10 days with deep snow.

Simulation modeling was used in 38 permit areas (Figure 1 and Table 4) to approximate deer density, identify trends, and project the effect of the 2008-hunting season. To better summarize the results for this report, permit areas were lumped in to one of 5 regions (Figs. 4 and 5). Deer density varied according to region with the lowest densities occurring in the Northeast and Northwest. Highest densities occurred in the West Central, Central, and South. 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, there has been a steady decline in deer numbers in both the South and West Central in response to the high antlerless harvest. Deer density in the Central region declined 5% since last year but the decline since 2003 has not been as steady as that in the South or West Central regions. The antlerless harvest in the NW remained low and deer numbers, according to the model, are gradually increasing. Antlerless harvest in the Northeast region was essentially flat and the decline was a response to the moderate-severe winter.

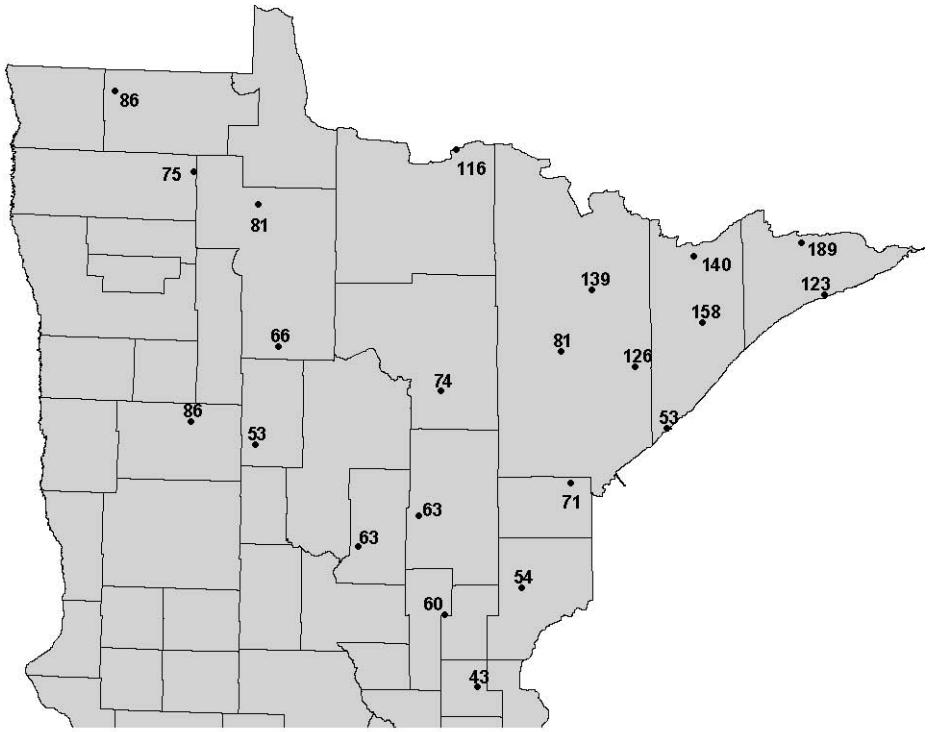


Figure 3. Final WSI values for the forested zone of Minnesota, winter of 2007-2008.

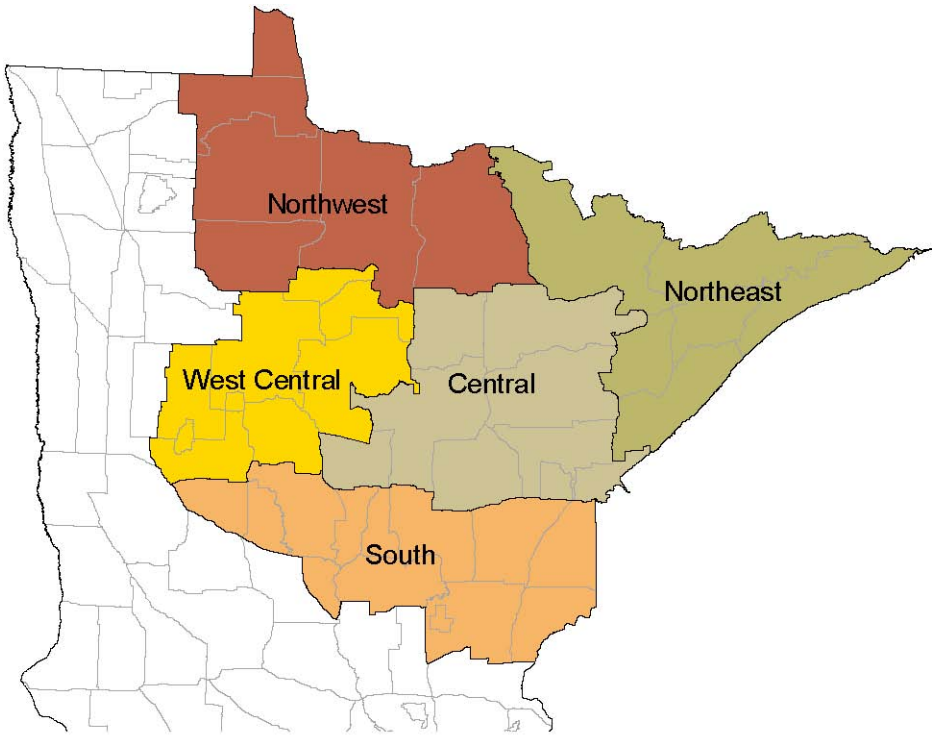


Figure 4. Permit areas grouped for summary discussion.

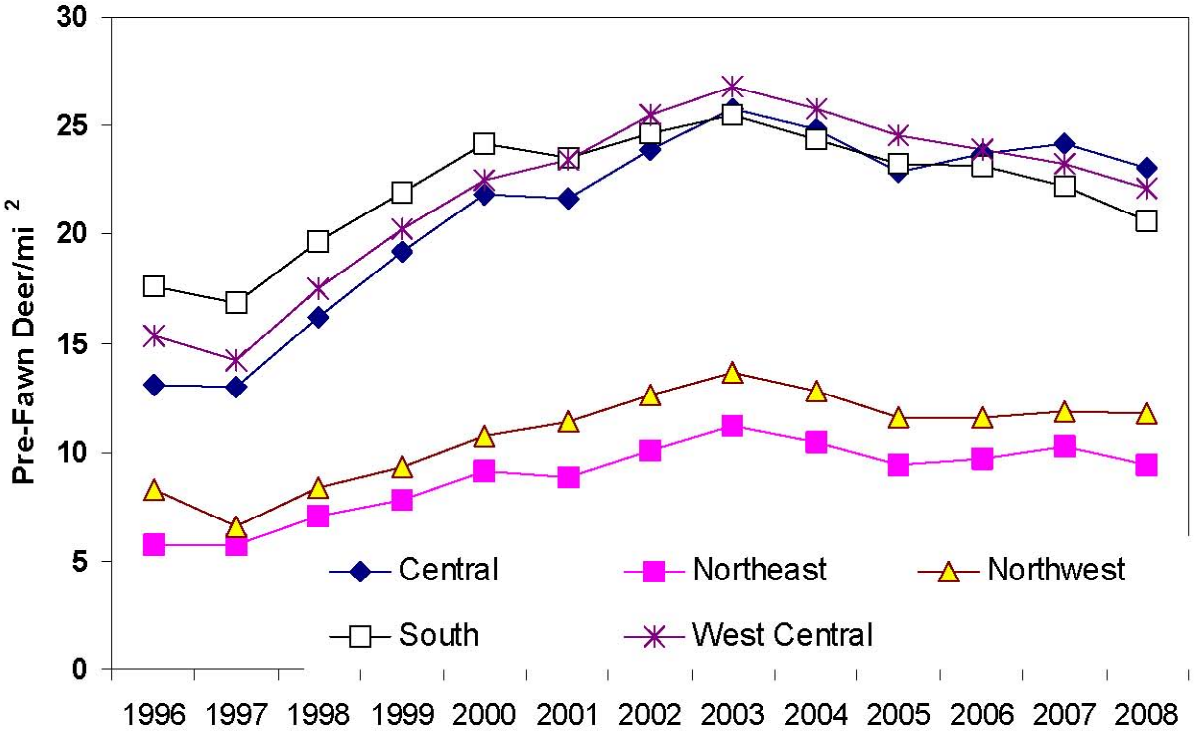


Figure 5. Population trends of deer in forest zone. Trend lines represent the groups of permit areas as illustrated in Figure 4. Density represents pre-fawn density.

Base on density targets set during the 2005 and 2006 goal setting processes, the 2008 pre-fawn deer density was above goal over much of the forest zone (Figure 6). For purposes here, if deer density was within 1 deer/mi^2 of the goal, the permit area is listed as being at goal. Permit areas ranged from 2 deer/mi^2 below goal to as much as 19 deer/mi^2 above goal.

Final classifications of permit areas for the 2008 season (Figure 7) were based primarily on the absolute difference between the 2008 pre-fawn density and that prescribed by the goal setting process. Four permit areas were classified as "Lottery" where hunters must apply for the limited number of antlerless permits. Seventeen permit areas were classified as "Managed" where hunters may take up to 2 antlerless deer. Eleven permit areas were classified as "Intensive" where hunters are allowed to harvest up to 5 antlerless deer and 10 additional permit areas were "Intensive" and include an early antlerless season in October.

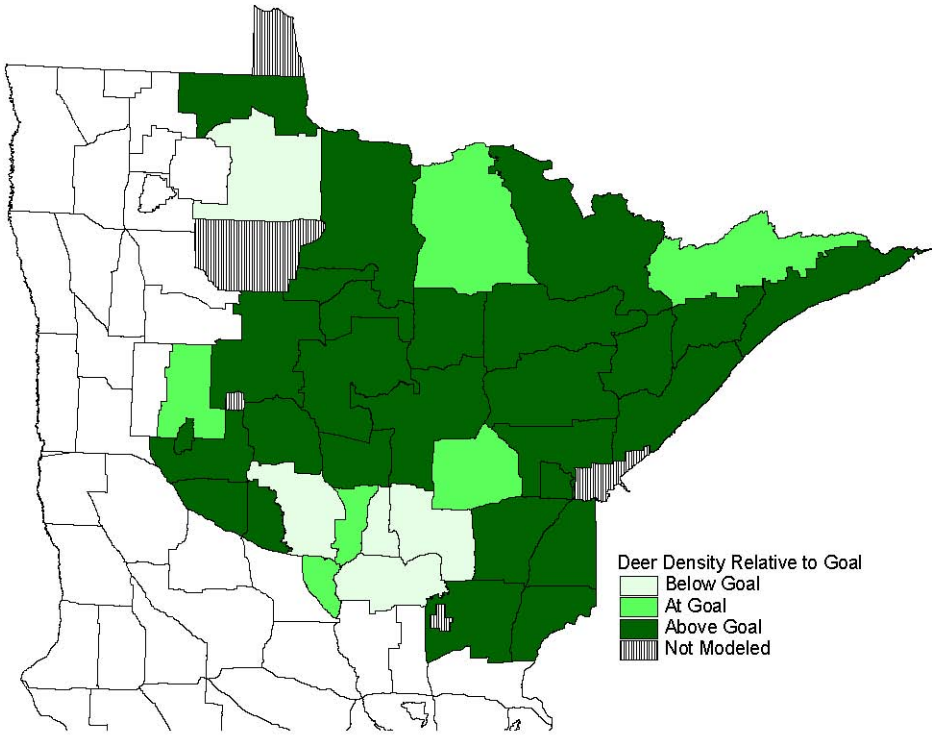


Figure 6. Deer density expressed relative to pre-fawn population goals.

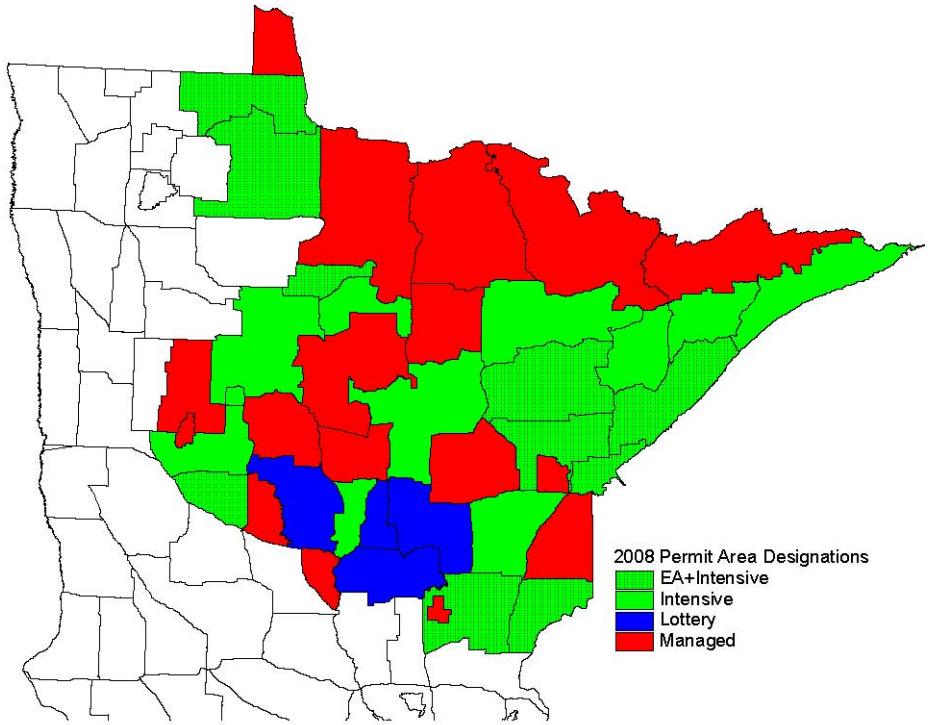


Figure 7. Final designation of permit areas in the Forest Zone for the 2008 hunting season.

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

Permit Area	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Change
104	567	897	1,372	1,837	1,939	2,253	3,421	2,902	2,483	2,632	2,557	-3%
105	876	1153	1,389	1,821	1,962	2,385	3,740	3,106	3,557	3,210	3,344	4%
107	948	1,176	1,994	2,846	3,547	3,499	5,206	4,027	3,936	3,825	3,874	1%
110	297	433	1,511	1,376	1,371	1,553	2,180	2,122	1,945	1,910	1,935	1%
111	540	683	1,169	1,644	2,223	2,264	3,064	2,621	2,687	2,812	2,530	-10%
114	52	39	40	55	72	80	96	110	123	174	127	-27%
115	1,029	1,347	2,334	3,174	3,586	3,815	5,431	4,333	4,378	4,480	4,250	-5%
116	100	146	138	150	156	157	265	298	261	270	350	30%
122	251	457	296	556	617	574	696	716	657	1067	1118	5%
126	260	351	306	445	470	597	702	841	904	977	1150	18%
127	63	83	176	81	95	99	146	177	151	188	215	14%
152	143	213	225	283	264	217	235	246	271	330	377	14%
154	1,370	1,952	2,978	4,418	4,169	5,032	5,717	5,176	4,583	4,546	4,526	0%
156	1,546	2,109	2,643	3,795	3,055	3,258	4,966	4,594	4,517	4,767	5,164	8%
157	3,293	4,709	5,385	6,990	7,194	7,728	9,001	7,606	6,901	7,989	7,828	-2%
159	2,553	3,751	4,371	5,311	4,459	4,153	5,207	3,887	3,968	3,905	4,165	7%
167	338	599	1,452	1,601	1,967	2,488	1,572	1,463	1,257	1,738	1,977	14%
168	552	988	2,410	2,686	2,376	3024	3,218	3,978	2,534	3,627	3,357	-7%
170	1,143	2,220	2,880	4,938	4,829	4,716	8,460	7,154	7,221	6,951	8,346	20%
172	979	1,443	2,961	4,253	4,621	4,910	7,004	5,489	5,227	5,345	4,877	-9%
174	754	1,371	1,927	2,438	2,140	2,678	3,825	3,347	3,095	3,180	3,245	2%
175	828	1,308	2,326	3,035	3,338	3233	5,071	4,254	3,103	4,559	4,419	-3%
178	912	1,401	2,351	3,050	3,347	3,666	5,523	5,297	5,373	5,476	6,562	20%
180	561	951	946	1,540	1,703	1,867	3,123	2,355	2,837	3,553	3,755	6%
181	703	1,186	1,780	2,362	2,457	2,419	3,599	3,544	3,755	4,475	5,005	12%
182	240	405	614	827	862	869	1,309	1,206	1,256	1,460	1,599	10%
183	598	1,003	2,147	2,748	2,743	2,771	3,960	3,533	3,449	4,006	3,747	-6%
184	1,822	2,558	5,970	7,283	7,762	8,811	14,023	12,307	11,482	10,261	11,005	7%
197	407	597	933	1,372	1,167	1,413	1,652	1,723	1,594	2,471	2,248	-9%
199	58	87	130	169	166	164	140	172	188	167	206	23%
241	3568	2919	2651	4284	3927	3857	4549	4449	4,288	4,369	4,787	10%
242	1,095	1,325	1,552	1,820	2,072	2,426	2,767	2,244	2,116	2,170	2,259	4%
243	1,268	1,602	1,907	2,634	2,864	3,238	4,131	3,684	3,165	3,429	3,458	1%
244	2,034	2,396	2,956	3,771	4,841	5,805	7,452	6,702	6,162	6,192	7,102	15%
245	1,021	1,657	3,524	4,695	5,053	5,626	8,231	6,377	5,737	6,115	5,393	-12%
246	2,761	3,447	4,075	5,599	6,090	5,149	7,530	6,782	5,835	6,389	5,339	-16%
247	1,155	1,407	1,631	1,923	2,115	2101	2,744	2,582	2,115	2,393	2,064	-14%
248	564	943	850	1,039	881	1,352	1,897	1,864	1,670	1,280	1,387	8%
249	1,110	1,514	2,217	2,826	3,148	3,238	4,223	3,800	3,211	3,667	3,305	-10%
251	188	208	246	326	254	298	470	387	325	301	253	-16%
287	313	314	368	376	460	470	529	425	280	305	306	0%
298	326	516	704	803	826	932	1988	1733	1664	1727	1610	-7%
Forested Zone	39,186	53,864	77,834	103,180	107,189	115,185	159,063	139,613	130,261	138,688	141,121	2%

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	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Change
104	567	897	1,137	1,240	1,266	1,332	1,589	1,586	1,250	1,176	1,279	9%
105	484	730	846	945	813	1,138	1,488	1,326	1,364	1,122	1,206	7%
107	948	1,174	1,706	1,948	2,174	2,119	2,523	2,277	1,861	1,725	1,921	11%
110	296	417	685	732	674	699	852	813	694	658	784	19%
111	540	683	1,088	1,168	1,395	1,463	1,467	1,408	1,316	1,149	1,155	1%
114	52	39	40	43	56	63	55	55	72	95	83	-13%
115	1,025	1,337	1,898	2,038	2,145	2,376	2,915	2,679	2,262	2,242	2,228	-1%
116	100	145	138	150	156	157	238	251	230	186	261	40%
122	248	455	293	417	452	449	501	567	534	565	658	16%
126	248	340	306	390	417	495	585	591	595	606	686	13%
127	62	83	176	80	82	86	126	149	127	147	148	1%
152	89	127	173	191	182	130	106	152	141	158	149	-6%
154	1,014	1,489	2,018	2,305	2,142	2,169	2,071	2,049	1,789	1,677	1,911	14%
156	1,116	1,590	1,836	2,084	1,690	1,653	2,001	2,003	1,811	1,881	2,068	10%
157	2,088	2,768	3,009	3,327	3,144	3,048	3,207	3,030	2,745	2,916	2,832	-3%
159	1,540	2,083	2,121	2,431	1,947	1,667	1,995	1,518	1,528	1,548	1,674	8%
167	336	597	906	1,036	968	1,211	821	819	709	692	821	19%
168	552	988	1,579	1,653	1,454	1,675	1,698	1,889	1,435	1,439	1,525	6%
170	1,143	2,174	1,621	3,106	2,786	2,611	3,435	3,233	2,987	2,920	3,285	13%
172	910	1,210	1,821	2,292	2,259	2,200	2,359	2,147	1,853	1,799	1,866	4%
174	725	1,268	1,234	1,448	1,257	1,363	1,542	1,597	1,367	1,313	1,400	7%
175	824	1,298	1,923	2,108	2,074	2,115	2,480	2,320	2,074	2,192	2,223	1%
178	908	1,390	1,946	2,059	2,013	2,218	2,651	2,767	2,704	2,503	2,966	18%
180	526	902	941	1,215	1,358	1,398	1,831	1,833	1,692	1,829	1,878	3%
181	625	1,060	1,351	1,596	1,562	1,590	1,943	1,940	1,779	1,998	2,240	12%
182	214	364	484	577	564	568	685	684	511	520	544	5%
183	537	902	1,633	1,919	1,650	1,575	1,661	1,654	1,514	1,634	1,745	7%
184	1,873	2,421	3,813	4,124	3,925	4,310	4,774	4,848	4,161	3,554	3,553	0%
197	403	585	923	1,142	953	998	1,040	1,143	999	1,090	1,108	2%
199	58	87	91	137	123	132	104	130	151	119	150	26%
241	1008	1175	1030	1382	1396	1477	1559	1621	1,460	1,506	1,498	-1%
242	586	743	812	988	885	824	912	740	721	692	688	-1%
243	760	991	1,081	1,192	1,169	1,247	1,343	1,217	1,066	1,142	1,066	-7%
244	1,195	1,491	1,848	2,014	2,048	2,300	2,540	2,390	2,170	2,155	2,080	-3%
245	1,019	1,527	2,216	2,350	2,179	2,430	2,743	2,449	2,036	2,229	1,932	-13%
246	1,639	2,113	2,355	2,784	2,479	2,384	2,599	2,527	2,082	2,178	1,935	-11%
247	700	887	970	1,181	1,056	948	1,047	955	861	848	802	-5%
248	272	534	641	778	622	720	714	739	656	638	487	-24%
249	706	1,104	1,310	1,590	1,479	1,429	1,479	1,327	1,261	1,285	1,246	-3%
251	95	112	129	134	152	132	176	183	128	145	91	-37%
287	70	127	167	189	201	184	207	182	106	104	92	-12%
298	326	492	601	648	685	654	952	894	810	799	753	-6%
Forested Zone	28,428	40,899	50,896	59,131	56,033	57,736	65,014	62,682	55,612	55,174	57,017	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 3. Registered antlerless deer harvest for Deer Permit Areas in Minnesota's Forested Zone.

Permit Area	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Change
104	0	0	235	597	673	921	1,832	1,316	1,233	1,456	1,278	-12%
105	392	423	543	876	1,149	1,247	2,252	1,780	2,193	2,088	2,138	2%
107	0	2	288	898	1,373	1,380	2,683	1,750	2,075	2,100	1,953	-7%
110	1	16	826	644	697	854	1,328	1,309	1,251	1,252	1,151	-8%
111	0	0	81	476	828	801	1,597	1,213	1,371	1,663	1,375	-17%
114	0	0	0	12	16	17	41	55	51	79	44	-44%
115	4	10	436	1,136	1,441	1,439	2,516	1,654	2,116	2,238	2,022	-10%
116	0	1	0	0	0	0	27	47	31	84	89	6%
122	3	2	3	139	165	125	195	149	123	502	460	-8%
126	12	11	0	55	53	102	117	250	309	371	464	25%
127	1	0	0	1	13	13	20	28	24	41	67	63%
152	54	86	52	92	82	87	129	94	130	172	228	33%
154	356	463	960	2,113	2,027	2,863	3,646	3,127	2,794	2,869	2,615	-9%
156	430	519	807	1,711	1,365	1,605	2,965	2,591	2,706	2,886	3,096	7%
157	1,205	1,941	2,376	3,663	4,050	4,680	5,794	4,576	4,156	5,073	4,996	-2%
159	1,013	1,668	2,250	2,880	2,512	2,486	3,212	2,369	2,440	2,357	2,491	6%
167	2	2	546	565	999	1,277	751	644	548	1,046	1,156	11%
168	0	0	831	1,033	922	1,349	1,520	2,089	1,099	2,188	1,832	-16%
170	0	46	1,259	1,832	2,043	2,105	5,025	3,921	4,234	4,031	5,061	26%
172	69	233	1,140	1,961	2,362	2,710	4,645	3,342	3,374	3,546	3,011	-15%
174	29	103	693	990	883	1,315	2,283	1,750	1,728	1,867	1,845	-1%
175	4	10	403	927	1,264	1,118	2,591	1,934	1,029	2,367	2,196	-7%
178	4	11	405	991	1,334	1,448	2,872	2,530	2,669	2,973	3,596	21%
180	35	49	5	325	345	469	1,292	522	1,145	1,724	1,877	9%
181	78	126	429	766	895	829	1,656	1,604	1,976	2,477	2,765	12%
182	26	41	130	250	298	301	624	521	745	940	1,055	12%
183	62	101	513	829	1,093	1,197	2,299	1,879	1,935	2,372	2,002	-16%
184	-51	137	2,157	3,159	3,837	4,501	9,249	7,459	7,321	6,707	7,452	11%
197	4	12	10	230	214	415	612	580	595	1,381	1,140	-17%
199	0	0	39	32	43	32	36	42	37	48	56	17%
241	2,560	1,744	1,621	2,902	2,531	2,380	2,990	2,828	2,828	2,863	3,289	15%
242	509	582	740	832	1,187	1,602	1,855	1,504	1,395	1,478	1,571	6%
243	508	611	826	1,442	1,695	1,991	2,788	2,467	2,099	2,287	2,392	5%
244	839	905	1,108	1,757	2,793	3,505	4,912	4,312	3,992	4,037	5,022	24%
245	2	130	1,308	2,345	2,874	3,196	5,488	3,928	3,701	3,886	3,461	-11%
246	1,122	1,334	1,720	2,815	3,611	2,765	4,931	4,255	3,753	4,211	3,404	-19%
247	455	520	661	742	1,059	1,153	1,697	1,627	1,254	1,545	1,262	-18%
248	292	409	209	261	259	632	1,183	1,125	1,014	642	900	40%
249	404	410	907	1,236	1,669	1,809	2,744	2,473	1,950	2,382	2,059	-14%
251	93	96	117	192	102	166	294	204	197	156	162	4%
287	243	187	201	187	259	286	322	243	174	201	214	6%
298	0	24	103	155	141	278	1,036	839	854	928	857	-8%
Forested Zone	10,759	12,965	26,938	44,049	51,156	57,449	94,049	76,931	74,649	83,514	84,104	1%

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

Permit Area	Area (sq. mi.)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Change
104	2,078	6	6	7	8	9	9	9	8	8	8	8	2%
105	766	21	24	27	30	34	37	37	35	35	36	37	2%
107	1,895	9	11	12	12	13	14	13	11	11	12	11	-4%
110	300	20	24	25	26	28	30	30	28	28	27	26	-4%
111	1,707	5	5	6	7	7	8	7	6	6	6	6	-5%
115	1,872	9	10	12	12	13	15	13	11	12	13	12	-4%
116	1,158	1	1	1	1	2	2	2	1	2	2	2	-6%
122	620	6	7	8	8	9	10	10	9	8	9	8	-9%
126	941	10	10	12	11	12	14	14	12	11	12	11	-12%
127	561	6	7	8	8	9	10	10	9	8	9	8	-9%
154	760	14	16	18	18	19	19	18	17	17	16	15	-6%
156	826	14	16	18	17	19	21	20	20	20	19	18	-9%
157	889	19	21	23	23	24	24	22	21	22	20	18	-10%
159	568	21	23	23	21	21	22	20	20	20	20	19	-6%
167	432	20	20	22	22	23	22	21	19	20	20	19	-4%
168	724	14	16	17	16	17	17	17	15	16	15	15	-6%
170	1,315	17	20	23	22	24	26	26	24	25	25	24	-6%
172	451	25	31	36	35	38	40	37	34	33	31	29	-8%
174	836	11	13	14	14	15	16	15	14	14	14	14	-4%
175	1,276	19	23	26	26	29	32	29	25	28	29	27	-8%
178	1,267	13	16	19	19	22	24	24	23	24	25	25	-1%
180	982	8	10	11	12	13	14	14	14	15	15	13	-10%
181	856	18	21	23	23	26	28	29	27	28	28	27	-3%
183	663	20	23	25	24	26	28	27	24	25	24	22	-5%
184	1,232	17	21	23	25	27	30	28	27	26	25	23	-8%
197	975	12	13	13	13	14	15	15	15	15	14	13	-6%
241	417	32	35	40	39	42	44	44	44	44	45	44	-1%
242	215	26	29	31	30	31	32	29	28	27	25	21	-13%
243	314	28	32	37	36	39	40	38	36	35	33	29	-12%
244	586	24	28	32	34	38	39	38	36	35	34	30	-10%
245	583	23	28	31	33	35	37	33	31	30	28	26	-6%
246	772	21	24	26	25	25	26	25	23	23	21	20	-6%
247	231	26	29	31	30	31	32	29	28	27	25	21	-13%
248	212	20	22	24	22	24	25	25	24	23	21	18	-15%
249	502	14	16	18	17	18	19	17	16	16	15	14	-9%
251	55	15	17	18	17	19	20	18	16	15	15	16	5%
298	619	15	16	17	18	19	22	21	20	20	20	23	12%
Forest Zone	30,456	14	16	18	18	19	20	19	18	18	18	17	-5%

2008 AERIAL MOOSE SURVEY

Mark S. Lenarz, Forest Wildlife Populations and Research Group

INTRODUCTION

Each year, we conduct an aerial survey in northeastern 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. We use these data in a simulation model to identify population trends and the harvestable surplus.

METHODS

We estimated moose numbers and age/sex ratios by flying transects within a stratified random sample of survey plots (Figure 1). Survey plots were last stratified in 2004. As in previous years, all survey plots were rectangular (5 x 2.67 mi.) and all transects were oriented east to west. DNR enforcement pilots flew the Bell Jet Ranger helicopters used to conduct the survey. We sexed moose using the presence of antlers, size and shape of the bell, nose color and/or presence of a vulval patch (Mitchell 1970), and identified calves on the basis of size and behavior. We recorded UTM coordinates and the percent visual obstruction (VOC) for all moose observed within the plots. We defined visual obstruction as the proportion of vegetation within a circle (10m radius or roughly 4 moose lengths) that would prevent you from seeing a moose when circling that spot from an oblique angle. If we observed more than one moose at a location, visual obstruction was based on the first moose sighted

We accounted for visibility bias by using a sightability model (Ackerman 1988, Anderson and Lindzey 1996, Otten et al. 1993, Quayle et al. 2001, Samuel et al. 1987). We developed this model between 2004 and 2007 using moose that were radiocollared as part of research on the population dynamics of the northeastern moose population. Logistic regression indicated that visual obstruction was the most important covariate in determining whether radiocollared moose were observed. We used uncorrected estimates (no visibility bias correction) of bulls, cows, and calves to calculate the bull:cow and calf:cow ratios.

RESULTS

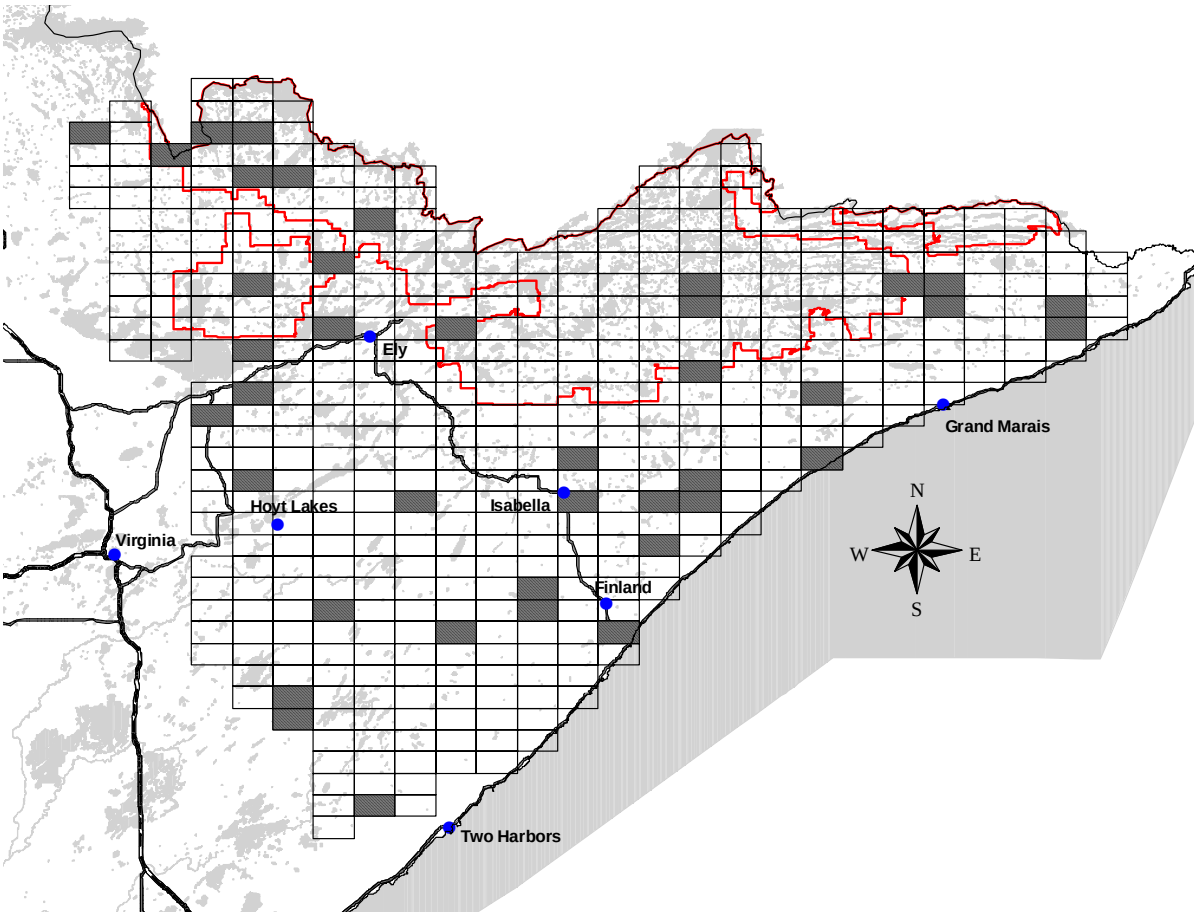
We initiated the survey on 2 January and completed it on 17 January. Observers rated survey conditions as "good" (highest rank) on 35 plots and "marginal" on 5 plots. Snow conditions for the survey were excellent and generally exceeded 16"in depth. During the survey flights, observers located 416 moose on the 40 plots (532 mi^2) including 155 bulls, 192 cows, 64 calves, and 5 unidentified moose.

After adjusting for sampling and sightability, we estimated that the moose population in northeastern Minnesota contained 7,637±2114 animals (Table 1). Estimates of the calf:cow and bull:cow ratio were 0.36 and 0.77, respectively (Table 1).

DISCUSSION

We have used the sightability model approach for 5 years to account for sightability bias in our estimates of moose numbers in northeastern Minnesota. In the first year, 3 observers equated VOC to crown closure on some observations and this resulted in significantly higher estimates of VOC (Kruskal Wallis AOV, F=20.3, $P<0.01$). As a result, the 2004 population estimate was biased high (Table 1). Pairwise comparison of the remaining years indicated that mean VOC did not differ among years 2005 - 2008 and as a result, population estimates were more comparable. Because of this bias, estimates for 2004 were not included in subsequent analyses.

Figure 1. Northeast moose survey area and sample plots (diagonal lines) flown in the 2008 aerial moose survey.



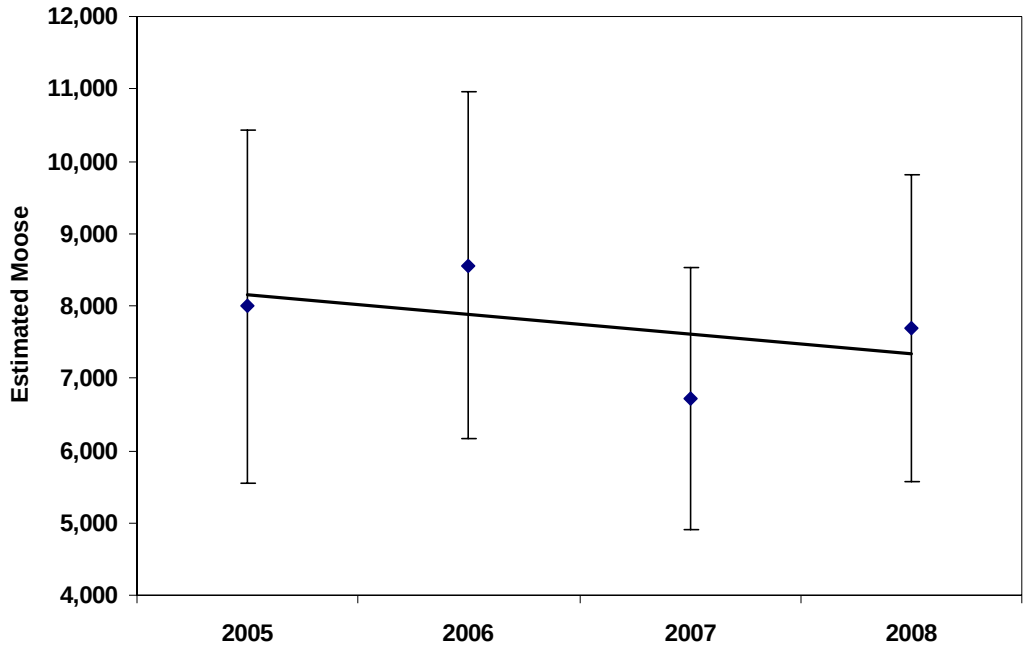
Prior to 2004, we used double sampling to calculate a sightability correction factor (SCF, Gasaway et al. 1986) to account for visibility bias. During the period 1997-2003, SCF averaged 1.35 (1.14 to 1.87). In the last 4 years, the mean theta value (a number equivalent to SCF) averaged 1.94 (1.78-2.09). The difference between estimates for SCF and theta implies that we missed a substantial proportion of the moose in the double sampling used to calculate SCF. Moreover, this difference implies that moose population estimates prior to 2004 were biased low. These inferences are corroborated by research conducted in Alaska (Gasaway et al. 1986) where they found that double sampling missed a larger proportion of moose if surveys were conducted in mid to late winter.

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

Survey	Estimate	Calves:Cow	Bulls:Cow	% Cows w/ Twins
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	13,093±40%	0.42	1.24	4
2005	7,923±30%	0.52	1.04	9
2006	8,501±28%	0.34	1.09	5
2007	6,659±27%	0.29	0.89	3
2008	7,637±28%	0.36	0.77	2

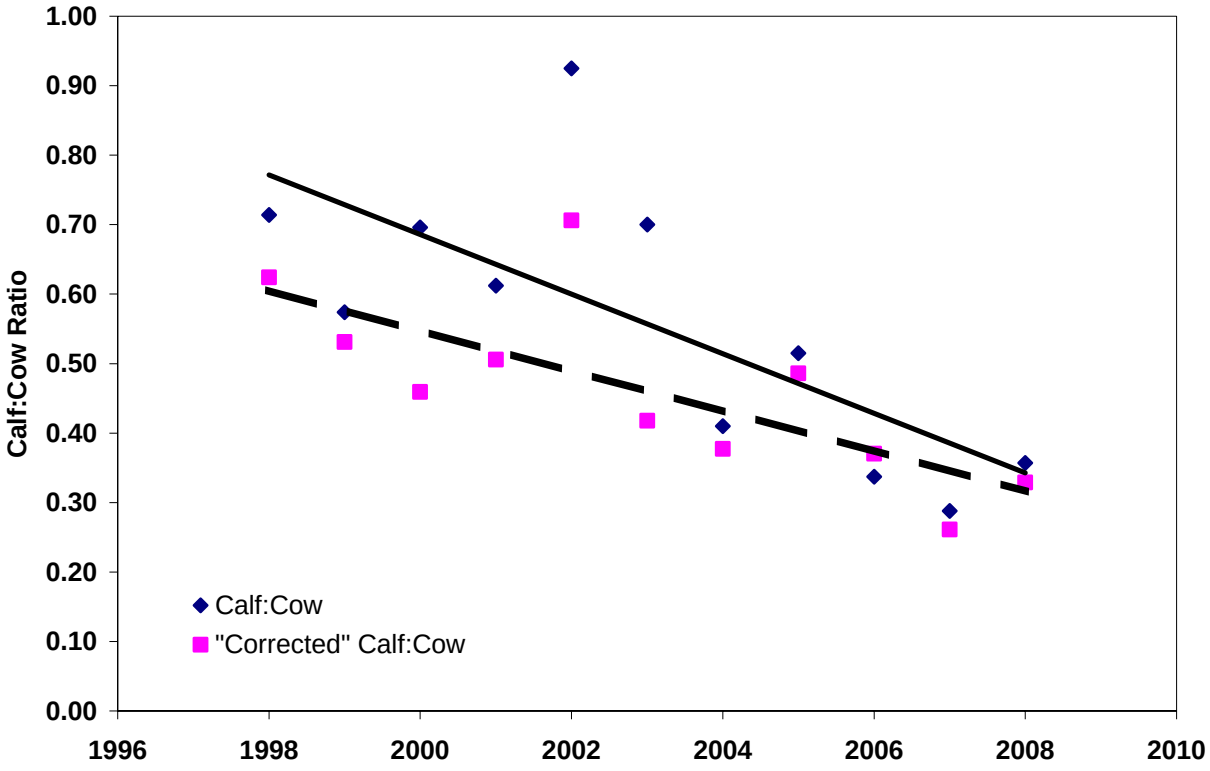
The 2008 population estimate was almost 15% higher than the 2007 estimate. The overlap in confidence intervals (Table 1, Figure 2), however, indicates that there was no statistical difference between the 2007 and 2008 point estimates. The population trend has a negative slope suggestive of a declining population. This inference is reinforced by the low calf:cow ratio (Table 1) and continued high mortality observed in research on radiocollared moose within the northeast population (Lenarz unpublished). citation.

Figure 2. Point estimates, 90% confidence intervals, and trend line of estimated moose numbers in northeastern Minnesota.



The calf:cow ratio estimated from the 2008 survey (Table 1) was significantly lower than the mean estimated in the previous 10 years ($\bar{x}$ = 0.58, t=3.56, P=0.003). Although slightly higher than in 2007, the calf:cow ratio has steadily declined in recent years (F=9.82, P=0.012; Figure 3.). Even if the cow:calf ratio is "corrected" by assuming that half of the unclassified moose were cows, there is still a significant decline in this important parameter (F=10.94, P=0.009). Ratio estimates (bull:cow and calf:cow) were not adjusted for sightability and hence, can be compared with estimates prior to adoption of the sightability model.

Figure 3. Estimates of calf:cow ratio of moose in northeastern Minnesota. Diamonds represent estimates adjusted for sampling and squares represent estimates "corrected" by assuming that half of the unclassified moose were cows. The solid and dashed lines represent the uncorrected and corrected trends, respectively.



The proportion of cows accompanied by twins was significantly lower ($\bar{x}$=7.2%, t =2.96, P=0.008) in 2008. Even when 50% of unclassified moose were included as cows in the calculation of the proportion twins, the values for 2008 remained significantly lower ($\bar{x}$=5.8%, t =2.87, P=0.009). 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).

The estimated bull:cow ratio (Table 1) was significantly lower than the mean bull:cow ratio estimated for the previous 10 years($\bar{x}$ = 1.22, t=4.49, P<0.001). This is true, even when recalculated with the assumption that 50% of the unclassified moose were adult bulls ($\bar{x}$ = 1.15, t=5.74, P<0.001). Although there is a negative trend in this statistic, the slope of the line is not significant (P=0.077). The hunter harvest has been heavily biased towards bulls in recent years (Lenarz, unpubl.), but the 2007 bull harvest (154) represented less than 6% of the estimated number of bulls in the 2007 population. This level of bull harvest is insufficient to have caused the decline in the bull:cow ratio observed between the 2007 and 2008 surveys. It has been speculated that reproduction would decline if the bull:cow ratio declines

below some unspecified level (e.g. Rausch 1974). Unless the bull:cow ratio drops to very low levels, there should be sufficient numbers of bulls to breed all cows.

In the January survey, 4% of the moose exhibited hair loss, which is indicative of infestation with the winter tick (*Dermacentor albipictus*). In 2007, 11% were observed with hair loss. 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.

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MIGRATORY BIRD POPULATIONS

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2008 WATERFOWL BREEDING POPULATION SURVEY MINNESOTA

Steve Cordts, Wetland Wildlife and Populations Research

ABSTRACT:

The number of breeding waterfowl in a portion of Minnesota has been estimated each year since 1968 as a part of the overall inventory of North American breeding waterfowl. The survey consists of aerial observations supplemented by more intensive ground counts on selected routes to determine the proportion of birds counted by the aerial crew. Procedures used are similar to those used elsewhere across the waterfowl breeding grounds. The 2008 aerial survey portion was flown from 5-12 May. Spring wetland habitat conditions were generally good and much improved from recent years. Wetland numbers increased 24% compared to 2007 and were 32% above both the 10-year and long-term averages. The estimated numbers of temporary (Type 1) wetlands increased 115% from 2007 but were similar to the long-term average. The mallard breeding population index (298,000) increased 23% from the 2007 estimate (242,000) but was statistically unchanged (P = 0.18). Mallard numbers were identical to the 10-year average but 34% above the long-term average of 222,000 breeding mallards. The blue-winged teal breeding population index (152,000) was 23% above the 2007 estimate (124,000) but remained below both the 10-year (-28%) and long-term (-32%) averages. Populations of other ducks (290,000), excluding scaup, increased 151% and were above the 10-year average (28%) and the long-term average (65%). Much of this increase was due to the record high numbers of ring-necked ducks observed. Ring-necked duck numbers increased by over 100,000 birds from last year and accounted for 43% of the other duck total. Many of these were likely migrant birds still present in the state due to the late spring weather conditions. However, totals for other typical late nesting species (i.e. blue-winged teal, scaup) that are often inflated during late springs showed different results and remained below average in 2008. Wood duck numbers more than doubled from last year but estimates remain lower than levels recorded in the late 1990s. The estimate of total ducks (740,000), which excludes scaup, increased 51% compared to 2007 and was identical to the 10-year average and 19% above the long-term average (623,000). Canada goose numbers (uncorrected for visibility) decreased 28% compared to 2007, were 20% below the 10-year average but 65% above the long-term average. Spring phenology (ice out, leaf-out, temperatures) was 1-2 weeks later than average this year. Based on the social status of mallards observed (number of pairs, lone males, and flocked birds), the survey timing was adequate and similar to recent years. For other species (i.e. ring-necked ducks), the late spring contributed to a large number of migrant birds still present in the state.

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.

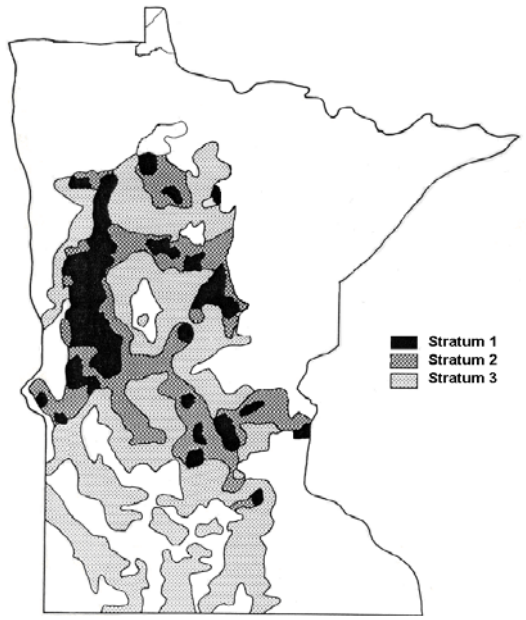

Figure 1. Location of waterfowl breeding population survey strata in Minnesota.

Strata boundaries were based upon "An Inventory of Minnesota Lakes" (Minnesota Conserv. Dept. 1968:12). Standard procedures for the survey follow those outlined in "Standard Operating 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). Data were recorded on digital voice recorders for both the pilot and observer and stored as WAV files.

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. We compared estimates for 2007 and 2008 using two-tailed Z-tests.

SURVEY CHRONOLOGY:

The 2008 aerial survey began on 5 May in southern Minnesota and concluded in northern Minnesota on 12 May. The survey was completed in 8 days of flight time, which was the shortest span since the survey was initiated in 1968. Transects were flown each day and flights began no earlier than 7 AM and were completed by 12 PM each day.

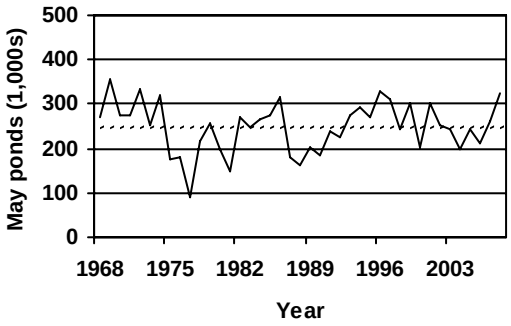

Fig. 2. Number of May ponds (Types II-V) and long-term average (dashed line) in Minnesota, 1968-2008.

WEATHER AND HABITAT CONDITIONS:

Wetland conditions in spring 2008 were improved from 2007. Ice out on most lakes across the state was 1 to 2 weeks later than average, particularly in the northern regions of the state. Some ice was still present on portions of large lakes (Leech, Bemidji) on the final day of the survey but no ice was present on any of the aerial transects. April temperatures averaged 2.7°F below normal statewide; regional temperatures ranged from 1.4°F below average in northeast Minnesota to 3.6°F below average in west central Minnesota (http://climate.umn.edu/cawap/monsum/0804.txt). April precipitation was 1.6 inches above normal statewide and ranged from 0.3 inches above normal in southwest Minnesota to 3.1 inches above normal in southeast

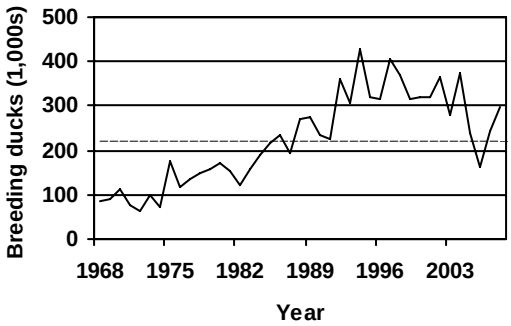

Figure 3. Mallard population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2008.

Minnesota. May temperatures averaged 3.8°F below normal statewide. May precipitation was 0.2 inches below normal statewide and ranged from 1.0 inch below normal in northwest Minnesota to 0.5 inches above normal in southwest Minnesota (http://climate.umn.edu/cawap/monsum/0805.txt).

From 20 April through 18 May, which normally would coincide with peak spring migration time for most duck species, average temperatures were near normal in mid-April (1°F above) but well below (2°F to 7°F) normal for the next 4 weeks throughout the state. Precipitation across the state averaged almost 2 inches above normal during this time period. Additional temperature and precipitation data are provided in Appendix A.

In early May 2008, statewide topsoil moisture indices were rated as 1 % short, 67 % adequate, and 32% surplus moisture. In late May, statewide indices were rated as 9% short, 81% adequate and 10% surplus moisture. (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, http://www.nass.usda.gov/mn/). For comparison, in early May 2007 statewide topsoil moisture indices were rated as 8% very short or short, 79% adequate, and 13% surplus moisture.

Planting dates for row crops were later in 2008 than recent years. By 4 May, 8% of the corn acres had been planted statewide compared to 58% in 2007 and 65% for the previous 5-year average. By 1 June, 7% of alfalfa hay had been cut compared to 29% in 2007 and a 5-year average of 20% (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, http://www.nass.usda.gov/mn/).

Wetland numbers (Type II-V) increased 24% from 2007 and were 32% above both the 10-year and long-term averages (Table 2; Figure 2). The numbers of temporary (Type 1) wetlands increased 115% from 2007 but were similar to the long-term average.

Leaf-out dates were considerably later than average, which greatly improved visibility from the air, particularly compared to recent years. The emergence of wetland vegetation was also much later than average, which also improved visibility from the air.

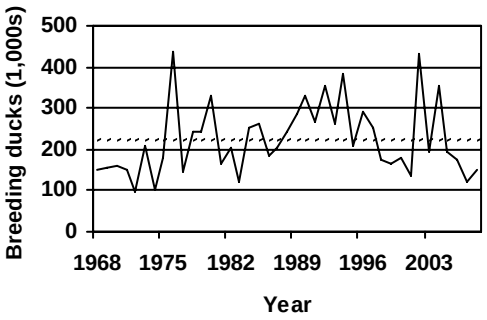

Figure 4. Blue-winged teal population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2008.

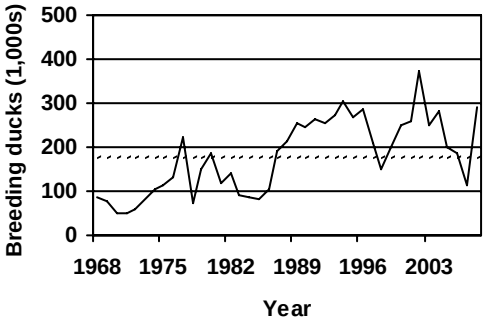

Figure 5. Other duck (excluding scaup) populations (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2008.

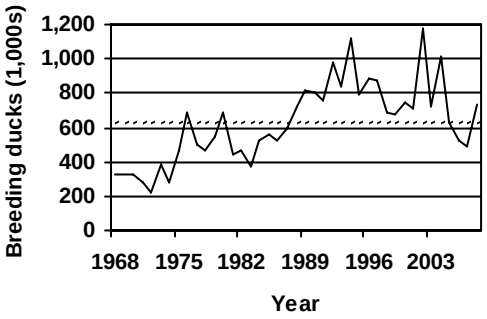

Figure 6. Total duck (excluding scaup) population estimate and long-term average (dashed line) in Minnesota, 1968-2008.

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 expanded for area but not corrected for visibility bias.

The 2008 waterfowl breeding population estimate of mallards was 297,565 (SE = 27,787), which was 23% higher but statistically unchanged from 2007 (Z = 1.37, P = 0.18) (Table 7, Figure 3). Mallard numbers were similar to the 10-year average and 34% above the long-term average of 222,000. In 2008, 2% of the total mallards were in flocks compared to 6% in 2007 and 7% in 2006. Pairs comprised 13% of the mallards observed, compared to 9% and 12% in 2006 and 2007, respectively. This suggests that survey timing was similar to recent years based on their social status.

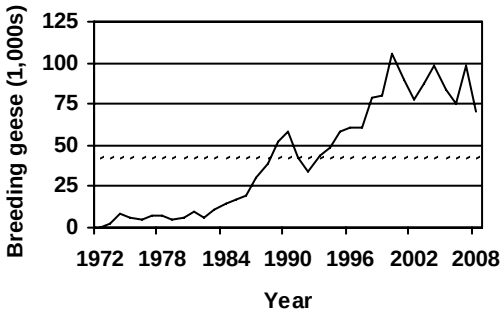

Figure 7. Canada goose population estimates (not adjusted for visibility bias) and long-term average in Minnesota, 1972-2008.

The estimated blue-winged teal population was 152,359 (SE = 24,157), which was higher than 2007 (123,000) but statistically unchanged from last year (Z = 0.92, P = 0.36). Blue-winged teal numbers remained 28% below the 10-year average and 32% below the long-term average (Table 7, Figure 4). In 2008, 11% of the blue-winged teal were observed in flocks compared to no teal in flocks in 2007. Pairs comprised 74% of the blue-winged teal observed, compared to 64% in 2007 and an average of 55% counted as pairs since 2000. This index of social status suggests that migrant blue-winged teal were still present in the state (flocked birds) and few had begun nesting (low numbers of lone males). Typically, this can result in higher than average population estimates but blue-winged teal estimates were below average this year.

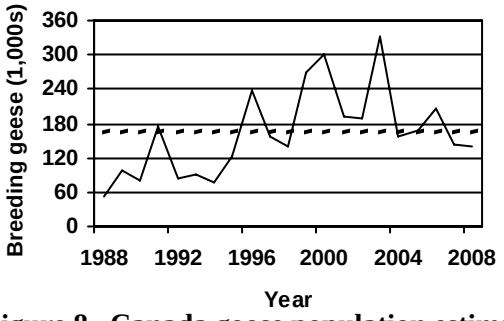

Figure 8. Canada goose population estimates (adjusted for visibility bias) and long-term average in Minnesota, 1988-2008.

Other duck numbers (excluding scaup) increased 151% to 289,629 and were 28% above the 10-year average and 65% above the long-term average (Table 7, Figure 5). Much of this increase was due to record numbers of ring-necked ducks counted. Ring-necked ducks accounted for 43% of the total number of other ducks and estimated numbers increased by over 100,000 from last year, reflecting large numbers of migrants present during the survey. Scaup numbers, however, were identical to the 10-year average (43,000) and 36% below the long-term average. Although scaup are only rare nesters in the state, spring migration patterns are generally assumed to be similar to ring-necked ducks. Based on the record high number of ring-necked ducks present this year, scaup numbers were considerably lower than expected. The total duck population, excluding scaup, was 740,000, which was 51% higher than 2007, identical to the 10-year average and 19% above the long-term average (Table 7, Figure 6).

Visibility Correction Factors (VCFs) were lower in 2008 for mallards (9%), blue-winged teal (11%) and other ducks (22%) compared to 2007 (Table 7). Mallard VCFs (2.88) were lower than last year (3.15) but 34% above the long-term average. The blue-winged teal VCF (3.74) was lower than last year (4.20) and near the long-term average. The VCF for other ducks (2.91) was also lower than last year (3.73) and near the long-term average. The late leaf-out conditions and/or ideal flying conditions (light winds, overcast skies, no precipitation) may have contributed to better visibility from the air and lower VCFs this year.

Canada goose numbers (uncorrected for visibility) decreased 28% compared to 2007 and were 65% above the long-term average (Table 7, Figure 7). The VCF for Canada geese was 1.99, 35% higher than 2007 but 15% below the long-term average. The population estimate of Canada geese, adjusted for visibility, was similar (-3%) to last year (Table 7, Figure 8). There were no Canada goose broods observed during the aerial survey compared to 30-50 broods each of the past 3 years. This may be related to the late spring chronology and a delayed nesting effort by Canada geese, or simply the timing to complete this year's survey (8 days vs. >20 days the past 3 years).

The estimated coot population, uncorrected for visibility, was 56,000 in 2008 compared to 6,000 in 2007.

SUMMARY:

Overall wetland conditions were improved from 2007 and above the long-term average. Mallard abundance in 2008 (298,000) was higher than 2007 (242,000) but statistically unchanged (P=0.18). Mallard numbers were 34% above the long-term average (222,000) and at the 10-year average (299,000). Blue-winged teal abundance (152,000) was higher than 2007 (124,000) but not significantly different (P=0.36) and remained 28% below the 10-year average (212,000) and 32% below the long-term average (225,000). Duck abundance for all other species increased relative to 2007. Total duck abundance (740,000), excluding scaup, increased 51% from 2007, was identical to the 10-year average and 19% above the long-term average. Much of this increase was attributed to large numbers of migrant ring-necked ducks present in the state, likely as a result of the late spring phenology. Canada goose numbers, unadjusted for visibility bias, decreased 28% from 2007 and were 65% above the long-term average.

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Minnesota Department of Natural Resources (MNDNR) and the U.S. Fish and Wildlife Service (USFWS)
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Ground Crew: Sean Kelly, Asst. Chief, Migratory Bird & Refuges, 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; Tom Cooper, USFWS, Region III, Twin Cities; 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; Paul Soler and Greg Dehmer, USFWS, Sherburne National Wildlife Refuge; Fred Osland, Luke Anderson, and Gina Houdek, USFWS, HAPET, Fergus Falls; Jeff Lawrence and Steve Cordts, MNDNR, Bemidji; Steve Lewis and Jane West, USFWS, Region III, Twin Cities; Steve Wilds, USFWS, retired.

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Table 1. Survey design for Minnesota, May 2008.[1]

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

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

Table 2. Estimated number of May ponds (Type 1 and Types II-V) during Minnesota waterfowl breeding population survey, 1968-2008.

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
2007	32,415	262,000
2008	69,734	325,000
10-year average (1998-2007)	43,892	246,100
Long-term average (1968-2007)	69,098	246,500
Change from:		
2007	115%	24%
10-year average	59%	32%
Long-term average	1%	32%

[1] Type II-V, correction factor from 1989 (123,000/203,000=0.606) used to adjust 1968-88 pond numbers.

Table 3. Minnesota waterfowl breeding populations by species for Stratum I (high wetland density), expanded for area but not visibility, 1990-2008.

	Year																		
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	16,357	25,104
Black Duck	0	56	0	0	56	0	0	0	0	0	0	0	0	0	0	56	0	0	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	889	1,166
American Wigeon	222	0	56	0	0	194	0	0	56	56	56	111	0	56	555	167	0	56	111
Green-winged Teal	0	56	0	111	278	0	278	56	333	0	278	56	278	222	444	56	56	167	278
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	5,332	9,942
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	56	1,000
Northern Pintail	444	389	222	611	167	167	167	111	111	167	167	389	56	111	56	0	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	2,666	6,665
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	25,523	44,322
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	916	1,389
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	1,000	2,277
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	555	6,276
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	1,555	21,494
Goldeneye	56	0	222	111	222	111	167	0	111	56	56	333	111	0	222	222	56	222	278
Bufflehead	0	333	722	0	444	56	278	0	56	111	56	111	222	111	389	167	222	56	1,611
Ruddy Duck	1,500	361	500	1,250	639	167	139	528	11,052	972	0	83	1,305	417	305	1,222	305	0	1,027
Hooded Merganser	139	0	444	222	111	278	611	555	389	722	500	722	555	333	278	333	555	111	666
Large Merganser	0	56	111	0	56	0	0	56	0	0	0	111	0	972	0	111	0	278	333
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	4,693	35,351
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	30,216	79,673
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	139	16,829
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	29,797	18,717

Table 4. Minnesota waterfowl breeding populations by species for Stratum II (medium wetland density), expanded for area but not visibility, 1990-2008.

	Year																		
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	24,779	27,935
Black Duck	0	0	0	0	0	0	0	0	0	0	0	117	0	0	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	234	3,039
American Wigeon	234	701	351	0	117	0	468	351	818	0	468	0	0	0	2,513	117	0	0	351
Green-winged Teal	0	0	0	351	117	0	935	234	351	117	117	117	468	234	234	0	117	0	0
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	8,416	12,740
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	351	468
Northern Pintail	701	701	234	351	468	234	117	234	468	117	117	117	0	117	0	0	0	234	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	2,221	6,546
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	36,235	51,079
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	935	935
Canvasback	234	117	0	584	1,052	0	234	701	117	117	935	0	468	1,052	234	0	0	1,169	468
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	643	3,097
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	1,578	13,149
Goldeneye	351	818	351	584	701	701	1,753	818	234	935	584	468	234	234	351	117	117	0	351
Bufflehead	234	0	526	117	234	0	117	117	0	0	0	0	1,169	117	468	351	117	117	1,403
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	0	0
Hooded Merganser	0	0	351	584	468	117	234	468	117	701	935	1,403	701	701	234	234	351	234	584
Large Merganser	0	0	117	0	0	0	0	0	0	0	117	117	0	0	234	351	0	0	351
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	4,676	20,338
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	40,911	71,417
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	409	23,961
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	25,890	19,753

Table 5. Minnesota waterfowl breeding populations by species for Stratum III (low wetland density), expanded for area but not visibility, 1990-2008.

	Year																		
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	35,843	50,371
Black Duck	174	0	0	0	0	0	0	0	0	0	0	0	0	0	174	0	0	174	174
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	4,176	870
American Wigeon	957	696	522	348	1,218	0	1,044	348	696	0	522	174	1,218	174	1,566	1,044	174	348	348
Green-winged Teal	0	348	0	348	174	0	957	348	174	0	1,218	1,392	522	174	0	174	522	0	0
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	15,659	18,095
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	870	4,002
Northern Pintail	696	1,914	870	1,218	696	174	870	522	870	870	696	522	0	174	348	174	174	348	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	5,394	14,442
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	62,812	88,476
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	522	783
Canvasback	1,044	696	0	348	696	174	1,392	0	3,306	174	3,915	522	696	1,131	2,784	0	0	348	1,566
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	696	5,481
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	1,392	8,526
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	870	348
Bufflehead	0	552	696	348	696	0	1,044	174	348	0	0	0	1,218	783	2,088	0	174	696	1,218
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	261	87
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	174	696
Large Merganser	0	0	348	0	174	174	0	0	0	0	0	0	522	0	0	261	957	348	348
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	5,307	19,053
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	68,119	107,529
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	5,742	15,137
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	42,629	31,841

Table 6. Minnesota waterfowl breeding populations by species for Stratum I-III combined, expanded for area coverage but not for visibility, 1990-2008.

	Year																		
Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
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	76,979	103,411
Black Duck	174	56	0	0	56	0	0	0	0	0	0	117	0	0	174	56	0	174	174
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	5,298	5,075
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	404	810
Green-winged Teal	0	404	0	810	569	0	2,170	638	858	117	1,613	1,564	1,267	630	678	230	694	167	278
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	29,407	40,777
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	1,276	5,469
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	582	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	10,281	27,652
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	124,568	183,876
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	2,373	3,107
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	2,517	4,311
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	1,894	14,854
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	4,525	43,169
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	1,092	976
Bufflehead	234	885	1,944	465	1,374	56	1,439	291	404	111	56	111	2,609	1,011	2,944	517	513	868	4,231
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	261	1,114
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	519	1,947
Large Merganser	0	56	576	0	230	174	0	56	0	0	117	228	522	972	234	723	957	626	1,032
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	14,675	74,741
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	139,243	258,617
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	6,290	55,927
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	98,316	70,311

Table 7. Estimated waterfowl populations during the Minnesota Waterfowl breeding population survey, 1968-2008.

	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
2007	76,979	3.15	242,481	30,020	29,407	4.20	123,588	20,055	30,963	3.73	115,390
2008	103,411	2.88	297,565	27,787	40,777	3.74	152,359	24,157	99,575	2.91	289,629
Averages:											
10-year (1998-2007)	128,851	2.41	298,659	39,873	53,091	4.01	212,094	41,959	73,802	3.38	226,526
Long-term (1968-2007)	103,567	2.15	222,280	36,215	60,568	3.91	224,827	42,730	59,615	3.19	176,025
% change from:											
2007	34%	-9%	23%	-7%	39%	-11%	23%	20%	222%	-22%	151%
10-year average	-20%	20%	0%	-30%	-23%	-7%	-28%	-42%	35%	-14%	28%
Long-term average	0%	34%	34%	-23%	-33%	-4%	-32%	-43%	67%	-9%	65%

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

Table 7. Cont.

Year	Scaup			Total ducks (ex. scaup)		Total Ducks		Canada geese		
	Unad. PI	VCF	PI	Unad. PI	PI	Unad. PI	PI	Unad. PI	VCF	PI
1968	22,834	2.08	47,495	144,392	320,994	167,226	368,488			
1969	9,719	2.27	22,062	132,952	323,213	142,671	345,275			
1970	12,105	1.62	19,610	129,967	324,219	142,072	343,829			
1971	5,713	1.71	9,764	119,667	277,137	125,380	286,901			
1972	12,062	1.69	20,379	132,928	217,181	144,990	237,560	366		
1973	10,633	2.45	26,093	142,857	389,486	153,490	415,580	1,965		
1974	18,378	2.79	51,201	122,534	281,605	140,912	332,806	8,835		
1975	9,563	3.31	31,649	135,626	471,608	145,189	503,257	5,997		
1976	22,494	3.35	75,323	198,236	684,082	220,730	759,405	5,409		
1977	2,971	11.95	35,517	116,641	501,099	119,612	536,616	7,279		
1978	14,774	3.35	48,812	106,677	462,502	121,451	511,314	7,865		
1979	92,134	3.79	348,948	148,200	552,416	240,334	901,364	4,843		
1980	12,602	3.97	50,070	182,063	690,593	194,665	740,663	6,307		
1981	19,844	3.88	75,451	175,055	439,769	194,899	515,220	10,156		
1982	21,556	4.32	93,204	127,153	465,195	148,709	558,399	6,600		
1983	9,551	2.84	27,077	148,392	367,142	157,943	394,219	11,081		
1984	15,683	2.18	34,111	224,736	529,679	240,419	563,790	14,051		
1985	7,409	2.35	17,430	221,516	562,898	228,925	580,328	16,658		
1986	6,247	2.67	16,678	215,463	520,787	221,710	537,465	19,599		
1987	10,306	2.51	25,910	345,107	588,954	355,413	614,864	29,960		
1988	10,545	2.61	27,553	338,240	725,238	348,785	752,791	39,057	1.36	53,004
1989	71,898	2.89	207,991	302,771	813,615	374,669	1,021,606	51,946	1.88	97,898
1990	40,075	1.97	78,892	372,587	807,870	412,662	886,761	58,425	1.37	80,147
1991	40,727	2.81	114,480	313,595	753,710	354,322	868,191	42,231	4.18	176,465
1992	66,071	2.33	153,939	347,012	973,323	413,083	1,127,262	33,965	2.43	82,486
1993	11,801	3.28	38,750	271,053	837,172	282,854	875,921	43,858	2.08	91,369
1994	57,670	3.55	204,536	294,477	1,115,558	352,147	1,320,095	48,595	1.68	77,878
1995	28,421	4.05	115,096	256,390	797,144	284,811	912,241	58,065	2.08	120,775
1996	65,585	2.64	173,351	318,619	889,057	384,204	1,062,408	60,870	3.92	238,708
1997	31,138	2.72	84,834	282,220	868,137	313,358	952,971	60,449	2.59	156,817
1998	28,416	1.64	46,528	328,238	693,084	356,654	739,612	79,147	1.75	138,507
1999	14,041	2.49	35,002	285,778	680,463	299,819	715,465	80,012	3.35	268,168
2000	32,376	2.10	67,520	338,299	747,779	370,675	815,299	105,932	2.84	301,298
2001	15,743	2.85	44,914	274,892	716,353	290,653	761,267	89,418	2.17	193,887
2002	13,016	4.04	52,606	327,951	1,171,537	340,967	1,224,143	78,200	2.42	189,353
2003	5,117	5.30	27,120	209,529	721,805	214,646	748,925	87,663	3.78	331,094
2004	30,906	2.94	90,926	347,673	1,008,324	378,579	1,099,250	98,339	1.58	155,859
2005	12,397	3.98	49,340	177,663	631,980	190,060	681,320	83,384	2.02	168,469
2006	1,971	4.22	8,322	153,504	521,109	155,475	529,431	75,688	2.73	206,757
2007	1,894	3.73	7,058	137,349	488,517	139,243	495,575	98,316	1.47	144,289
2008	14,854	2.91	43,205	243,763	739,553	258,617	782,758	70,311	1.99	139,708
Averages:										
10-year (1998-2007)	15,588	3.33	42,934	258,088	738,095	273,677	781,029	87,610	2.41	209,768
Long-term (1968-2007)	22,910	3.18	67,639	223,700	623,308	246,610	690,947	42,515	2.38	163,661
% change from:										
2007	684%	-22%	512%	77%	51%	86%	58%	-28%	35%	-3%
10-year average	-5%	-13%	1%	-6%	0%	-6%	0%	-20%	-17%	-33%
Long-term average	-35%	-8%	-36%	9%	19%	5%	13%	65%	-16%	-15%

[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, 20 April - 18 May 2008 (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
		20-April		27-April		4-May		11-May		18-May							
Region	City	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	Avg[1]	Depart[2]	20-April	27-April	4-May	11-May	18-May	1 Apr-18 May
NW	Crookston	45.8	3.1	39.2	-7.2	41.9	-8.1	45.4	-7.9	51.2	-5.1	0.01	0.93	0.02	0.14	0.06	-1.35
NC	Grand Rapids	43.0	1.1	41.2	-4.0	42.5	-5.8	46.6	-4.8	49.8	-4.4	0.00	2.19	0.38	1.14	0.49	4.29
	Itasca	39.9	1.2	38.2	-4.1	38.2	-7.7	43.3	-6.0	49.2	-3.2	0.00	1.79	0.12	0.93	0.29	2.87
WC	Alexandria	45.8	2.4	41.4	-5.5	43.8	-6.5	49.6	-3.8	53.8	-2.4	0.00	1.40	0.08	0.91	0.16	-0.16
	Fergus Falls	45.0	1.4	41.6	-5.7	40.6	-10.1	51.4	-2.5	51.9	-4.8	0.00	2.52	0.65	1.13	0.03	2.35
	Montevideo	47.2	2.1	44.8	-3.8	46.4	-5.5	51.7	-3.4	55.0	-3.0	0.00	0.90	0.36	1.67	0.15	0.72
	Morris	43.7	-1.3	43.8	-4.7	39.8	-12.0	51.4	-3.5	53.4	-4.3	0.00	1.32	0.26	1.38	0.09	1.12
C	Becker	44.4	0	48.2	0.4	43.8	-7.1	52.4	-1.4	54.6	-1.9	0.17	2.49	0.86	1.42	0.35	2.75
	Hutchinson	46.6	0.6	49.8	0.3	44.3	-8.4	53.3	-2.5	56.4	-2.2	0.00	1.75	1.30	0.81	0.18	2.16
	St. Cloud	46.2	1.8	45.3	-2.5	45.4	-5.5	50.6	-3.2	54.0	-2.5	0.00	1.93	0.87	1.14	0.10	1.42
	Staples	42.0	-0.9	45.0	-1.3	40.3	-9.1	47.8	-4.5	51.0	-3.9	0.00	0.87	0.38	0.80	0.16	0.75
	Willmar	44.9	-0.2	47.4	-1.1	43.2	-8.7	52.8	-2.3	54.3	-3.6	0.00	1.77	0.62	1.72	0.25	2.22
EC	Aitkin	42.0	0.2	46.1	1.1	40.3	-7.7	48.2	-2.7	49.4	-4.1	0.00	1.30	0.47	0.80	0.38	2.16
	Cambridge	Missing															
	Msp Airport	49.0	1.6	49.8	-0.8	47.2	-6.4	54.5	-1.9	57.1	-2.0	0.27	1.46	1.34	0.51	0.01	0.96
SW	Pipestone	44.5	-0.9	44.3	-4.3	44.2	-7.5	52.6	-2.1	53.1	-4.4	0.00	1.45	0.18	1.68	0.00	0.37
	Redwood Falls	48.3	0.6	46.2	-4.8	47.0	-7.2	52.7	-4.6	55.7	-4.4	0.00	2.42	1.19	1.19	0.22	1.71
	Worthington	43.8	-0.4	46.8	-0.7	43.4	-7.5	52.8	-1.2	55.4	-1.6	0.07	1.07	1.70	0.88	0.00	0.69
SC	Faribault	44.2	-0.7	51.4	3.3	43.4	-7.9	52.4	-1.9	54.9	-2.2	0.10	1.90	1.23	0.67	0.05	1.56
	Waseca	44.8	-0.9	50.9	1.9	44.0	-8.2	55.0	-0.3	55.8	-2.4	0.69	1.09	1.39	0.67	0.00	0.68
	Winnebago	45.6	-1.2	51.8	1.9	45.2	-7.7	56.0	0.2	57.5	-1.0	0.36	1.55	2.04	0.86	0.00	3.03
Statewide		45.0	1.0	45.4	-1.9	43.1	-7.3	49.8	-3.7	53.0	-3.2	0.26	1.76	0.76	0.82	0.24	

[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, 2008** by Pamela R. Garrettson, Timothy J. Moser, Nathan Zimpfer, and Kathy Fleming. The entire report is available on the Division of Migratory Bird Management home page (http://www.fws.gov/migratorybirds/reports/reports.html .

Table 1. Canada goose population indices (in thousands) of the eastern prairie flock, 1971-2008 (from: U.S. Fish and Wildlife Service. 2008. Waterfowl population status, 2008. 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
2006-07	218,000
2007-08	256,600

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

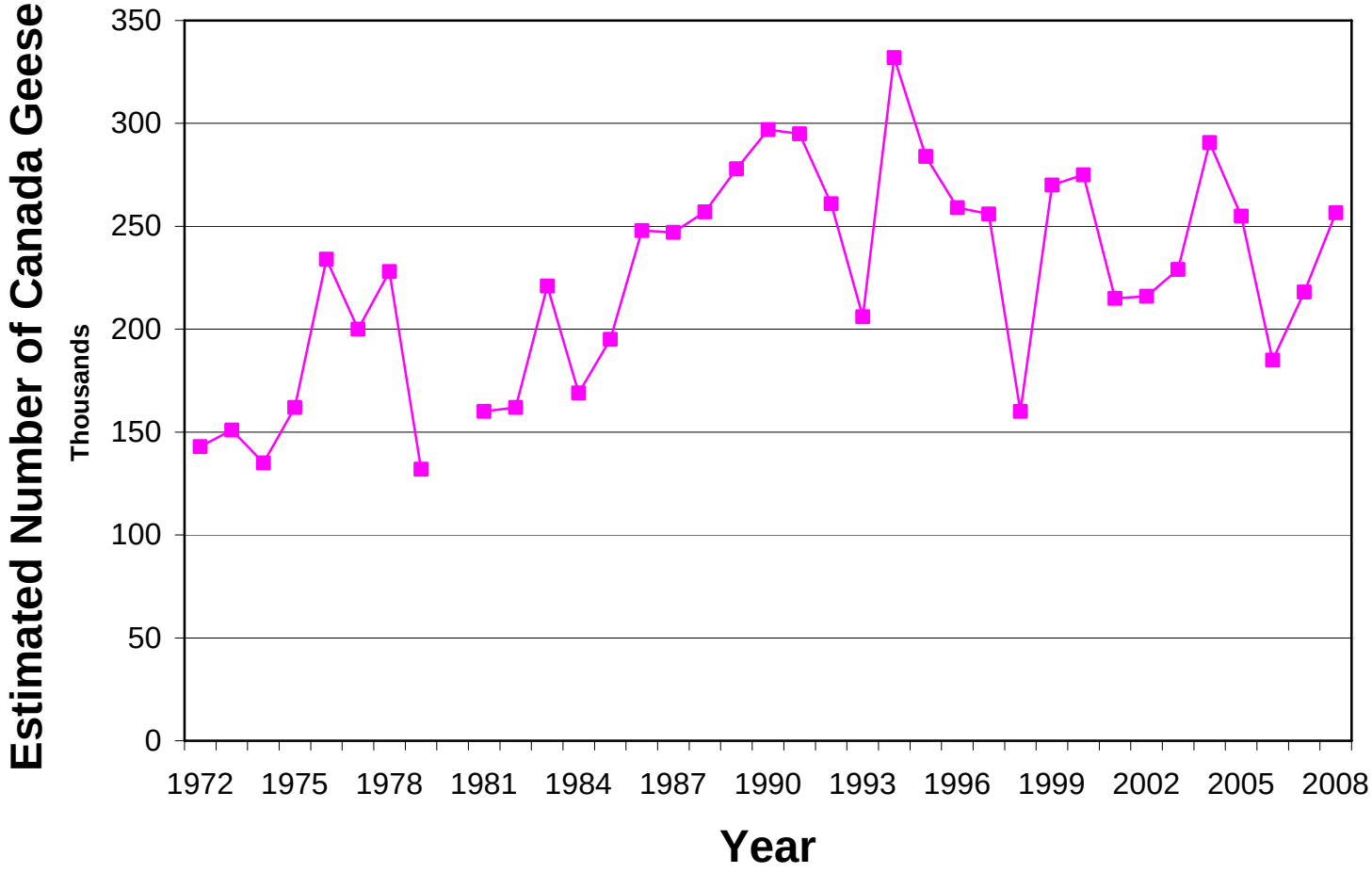

Figure 1. Breeding ground survey estimates of the Eastern Prairie Population of Canada geese, 1972-2008. (from: U.S. Fish and Wildlife Service. 2008. Waterfowl population status, 2008. U.S. Department of the Interior, Washington, D.C. U.S.A.). Surveys conducted in spring. Indirect or preliminary estimates. Data not available for 1980.

Table 2. Estimated number of May ponds (adjusted for visibility) in Prairie Canada (portions of Alberta, Saskatchewan and Manitoba) 1964-2008 and north-central U.S. (North Dakota, South Dakota and Montana) 1974-2008. (from: U.S. Fish and Wildlife Service. 2008. Waterfowl population status, 2008. U.S. Department of the Interior, Washington, D.C. U.S.A.)

	Ponds (thousands)	
Year	Prairie Canada	North Central U.S.[a]
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	4,450	1,644
2007	5,040	1,963
2008	3,055	1,534
Average	3,439	1,538
% Change in 2008 from:		
2007	- 39	- 30
Long term Average	+ 47	+ 28

[a] No comparable survey data available for the north-central U.S. during 1964-73.

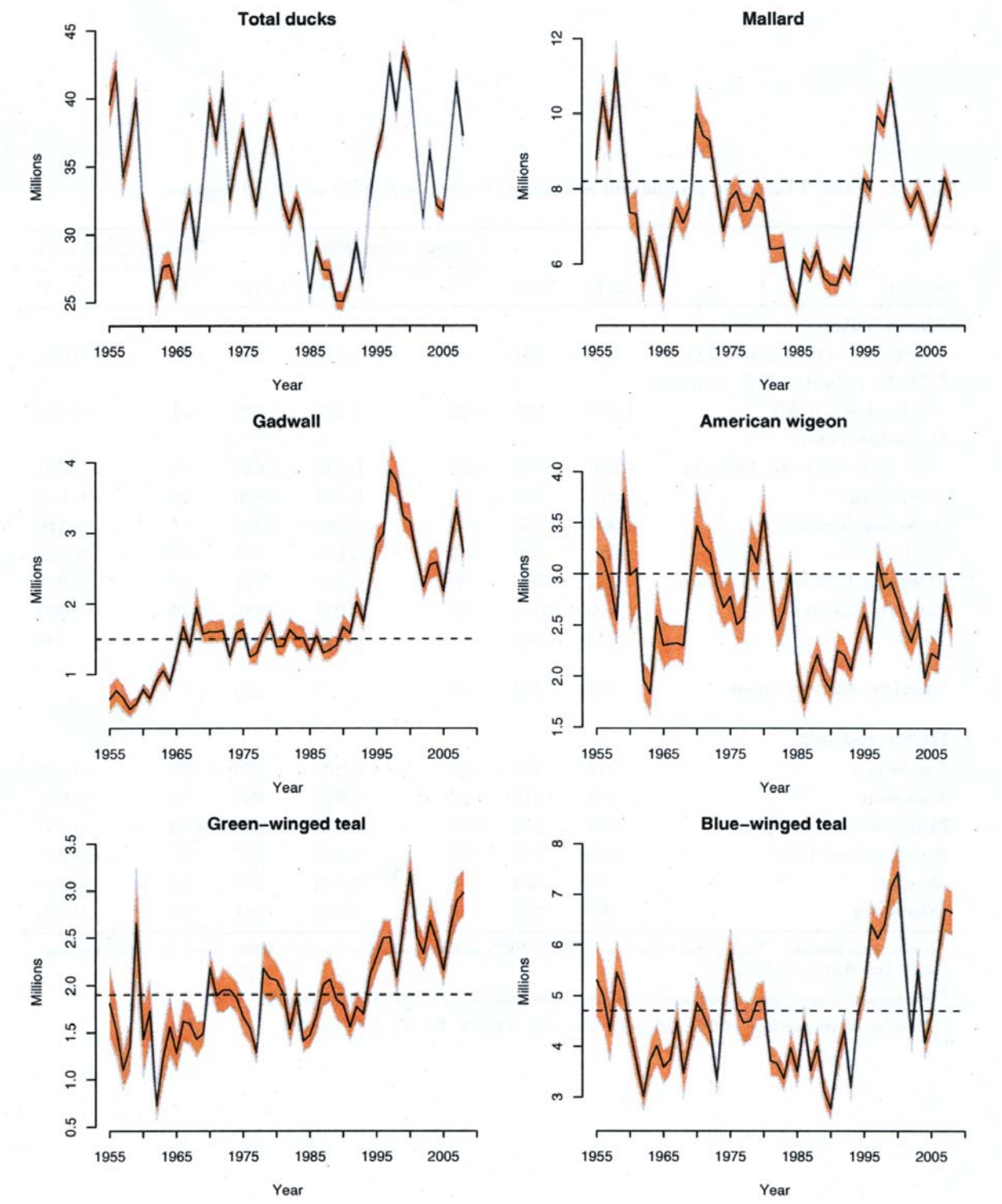

Figure 2. Estimates of North American breeding populations, 95% confidence intervals, and North American Waterfowl Management Plan population goal (dashed line) for selected species and number of water areas in May in Prairie Canada and Northcentral U.S. (from: U.S. Fish and Wildlife Service. 2008. Waterfowl population status, 2008. U.S. Department of the Interior, Washington, D.C. U.S.A.)

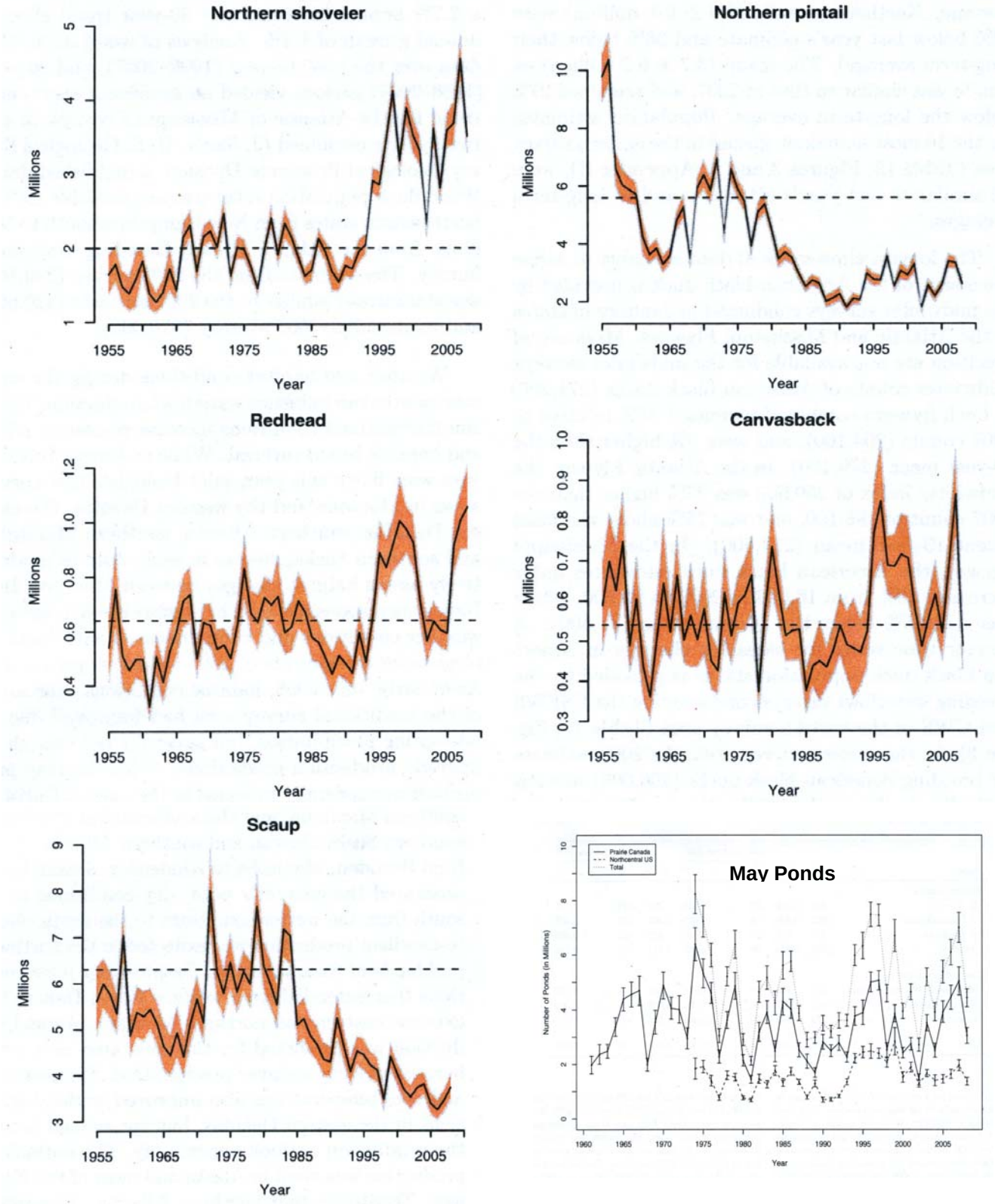

Figure 2. (continued).

MINNESOTA SPRING CANADA GOOSE SURVEY, 2008

David Rave, Wetland Wildlife Populations and Research Group

INTRODUCTION

This report presents results from the eighth year of a spring helicopter survey of resident Canada geese in Minnesota. The survey was developed to comply with a Mississippi Flyway Council request to produce a statewide population estimate of resident giant Canada geese having 95% confidence intervals (C.I.'s) that are within ± 25% of the estimate.

METHODS

The original survey was initiated in 2001 using a double sampling design where an annual stratified sample was randomly selected from 900 plots in each ecoregion (Maxson 2002). We eliminated the double sampling design this year by stratifying all potential plots in each ecoregion, and randomly sampling from the entire sampling frame (i.e., it is now a simple stratified sampling design with new sample plots drawn each year). However, stratification criteria and survey protocols were the same as in previous years; thus, results should be comparable among years.

As in the original stratification, 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 and the Northwest Angle were excluded from the Forest ecoregion. Four Statewide ArcView shapefiles were then unioned together: National Wetlands Inventory circular 39, DNR 1:24k lakes, Public Land Survey Quarter section Boundaries, and ECS provinces, to assign each quarter section plot to the appropriate strata.

Four new fields were then computed: total acres of Type 3, 4, and 5 wetlands per quarter section (Circ39_acr) , total acres of 1:24k lakes per quarter section (Lakes_acr), total acres of type 3 wetlands per quarter section (Sum_type3_acr) and total acres of river per quarter section (Sum_Riv_acr). A summary table was created with text fields for each of the 8 strata (habitat-quality class x ecoregion). Using the query builder in ArcMap, quarter sections in each ecoregion were assigned to habitat-quality classes for resident geese: 1) not nesting habitat – expect no geese, 2) limited nesting habitat – habitat capable of supporting 1 or 2 pairs of geese, 3) prime nesting habitat – habitat capable of supporting 3 or more pairs. Habitat-classification criteria for each ecoregion was:

Prairie

No geese =	Type 3-4-5 <0.5 acres and rivers <10 acres or plot is all water. (n = 61,597 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 = 30,874 plots).
3+ pairs =	Type 3 >15 acres, but plot is not all water. (n = 9,537 plots).

Transition

No geese =	Type 3-4-5 <1 acre and rivers <8 acres or plot is all water. (n = 39,484 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 = 31,091 plots).
3+ pairs =	Type 3-4-5 >25 acres, but Type 3 >15 acres and plot is not all water. (n = 7,988 plots).

Forest

No geese =	Type 3-4-5 <2 acres and rivers <2 acres or plot all water. (n = 75,835 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 = 51,155 plots).
3+ pairs =	None.

Plots in the "no geese class" are not flown and there are no plots in the "3+ pairs" class in the Forest ecoregion. Each year 30 plots are randomly selected in each of the 5 remaining strata using ArcView's AlaskaPak extension, 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 23 April through 5 May, 2008. 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 Canada goose population estimate in the surveyed area for 2008 was 276,697 ($\pm$71,564). Adding 17,500 for the Twin Cities metro area (Cooper 2004) yields a statewide estimate of 294,197 (Table 1). Relative error (95% CI half-width) was 25.9% of the estimate, close to the target of 25.0%. The survey tallied 38.4% singles (after doubling, as noted above), 55.4% pairs, and 6.2% 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 2008, 42.6% 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 stable over the 8 years of this survey (Figure 1).

The 2008 Canada goose breeding population estimate for the surveyed area was unchanged from the 2007 estimate. The goose number estimates from the Transition and Forest regions increased somewhat, whereas the estimate from the Prairie region decreased slightly compared to last year (Table 1). While the survey design is robust, results potentially could be influenced by other factors. Survey methods were the same as previous years, but the sampling frame was restratified in 2008. Although the same criteria were used for habitat classification, ecogregion boundary assignments may have changed slightly for some plots because the data sets we used better defined ecoregion boundaries than data sets available in 2001. Furthermore, we eliminated double-sampling for stratification, which may also have contributed to some of the observed changes in stratum sizes (total plots per stratum per ecoregion) and, thus, total estimated geese in each ecoregion. Finally, weather conditions in 2008 were characterized by a late spring with several April winter storm events, and unusually late ice-out on lakes in the northern half of the state. Late springs typically result in a poorer goose reproduction effort. However, the number of geese observed on nests this year indicates that 2008 will likely be a more productive year for Canada geese than 2007. Weather conditions throughout May and June will influence goose productivity. Regardless, the 2008 Canada goose population estimate was 18 % above the state Canada goose population goal, and indicates that the goose population in the state is healthy.

Wetland and habitat quality were variable in the state this year. Water levels throughout the state appeared to be normal to above normal. The unusually late spring and ice out may influence production by affecting egg hatchability, gosling survival due to exposure, and amount of food available to goslings in the form of green vegetation. This may result in fewer and/or smaller goose broods in the state. Based

upon the number of productive geese from the survey, I expect average to above average Canada goose production throughout the state, depending upon May and June weather conditions.

ACKNOWLEDGEMENTS

Frank Martin (Univ. of MN) and Steve Maxson were instrumental in the original design of this survey. Steve also was the principal observer during the first 6 years of the survey. Tim Loesch, Christopher Pouliot, and Shelly Sentyrz 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 Sentyrz was also instrumental in helping to restratify plots statewide for the 2008 survey. John Giudice helped design the 2008 survey, wrote the SAS program and analyzed the survey data. Shelly Sentyrz provided GPS coordinates of plots to the pilot, and printed out maps of the 150 plots flown this year. John Heineman piloted the helicopter and served as the second observer.

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Table 1. Spring Canada goose population estimates in Minnesota, 2001-2008.

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**
2007	137,151	99,274	25,509	261,933	± 80,167	17,500	**279,433**
2008	113,663	132,341	30,693	276,697	± 71,564	17,500	**294,197**

Table 2. Percent of Canada Geese seen as singles, pairs, groups, and productive geese on the Minnesota Spring Canada Goose Survey, 2001-2008.

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
2007	31.0	51.5	17.5	36.2
2008	38.4	55.4	6.2	42.6

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

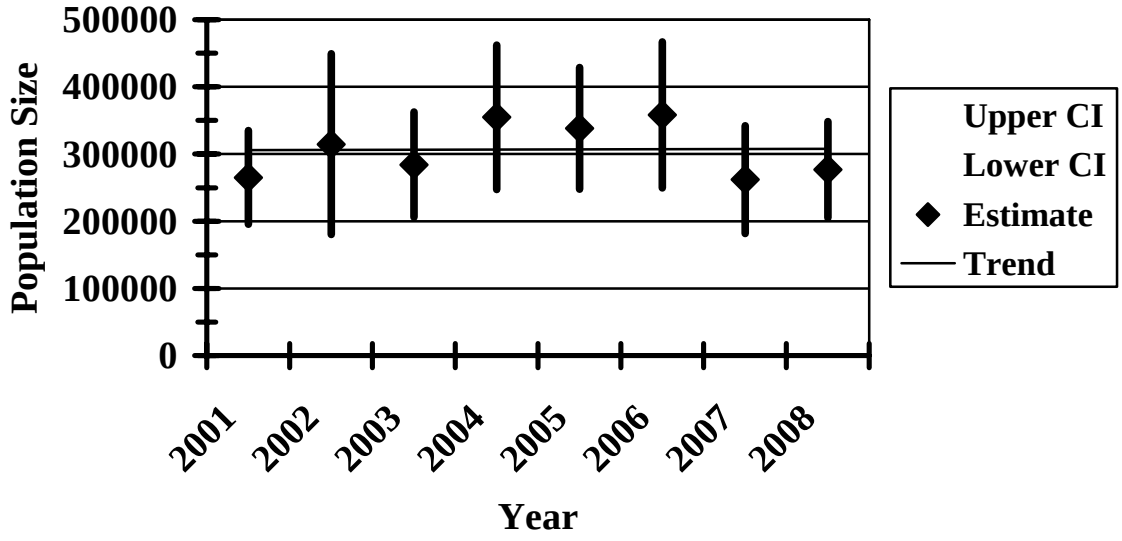

Figure 1. Spring Canada goose population estimates (±95% CI) in Minnesota, 2001-2008. (Does not include Metro area.)

Mourning dove information is taken from the U.S. Fish and Wildlife Service report by Dolton, D.D., K. Parker, and R.D. Rau. 2008. **Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008.** U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp. The entire report is available on the Division of Migratory Bird Management home page (http://migratorybirds.fws.gov).

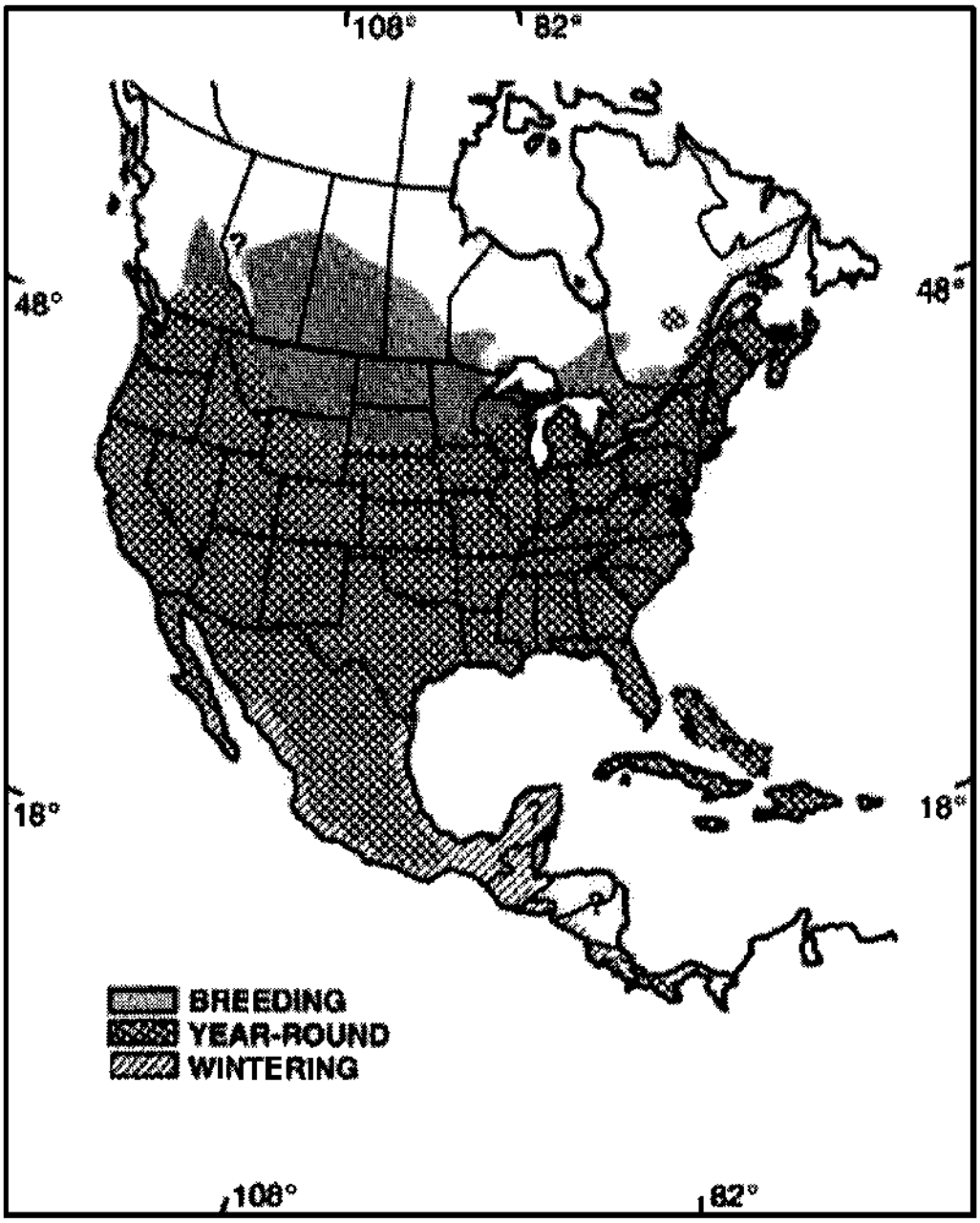

Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994). (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.)

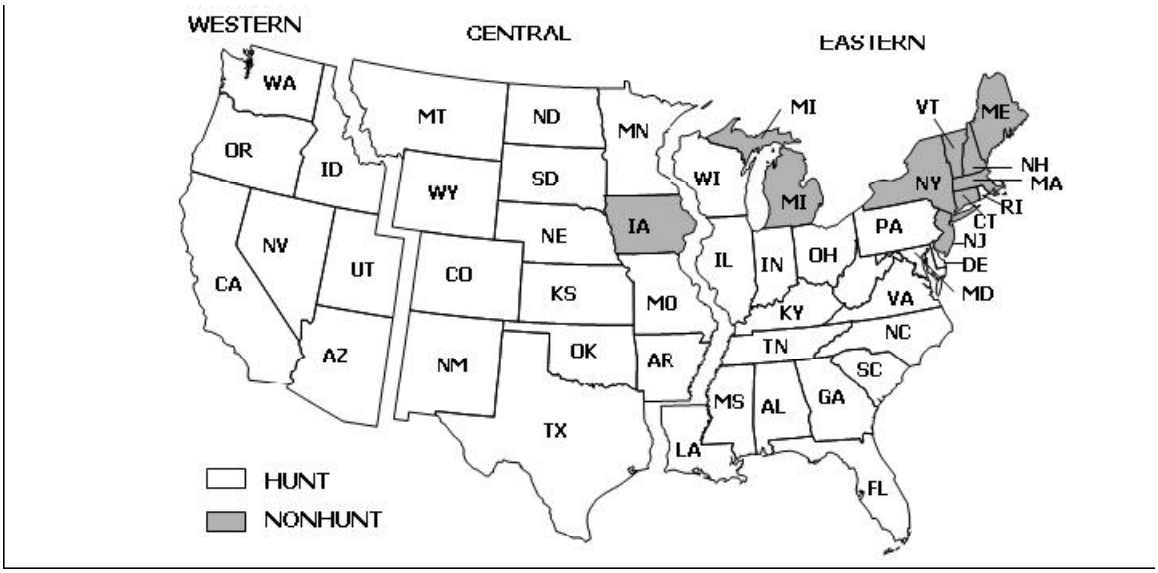

Figure 2. Mourning dove management units with 2007 hunting and nonhunting states. (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.)

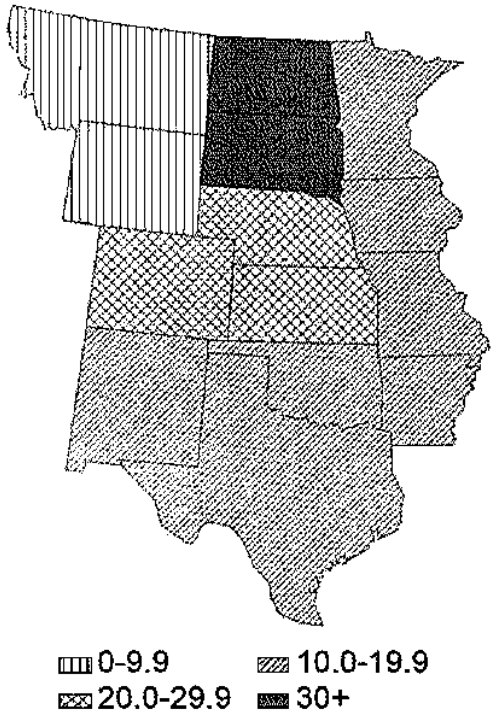

Figure 3. Mean number of mourning doves heard per route by state in the Central Management Unit, 2007-08. (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.).

Table 1. Preliminary estimates of the number of hunters, days hunted, and total bag from Harvest Information Program surveys for the 2005-06, 2006-07, and 2007-08 seasons. (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.)

Management unit / State	Hunters			Days Hunted			Birds bagged		
	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08	2005-06	2006-07	2007-08
CENTRAL	473,900	470,800 [2]	485,700 [2]	1,729,800 ± 8%	1,605,900 ± 9%	1,803,900 ± 9%	9,891,400 ± 9%	8,887,000 ± 9%	9,180,200 ± 9%
AR	43,400 ± 15%	31,300 ± 16% [2]	37,000 ± 16%	147,300 ± 24%	77,500 ± 18%	115,900 ± 23%	861,600 ± 20%	621,500 ± 20%	791,700 ± 24%
CO	18,400 ± 7%	19,800 ± 11%	21,800 ±11%	48,700 ± 9%	45,700 ± 13%	57,800 ± 14%	263,400 ± 10%	270,300 ± 19%	315,000 ± 14%
KS	32,400 ± 8%	35,400 ± 8%	36,300 ±8%	109,500 ± 12%	116,400 ± 11%	119,100 ± 11%	680,400 ± 11%	711,800 ± 12%	725,100 ± 13%
MN	6,000 ± 34%	8,000 ± 33%	7,700 ± 35%	14,700 ± 43%	24,200 ± 39%	27,600 ± 49%	48,800 ± 61%	50,000 ± 46%	67,400 ± 52%
MO	40,200 ± 10%	44,700 ± 7%	42,600 ± 8%	113,400 ± 16%	129,800 ± 12%	124,400 ± 13%	641,800 ± 20%	709,500 ± 15%	603,300 ± 15%
MT	2,000 ± 34%	1,800 ± 36%	1,700 ± 31%	4,800 ± 38%	3,900 ± 38%	4,000 ± 34%	17,800 ± 44%	14,800 ± 33%	20,900 ± 43%
NE	17,800 ± 10%	15,000 ± 12%	17,000 ± 12%	64,300 ± 14%	43,000 ± 12%	55,300 ± 16%	361,100 ± 15%	249,700 ± 12%	319,600 ± 18%
NM	9,300 ± 17%	7,100 ± 20%	8,600 ± 18%	42,000 ± 20%	33,900 ± 28%	40,100 ± 33%	250,100 ± 22%	226,900 ± 33%	198,700 ± 25%
ND	3,100 ± 27%	4,000 ± 23%	3,200 ± 27%	11,800 ± 38%	10,800 ± 24%	9,900 ± 26%	55,500 ± 48%	56,400 ± 25%	48,700 ± 27%
OK	34,500 ± 9%	36,100 ± 9%	24,600 ± 14%	111,500 ± 16%	108,300 ± 17%	73,100 ± 19%	828,500 ± 20%	704,400 ± 24%	480,000 ± 24%
SD	7,100 ± 18%	6,400 ± 16%	6,000 ± 20%	25,200 ± 26%	19,600 ± 17%	18,200 ± 25%	127,700 ± 28%	103,300 ± 18%	104,000 ± 30%
TX	257,200 ± 10%	258,900 ± 10%	275,200 ± 10%	1,030,000 ± 13%	986,200 ± 14%	1,149,600 ± 13%	5,710,700 ± 15%	5,138,700 ± 14%	5,463,300 ± 14%
WY	2,500 ± 27%	2,300 ± 29%	4,000 ± 20%	6,600 ± 27%	6,500 ± 36%	8,800 ± 24%	34,100 ± 31%	29,500 ± 37%	42,600 ± 27%

[1] This represents the 95% confidence interval expressed as a percent of the point estimate.
[2] This total is slightly exaggerated because people are counted more than once if they hunted in more than one state.

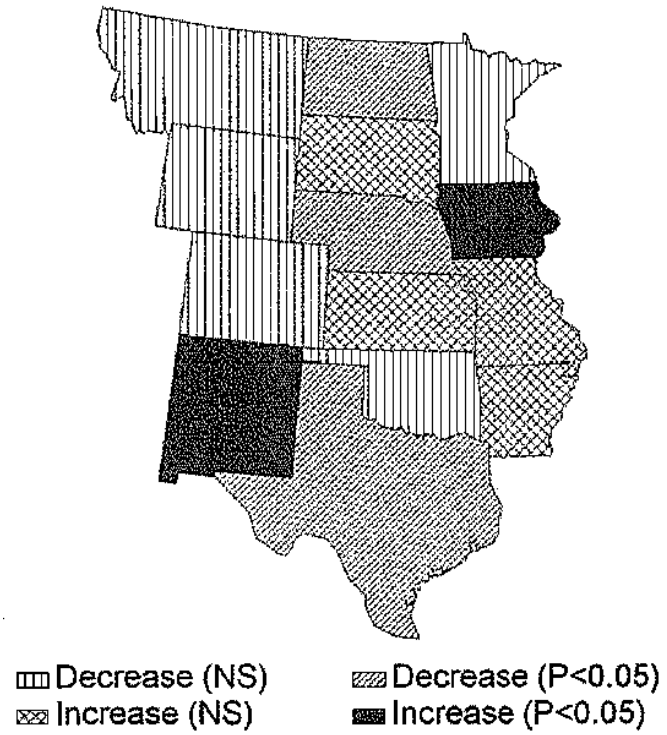

Figure 4. Trends in number of mourning doves heard per route by state in the Central Management Unit, 1999-2008. (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.).

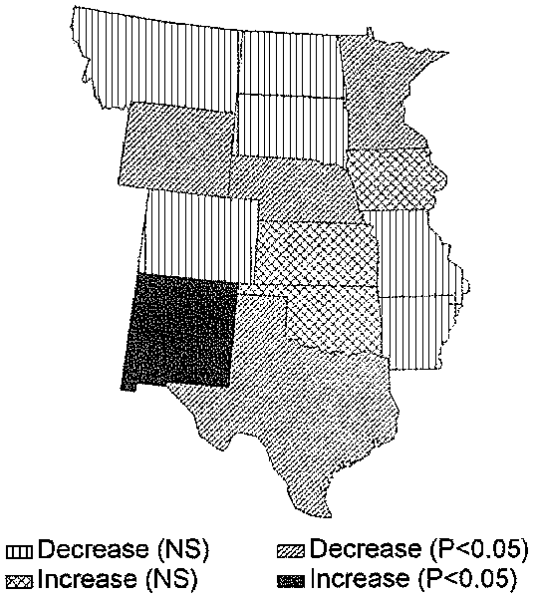

Figure 5. Trends in mourning doves heard per route by state in the Central Management Unit, 1966-2008 (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.).

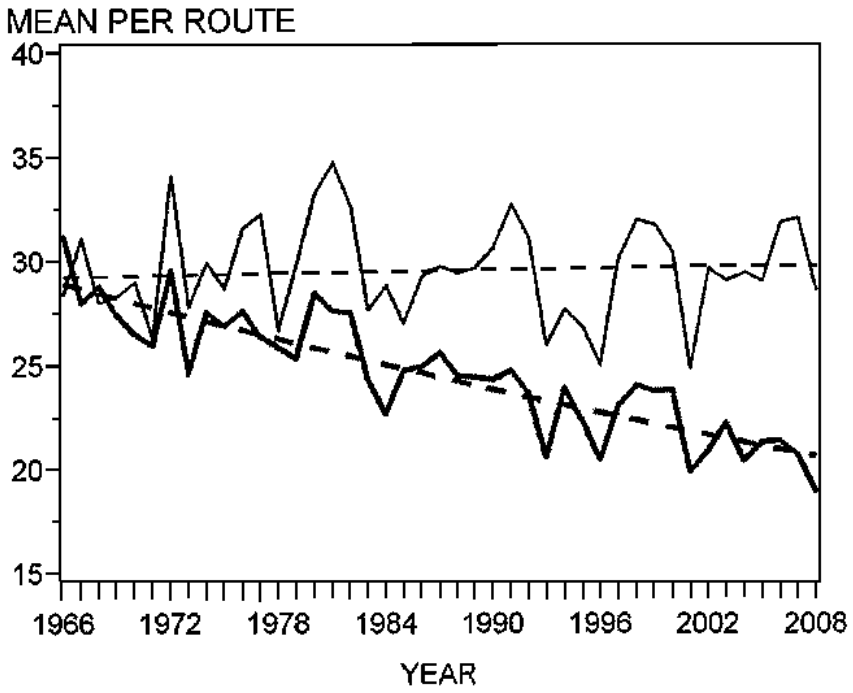

Figure 6. Population indices and trends of breeding mourning doves in the Central Management Unit, 1966-2006. Heavy solid line = doves heard; light solid line = doves seen. Light and heavy dashed lines = predicted trends. (From: Mourning dove, White-winged dove, and Band-tailed Pigeon population status, 2008. Dolton, D.D., K. Parker, and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, Maryland, USA. 43 pp.)

American Woodcock information is taken from the U.S. Fish and Wildlife Service report **American Woodcock Population Status, 2008** by Thomas R. Cooper, Keri Parker, and Rebecca D. Rau. The entire report is available on the Division of Migratory Bird Management home page (http://migratorybirds.fws.gov).

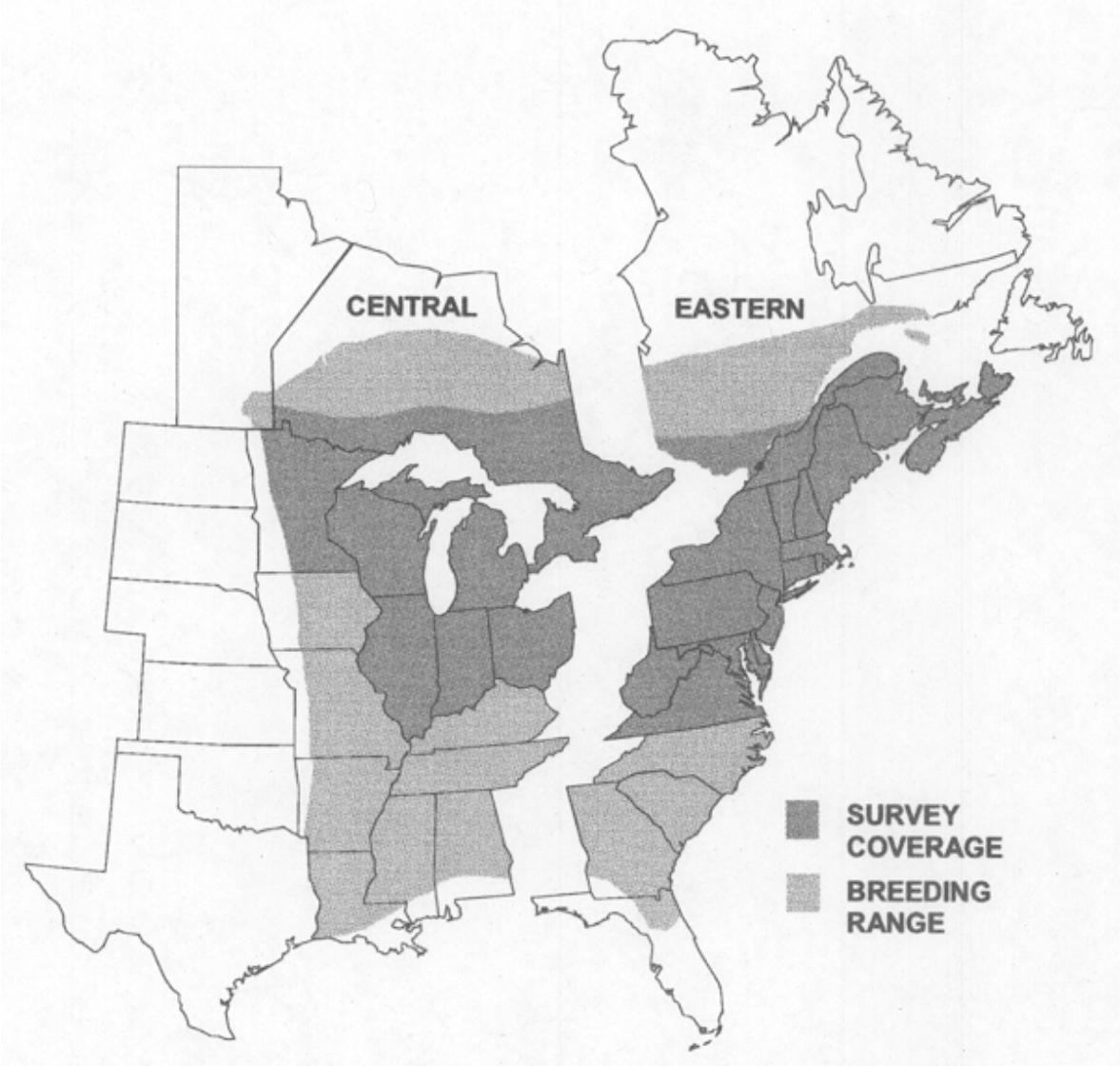

Figure 1. Woodcock management regions, breeding range, singing-ground survey coverage, (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.)

Table 24. Trends (% change per year [a]) in number of American woodcock heard in singing-ground survey during 1968-2008, as determined by using the hierarchical log-linear modeling technique (Sauer et al. 2008) (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.).

Management Unit/State	Number of Routes[b]	n[c]	(2007-08) % Change	(1998-08) % Change	(1968-08) % Change
CENTRAL	369	637	- 9.2	-1.5	- 1.1
IL	21	25	0.6	-0.7	1.2
IN	14	40	0.4	- 5.4	- 4.3
MB[d]	12	23	-5.5	- 2.7	- 3.3
MI	114	148	- 5.7	- 2.8	- 1.3
MN	70	102	- 6.1	- 0.3	- 0.2
OH	31	57	0.8	- 2.9	- 2.3
ON	35	139	- 13.1	- 1.2	- 0.8
WI	72	103	- 14.2	- 0.1	- 0.7

[a] Median of route trends estimated used hierarchical modeling. To estimate the total percent change over several years, use: 100(% change/100+1)y)-100 where y is the number of years. Note: extrapolating the estimated trend statistic (% change per year) over time (e.g., 30 years) may exaggerate the total change over the period.

[b] Total number of routes surveyed in 2008 for which data were received by 28 May.

[c] Number of routes that could be used for trend analysis, routes with <2 years of data were not used.

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

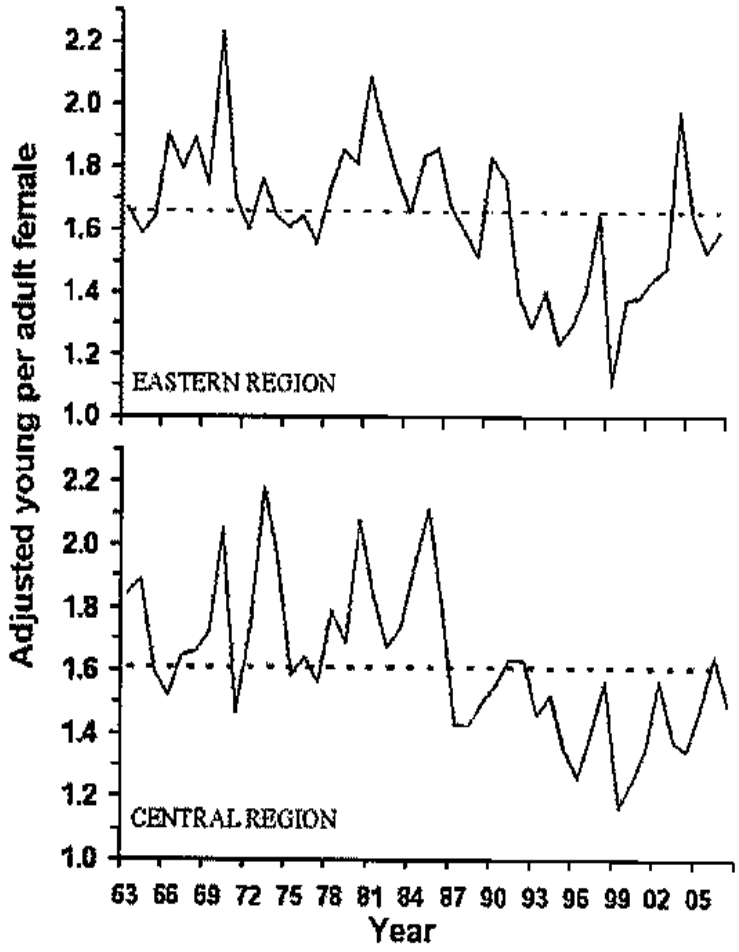

Figure 2. Adjusted index of American woodcock recruitment, 1963-2005. Dashed line is the index based on all 1963-2004 average. (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.).

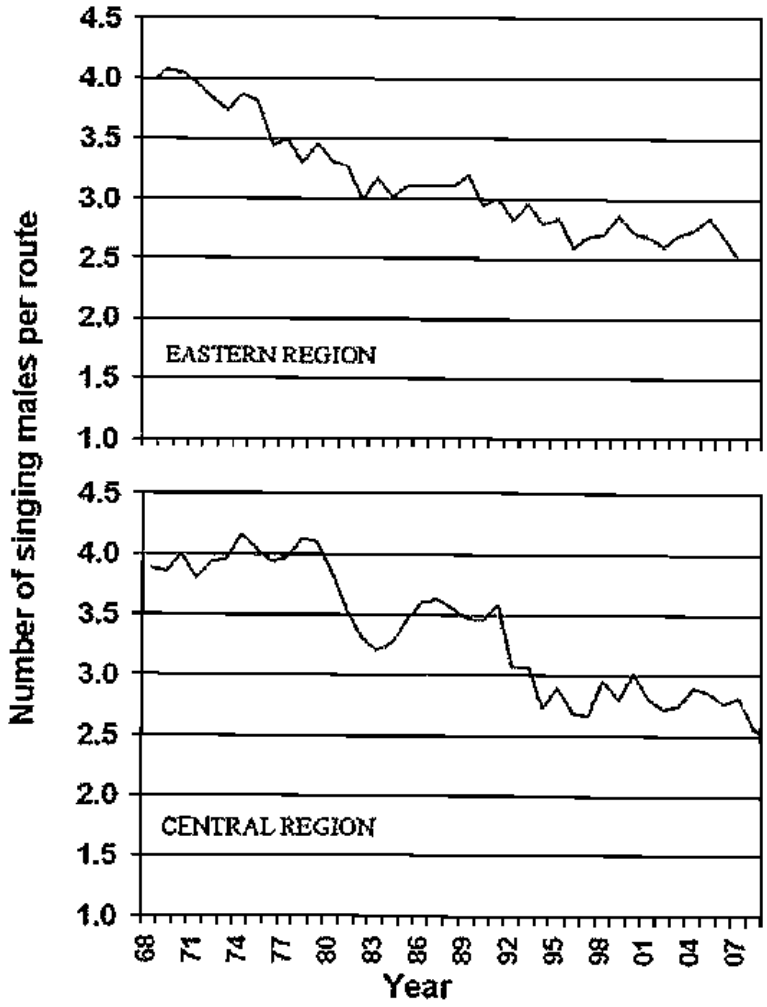

Figure 3. American woodcock singing ground survey long term trends and annual indices, 1968-2006. (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.).

Table 25. Preliminary estimates of woodcock hunter numbers, days afield, and harvest for selected states, from the 2004-05, 2005-06, 2006-07 and 2007-08. Harvest Information Program surveys. (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.).

Management Unit / State	Active woodcock hunters				Days afield				Harvest			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Central Region	n.a.	n.a.	n.a.	n.a.	366,100 ± 15%	356,100 ± 14%	344,262 ± 12%	358,480 ± 14%	234,800 ± 20%	225,000 ± 19%	232,557 ± 17%	214,162 ± 16%
IL	1,200 ± 74%	2,100 ± 79%	1,973 ± 87%	3,111 ± 73%	3,500 ± 78%	5,300 ± 89%	8,944 ± 115%	7,644 ± 72%	1,900 ± 96%	3,900 ± 196%	2,171 ± 160%	3,819 ± 149%
IN	1,100 ±104%	2,100 ± 55%	1,000 ± 58%	1,788 ± 71	5,300 ±124%	7,400 ± 69%	4,377 ± 75%	3,342 ± 58%	7,900 ± 145%	4,400 ± 91%	2,403 ± 69%	1,203 ± 53%
MI	31,200 ± 13%	28,000 ± 13%	30,017 ± 14%	28,412 ± 13%	147,000 ± 14%	151,200 ±17%	155,333 ± 17%	138,881 ±15%	102,500 ± 21%	106,800 ± 27%	116,216 ± 27%	86,825 ± 17%
MN	14,500 ± 27%	12,000 ± 31%	14,934 ± 24%	15,295 ± 29%	67,000 ± 33%	60,200 ± 42%	60,160 ± 31%	62,810 ± 36%	38,500 ± 53%	42,200 ± 54%	38,738 ± 41%	34,400 ± 38%
OH	2,600 ± 82%	4,700 ± 65%	2,249 ± 68%	2,611 ± 73%	18,200 ± 126%	15,800 ± 79%	9,764 ± 67%	9,259 ± 72%	4,600 ±101%	6,900 ± 83%	4,060 ± 51%	2,598 ± 68%
WI	15,700 ± 30%	15,600 ± 25%	19,390 ± 22%	17,258 ± 23%	61,100 ± 30%	73,100 ± 31%	72,365 ± 25%	79,139 ± 31%	47,300 ±50%	37,600 ± 28%	42,958 ± 25%	48,027 ± 31%

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

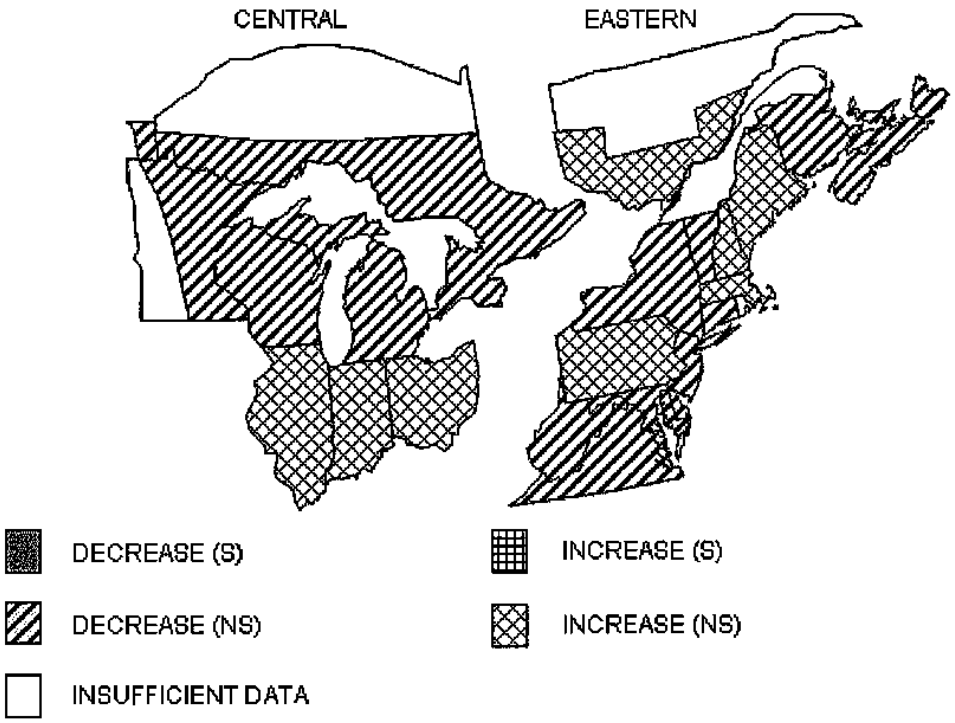

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Figure 4. Short-term trends in number of American woodcock heard on the Singing-ground Survey; 2005-06. (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.)

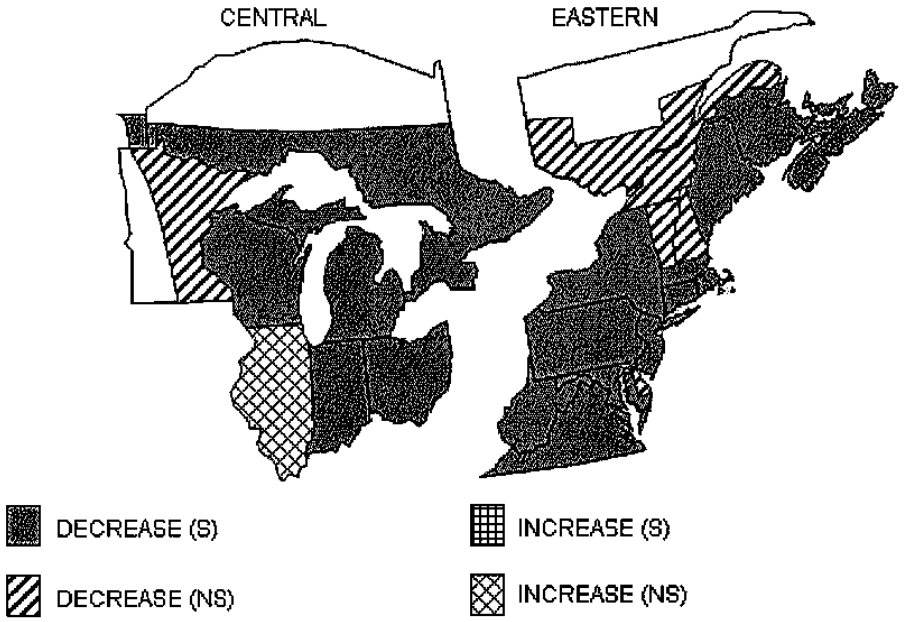

Figure 5. Long-term trends in number of American woodcock heard on the Singing-ground Survey; 1968-06. (from: Cooper, T.R., K. Parker, and R.D. Rau. 2008. American woodcock population status, 2008. U.S. Fish and Wildlife Service, Laurel, MD. 15pp.)

HUNTING HARVEST STATISTICS

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2007 SMALL GAME HUNTER MAIL SURVEY

Margaret Dexter, Wildlife Research Unit

INTRODUCTION

The Minnesota Department of Natural Resources, Division of Fish and Wildlife, Wildlife 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 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 6,000 (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

Estimated number of hunters increased slightly for spruce grouse, gray partridge, gray squirrels, and raccoons (Table 3). Number of duck hunters stabilized but Canada goose hunters continued to decline. Mean harvest and hunter success rates were up slightly (Table 5) for rails and gallinules, pheasants, and jack rabbits. Total estimated harvests increased for mourning doves, pheasants, sharp-

tailed grouse, cottontails, jack rabbits, and coyotes (Table 6). Estimated harvests were down for ducks, geese, coots, crows, woodcock, ruffed grouse, spruce grouse, gray squirrel, fox squirrel, snowshoe hare, raccoon, red fox, gray fox, and badger. Note that all estimates are based on a survey of approximately 2% of all small game license holders. Data in this report may change as a result of future verification and more comprehensive analysis.

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

Table 1. Small game hunter response to mail surveys, 1979 - 80 through 2007 - 08.

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
2006 - 07	6,000	151	3,810	65.1
2007 - 08	6,000	113	3,736	65.5

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

Table 2. Use of small game hunter licenses, 1997-98 through 2007-2008.

		Returns from mail survey	Projections from license sales
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%)	223,275
	Did not hunt	847 (22.4%)	64,450
		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
2006-07	Hunted	2,994 (79.0%)	233,759
	Did not hunt	795 (21.0%)	62,139
		3,789 (100.0%)	295,898
2007-08	Hunted	2,894 (77.9%)	232,505
	Did not hunt	822 (22.1%)	65,961
		3,716 (100.0%)	298,467

Includes resident and non-resident information. Excludes duplicates.

2007 Small Game Hunter Report

1. Did you hunt small game, listed below, in Minnesota this year (March 2007 - Feb 2008)? ☐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	94			
Red fox	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 2007-2008 small game hunting season **(March 2007-February 2008)**. We need information to estimate the season's harvest and to help set future small game seasons. Answer only for your Minnesota 2007 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
Wildlife Research Unit
500 Lafayette Road, Box 20
St. Paul, MN 55155

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Figure 1. Sample of Small Game Hunter survey card

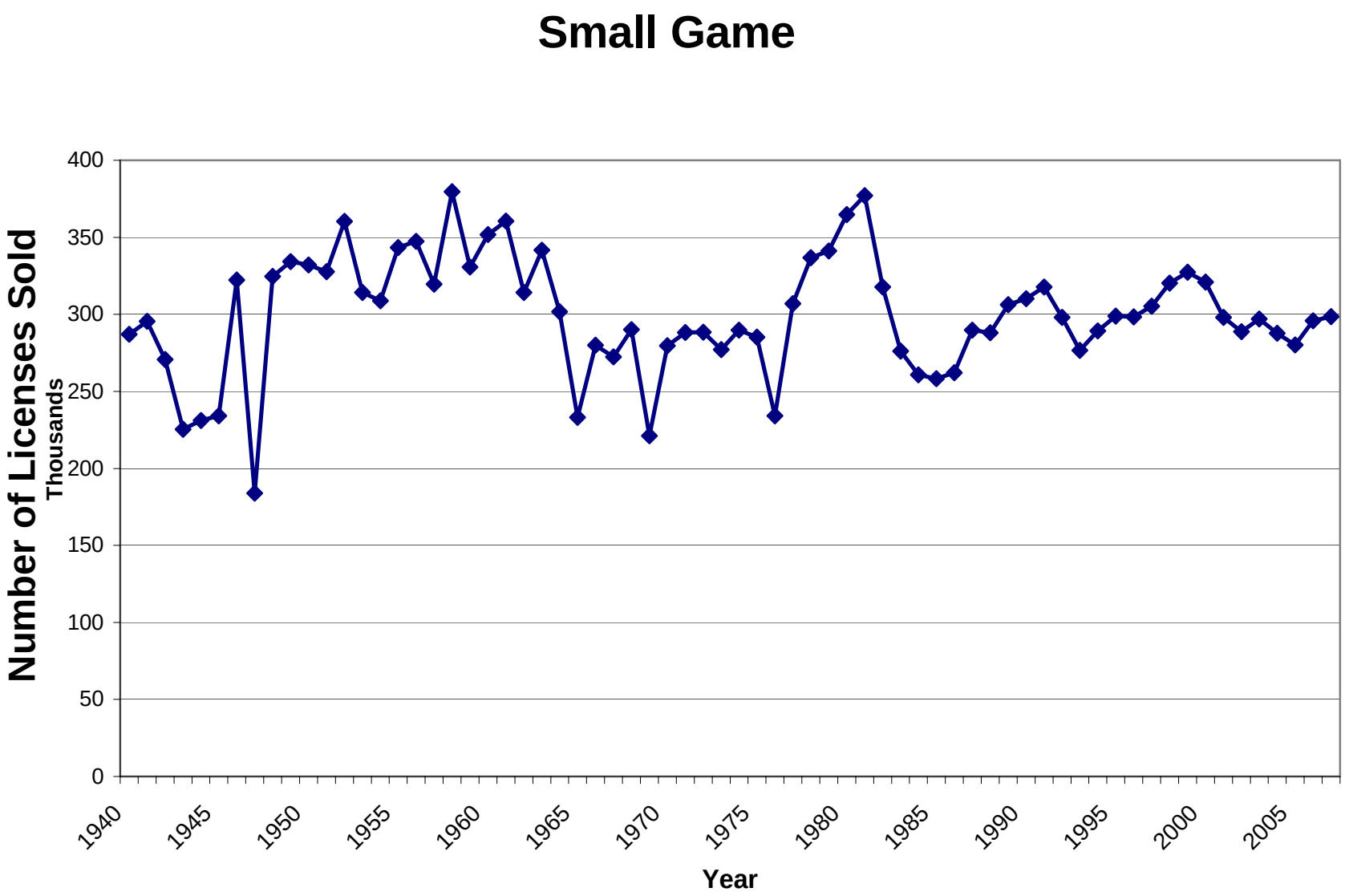

Figure 2. Number of Minnesota small game licenses sold, 1940 – 2007

Table 3. Estimated number of hunters (thousands) for various species, 1994-95 through 2007-08.

	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Ducks	118	119	114	122	117	122	109	109	112	101	105	92	87	87
Canada goose	70	73	75	79	77	80	77	76	79	75	75	69	66	63
Other geese	7	10	6	5	6	5	7	7	6	7	5	5	5	4
American coot	7	9	6	7	5	6	4	4	4	4	5	4	5	3
Common snipe	2	2	2	2	2	2	2	1	2	1	2	1	2	2
Rails / gallinules	1	1	<1	<1	<1	<1	<1	<1	1	<1	<1	0	1	<1
Crow *	12	15	13	11	11	14	14	11	13	12	12	12	11	9
American woodcock	21	21	18	17	19	19	16	11	12	13	12	11	14	11
Mourning dove γ											16	11	13	13
Ring-necked pheasant	92	96	88	80	88	93	100	85	91	105	104	111	119	118
Ruffed grouse	107	116	118	127	142	139	121	101	91	94	79	76	92	91
Spruce grouse	12	14	11	11	11	11	9	9	7	9	7	7	10	11
Sharp-tailed grouse	7	8	7	8	8	8	10	8	6	7	6	5	7	7
Gray partridge	14	12	11	8	10	10	8	7	7	8	5	6	6	7
Gray squirrel	35	35	33	27	30	31	27	26	25	29	23	25	25	26
Fox squirrel	24	23	20	16	18	20	17	15	15	20	15	15	16	15
Eastern cottontail	21	23	19	14	19	18	20	17	16	21	19	20	20	20
White-tailed jackrabbit	4	5	4	3	3	3	2	3	2	3	3	2	3	3
Snowshoe hare	6	5	4	4	7	7	5	6	6	6	4	3	6	4
Raccoon (Sept -Feb)	10	10	10	9	9	6	6	6	6	6	6	5	9	10
Raccoon‡ (March-Aug)	3	5	4	3	4	3	5	4	4	5	3	3		
Red fox (Sept -Feb)	15	15	11	9	9	8	10	6	7	7	6	6	6	6
Red fox‡ (March -Aug)	3	4	3	2	3	2	2	3	2	2	1	1		
Gray fox	2	3	n.a.	2	2	2	1	1	1	2	2	1	2	2
Coyote	11	15	13	10	11	11	16	11	12	15	16	19	17	16
Badger	1	<1	1	1	<1	<1	1	<1	1	<1	1	1	1	<1

*Crow season added in 1989. ‡ Raccoon and red fox season continuous May 1994 thru March 15, 2006. γ Mourning dove season added 2004.

Table 4. Estimated take per hunter, for respondents reporting that they hunted a particular species, 1993-94 through 2007-08.

	Estimated take per hunter														
	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	2006-07	2007-08
Ducks	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	8.4	8.1
Canada geese	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	4.9	3.9
Other geese	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	1.5	2.1
American coot	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	5.6	4.6
Common snipe	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	1.9	2.0
Rails/gallinules	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	2.4	5.3
Crow *	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	6.4	6.4
American woodcock	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	3.2	2.6
Mourning dove [γ]												6.2	7	6.7	7.7
Ring-necked pheasant	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	4.9	5.5
Ruffed grouse	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	4.5	3.2
Spruce grouse	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	2.7	1.7
Sharp-tailed grouse	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	1.8	2.0
Gray partridge	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	1.9	1.6
Gray squirrel	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	5.5	5.2
Fox squirrel	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	4.2	3.2
Eastern cottontail	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	3.9	4.0
White-tailed jackrabbit	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	1.6	3.3
Snowshoe hare	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	3.0	1.4
Raccoon (Sept -Feb)	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	7.2	4.9
Raccoon[‡] (March -Aug)		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 -Feb)	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	1.3	1.1
Red fox[‡] (March -Aug)		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	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	1.8	0.3
Coyote	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	1.2	2.1
Badger	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	1.3	0.3

[*]Crow season added in 1989. [‡] Raccoon and red fox season continuous May 1994 thru March 15, 2006. [γ] Mourning dove season added 2004.

Table 5. Mean Harvest for successful hunters and hunter success rates (%), 1997 - 98 through 2007 - 08.

	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Ducks	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)	9.9 (84.4)	9.5 (85.4)
Canada geese	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)	6.3 (78.4)	5.5 (71.4)
Other geese	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)	2.7 (55.2)	4.2 (50.0)
American coot	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)	7.2 (77.6)	6.3 (74.4)
Common snipe	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)	2.6 (75.0)	2.9 (70.8)
Rails / gallinules	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) *	4.3 (57.1)	6.4 (83.3)
Crow	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)	7.2 (89.1)	7.3 (87.7)
American woodcock	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)	3.9 (82.7)	3.7 (68.9)
Mourning dove [γ]								7.9 (78.9)	8.7 (80.1)	8.2 (81.2)	9.8 (78.7)
Ring-necked pheasant	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)	6.6 (75.3)	7.1 (78.1)
Ruffed grouse	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)	5.9 (77.4)	4.7 (69.4)
Spruce grouse	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)	3.8 (70.6)	3.1 (53.8)
Sharp-tailed grouse	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)	3.3 (56.0)	4.4 (45.9)
Gray partridge	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)	2.8 (68.8)	3.0 (55.4)
Gray squirrel	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)	6.4 (87.1)	5.9 (87.6)
Fox squirrel	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)	5.0 (84.5)	3.9 (82.6)
Eastern cottontail	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)	4.6 (84.8)	4.8 (84.0)
White-tailed jackrabbit	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)	2.5 (63.6)	4.5 (72.2)
Snowshoe hare	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)	3.8 (80.3)	2.2 (62.3)
Raccoon (Sept -Feb)	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)	7.7 (93.8)	5.4 (89.9)
Raccoon[‡] (March -Aug)	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 -Feb)	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)	2.1 (60.0)	2.3 (45.8)
Red fox[‡] (March -Aug)	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	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)	2.7 (65.4)	1.0 (29.2)
Coyote	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)	2.4 (50.5)	4.4 (49.0)
Badger	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)	1.6 (81.8)	1.0 (33.3)

[‡] Raccoon and red fox season continuous May 1994 thru March 15, 2006. [γ] 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, 1995-96 through 2007-08.

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Small game license sales[a]	298,425	298,337	305,186	320,308	327,431	320,862	298,055	288,729	296,939	287,725	280,156	295,898	298,467
Federal duck stamp sales	132,546	132,738	138,331	134,098	134,138	135,884	140,980[e]	144,851[e]					
State duck stamp sales	122,092	122,634	126,009	126,488	128,245	121,709	118,590	119,677	118,757	114,003	102,143	101,792	100,134
Pheasant stamp sales	105,093	95,866	85,093	99,664	106,945	114,440	97,665	102,097	121,456	114,653	117,301	129,546	129,315
Estimated harvest[b] (thousands)													
Ducks[c]	1,162	1,098	1,206	1,119	1,021	969	990	1,024	914	727	677	731	708
Canada geese[c]	180	241	230	218	285	301	308	257	290	284	282	324	244
Other geese[c]	9	8	11	6	6	15	8	11	13	8	9	7	8
American coot [c]	28	23	29	25	25	10	17	20	11	20	16	25	16
Common snipe	3	5	4	5	3	3	2	3	3	2	5	4	4
Rails / gallinules	1	<1	<1	<1	<1	1	<1	2	<1	<1	0	1	3
Crow	130	96	74	106	60	96	88	72	82	72	93	69	54
American woodcock	82	58	58	63	54	45	27	28	30	41	28	43	28
Mourning dove[f]										97	78	86	101
Ring-necked pheasant	398	341	248	309	339	375	267	358	511	420	586	588	655
Ruffed grouse	457	533	654	946	685	619	332	249	351	194	224	417	294
Spruce grouse	25	16	25	27	19	23	9	12	18	9	10	27	18
Sharp-tailed grouse	10	8	13	22	14	16	10	9	12	10	6	12	14
Gray partridge	26	24	16	24	19	17	10	11	22	13	16	11	11
Gray squirrel	169	158	131	149	132	140	146	134	175	133	122	141	133
Fox squirrel	105	75	68	57	71	65	63	67	85	62	62	66	48
Eastern cottontail	100	65	65	89	59	78	63	52	93	87	90	78	79
White-tailed jack rabbit	7	10	4	7	6	7	8	4	7	7	5	4	9
Snowshoe hare	11	10	8	25	21	27	22	11	12	8	10	17	6
Raccoon (Sept -Feb)	155	207	124	143	65	49	59	60	50	57	29	63	47
Raccoon[d] (Mar –Aug)	55	99	17	2	16	36	18	19	22	20	7		
Red fox (Sept -Feb)	48	33	13	13	10	19	7	11	13	6	10	8	6
Red fox [d] (Mar –Aug)	6	4	2	3	1	2	4	4	1	1	1		
Gray fox	3	n.a.	3	1	2	1	1	1	1	2	1	4	1
Coyote	26	30	16	14	13	29	12	14	20	18	39	21	34
Badger	1	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 5, 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 that appear 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, 1995-96 through 2007-08.

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Nonresident licenses issued[a]	4,993	5,488	6,361	7,155	7,572	7001	5,843	5,852	6,291	6,385	5,897	7,356	7,858
Questionnaires:													
Number mailed	205	51	269	200	199	98	124	130	123	182	210	185	185
Number not delivered	14	4	18	17	16	6	9	9	17	13	10	11	11
Number (percent) returned	140 (73)	32 (68)	183 (73)	117 (64)	136 (74)	56 (61)	77 (67)	75 (66)	68 (64)	114 (67)	134 (67)	115 (62)	101 (58)
Estimated nonresidents and (percent) of all nonresidents hunting:													
Ducks	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)	2,344 (32)	2256 (29)
Canada goose	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)	2,083 (28)	934 (12)
Ruffed grouse	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)	1,953 (26)	1,867 (24)
Ring-necked pheasant	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)	3,776 (51)	2,645 (34)
Raccoon [b]	107 (2) *	172 (3)	35 (1)	0 (0) [c]	56 (1)	250 (4)	0 (0)	0 (0)	0 (0)	0 (0)	44 (0.7)	0 (0)	78 (1.0)
Estimated nonresident take:													
Ducks	26,713	6,346	15,967	26,663	26,391	18,253	42,225	17,556	17,855	19,269	12,149	12,173	22,718
Canada goose	4,173	1,544	4,905	4,587	6,960	5,001	13,400	5,852	5,736	6,214	3,946	3,580	3,501
Ruffed grouse	9,415	23,153	16,072	27,886	23,384	24,003	6,622	9,207	9,437	7,924	6,429	11,522	7,236
Ring-necked pheasant	3,638	1,887	2,505	1,712	4,844	4,001	3,740	7,647	9,344	11,174	13,656	16,079	17,661
Raccoon	3,638	8,061	70	0	724	3,375	0	0	0	0	887	0	3,268

[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, 2004 and 2006 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
1999	11	13	48
2000	8	13	51
2001[c]	10	0	48
2002	11	0	46
2003	10	0	44
2004	8	0	46
2005	6	20	44
2006	8	0	53
2007	5	42	45

The following information has been excerpted from: U.S. Fish and Wildlife Service. **Migratory bird hunting activity and harvest during the 2006 and 2007 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://www.fws.gov/migratorybirds/reports/reports.html

Table 1. Species composition of the Minnesota waterfowl harvest, 2006 and 2007. (from: Richkus, K.D, K.A. Wilkins, R.V. Raftovich, S.S. Williams, and H.L. Spriggs. 2008. Migratory Bird Hunting activity and harvest during the 2006 and 2007 hunting seasons: Preliminary estimates. U.S. Fish and Wildlife Service, Laurel, Maryland. USA July 2008. 62 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	2006	% of Harvest	2007	% of Harvest	Percent change in Harvest 05-06	2006	2007	Percent change Harvest 06-07
Mallard	215,727	33.65	178,969	31.74	- 21	2,286,643	2,514,119	+ 9
Domestic mallard	579	0.09	270	0.05	- 114	8,493	3,828	- 122
American black duck	1,158	0.18	540	0.10	- 114	35,840	38,692	+ 7
Black x mallard	290	0.05	270	0.05	- 7	4,479	5,246	+ 15
Gadwall	38,802	6.05	24,834	4.40	- 56	803,785	842,192	+ 5
American wigeon	20,849	3.25	12,417	2.20	- 68	163,839	148,774	- 10
Green-winged teal	47,199	7.36	49,399	8.76	+ 4	659,628	792,182	+ 17
Blue-winged /cinnamon teal	54,438	8.49	60,196	10.67	+ 10	513,876	626,720	+ 18
Northern shoveler	13,610	2.12	10,798	1.91	- 26	225,492	289,071	+ 22
Northern pintail	7,818	1.22	13,227	2.35	+ 41	104,286	162,416	- 36
Wood duck	81,658	12.74	80,981	14.36	– 1	635,053	621,615	– 2
Redhead	24,613	3.84	18,896	3.35	- 30	69,500	63,027	- 10
Canvasback	13,030	2.03	8,098	1.44	- 61	45,640	56,432	+ 19
Greater scaup	1,737	0.27	1,890	0.34	+ 8	21,454	21,964	+ 2
Lesser scaup	21,717	3.39	12,147	2.15	- 79	101,219	84,791	– 19
Ring-necked duck	80,499	12.56	68,024	12.06	- 18	353,705	241,239	- 47
Goldeneye	3,185	0.50	9,448	1.68	+ 66	19,906	26,478	+ 25
Bufflehead	6,950	1.08	9,718	1.72	+ 28	78,889	60,383	- 31
Ruddy duck	1,158	0.18	1,350	0.24	+ 14	20,250	10,891	- 86
Scoters	0	0	0	0	0	1,882	4,438	+ 58
Hooded merganser	5,791	0.90	1,890	0.34	- 206	37,241	38,686	+ 4
Other mergansers	0	0	540	0.10	+ 100	6,197	4,670	- 33
Total Duck Harvest (retrieved kill)	641,100 ± 11%		563,900 ± 11%		- 14	6,257,200 ± 5%	6,719,700 ± 6%	+ 7

[a] Sum of all species does not equal total because of rounding error.

Table 2. Top 10 states in number of **adult duck hunters**, 2007, and number of hunter-days and retrieved duck kill, in each (from: Richkus, K.D, K.A. Wilkins, R.V. Raftovich, S.S. Williams, and H.L. Spriggs. 2008. Migratory Bird Hunting activity and harvest during the 2006 and 2007 hunting seasons: Preliminary estimates. U.S. Fish and Wildlife Service, Laurel, Maryland. USA July 2008. 62 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	80,200 ± 18%	418,500 ± 17%	1,074,300± 21%	13.4 ± 28%
Minnesota	70,200 ± 9%	414,700 ± 10%	563,900 ± 11%	8.0 ± 14%
Louisiana	62,300 ± 9%	539,500 ± 12%	1,532,800 ± 13%	24.6 ±15%
Wisconsin	60,900 ± 10%	384,300 ± 11%	431,200 ± 10%	7.1 ± 14%
Arkansas	59,900 ± 9%	438,300 ± 10%	1,112,200 ± 11%	18.6 ± 14%
California	53,200 ± 11%	552,900 ± 15%	1,632,900 ± 16%	30.7 ± 19%
Illinois	37,900 ± 9%	324,500 ± 10%	467,900 ± 11%	12.0 ± 14%
Michigan	39,200 ± 10%	252,800 ± 14%	355,500 ±20%	9.1 ± 22%
Missouri	34,600 ± 11%	218,800 ± 15%	450,900 ± 19%	13.0 ± 22%
North Dakota	32,200 ± 6%	157,600 ± 7%	373,000 ± 8%	11.6 ± 10%
Mississippi Flyway		3,479,100 ± 4%	6,719,700 ± 6%	
United States		6,978,400 ± 3%	14,578,900 ± 4%	

Table 3. Top 10 states in number of **adult goose hunters**, 2007, and number of hunter-days and retrieved goose kill, in each (from: Richkus, K.D, K.A. Wilkins, R.V. Raftovich, S.S. Williams, and H.L. Spriggs. 2008. Migratory Bird Hunting activity and harvest during the 2006 and 2007 hunting seasons: Preliminary estimates. U.S. Fish and Wildlife Service, Laurel, Maryland. USA July 2008. 62 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	63,600 ± 18%	197,400 ± 27%	361,700 ± 30%	5.7 ± 34%
Minnesota	56,400 ± 10%	329,400 ± 13%	203,800 ± 13%	3.6 ± 16%
Wisconsin	46,700 ± 10%	286,800 ± 15%	114,200 ± 15%	2.4 ± 18%
Pennsylvania	37,500 ± 13%	244,800 ± 18%	288,300 ± 32%	7.7 ± 34%
Michigan	34,000 ± 10%	177,400 ± 13%	149,200 ± 15%	4.4 ± 19%
Illinois	33,700 ± 10%	254,600 ± 14%	181,400 ± 14%	5.4 ± 17%
California	33,300 ± 12%	247,900 ± 15%	171,700 ± 26%	5.2 ± 29%
Maryland	26,500 ± 8%	131,900 ± 11%	173,700 ± 12%	6.6 ± 15%
North Dakota	23,100 ± 7%	99,300 ± 9%	138,100 ± 16%	6.0 ± 18%
Ohio	19,900 ± 17%	124,100 ± 23%	78,900 ± 24%	4.0 ± 31%
Mississippi Flyway		1,807,700 ± 6%	1,330,900 ± 9%	
United States [b]		3,931,600 ± 4%	3,666,100 ± 6%	

[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 2007 CANADA GOOSE HUNT IN MINNESOTA

David P. Rave, Wetland Wildlife Populations and Research
Margaret H. Dexter, Wildlife Policy and Research Unit

INTRODUCTION

The September Canada goose season in Minnesota was 1-22 September 2007 (22 days). Beginning in 2007, a 7-day (16 - 22 Sep) experimental season addition was added in the Northwest Goose Zone (Fig. 1). The U.S. Fish and Wildlife Service had approved the 7-day season extension in other goose zones in Minnesota after a 3-year experimental season from 1999-2001 (Maxson et al. 2003).

During the September season the daily bag limit was 5 geese per day statewide, except in the Southeast Goose Zone where the daily bag was 2. 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. Within the Twin Cities Metro Zone, and goose refuges open to goose hunting, hunting was not permitted from public road right-of-ways. Goose hunters were required to obtain a $4.00 permit to participate in the September season.

This report documents results of the 2007 September goose hunter mail questionnaire survey.

METHODS

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, and, for the season as a whole, number of geese taken and number of geese knocked down and not retrieved. The questionnaire also asked whether hunters hunted in the Northwest Zone during the final week of the season (16 – 22 Sep), and how many days and how many geese they shot and retrieved during that week.

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 37,050 Special Canada Goose Season permits were sold prior to 23 September, 2007. Response rate to the survey was 67.7%. Among those respondents, 68.5% 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 3.0 to 4.4 days, and retrieved 2.6 to 4.9 geese, when totaled according to their hunt zone (Table 1). Overall, the success rate for active hunters was 70.5%.

The survey estimates that 94,314 Canada geese were harvested during the 2007 September season with approximately 62% of the harvest in the Remainder Zone and 16% in the West Zone (Table 1). This harvest pattern has remained rather consistent during the 2000-2007 September seasons (Table 2). Prior to the implementation of the Harvest Information Program, the U.S. Fish and Wildlife Service adjusted 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 2007 harvest of 79,978.

Of those hunters who indicated that they hunted in the Northwest Zone, 53% reported hunting during the final week of the season, Sep 16 – 22, 2007. This equates to 855 hunters, 1,762 hunter days, and a retrieved harvest of 1,570 geese during the experimental season (Sep 16 – 22) in the Northwest zone.

LITERATURE CITED

Maxson, S. J., J. S. Lawrence, and M. H. Dexter. 2003. Final report on Minnesota's 1999-2002 experimental September Canada goose season extension. Minnesota Dept. of Natural Resources Unpubl. Report. 18 pp.

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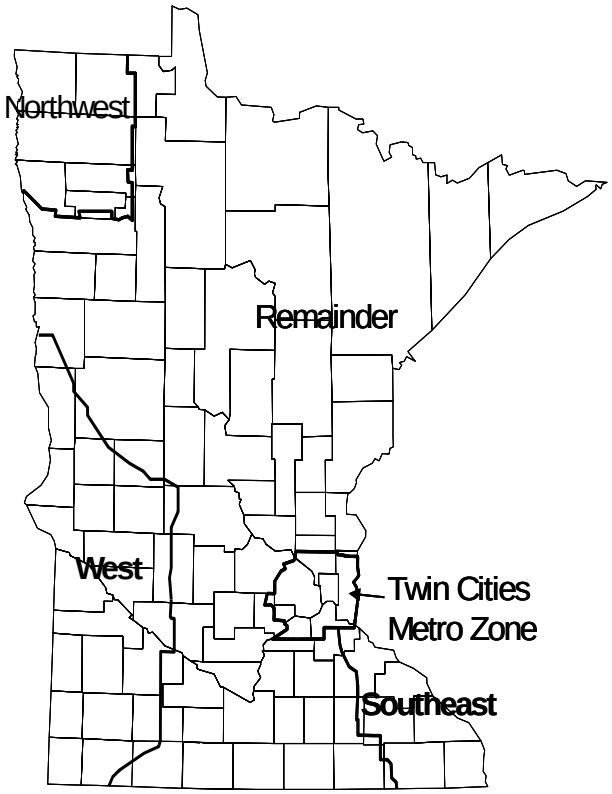

Figure 1. September season Goose Zones in

Table 1. Permit sales, hunter activity, and harvest[a] by zone during the September Canada Goose season (1-22 September) in Minnesota, 2007.

Parameter	Northwest	West	Southeast	Twin Cities Metro	Remainder	Total
ALL ZONES						
Total permits sold						37,050
Questionnaires delivered						3,096
Useable questionnaires returned						1,996
% responding						67.7
Active hunters						1,368
% active hunters						68.5
BY ZONE						
% Distribution of hunters by primary hunt zone	6.39	19.64	2.27	13.60	58.10	100
%successful	79.6	67.5	60.6	70.7	69.9	70.0
Days/active hunter	3.96	3.61	2.97	3.81	4.39	
Geese/active hunter	4.90	3.00	2.55	3.39	3.95	
Unretrieved harvest/active	0.61	0.45	0.21	0.31	0.47	
% unretrieved harvest	12.5	15.1	8.3	9.1	11.9	
EXPANDED:						
Active hunters	1,622	4,984	576	3,452	14,745	25,379
Hunter days	6,423	17,992	1,710	13,152	64,731	104,008
Retrieved harvest	7,948	14,952	1,469	11,702	58,243	**94,314**
Est. unretrieved harvest	989	2,243	121	1,070	6,930	11,360
Total harvest	8,937	17,195	1,590	12,772	65,173	105,667

[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 – 2007.

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**
2006	6,826	17,987	1,461	11,844	53,321	**91,439**
2007	7,948	14,952	1,469	11,702	58,243	**94,314**

LIGHT GOOSE CONSERVATION ORDER HARVEST IN MINNESOTA, 2008

David Rave, Wetland Wildlife Populations and Research Group
Margaret Dexter, Wildlife Populations and Research Unit

INTRODUCTION

This report documents results of the 2008 Light Goose Conservation Order hunter mail questionnaire survey.

METHODS

Minnesota held a light goose Conservation Order harvest from 1 March - 30 April 2008. 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 was 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 1,406 permits was issued and 910 responses (64.7%) to the questionnaire were obtained (Table 1). In calculating harvest estimates, we assumed that the 496 non-respondents participated in the conservation action and took light geese in the same manner as respondents (i.e., tallies were expanded by 1.55). More light geese were present in Minnesota during spring 2008 than spring 2007, and harvest was again concentrated in the southwest portion of the state with some also being taken in west-central Minnesota. Seven hundred seventy-five people attempted to take light geese during the 61-day conservation order period. Active participants pursued light geese for 3,415 days and 2,412 light geese were shot and retrieved. This was an average retrieved take of 3.1 geese per active participant. Another 288 light geese were reported wounded and not retrieved.

Unplugged shotguns were used by 361 (46.6%) individuals to take 1279 (53.0%) geese, of which 339 (26.5%) were taken with the 4^{th}, 5^{th}, or 6^{th} shell. Electronic calls were used by 147 (19.0%) participants to take 567 (23.5%) light geese. During the 1/2 hour after sunset period, 512 (21.2%) geese were harvested by 326 (42.1%) active hunters.

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

MINNESOTA 2008 LIGHT GOOSE HARVEST SURVEY

For the Period of March 1 - April 30, 2008 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, 2008. 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 2008 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, 2008? 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, 2008? _____
3. In what county did you hunt light geese most often during March 1 - April 30, 2008? _____
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 4^{th}, 5^{th}, or 6^{th} 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 ½ hour after sunset period? Yes / No
12. If yes, how many light geese did you shoot and retrieve during the ½ hour after sunset period? ____

Dear Light Goose Permit holder:

You are being asked to assist us in evaluating the March 1 - April 30, 2008 Light Goose Conservation Order. Please answer only for your Minnesota 2008 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, 2000-2008.

Parameter	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Total permits sold	1,982	1,128	1,997	1,438	1,424	1,383	1,363	1,292	1,406
Usable questionnaires returned	1,457	769	1,375	1,071	1,095	998	955	921	910
% Responding	73.5	68.2	68.9	74.4	76.9	72.2	70.1	71.3	64.7
Active hunters	1,461	393	1,209	553	690	618	516	514	775
% Active hunters	73.7	34.8	60.5	38.5	48.5	44.7	37.3	39.8	55.1
Total hunter days	8,244	2,112	5,517	2,600	3,372	2,643	2,665	2,302	3,415
Days/active hunter	5.6	5.4	4.6	4.7	4.9	4.3	5.2	4.5	4.4
Retrieved harvest	6,290	316	3,516	2,005	2,735	1,395	1,360	1,786	2,412
Geese/active hunter	4.3	0.8	2.9	3.6	4.0	2.3	2.6	3.5	3.1
Unretrieved harvest	904	19	637	253	315	150	163	172	288
No. using unplugged guns	830	193	560	280	333	272	215	224	361
Take w/unplugged guns	4,416	129	2,137	996	1,385	777	689	1,032	1,279
Take w/shell 4-5-6	1,316	68	615	401	491	269	287	277	339
No. using electronic calls	218	56	142	87	133	110	73	88	147
Take w/electronic calls	854	103	512	474	326	268	280	329	567
No. hunting ½ hr after sunset	696	141	550	228	265	264	223	197	326
Take ½ hr after sunset	1,185	43	841	267	311	242	246	209	512

2007 FALL WILD TURKEY HARVEST REPORT

Eric Dunton, Farmland Wildlife Populations and Research Group

Minnesota's fall turkey hunting season uses a permit area quota system similar to spring turkey hunting. Fall hunting varies from spring hunting in that there are fewer permit areas open and fewer permits available because of the potential to reduce the size of the turkey population (i.e., additive mortality via harvest of hens). In addition, fewer hunters participate in fall turkey hunting due to several factors such as competition with other fall hunting activities and the method of hunting turkeys varies from spring turkey hunting.

The 2007 fall turkey season took place during 2, 5-day time periods. Time Period A occurred from 17-21 October Time Period B occurred from 24-28 October. A total of 33 permit areas were open to fall hunting. An increase of 1 permit area from the 2006 season, permit area 227. For all permit areas and time periods 4,464 individuals applied for 4,490 available permits, an increase of 200 permits from 2006 (Table 1, Figure 1). However, only 2,837 permits were issued, an increase of 35 permits from 2006 (Table 2). The majority (93%) of permits were general lottery permits, compared to 4% landowners, and 3% surplus permits (Table 2).

Total registered harvest was 396 turkeys during time period A and 299 turkeys during time period B, for a total of 695 turkeys for both time periods (Table 3). Overall harvest was up from 618 turkeys in 2006 but down from the 5-year average of 708 (Table 1). Hunter success averaged 27%, which was similar to 25% success during the 2006 season and the 5-year average of 26% success (Table 1). Far more turkeys were harvested by shotgun (95%) than by archery (5%) or muzzleloader (< 1%, Table 4).

A total of 402 female turkeys were harvested representing 58% of the total harvest, which was similar to the 2006 season (Tables 5-6). A total of 196 juvenile turkeys comprised 28% of the harvest, with 15% juvenile male and 13% juvenile female (Tables 5-6). Harvest age ratios are assumed biased due to hunter preference for harvesting an adult turkey and age/sex information are reported by hunters (i.e., some juveniles get reported as adults).

Monitoring wild turkey harvest is an important component of population management. Information gathered during the fall hunting season is used for modeling permit numbers for future hunts. Turkey populations and range continue to expand across the state. This has allowed additional permit areas to be opened for fall turkey hunting and permit numbers continue to gradually increase each year.

Table 1. Number of permits available, applicants, harvest, and adjusted harvest success rates for fall turkey hunting seasons 1990-2007, Minnesota.

Year	Permits Available	Applicants	Permits Issued	Total harvest	Success rate (%)[a]
1990	1000	4522	951	326	38
1991	2200	2990	2020	552	30
1992	2200	2782	2028	588	32
1993	2400	3186	2094	605	32
1994	2500	3124	2106	601	32
1995	2500	3685	2125	648	34
1996	2500	4453	2289	685	33
1997	2580	4574	2378	698	33
1998	2710	4526	2483	828	37
1999	2890	5354	2644	865	36
2000	3090	5263	2484	735	33
2001	2870	4501	2262	629	31
2002	3790	5180	2945	594	22
2003	3870	5264	2977	889	33
2004	4380	5878	3277	758	26
2005	4410	4542	2978	681	25
2006	4290	4167	2802	618	25
2007	4490	4464	2837	695	27

[a] Harvest rates adjusted using an estimated 10% non-participation rate based on hunter survey data.

Table 2. Number of permits available and issued by type, time period, and permit area for the 2007 fall turkey season, Minnesota.

		General lottery		Landowner		Surplus	
Permit Area	Permits Available	Time A	Time B	Time A	Time B	Time A	Time B
227	100	35	33	1	1	0	0
228	100	41	41	0	1	0	0
236	210	77	50	2	1	0	17
337	100	37	34	0	0	0	0
338	140	51	40	6	1	0	10
339	140	48	32	1	0	0	7
341	250	182	115	8	3	0	11
342	350	107	68	5	1	6	1
343	200	65	75	9	1	0	0
344	150	43	50	0	1	0	0
345	180	41	22	0	0	1	0
346	300	106	49	4	3	1	4
347	100	42	43	2	1	0	0
348	250	93	81	4	0	0	2
349	450	129	83	4	0	0	0
420	10	0	4	2	0	0	0
422	10	5	4	0	0	0	0
425	10	4	3	0	1	0	0
431	10	4	4	0	1	0	0
433	10	5	4	0	0	0	0
442	250	86	71	6	3	0	16
443	100	40	21	1	0	0	0
446	10	4	0	1	2	0	0
447	10	3	1	0	0	0	0
448	10	2	7	2	0	0	0
449	10	4	5	1	0	0	0
450	10	3	3	0	0	0	0
461	200	70	51	5	4	0	17
462	220	69	60	7	1	0	0
464	70	21	8	0	0	0	3
465	80	19	11	0	0	1	1
466	150	33	19	1	1	1	2
467	100	36	29	4	6	0	1
Total	4490	1505	1121	76	33	10	92

Table 3. Permits and harvest by time period and permit area for the 2007 fall turkey season, Minnesota.

	Permits				Harvest		
Permit Area	Available	Issued time A	Issued time B	Total	Time A	Time B	Total
227	100	36	34	70	15	7	22
228	100	41	42	83	16	9	25
236	210	79	68	147	23	16	39
337	100	37	34	71	11	11	22
338	140	57	51	108	18	11	29
339	140	49	39	88	11	5	16
341	450	190	129	319	40	30	70
342	350	118	70	188	32	21	53
343	200	74	76	150	14	29	43
344	150	43	51	94	11	7	18
345	180	42	22	64	5	2	7
346	300	111	56	167	17	14	31
347	100	44	44	88	6	9	15
348	250	97	83	180	26	27	53
349	450	133	83	216	24	15	39
420	10	2	4	6	2	0	2
422	10	5	4	9	3	1	4
425	10	4	4	8	2	1	3
431	10	4	5	9	2	0	2
433	10	5	4	9	1	3	4
442	250	92	90	182	26	21	47
443	100	41	21	62	4	3	7
446	10	5	2	7	2	0	2
447	10	3	1	4	0	0	0
448	10	4	7	11	0	2	2
449	10	5	5	10	1	0	1
450	10	3	3	6	1	0	1
461	200	75	72	147	25	26	51
462	220	76	61	137	26	18	44
464	70	21	11	32	10	3	13
465	80	20	12	32	10	2	12
466	150	35	22	57	5	1	6
467	100	40	36	76	7	5	12
Total	4490	1591	1246	2837	396	299	695

Table 4. Total harvest and harvest method by permit area for the 2007 fall turkey season, Minnesota.

Permit Area	Harvest	Shotgun	Archery	Muzzleloader
227	22	21	1	0
228	25	19	6	0
236	39	36	3	0
337	22	16	6	0
338	29	28	1	0
339	16	16	0	0
341	70	65	3	2
342	53	52	1	0
343	43	39	3	1
344	18	18	0	0
345	7	7	0	0
346	31	30	1	0
347	15	15	0	0
348	53	51	2	0
349	39	38	0	1
420	2	2	0	0
422	4	4	0	0
425	3	3	0	0
431	2	2	0	0
433	4	4	0	0
442	47	47	0	0
443	7	7	0	0
446	2	2	0	0
447	0	0	0	0
448	2	2	0	0
449	1	1	0	0
450	1	1	0	0
461	51	51	0	0
462	44	42	1	1
464	13	13	0	0
465	12	12	0	0
466	6	4	2	0
467	12	10	2	0
Total	695	658	32	5

Table 5. Total harvest by sex, age, and permit area for the 2007 fall turkey season, Minnesota.

	Male Harvest		Female Harvest		
Permit Area	Juvenile	Adult	Juvenile	Adult	Total Harvest
227	1	6	4	11	22
228	4	10	1	10	25
236	5	13	2	19	39
337	5	11	0	6	22
338	0	17	1	11	29
339	2	5	2	7	16
341	13	18	6	33	70
342	7	6	11	29	53
343	9	10	6	18	43
344	5	2	0	11	18
345	2	1	2	2	7
346	6	6	2	17	31
347	1	3	4	7	15
348	6	8	11	28	53
349	5	11	5	18	39
420	0	1	1	0	2
422	1	2	0	1	4
425	1	1	0	1	3
431	2	0	0	0	2
433	1	3	0	0	4
442	4	15	9	19	47
443	2	3	0	2	7
446	0	1	1	0	2
447	0	0	0	0	0
448	0	0	0	2	2
449	0	0	0	1	1
450	0	1	0	0	1
461	8	20	8	15	51
462	5	8	9	22	44
464	3	2	2	6	13
465	2	1	4	5	12
466	2	2	0	2	6
467	1	3	2	6	12
Total	103	190	93	309	695

Table 6. Harvest sex and age structure for the fall turkey seasons 1990-2007, Minnesota.

	Male Harvest (%)			Female Harvest (%)				
Year	Juvenile	Adult	Unknown	Juvenile	Adult	Unknown	Unknown Age/Sex (%)	Total Harvest
1990	21	25		26	28			326
1991	22	15		38	25			552
1992	20	15		35	30			588
1993	18	19		30	32		< 1	605
1994	17	14		35	34			601
1995	20	21		30	29			648
1996	14	20		33	33			685
1997	16	19		31	34			698
1998	18	17		32	33		< 1	828
1999	16	25		29	30			865
2000	14	24		28	34			735
2001	13	19		28	40			629
2002	16	18	< 1	28	35	< 1	2	594
2003	14	27		18	39	< 1	2	889
2004	12	37		11	40		< 1	745
2005	15	19		20	45		< 1	681
2006	18	23		13	45			618
2007	15	27		13	44			695

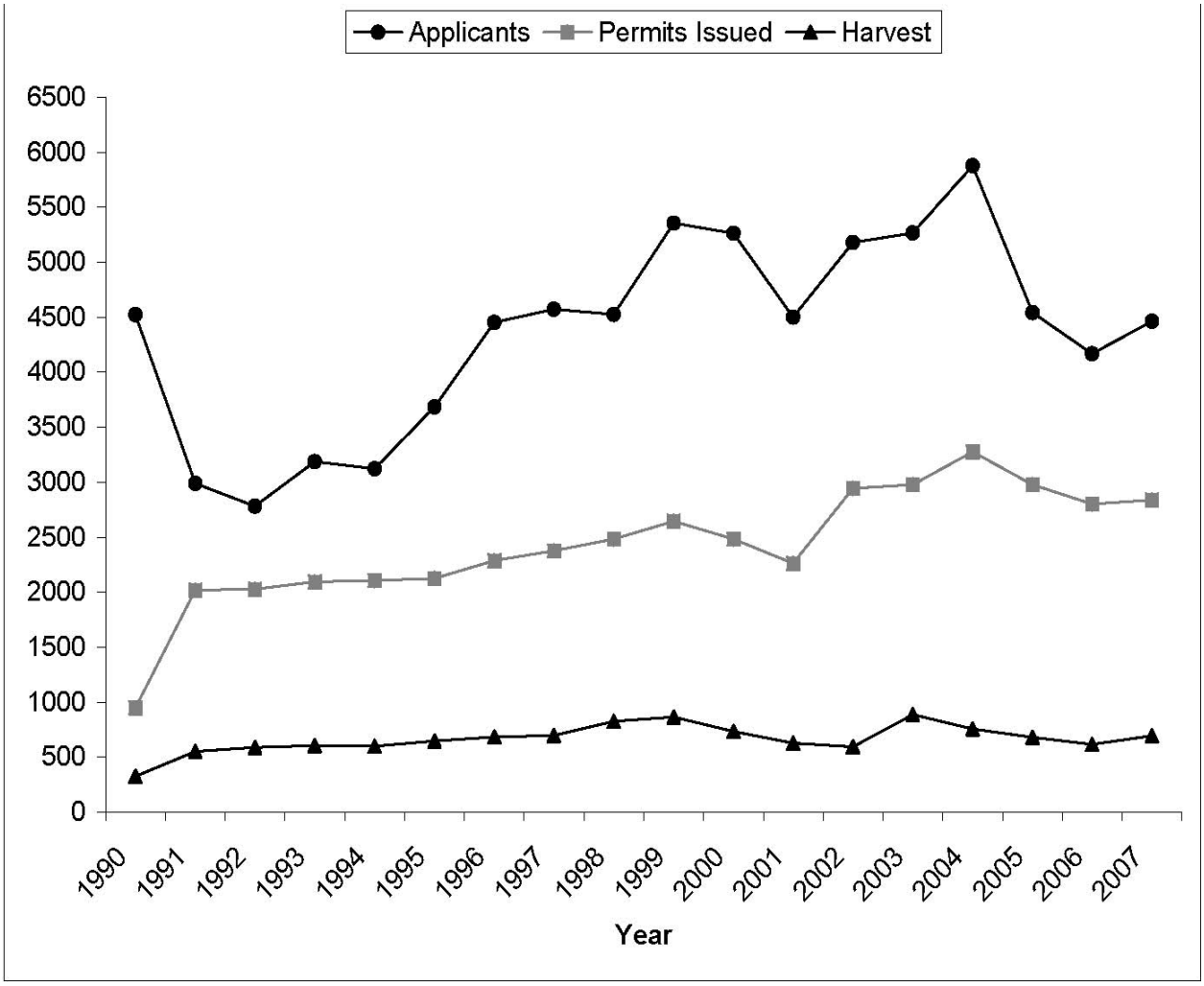

Figure 1. Permit applicants, permits issued, and total harvest for fall turkey seasons 1990 -2007, Minnesota.

SPRING WILD TURKEY HARVEST REPORT, 2008

Eric Dunton, Farmland Wildlife Populations and Research Group

INTRODUCTION

In Minnesota, the demand for spring turkey permits exceeds the supply of permits available. To regulate harvest and distribute hunting pressure, permits are allocated across 73 permit areas (PAs) and 8 time periods using a quota system (Figure 1). Hunters interested in pursuing wild turkeys are required to apply for a permit through a drawing based on a system of preference. Preference is determined by the number of years a valid but unsuccessful application has been submitted since last receiving a permit. Hunters may apply individually or in a group of up to 4 members, and may apply for a second choice permit area and time period. Successful applicants are notified through mail, unsuccessful applicants are awarded a preference point. The goal of this system is to provide quality turkey hunting opportunities where populations can sustain harvest.

METHODS

Three types of hunting licenses were available to spring turkey hunters: (1) general lottery permit in which an applicant or a group of up to 4 hunters applied for a specific PA and time period (2) landowner permit in which up to 20% of permits for each PA and time period were reserved for landowners or tenants who lived on 40 acres or more of land within the PA, and (3) archery permits which could be purchased for the last 2 time periods of any PA with 50 or more permits per period.

RESULTS

During 2008 we received 51,000 applications for 37,992 permits (Table 1). Almost 32,000 general lottery and landowner permits were issued to hunters, and about 4,000 were issued to archers (Table 2). Hunters registered almost 11,000 turkeys, an increase of 17% from 2007 and harvest increased in 74% of PAs, which was the highest recorded harvest in history (Table 1). Hunter success averaged 34%, which was above the 5-year average 32% (Table 1). Hunter success by PA ranged from 13% (PA 426) to 67% (PA 156) (Table 2, Figure 2). Similar to the 5-year average, hunter success rates were highest during the first 2 time periods (Table 3).

A mentored youth hunt sponsored by non-profit organizations was held on weekends from mid April through May. During 2008, 270 youth hunters registered 100 turkeys, an increase of 57% from 2007. Success averaged 37%, which was above the 2007 success rate (33%; Table 3).

DISCUSSION

A series of late spring snowstorms dropped unusually heavy snow across the Red River Valley and portions of western Minnesota during early April. April precipitation totals were above historic averages, and air temperatures ranged from 1.12 – 2.24°C (2 - 4°F) below normal across Minnesota (Minnesota Climatology Working Group 2008). May precipitation totals were near historic averages, and air temperatures ranged from 1.68 – 3.36°C (3 - 6 °F) below normal across Minnesota (Minnesota Climatology Working Group 2008). Despite the cool, wet spring conditions, 2008 was the highest recorded harvest of wild turkeys in Minnesota. The continued increase in harvest can be partially attributed to the increase in the number of permits available (i.e., 4,016) from 2007 and 8 new permit areas, open to hunting. Increased permits and permit areas resulted in more opportunities for hunters to harvest turkeys.

LITERATURE CITED

Minnesota Climatology Working Group. 2008. Climate journal. http://climate.umn.edu/ Accessed 16 June 2008.

Table 1. Spring and fall applicants, permits available, permits issued and harvest from 1978 – 2008 for all wild turkey hunting seasons, Minnesota.

	Spring						Fall		
Year	Applicants	Permits available	Permits issued	Permits issued (%)	Registered harvest	Hunter success (%)[a]	Applicants	Permits available	Permits issued
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	4,167	4,290	618
2007[b]	52,566	33,976	28,320	83.4	9,412	33.2	4,464	4,490	695
2008[b]	51,000	37,992	31,942	84.1	10,994	34.4	-	-	-

[a] Success rate not adjusted for non-participation

[b] Youth hunt data included

Table 2. Permits available, permits issued, registered harvest, success, and average success rates by permit area for the 2008 spring wild turkey season, Minnesota.

Permit area	Permits available	Permits issued[a]	Registered harvest	Success (%)[b]	Success 5-year average (%)
152[c]	40	36	13	36.1	-
156[c]	40	33	22	66.7	-
157	240	221	96	43.4	42.4
159	80	75	29	38.7	37.0
183[c]	40	40	8	20.0	-
213[e]	480	443	218	49.2	46.8
214	280	240	110	45.8	39.9
215	680	616	279	45.3	42.9
218[e]	680	613	291	47.5	50.3
219	440	395	145	36.7	32.8
221	240	213	115	54.0	52.5
222[f]	160	150	65	43.3	49.7
223	720	638	278	43.6	36.4
225	1320	1163	333	28.6	27.2
227	800	724	261	36.0	38.0
229	320	267	75	28.1	26.0
235	120	114	33	28.9	35.0
236	1120	977	379	38.8	38.1
239	880	768	301	39.2	42.2
240	680	604	248	41.1	39.7
241[c]	120	110	49	44.5	-
243[c]	80	67	27	40.3	-
244	320	268	96	35.8	33.2
248	200	208	94	45.2	47.2
249	320	285	95	33.3	32.5
262[c]	56	55	26	47.3	-
338	680	600	200	33.3	33.2
339	640	557	187	33.6	34.8
341	1880	1633	587	35.9	33.9
342	1800	1434	424	29.6	26.0
343	1320	1187	514	43.3	40.9
344	1000	854	263	30.8	24.9
345	1400	1015	247	24.3	20.2
346	2600	1728	447	25.9	23.2
347	1200	1023	272	26.6	26.1
348	1400	1151	327	28.4	25.4
349	3600	2621	564	21.5	22.5
412[e]	240	222	93	41.9	43.0
416	120	113	45	39.8	37.1
417[e]	360	342	152	44.4	40.8
420	120	85	26	30.6	38.7

Table 2. Continued.

Permit area	Permits available	Permits issued[a]	Registered harvest	Success (%)[b]	Success 5-year average (%)[c]
421[c]	56	35	8	22.9	-
422	80	77	49	63.6	53.4
423[c]	40	29	8	27.6	-
424[f]	80	76	23	30.3	37.9
425	480	443	173	39.1	39.8
426	40	32	4	12.5	19.9
427	80	64	24	37.5	32.8
428	200	172	92	53.5	43.8
431	80	76	36	47.4	51.5
433	64	60	33	55.0	51.8)
440	600	522	174	33.3	30.2
442	1280	1161	421	36.3	33.9
443	680	578	180	31.1	29.4
446[f]	56	49	22	44.9	44.8
447	80	66	13	19.7	27.5
448	80	72	25	34.7	51.3
449	80	79	36	45.6	47.5
450	120	100	25	25.0	27.4
451[f]	120	109	33	30.3	46.3
454[f]	40	38	18	47.4	35.6
456	40	29	5	17.2	9.3
457	80	73	39	53.4	42.6
458	80	49	10	20.4	29.7
459	200	171	32	18.7	23.2
461	880	800	332	41.5	38.0
462	880	790	307	38.9	37.3
463	200	183	71	38.8	37.7
464	280	253	83	32.8	32.5
465	320	256	87	34.0	29.0
466	640	510	149	29.2	30.9
467	400	368	146	37.7	35.2
601[d]	840	734	302	41.1	38.9
Total	37992	31942	10994	34.4	

[a] 4, 020 permits were issued to archery hunters and are not included in these figures

[b] Success rates not adjusted for non-participants

[c] New permits areas for the 2008 spring season

[d] Permit areas 228 and 337 were combined into permit area 601

[e] Permit area boundary change in 2006 success rate (%) 2-year average

[f] Permit area boundary change or new permit area in 2005 success rate (%) 4-year average

Table 3. Permits issued, registered harvest, success, and average success by time period for the 2008 spring wild turkey season, Minnesota.

Time period[a]	Permits issued	Registered harvest	Success (%)[b]	Success 5– year average (%)
A	4,324	1,872	43.3	42.6
B	4,272	1,729	40.5	40.1
C	4,272	1,356	31.7	30.6
D	4,216	1,329	31.5	27.5
E	4,169	1,435	34.4	32.0
F	3,561	1,021	28.7	28.7
G	3,798	1,236	32.5	25.5
H	3,060	916	29.9	25.2
Youth Hunt				
U	4	0	0	
V	7	2	28.6	
W	0	0	0	
X	7	0	0	
Y	240	94	39.2	
Z	12	4	33.3	
Total	31,942	10,994	34.4	

[a] A = 16–20 April, B = 21-25 April, C = 26-30 April, D = 1-5 May, E = 6-10 May, F = 11-15 May, G = 16-22 May, H = 23-29 May, U = 17-18 May, V = 10-11 May, W = 3-4 May, X = 26-27 April, Y = 19-20 April, Z = 12-13 April.

[b] Success rates not adjusted for non-participants

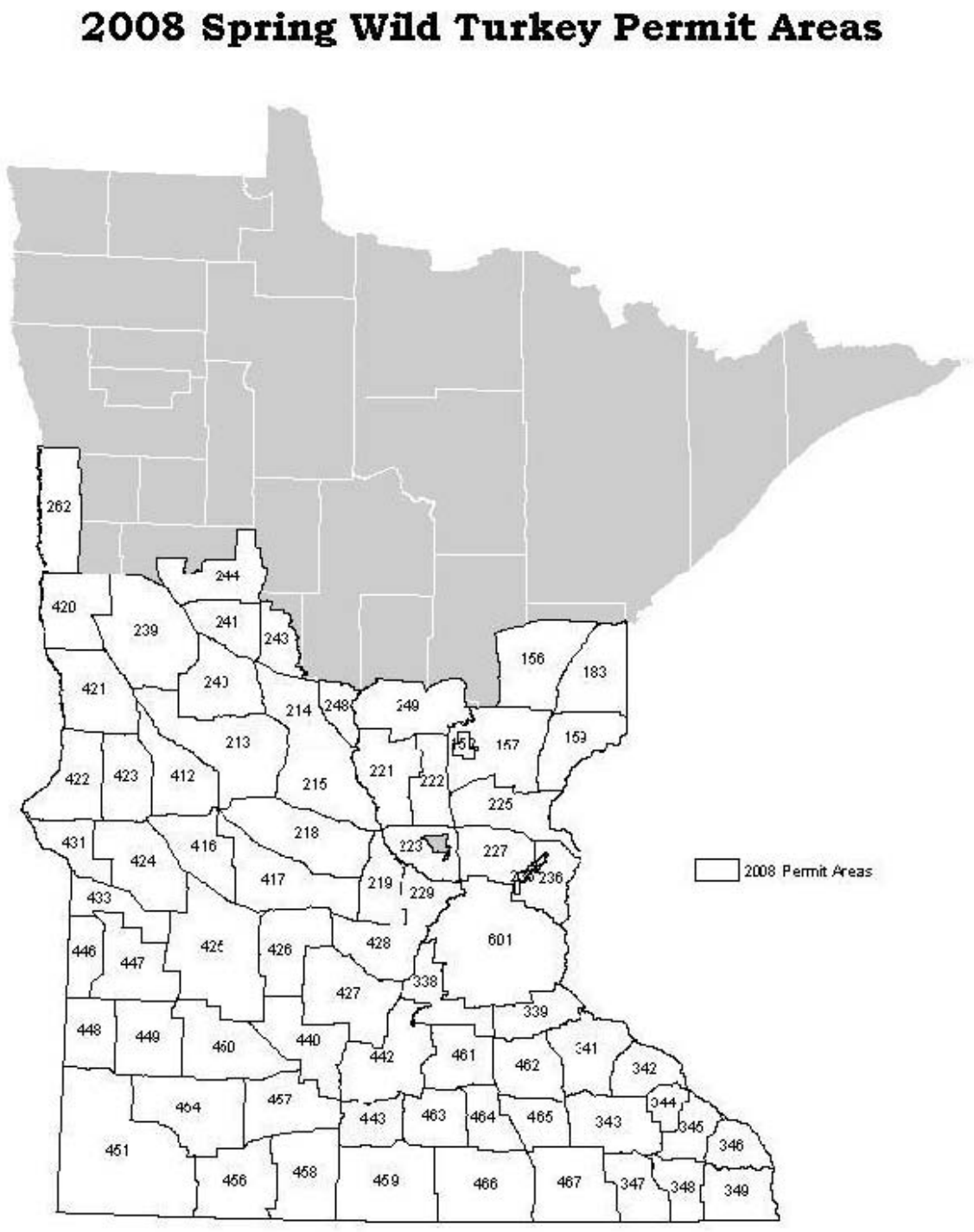

Figure 1. Permit areas open for hunting during the 2008 spring turkey hunting season, Minnesota.

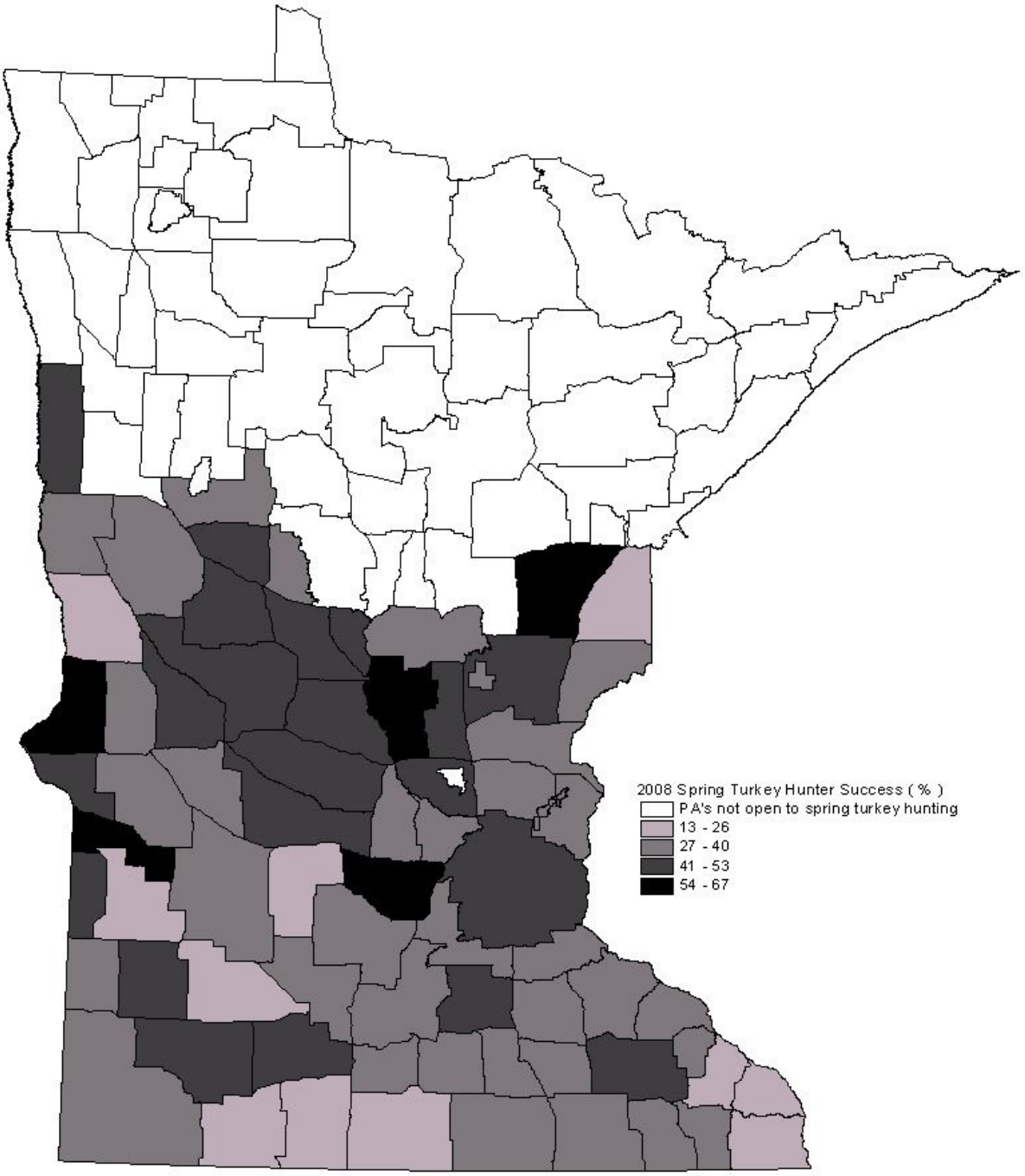

Figure 2. Hunter success for the 2008 spring turkey hunting season, Minnesota.

Appendix A. Registered harvest, general lottery applicants, total permits available, landowner permits available, general lottery permits available, and the chance of being drawn in the general lottery by permit area and time period for the 2008 spring wild turkey season, Minnesota.

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
152	A	3	10	5	0	5	50
	B	3	2	5	0	5	100
	C	0	9	5	0	5	56
	D	1	3	5	0	5	100
	E	3	1	5	0	5	100
	F	2	0	5	0	5	100
	G	1	1	5	0	5	100
	H	0	0	5	0	5	100
156	A	4	7	5	1	4	57
	B	2	8	5	1	4	50
	C	3	14	5	0	5	36
	D	3	15	5	1	4	27
	E	2	11	5	0	5	45
	F	3	2	5	1	4	100
	G	3	7	5	0	5	71
	H	2	4	5	0	5	100
157	A	15	154	30	8	22	14
	B	15	94	30	6	24	26
	C	8	164	30	3	27	16
	D	12	76	30	3	27	36
	E	12	20	30	0	30	100
	F	15	25	30	1	29	100
	G	9	27	30	2	28	100
	H	10	9	30	0	30	100
159	A	4	77	10	2	8	10
	B	5	36	10	2	8	22
	C	7	62	10	2	8	13
	D	1	43	10	2	8	19
	E	4	13	10	2	8	62
	F	4	14	10	0	10	71
	G	4	9	10	0	10	100
	H	0	5	10	1	9	100
183	A	1	13	5	2	3	23
	B	0	13	5	0	5	38
	C	2	28	5	0	5	18
	D	1	19	5	1	4	21
	E	1	10	5	0	5	50
	F	1	1	5	0	5	100
	G	1	3	5	0	5	100
	H	1	4	5	0	5	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
213	A	28	215	60	15	45	21
	B	30	199	60	13	47	24
	C	21	278	60	13	47	17
	D	30	200	60	9	51	26
	E	26	96	60	6	54	56
	F	25	32	60	2	58	100
	G	24	65	60	4	56	86
	H	27	19	60	0	60	100
214	A	20	140	35	5	30	21
	B	13	62	35	7	28	45
	C	17	98	35	8	27	28
	D	11	61	35	4	31	51
	E	22	17	35	1	34	100
	F	8	5	35	2	33	100
	G	8	13	35	0	35	100
	H	11	15	35	1	34	100
215	A	38	324	85	17	68	21
	B	37	180	85	10	75	42
	C	34	405	85	10	75	19
	D	42	224	85	5	80	36
	E	40	83	85	2	83	100
	F	33	29	85	2	83	100
	G	34	69	85	1	84	100
	H	21	28	85	1	84	100
218	A	46	281	85	17	68	24
	B	39	188	85	16	69	37
	C	32	402	85	18	67	17
	D	33	223	85	7	78	35
	E	30	81	85	0	85	100
	F	28	54	85	1	84	100
	G	43	80	85	5	80	100
	H	30	15	85	3	82	100
219	A	25	157	55	4	51	32
	B	29	128	55	4	51	40
	C	19	153	55	3	52	34
	D	14	95	55	0	55	58
	E	23	69	55	2	53	77
	F	8	8	55	1	54	100
	G	18	15	55	0	55	100
	H	8	5	55	0	55	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
221	A	14	129	30	6	24	19
	B	22	90	30	6	24	27
	C	13	155	30	6	24	15
	D	11	88	30	2	28	32
	E	18	35	30	0	30	86
	F	9	15	30	0	30	100
	G	16	33	30	1	29	88
	H	12	10	30	0	30	100
222	A	7	104	20	4	16	15
	B	10	55	20	3	17	31
	C	10	116	20	4	16	14
	D	15	74	20	1	19	26
	E	4	34	20	2	18	53
	F	9	11	20	2	18	100
	G	8	15	20	2	18	100
	H	2	10	20	0	20	100
223	A	45	395	90	16	74	19
	B	44	176	90	10	80	45
	C	36	298	90	8	82	28
	D	39	172	90	1	89	52
	E	23	112	90	2	88	79
	F	30	32	90	0	90	100
	G	36	44	90	1	89	100
	H	22	14	90	3	87	100
225	A	65	360	165	33	132	37
	B	51	227	165	18	147	65
	C	38	340	165	23	142	42
	D	36	200	165	6	159	80
	E	46	89	165	0	165	100
	F	27	43	165	1	164	100
	G	33	28	165	0	165	100
	H	35	8	165	0	165	100
227	A	51	311	100	9	91	29
	B	38	182	100	7	93	51
	C	27	299	100	9	91	30
	D	28	148	100	3	97	66
	E	27	117	100	1	99	85
	F	26	16	100	0	100	100
	G	33	29	100	6	94	100
	H	24	18	100	0	100	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
229	A	15	74	40	3	37	50
	B	12	37	40	1	39	100
	C	11	60	40	2	38	63
	D	5	47	40	0	40	85
	E	11	8	40	1	39	100
	F	7	14	40	0	40	100
	G	8	12	40	0	40	100
	H	6	0	40	0	40	100
235	A	8	104	15	0	15	14
	B	6	36	15	0	15	42
	C	4	63	15	0	15	24
	D	3	35	15	0	15	43
	E	4	21	15	0	15	71
	F	4	7	15	0	15	100
	G	4	21	15	0	15	71
	H	0	5	15	0	15	100
236	A	63	383	140	18	122	32
	B	51	252	140	5	135	54
	C	36	388	140	8	132	34
	D	46	195	140	3	137	70
	E	43	106	140	1	139	100
	F	40	46	140	0	140	100
	G	44	55	140	1	139	100
	H	48	21	140	0	140	100
239	A	52	391	110	18	92	24
	B	48	219	110	14	96	44
	C	27	405	110	9	101	25
	D	37	255	110	8	102	40
	E	32	130	110	2	108	83
	F	29	33	110	0	110	100
	G	40	51	110	2	108	100
	H	32	23	110	2	108	100
240	A	46	236	85	15	70	30
	B	35	159	85	17	68	43
	C	27	262	85	15	70	27
	D	28	143	85	7	78	55
	E	27	64	85	2	83	100
	F	18	36	85	2	83	100
	G	26	23	85	2	83	100
	H	29	12	85	0	85	100
241	A	7	42	15	2	13	31
	B	9	24	15	4	11	46
	C	3	59	15	3	12	20
	D	7	20	15	2	13	65
	E	5	6	15	0	15	100
	F	8	9	15	0	15	100
	G	6	8	15	0	15	100
	H	4	0	15	0	15	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
262	A	3	7	7	0	7	100
	B	7	5	7	0	7	100
	C	5	12	7	0	7	58
	D	3	1	7	0	7	100
	E	2	2	7	0	7	100
	F	5	0	7	0	7	100
	G	1	0	7	0	7	100
	H	0	1	7	0	7	100
338	A	28	245	85	17	68	28
	B	33	165	85	10	75	45
	C	27	232	85	13	72	31
	D	30	154	85	5	80	52
	E	26	66	85	1	84	100
	F	11	34	85	0	85	100
	G	26	32	85	1	84	100
	H	14	11	85	0	85	100
339	A	22	250	80	16	64	26
	B	34	150	80	3	77	51
	C	23	187	80	8	72	39
	D	18	145	80	3	77	53
	E	24	44	80	1	79	100
	F	21	21	80	0	80	100
	G	24	35	80	0	80	100
	H	19	8	80	1	79	100
341	A	78	636	235	30	205	32
	B	82	425	235	21	214	50
	C	73	600	235	24	211	35
	D	73	496	235	8	227	46
	E	87	186	235	2	233	100
	F	56	99	235	0	235	100
	G	65	124	235	2	233	100
	H	65	51	235	0	235	100
342	A	68	445	225	45	180	40
	B	71	283	225	8	217	77
	C	64	489	225	21	204	42
	D	61	264	225	7	218	83
	E	66	120	225	0	225	100
	F	53	53	225	3	222	100
	G	34	44	225	2	223	100
	H	7	23	225	0	225	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
343	A	61	504	165	33	132	26
	B	69	299	165	20	145	48
	C	66	643	165	33	132	21
	D	53	299	165	21	144	48
	E	63	176	165	2	163	93
	F	53	76	165	1	164	100
	G	81	122	165	0	165	100
	H	64	57	165	9	156	100
344	A	48	425	125	22	103	24
	B	45	260	125	12	113	43
	C	36	302	125	5	120	40
	D	27	245	125	0	125	51
	E	30	124	125	0	125	100
	F	30	71	125	1	124	100
	G	24	81	125	0	125	100
	H	19	15	125	0	125	100
345	A	60	239	175	27	148	62
	B	54	183	175	8	167	91
	C	33	248	175	5	170	69
	D	27	191	175	4	171	90
	E	37	64	175	1	174	100
	F	19	26	175	0	175	100
	G	13	11	175	2	173	100
	H	4	12	175	0	175	100
346	A	97	551	325	53	272	49
	B	88	341	325	11	314	92
	C	54	465	325	10	315	68
	D	80	316	325	10	315	99
	E	58	146	325	0	325	100
	F	21	52	325	0	325	100
	G	40	82	325	5	320	100
	H	9	12	325	0	325	100
347	A	49	336	150	20	130	39
	B	47	185	150	6	144	78
	C	28	367	150	17	133	36
	D	34	193	150	8	142	74
	E	39	112	150	0	150	100
	F	21	32	150	2	148	100
	G	30	64	150	1	149	100
	H	19	16	150	0	150	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery Applicant being drawn (%)[b]
348	A	63	456	175	24	151	33
	B	47	264	175	4	171	65
	C	45	419	175	13	162	39
	D	37	272	175	7	168	62
	E	47	177	175	1	174	98
	F	30	52	175	0	175	100
	G	25	88	175	0	175	100
	H	33	21	175	1	174	100
349	A	139	904	450	75	375	41
	B	108	517	450	16	434	84
	C	58	773	450	32	418	54
	D	63	528	450	10	440	83
	E	74	308	450	3	447	100
	F	49	163	450	2	448	100
	G	55	124	450	0	450	100
	H	17	50	450	1	449	100
412	A	15	132	30	4	26	20
	B	13	69	30	5	25	36
	C	12	115	30	4	26	23
	D	9	80	30	3	27	34
	E	10	51	30	3	27	53
	F	15	12	30	0	30	100
	G	12	28	30	1	29	100
	H	7	11	30	0	30	100
416	A	9	50	15	3	12	24
	B	7	36	15	2	13	36
	C	4	62	15	2	13	21
	D	5	50	15	0	15	30
	E	8	39	15	1	14	36
	F	6	10	15	0	15	100
	G	5	19	15	0	15	79
	H	1	9	15	0	15	100
417	A	28	180	45	10	35	19
	B	21	134	45	5	40	30
	C	24	209	45	5	40	19
	D	14	111	45	2	43	39
	E	23	79	45	0	45	57
	F	13	30	45	0	45	100
	G	14	36	45	2	43	100
	H	15	15	45	2	43	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
420	A	6	20	15	0	15	75
	B	3	8	15	0	15	100
	C	6	23	15	3	12	52
	D	2	7	15	0	15	100
	E	1	3	15	1	14	100
	F	1	0	15	0	15	100
	G	6	4	15	0	15	100
	H	1	1	15	0	15	100
421	A	5	4	7	0	7	100
	B	0	3	7	0	7	100
	C	0	7	7	0	7	100
	D	2	3	7	0	7	100
	E	0	0	7	0	7	100
	F	0	0	7	0	7	100
	G	0	0	7	0	7	100
	H	1	1	7	0	7	100
422	A	8	30	10	0	10	33
	B	9	17	10	2	8	47
	C	5	16	10	0	10	63
	D	5	13	10	0	10	77
	E	6	13	10	0	10	77
	F	5	2	10	0	10	100
	G	9	7	10	0	10	100
	H	2	3	10	0	10	100
423	A	2	3	5	0	5	100
	B	3	0	5	0	5	100
	C	1	0	5	0	5	100
	D	2	0	5	0	5	100
	E	0	0	5	0	5	100
	F	0	0	5	0	5	100
	G	0	0	5	0	5	100
	H	0	0	5	0	5	100
424	A	5	26	10	1	9	35
	B	2	10	10	0	10	100
	C	1	7	10	1	9	100
	D	3	8	10	0	10	100
	E	3	1	10	0	10	100
	F	1	4	10	0	10	100
	G	6	1	10	0	10	100
	H	2	0	10	0	10	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
425	A	24	191	60	12	48	25
	B	19	100	60	8	52	52
	C	22	272	60	5	55	20
	D	25	180	60	2	58	32
	E	26	67	60	1	59	88
	F	20	31	60	2	58	100
	G	18	38	60	0	60	100
	H	18	26	60	0	60	100
426	A	1	10	5	1	4	40
	B	0	4	5	1	4	100
	C	0	8	5	0	5	63
	D	0	2	5	0	5	100
	E	2	1	5	0	5	100
	F	1	1	5	0	5	100
	G	0	5	5	0	5	100
	H	0	0	5	0	5	100
427	A	2	20	10	2	8	40
	B	6	15	10	2	8	53
	C	3	25	10	1	9	36
	D	3	10	10	1	9	90
	E	3	13	10	3	7	54
	F	1	4	10	0	10	100
	G	3	6	10	0	10	100
	H	3	0	10	0	10	100
428	A	18	91	25	5	20	22
	B	15	45	25	2	23	51
	C	14	83	25	5	20	24
	D	10	44	25	6	19	43
	E	16	17	25	0	25	100
	F	6	17	25	1	24	100
	G	6	16	25	0	25	100
	H	7	7	25	0	25	100
431	A	4	31	10	0	10	32
	B	5	20	10	2	8	40
	C	6	27	10	4	6	22
	D	6	17	10	0	10	59
	E	2	5	10	0	10	100
	F	3	6	10	0	10	100
	G	3	9	10	0	10	100
	H	7	0	10	0	10	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
433	A	4	39	8	4	4	10
	B	4	45	8	2	6	13
	C	6	49	8	2	6	12
	D	7	27	8	0	8	30
	E	2	14	8	1	7	50
	F	5	10	8	1	7	70
	G	3	11	8	1	7	64
	H	2	5	8	0	8	100
440	A	31	191	75	15	60	31
	B	25	94	75	4	71	76
	C	32	168	75	2	73	43
	D	19	83	75	1	74	89
	E	26	46	75	0	75	100
	F	16	13	75	1	74	100
	G	16	24	75	5	70	100
	H	8	10	75	1	74	100
442	A	77	442	160	34	126	29
	B	62	320	160	22	138	43
	C	45	561	160	27	133	24
	D	46	299	160	17	143	48
	E	51	161	160	12	148	92
	F	45	52	160	2	158	100
	G	43	87	160	2	158	100
	H	45	31	160	6	154	100
443	A	34	146	85	17	68	47
	B	25	90	85	2	83	92
	C	29	150	85	7	78	52
	D	26	122	85	3	82	67
	E	31	47	85	1	84	100
	F	11	26	85	1	84	100
	G	15	26	85	0	85	100
	H	7	8	85	0	85	100
446	A	4	21	7	2	5	24
	B	5	4	7	2	5	100
	C	2	17	7	0	7	41
	D	2	16	7	0	7	44
	E	4	8	7	3	4	50
	F	2	10	7	1	6	60
	G	3	4	7	2	5	100
	H	0	3	7	1	6	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
447	A	2	22	10	1	9	41
	B	2	5	10	0	10	100
	C	1	21	10	0	10	48
	D	1	5	10	0	10	100
	E	0	7	10	0	10	100
	F	2	2	10	1	9	100
	G	3	3	10	0	10	100
	H	2	5	10	0	10	100
448	A	2	27	10	6	4	15
	B	5	21	10	2	8	38
	C	3	26	10	1	9	35
	D	3	25	10	0	10	40
	E	4	14	10	1	9	64
	F	2	6	10	0	10	100
	G	1	14	10	1	9	64
	H	5	4	10	4	6	100
449	A	3	40	10	3	7	18
	B	7	32	10	3	7	22
	C	4	44	10	2	8	18
	D	2	31	10	0	10	32
	E	5	19	10	0	10	53
	F	6	14	10	0	10	71
	G	4	17	10	3	7	41
	H	5	13	10	0	10	77
450	A	4	28	15	3	12	43
	B	4	8	15	2	13	100
	C	4	18	15	1	14	78
	D	2	18	15	0	15	83
	E	1	3	15	0	15	100
	F	1	3	15	0	15	100
	G	5	3	15	0	15	100
	H	4	6	15	0	15	100
451	A	8	30	15	1	14	47
	B	4	9	15	0	15	100
	C	1	24	15	0	15	63
	D	4	28	15	1	14	50
	E	8	11	15	0	15	100
	F	5	5	15	0	15	100
	G	2	8	15	0	15	100
	H	1	5	15	0	15	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
454	A	2	21	5	2	3	14
	B	3	20	5	0	5	25
	C	2	14	5	1	4	29
	D	5	23	5	1	4	17
	E	1	7	5	0	5	71
	F	2	4	5	0	5	100
	G	1	7	5	0	5	71
	H	2	2	5	0	5	100
456	A	0	5	5	0	5	100
	B	2	3	5	0	5	100
	C	0	6	5	0	5	83
	D	2	5	5	0	5	100
	E	1	2	5	0	5	100
	F	0	1	5	0	5	100
	G	0	5	5	0	5	100
	H	0	1	5	0	5	100
457	A	4	30	10	3	7	23
	B	7	13	10	2	8	62
	C	8	22	10	1	9	41
	D	5	21	10	1	9	43
	E	2	5	10	0	10	100
	F	4	0	10	0	10	100
	G	5	4	10	0	10	100
	H	4	1	10	0	10	100
458	A	3	7	10	0	10	100
	B	1	1	10	0	10	100
	C	2	3	10	0	10	100
	D	2	7	10	0	10	100
	E	0	0	10	0	10	100
	F	1	2	10	0	10	100
	G	1	1	10	0	10	100
	H	0	0	10	0	10	100
459	A	9	77	25	3	22	29
	B	4	39	25	5	20	51
	C	4	68	25	4	21	31
	D	2	52	25	0	25	48
	E	5	21	25	1	24	100
	F	5	2	25	2	23	100
	G	1	17	25	1	24	100
	H	2	2	25	0	25	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
461	A	57	315	110	21	89	28
	B	51	159	110	10	100	63
	C	44	270	110	10	100	37
	D	36	147	110	10	100	68
	E	47	105	110	2	108	100
	F	29	29	110	0	110	100
	G	37	34	110	3	107	100
	H	30	8	110	0	110	100
462	A	55	234	110	14	96	41
	B	48	145	110	6	104	72
	C	35	278	110	12	98	35
	D	36	176	110	1	109	62
	E	41	104	110	0	110	100
	F	16	26	110	0	110	100
	G	46	60	110	5	105	100
	H	30	13	110	0	110	100
463	A	9	70	25	4	21	30
	B	9	41	25	2	23	56
	C	12	56	25	5	20	36
	D	7	55	25	0	25	45
	E	7	23	25	0	25	100
	F	8	6	25	0	25	100
	G	12	6	25	0	25	100
	H	7	7	25	0	25	100
464	A	14	73	35	4	31	42
	B	9	44	35	1	34	77
	C	12	70	35	0	35	50
	D	8	48	35	0	35	73
	E	16	18	35	0	35	100
	F	10	0	35	0	35	100
	G	5	8	35	0	35	100
	H	9	3	35	0	35	100
465	A	21	84	40	1	39	46
	B	14	33	40	0	40	100
	C	13	41	40	0	40	98
	D	10	47	40	0	40	85
	E	15	25	40	0	40	100
	F	6	1	40	0	40	100
	G	7	3	40	0	40	100
	H	1	2	40	0	40	100

Appendix A. Continued

Permit area	Time period	Registered harvest	Applicants	Permits available	Landowner permits[a]	General lottery permits	Chance of general lottery applicant being drawn (%)[b]
466	A	25	176	80	9	71	40
	B	22	81	80	7	73	90
	C	18	161	80	2	78	48
	D	15	78	80	0	80	100
	E	22	43	80	1	79	100
	F	12	7	80	4	76	100
	G	25	13	80	5	75	100
	H	10	2	80	0	80	100
467	A	17	140	50	11	39	28
	B	21	79	50	5	45	57
	C	21	132	50	8	42	32
	D	17	82	50	4	46	56
	E	18	44	50	0	50	100
	F	14	20	50	1	49	100
	G	17	32	50	1	49	100
	H	21	16	50	3	47	100
601	A	40	422	105	7	98	23
	B	33	224	105	7	98	44
	C	30	302	105	3	102	34
	D	33	192	105	1	104	54
	E	37	93	105	1	104	100
	F	23	29	105	0	105	100
	G	57	77	105	2	103	100
	H	44	16	105	1	104	100

[a] Landowners are allotted 20% of the total permits available for each permit area and time period, if there are less than 20% landowner applicants remaining permits are made available in the general lottery.

[b] Chance of general lottery applicant being drawn assumes no hunter preference

2008 MINNESOTA SPRING TURKEY HUNTER SURVEY REPORT

Eric Dunton, Farmland Wildlife Populations and Research Group

INTRODUCTION

Since Minnesota's first modern hunting season in 1978, the demand for spring turkey hunting permits has exceeded the supply available. For the 2008 spring turkey season there were 51,000 applicants for almost 38,000 available permits in 73 permit areas (PAs) and 8 time periods (MNDNR 2008). The Minnesota Department of Natural Resources (MNDNR) allocates permits for the spring turkey hunting season with a permit area quota system which attempts to issue the optimum number of permits to satisfy demand for hunting while maintaining sustainable turkey populations and quality of hunting (Kimmel 2001, MNDNR 2007). The system is designed to distribute hunters across space (i.e., PAs) and time (i.e., time period), and attempts to control harvest and hunter satisfaction.

Three types of hunting licenses were available to hunters: (1) general lottery permit in which an applicant or a party of up to 4 hunters applied for a specific PA and time period (they also had the option to apply for a second choice area and time period); (2) landowner permit in which up to 20 percent of permits for each PA and time period were reserved for landowners or tenants who lived on 40 acres or more of land within the PA, and (3) archery permit which could be purchased for the last 2 time periods of any PA with 50 or more permits per period. Licenses were made available based on a system of preference which was determined by the number of years applicants submitted a valid but unsuccessful application since last receiving a license. Hunters who applied in the lottery but were unsuccessful were offered surplus permits in under-subscribed permit areas and time periods. If available, surplus permits could be purchased on a first-come, first-served basis. Successful applicants were allowed to harvest 1 bearded turkey during the spring season.

The objectives of this survey were to estimate hunter satisfaction and factors such as interference rates between hunters and relative ease of access to hunting land that may influence hunter satisfaction.

METHODS

Spring turkey hunters were surveyed by mail following the 4th time period of the 2008 spring season. Twenty-three PAs were surveyed based on PA boundary changes or length of time since previous survey. Hunters that possessed a general lottery, landowner, or surplus permit were randomly selected from the Electronic Licensing System (ELS) database of Spring 2008 turkey hunt license purchasers. Hunter samples were drawn only from the first 4 time periods (i.e., April 16 – May 5 2008).

RESULTS

After 3 mailings almost 80% of hunters responded and 98% indicated that they hunted during the 2008 season (Table 1). Hunters were evenly distributed across all 4 surveyed time periods and the majority (85%) possessed a general lottery permit (Table 2). Hunters averaged almost 3 days of turkey hunting per time period and the most common hunting method was firearm (91%; Table 3). Most hunters (75%) hunted private land exclusively and 83% reported accessibility to hunting land as "very easy" or "somewhat easy" (Table 4). Over 30% of the private land hunters owned the land or were a tenant of the land they hunted (Table 5). Over 60% of hunters who hunted private land reported being denied access almost 2 occasions/hunter (Table 5). Less than 10% of hunters reported interference but interference rate varied by the type of land hunted. Interference was reported by 17% of respondents that hunted both public and private land, 16% of respondents that hunted only public lands, and < 1% of respondents that hunted only private land. Overall hunt quality was 7.2 on a 10-point scale (10 = excellent, 0 = poor) and ranged from 5.3 (PA 224) to 8.9 (PA 262; Table 7).

DISCUSSION

Only hunters from the first 4 time periods were surveyed because most turkey hunters prefer to hunt during those time periods (e.g., 1,678 more permits issued for time periods A - D) and we expected higher interference rates and greater difficulty gaining access to hunting lands would occur during those time periods.

Interference rates estimated from this survey are used to adjust spring hunting permit allocations for each PA. Interference rates between 15-20% are considered acceptable; whereas IR > 20% reflect a need to reduce permit numbers and IR < 15% reflect an opportunity to increase the number of permits (Kimmel 2001).

Minnesota's harvest management strategy is to maximize the amount of turkey hunting across each permit area while providing a safe quality hunting experience. The factors most often cited as contributing to a quality hunt include ease of access to hunting lands, feeling of safety, proper distribution of hunters (i.e., lack of interference from other hunters), observing turkeys while hunting, having the opportunity to get a shot, and success in harvesting a turkey (Smith et al. 1992, Dingman 2003). Success is the most often cited factor influencing a quality hunting experience (Stankey et al. 1973, Hende 1974, Dingman 2003). Based on the results from this survey, hunters in the surveyed permit areas generally are experiencing a quality hunt, which is characterized generally by high success, low interference, and accessibility to hunting land.

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Table 1. Spring turkey permits available and issued, hunters surveyed, response rate, and respondents who hunted by permit area for the 2008 spring turkey season, Minnesota.

Permit area	Permits[a]		Hunters surveyed	Surveys returned		Respondents that hunted	
	Available	Issued[b]		n	Percent (%)	n	Percent (%)
152	20	19	19	17	89	17	100
156	20	18	18	15	83	15	100
183	20	21	20	15	75	15	100
214	140	124	120	97	81	96	99
215	340	312	211	167	79	165	99
219	220	207	165	131	79	129	98
223	360	336	219	177	81	174	98
229	160	138	133	100	75	99	99
241	60	54	54	48	89	47	98
243	40	38	38	27	71	27	100
262	28	25	25	16	64	16	100
412	120	115	108	84	78	82	98
421	28	25	25	19	76	18	95
423	20	22	20	16	80	16	100
424	40	41	40	29	73	29	100
426	20	19	18	14	78	13	93
427	40	31	31	24	77	22	92
431	40	39	39	28	72	28	100
433	32	32	32	30	94	30	100
449	40	39	39	33	85	33	100
454	20	19	19	18	95	18	100
467	200	193	155	110	71	107	97
601	420	381	236	188	80	183	97
Total	2428	2248	1784	1403	79	1379	98

[a] Permits available and issued represent time periods A – D

[b] Permits issued can be greater than permits available because hunters have the option to apply as groups (up to 4 hunters) if successfully drawn the group will be awarded permits even if greater than permits available

Table 2. Time period hunted and permit type by permit area for the 2008 spring turkey season, Minnesota.

	Time period[a]					Permit type			
Permit area	n	A	B	C	D	n	General lottery	Landowner	Surplus
152	17	4	4	4	5	17	14	0	3
156	15	3	4	3	5	15	12	3	0
183	15	3	4	4	4	15	13	2	0
214	96	28	25	22	21	97	83	14	0
215	165	53	42	31	39	167	142	24	1
219	129	35	33	33	28	131	123	7	1
223	174	47	42	46	39	177	158	16	3
229	99	27	22	23	27	100	94	4	2
241	47	15	13	9	10	48	37	11	0
243	27	5	8	5	9	27	23	4	0
262	16	4	4	4	4	16	11	0	5
412	82	19	28	20	15	84	69	15	0
421	18	6	5	4	3	19	12	0	7
423	16	6	4	4	2	16	5	1	10
424	29	6	8	9	6	29	22	2	5
426	13	3	3	4	3	14	10	2	2
427	22	7	7	5	3	23	18	5	0
431	28	6	6	6	10	28	23	5	0
433	30	6	10	7	7	30	21	9	0
449	33	9	9	8	7	33	27	6	0
454	18	5	5	5	3	19	14	5	0
467	107	25	24	29	29	110	91	14	5
601	182	55	43	42	42	188	167	21	0
Total	1378	377	353	327	321	1403	1189	170	44

[a] A = 16 – 20 April, B = 21 – 25 April, C = 26 – 30 April, D = 1 – 5 May

Table 3. Hunter effort and hunting method by permit area for the 2008 spring turkey season, Minnesota.

Permit area	Hunting effort			Hunting method			
	n	Number of days hunted	Average number of days hunted	n	Firearm	Archery	Archery & firearm
152	15	36	2.4	17	17	0	0
156	12	36	3.0	15	14	1	0
183	15	41	2.7	15	13	1	1
214	90	231	2.6	96	91	2	3
215	150	438	2.9	165	158	2	5
219	121	367	3.0	129	120	4	5
223	155	420	2.7	174	165	5	4
229	87	263	3.0	99	80	8	11
241	45	106	2.4	47	44	1	2
243	25	69	2.8	26	24	1	1
262	14	32	2.3	16	12	3	1
412	79	214	2.7	82	75	4	3
421	17	40	2.4	18	18	0	0
423	14	41	2.9	16	15	0	1
424	27	84	3.1	29	29	0	0
426	11	34	3.1	13	13	0	0
427	21	59	2.8	22	21	1	0
431	23	63	2.7	28	25	1	2
433	28	72	2.6	30	29	1	0
449	30	83	2.8	33	29	2	2
454	18	44	2.4	18	16	1	1
467	100	254	2.5	106	99	4	3
601	164	476	2.9	182	151	17	14
Total	1261	3503	2.8	1376	1258	59	59

Table 4. Type of land hunted and accessibility to hunting lands by permits area for the 2008 spring turkey season, Minnesota.

	Type of land hunted				Accessibility to hunting land				
Permit area	n	Public	Private	Both	n	Very easy	Somewhat easy	Somewhat difficult	Very difficult
152	17	16	0	1	17	8	8	1	0
156	15	0	9	6	15	7	5	3	0
183	15	1	9	5	15	10	3	2	0
214	96	2	85	9	94	66	24	3	1
215	165	3	143	19	163	77	68	17	1
219	129	5	99	25	129	58	52	16	3
223	174	38	112	24	172	62	74	32	4
229	99	2	84	13	99	33	37	26	3
241	47	0	45	2	47	34	11	2	0
243	27	2	22	3	27	12	11	4	0
262	16	0	13	3	16	5	10	1	0
412	82	6	55	21	81	43	23	13	2
421	18	2	12	4	18	6	7	2	3
423	16	5	7	4	16	1	9	4	2
424	29	4	16	9	28	12	10	6	0
426	13	2	4	7	13	6	5	2	0
427	22	2	16	4	22	8	11	2	1
431	28	2	14	12	28	9	16	2	1
433	30	2	18	10	30	14	13	3	0
449	33	9	14	10	33	12	18	3	0
454	18	0	14	4	18	5	11	2	0
467	107	5	84	18	107	45	41	20	1
601	182	9	165	8	181	66	71	36	8
Total	1378	117	1040	221	1369	599	538	202	30

Table 5. Type of land hunted, ownership of land, and number of times denied access to private land by permit area for the 2008 spring turkey season, Minnesota.

Permit area	Type of land hunted				Landowner or tenant of land hunted	n	Number of times denied access to private land	Average number of times denied access to private land
	n	Public	Private	Both				
152	17	16	0	1	0	1	0	0
156	15	0	9	6	4	12	12	1.0
183	15	1	9	5	8	11	4	0.4
214	96	2	85	9	45	72	33	0.5
215	165	3	143	19	48	145	74	0.5
219	129	5	99	25	29	115	45	0.4
223	174	38	112	24	26	125	78	0.6
229	99	2	84	13	18	15	58	3.9
241	47	0	45	2	24	34	4	0.1
243	27	2	22	3	11	20	5	0.3
262	16	0	13	3	2	15	10	0.7
412	82	6	55	21	27	68	35	0.5
421	18	2	12	4	2	15	6	0.4
423	16	5	7	4	1	10	5	0.5
424	29	4	16	9	8	23	16	0.7
426	13	2	4	7	2	10	7	0.7
427	22	2	16	4	5	19	19	1.0
431	28	2	14	12	8	24	3	0.1
433	30	2	18	10	11	24	4	0.2
449	33	9	14	10	7	20	7	0.4
454	18	0	14	4	1	18	18	0.4
467	107	5	84	18	18	17	17	2.4
601	182	9	165	8	34	157	128	0.8
Total	1378	117	1040	221	339	970	588	1.6

Table 6. Hunters and day's interference experienced, interference rate (i.e., hunters that experienced interference/number of respondents), and type of land where interference occurred by permit area for the 2008 spring turkey season, Minnesota.

Permit area	n	Hunters that experienced interference	Days interference experienced	Interference rate (IR)	95% CL[a]	Type of land where interference occurred		
						Public	Private	Both
152	17	2	3	0.12	0.17	1	0	1
156	15	0	0	0	0	0	0	0
183	15	0	0	0	0	0	0	0
214	95	2	3	0.02	0.03	0	0	2
215	165	12	18	0.07	0.04	4	5	3
219	131	14	18	0.11	0.05	1	5	8
223	172	23	32	0.13	0.05	8	12	3
229	99	16	34	0.16	0.07	1	8	7
241	47	0	0	0	0	0	0	0
243	27	1	1	0.04	0.08	1	0	0
262	16	1	2	0.06	0.13	0	1	0
412	82	9	16	0.11	0.07	0	3	6
421	18	0	0	0	0	0	0	0
423	16	4	4	0.25	0.24	0	3	1
424	29	2	5	0.07	0.1	0	1	1
426	13	0	0	0	0	0	0	0
427	22	2	4	0.09	0.13	0	2	0
431	28	2	2	0.07	0.1	1	1	0
433	30	2	3	0.07	0.09	0	1	1
449	33	2	2	0.06	0.09	0	2	0
454	18	2	3	0.11	0.16	0	2	0
467	106	10	14	0.09	0.06	0	6	4
601	179	23	30	0.13	0.05	2	20	1
Total	1373	129	194	0.09	0.01	19	72	38

[a] 95% confidence level of interference rate

Table 7. Hunt quality and factors most commonly associated with hunt quality by permit area for the 2008 spring turkey season, Minnesota.

Permit area	Harvest[a]	Success (%)[a]	Interference rate (IR)	Ease of access to hunting land (%)[b]	n	Hunt quality[c]
152	7	36.8	0.12	94.1	17	7.3
156	12	66.7	0.00	80.0	15	7.7
183	4	20.0	0.00	86.7	15	7.0
214	61	49.2	0.02	95.7	96	7.1
215	151	48.4	0.07	89.0	165	7.4
219	87	42.0	0.11	85.3	129	7.3
223	164	48.8	0.13	79.1	172	7.5
229	43	31.2	0.16	70.7	99	6.8
241	26	48.1	0.00	95.7	47	7.4
243	14	36.8	0.04	85.2	27	7.3
262	18	72.0	0.06	93.8	16	8.9
412	49	42.6	0.11	81.5	82	7.3
421	7	28.0	0.00	72.2	18	6.3
423	8	36.4	0.25	62.5	16	6.1
424	11	26.8	0.07	78.6	29	5.3
426	1	5.3	0.00	84.6	13	6.3
427	14	45.2	0.09	86.4	22	7.0
431	21	53.8	0.07	89.3	28	7.3
433	21	65.6	0.07	90.0	30	8.0
449	16	41.0	0.06	90.9	33	7.2
454	12	63.2	0.11	88.9	18	7.4
467	76	39.4	0.09	80.4	107	7.2
601	136	35.7	0.13	75.7	182	7.1
Total	972	43.2	0.09	83.1	1376	7.2

[a] 2008 harvest and hunter success represent time periods A – D only and do not reflect overall harvest and success for permit areas

[b] Ease of access to hunting land calculated by combining hunters that reported accessibility to hunting land as “Very easy” or “Somewhat easy.”

[c] Quality was rated from 0-10 with 0 representing poor quality and 10 representing excellent quality

Appendix A.

Minnesota Spring Turkey Hunter Survey

*Please respond to all questions based on the **SPRING 2008 TURKEY SEASON**.

1. Did you hunt turkeys in Minnesota during the spring 2008 season? Yes____ No____

2. Which wild turkey permit area did you hunt? _____

3. Did you have a landowner permit, general lottery permit, or a surplus hunting permit*?
   Landowner____ General Lottery_____ Surplus_____

   *If you bought a turkey hunting permit but did not hunt in 2008 please do not continue

4. Which season did you hunt? (**A**) April 16-20 ___ (**B**) April 21-25 ___
   (**C**) April 26-30 ___ (**D**) May 1- 5 ___

5. How many days did you hunt turkeys in Minnesota during spring 2008? _____

6. How did you hunt turkeys in 2008? Shotgun only____ Archery Only____
   Shotgun and Archery____ Muzzleloader____

7. How difficult was it to find a place to hunt during the spring 2008 wild turkey hunting season? (Check one answer)
   Very easy____ Somewhat easy____ Somewhat difficult____ Very difficult____

8. Did you hunt on public land or private land during the spring 2008 season?

   Public_____ Private*_____ Both*_____

   *If you hunted private land were you the landowner or a tenant of the land you hunted?
   Yes_____ No___

9. If you hunted on private land, how many times were you denied access_____

10. During the spring 2008 season did you experience interference from another hunter while you were hunting?
   Yes*____ No____

   *If yes number of days hunting that you experienced interference? _____

   *If yes what type of land were you hunting when the interference occurred?
   Public_____ Private_____ Both_____

11. Rate the quality of your turkey hunting experience during spring 2008 on a scale of 1-10 (check one number):

Poor Quality Average Quality Excellent Quality
0____ 1____ 2____ 3____ 4____ 5____ 6____ 7____ 8____ 9____ 10____

PRAIRIE-CHICKEN HARVEST IN MINNESOTA DURING 2007

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. 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 2004 and 2005. The number of permit areas was increased to 11 in 2006 (Figure 1). The objective of this report is to document results of the 2007 prairie chicken season.

METHODS

This report summarizes prairie-chicken hunting season information from the Electronic Licensing System (ELS), where all permit applications, lottery results, and harvest registrations are recorded. All successful hunters are required to register their prairie-chicken(s) at an ELS registration station. Relying on ELS registration data requires one to assume that all harvested prairie-chickens were registered and were registered as being harvested in the correct permit area. As advised by the Prairie Chicken Committee, I did not conduct a post-season hunter survey because there were no changes to the season this year and results of the hunter survey were fairly consistent among years from 2003 to 2006.

RESULTS & DISCUSSION

One hundred eighty-two prairie-chicken hunting permits were available during 2007. There were 187 lottery winners because if the last applicant selected for a permit area had applied as a member of a party, permits were awarded to all members of the party (Table 1). Of the 150 hunters who purchased a permit, 79 (53%) bagged at least 1 prairie-chicken (Table 2). Hunters registered 122 prairie-chickens during 2007, which may have been the greatest annual harvest since the modern seasons began in 2003 (Table 3). During 2003 115 prairie-chickens were registered in ELS, but hunters reported during the post-season survey that 129 prairie-chickens were killed and retrieved. The number of applicants has been similar during the last 3 years; hunter success rates and total harvest have been more variable (Table 3).

Table 1. Results of the lottery for prairie-chicken hunting permits in Minnesota during 2007.

Permit type	Permit area	No. of applicants	Lottery winners	
			Number	Proportion
Regular	801A	4	4	1.00
	802A	11	11	1.00
	803A	10	10	1.00
	804A	15	15	1.00
	805A	74	17	0.23
	806A	61	15	0.25
	807A	62	22	0.35
	808A	31	16	0.52
	809A	53	17	0.32
	810A	115	25	0.22
	811A	60	15	0.25
	All	496	167	0.34
Landowner	801A	0	0	
	802A	0	0	
	803A	1	1	1.00
	804A	1	1	1.00
	805A	4	4	1.00
	806A	6	3	0.50
	807A	3	3	1.00
	808A	2	2	1.00
	809A	4	4	1.00
	810A	1	1	1.00
	811A	1	1	1.00
	All	23	20	0.87
Both	All	519	187	0.36

Table 2. Hunter harvest of prairie-chickens in Minnesota during 2007.

Permit area	No. of hunters[a]	Success rate[b]	Birds registered	Birds per harvester[c]
801A	1	0.00	0	0.0
802A	9	0.78	12	1.7
803A	9	0.67	9	1.5
804A	11	0.64	8	1.1
805A	20	0.60	19	1.6
806A	16	0.75	18	1.5
807A	18	0.28	9	1.8
808A	13	0.77	14	1.4
809A	19	0.37	13	1.9
810A	21	0.52	17	1.5
811A	13	0.15	3	1.5
All	150	0.53	122	1.5

[a] Number of people who purchased a permit.
[b] Proportion of hunters who registered at least 1 prairie-chicken.
[c] Mean number of prairie-chickens registered per successful hunter.

Table 3. Annual summary of prairie-chicken hunting results in Minnesota during 2003–2007.

Year	Permits available	Applicants	Harvest	Success rate[a]
2003	100	853	115	0.68
2004	101	759	51	0.37
2005	110	500	90	0.58
2006	182	512	92	0.40
2007	187	519	122	0.53

[a] Proportion of hunters who registered at least 1 prairie-chicken.

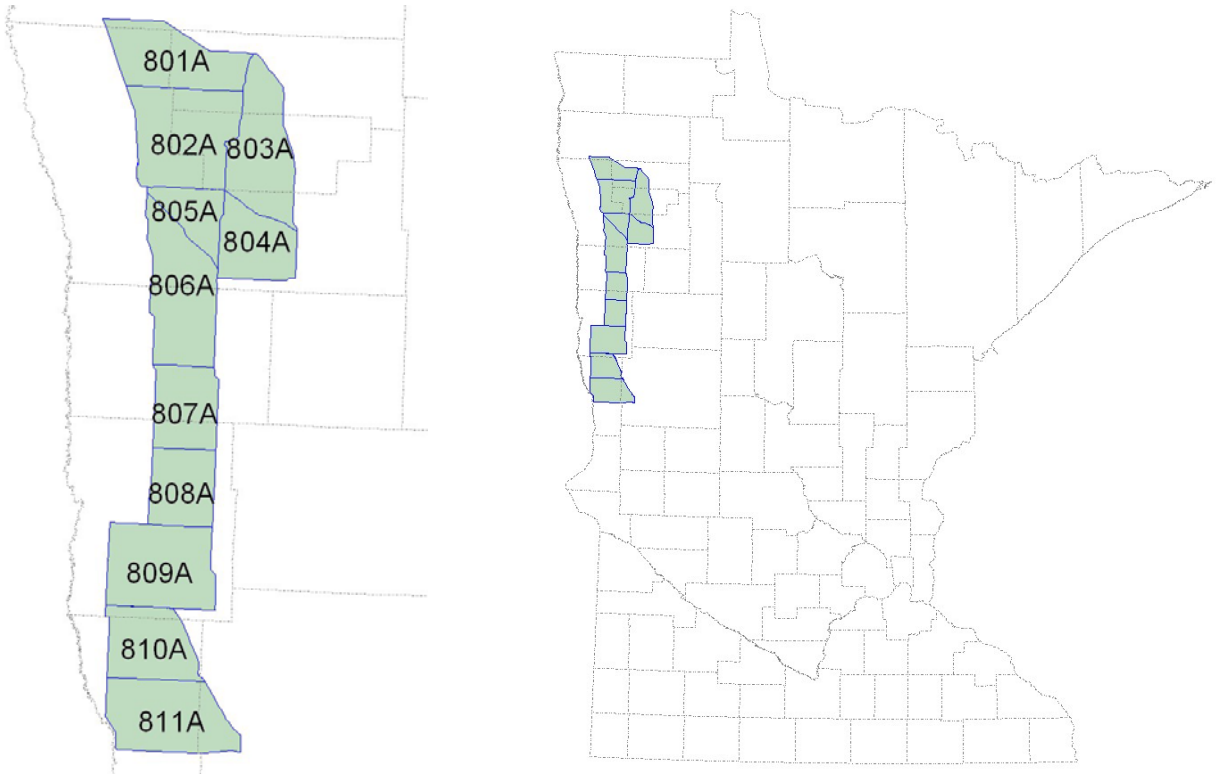


Figure 1. Map of permit areas for prairie-chicken hunting in Minnesota (left) and their location relative to counties within the state (right).

2007 MINNESOTA BEAR HARVEST REPORT

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

INTRODUCTION

In 1982, out of concern that the Minnesota bear population was being over-harvested, a quota on hunting licenses was implemented. 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). In recent years, hunters in this area could harvest two bears, and beginning in 2005 hunters could purchase both a quota and no-quota license. In all areas, hunters may purchase licenses either before or during the bear season, and in all areas the season runs from September 1 through mid-October. About 80% of hunters use bait. This report summarizes status and trends in harvests and population structure.

METHODS

Successful hunters must register their bears at designated registration stations. Harvest data are a simple tally of these registrations, which for the most part are done electronically. Hunters also were required to submit a tooth from harvested bears (compliance ≈ 70%), which is used to estimate age. DNR and other field personnel made qualitative assessments of bear food abundance, which has a large impact on hunting success.

RESULTS

The number of permits available to hunters steadily increased through the 1980s and 1990s (Table 1) in response to increasing bear numbers and nuisance complaints. Permit availability was capped at just over 20,000 during 1999–2003. However, from 2000 to 2003, the proportion of permittees who bought licenses sharply declined, from >80% to near 60%. This resulted in 7 of 11 BMUs being undersubscribed by 2003. Permits were reduced each year from 2003 to 2007 (Table 2) in accordance with the diminishing level of interest and hunter complaints of overcrowding in some BMUs. By 2007, only 3 BMUs remained undersubscribed (Table 3).

Harvests, while variable due to natural food abundance, showed no trend over the past 10 years, averaging ~3500 bears, with hunting success averaging 25%. Harvests during the past 5 years have been remarkably similar (3200–3600; Table 1). In 2007, none of the BMUs had a record high or low harvest; 6 were above and 5 below the mean harvests of the past 5 years. Within the no-quota zone (see Figure 1), BMU 11, in northwestern Minnesota, had the second highest harvest for this area, while BMU 52, along the southeastern corner of the range, had a modest harvest (Table 4). Harvest sex ratios in 2007, uncorrected for misreporting (Table 1, footnote e), averaged 57% male, equaling the average for the past 10 years; sex ratios varied little among BMUs (Table 4). Hunting success ranged from 14% in the BWCAW, where unattended baiting is not allowed, to ≥35% in 3 BMUs (12, 26, 41; Table 5). As typical of a year with fairly average fall food conditions (higher than normal hazelnut but lower than normal acorns), ~70% of the harvest occurred during the first week of the season (Table 6).

Two key factors, fall food abundance and hunter numbers, explain 88% of the variation in the number of bears killed each year (Figure 2). However, for the past 6 years, this regression model predicted slightly higher harvests than actually occurred, suggesting that bears are somewhat harder to harvest now than they were during the 1990s, when the population was growing. A diminishing median age among harvested females, reflecting an increasing proportion of harvested 1–2 year-olds (Figures 3 & 4), indicate changes in the composition of the living population, and possibly a downturn in population size.

DISCUSSION

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 in lower license sales 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.

Harvests, however, have remained consistently high, and nuisance complaints have been low. While this has appearances of an ideal management situation, the declining harvest age structure (along with high harvests of radio-collared bears) suggests that bear numbers may be declining. Continued monitoring of this population and the factors impacting it are hence warranted.

Table 1. Bear permits, licenses, hunters, harvests, and success rates, 1987–2007.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Permit applications	19687	25879	24096	24861	25890	26428	27365	30127	29922	30405	27353	30245	29384	29275	26824	21886	16431	16466	16153	15725	16345
Permits available	4810	5310	5520	6370	7140	7920	8630	9400	11950	12030	11370	18210	20840	20710	20710	20610	20110	16450	15950	14850	13200
Licenses purchased (total)	6054	5643	5901	7094	7757	8485	9224	9826	12448	12414	11440	16737	18355	19304	16510	14639	14409	13669	13199	13164	11936
Quota area [a]	4213	4297	4628	5568	6257	6845	7528	8125	10304	10592	9655	14941	16563	17021	13632	12350	9833	10063	9340	9169	8905
Quota surplus/military [a]															235	209	2554	1356	1591	1561	526
No-quota area [a]	1841	1346	1273	1526	1500	1640	1696	1701	2144	1822	1785	1796	1792	2283	2643	2080	2022	2238	2268	2434	2505
% 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	72.3	71.4
Of permits issued [b]												84.4	87.2	83.9	69.8	66.3	65.7	68.3	67.1	68.9	70.0
Estimated no. hunters [c]	5600	5100	5500	6600	7200	7900	8600	9100	11600	11500	10300	14500	15900	16800	15500	13700	13500	12800	12400	12400	11200
Harvest	1577	1509	1930	2381	2143	3175	3003	2329	4956	1874	3212	4110	3620	3898	4936	1915	3598	3391	3340[d]	3290[d]	3172
Harvest sex ratio (%M) [e]	60	58	57	52	59	50	56	62	47	62	55	55	53	58	56	61	58	57	59	58	57
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	26	28
Quota harvest/licenses	33	28	36	35	30	41	34	26	42	15	29	25	20	20	28	14	25	26	25	25	28

[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 tallied registration + lost registration data (ascertained from tooth 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 2001–2007 were calculated as number of successful hunters/total hunters, rather than bears killed/total hunters, because hunters could take 2 bears. In 2007, 63 hunters took more than 1 bear (59 took 2 bears on NQ license, 1 hunter took 1 quota and 1 NQ bear, and 3 hunters took 2 bears on a quota license [illegally]): thus, there were 3172-63 = 3109 successful hunters/11200 total hunters = 28% success.

Figure. 1. Bear management units (BMUs) within quota (white) and no-quota (gray) zones. Hunters in the quota zone are restricted to a single BMU, whereas no-quota hunters can hunt anywhere within that zone.

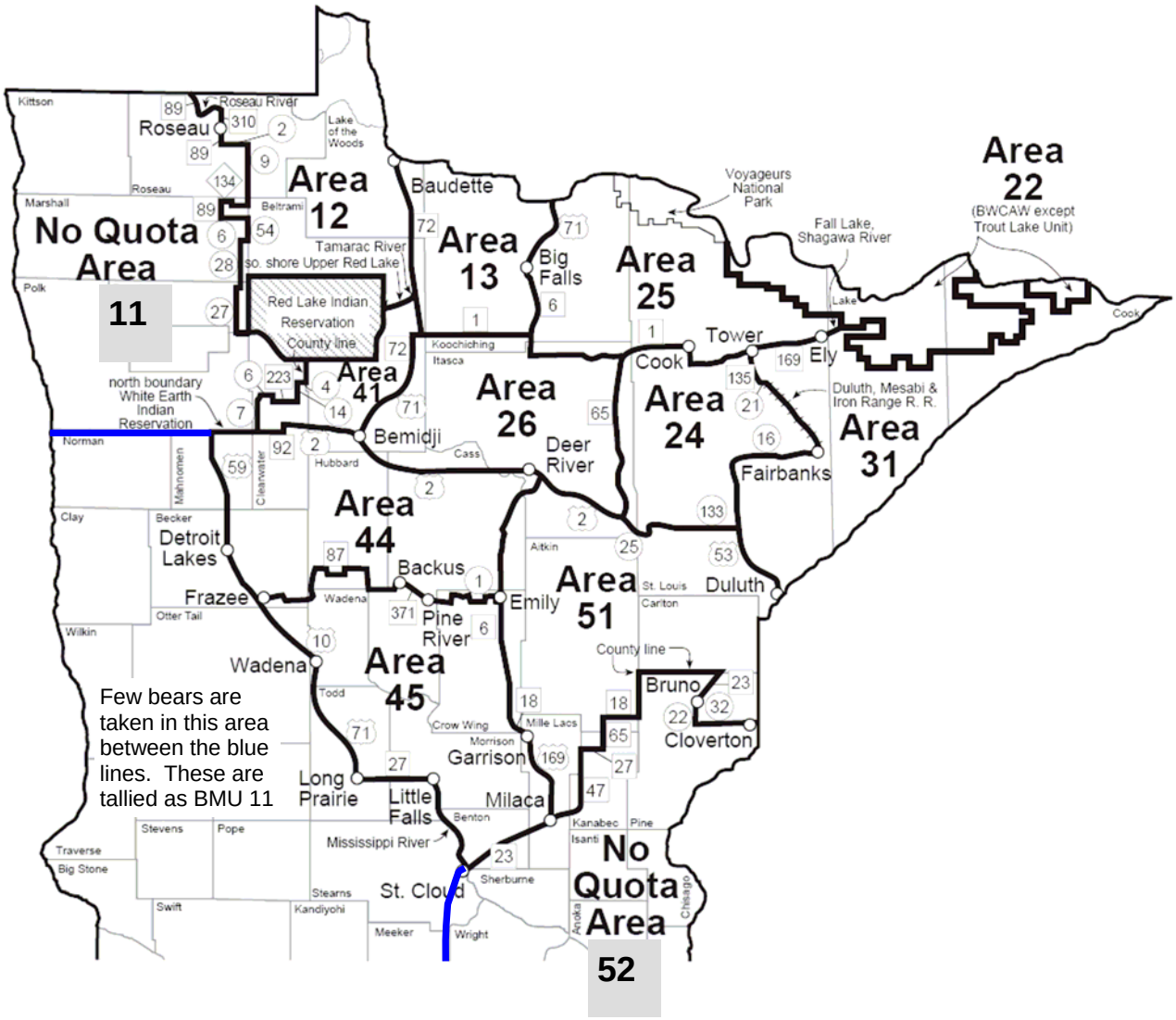


Table 2. Number of bear hunting permits available per year, 2003–2007 (aligned with permit applications in Table 3 below; highlighted numbers show drop from previous year).

BMU	2007	2006	2005	2004	2003
12	500	550	550	700	700
13	700	800	900	900	1100
22	150	150	150	150	250
24	900	1000	1200	1200	1500
25	1700	1900	1900	1900	2400
26	1250	1500	1500	1500	1500
31	1900	2100	2100	2100	2660
41	400	450	450	500	500
44	1500	1700	1700	2000	2500
45	1200	1200	1500	1500	2000
51	3000	3500	4000	4000	5000
Total	13200	14850	15950	16450	20110

Table 3. Number of bear hunting license applicants, and number and percent of available surplus licenses bought, 2003–2007[a].

BMU	2007		2006		2005		2004		2003	
	Apps	Surplus bought	Apps	Surplus bought	Apps	Surplus bought	Apps	Surplus bought	Apps	Surplus bought
12	811		1005		864		808		837	
13	745		680	120 100%	714	186 100%	670	129 56%	668	167 39%
22	87	51 81%	92	58 100%	65	46 54%	73	47 61%	88	26 16%
24	742	159 100%	624	367 98%	749	270 60%	766	259 60%	756	193 26%
25	1799		1789	112 100%	1923		1793	111 100%	1716	317 46%
26	2028		1915		1997		2110		2280	
31	2383		2290		2097	4 100%	2006	92 100%	1996	412 62%
41	577		683		653		601		688	
44	2669		2838		2884		2934		2855	
45	936	266 100%	840	360 100%	927	346 60%	1092	332 81%	1069	461 50%
51	3568		2969	531 100%	3276	726 100%	3613	386 100%	3467	978 64%
Total	16345	476 98%	15725	1548 ~100%	16149	1578 78%	16466	1356 78%	16431	2554 50%

[a] Surplus licenses available beginning in 2001.

Undersubscribed

Table 4. Minnesota bear harvest tally[a] for 2007 by Bear Management Unit (BMU) and sex compared to harvests during 2002-2006 and record high harvests.

	2007										Record high harvest (yr)
BMU	M	(%M)	F	Total	**2006**	**2005**	**2004**	**2003**	**2002**	**5 year mean**	
Quota											
12	71	(57)	53	124	70	165	165	174	104	136	263 (01)
13	93	(57)	70	163	151	205	197	185	116	171	258 (95)
22	5	(33)	10[b]	15	15	8	10	3	7	9	41 (89)
24	75	(56)	59	134	194	144	212	163	101	163	288 (95)
25	201	(54)	168	369	421	404	546	510	328	442	584 (01)
26	167	(53)	148	315	314	285	320	303	171	279	513 (95)
31	229	(58)	169	398	482	445	484	436	301	430	697 (01)
41	55	(53)	49	104	40	104	83	100	51	76	201 (01)
44	191	(57)	142	333	192	273	283	444	183	275	643 (95)
45	59	(52)	54	113	118	107	118	143	36	104	178 (01)
51	314	(56)	243	557	721	505	544	667	300	547	895 (01)
Total	1460	(56)	1165	2625	2718	2759[c]	2962	3128	1698	2653	4288 (01)
No Quota[d]											
11	195	(60)	133	328[e]	120	335	177	200	112	189	351 (05)
52	139	(63)	80	219	400	223	252	270	105	250	400 (06)
Total	334	(61)	213	547	520	581[c]	429	470	217	443	678 (95)
State	1794	(57)	1378	**3172**	3290[c]	3340[c]	3391	3598	1915	3107	4956 (95)

[a] Harvest data were obtained from registration slips electronic registration, and tooth envelopes. All data for 2007 was e-registration. The following table shows the number of tooth envelopes that had no corresponding registration slip or e-registration (these were added to the harvest tally).

Year	Quota area	No-quota area
2002	46	7
2003	84	13
2004	96	39
2005	179	31
2006	63	15
2007	27	9

[b] Second consecutive year with an unusually high harvest of females in this BMU (BWCAW).

[c] The estimated registered harvest, including those in which registration data were lost and no tooth envelope was received. Values for 2006 do not match column total because other data on table are uncorrected for estimated lost registration data.

[d] Some hunters with no-quota licenses hunted in the quota area, and their kills were assigned to the BMU where they hunted (*n*= 28 in 2006, 27 in 2007). Some quota area hunters also apparently hunted in the wrong BMU, based on the block where they said they killed a bear (*n*= 20 in 2006, 85 in 2007). However, some of these blocks may have been read wrong from the map, so all these were recorded in the BMU where they were assigned, not the BMU of the indicated harvest block.

[e] Second highest harvest for this area. Third highest was 321 bears in 2001.

Table 5. Bear hunting success (%) by BMU, measured as the registered harvest (excluding second bear) divided by the number of licenses sold[a], 2002–2007.

BMU	Mean success 2002-2006	2007		2006		2005[b]		2004		2003		2002	
		% 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]	% Success	**% Taking** 2 bears[c]
Quota	**23**	**28**		**25**		**25**		**26**		**25**		**14**	
12	30	36		19		41		33		35		22	
13	28	31		24		32		33		31		19	
22	9	14		14		10		11		4		8	
24	22	20		25		20		27		25		15	
25	31	31		30		30		38		34		23	
26	28	36		30		34		31		29		17	
31	28	28		33		31		33		25		17	
41	22	35		13		31		23		29		14	
44	19	30		16		24		20		26		9	
45	11	14		14		13		12		13		4	
51	19	27		28		18		19		21		9	
No Quota	**19**	**19**	**(11)**	**22**	**(9)**	**23**	**(9)**	**18**	**(7)**	**21**	**(10)**	**10**	**(7)**
Statewide	**23**	**26**		**25**		**25**		**25**		**25**		**13**	

[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 only in the no-quota area in 2002–2007.

Table 6. Cumulative bear harvest (% of total harvest) by date, 1990–2007.

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
2006	Fri		69	83	96
2007	Sat		69	82	96

[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 2. Number of bears killed vs. number predicted, based on fall food abundance and hunter numbers. Prediction for 2007 based on regression from 1984–2006 ($R^2 = 0.88$).

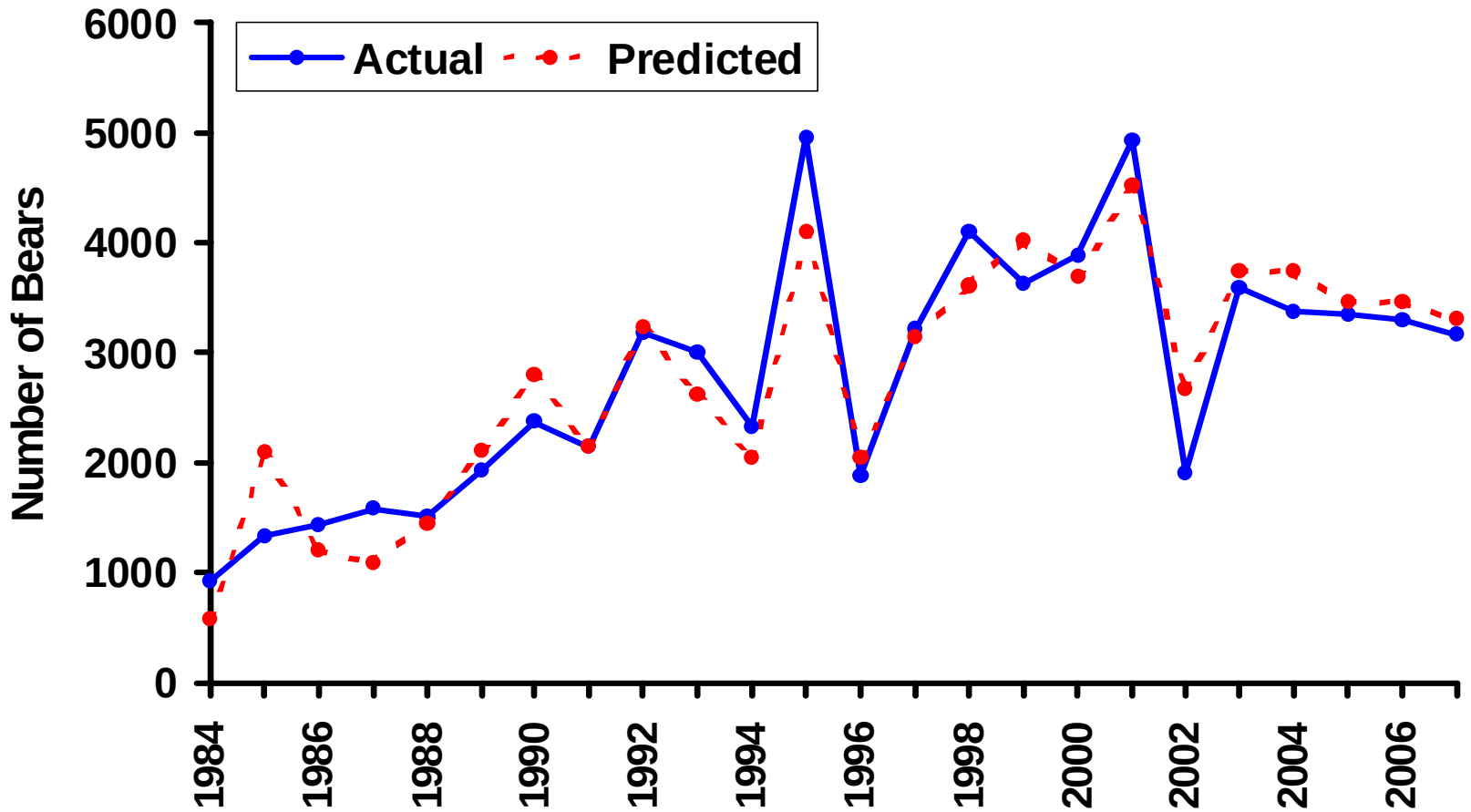


Figure 3. Statewide harvest age structure: median ages by sex, 1982–2007

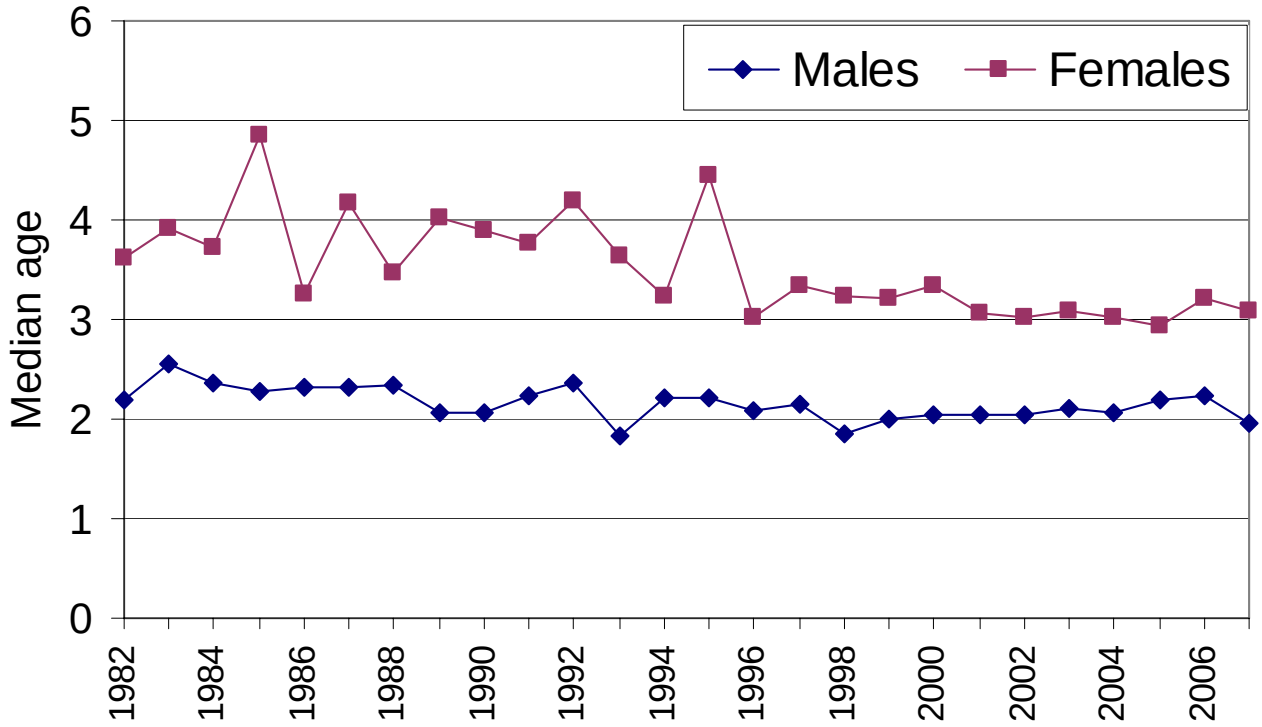
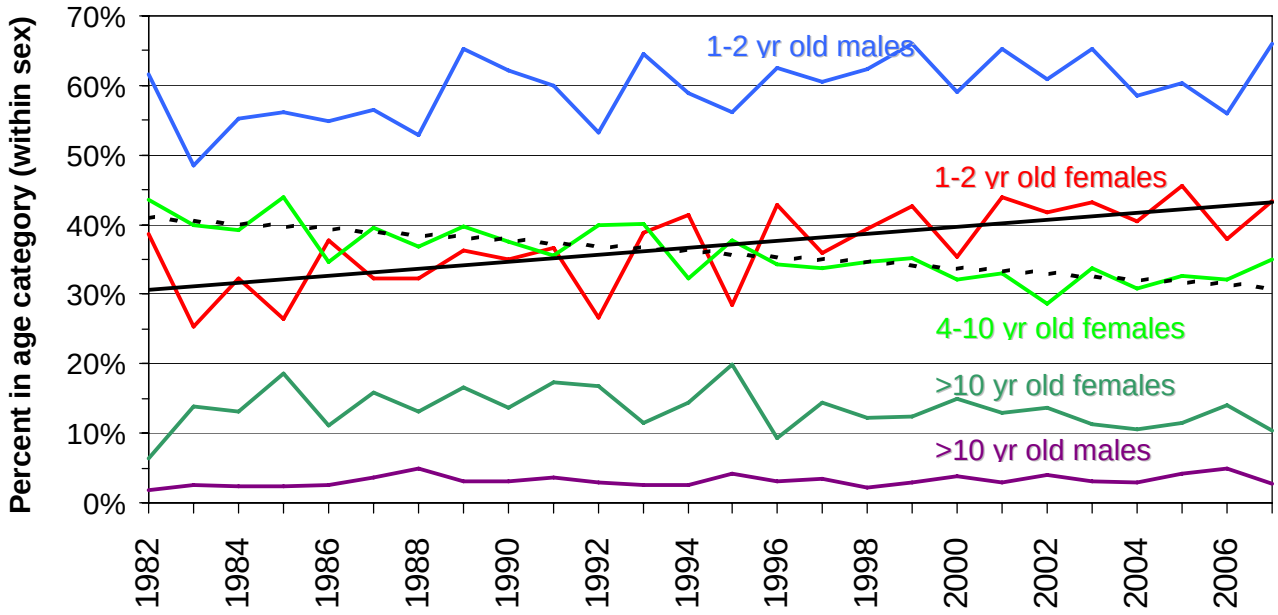


Figure 4. Statewide harvest age structure: proportion of each sex in age category, 1982–2007



2007 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 2007, hunters registered 260,434 deer. This harvest marked the second highest harvest recorded in Minnesota.

METHODS

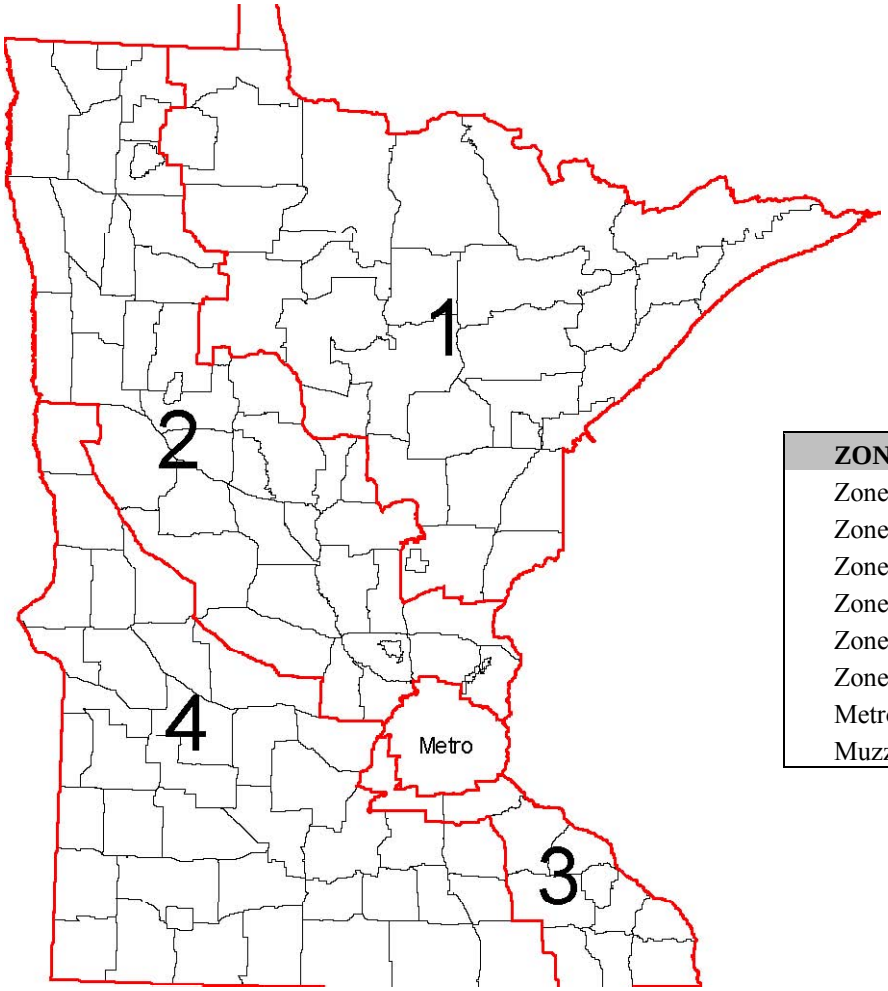
Every deer taken by hunting in Minnesota must be registered within 24 hours of the close of the season under which the deer was taken. Deer may be registered at any of the 825 to nearly 900 "Big Game Registration" stations available throughout the state. Implementation of electronic licensing (ELS) has 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 2007 deer harvest are presented in the following tables.

Figure 1. 2007 Firearms and Archery Deer Seasons. 2007 Minnesota Firearms Deer Seasons

2007 Minnesota Firearms Deer Seasons



ZONE	DATES
Zone 1	Nov. 3-18
Zone 2	Nov. 3-11
Zone 3A	Nov. 3-9
Zone 3B	Nov. 17-25
Zone 4A	Nov. 3-4
Zone 4B	Nov. 10-13
Metro Zone	Nov. 3-25
Muzzeloader	Nov. 24-Dec.9

2007 Minnesota Archery Deer Season

Season Dates: September 15-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 1. Statewide Firearms, Archery, and Muzzleloader Harvest, License Sales, and Success Rates, 1995-2007.

REGULAR FIREARMS													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
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	299,774	285,286
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	12,520	12,520
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	167,343	145,522
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	15,984	15,051
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	49,599	49,242
All Season Deer License Sales						2,384	3,986	22,125	30,998	46,008	59,090	75,511	76,385
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	620,731	584,006
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	95,695	97,528
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	28,830	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	25,656	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	31,403	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	135,981	118,860
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	231,676	216,388
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	37.3	37.1
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	49,595	52,780
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	1,286	1,509
Youth Archery Sales									3748	7261	7,489	7,688	7,663
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	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	58,569	61,952
Registered Harvest	14,521	14,338	13,258	12,306	13,376	15,776	15,884	14,744	21,720	17,237	18,975	17,076	17,261
Registered Harvest - AS license										3,489	4,563	8,284	6,900
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	25,360	24,161
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	24.8	24.3
MUZZLELOADER													
Total Muzzleloader License Sales						11,972	13,043	11,764	9,142	10,512	9,226	10,781	9,867
Estimated All-Season Hunters									12,020	14,168	23,293	23,293	26,813
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	13,507	12,138
Registered % Successful [2]						38	34.5	29.8	44.7	37.6	47.4	39.6	28.2
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	270,778	260,434

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

Table 2. Deer Harvest by License Type and Zone, 2007.

Firearms/Zone	Hunters	Harvest			Overall Success
		Bucks	Antlerless	Total	
1	172,112	42,156	50,919	93,075	43.7%
2	152,305	32,939	47,753	80,692	42.6%
3A	21,190	5,766	3,600	9,366	38.1%
3B	18,427	2,881	6,764	9,645	41.9%
4A	40,151	7,818	4,154	11,972	28.7%
4B	20,048	5,064	3,926	8,990	42.9%
Early Season	23,306	0	7,165	7,165	26.3%
Multi-Zone Buck	15,051	3,734	0	3,734	24.8%
Free Landowner[1]	4,393	0	1,444	1,444	32.9%
All-Season Deer[1]	76,385	17,116	33,485	50,601	47.4%
Muzzleloader	36,680	3,507	8,631	12,138	28.1%
Archery[2]	78,952	7,500	16,661	24,161	24.3%
TOTAL[3,4]	**482,613**	**108,623**	**151,811**	**260,434**	41.6%

[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 22,443.

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

[4] Column totals do not add to 260,434 because all-season firearm harvest was placed in appropriate zone.

Table 3. Firearms Harvest and Harvest per Square Mile by Permit Area, 2007. Includes all firearm licenses but does not include early antlerless harvest.

Permit Area	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks / Sq. Mile	Antlerless / Sq. Mile	Total/ Sq. Mile
101	1A	501	149	442	111	1,203	496	1.01	1.42	2.43
104	1A	1,250	211	824	159	2,444	2,078	0.60	0.57	1.18
105	1A	1,142	316	1,077	242	2,777	740	1.54	2.21	3.75
107	1A	1,866	316	1,236	221	3,639	1,896	0.98	0.93	1.92
110	1A	768	191	669	186	1,814	300	2.56	3.49	6.05
111	1A	805	127	505	96	1,533	1,437	0.56	0.51	1.07
114	1A	80	6	22	3	111	123	0.65	0.25	0.90
115	1A	2,169	342	1,284	227	4,022	1,867	1.16	0.99	2.15
116	1A	247	16	56	6	325	1,164	0.21	0.07	0.28
122	1A	645	83	297	53	1,078	619	1.04	0.70	1.74
126	1A	656	44	306	28	1,034	943	0.70	0.40	1.10
127	1A	146	5	51	6	208	561	0.26	0.11	0.37
152	1A	136	41	141	25	343	61	2.23	3.39	5.62
154	1A	1,814	473	1,483	415	4,185	760	2.39	3.12	5.51
156	1A	1,977	574	1,688	512	4,751	825	2.40	3.36	5.76
157	1A	2,679	876	2,341	671	6,567	889	3.01	4.37	7.38
159	1A	1,518	404	1,249	315	3,486	568	2.67	3.47	6.14
167	1A	804	218	696	138	1,856	432	1.86	2.44	4.30
168	1A	1,462	376	1,075	240	3,153	723	2.02	2.34	4.36
170	1A	2,963	911	2,784	800	7,458	1,311	2.26	3.43	5.69
172	1A	1,757	556	1,751	431	4,495	451	3.90	6.07	9.97
174	1A	1,350	357	1,058	254	3,019	835	1.62	2.00	3.62
175	1A	2,158	411	1,357	295	4,221	1,249	1.73	1.65	3.38
178	1A	2,864	695	2,058	482	6,099	1,259	2.27	2.57	4.84
180	1A	1,746	253	1,121	178	3,298	983	1.78	1.58	3.36
181	1A	2,055	509	1,500	358	4,422	709	2.90	3.34	6.24
182	1A	372	71	264	53	760	269	1.38	1.44	2.83
183	1A	1,667	364	1,183	270	3,484	663	2.51	2.74	5.25
184	1A	3,345	1,334	3,236	1,048	8,963	1,231	2.72	4.56	7.28
197	1A	1,074	221	682	159	2,136	975	1.10	1.09	2.19
199	1A	140	13	35	3	191	148	0.95	0.34	1.29
201	2A	88	14	60	17	179	161	0.55	0.57	1.11
203	2A	87	7	27	3	124	118	0.74	0.31	1.05
208	2A	228	53	185	36	502	379	0.60	0.72	1.33
209	2A	595	177	532	157	1,461	639	0.93	1.35	2.28
210	2A	1,027	295	812	289	2,423	615	1.67	2.27	3.94
213	2A	1,688	515	1,492	437	4,132	1,057	1.60	2.31	3.91
214	2A	1,262	562	1,363	515	3,702	557	2.27	4.38	6.65
215	2A	853	167	493	132	1,645	701	1.22	1.13	2.35
218	2A	688	130	380	115	1,313	884	0.78	0.71	1.48
219	2A	446	49	207	56	758	392	1.14	0.80	1.93
221	2A	1,010	368	952	326	2,656	642	1.57	2.56	4.14
222	2A	909	322	856	269	2,356	413	2.20	3.51	5.71

Table 3. (Continued).

Permit Area	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks / Sq. Mile	Antlerless / Sq. Mile	Total/ Sq. Mile
223	2A	514	134	337	125	1,110	377	1.36	1.58	2.94
224	2A	118	32	119	37	306	47	2.53	4.03	6.55
225	2A	1,327	349	981	327	2,984	618	2.15	2.68	4.83
227	2A	846	227	581	189	1,843	471	1.80	2.12	3.91
229	2A	232	76	188	69	565	287	0.81	1.16	1.97
235	2A	47	15	44	13	119	32	1.47	2.24	3.71
236	2A	798	178	494	125	1,595	372	2.14	2.14	4.29
239	2A	1,562	487	1,332	407	3,788	922	1.69	2.41	4.11
240	2A	1,748	664	1,702	595	4,709	642	2.72	4.62	7.34
241	2A	1,400	575	1,254	460	3,689	417	3.36	5.49	8.85
242	2A	589	237	653	191	1,670	215	2.74	5.03	7.78
243	2A	982	394	1,009	295	2,680	314	3.13	5.41	8.55
244	2A	1,888	809	1,951	803	5,451	583	3.24	6.11	9.34
245	2A	1,787	673	1,757	614	4,831	583	3.07	5.22	8.29
246	2A	1,828	655	1,793	618	4,894	772	2.37	3.97	6.34
247	2A	714	229	625	176	1,744	229	3.12	4.49	7.61
248	2A	396	166	401	127	1,090	212	1.87	3.27	5.14
249	2A	1,145	431	1,069	321	2,966	502	2.28	3.63	5.91
251	2A	88	28	93	27	236	55	1.60	2.68	4.28
256	2A	586	143	507	120	1,356	653	0.90	1.18	2.08
257	2A	432	122	433	110	1,097	412	1.05	1.61	2.66
260	2A	700	135	636	123	1,594	1,249	0.56	0.72	1.28
261	2A	230	50	245	47	572	795	0.29	0.43	0.72
262	2A	220	15	63	10	308	677	0.32	0.13	0.45
263	2A	435	67	255	55	812	512	0.85	0.74	1.59
264	2A	751	174	536	151	1,612	669	1.12	1.29	2.41
265	2A	575	162	615	170	1,522	494	1.16	1.92	3.08
266	2A	457	36	139	23	655	617	0.74	0.32	1.06
267	2A	276	80	263	58	677	472	0.58	0.85	1.43
268	2A	332	83	219	44	678	229	1.45	1.51	2.95
287	2A	91	45	126	43	305	46	1.98	4.66	6.64
297	2A	237	38	149	44	468	438	0.54	0.53	1.07
298	2A	727	176	457	155	1,515	618	1.18	1.27	2.45
338	3A	209	11	52	10	282	454	0.46	0.16	0.62
338	3B	103	46	122	21	292	454	0.23	0.42	0.64
339	3A	195	10	29	3	237	394	0.49	0.11	0.60
339	3B	100	47	104	34	285	394	0.25	0.47	0.72
341	3A	608	46	94	28	776	611	1.00	0.28	1.27
341	3B	330	194	510	138	1,172	611	0.54	1.38	1.92
342	3A	519	14	64	14	611	350	1.48	0.26	1.74
342	3B	282	149	432	125	988	350	0.81	2.02	2.82
343	3A	575	75	240	53	943	662	0.87	0.56	1.42
343	3B	296	177	453	107	1,033	662	0.45	1.11	1.56
344	3A	365	29	45	11	450	189	1.93	0.45	2.37
344	3B	121	32	91	19	263	189	0.64	0.75	1.39

Table 3. (Continued).

Permit Area	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks / Sq. Mile	Antlerless / Sq. Mile	Total/ Sq. Mile
345	3A	382	49	169	28	628	326	1.17	0.75	1.93
345	3B	227	100	343	71	741	326	0.70	1.58	2.27
346	3A	787	111	401	86	1,385	319	2.47	1.88	4.35
346	3B	367	192	577	142	1,278	319	1.15	2.86	4.01
347	3A	526	98	317	55	996	434	1.21	1.08	2.30
347	3B	264	121	372	92	849	434	0.61	1.35	1.96
348	3A	640	90	426	69	1,225	332	1.93	1.76	3.69
348	3B	256	115	420	100	891	332	0.77	1.91	2.69
349	3A	960	129	598	146	1,833	492	1.95	1.77	3.73
349	3B	535	245	859	214	1,853	492	1.09	2.68	3.77
412	4A	274	43	146	33	496	572	0.48	0.39	0.87
412	4B	140	23	98	19	280	572	0.24	0.24	0.49
416	4A	312	17	97	11	437	543	0.57	0.23	0.81
416	4B	201	22	82	15	320	543	0.37	0.22	0.59
417	4A	634	36	173	33	876	813	0.78	0.30	1.08
417	4B	333	41	165	38	577	813	0.41	0.30	0.71
420	4A	151	18	57	18	244	650	0.23	0.14	0.38
420	4B	119	16	60	16	211	650	0.18	0.14	0.32
421	4A	113	13	44	7	177	748	0.15	0.09	0.24
421	4B	60	9	19	0	88	748	0.08	0.04	0.12
422	4A	108	6	13	3	130	632	0.17	0.03	0.21
422	4B	95	4	9	3	111	632	0.15	0.03	0.18
423	4A	99	4	17	4	124	531	0.19	0.05	0.23
423	4B	64	4	10	1	79	531	0.12	0.03	0.15
424	4A	209	8	23	3	243	764	0.27	0.04	0.32
424	4B	129	6	22	4	161	764	0.17	0.04	0.21
425	4A	71	2	13	3	89	779	0.09	0.02	0.11
425	4B	56	2	14	4	76	779	0.07	0.03	0.10
426	4A	164	11	23	7	205	614	0.27	0.07	0.33
426	4B	85	7	18	3	113	614	0.14	0.05	0.18
427	4A	162	9	45	6	222	838	0.19	0.07	0.27
427	4B	93	7	26	2	128	838	0.11	0.04	0.15
428	4A	179	22	63	11	275	550	0.33	0.17	0.50
428	4B	143	20	65	18	246	550	0.26	0.19	0.45
431	4A	119	5	29	2	155	355	0.34	0.10	0.44
431	4B	87	3	15	5	110	355	0.24	0.06	0.31
433	4A	266	19	85	10	380	401	0.66	0.28	0.95
433	4B	153	22	63	7	245	401	0.38	0.23	0.61
435	4A	232	9	37	4	282	575	0.40	0.09	0.49
435	4B	152	13	49	7	221	575	0.26	0.12	0.38
440	4A	315	16	101	22	454	662	0.48	0.21	0.69
440	4B	103	16	56	5	180	662	0.16	0.12	0.27
442	4A	436	32	129	24	621	802	0.54	0.23	0.77
442	4B	230	16	111	21	378	802	0.29	0.18	0.47

Table 3. (Continued).

Permit Area	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks / Sq. Mile	Antlerless / Sq. Mile	Total/ Sq. Mile
443	4A	140	21	63	14	238	386	0.36	0.25	0.62
443	4B	69	12	63	12	156	386	0.18	0.23	0.40
446	4A	122	9	38	3	172	344	0.36	0.15	0.50
446	4B	83	8	42	9	142	344	0.24	0.17	0.41
447	4A	133	12	46	5	196	675	0.20	0.09	0.29
447	4B	71	7	39	2	119	675	0.11	0.07	0.18
448	4A	208	14	57	14	293	446	0.47	0.19	0.66
448	4B	89	6	55	6	156	446	0.20	0.15	0.35
449	4A	246	16	66	16	344	625	0.39	0.16	0.55
449	4B	106	9	59	3	177	625	0.17	0.11	0.28
450	4A	144	7	26	6	183	816	0.18	0.05	0.22
450	4B	66	5	22	7	100	816	0.08	0.04	0.12
451	4A	184	11	53	12	260	686	0.27	0.11	0.38
451	4B	140	11	63	11	225	686	0.20	0.12	0.33
452	4A	121	7	72	8	208	636	0.19	0.14	0.33
452	4B	129	12	71	7	219	636	0.20	0.14	0.34
453	4A	149	11	54	6	220	728	0.20	0.10	0.30
453	4B	108	6	45	2	161	728	0.15	0.07	0.22
454	4A	280	19	97	19	415	840	0.33	0.16	0.49
454	4B	203	20	84	7	314	840	0.24	0.13	0.37
455	4A	31	8	18		57	95	0.33	0.27	0.60
455	4B	33	3	12		48	95	0.35	0.16	0.51
456	4A	184	16	91	7	298	711	0.26	0.16	0.42
456	4B	169	16	79	16	280	711	0.24	0.16	0.39
457	4A	209	9	77	16	311	666	0.31	0.15	0.47
457	4B	115	9	49	2	175	666	0.17	0.09	0.26
458	4A	163	11	43	7	224	715	0.23	0.09	0.31
458	4B	140	7	50	7	204	715	0.20	0.09	0.29
459	4A	237	8	69	13	327	974	0.24	0.09	0.34
459	4B	186	20	89	19	314	974	0.19	0.13	0.32
461	4A	235	59	189	56	539	480	0.49	0.63	1.12
461	4B	153	33	165	41	392	480	0.32	0.50	0.82
462	4A	304	72	174	45	595	511	0.59	0.57	1.16
462	4B	188	63	199	47	497	511	0.37	0.60	0.97
463	4A	158	11	75	7	251	452	0.35	0.21	0.56
463	4B	91	17	53	9	170	452	0.20	0.17	0.38
464	4A	139	25	69	15	248	377	0.37	0.29	0.66
464	4B	107	26	109	23	265	377	0.28	0.42	0.70
465	4A	121	26	71	11	229	385	0.31	0.28	0.60
465	4B	98	31	110	19	258	385	0.25	0.42	0.67
466	4A	266	46	169	25	506	930	0.29	0.26	0.54
466	4B	263	48	255	42	608	930	0.28	0.37	0.65
467	4A	200	45	178	25	448	774	0.26	0.32	0.58
467	4B	214	46	195	31	486	774	0.28	0.35	0.63

Table 3. (Continued).

Permit Area	Zone	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Area Size (sq.mi.)	Bucks / Sq. Mile	Antlerless / Sq. Mile	Total/ Sq. Mile
601	Metro	660	148	456	98	1,362	1,633	0.40	0.43	0.83
901		5	1	2	0	8				
902		65	60	142	51	318				
903		6	3	12	4	25				
904		2	0	4	0	6				
905		4	1	2	0	7				
906		6	3	12	2	23				
907		0	1	3	0	4				
908		0	0	2	0	2				
909		1	0	5	0	6				
910		0	0	4	0	4				
911		1	0	1	1	3				
912		19	16	36	32	103				
913		0	5	11	2	18				
914		18	7	23	6	54				
915		0	1	2	1	4				
916		23	30	55	20	128				
918		4	0	2	0	6				
919		7	9	11	3	30				
920		0	1	4	0	5				
921		10	22	31	24	87				
922		13	14	28	9	64				
923		11	12	21	13	57				
924		0	3	10	0	13				
925		2	8	18	2	30				
926		14	11	50	20	95				
927		16	14	27	13	70				
928		0	1	4	1	6				
929		6	6	4	2	18				
930		0	5	19	7	31				
931		1	0	3	0	4				
932		0	1	6	6	13				
933		10	7	20	7	44				
TOTAL		**97,528**	**24,656**	**74,284**	**19,920**	**216,388**				

Table 4. Firearm Bonus Permit Harvest by Permit Area, 2007.
Managed Permit Areas.

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
104	1A	97	348	79	524
107	1A	127	560	106	793
111	1A	55	229	49	333
114	1A	2	15	2	19
115	1A	133	523	101	757
122	1A	41	120	24	185
127	1A	1	13	0	14
152	1A	9	50	12	71
154	1A	184	576	178	938
168	1A	133	352	94	579
172	1A	200	702	188	1,090
174	1A	146	411	108	665
175	1A	171	578	166	915
183	1A	155	512	115	782
197	1A	76	253	67	396
201	2A	8	17	4	29
208	2A	28	78	15	121
213	2A	153	390	154	697
223	2A	42	95	42	179
224	2A	11	50	21	82
229	2A	19	59	20	98
235	2A	9	22	4	35
239	2A	193	497	164	854
245	2A	220	666	243	1,129
246	2A	235	689	237	1,161
247	2A	86	244	76	406
249	2A	160	370	134	664
251	2A	9	41	12	62
263	2A	25	115	24	164
264	2A	73	233	68	374
268	2A	36	107	21	164
297	2A	11	59	17	87
298	2A	64	159	75	298
343	3A	31	87	24	142
345	3A	25	75	13	113
338	3B	19	45	5	69
339	3B	18	50	17	85
341	3B	75	186	61	322
342	3B	52	178	50	280
461	4A	9	27	6	42
462	4A	12	45	13	70
464	4A	5	10	0	15
465	4A	3	19	1	23
466	4A	11	30	7	48
467	4A	12	44	5	61
461	4B	6	35	5	46
462	4B	15	53	9	77
464	4B	5	16	6	27
465	4B	6	26	4	36
466	4B	12	63	11	86
467	4B	17	39	6	62
Total		**3,245**	**10,161**	**2,863**	**16,269**

Table 4. Firearm Bonus Permit Harvest by Permit Area, 2007.
Intensive Permit Areas

Permit Area	Zone	Fawn Male	Adult Female	Fawn Female	Total
105	1A	173	632	148	953
110	1A	98	347	100	545
126	1A	29	179	17	225
156	1A	274	841	274	1,389
157	1A	388	1110	350	1,848
159	1A	205	620	171	996
167	1A	101	264	50	415
170	1A	406	1309	391	2,106
178	1A	367	1079	266	1,712
180	1A	142	604	99	845
181	1A	282	817	239	1,338
182	1A	37	141	29	207
184	1A	673	1647	554	2,874
209	2A	83	270	95	448
210	2A	148	391	155	694
214	2A	203	458	192	853
221	2A	127	331	121	579
222	2A	132	320	90	542
225	2A	152	414	176	742
227	2A	115	255	87	457
236	2A	90	247	68	405
240	2A	278	657	238	1,173
241	2A	264	524	223	1,011
242	2A	121	283	94	498
243	2A	158	421	123	702
244	2A	368	885	430	1,683
248	2A	60	132	55	247
256	2A	72	265	67	404
257	2A	49	215	67	331
260	2A	66	339	80	485
261	2A	26	118	17	161
265	2A	67	263	79	409
267	2A	42	118	37	197
287	2A	19	47	15	81
346	3A	41	205	49	295
347	3A	44	115	21	180
348	3A	40	208	41	289
349	3A	58	289	84	431
343	3B	105	249	69	423
345	3B	45	163	35	243
346	3B	103	314	79	496
347	3B	74	210	62	346
348	3B	49	208	67	324
349	3B	136	462	136	734
Total		**6,510**	**18,966**	**5,840**	**31,316**

Table 5. Early Antlerless Season Harvest by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
101	11	83	31	125
105	36	195	57	288
157	113	312	135	560
184	212	537	207	956
209	30	143	43	216
210	81	209	84	374
214	129	246	146	521
221	82	222	95	399
222	50	141	48	239
225	77	165	87	329
227	44	113	41	198
236	25	93	20	138
241	114	283	136	533
243	71	193	75	339
244	175	418	202	795
256	34	141	33	208
257	34	57	29	120
260	22	102	18	142
261	5	28	10	43
265	32	62	24	118
346	45	110	53	208
349	41	152	63	256
601	12	43	5	60
Total	1,475	4,048	1,642	7,165

Table 6. Multi-Zone Buck Harvest by Permit Area, 2007.

Zone 1	
Permit Area	**Adult Male**
101	19
104	23
105	31
107	20
110	17
111	21
114	2
115	20
116	1
122	7
126	6
127	1
152	6
154	33
156	21
157	32
159	21
167	12
168	15
170	32
172	40
174	30
175	14
178	21
180	12
181	9
182	1
183	28
184	91
197	27
199	1
Zone 1 Total	**614**

Zone 2			
Permit Area	**Adult Male**	**Permit Area**	**Adult Male**
201	1	242	16
203	3	243	13
208	6	244	20
209	12	245	42
210	22	246	31
213	67	247	12
214	29	248	5
215	46	249	21
218	18	251	4
219	22	256	21
221	15	257	7
222	22	260	18
223	10	261	8
224	3	262	8
225	36	263	7
227	26	264	17
229	12	265	11
235	6	266	12
236	19	267	9
239	39	268	16
240	51	287	4
241	33	297	8
		298	19

Zone 2 Total	**827**

Area 601 Total	**25**

Grand Total	**3,734**

Zone 3	
Permit Area	**Adult Male**
338	8
339	5
341	14
342	4
343	9
344	9
345	3
346	4
347	12
348	6
349	7
Zone 3 Total	**81**

Zone 4	
Permit Area	**Adult Male**
412	78
416	83
417	137
420	51
421	29
422	43
423	28
424	56
425	21
426	61
427	69
428	51
431	26
433	60
435	55
440	60
442	124
443	32
446	35
447	29
448	60
449	46
450	43
451	61
452	41
453	47
454	64
455	7
456	53
457	48
458	72
459	74
461	65
462	69
463	35
464	44
465	49
466	112
467	69
Zone 4 Total	**2,187**

Table 7. Summary of Firearms Special Hunts, 2007.
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	11/10 - 11/18	1A	100*	6	1	2	0	9
902 - St. Croix State Park[1]	11/10 - 11/13	1A	550**	65	60	142	51	318
903 - Savanna Portage State Park[1]	11/10 - 11/18	1A	55***	6	3	12	4	25
904 - Gooseberry Falls State Park[1]	11/3 - 11/18	1A	30*	2	0	4	0	6
905 - Split Rock Lighthouse State Park[1]	11/3 - 11/18	1A	30*	4	1	2	0	7
906 - Tettegouche State Park[1]	11/3 - 11/18	1A	125*	6	3	12	2	23
907 - Scenic State Park[1]	11/3 - 11/18	1A	30*	0	1	3	0	4
908 - Hayes Lake State Park[1]	11/3 - 11/18	1A	Unl.	0	0	2	0	2
909 - Lake Bemidji State Park[1]	11/3 - 11/6	1A	35#	1	0	5	0	6
910 - Zippel Bay State Park[1]	11/3 - 11/18	1A	55#	0	0	4	0	4
911 - Judge CR Magney SP*	11/3 - 11/18	1A	Unl.	1	0	1	1	3
912 - Wild River State Park[1]	11/3 - 11/6	2A	150**	19	16	36	32	103
913 - Lake Carlos State Park[1]	11/3 - 11/6	2A	27#	0	5	11	2	18
914 - William O'Brien State Park[1]	11/3 - 11/4	2A	65*	18	7	23	6	54
915 - Lake Bronson State Park[1]	11/3 - 11/11	2A	25#	0	1	2	1	4
916 - Maplewood State Park[1]	11/3 - 11/11	2A	100**	23	30	55	20	128
917 - Rydell NWR[1]	11/3 - 11/11	2A	5#	0	0	0	0	0
918 - Lake Alexander SNA[1]	11/3 - 11/11	2A	40*	4	0	2	0	6
919 - Beaver Creek Valley State Park[1]	11/3 - 11/4	3A	20**	7	9	11	3	30
920 - Zumbro Falls SNA[1]	11/3 - 11/9	3A	12#	0	1	4	0	5
921 - Forestville/Mystery Cave SP[1]	11/17 - 11/19 11/23 - 11/25	3B	110***	10	22	31	24	87
922 - Frontenac State Park[1]	11/17 - 11/19	3B	50**	13	14	28	9	64
923 - Great River Bluffs SP[1]	11/17 - 11/19 11/23 - 11/25	3B	100**	11	12	21	13	57
924 - Zumbro Falls SNA[1]	11/17 - 11/25	3B	12#	0	3	10	0	13
925 - Whitewater Refuge	11/17 - 11/25	3B	75#	2	8	18	2	30
926 - Whitewater State Park[1]	11/17 - 11/25	3B	50**	14	11	50	20	95
927 - Carver Park Reserve[1]	11/17 - 11/18	Metro	105*	16	14	27	14	71
928 - Crow Hassan Park Reserve[1]	11/25 - 11/26	Metro	75*	1	1	4	1	7
929 - Vermillion Highlands WMA[1]	11/3 - 11/16	Metro	20*	6	6	5	2	19
930 - Buffalo River State Park[1]	11/3 - 11/4	4A	16#	0	5	19	7	31
931 - Blue Mounds State Park[1]	11/3 - 11/4	4A	25#	1	0	3	0	4
932 - Glacial Lakes State Park[1]	11/10 - 11/13	4B	30#	0	1	6	6	13
933 - Lake Louise State Park[1]	11/10 - 11/11	4B	25**	10	7	20	7	44
TOTAL				246	242	575	227	1,290

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

Table 8. Free Landowner Firearms Harvest by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
101	1	2	1	4
104	3	12	2	17
105	1	7	0	8
107	2	8	2	12
110	0	8	1	9
111	0	3	1	4
115	1	3	1	5
122	0	2	1	3
154	1	4	0	5
156	2	6	3	11
157	6	31	4	41
159	1	2	1	4
167	0	2	1	3
168	1	0	0	1
170	5	15	2	22
172	1	1	2	4
174	1	7	0	8
175	2	3	3	8
178	6	7	3	16
180	1	5	0	6
181	1	7	1	9
182	0	1	0	1
183	1	4	1	6
184	16	28	11	55
197	0	8	1	9
208	1	0	2	3
209	3	8	5	16
210	6	18	5	29
213	15	40	15	70
214	18	61	18	97
221	8	16	9	33
222	1	11	4	16
223	2	0	0	2
225	6	15	7	28
227	0	2	0	2
229	0	2	0	2
236	3	5	0	8

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
239	7	23	6	36
240	9	24	9	42
241	5	30	8	43
242	0	2	1	3
243	4	12	9	25
244	7	14	5	26
245	4	10	3	17
246	5	35	6	46
247	2	0	0	2
248	0	5	3	8
249	13	32	8	53
256	2	15	3	20
257	2	10	4	16
260	3	11	1	15
261	3	5	1	9
263	3	2	1	6
264	3	21	5	29
265	3	21	7	31
267	1	8	1	10
268	2	3	2	7
297	2	1	0	3
338	0	5	1	6
339	0	3	0	3
341	11	22	11	44
342	8	22	8	38
343	5	12	3	20
345	2	19	3	24
346	8	25	12	45
347	1	15	1	17
348	6	21	5	32
349	7	51	10	68
461	1	7	2	10
462	6	2	1	9
464	0	2	0	2
465	0	4	1	5
466	0	4	0	4
467	4	11	1	16
601	1	0	0	1
TOTAL	256	863	249	1,368

Table 9. Archery Harvest by Permit Area, 2007.
Includes Regular, Youth, All-Season, and Bonus Permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
101	20	5	19	5	49
104	14	4	24	5	47
105	32	11	79	7	129
107	28	12	98	8	146
110	9	9	57	12	87
111	10	1	10	1	22
114	2	1	10	0	13
115	24	5	46	4	79
116	6	0	3	0	9
122	12	2	16	4	34
126	19	3	36	4	62
127	1	0	3	0	4
152	7	1	6	5	19
154	71	22	122	26	241
156	69	26	188	27	310
157	118	52	294	47	511
159	75	27	151	24	277
167	7	8	43	6	64
168	47	17	62	10	136
170	131	68	351	58	608
172	78	25	133	10	246
174	28	13	91	9	141
175	47	14	70	4	135
178	76	33	210	18	337
180	101	32	184	30	347
181	156	39	221	33	449
182	166	95	443	108	812
183	55	15	96	16	182
184	142	104	420	95	761
197	20	7	37	5	69
199	8	2	2	0	12
201	1	1	4	1	7
203	1	0	1	0	2
208	2	0	6	1	9
209	28	8	53	7	96
210	29	13	79	14	135
213	121	28	218	28	395
214	75	54	200	33	362
215	85	11	52	12	160
218	79	14	54	9	156
219	65	11	57	9	142
221	80	54	185	59	378
222	52	31	134	29	246
223	138	33	186	28	385
224	14	0	17	0	31
225	147	50	195	32	424
227	220	69	369	81	739
229	45	15	78	10	148

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
235	17	6	9	4	36
236	252	70	354	91	767
239	78	27	123	13	241
240	83	48	253	55	439
241	56	38	197	40	331
242	83	66	251	51	451
243	51	28	188	28	295
244	97	60	285	57	499
245	72	36	140	34	282
246	71	37	153	22	283
247	66	26	95	17	204
248	48	28	92	13	181
249	63	28	106	13	210
251	1	2	2	1	6
256	24	9	43	7	83
257	14	4	43	9	70
260	40	6	57	5	108
261	19	0	20	6	45
262	21	3	12	2	38
263	8	1	12	1	22
264	21	3	25	2	51
265	22	4	61	6	93
266	9	4	7	1	21
267	12	3	30	5	50
268	5	0	14	0	19
287	1	0	0	0	1
297	4	0	4	3	11
298	14	6	27	2	49
338	85	15	57	9	166
339	64	10	67	5	146
341	138	31	175	22	366
342	89	21	72	13	195
343	247	85	466	56	854
344	54	6	20	3	83
345	80	19	150	17	266
346	171	35	259	57	522
347	96	28	250	35	409
348	98	33	162	36	329
349	145	39	258	37	479
412	33	7	14	5	59
416	33	0	31	2	66
417	116	13	98	9	236
420	43	1	7	2	53
421	19	1	11	1	32
422	17	1	5	1	24
423	10	1	6	0	17
424	13	2	12	1	28

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
425	12	1	4	0	17
426	21	2	8	1	32
427	36	2	14	0	52
428	64	5	40	7	116
431	17	2	26	0	45
433	50	5	34	11	100
435	42	1	14	0	57
440	47	6	35	2	90
442	128	8	83	11	230
443	38	2	44	1	85
446	9	4	8	2	23
447	21	0	7	1	29
448	14	1	5	0	20
449	41	5	31	4	81
450	19	4	12	0	35
451	24	2	11	2	39
452	19	1	12	2	34
453	25	2	11	2	40
454	45	3	30	1	79
455	6	1	5	0	12
456	46	2	25	3	76
457	26	5	13	3	47
458	27	5	22	6	60
459	34	8	33	2	77
461	64	17	80	8	169
462	75	18	99	13	205
463	33	3	8	0	44
464	28	3	37	3	71
465	33	7	55	8	103
466	63	9	90	9	171
467	84	14	83	8	189
601	603	216	910	158	1,887
953*	64	28	104	36	232
954**	78	29	117	21	245
Total	**7,500**	**2,357**	**12,246**	**2,058**	**24,161**

*Camp Ripley First Hunt
**Camp Ripley Second Hunt

Table 10. Archery Harvest using Bonus Permits by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
101	1	0	0	1
104	1	12	1	14
105	5	30	1	36
107	8	62	6	76
110	3	29	5	37
111	0	2	0	2
114	0	6	0	6
115	2	16	2	20
122	0	9	3	12
126	3	22	2	27
127	0	2	0	2
152	1	3	1	5
154	14	60	10	84
156	12	106	16	134
157	23	158	25	206
159	16	101	14	131
167	4	21	4	29
168	6	27	2	35
170	34	152	36	222
172	5	56	5	66
174	6	40	5	51
175	5	28	0	33
178	14	95	12	121
180	16	107	21	144
181	19	124	20	163
182	75	360	93	528
183	9	54	7	70
184	65	237	55	357
197	2	14	0	16
201	0	4	0	4
208	0	1	0	1
209	3	30	3	36
210	9	32	9	50
213	11	74	9	94
214	14	77	10	101
221	20	87	31	138
222	10	64	16	90
223	7	88	14	109
224	0	10	0	10
225	28	131	19	178
227	44	216	47	307
229	9	39	4	52
235	4	7	3	14
236	51	245	64	360
239	6	48	6	60
240	24	87	28	139
241	14	83	16	113
242	39	152	33	224
243	12	86	8	106
244	27	118	26	171
245	10	61	15	86
246	15	77	11	103
247	12	46	10	68
248	11	43	10	64
249	10	49	2	61
251	1	0	1	2
256	2	14	2	18
257	1	14	5	20
260	3	23	2	28
261	0	10	5	15
263	1	6	1	8
264	1	9	2	12
265	1	33	3	37
267	2	12	2	16
268	0	5	0	5
297	0	2	1	3
298	1	5	0	6
338	6	24	3	33
339	6	40	4	50
341	18	128	18	164
342	12	44	7	63
343	65	313	40	418
345	13	98	11	122
346	24	178	46	248
347	16	152	23	191
348	19	109	27	155
349	27	180	27	234
461	6	25	5	36
462	6	54	6	66
464	2	16	0	18
465	5	26	5	36
466	2	26	5	33
467	7	44	5	56
601	166	663	124	953
TOTAL	**1,307**	**6,806**	**1,268**	**9,381**

Table 11. Summary of Archery Special Hunts, 2007. Includes Regular, Youth, and Bonus Permits.

Area	Dates	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
Camp Ripley	10/18-10/19	2,250	64	28	104	36	232
Camp Ripley	10/27-10/28	2,250	79	30	117	21	247
Cleary Lake	11/10-11/12	55	5	1	2	1	9
Crow-Hassan Park Reserve	11/10-11/12	130	6	3	5	3	17
Murphy-Hanrahan Park Reserve	11/10-11/12	185	9	0	8	1	18
Vermillion Highlands WMA	9/15 - 11/2	30	2	0	3	0	5
City of New Ulm	10/13-12/31	50	3	0	0	15	18
City of Sandstone	9/15 - 12/31	Unl.	No Data				0
City of St. Cloud	9/15 - 12/31	50	0	3	16	2	21
City of Taylors Falls	9/15 - 12/31	Unl.	0	0	1	3	4
City of Mankato	10/20-12/31	40	5	0	20	0	25
City of Granite Falls	9/15 - 12/31	10	0	0	5	0	5
City of Red Wing	9/15 - 12/31	117**	14	10	33	6	63
City of Ortonville	10/1 - 12/31	30	2	1	16	0	19
City of Canby	9/15 - 12/31	20	0	0	4	0	4
City of Bemidji	9/15 - 12/31	20	No Data				0
Camp Ripley - Youth	10/5 - 10/7	150	5	7	6	2	20
Lake Alexander Preserve	10/5-10/7	20	0	0	1	1	2
Arden Hills - Site A	10/18-10/19	30	No Data				0
Arden Hills - Site B	10/20-10/21	30	No Data				0

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

Table 12. Free Landowner Archery Harvest by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
104	0	1	0	1
105	0	1	0	1
107	0	2	0	2
110	0	0	1	1
156	0	1	0	1
167	0	1	0	1
175	0	0	1	1
182	0	1	0	1
183	0	1	0	1
184	0	0	1	1
197	0	1	0	1
209	0	1	0	1
213	0	1	1	2
221	0	1	0	1
227	0	1	1	2
240	1	2	0	3
244	0	1	0	1
245	0	1	1	2
248	0	1	0	1
249	1	0	0	1
264	0	1	0	1
341	0	1	0	1
342	0	4	0	4
343	2	3	1	6
345	0	2	0	2
349	0	1	0	1
TOTAL	4	30	7	41

Table 13. Muzzleloader Harvest by Permit Area, 2007.
Includes Regular, Muzzleloader, Youth, All-Season, and Bonus permits.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
101	15	2	28	4	49
104	15	9	39	3	66
105	32	10	56	15	113
107	27	7	53	2	89
110	7	1	23	3	34
111	15	6	15	6	42
114	1	0	1	0	2
115	35	18	82	14	149
116	8	0	7	1	16
122	1	0	5	0	6
126	11	5	35	3	54
127	1	1	1	0	3
152	6	2	6	1	15
154	20	9	50	12	91
156	22	17	56	8	103
157	35	28	97	30	190
159	16	4	55	9	84
167	10	8	33	6	57
168	16	8	32	8	64
170	45	46	150	39	280
172	31	25	66	14	136
174	16	10	26	8	60
175	18	3	37	5	63
178	26	18	72	10	126
180	19	7	43	5	74
181	29	15	64	26	134
182	6	1	17	3	27
183	23	6	46	6	81
184	66	33	179	40	318
197	14	4	21	4	43
199	2	0	1	0	3
201	4	1	1	3	9
208	9	4	14	3	30
209	21	8	34	8	71
210	28	12	58	11	109
213	66	25	132	31	254
214	34	36	90	33	193
215	39	12	42	5	98
218	34	9	33	9	85
219	27	16	27	9	79
221	41	26	85	24	176
222	36	19	55	17	127
223	31	18	33	4	86
224	0	1	1	1	3
225	28	24	84	15	151

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
227	40	32	74	19	165
229	6	7	43	2	58
235	10	1	4	1	16
236	35	29	88	10	162
239	50	26	84	27	187
240	60	39	116	31	246
241	42	40	119	33	234
242	16	26	75	21	138
243	33	18	72	21	144
244	95	51	165	46	357
245	73	37	130	40	280
246	36	15	92	18	161
247	22	18	65	11	116
248	39	16	39	12	106
249	38	20	53	18	129
251	2	1	7	0	10
256	34	11	46	9	100
257	23	4	31	11	69
260	48	18	77	16	159
261	15	7	36	7	65
262	15	1	5	1	22
263	15	1	18	0	34
264	37	12	34	7	90
265	25	14	43	16	98
266	29	2	5	2	38
267	21	6	20	10	57
268	11	3	14	4	32
297	10	3	16	3	32
298	12	5	24	5	46
338	17	6	35	6	64
339	6	1	17	2	26
341	35	16	65	10	126
342	19	20	53	14	106
343	40	44	149	30	263
344	13	1	12	3	29
345	19	13	58	6	96
346	50	30	132	23	235
347	29	33	142	29	233
348	40	29	159	32	260
349	67	34	179	32	312
412	28	3	17	1	49
416	26	4	25	4	59
417	76	20	61	9	166
420	45	3	8	4	60
421	13	1	2	0	16

Table 13. (Continued).

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
422	9	1	10	1	21
423	19	6	4	2	31
424	37	3	23	3	66
425	18	1	8	1	28
426	21	3	9	2	35
427	23	4	7	1	35
428	29	7	16	2	54
431	22	5	25	1	53
433	56	6	49	5	116
435	24	2	19	2	47
440	35	1	23	2	61
442	76	26	71	8	181
443	21	7	28	3	59
446	23	1	15	3	42
447	13	4	12	4	33
448	23	5	19	2	49
449	38	10	44	5	97
450	18	0	8	1	27
451	55	8	40	7	110
452	17	2	14	3	36
453	51	6	33	3	93
454	71	16	65	2	154
455	7	1	3	1	12
456	30	6	37	5	78
457	26	3	16	1	46
458	27	6	23	7	63
459	46	11	47	11	115
461	38	21	74	14	147
462	31	16	58	16	121
463	19	2	12	2	35
464	23	13	41	2	79
465	26	7	28	5	66
466	50	15	102	10	177
467	46	18	68	19	151
601	38	17	59	12	126
TOTAL	**3,507**	**1,495**	**5,904**	**1,232**	**12,138**

Table 14. Muzzleloader Harvest using Bonus Permits by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
101	0	1	0	1
104	0	1	0	1
105	1	9	2	12
107	1	5	0	6
110	0	4	1	5
111	1	2	0	3
115	1	5	1	7
122	0	1	0	1
126	0	9	1	10
152	1	0	0	1
154	1	4	0	5
156	3	10	2	15
157	5	21	10	36
159	3	14	0	17
167	0	4	1	5
168	2	1	0	3
170	9	40	10	59
172	5	9	0	14
174	1	1	1	3
175	0	2	1	3
178	5	8	3	16
180	1	7	2	10
181	2	10	3	15
182	0	3	0	3
183	1	2	0	3
184	6	39	7	52
197	0	2	2	4
201	1	0	0	1
208	1	1	1	3
209	2	5	0	7
210	5	14	3	22
213	2	6	3	11
214	5	6	10	21
221	9	18	5	32
222	3	5	2	10
223	2	2	0	4
225	4	19	5	28
227	4	9	4	17
229	0	5	0	5
235	0	1	1	2
236	6	19	1	26
239	3	3	4	10
240	6	17	6	29
241	7	25	6	38
243	3	15	4	22
244	12	34	8	54
245	6	15	1	22
246	1	7	2	10
247	1	6	2	9
248	1	8	3	12
249	2	5	2	9
251	0	1	0	1
256	2	8	2	12
257	1	7	3	11
260	4	17	6	27
261	1	13	3	17
263	0	1	0	1
264	0	3	0	3
265	2	6	3	11
267	4	3	2	9
268	0	0	0	0
297	0	3	0	3
298	0	1	1	2
338	1	2	0	3
341	3	10	3	16
342	0	8	2	10
343	9	38	6	53
345	0	11	1	12
346	10	33	9	52
347	3	33	6	42
348	8	33	8	49
349	11	36	14	61
461	3	9	0	12
462	1	7	1	9
464	2	1	0	3
465	1	5	0	6
466	3	15	1	19
467	5	8	2	15
601	5	10	3	18
TOTAL	**214**	**781**	**196**	**1,191**

Table 15. Summary of Muzzleloader Special Hunts, 2007.
Includes Regular, Youth, All-Season, and Bonus Permits.

Area	Dates	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
935 - Jay Cooke SP[1]	11/24 - 11/28	120*	25	11	34	8	78
936 - Crow Wing SP[1]	11/30 - 12/2	40*	5	4	3	4	16
937 - Lake Shetek SP[1]	12/1 - 12/2	25**	0	1	0	3	4
938 - Sibley SP	12/1 - 12/2	40**	0	1	5	1	7
939 - Myre Big Island SP[1]	11/24 - 11/25	40**	0	7	22	1	30
940 - Lake Louise SP***	11/24 - 11/25	25	2	2	3	1	8
941 - Interstate SP[1]	11/29 - 12/2	15**	0	0	0	0	0
942 - Nerstrand Big Woods SP[1]	11/24 - 11/25	50*	9	6	15	5	35
943 - Vermillian Highlands WMA[1]	11/24 - 12/9	20*	2	1	2	1	6
TOTAL			43	33	84	24	143

[1] Bonus permits available *Either Sex **Antlerless Only ***Earn-A-Buck

Table 16. Free Landowner Muzzleloader Harvest by Permit Area, 2007.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
126	0	1	0	1
154	0	1	0	1
157	0	0	1	1
170	0	2	0	2
175	0	1	0	1
221	0	1	0	1
239	1	0	1	2
241	0	1	0	1
243	0	1	0	1
244	0	2	0	2
246	0	1	0	1
256	1	0	1	2
268	0	1	0	1
297	0	0	1	1
338	0	1	0	1
341	0	1	0	1
342	0	2	0	2
343	0	2	0	2
345	0	1	0	1
346	1	1	0	2
348	0	1	1	2
349	0	3	0	3
461	0	1	0	1
462	0	2	0	2
Total	**3**	**27**	**5**	**35**

Table 17. Summary of Youth Firearm Hunts and NW Youth Season, 2007.

			Harvest				
Area	Dates	Permits Issued	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
956 - St. Croix SP	10/27 - 10/28	100	7	4	7	6	24
957 - Rydell NWR	10/20 - 10/21	20	No Data				0
958 - Savanna Portage SP	10/27 - 10/28	15	3	3	3	0	9
959 - Buffalo River SP	10/20 - 10/21	10	No Data				0
954 - Lake Bemidji SP	10/20 - 10/21	25	1	1	0	0	2
999 - Whitewater Game Refuge	10/18 - 10/21	75	5	1	6	0	12

Northwest Youth Season – October 20-21, unlimited permits.

Permit Area	Fawn Male	Adult Female	Fawn Female	Total
101	2	15	0	17
105	5	24	4	33
111	0	9	2	11
114	0	1	0	1
201	1	3	0	4
203	0	1	0	1
208	3	8	3	14
209	3	1	1	5
256	0	2	1	3
257	0	1	2	3
260	1	15	5	21
261	1	1	0	2
263	3	10	1	14
264	3	19	3	25
267	1	8	1	10
268	1	16	1	18
Total	24	134	24	182

Table 18. Firearms All-Season Deer Harvest by Permit Area, 2007.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
101	68	21	81	27	197
104	119	26	132	20	297
105	129	55	224	42	450
107	167	49	146	21	383
110	95	44	133	45	317
111	103	26	90	14	233
114	6	2	4	0	12
115	197	55	183	25	460
116	12	2	2	0	16
122	45	11	24	8	88
126	45	7	41	6	99
127	8	0	5	2	15
152	18	9	28	8	63
154	170	58	230	36	494
156	158	75	258	91	582
157	225	142	368	121	856
159	118	53	194	44	409
167	104	28	152	30	314
168	160	53	176	32	421
170	330	162	488	150	1130
172	223	91	276	80	670
174	112	35	139	33	319
175	123	40	124	14	301
178	215	74	230	53	572
180	109	29	140	18	296
181	134	56	205	40	435
182	27	9	36	10	82
183	147	45	157	34	383
184	422	273	754	251	1700
197	157	36	124	31	348
199	5	1	2	0	8
Zone 1 Total	**3,951**	**1,567**	**5,146**	**1,286**	**11,950**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
338	41	1	8	1	51
339	30	1	2	0	33
341	95	7	18	6	126
342	81	2	10	1	94
343	117	26	88	8	239
344	44	2	5	1	52
345	65	7	49	6	127
346	132	38	106	20	296
347	135	37	155	25	352
348	101	17	116	15	249
349	146	35	174	36	391
Zone 3 Total	**987**	**173**	**731**	**119**	**2,010**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	16	1	11	3	31
203	8	1	2	0	11
208	26	7	45	10	88
209	67	41	144	32	284
210	115	47	155	59	376
213	282	123	399	88	892
214	221	153	414	140	928
215	135	16	58	15	224
218	116	17	65	13	211
219	127	6	46	15	194
221	148	93	268	97	606
222	119	90	231	66	506
223	87	32	83	29	231
224	17	4	14	7	42
225	124	64	213	47	448
227	109	48	151	50	358
229	51	26	54	21	152
235	9	0	6	2	17
236	90	31	100	27	248
236	90	31	100	27	248
239	232	86	322	78	718
240	247	182	528	195	1152
241	243	154	400	111	908
242	61	53	185	49	348
243	145	97	259	66	567
244	252	208	530	202	1192
245	215	109	340	90	754
246	204	91	287	101	683
247	101	40	103	29	273
248	63	39	126	28	256
249	151	67	207	51	476
251	13	7	20	7	47
256	66	23	114	23	226
257	48	26	90	19	183
260	79	29	161	23	292
261	28	10	72	3	113
262	25	3	5	2	35
263	57	12	55	10	134
264	80	28	85	11	204
265	82	38	181	44	345
266	79	5	20	6	110
267	34	16	74	12	136
268	46	21	41	5	113
287	17	14	42	16	89
297	28	13	33	10	84
Zone 2 Total	**4,553**	**2,202**	**6,839**	**1,939**	**15,533**

Table 18. (Continued).

Zone 4											
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total	Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
412	81	12	39	7	139	447	23	2	3	0	28
416	105	5	26	2	138	448	38	3	8	0	49
417	239	10	47	12	308	449	56	4	9	3	72
420	54	9	34	7	104	450	39	0	1	0	40
421	42	4	11	2	59	451	42	2	8	2	54
422	52	3	2	3	60	452	29	2	17	0	48
423	35	4	0	1	40	453	49	6	6	1	62
424	71	2	3	1	77	454	69	5	21	0	95
425	27	1	2	1	31	455	12	2	6	0	20
426	46	3	3	0	52	456	66	6	23	1	96
427	49	2	10	0	61	457	57	1	12	2	72
428	87	11	19	4	121	458	53	3	6	1	63
431	45	2	5	3	55	459	102	4	14	10	130
433	85	6	24	2	117	461	145	40	158	49	392
435	59	1	8	1	69	462	175	60	156	42	433
440	72	5	20	2	99	463	54	11	26	1	92
442	142	8	38	4	192	464	78	22	85	16	201
443	37	5	14	2	58	465	69	32	80	14	195
446	39	4	7	2	52	466	161	36	181	23	401
						467	135	32	168	28	363
						Zone 4 Total	**2,819**	**370**	**1,300**	**249**	**4,738**

Special Hunts					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
901	3	0	1	0	4
902	17	6	40	7	70
903	3	1	0	1	5
904	1	0	0	0	1
905	2	0	0	0	2
906	0	1	3	2	6
907	0	0	3	0	3
909	0	0	1	0	1
912	7	4	11	10	32
913	0	2	4	0	6
914	2	2	0	0	4
915	0	0	2	1	3
916	10	13	27	9	59
918	1	0	0	0	1
919	2	1	1	0	4
922	0	1	0	0	1
926	0	1	0	0	1
927	6	2	12	4	24
928	0	0	2	1	3
929	4	1	2	0	7
930	0	0	5	1	6
931	1	0	1	0	2
932	0	1	1	3	5
933	6	3	9	6	24
Special HuntTotal	**65**	**39**	**125**	**45**	**274**

Metro					
Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
601	100	32	97	21	250

GRAND TOTAL	**12,475**	**4,383**	**14,238**	**3,659**	**34,755**

Table 19. Archery All-Season Deer Harvest by Permit Area, 2007.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
101	6	1	9	0	16
104	4	2	5	2	13
105	9	4	34	5	52
107	8	2	13	0	23
110	3	4	18	3	28
111	4	1	5	1	11
114	1	0	3	0	4
115	9	3	16	1	29
116	1	0	1	0	2
122	1	1	4	0	6
126	6	0	7	2	15
152	2	0	1	1	4
154	16	5	35	8	64
156	13	10	48	7	78
157	31	22	98	15	166
159	16	5	34	6	61
167	4	2	14	1	21
168	13	0	17	6	36
170	44	22	128	13	207
172	29	12	52	4	97
174	5	4	31	1	41
175	17	4	18	2	41
178	7	10	60	3	80
180	21	7	46	2	76
181	28	12	65	9	114
182	26	15	51	7	99
183	7	4	20	7	38
184	35	32	143	26	236
197	5	3	15	2	25
199	2	0	0	0	2
Zone 1 Total	**373**	**187**	**991**	**134**	**1,685**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	1	0	0	0	1
208	0	0	4	0	4
209	7	2	13	1	23
210	7	0	37	5	49
213	44	15	99	12	170
214	32	35	104	19	190
215	27	2	17	3	49
218	25	5	23	6	59
219	22	4	27	7	60
221	34	29	84	22	169
222	23	17	52	9	101
223	42	12	65	9	128
224	1	0	6	0	7
225	37	15	38	10	100
227	49	20	114	27	210
229	8	5	33	5	51
235	1	2	1	0	4
236	38	12	70	16	136
239	29	12	61	5	107
239	29	12	61	5	107
240	48	19	149	25	241
241	27	22	100	17	166
242	25	18	69	13	125
243	18	11	84	15	128
244	33	26	144	26	229
245	24	13	47	11	95
246	19	15	44	8	86
247	17	8	29	3	57
248	13	8	33	2	56
249	15	6	33	9	63
251	1	0	2	0	3
256	11	4	24	4	43
257	3	3	23	4	33
260	16	2	29	1	48
261	7	0	7	1	15
262	3	1	4	0	8
263	4	0	3	0	7
264	7	1	10	0	18
265	13	3	23	1	40
266	2	0	2	0	4
267	6	1	13	3	23
268	3	0	4	0	7
297	3	0	2	1	6
Zone 2 Total	**774**	**360**	**1,787**	**305**	**3,226**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
338	16	5	18	5	44
339	10	1	15	0	26
341	16	4	23	1	44
342	8	4	7	1	20
343	41	11	103	8	163
344	9	1	4	1	15
345	20	2	41	4	67
346	28	8	59	9	104
347	31	10	84	11	136
348	32	8	44	7	91
349	31	11	53	7	102
Zone 3 Total	**242**	**65**	**451**	**54**	**812**

Table 19. (Continued).

Zone 4												
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**		**Permit Area**	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
412	10	2	3	2	17		447	4	0	2	0	6
416	2	0	6	1	9		448	5	0	2	0	7
417	25	4	29	0	58		449	8	1	9	1	19
420	14	0	1	1	16		450	5	2	2	0	9
421	4	0	6	1	11		451	4	1	4	1	10
422	4	1	0	0	5		452	7	0	2	1	10
423	4	0	1	0	5		453	2	1	0	0	3
424	3	0	3	0	6		454	4	1	7	0	12
425	4	0	0	0	4		455	0	0	1	0	1
426	6	2	2	0	10		456	7	0	6	0	13
427	11	2	3	0	16		457	8	0	1	2	11
428	19	4	16	3	42		458	6	3	4	1	14
431	6	0	1	0	7		459	7	2	7	0	16
433	10	1	11	1	23		461	27	10	42	1	80
435	16	0	0	0	16		462	21	8	32	5	66
440	12	1	13	0	26		463	11	3	1	0	15
442	27	1	23	2	53		464	12	1	14	3	30
443	11	1	8	0	20		465	8	1	21	2	32
446	1	2	4	0	7		466	22	5	57	4	88
							467	24	5	29	1	59
							Zone 4 Total	381	65	373	33	852

Metro					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
601	96	30	173	26	926

GRAND TOTAL	**1,866**	**707**	**3,775**	**552**	**6,900**

Table 20. Muzzleloader All-Season Deer Harvest by Permit Area, 2007.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
101	14	2	20	1	37
104	15	9	35	2	61
105	25	8	41	13	87
107	24	3	48	2	77
110	7	0	19	2	28
111	9	5	12	6	32
114	1	0	1	0	2
115	31	14	70	13	128
116	6	0	7	1	14
122	1	0	3	0	4
126	11	5	23	2	41
127	0	1	1	0	2
152	5	1	5	0	11
154	17	7	42	11	77
156	20	12	46	6	84
157	30	21	72	19	142
159	15	1	40	7	63
167	8	8	28	5	49
168	15	6	29	8	58
170	41	35	104	28	208
172	23	19	54	13	109
174	16	6	23	6	51
175	16	3	34	4	57
178	22	13	61	7	103
180	16	6	31	3	56
181	28	13	51	21	113
182	6	1	13	3	23
183	21	4	36	6	67
184	53	27	130	31	241
197	12	4	19	2	37
199	2	0	1	0	3
Zone 1 Total	**510**	**234**	**1,099**	**222**	**2,065**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	3	0	1	3	7
208	6	1	12	1	20
209	18	6	28	6	58
210	20	6	38	7	71
213	64	23	115	26	228
214	28	25	82	22	157
215	34	6	26	3	69
218	28	7	24	7	66
219	16	12	21	5	54
221	37	16	60	19	132
222	33	15	45	14	107
223	23	15	29	4	71
224	0	1	0	0	1
225	23	16	58	8	105
227	32	27	65	14	138
229	6	7	34	2	49
235	6	1	2	0	9
236	32	21	64	9	126
239	42	20	78	20	160
240	52	32	96	24	204
241	38	32	91	26	187
242	12	18	53	11	94
243	30	12	51	15	108
244	86	37	127	37	287
245	58	28	94	36	216
246	31	11	73	13	128
247	17	16	49	9	91
248	37	15	29	8	89
249	34	18	47	15	114
251	2	1	5	0	8
256	30	6	33	4	73
257	20	2	24	7	53
260	32	14	59	9	114
261	10	6	21	4	41
262	11	0	0	1	12
263	12	1	16	0	29
264	32	11	29	7	79
265	20	12	37	13	82
266	21	2	5	2	30
267	18	2	17	7	44
268	10	3	12	3	28
297	8	2	12	2	24
298	10	5	23	4	42
Zone 2 Total	**1,082**	**511**	**1,785**	**427**	**3,805**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
338	9	2	29	5	45
339	6	1	13	1	21
341	22	8	44	6	80
342	12	15	29	8	64
343	30	27	98	20	175
344	9	0	1	0	10
345	14	12	44	5	75
346	35	19	93	13	160
347	18	27	100	20	165
348	35	16	115	22	188
349	43	21	130	17	211
Zone 3 Total	**233**	**148**	**696**	**117**	**1,194**

Table 20. Muzzleloader All-Season Deer Harvest by Permit Area, 2007.

Zone 4												
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**		**Permit Area**	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
412	24	3	13	1	41		447	6	1	1	0	8
416	21	2	7	3	33		448	14	3	7	0	24
417	61	8	24	4	97		449	21	4	3	0	28
420	41	2	6	2	51		450	13	0	4	0	17
421	10	0	1	0	11		451	29	2	6	0	37
422	7	1	3	1	12		452	11	2	1	2	16
423	16	1	1	0	18		453	27	0	7	1	35
424	22	0	2	0	24		454	37	1	11	0	49
425	12	0	2	0	14		455	3	1	1	1	6
426	12	0	0	0	12		456	16	2	18	2	38
427	17	2	1	0	20		457	19	1	4	0	24
428	23	4	8	1	36		458	14	3	3	2	22
431	15	0	0	0	15		459	28	5	4	1	38
433	29	2	7	1	39		461	29	17	59	14	119
435	15	1	4	0	20		462	22	14	45	14	95
440	23	0	4	0	27		463	12	1	8	1	22
442	54	8	20	2	84		464	22	9	37	2	70
443	11	1	8	1	21		465	21	6	17	4	48
446	18	1	6	0	25		466	32	11	80	7	130
							467	28	12	47	15	102
							Zone 4 Total	**835**	**131**	**480**	**82**	**1,528**

Metro					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
601	28	11	44	9	92

Special Hunts					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
935	21	8	28	8	65
936	4	3	3	3	13
938	0	1	3	0	4
939	0	5	5	0	10
940	2	2	1	1	6
942	7	1	12	1	21
943	2	1	1	1	5
Special Hunts Total	**36**	**21**	**53**	**14**	**124**

GRAND TOTAL	**2,724**	**1,056**	**4,157**	**871**	**8,808**

Table 21. Total All-Season Deer Harvest by Permit Area, 2007.

Zone 1					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
101	88	24	110	28	250
104	138	37	172	24	371
105	163	67	299	60	589
107	199	54	207	23	483
110	105	48	170	50	373
111	116	32	107	21	276
114	8	2	8	0	18
115	237	72	269	39	617
116	19	2	10	1	32
122	47	12	31	8	98
126	62	12	71	10	155
127	8	1	6	2	17
152	25	10	34	9	78
154	203	70	307	55	635
156	191	97	352	104	744
157	286	185	538	155	1,164
159	149	59	268	57	533
167	116	38	194	36	384
168	188	59	222	46	515
170	415	219	720	191	1,545
172	275	122	382	97	876
174	133	45	193	40	411
175	156	47	176	20	399
178	244	97	351	63	755
180	146	42	217	23	428
181	190	81	321	70	662
182	59	25	100	20	204
183	175	53	213	47	488
184	510	332	1027	308	2,177
197	174	43	158	35	410
199	9	1	3	0	13
Zone 1 Total	**4,834**	**1,988**	**7,236**	**1,642**	**15,700**

Zone 3					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
338	66	8	55	11	140
339	46	3	30	1	80
341	133	19	85	13	250
342	101	21	46	10	178
343	188	64	289	36	577
344	62	3	10	2	77
345	99	21	134	15	269
346	195	65	258	42	560
347	184	74	339	56	653
348	168	41	275	44	528
349	220	67	357	60	704
Zone 3 Total	**1,462**	**386**	**1,878**	**290**	**4,016**

Zone 2					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
201	20	1	12	6	39
203	8	1	2	0	11
208	32	8	61	11	112
209	92	49	185	39	365
210	142	53	230	71	496
213	390	161	613	126	1,290
214	281	213	600	181	1,275
215	196	24	101	21	342
218	169	29	112	26	336
219	165	22	94	27	308
221	219	138	412	138	907
222	175	122	328	89	714
223	152	59	177	42	430
224	18	5	20	7	50
225	184	95	309	65	653
227	190	95	330	91	706
229	65	38	121	28	252
235	16	3	9	2	30
236	160	64	234	52	510
239	303	118	461	103	985
240	347	233	773	244	1,597
241	308	208	591	154	1,261
242	98	89	307	73	567
243	193	120	394	96	803
244	371	271	801	265	1,708
245	297	150	481	137	1,065
246	254	117	404	122	897
247	135	64	181	41	421
248	113	62	188	38	401
249	200	91	287	75	653
251	16	8	27	7	58
256	107	33	171	31	342
257	71	31	137	30	269
260	127	45	249	33	454
261	45	16	100	8	169
262	39	4	9	3	55
263	73	13	74	10	170
264	119	40	124	18	301
265	115	53	241	58	467
266	102	7	27	8	144
267	58	19	104	22	203
268	59	24	57	8	148
287	17	14	42	16	89
297	39	15	47	13	114
298	117	34	129	35	315
Zone 2 Total	**6,397**	**3,059**	**10,356**	**2,670**	**22,482**

Table 21. Continued.

Zone 4					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
412	115	17	55	10	197
416	128	7	39	6	180
417	325	22	100	16	463
420	109	11	41	10	171
421	56	4	18	3	81
422	63	5	5	4	77
423	55	5	2	1	63
424	96	2	8	1	107
425	43	1	4	1	49
426	64	5	5	0	74
427	77	6	14	0	97
428	129	19	43	8	199
431	66	2	6	3	77
433	124	9	42	4	179
435	90	2	12	1	105
440	107	6	37	2	152
442	223	17	81	8	329
443	59	7	30	3	99
446	58	7	17	2	84
447	33	3	6	0	42
448	57	6	17	0	80
449	85	9	21	4	119
450	57	2	7	0	66
451	75	5	18	3	101
452	47	4	20	3	74
453	78	7	13	2	100
454	110	7	39	0	156
455	15	3	8	1	27
456	89	8	47	3	147
457	84	2	17	4	107
458	73	9	13	4	99
459	137	11	25	11	184
461	201	67	259	64	591
462	218	82	233	61	594
463	77	15	35	2	129
464	112	32	136	21	301
465	98	39	118	20	275
466	215	52	318	34	619
467	187	49	244	44	524
Zone 4 Total	**4,035**	**566**	**2,153**	**364**	**7,118**

Special Hunts					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
901	3	0	1	0	4
902	17	6	40	7	70
903	3	1	0	1	5
904	1	0	0	0	1
905	2	0	0	0	2
906	0	1	3	2	6
907	0	0	3	0	3
909	0	0	1	0	1
910	0	0	1	0	1
912	7	4	11	10	32
913	0	2	4	0	6
914	2	2	0	0	4
915	0	0	2	1	3
916	10	13	27	9	59
918	1	0	0	0	1
919	2	1	1	0	4
922	0	1	0	0	1
926	0	1	0	0	1
927	6	2	12	4	24
928	0	0	2	1	3
929	4	1	2	0	7
930	0	0	5	1	6
931	1	0	1	0	2
932	0	1	1	3	5
933	6	3	9	6	24
935	21	8	28	8	65
936	4	3	3	3	13
938	0	1	3	0	4
939	0	5	5	0	10
940	2	2	1	1	6
942	7	1	12	1	21
943	2	1	1	1	5
950	0	1	3	0	4
953	26	9	47	15	97
954	34	13	58	8	113
956	1	0	1	0	2
999	2	0	1	0	3
Special Hunts Total	**164**	**83**	**289**	**82**	**618**

Metro					
Permit Area	**Adult Male**	**Fawn Male**	**Adult Female**	**Fawn Female**	**Total**
601	224	73	314	56	667

GRAND TOTAL	**17,116**	**6,155**	**22,226**	**5,104**	**50,601**

Table 22. Total Deer Harvest by Permit Area, 2007. Includes all license types, permits, and special hunts.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
101	551	190	649	173	1,563
104	1279	224	887	167	2,557
105	1206	378	1431	325	3,340
107	1921	335	1387	231	3,874
110	784	201	749	201	1,935
111	830	134	539	105	1,608
114	83	7	34	3	127
115	2228	365	1412	245	4,250
116	261	16	66	7	350
122	658	85	318	57	1,118
126	686	52	377	35	1,150
127	148	6	55	6	215
152	149	44	153	31	377
154	1905	504	1655	453	4,517
156	2068	617	1932	547	5,164
157	2832	1069	3044	883	7,828
159	1609	435	1455	348	3,847
167	821	234	772	150	1,977
168	1525	401	1169	258	3,353
170	3139	1025	3285	897	8,346
172	1866	606	1950	455	4,877
174	1394	380	1175	271	3,220
175	2223	428	1464	304	4,419
178	2966	746	2340	510	6,562
180	1866	292	1348	213	3,719
181	2240	563	1785	417	5,005
182	544	167	724	164	1,599
183	1745	385	1325	292	3,747
184	3553	1683	4372	1391	10,999
197	1108	232	740	168	2,248
199	150	15	38	3	206
201	93	17	68	21	199
203	88	7	29	3	127
208	239	60	213	43	555
209	644	226	763	216	1,849
210	1084	401	1158	398	3,041
213	1875	568	1842	496	4,781
214	1371	781	1899	727	4,778
215	977	190	587	149	1,903
218	801	153	467	133	1,554
219	538	76	291	74	979
221	1131	530	1444	504	3,609
222	997	422	1186	363	2,968
223	683	185	556	157	1,581
224	132	33	137	38	340
225	1502	500	1425	461	3,888
227	1106	372	1137	330	2,945
229	283	98	309	81	771
235	75	24	61	19	179
236	1085	302	1029	246	2,662
239	1690	540	1539	447	4,216
240	1891	751	2071	681	5,394
241	1498	767	1853	669	4,787
242	688	329	979	263	2,259
243	1066	511	1462	419	3,458
244	2080	1095	2819	1108	7,102
245	1932	746	2027	688	5,393
246	1935	707	2039	658	5,339
247	802	273	785	204	2,064
248	487	211	536	153	1,387
249	1246	479	1228	352	3,305
251	91	32	102	28	253
256	645	197	739	170	1,751
257	469	164	565	161	1,359
260	789	182	887	167	2,025
261	264	63	330	70	727
262	256	19	80	13	368
263	458	72	295	57	882
264	809	192	614	163	1,778
265	622	212	781	216	1,831
266	495	42	151	26	714
267	309	90	321	74	794
268	348	87	263	49	747
287	92	45	126	43	306
297	251	41	169	50	511
298	753	187	508	162	1,610
338	414	78	266	46	804
339	365	68	217	44	694
341	1111	287	844	198	2,440
342	909	204	621	166	1,900
343	1158	381	1308	246	3,093
344	553	68	168	36	825
345	708	181	720	122	1,731
346	1375	413	1479	361	3,628
347	915	280	1081	211	2,487
348	1034	267	1167	237	2,705
349	1707	488	2046	492	4,733
412	475	76	275	58	884
416	572	43	235	32	882
417	1159	110	497	89	1,855
420	358	38	132	40	568
421	205	24	76	8	313
422	229	12	37	8	286
423	192	15	37	7	251
424	388	19	80	11	498
425	157	6	39	8	210
426	291	23	58	13	385
427	314	22	92	9	437
428	415	54	184	38	691
431	245	15	95	8	363
433	525	52	231	33	841
435	450	25	119	13	607
440	500	39	215	31	785
442	870	82	394	64	1,410
443	268	42	198	30	538
446	237	22	103	17	379
447	238	23	104	12	377
448	334	26	136	22	518

Table 22. Continued.

Permit Area	Adult Male	Fawn Male	Adult Female	Fawn Female	Total
449	431	40	200	28	699
450	247	16	68	14	345
451	403	32	167	32	634
452	286	22	169	20	497
453	333	25	143	13	514
454	599	58	276	29	962
455	77	13	38	1	129
456	429	40	232	31	732
457	376	26	155	22	579
458	357	29	138	27	551
459	503	47	238	45	833
461	490	130	508	119	1,247
462	598	169	530	121	1,418
463	301	33	148	18	500
464	297	67	256	43	663
465	278	71	264	43	656
466	642	118	616	86	1,462
467	544	123	524	83	1,274
601	1301	393	1468	273	3,435
901	6	1	2	0	9
902	65	60	142	51	318
903	6	3	12	4	25
904	2	0	4	0	6
905	4	1	2	0	7
906	6	3	12	2	23
907	0	1	3	0	4
908	0	0	2	0	2
909	1	0	5	0	6
910	0	0	4	0	4
911	1	0	1	1	3
912	19	16	36	32	103
913	0	5	11	2	18
914	18	7	23	6	54
915	0	1	2	1	4
916	23	30	55	20	128
918	4	0	2	0	6
919	7	9	11	3	30
920	0	1	4	0	5
921	10	22	31	24	87
922	13	14	28	9	64
923	11	12	21	13	57
924	0	3	10	0	13
925	2	8	18	2	30
926	14	11	50	20	95
927	16	14	27	14	71
928	1	1	4	1	7
929	6	6	5	2	19
930	0	5	19	7	31
931	1	0	3	0	4
932	0	1	6	6	13
933	10	7	20	7	44
935	25	11	34	8	78
936	5	4	3	4	16
937	0	1	0	3	4
938	0	1	5	1	7
939	0	7	22	1	30
940	2	2	3	1	8
942	9	6	15	5	35
943	2	1	2	1	6
950	5	7	6	2	20
953	64	28	104	36	232
954	79	30	117	21	247
955	0	0	1	1	2
956	7	4	7	6	24
958	3	3	3	0	9
999	5	1	6	0	12
TOTAL	**108,623**	**30,081**	**96,795**	**24,935**	**260,434**

Table 23. Estimated firearm hunter numbers, density, and harvest by permit area, 2007.

Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ mile2	Harvest/ mile2
101	1,892	496	3.8	2.4
104	4,529	2,078	2.2	1.2
105	4,086	740	5.5	3.8
107	7,181	1,896	3.8	1.9
110	2,553	300	8.5	6.0
111	3,298	1,437	2.3	1.1
114	182	123	1.5	0.9
115	8,155	1,867	4.4	2.2
116	902	1,164	0.8	0.3
122	2,086	619	3.4	1.7
126	1,936	943	2.1	1.1
127	568	561	1.0	0.4
152	1,052	61	17.2	5.6
154	8,744	760	11.5	5.5
156	8,863	825	10.7	5.8
157	12,808	889	14.4	7.4
159	6,882	568	12.1	6.1
167	3,800	432	8.8	4.3
168	7,354	723	10.2	4.4
170	13,151	1,311	10.0	5.7
172	9,177	451	20.4	10.0
174	6,485	835	7.8	3.6
175	8,386	1,249	6.7	3.4
178	9,736	1,259	7.7	4.8
180	6,013	983	6.1	3.4
181	6,788	709	9.6	6.2
182	1,506	269	5.6	2.8
183	7,465	663	11.3	5.3
184	13,895	1,231	11.3	7.3
197	4,630	975	4.8	2.2
199	472	148	3.2	1.3
201	373	161	2.3	1.1
203	320	118	2.7	1.1
208	1,106	379	2.9	1.3
209	2,319	639	3.6	2.3
210	4,125	615	6.7	3.9
213	8,751	1,057	8.3	3.9
214	6,542	557	11.8	6.7
215	5,803	701	8.3	2.3
218	4,694	884	5.3	1.5
219	2,708	392	6.9	1.9
221	4,875	642	7.6	4.1
222	4,471	413	10.8	5.7

Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ mile2	Harvest/ mile2
223	2,682	377	7.1	2.9
224	704	47	15.1	6.6
225	6,337	618	10.2	4.8
227	4,342	471	9.2	3.9
229	1,377	287	4.8	2.0
235	453	32	14.1	3.7
236	3,381	372	9.1	4.3
239	7,105	922	7.7	4.1
240	6,986	642	10.9	7.3
239	7,105	922	7.7	4.1
240	6,986	642	10.9	7.3
241	5,055	417	12.1	8.9
242	2,642	215	12.3	7.8
243	5,019	314	16.0	8.5
244	8,149	583	14.0	9.3
245	8,765	583	15.0	8.3
246	9,399	772	12.2	6.3
247	3,413	229	14.9	7.6
248	1,942	212	9.2	5.1
249	5,408	502	10.8	5.9
251	565	55	10.2	4.3
256	2,432	653	3.7	2.1
257	1,728	412	4.2	2.7
260	2,236	1,249	1.8	1.3
261	1,030	795	1.3	0.7
262	960	677	1.4	0.5
263	1,943	512	3.8	1.6
264	3,280	669	4.9	2.4
265	1,990	494	4.0	3.1
266	1,919	617	3.1	1.1
267	1,127	472	2.4	1.4
268	1,223	229	5.3	3.0
287	555	46	12.1	6.6
297	1,194	438	2.7	1.1
298	3,236	618	5.2	2.5
338	1,849	454	4.1	1.3
339	1,670	394	4.2	1.3
341	4,630	611	7.6	3.2
342	3,508	350	10.0	4.6
343	4,626	662	7.0	3.0
344	2,442	189	12.9	3.8
345	2,907	326	8.9	4.2
346	4,076	319	12.8	8.4

Table 23. Continued.

Permit Area	Firearm Hunters	Area Size (sq mi)	Hunters/ mile2	Harvest/ mile2
347	3,370	434	7.8	4.3
348	3,922	332	11.8	6.4
349	5,877	492	11.9	7.5
412	2,808	572	4.9	1.4
416	2,971	543	5.5	1.4
417	5,660	813	7.0	1.8
420	1,462	650	2.2	0.7
421	1,036	748	1.4	0.4
422	864	632	1.4	0.4
423	858	531	1.6	0.4
424	1,740	764	2.3	0.5
425	743	779	1.0	0.2
426	1,382	614	2.3	0.5
427	1,439	838	1.7	0.4
428	2,223	550	4.0	0.9
431	904	355	2.5	0.7
433	2,309	401	5.8	1.6
435	2,239	575	3.9	0.9
440	2,294	662	3.5	1.0
442	3,747	802	4.7	1.2
443	1,442	386	3.7	1.0
446	1,125	344	3.3	0.9
447	1,244	675	1.8	0.5
448	1,447	446	3.2	1.0
449	1,957	625	3.1	0.8
450	967	816	1.2	0.3
451	1,304	686	1.9	0.7
452	1,021	636	1.6	0.7
453	1,124	728	1.5	0.5
454	2,238	840	2.7	0.9
455	254	95	2.7	1.1
456	1,556	711	2.2	0.8
457	1,634	666	2.5	0.7
458	1,459	715	2.0	0.6
459	2,093	974	2.1	0.7
461	2,475	480	5.2	1.9
462	2,532	511	5.0	2.1
463	1,387	452	3.1	0.9
464	1,326	377	3.5	1.4
465	1,079	385	2.8	1.3
466	2,689	930	2.9	1.2
467	1,951	774	2.5	1.2
601	2,121	1,633	1.3	0.8
Total	439,232	78,929	5.6	2.7

Table 24. Deer harvest per square mile by season, 2007.

Permit Area	Area Size (sq mi)	Archery Harvest/ mi2	Firearm Harvest/ mi2	Muzzleloader. Harvest/ mi2	EA Harvest/ mi2	Total Harvest/ mi2
101	496	0.1	2.4	0.1	0.3	2.9
104	2,078	0.0	1.2	0.0		1.2
105	740	0.2	3.8	0.2	0.4	4.5
107	1,896	0.1	1.9	0.0		2.0
110	300	0.3	6.0	0.1		6.4
111	1,437	0.0	1.1	0.0		1.1
114	123	0.1	0.9	0.0		1.0
115	1,867	0.0	2.2	0.1		2.3
116	1,164	0.0	0.3	0.0		0.3
122	619	0.1	1.7	0.0		1.8
126	943	0.1	1.1	0.1		1.2
127	561	0.0	0.4	0.0		0.4
152	61	0.3	5.6	0.2		6.2
154	760	0.3	5.5	0.1		5.9
156	825	0.4	5.8	0.1		6.3
157	889	0.6	7.4	0.2	0.6	8.8
159	568	0.5	6.1	0.1		6.8
167	432	0.1	4.3	0.1		4.6
168	723	0.2	4.4	0.1		4.6
170	1,311	0.5	5.7	0.2		6.4
172	451	0.5	10.0	0.3		10.8
174	835	0.2	3.6	0.1		3.9
175	1,249	0.1	3.4	0.1		3.5
178	1,259	0.3	4.8	0.1		5.2
180	983	0.4	3.4	0.1		3.8
181	709	0.6	6.2	0.2		7.1
182	269	3.0	2.8	0.1		5.9
183	663	0.3	5.3	0.1		5.7
184	1,231	0.6	7.3	0.3	0.8	8.9
197	975	0.1	2.2	0.0		2.3
199	148	0.1	1.3	0.0		1.4
201	161	0.0	1.1	0.1		1.2
203	118	0.0	1.1	0.0		1.1
208	379	0.0	1.3	0.1		1.4
209	639	0.2	2.3	0.1	0.3	2.9
210	615	0.2	3.9	0.2	0.6	4.9
213	1,057	0.4	3.9	0.2		4.5
214	557	0.7	6.7	0.3	0.9	8.6
215	701	0.2	2.3	0.1		2.7
218	884	0.2	1.5	0.1		1.8
219	392	0.4	1.9	0.2		2.5
221	642	0.6	4.1	0.3	0.6	5.6
222	413	0.6	5.7	0.3	0.6	7.2
223	377	1.0	2.9	0.2		4.2
224	47	0.7	6.6	0.1		7.3

Table 24. Continued.

Permit Area	Area Size (sq mi)	Archery Harvest/ mi2	Firearm Harvest/ mi2	Muzzleloader Harvest/ mi2	EA Harvest/ mi2	Total Harvest/ mi2
225	618	0.7	4.8	0.2	0.5	6.3
227	471	1.6	3.9	0.4	0.4	6.3
229	287	0.5	2.0	0.2		2.7
235	32	1.1	3.7	0.5		5.3
236	372	2.1	4.3	0.4	0.4	7.2
239	922	0.3	4.1	0.2		4.6
240	642	0.7	7.3	0.4		8.4
241	417	0.8	8.9	0.6	1.3	11.5
242	215	2.1	7.8	0.6		10.5
243	314	0.9	8.5	0.5	1.1	11.0
244	583	0.9	9.3	0.6	1.4	12.2
245	583	0.5	8.3	0.5		9.3
246	772	0.4	6.3	0.2		6.9
247	229	0.9	7.6	0.5		9.0
248	212	0.9	5.1	0.5		6.5
249	502	0.4	5.9	0.3		6.6
251	55	0.1	4.3	0.2		4.6
256	653	0.1	2.1	0.2	0.3	2.7
257	412	0.2	2.7	0.2	0.3	3.3
260	1,249	0.1	1.3	0.1	0.1	1.6
261	795	0.1	0.7	0.1	0.1	0.9
262	677	0.1	0.5	0.0		0.5
263	512	0.0	1.6	0.1		1.7
264	669	0.1	2.4	0.1		2.6
265	494	0.2	3.1	0.2	0.2	3.7
266	617	0.0	1.1	0.1		1.2
267	472	0.1	1.4	0.1		1.7
268	229	0.1	3.0	0.1		3.2
287	46	0.0	6.6	0.0		6.7
297	438	0.0	1.1	0.1		1.2
298	618	0.1	2.5	0.1		2.6
338	454	0.4	1.3	0.1		1.8
339	394	0.4	1.3	0.1		1.8
341	611	0.6	3.2	0.2		4.0
342	350	0.6	4.6	0.3		5.4
343	662	1.3	3.0	0.4		4.7
344	189	0.4	3.8	0.2		4.4
345	326	0.8	4.2	0.3		5.3
346	319	1.6	8.4	0.7	0.7	11.4
347	434	0.9	4.3	0.5		5.7
348	332	1.0	6.4	0.8		8.2
349	492	1.0	7.5	0.6	0.5	9.6
412	572	0.1	1.4	0.1		1.5
416	543	0.1	1.4	0.1		1.6
417	813	0.3	1.8	0.2		2.3

Table 24. Continued.

Permit Area	Area Size (sq mi)	Archery Harvest/ mi2	Firearm Harvest/ mi2	Muzzleloader Harvest/ mi2	EA Harvest/ mi2	Total Harvest/ mi2
420	650	0.1	0.7	0.1		0.9
421	748	0.0	0.4	0.0		0.4
422	632	0.0	0.4	0.0		0.5
423	531	0.0	0.4	0.1		0.5
424	764	0.0	0.5	0.1		0.7
425	779	0.0	0.2	0.0		0.3
426	614	0.1	0.5	0.1		0.6
427	838	0.1	0.4	0.0		0.5
428	550	0.2	0.9	0.1		1.3
431	355	0.1	0.7	0.1		1.0
433	401	0.2	1.6	0.3		2.1
435	575	0.1	0.9	0.1		1.1
440	662	0.1	1.0	0.1		1.2
442	802	0.3	1.2	0.2		1.8
443	386	0.2	1.0	0.2		1.4
446	344	0.1	0.9	0.1		1.1
447	675	0.0	0.5	0.0		0.6
448	446	0.0	1.0	0.1		1.2
449	625	0.1	0.8	0.2		1.1
450	816	0.0	0.3	0.0		0.4
451	686	0.1	0.7	0.2		0.9
452	636	0.1	0.7	0.1		0.8
453	728	0.1	0.5	0.1		0.7
454	840	0.1	0.9	0.2		1.1
455	95	0.1	1.1	0.1		1.4
456	711	0.1	0.8	0.1		1.0
457	666	0.1	0.7	0.1		0.9
458	715	0.1	0.6	0.1		0.8
459	974	0.1	0.7	0.1		0.9
461	480	0.4	1.9	0.3		2.6
462	511	0.4	2.1	0.2		2.8
463	452	0.1	0.9	0.1		1.1
464	377	0.2	1.4	0.2		1.8
465	385	0.3	1.3	0.2		1.7
466	930	0.2	1.2	0.2		1.6
467	774	0.2	1.2	0.2		1.6
601	1,633	1.2	0.8	0.1	0.04	2.1
Total	78,929	0.3	2.7	0.2	0.1	3.3

Table 25. 2007 Antlerless Lottery Distribution Report.

Permit Area Number	Preference Level	Applications			Winners	Permits Available	% Under-Subscribed
		Total	Rejected	Unsuccessful			
116	1	218	6	0	218	**650**	**60.3%**
	2	40	4	0	40		
		258	**10**	**0**	**258**		
199	1	135	3	0	135	**150**	**6.7%**
	2	5	1	0	5		
	3	0	1	0	0		
		140	**5**	**0**	**140**		
203	1	135	3	88	47	**50**	**0.0%**
	2	3	1	0	3		
		138	**4**	**88**	**50**		
215	1	2,755	223	824	1,931	**2,000**	**0.0%**
	2	56	4	0	56		
	3	11	2	0	11		
	4	1	0	0	1		
		2,823	**229**	**824**	**1,999**		
218	1	2,312	187	893	1,419	**1,500**	**0.1%**
	2	69	8	0	69		
	3	9	1	0	9		
	4	2	0	0	2		
		2,392	**196**	**893**	**1,499**		
219	1	977	89	208	769	**800**	**1.3%**
	2	19	5	2	17		
	3	4	1	0	4		
		1,000	**95**	**210**	**790**		
262	1	321	20	177	144	**150**	**0.0%**
	2	4	0	0	4		
	3	2	0	0	2		
		327	**20**	**177**	**150**		
266	1	715	49	231	484	**500**	**0.0%**
	2	13	1	0	13		
	3	3	0	0	3		
		731	**50**	**231**	**500**		
338A	1	210	7	146	64	**100**	**0.0%**
	2	32	3	0	32		
	3	2	1	0	2		
	4	2	0	0	2		
		246	**11**	**146**	**100**		
339A	1	216	11	123	93	**100**	**1.0%**
	2	6	1	0	6		
	3	1	1	0	0		
		223	**13**	**123**	**99**		
341A	1	568	22	253	315	**350**	**0.0%**
	2	32	9	0	32		
	3	2	3	0	2		
	4	0	1	0	0		
	5	1	1	0	1		
		603	**36**	**253**	**350**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
116	1 2 	218 40 **258**	6 4 **10**	0 0 **0**	218 40 **258**	**650**	**60.3%**
199	1 2 3 	135 5 0 **140**	3 1 1 **5**	0 0 0 **0**	135 5 0 **140**	**150**	**6.7%**
203	1 2 	135 3 **138**	3 1 **4**	88 0 **88**	47 3 **50**	**50**	**0.0%**
215	1 2 3 4 	2,755 56 11 1 2,823	223 4 2 0 229	824 0 0 0 824	1931 56 11 1 1999	**2000**	**0.0%**
218	1 2 3 4 	2,312 69 9 2 **2,392**	187 8 1 0 **196**	893 0 0 0 **893**	1,419 69 9 2 **1,499**	**1,500**	**0.1%**
219	1 2 3 	977 19 4 **1,000**	89 5 1 **95**	208 2 0 **210**	769 17 4 **790**	**800**	**1.3%**
262	1 2 3 	321 4 2 **327**	20 0 0 20	177 0 0 **177**	144 4 2 **150**	**150**	**0.0%**
266	1 2 3 	715 13 3 **731**	49 1 0 **50**	231 0 0 **231**	484 13 3 **500**	**500**	**0.0%**
338A	1 2 3 4 	210 32 2 2 **246**	7 3 1 0 **11**	146 0 0 0 **146**	64 32 2 2 **100**	**100**	**0.0%**
339A	1 2 3 	216 6 1 **223**	11 1 1 **13**	123 0 0 **123**	93 6 0 **99**	**100**	**1.0%**
341A	1 2 3 4 5 	568 32 2 0 1 **603**	22 9 3 1 1 **36**	253 0 0 0 0 **253**	315 32 2 0 1 **350**	**350**	**0.0%**

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
342A	1	357	13	155	202	**250**	**0.0%**
	2	45	1	0	45		
	3	2	0	0	2		
	4	1	2	0	1		
	5	0	1	0	0		
		405	**17**	**155**	**250**		
344A	1	438	7	374	64	**100**	**0.0%**
	2	32	4	0	32		
	3	2	2	0	2		
	4	2	2	0	2		
		474	**15**	**374**	**100**		
344B	1	568	19	325	243	**250**	**0.4%**
	2	5	5	0	5		
	3	0	8	0	0		
	4	1	1	0	1		
		574	**33**	**325**	**249**		
412A	1	673	48	0	673	**1,200**	**42.1%**
	2	21	0	0	21		
	3	1	0	0	1		
		695	**48**	**0**	**695**		
412B	1	259	15	0	359	**1200**	**69.8%**
	2	3	0	0	3		
	3	1	0	0	1		
		363	**15**	**0**	**363**		
416A	1	798	31	574	224	**250**	**0.0%**
	2	22	17	0	22		
	3	4	0	0	4		
		824	**48**	**574**	**250**		
416B	1	437	13	196	241	**250**	**0.0%**
	2	9	7	0	9		
		446	**20**	**196**	**250**		
417A	1	1,480	52	1,243	237	**400**	**0.0%**
	2	157	28	0	157		
	3	3	9	0	3		
	4	2	1	0	2		
	5	1	0	0	1		
		1,643	**90**	**1,243**	**400**		
417B	1	900	34	533	367	**400**	**0.0%**
	2	28	15	0	28		
	3	5	1	0	5		
		933	**50**	**533**	**400**		
420A	1	353	30	59	294	**300**	**0.0%**
	2	6	0	0	6		
		359	**30**	**59**	**300**		
420B	1	136	13	59	77	**200**	**58.5%**
	2	6	0	0	6		
		142	**13**	**59**	**83**		
421A	1	270	27	124	146	**150**	**0.0%**
	2	3	0	0	3		
	3	1	0	0	1		
		274	**27**	**124**	**150**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
421B	1 2 **94**	91 3 **94**	5 0 **5**	44 0 **44**	47 3 **50**	**50**	**0.0%**
422A	1 2 3 **209**	143 63 3 **209**	11 3 0 **14**	143 41 0 **184**	0 22 3 **25**	**25**	**0.0%**
422B	1 2 3 4 **84**	70 13 1 0 **84**	4 2 2 1 **9**	60 0 0 0 **60**	10 13 1 0 **24**	**25**	**4.0%**
423A	1 2 3 **208**	191 16 1 **208**	9 2 0 **11**	183 0 0 **183**	8 16 1 **25**	**25**	**0.0%**
423B	1 2 **98**	95 3 **98**	3 0 **3**	73 0 **73**	22 3 **25**	**25**	**0.0%**
424A	1 2 3 4 5 **368**	179 180 6 2 1 **368**	13 5 2 0 0 **20**	179 174 0 0 0 **353**	0 6 6 2 1 **15**	**15**	**0.0%**
424B	1 2 3 4 **209**	119 89 0 1 **209**	10 4 2 0 **16**	119 75 0 0 **197**	0 14 0 1 **15**	**15**	**0.0%**
426A	1 2 3 4 6 **255**	210 41 2 1 1 **255**	8 2 4 1 0 **15**	210 30 0 0 0 **240**	0 11 2 1 1 **15**	**15**	**0.0%**
426B	1 2 3 4 **171**	154 16 1 0 **171**	5 2 0 1 **8**	154 2 0 0 **156**	0 14 1 0 **15**	**15**	**0.0%**
427A	1 2 3 4 5 **312**	103 108 81 20 0 **312**	11 4 2 3 1 **21**	103 108 81 5 0 **297**	0 0 0 15 0 **15**	**15**	**0.0%**

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
427B	1	75	3	75	0	**15**	**0.0%**
	2	60	2	60	0		
	3	28	0	15	13		
	4	2	1	0	2		
		165	**6**	**150**	**15**		
428A	1	508	23	297	211	**250**	**0.0%**
	2	32	7	0	32		
	3	6	2	0	6		
	4	1	1	0	1		
	5	0	1	0	0		
		547	**34**	**297**	**250**		
428B	1	406	16	176	230	**250**	**0.0%**
	2	16	4	0	16		
	3	3	1	0	3		
	4	1	2	0	1		
	5	0	1	0	0		
		426	**24**	**176**	**250**		
431A	1	67	6	67	0	**15**	**0.0%**
	2	67	2	67	0		
	3	32	0	18	14		
	4	1	0	0	1		
	5	0	1	0	0		
		167	**9**	**152**	**15**		
431B	1	75	1	75	0	**15**	**0.0%**
	2	41	2	40	1		
	3	14	0	0	14		
		130	**3**	**115**	**15**		
433A	1	443	10	442	1	**200**	**0.0%**
	2	188	9	0	188		
	3	6	1	0	6		
	4	1	1	0	1		
	5	3	3	0	3		
	6	1	0	0	1		
		642	**24**	**442**	**200**		
433B	1	390	12	249	141	**200**	**0.0%**
	2	51	4	0	51		
	3	4	1	0	4		
	4	3	0	0	3		
	5	0	1	0	0		
	9 (military)	1	0	0	1		
		449	**18**	**249**	**200**		
435A	1	392	18	392	0	**75**	**0.0%**
	2	204	10	134	70		
	3	3	5	0	3		
	4	1	2	0	1		
	5	1	1	0	1		
		601	**36**	**526**	**75**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
435B	1	259	18	235	24	**75**	**0.0%**
	2	48	4	0	48		
	3	3	3	0	3		
	4	0	3	0	0		
	5	0	1	0	0		
		310	**29**	**235**	**75**		
440A	1	542	27	542	0	**150**	**0.0%**
	2	259	10	123	136		
	3	9	5	0	9		
	4	2	0	0	2		
	5	3	1	0	3		
		815	**43**	**665**	**150**		
440B	1	242	9	119	123	**150**	**0.0%**
	2	26	0	0	26		
	3	0	1	0	0		
	4	0	2	0	0		
	5	0	1	0	0		
	9 (military)	1	1	0	1		
		269	**14**	**119**	**150**		
442A	1	663	33	663	0	**300**	**0.0%**
	2	347	20	72	275		
	3	20	5	0	20		
	4	4	5	0	4		
	5	0	2	0	0		
	9 (military)	1	0	0	1		
		1,035	**65**	**735**	**300**		
442B	1	487	11	276	211	**300**	**0.0%**
	2	78	9	0	78		
	3	9	6	0	9		
	4	1	3	0	1		
	9 (military)	1	0	0	1		
		576	**29**	**276**	**300**		
443A	1	296	9	273	23	**150**	**0.0%**
	2	122	3	0	122		
	3	4	4	0	4		
	4	1	1	0	1		
		423	**17**	**273**	**150**		
443B	1	213	9	91	122	**150**	**0.0%**
	2	25	2	0	25		
	3	1	0	0	1		
	4	2	1	0	2		
		241	**12**	**91**	**150**		
446A	1	207	8	201	3	**75**	**0.0%**
	2	70	5	0	70		
	3	1	4	0	1		
	4	1	0	0	1		
	5	0	2	0	0		
		276	**19**	**201**	**75**		
446B	1	179	7	155	24	**75**	**0.0%**
	2	50	2	0	50		
	4	0	1	0	0		
	6	1	0	0	1		
		230	**10**	**155**	**75**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
	1	212	11	212	0		
	2	104	5	57	47		
447A	3	3	3	0	3	**50**	**0.0%**
	4	0	3	0	0		
		319	**22**	**269**	**50**		
	1	126	6	96	30		
447B	2	19	4	0	19	**50**	**0.0%**
	3	1	2	0	1		
		146	**12**	**96**	**50**		
	1	412	12	338	74		
	2	25	2	0	25		
448A	3	0	1	0	0	**100**	**0.0%**
	4	1	2	0	1		
	5	0	1	0	0		
		438	**18**	**338**	**100**		
	1	151	10	59	92		
	2	7	1	0	7		
448B	3	0	1	0	0	**100**	**0.0%**
	4	1	0	0	1		
	6	0	1	0	0		
		159	**13**	**59**	**100**		
	1	449	21	467	32		
	2	61	12	0	61		
	3	6	6	0	6		
449A	4	1	2	0	1	**100**	**0.0%**
	5	0	2	0	0		
	6	0	1	0	0		
		567	**44**	**467**	**100**		
	1	178	6	94	84		
	2	15	3	0	15		
449B	3	0	3	0	0	**100**	**0.0%**
	4	1	0	0	1		
		194	**12**	**94**	**100**		
	1	108	6	108	0		
	2	115	3	98	17		
450A	3	6	2	0	6	**25**	**0.0%**
	5	2	0	0	2		
		231	**11**	**206**	**25**		
	1	62	5	62	0		
	2	29	0	5	24		
450B	3	0	1	0	0	**25**	**0.0%**
	4	1	0	0	1		
		92	**6**	**67**	**25**		
	1	235	8	151	84		
	2	9	3	0	9		
	3	5	2	0	5		
451A	4	0	1	0	0	**100**	**0.0%**
	5	2	0	0	2		
	6	0	1	0	0		
		251	**15**	**151**	**100**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
451B	1	217	8	125	92	**100**	**0.0%**
	2	5	3	0	5		
	4	1	0	0	1		
	5	1	0	0	1		
	7	1	0	0	1		
		225	**11**	**125**	**100**		
452A	1	139	12	0	139	**650**	**76.9%**
	2	9	0	0	9		
	3	1	1	0	1		
	4	1	0	0	1		
		150	**13**	**0**	**150**		
452B	1	132	6	0	132	**650**	**79.5%**
	2	1	1	0	1		
		133	**7**	**0**	**133**		
453A	1	259	15	175	84	**100**	**0.0%**
	2	14	3	0	14		
	3	2	1	0	2		
	4	0	2	0	0		
	5	0	1	0	0		
		275	**22**	**175**	**100**		
453B	1	119	6	23	96	**100**	**0.0%**
	2	3	2	0	3		
	3	1	0	0	1		
	4	0	1	0	0		
		123	**9**	**23**	**100**		
454A	1	516	23	284	232	**250**	**0.0%**
	2	16	8	0	16		
	3	2	5	0	2		
	4	0	2	0	0		
		534	**38**	**284**	**150**		
454B	1	322	16	198	124	**150**	**0.0%**
	2	23	3	0	23		
	3	2	0	0	2		
	4	1	2	0	1		
		348	**21**	**198**	**150**		
455A	1	46	1	7	39	**65**	**21.5%**
	2	12	1	0	12		
	3	0	1	0	0		
		58	**3**	**7**	**51**		
455B	1	44	2	0	44	**65**	**29.2%**
	2	2	0	0	2		
		46	**2**	**0**	**46**		
456A	1	296	14	0	296	**400**	**23.3%**
	2	9	2	0	9		
	3	2	0	0	2		
		307	**16**	**0**	**307**		
456B	1	215	10	0	215	**400**	**44.3%**
	2	8	1	0	8		
	3	0	1	0	0		
		223	**12**	**0**	**223**		

Table 25. Continued.

Permit Area Number	Preference Level	Applications		Unsuccessful	Winners	Permits Available	% Under-Subscribed
		Total	Rejected				
457A	1	255	18	255	0	**100**	**0.0%**
	2	159	6	65	94		
	3	4	3	0	4		
	4	1	4	0	1		
	5	1	4	0	1		
		420	**35**	**320**	**100**		
457B	1	173	8	110	63	**100**	**0.0%**
	2	36	0	0	36		
	3	1	1	0	1		
	4	0	2	0	0		
		210	**11**	**110**	**100**		
458A	1	228	5	173	55	**100**	**0.0%**
	2	44	6	0	44		
	3	0	4	0	0		
	5	1	0	0	1		
		273	**15**	**173**	**100**		
458B	1	197	7	137	60	**100**	**0.0%**
	2	40	1	0	40		
	6	0	1	0	0		
		237	**9**	**137**	**100**		
459A	1	308	17	308	0	**150**	**0.0%**
	2	156	4	8	148		
	3	1	4	0	1		
	4	1	2	0	1		
		466	**27**	**316**	**150**		
459B	1	247	11	175	72	**150**	**0.0%**
	2	78	6	0	78		
	3	0	2	0	0		
	4	0	2	0	0		
	5	0	2	0	0		
		325	23	175	150		
463A	1	392	12	138	254	**275**	**0.0%463b**
	2	18	1	0	18		
	3	2	5	0	2		
	4	1	1	0	1		
		413	19	138	275		
463B	1	223	8	0	223	**275**	**17.1%**
	2	3	3	0	3		
	3	2	1	0	2		
		228	12	0	228		
TOTAL		**32,777**	**2,052**	**17,322**	**15,454**	**18,830**	

Table 26. 2007 Special Permit Areas for Firearms Hunters.

Special Hunt	Preference Level	Applications			Winners	Permits Available	Bonus Permits
		Total	Rejected	Unsuccessful			
901 - Rice Lake Nat. Wildlife Refuge	1	95	0	0	95	**100**	**No**
		95	**0**	**0**	**95**		
902 - St. Croix State Park	1	608	0	139	469	**550**	**Yes**
	2	80	0	0	80		
	3	1	0	0	1		
		689	**0**	**139**	**550**		
903 - Savanna Portage State Park	1	58	0	26	32	**55**	**Yes**
	2	22	0	22	0		
	3	2	0	0	2		
		82	**0**	**48**	**34**		
904 - Gooseberry Falls State Park	1	20	0	0	20	**30**	**Yes**
	2	1	0	0	1		
	3	1	0	0	1		
		22	**0**	**0**	**22**		
905 - Split Rock Lighthouse State Park	1	26	0	0	26	**30**	**Yes**
	2	1	0	0	1		
		27	**0**	**0**	**27**		
906 - Tettegouche State Park	1	60	0	0	60	**125**	**Yes**
	2	1	0	0	1		
		61	**0**	**0**	**61**		
907 - Scenic State Park	1	40	0	11	29	**30**	**Yes**
	2	2	0	0	2		
		42	**0**	**11**	**31**		
909 - Lake Bemidji State Park	1	36	0	0	35	**35**	**Yes**
		36	**0**	**0**	**35**		
910 - Zippel Bay State Park	1	65	0	13	52	**55**	**Yes**
	2	3	0	0	3		
		68	**0**	**13**	**55**		
912 - Wild River State Park	1	218	0	153	65	**150**	**Yes**
	2	86	0	0	86		
	3	1	0	0	1		
		305	**0**	**153**	**152**		
913 - Lake Carlos State Park	1	8	0	0	8	**27**	**Yes**
		8	**0**	**0**	**8**		
914 - William O'Brien State Park	1	71	0	31	40	**65**	**Yes**
	2	21	0	0	21		
		92	**0**	**31**	**61**		
915 - Lake Bronson State Park	1	14	0	0	14	**25**	**Yes**
	2	1	0	0	1		
		15	**0**	**0**	**15**		
916 - Maplewood State Park	1	241	0	241	0	**100**	**Yes**
	2	173	0	101	72		
	3	25	0	0	25		
	4	3	0	0	3		
		442	**0**	**342**	**100**		
917 - Rydell NWR	1	9	0	3	6	**7**	**Yes**
	2	1	0	0	1		
		10	**0**	**3**	**7**		
918 - Lake Alexander SNA	1	49	0	10	39	**40**	**Yes**
	2	2	0	0	2		
		51	**0**	**10**	**41**		

Table 26. Continued.

Special Hunt	Preference Level	Applications			Winners	Permits Available	Bonus Permits
		Total	**Rejected**	**Unsuccessful**			
919 - Beaver Creek Valley State Park	1 2 **23**	18 5 **23**	0 0 **0**	3 0 **3**	15 5 **20**	**20**	**Yes**
920 - Zumbro Falls SNA	1 **3**	3 **3**	0 **0**	0 **0**	3 **3**	**12**	**Yes**
921 - Forestville/Mystery Cave SP	1 2 **150**	132 18 **150**	0 0 **0**	40 0 **40**	92 18 **110**	**110**	**Yes**
922 - Frontenac State Park	1 2 **91**	69 22 **91**	0 0 **0**	41 0 **41**	28 22 **50**	**50**	**Yes**
923 - Great River Bluffs SP	1 2 **79**	66 13 **79**	0 0 **0**	0 0 **0**	66 13 **79**	**100**	**Yes**
924 - Zumbro Falls SNA	1 **14**	14 **14**	0 **0**	2 **2**	12 **12**	**12**	**Yes**
925 - Whitewater Refuge	1 2 **65**	64 1 **65**	0 0 **0**	0 0 **0**	64 1 **65**	**75**	**Yes**
926 - Whitewater State Park	1 2 3 **93**	86 6 1 **93**	0 0 0 **0**	43 0 0 **43**	43 6 1 **50**	**50**	**Yes**
927 - Carver Park Reserve	1 2 **178**	157 21 **178**	0 0 **0**	71 0 **71**	86 21 **107**	**105**	**Yes**
928 - Crow Hassan Park Reserve	1 2 3 **100**	86 11 3 **100**	0 0 0 **0**	25 0 0 **25**	61 11 3 **75**	**75**	**Yes**
929 - Vermillion Highlands WMA	1 2 **23**	18 5 **23**	0 0 **0**	3 0 **3**	15 5 **20**	**75**	**Yes**
930 - Buffalo River State Park	1 2 **15**	14 1 **15**	0 0 **0**	0 0 **0**	14 1 **15**	**16**	**No**
931 - Blue Mounds State Park	1 2 **7**	6 1 **7**	0 0 **0**	0 0 **0**	6 1 **7**	**25**	**Yes**
932 - Glacial Lakes State Park	1 2 3 **58**	47 9 2 **58**	0 0 0 **0**	27 0 0 **27**	20 9 2 **31**	**30**	**Yes**
933 - Lake Louise State Park	1 2 **39**	27 12 **39**	0 0 **0**	14 0 **14**	13 12 **25**	**25**	**Yes**
		2,983	**0**	**1,019**	**1,963**	**2,204**	

Table 27. 2007 Special Permit Areas for Muzzleloader Hunters.

Permit Area Number	Preference Level	Applications			Winners	Permits Available	Bonus Permits
		Total	Rejected	Unsuccessful			
935 - Jay Cooke SP	1 2 3 **324**	250 69 5 **324**	0 0 0 **0**	204 0 0 **204**	46 69 5 **120**	**120**	**Yes (4)**
936 - Crow Wing SP	1 2 3 **213**	100 75 38 **213**	0 0 0 **0**	100 73 0 **173**	0 2 38 **40**	**40**	**Yes (4)**
937 - Lake Shetek SP	1 2 4 **100**	58 41 1 **100**	0 0 0 **0**	58 16 0 **74**	0 25 1 **26**	**25**	**Yes (1)**
938 - Sibley SP	1 2 3 **90**	64 25 1 **90**	0 0 0 **0**	50 0 0 **50**	14 25 1 **40**	**40**	**No**
939 - Myre Big Island SP	1 2 3 **68**	35 29 4 **68**	0 0 0 **0**	27 0 0 **27**	8 29 4 **41**	**40**	**Yes (1)**
940 - Lake Louise SP	1 2 **46**	43 3 **46**	0 0 **0**	21 0 **21**	22 3 **25**	**25**	**Yes (4)**
941 - Interstate SP	1 2 **9**	7 2 **9**	0 0 **0**	0 0 **0**	7 2 **9**	**25**	**Yes (4)**
942 - Nerstrand Big Woods SP	1 2 3 **171**	107 51 13 **171**	0 0 0 **0**	107 14 0 **121**	0 37 13 **50**	**50**	**Yes (1)**
943 - Vermillian Highlands WMA	1 2 3 **43**	30 8 5 **43**	0 0 0 **0**	23 0 0 **23**	7 8 5 **20**	**20**	**Yes (1)**
TOTAL		**1,055**	**0**	**693**	**362**	**385**	

2007 ELK HARVEST REPORT

Joel Huener, Thief Lake Wildlife Management Area

INTRODUCTION

Minnesota has two populations of elk. The first herd lives in the area north of Grygla on a combination of public and private lands, and can trace its origins back to re-introduction efforts in the area in 1935 (Figure 1). The second herd lives along the Manitoba/Kittson County border, and is comprised of animals that have moved in from Canada.

The Minnesota Legislature provided for the opportunity for sport hunting of elk in 1987 to help alleviate depredation concerns in the Grygla herd range, and to provide for the unique recreational opportunity this affords. Hunting this population is permitted whenever the pre-calving population exceeds 20 animals.

METHODS

Population estimates for these two herds are based on helicopter surveys done between December and March, when snow conditions and the lack of leaf cover permits good visibility of elk. Surveys are undertaken with DNR – Wildlife personnel from Thief Lake WMA and the Karlstad area office with DNR aircraft and pilots. Areas are covered using transects at 1/5 mile intervals in the Grygla herd range, and 1/3 mile intervals in the Border herd range. Transects are programmed into GPS based systems on the aircraft.

Further information on herd composition is derived from ground surveys driven during early morning hours in the respective elk ranges. Because the Border herd winters on both sides of the border, coordination between the Province of Manitoba and Minnesota DNR is necessary, and has not been possible in all years.

When the pre-calving population in the Grygla herd is above 30, a recommendation for hunting seasons and permit numbers is forwarded to the Region and St. Paul based on herd composition. Elk hunting in Minnesota is a once-in-a-lifetime opportunity, and hunters may apply for permits singly or in parties of two (receiving one permit between them). Permits are distributed based on a lottery. Successful applicants must attend a mandatory orientation at Thief Lake WMA, and animals taken must be registered there, where biological samples are taken.

RESULTS

The pre-calving population for the Grygla elk herd in 2007 was 54 animals (see Figure 2). Based on the survey and observed bull mortality since the 2006 hunting season, a bull season was not offered in 2007. Two different antlerless hunts with three permits each were authorized for September 15-23, and December 1-9, 2007. This was the first time that an antlerless elk hunt was held in September, and the opportunity was offered since it did not conflict with a concurrent bull hunt. The Border herd is not hunted at this time in the U.S., and their survey information is presented in Figure 3.

Harvest statistics for this season and a comparison with previous years is presented in Table 1. The elk rut was going on during the first antlerless hunt, and all three parties were able to fill their tags. One cow was taken on each of the first two days of the season, and a third was taken on the fifth day of the season. Snow was present during the second antlerless hunt, and all three parties took cows. The first cow wasn't taken until the fifth day of the season, while a second was taken the following day. The last animal wasn't taken until the eighth day of the hunt. Biological samples to examine elk health and screen for bovine tuberculosis were collected from all animals.

Figure 1. Current elk range in Minnesota, 2007.

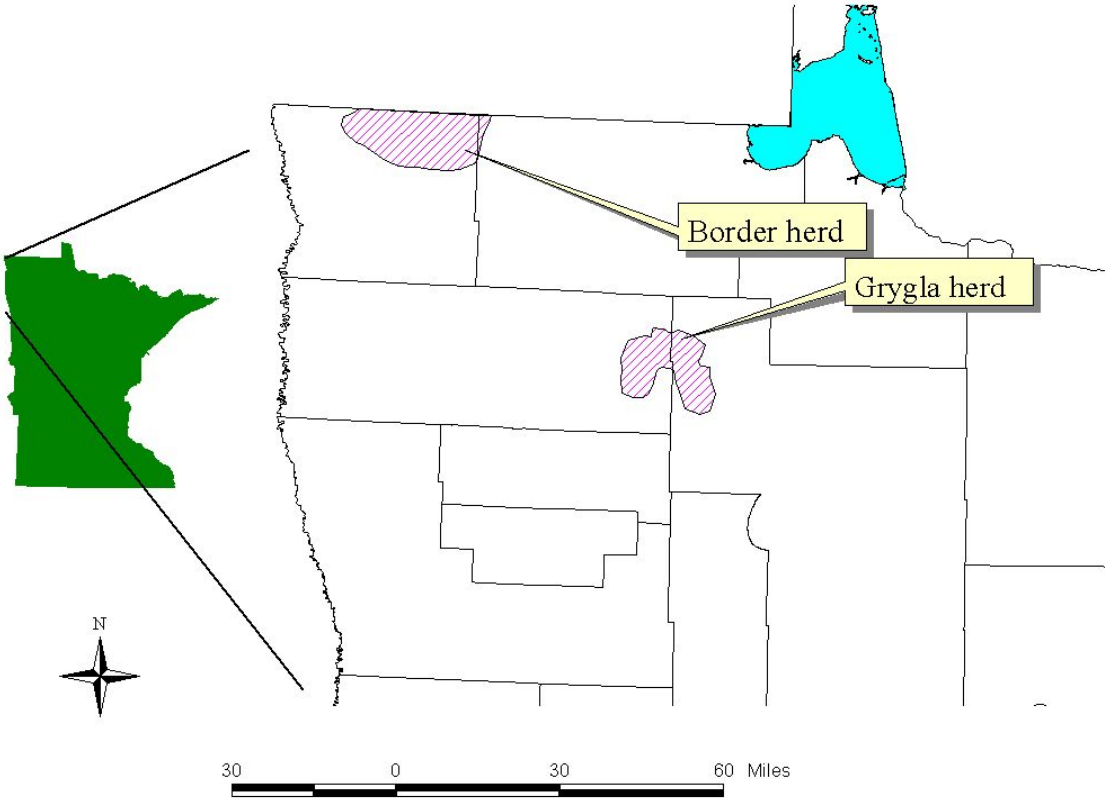


Figure 2. Pre-calving elk numbers in the Grygla herd, 2007.

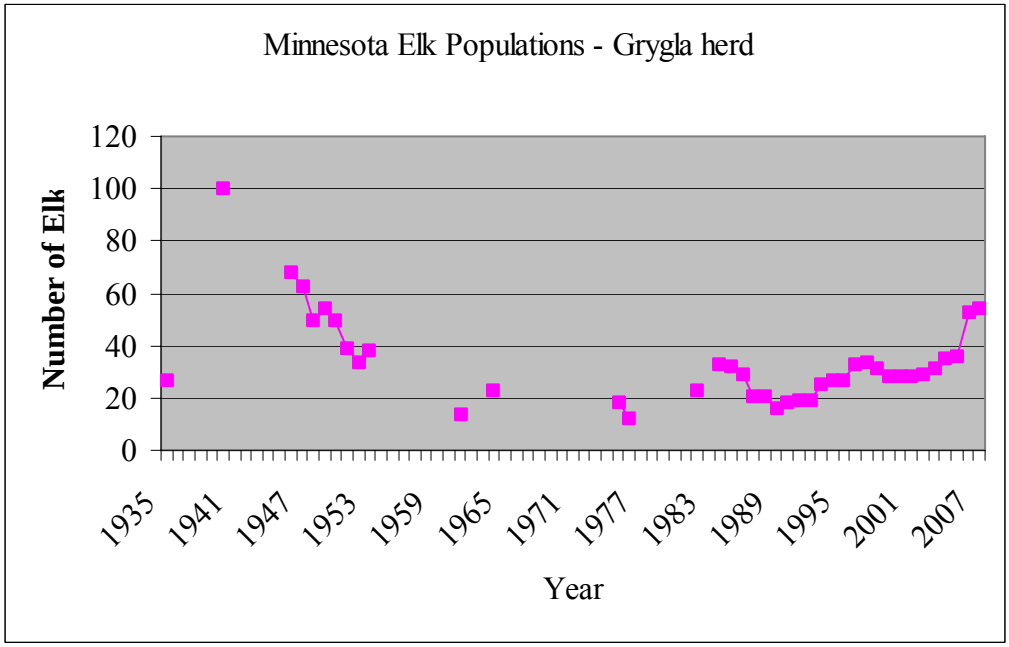


Figure 3. Pre-calving elk numbers in the Border herd, 2007.

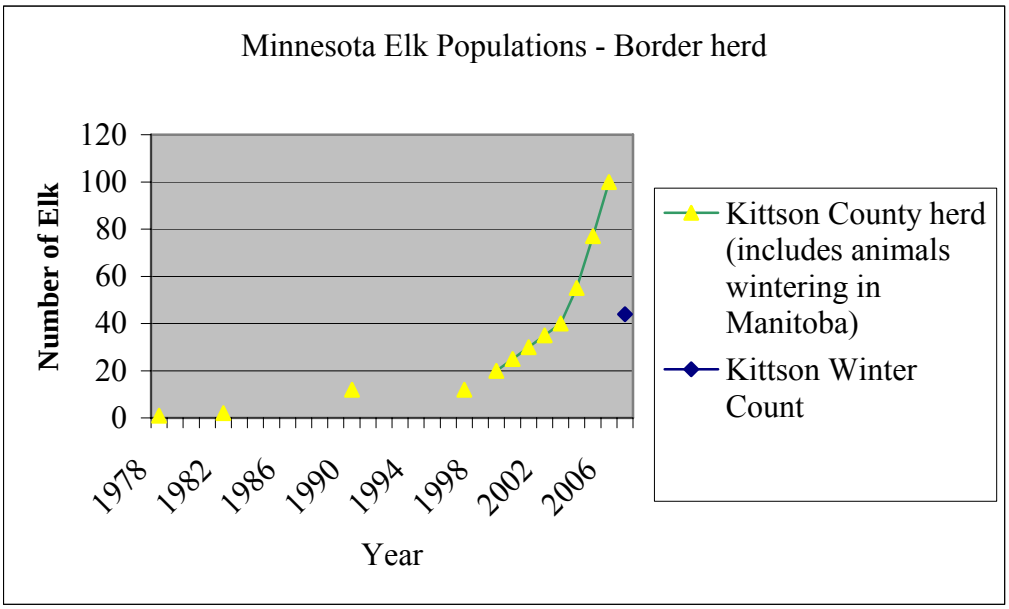


Table 1. Minnesota elk harvest by year including 2007.

	Bulls		Antlerless	
Year	**Permits**	**Harvest**	**Permits**	**Harvest**
1987	2	1	2	1
1996	2	2	7(1 alternate)	6
1997	5(2 alternate)	1	5(2 alternate)	2
1998	4(2 alternate)	2	0	0
2004	1	1	4	2
2005	1	0	4	0
2006	2	2	6	2*
2007			6	6
Total	17(3 alternate)	9	34	19*

*One of two elk taken was actually a spike bull

2007 MINNESOTA MOOSE HARVEST

Mark S. Lenarz, Forest Wildlife Populations and 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. Information on permit numbers and moose harvested by members of the 1854 Treaty 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 2007, 155 moose were harvested in northeastern Minnesota. No season was held in northwestern Minnesota. The State of Minnesota sold licenses to 229 hunting parties and hunters killed 115 bull moose (Table 1). This year, it was a bulls only season. Table 1 also lists the number of permits offered, chance of being selected for a permit, and hunter success. The 1854 Treaty Authority issued 51 hunter permits and 4 subsistence permits. Band members killed 26 moose (18 bulls and 8 cows). The Fond du Lac band issued a total of 70 permits and the preliminary harvest (as of 10/19/2007) was 14 moose (bulls only). The Fond du Lac season closes 12/31/2007.

DISCUSSION

The success rate of State hunters in 2007 was 50%, a decrease of 10% over 2006 (Tables 1 and 2). This year's hunt was for bulls only, however. In 2005, and 2006, hunter success for bulls was 50% and 49%, respectively. The success rate for members of the 1854 Treaty Authority was 43%. The preliminary success rate for the Fond du Lac band was 20%, as of 10/19/2007.

Table 1. Moose harvested, licenses offered and sold, application rate, and party success, in 2007 moose hunt by State hunters in northeastern Minnesota

Zone	Bulls	Cows	Total	Licenses Offered	Licenses Sold*	Party Applications**	Chances for Permit	% Success
20	4	0	4	12	11	66	18%	36%
21	7	0	7	10	10	139	7%	70%
22	4	0	4	7	7	52	13%	57%
23	1	0	1	5	4	43	12%	25%
24	6	0	6	6	7	173	3%	86%
25	7	0	7	8	8	205	4%	88%
26	2	0	2	4	4	5	80%	50%
27	1	0	1	4	4	17	24%	25%
28	3	0	3	9	9	87	10%	33%
29	4	0	4	5	5	130	4%	80%
30	4	0	4	10	10	174	6%	40%
31	14	0	14	16	16	311	5%	88%
32	2	0	2	5	4	19	26%	50%
33	3	0	3	7	7	80	9%	43%
34	1	0	1	6	6	68	9%	17%
36	2	0	2	13	12	34	38%	17%
37	1	0	1	3	3	14	21%	33%
60	3	0	3	7	7	43	16%	43%
61	4	0	4	10	9	48	21%	44%
62	12	0	12	22	22	146	15%	55%
63	1	0	1	5	5	27	19%	20%
64	1	0	1	8	8	53	15%	13%
70	3	0	3	5	5	109	5%	60%
72	7	0	7	12	12	103	12%	58%
73	4	0	4	5	5	75	7%	80%
74	3	0	3	4	4	37	11%	75%
76	2	0	2	6	6	93	6%	33%
77	5	0	5	10	10	103	10%	50%
79	1	0	1	5	5	44	11%	20%
80	3	0	3	4	4	68	6%	75%
Total	115	0	115	233	229	2566	9%	50%

*Application error resulted extra licenses sold in zones 74 and 76

**Number of 2, 3, or 4 person parties - rejected applications

Table 2. Applicants, permit numbers, moose harvested, and success rates of state moose hunters since 1993.

	Northwest				Northeast				
Year	Party Applicants	Permits	Moose Harvested	Party Success	Party Applicants	Permits	Licenses Purchased	Moose Harvested	Party Success
1993	6,558	446	422	95%	2,934	315	315	264	84%
1994	8,208	262	244	93%	3,022	189	189	155	82%
1995	7,622	191	171	90%	3,181	188	188	156	83%
1996	2,476	39	38	97%	3,830	207	207	156	75%
1997		No Season			3,958	198	198	152	77%
1998		No Season			4,157	182	182	125	69%
1999		No Season			3,919	189	189	136	72%
2000		No Season					No Season		
2001		No Season			3,164	182	176	125	71%
2002		No Season			2,580	208	202	141	70%
2003		No Season			2,328	224	217	144	66%
2004		No Season			3,062	246	240	151	63%
2005		No Season			3,060	284	276	164	59%
2006		No Season			2,952	279	269	161	60%
2007		No Season			2,566	233	229	115	50%

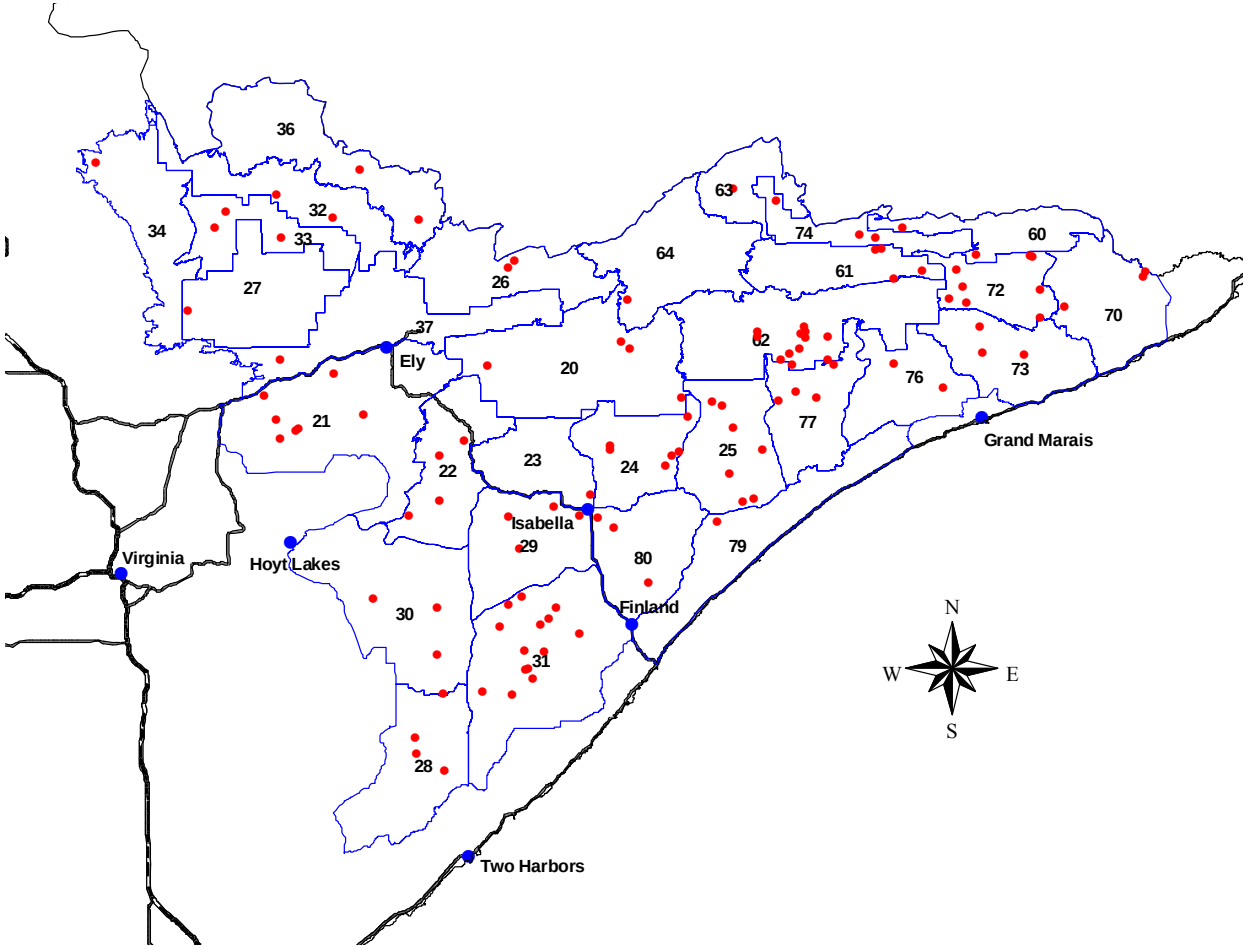


Figure 1. 2007 moose harvest and hunting zones in northeastern Minnesota.

TRAPPING HARVEST STATISTICS

Division of Fish and Wildlife
500 Lafayette Road, Box 20
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2007 TRAPPER HARVEST SURVEY

Margaret Dexter, Wildlife Research Unit

INTRODUCTION

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

METHODS

The Research Surveys and Statistics unit requests a list of all active trapper license holders from the Electronic License System database in late February. The sample consisted of all valid Regular, Junior and Non-resident Trapper License holders. For the 2007-08 trapping season there were 5,756 Resident Regular Trappers, 589 Resident Junior Trappers, 786 Resident Senior Trappers, 33 Lifetime Trappers, and 3 Nonresident (MN landowners) Trappers surveyed. Of the 7,167 valid licenses, 6,342 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 for Harvest Statewide and by License type, in tabular form (Tables 1 – 5).

Table 1. Trapper response to mail surveys, 1988-83 through 2007-08.

Year	Number mailed	Number not delivered	Delivered questionnaires completed and returned	
			Number	Percent
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
2006-07	8,508	139	5,835	69.9
2007-08	6,342	104	4,326	69.9

Table 2. Use of trapper licenses, 1995-96 through 2007-08.

		Return from mail survey	Projections from license sales
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]
2006-07	Trapped	4,782 (81.9%)	7,008
	Did not trap	1,053 (18.1%)	1,549
		5,835 (100.0%)	8,557[a]
2007-08	Trapped	3,322 (77.2%)	5,533
	Did not trap	980 (22.8%)	1,634
		4,302 (100.0%)	7,167[a]

[a] excludes duplicates.

Table 3. Estimated number of trappers of various furbearers, 1993-94 through 2007-08.

Estimated number of trappers (thousands)															
	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	2006-07	2007-08
Muskrat	3	4	3	4	4	3	2	2	2	2	2	2	2	4	2
Mink	3	3	2	3	3	3	2	2	2	2	2	2	2	3	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 -Feb)	3	3	2	3	3	3	2	2	2	2	2	3	2	4	3
Raccoon (Mar –Aug)[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	2	1
Eastern spotted skunk	<1	<1	<1	Closed	Closed	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	2	1
Red fox (Sept -Feb)	2	2	2	2	2	1	1	1	1	1	1	1	1	2	1
Red fox (Mar -Aug)[a]		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Gray fox	<1	<1	<1	n.a.	<1	<1	<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 -Feb)	2	3	2	2	3	3	2	2	2	2	2	2	2	3	2
Beaver (Mar -Apr)	1	2	1	2	2	2	1	1	1	1	1	1	1	2	1

[a] Raccoon and red fox season continuous May 1994 thru March 15, 2006.

Table 4. Estimated take per trapper of various furbearers, 1993-94 through 2007-2008.

	Estimated take per successful trapper reporting that species														
	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	2006-07	2007-08
Muskrat	64	90	70	55	58	42	46	42	42	35	33	32	39	58	32
Mink	12	12	11	11	11	13	14	12	14	10	9	10	10	9	9
Short-tailed weasel	6	12	10	9	10	7	5	8	10	7	7	6	6	9	7
Long-tailed weasel	4	6	5	5	5	5	5	5	7	4	5	3	3	5	5
Raccoon (Sept -Feb)	5	20	23	23	24	23	20	20	27	25	22	23	21	21	23
Raccoon (Mar -Aug)[a]		15	15	13	14	15	14	11	19	12	15	12	11		
Striped skunk	9	8	8	10	10	9	8	8	8	8	8	8	7	7	7
Eastern spotted skunk	6	4	5	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Badger	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2
Opossum	8	9	9	9	9	11	13	11	8	11	12	14	12	14	12
Red fox (Sept -Feb)	11	11	9	7	7	5	6	6	6	6	5	4	4	4	3
Red fox (Mar -Aug)[a]		9	5	4	4	3	4	4	5	5	6	3	3		
Gray fox	3	2	2	n.a.	3	3	2	2	2	2	2	2	2	2	2
Coyote	5	4	5	4	3	3	4	4	4	4	5	4	5	4	4
Beaver (Oct -Feb)	16	18	14	16	16	16	16	15	18	13	12	13	13	13	11
Beaver (Mar -Apr)	29	37	29	31	32	29	27	26	31	26	21	26	24	24	19

[a] Raccoon and red fox season continuous May 1994 thru March 15, 2006.

Table 5. Minnesota trapper license sales and estimated annual harvest, 1993-94 through 2007-2008[a]

	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	2006-07	2007-08
Trapper license sales[b]	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	8,557	7,167
Estimated harvest[c] (thousands)															
Muskrat	202	355	195	202	194	131	97	86	101	75	69	72	91	243	75
Mink	33	40	26	35	34	36	27	23	29	20	17	21	18	26	19
Short-tailed weasel	2	6	4	4	4	2	2	3	4	3	4	3	2	8	4
Long-tailed weasel	1	3	2	2	2	2	2	1	2	1	2	1	1	3	2
Raccoon (Sept -Feb)	56	58	53	69	66	64	37	32	60	61	54	57	49	79	73
Raccoon (Mar -Aug)[f]		1	5	5	5	7	4	4	6	4	5	5	4		
Striped skunk	9	9	8	11	11	9	5	5	7	8	8	9	7	11	11
Eastern spotted skunk[g]	<1	<1	<1	Closed	Closed	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	5	6	6	6	7	6	5	5	8	11	14	12	20	17
Red fox (Sept -Feb)	22	24	14	13	12	6	7	6	7	8	7	5	4	7	4
Red fox (Mar -Aug)[f]		1	1	1	1	<1	<1	<1	<1	1	1	<1	<1		
Gray fox	1	1	1	n.a.	1	1	1	<1	1	1	1	1	1	2	1
Coyote	4	5	3	3	3	2	2	2	2	4	4	4	4	5	5
Beaver (Oct -Feb)	29	49	25	38	36	39	31	25	36	24	23	29	26	34	22
Beaver (Mar -Apr)	32	64	41	48	47	55	36	37	42	34	26	38	35	42	26
Registered harvest															
Otter	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	2,720	1,861
Lynx[g]	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Bobcat[e]	201	238	134	223	359	103	206	231	250	544	483	631	590	890	702
Fisher	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	3,251	1,682
Marten	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	3,788	2,221

[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. Nonresident (MN Landowner) licenses started in 2004. Senior trapping licenses were first issued in 2007. Lifetime Licenses became available for free when renewing lifetime sports or small game licenses in 2007. As of March 3, 2008 7,167 trapping licenses were sold in 2007 589 (8.2%) were juvenile licenses, 5,756 (80.3%) were Regular adult licenses, 786 (1.1%) were Senior licenses, 33(<1%) were Lifetime licenses, and 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 season continuous May 1994 thru March 15, 2006.

[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 2007-2008 HUNTING AND TRAPPING SEASON

Jason Abraham, Wildlife Furbearer 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 July 2008, questionnaires were mailed to the 32 licensed fur buyers in Minnesota. The survey asked them to report the number and type of fur purchased from Minnesota trappers and hunters in 2007-08 and the "average price" paid to those hunters and trappers based on all furs purchased. A total of 20 usable surveys were received, for a return rate of 62.5 percent.

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 2007-08 was 944,859, a decrease of about 47 percent from 2006-07.

RESULTS

Survey summaries are presented in the following tables.

Table 1. Minnesota fur prices as reported by licensed fur dealers, 2007-08.

Species	Number Buyers	Number Pelts	Minimum Price	Maximum Price	Weighted Mean
Muskrat	23	79,358	$2.00	$7.00	$5.81
Mink, female	21	4,105	$5.00	$18.00	$13.22
Mink, male	21	4,408	$6.00	$20.00	$18.05
Raccoon	23	43,824	$8.00	$14.90	$11.93
Red fox	22	1,811	$10.00	$22.00	$17.88
Gray fox	20	366	$15.00	$30.00	$22.29
Coyote	22	3,724	$8.00	$49.00	$17.79
Bobcat	18	335	$43.33	$110.00	$101.83
River Otter	18	629	$30.00	$60.00	$42.29
Beaver, fall	22	9,335	$7.00	$22.00	$18.39
Beaver, spring	20	7,811	$8.00	$16.00	$14.92
LT weasel	19	193	$3.00	$5.00	$4.35
ST weasel	19	601	$1.00	$8.00	$3.72
Striped skunk	18	407	$2.00	$6,357.00	$4.42
Badger	18	182	$8.52	$26.00	$15.73
Opossum	18	885	$0.40	$3.00	$1.53
Fisher, male	19	706	$25.00	$90.00	$77.37
Fisher, female	18	461	$45.00	$80.00	$68.50
Marten, male	15	307	$40.00	$80.00	$74.10
Marten, female	17	173	$35.00	$75.00	$66.13
Deer Hides	21	20,357	$2.50	$7.00	$4.39
Bear Hides	17	70	$25.00	$53.00	$43.96

Table 2. Average price per pelt paid to hunters and trappers in Minnesota, 1992-93 through 2007-08.

Species	Average pelt prices paid hunters and trappers in Minnesota (dollars)															
	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	2006-07	2007-08
Muskrat	1.35	1.35	1.61	1.53	3.49	2.24	1.11	1.57	1.83	2.32	2.11	2.05	1.9	2.81	5.79	2.96
Mink (female)	15.02	12.18	11.43	8.56	13.71	9.65	6.11	8.22	7.7	6.76	6.52	7.23	10.22	10.23	13.18	9.05
Mink (male)	24.74	21.89	14.9	11.75	20.82	13.52	9.83	11.61	11.15	9.34	9.55	11.41	11.34	14.29	18.04	12.32
S.T. Weasel	1.31	1.72	1.73	1.84	2.32	2.33	1.72	2.16	2.3	2.41	2.63	2.53	2.52	2.6	3.58	3.18
L.T. Weasel	1.06	1.05	2.05	1.24	3.33	2.67	2.05	2.34	1.8	2.98	1.94	3.34	3.05	2.56	4.35	5.00
Raccoon	7.29	8.26	9.02	9.4	15.16	13.92	7.25	5.09	8.86	9.53	10.33	11.45	10.49	9.61	11.92	14.32
Striped Skunk	2.69	3.7	3.52	3.21	2.11	3.18	4.72	4.4	4.79	3.91	5.81	4.66	3.95	3.77	4.46	5.27
Badger	4.2	4.62	6.12	6.33	8.49	6.53	6.3	7.3	10.15	9.39	13.18	14.23	12.94	13.4	15.71	13.92
Opossum	0.78	0.89	0.98	0.97	1.04	1.1	0.58	0.96	0.97	1.19	1.22	1.23	1.51	1.4	1.52	1.76
Red Fox	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	17.68	14.69
Gray Fox	6.73	6.55	9.69	7.49	9	7.69	5.63	7.06	7.52	8.36	9.05	13.64	12.58	15	22.36	30.09
Coyote	15.55	14.68	13.55	10.89	12.25	10.12	5.57	9.42	12.4	13.37	16.12	18.37	15.24	13.57	17.76	13.51
Bobcat	28.18	43.42	36.36	31.81	32.82	30.39	27.66	24.23	33.09	46	71.54	95.9	98.99	95.74	101.07	93.41
Beaver (fall-winter)	7.1	11.24	13.8	12.56	19.24	16.48	11.4	11.51	14.66	12.74	10.05	12.57	13.62	14.48	18.35	14.60
Beaver (spring)	7.89	9.41	14.48	10.96	19.14	17.39	14.06	11.02	12.8	12.47	9.99	11.09	13.8	16.49	14.81	17.77
Otter	29.9	43.14	47.5	38.76	38.75	39.81	34.03	41.41	50.52	46.19	61.16	85.33	87.23	88.89	42.85	29.49
Fisher (male)	15.73	14.17	19.06	16.17	25.48	31.09	18.92	19.45	20.14	23.18	26.7	27.15	30.02	36.03	76.33	63.09
Fisher (female)	28.79	28.4	29.93	24.9	34.47	33.65	21.76	19.91	19.01	22.86	25.44	25.71	27.47	31.46	67.82	48.24
Marten (male)	27.87	35.86	34.07	28.3	34.47	27.82	19.7	24.89	27.56	24.1	28	30.09	30.65	37.47	74.04	58.72
Marten (female)	24.96	29.58	28.34	21.42	29.26	21.79	16.12	21.27	21.25	22.52	27.3	26.7	27.42	31.53	66.09	50.05
Deer Hides	5.67	5.27	7.17	6.92		6.97	6.4	6.32	6.46	2.86	3.48	5.41	3.95	4.14	4.51	3.92
Bear Hides	30.21	46.77	38.93	50.72		37.27	36.23	33.87	39.81	36.1	40.56	41.55	46.61	39.3	43.03	36.57

REGISTERED FURBEARER HARVEST STATISTICS

Forest Wildlife Populations and Research Group
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REGISTERED FURBEARER HARVEST STATISTICS
2007-08 Report

John Erb, Forest Wildlife Populations and Research Group
Drawing by Gilbert Proulx

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 30 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. The fisher and marten harvest season was shortened this year from 16 days to 9 days. The otter-trapping zone was expanded this year to include more areas in central Minnesota, as well as a portion of southeast Minnesota (Figure 4).
NOTE: This report does not include tribal harvests, or any confiscations.

Table 1. Registered furbearer harvests and total permits[a] issued, 1983-2007.

	Bobcat		Fisher		Marten		Otter	
Year	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
1983-84	--	208	--	631	--	--	--	408
1984-85	--	280	--	1,289	--	--	--	529
1985-86	--	119	--	678	746	430	--	559
1986-87	--	160	3,302	1,067	2,171	798	3,198	777
1987-88	--	212	4,952	1,641	3,025	1,363	4,708	1,386
1988-89	--	141	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	1,772	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
2006-07	--	890	--	3,251	--	3,788	--	2,720
2007-08	--	702	--	1,682	--	2,221	--	1,861

[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.

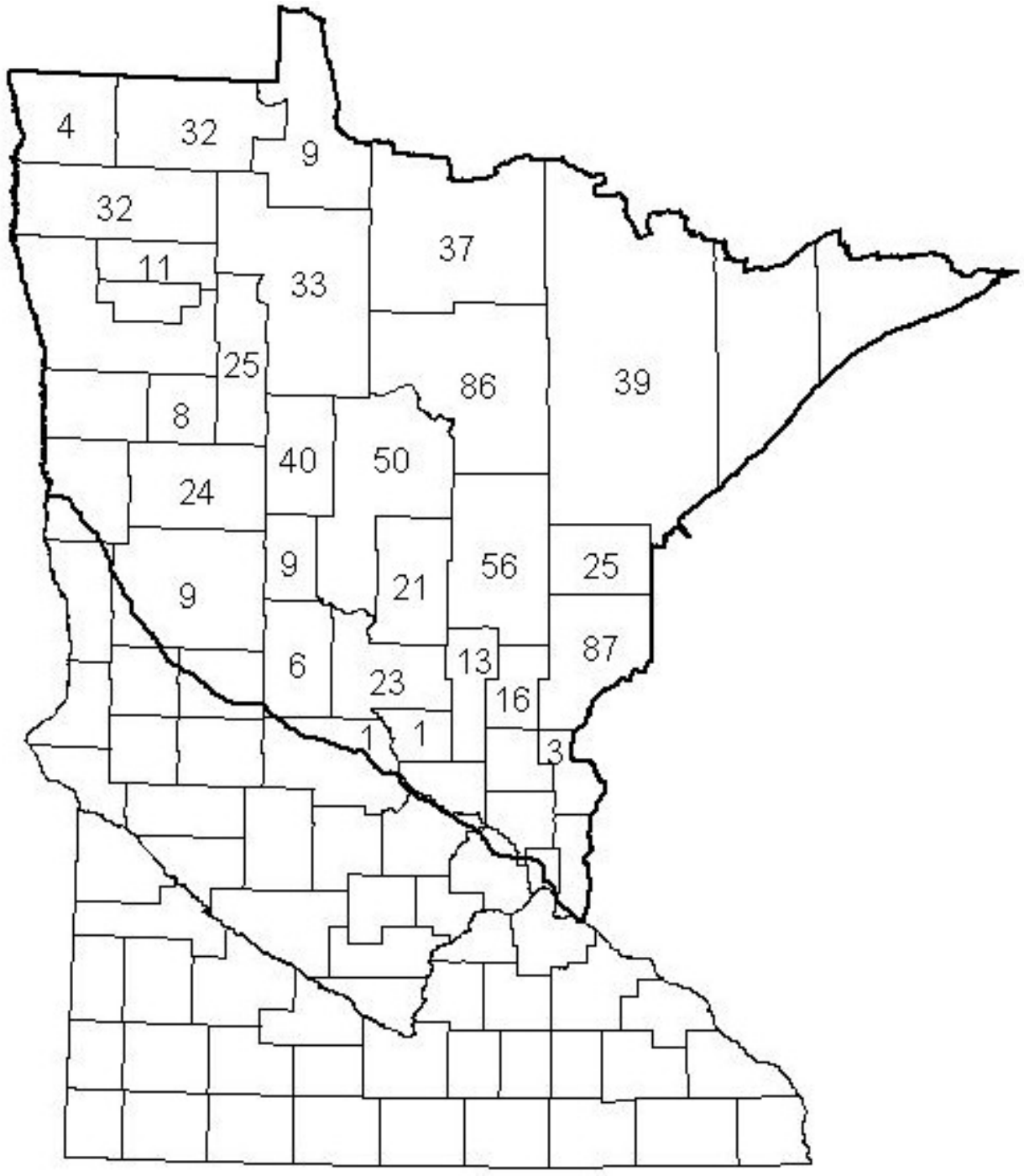

Figure 1. Bobcat harvest by county, 2007-08.

Table 2. Bobcat harvest by county and sex, 2007-08.

County	Sex*			Total
	Male	Female	Unknown	
Aitkin	17	39		56
Becker	9	15		24
Beltrami	13	20		33
Benton	0	1		1
Carlton	13	12		25
Cass	27	23		50
Chisago	2	1		3
Clay	0	0		0
Clearwater	11	14		25
Cook	0	0		0
Crow Wing	7	14		21
Hubbard	15	25		40
Isanti	0	0		0
Itasca	37	49		86
Kanabec	9	7		16
Kittson	2	2		4
Koochiching	14	23		37
Lake	0	0		0
LOW	7	2		9
Mahnomen	5	3		8
Marshall	24	8		32
Mille Lacs	3	10		13
Morrison	7	16		23
Norman	0	0		0
Ottertail	3	6		9
Pennington	2	9		11
Pine	26	60	1	87
Polk	0	0		0
Red Lake	0	0		0
Roseau	16	16		32
St. Louis	12	22	5	39
Stearns	1	0		1
Todd	4	2		6
Wadena	5	4		9
Unknown	1	1		2
Total	292	404	6	702

* 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, 1997-2007.

County	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Aitkin	19	6	25	32	20	35	19	37	32	46	56
Becker	10	1	8	6	28	26	19	28	19	46	24
Beltrami	37	7	13	16	26	63	47	66	34	90	33
Benton	0	0	0	0	0	0	0	0	0	0	1
Carlton	18	4	10	12	14	11	20	27	25	34	25
Cass	64	16	24	11	17	59	48	56	103	137	50
Chisago	0	0	0	0	0	1	0	0	0	0	3
Clay	0	0	0	0	0	0	1	0	0	0	0
Clearwater	14	1	4	0	6	24	19	18	18	42	25
Cook	0	0	0	0	0	1	1	2	3	0	0
Crow Wing	8	15	21	13	4	20	15	19	18	27	21
Hubbard	19	1	7	4	10	31	21	35	22	69	40
Isanti	0	0	2	0	0	0	2	0	1	0	0
Itasca	45	10	23	40	33	74	76	93	68	113	86
Kanabec	13	3	4	11	8	10	9	17	11	14	16
Kittson	0	0	7	6	7	5	8	6	3	5	4
Kooch	14	2	8	11	12	23	25	14	22	16	37
Lake	0	1	0	1	0	0	0	1	2	1	0
LOW	0	2	2	3	0	6	4	6	3	2	9
Mahnomen	2	0	1	1	1	0	3	7	2	7	8
Marshall	28	4	10	2	4	24	14	20	16	19	32
Mille Lacs	0	0	1	2	0	10	4	11	9	8	13
Morrison	1	2	6	8	4	6	14	18	18	17	23
Norman	0	0	0	0	0	0	0	0	0	1	0
Ottertail	2	0	0	0	1	0	0	5	1	7	9
Pennington	1	0	0	1	1	1	0	6	3	2	11
Pine	23	12	15	21	23	49	44	59	47	59	87
Polk	1	0	0	1	0	2	2	4	1	3	0
Red Lake	0	0	0	2	0	1	1	0	6	1	0
Roseau	15	3	7	12	18	22	28	27	28	36	32
St. Louis	14	10	5	9	7	30	25	37	44	45	39
Stearns	0	0	0	0	0	0	0	0	0	0	1
Todd	0	2	1	0	1	3	6	5	7	12	6
Wadena	5	1	2	0	5	7	8	3	17	16	9
Unknown	4	0	0	4	0	0	0	4	7	15	2
Total	357	103	206	229	250	544	483	631	590	890	702

Table 4. Bobcat harvest by sex and week, 2007-08 season.

Date	Sex*			Total	% of Total	Cumulative %
	Male	Female	Unknown			
Nov.24 - Nov.30	63	69	5	137	19.52	19.52
Dec.1 - Dec.7	52	71		123	17.52	37.04
Dec.8 - Dec.14	42	61	1	104	14.81	51.85
Dec.15 - Dec.21	47	67		114	16.24	68.09
Dec.22 - Dec.28	36	59		95	13.53	81.62
Dec.29 - Jan.6**	48	75		123	17.52	99.15
Unknown	4	2		6	0.85	100%
Total	292	404	6	702	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, 1985-2007.

Number (%) of Takers	Number Taken					
	1	2	3	4	5	Total Takers
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
2006-07	265 (57)	90 (19)	44 (9)	25 (5)	42 (9)	466
2007-08	212 (58)	71 (19)	30 (8)	16 (4)	38 (10)	367

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

Table 6. Bobcat harvest by method of take, 1981-2007.

	Total	Trapping					Hunting				
Year	Harvest[a]	Harvest	% of Total	# Takers	Ave. Take	% Males[b]	Harvest	% of Total	# Takers	Ave. Take	% Males[b]
1981-82	259	218	84	142	1.5		41	16	30	1.4	
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
2006-07	890	779	88	391	2.0	45	111	12	81	1.4	57
2007-08	702	524	75	266	2.0	40	178	25	110	1.6	48

[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

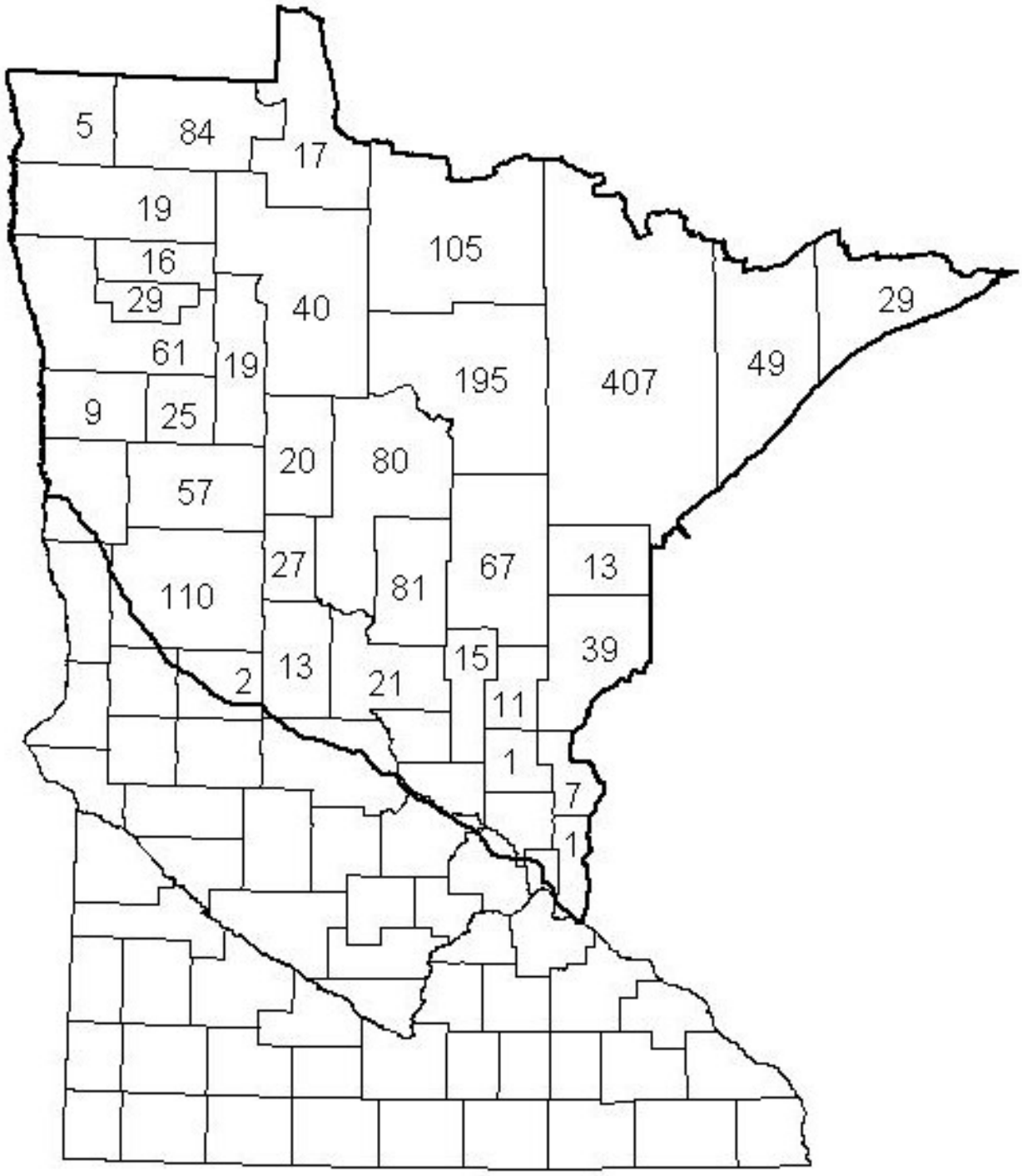

Figure 2. Fisher harvest by county, 2007-08.

Table 7. Fisher harvest by county and sex, 2007-08 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	32	35		67
Anoka	0	0		0
Becker	33	24		57
Beltrami	17	23		40
Benton	0	0		0
Carlton	10	3		13
Cass	51	29		80
Chisago	3	4		7
Clay	0	0		0
Clearwater	12	7		19
Cook	11	18		29
Crow Wing	47	34		81
Douglas	1	1		2
Hubbard	12	8		20
Isanti	0	1		1
Itasca	90	105		195
Kanabec	6	5		11
Kittson	2	3		5
Koochiching	47	58		105
Lake	25	24		49
LOW	8	9		17
Mahnomen	11	14		25
Marshall	8	11		19
Mille Lacs	10	5		15
Morrison	9	12		21
Norman	4	5		9
Ottertail	62	48		110
Pennington	5	11		16
Pine	21	18		39
Polk	31	27	3	61
Red Lake	18	11		29
Roseau	44	40		84
St. Louis	206	201		407
Sherburne	0	0		0
Stearns	0	0		0
Todd	7	6		13
Wadena	15	12		27
Washington	1	0		1
Unknown	5	2	1	8
Total	864	814	4	1,682

Table 8. Comparison of fisher harvest by county, 1996-2007.

County	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Aitkin	58	86	105	84	68	103	122	124	96	97	156	67
Anoka	0	0	0	0	0	0	0	1	0	0	0	0
Becker	15	25	15	32	42	46	96	88	92	49	87	57
Beltrami	84	140	105	70	60	73	117	74	71	47	54	40
Benton	0	0	0	0	0	0	0	1	0	1	1	0
Carlton	10	45	25	23	27	37	48	42	40	35	49	13
Cass	142	212	133	123	122	134	225	205	186	149	209	80
Chisago	0	0	1	0	3	2	6	5	6	2	18	7
Clay	0	0	0	0	0	0	0	0	0	0	1	0
Clearwater	6	31	18	13	15	45	45	52	41	35	54	19
Cook	12	24	26	19	19	33	27	28	24	40	35	29
Crow Wing	32	65	75	53	71	82	106	106	113	79	140	81
Douglas	0	0	0	0	1	0	0	3	3	3	6	2
Hubbard	30	66	38	34	34	64	59	62	32	20	51	20
Isanti	0	0	0	0	0	0	0	0	2	3	5	1
Itasca	291	477	441	248	288	298	354	319	323	320	405	195
Kanabec	6	7	3	11	4	4	19	21	13	15	26	11
Kittson	0	7	3	3	3	7	3	11	2	7	2	5
Koochiching	232	386	369	150	159	156	178	171	179	209	221	105
Lake	60	123	84	46	62	54	72	74	87	85	87	49
LOW	30	59	99	83	71	48	115	78	33	63	74	17
Mahnomen	0	0	0	3	0	12	16	14	13	9	27	25
Marshall	4	21	7	10	27	19	18	21	25	18	26	19
Mille Lacs	6	0	3	0	4	3	16	22	14	16	20	15
Morrison	0	0	0	2	0	1	6	3	7	5	23	21
Norman	0	0	0	6	0	0	1	1	11	6	4	9
Ottertail	0	0	1	0	0	1	12	40	52	60	158	110
Pennington	1	1	0	2	4	4	10	18	42	22	22	16
Pine	24	34	55	36	37	29	44	54	56	42	82	39
Polk	3	6	5	6	8	24	46	65	47	38	72	61
Red Lake	2	5	0	2	18	16	15	16	29	34	32	29
Roseau	89	134	171	111	157	180	106	141	114	110	127	84
St. Louis	604	783	880	546	369	608	734	611	740	688	898	407
Sherburne	0	0	0	0	0	0	0	2	0	0	0	0
Stearns	0	0	0	0	0	0	0	0	1	0	0	0
Todd	0	2	0	0	0	2	5	14	18	23	21	13
Wadena	2	10	5	8	0	31	39	32	31	40	44	27
Washington	0	0	0	0	0	0	0	0	0	0	0	1
Unknown	30	12	28	2	1	1	0	2	9	18	14	8
Total	1,773	2,761	2,695	1,726	1,674	2,117	2,660	2,521	2,552	2,388	3,251	1,682

Table 9. Fisher harvest by date and sex, 2007-08 season.

Date	Sex			Total	% of Known Total	Cumulative %
	Male	Female	Unknown			
Nov. 24	5	6		11	0.65	0.65
Nov. 25	83	96	1	180	10.70	11.36
Nov. 26	144	124	1	269	15.99	27.35
Nov. 27	109	116		225	13.38	40.73
Nov. 28	127	144		271	16.11	56.84
Nov. 29	95	81		176	10.46	67.30
Nov. 30	116	96		212	12.60	79.90
Dec. 1	108	90	1	199	11.83	91.74
Dec. 2	53	41		94	5.59	97.32
Unknown	24	20	1	45	2.68	100%
Total	864	814	4	1,682	100%	

Table 10. Distribution of fisher harvest* among trappers, 1993-2007.

Number (%) of Takers	Number Taken						
	1	2	3	4	5	Total Takers	Ave. Take
1993-94	239 (34)	460 (66)	----	----	----	699	1.7
1994-95	321 (31)	725 (69)	----	----	----	1046	1.7
1995-96	232 (40)	355 (60)	----	----	----	587	1.6
1996-97	321 (31)	726 (69)	----	----	----	1047	1.7
1997-98	351 (23)	1205 (77)	----	----	----	1556	1.8
1998-99	443 (28)	1141 (72)	----	----	----	1584	1.7
1999-00	397 (37)	664 (63)	----	----	----	1061	1.6
2000-01	301(38)	251 (31)	129 (16)	121 (15)	----	802	2.1
2001-02	294 (33)	271 (31)	146 (17)	168 (19)	----	879	2.2
2002-03	336 (35)	234 (25)	138 (15)	117 (12)	123 (13)	948	1.8
2003-04	403 (39)	249 (24)	150 (15)	107 (11)	115 (11)	1024	1.7
2004-05	390 (37)	260 (25)	184 (17)	95 (9)	132 (12)	1061	1.7
2005-06	407 (40)	251 (24)	150 (15)	102 (10)	118 (11)	1028	1.7
2006-07	510 (37)	328 (24)	208 (15)	150 (11)	171 (13)	1367	1.7
2007-08	416 (50)	193 (23)	104 (12)	68 (8)	57 (7)	838	1.7

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

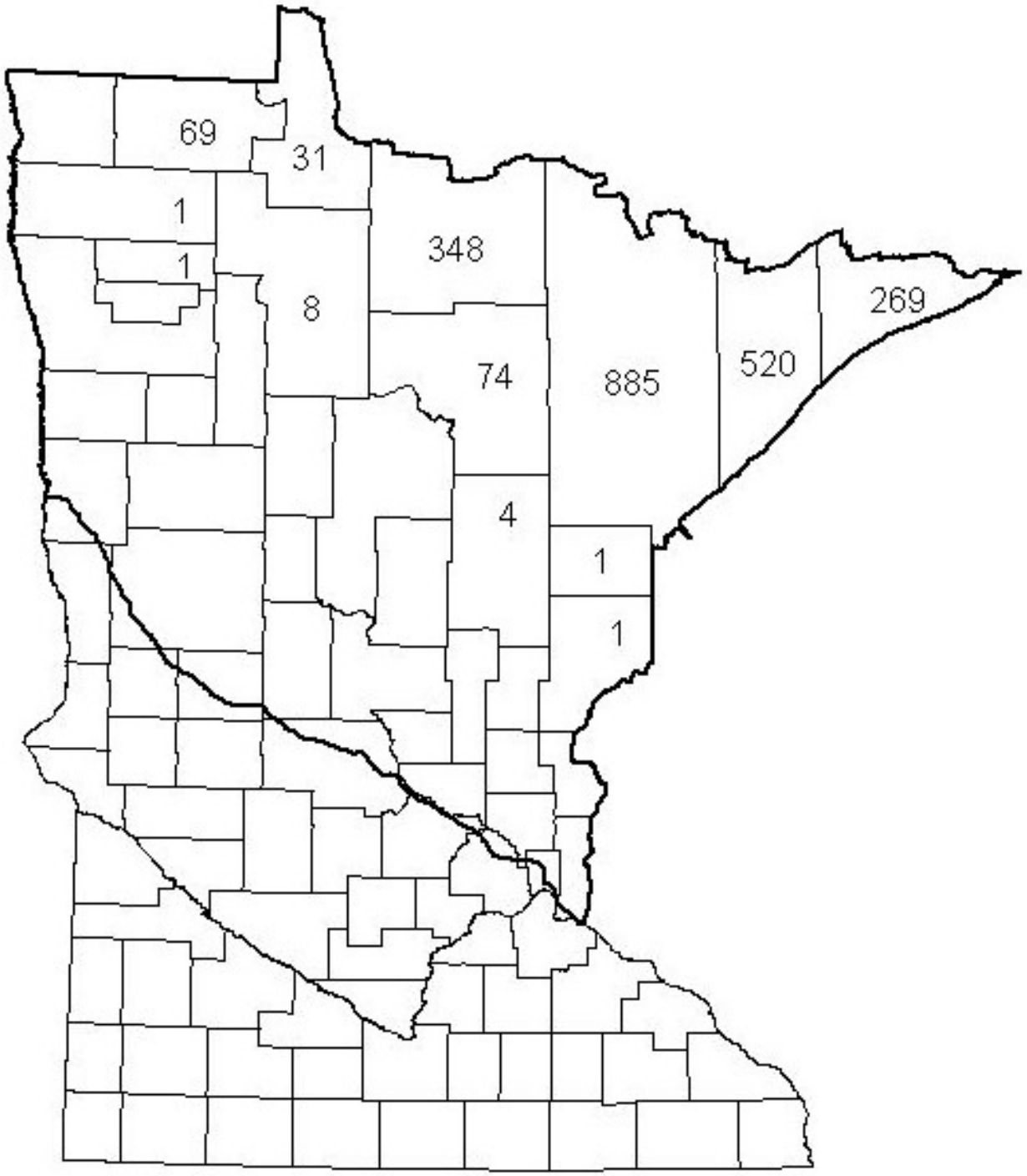

Figure 3. Marten harvest by county, 2007-08.

Table 11. Marten harvest by county and sex, 2007-08 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	3	1		4
Beltrami	6	2		8
Carlton	1	0		1
Cass	0	0		0
Clearwater	0	0		0
Cook	140	129		269
Crow Wing	0	0		0
Itasca	43	31		74
Kanabec	0	0		0
Koochiching	225	123		348
Lake	304	216		520
Lake of the Woods	23	8		31
Mahnomen	0	0		0
Marshall	1	0		1
Pennington	1	0		1
Pine	1	0		1
Red Lake	0	0		0
Roseau	36	33		69
St. Louis	536	346	3	885
Unknown	7	2		9
Total	1,327	891	3	2,221

Table 12. Comparison of marten harvest by county in Minnesota, 1996-2007.

County	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Aitkin	0	0	1	2	2	3	5	6	6	6	13	4
Beltrami	2	12	12	37	2	24	30	38	65	17	19	8
Carlton	0	0	3	6	5	11	4	11	1	10	6	1
Cass	0	0	1	2	3	1	3	2	3	1	4	0
Clearwater	0	0	0	0	0	0	0	1	1	0	0	0
Cook	116	195	208	240	190	164	228	411	318	369	446	269
Crow Wing	0	0	0	3	0	0	0	0	0	0	0	0
Itasca	83	164	155	114	82	102	147	141	136	98	155	74
Kanabec	0	0	0	0	0	0	0	0	0	0	2	0
Koochiching	382	597	517	492	306	327	525	534	549	418	592	348
Lake	234	287	284	284	323	243	492	541	551	536	892	520
LOW	0	12	26	58	15	13	104	71	122	54	46	31
Mahnomen	0	0	0	0	0	0	0	0	2	0	0	0
Marshall	0	0	0	1	1	1	1	1	5	3	0	1
Pennington	0	0	0	0	2	0	0	0	0	0	0	1
Pine	0	0	0	0	0	0	0	1	2	1	1	1
Red Lake	0	0	0	0	3	0	0	0	0	0	0	0
Roseau	0	0	41	51	98	48	116	104	127	51	31	69
St. Louis	797	980	1,020	1,131	596	991	1,184	1,352	1,346	1,065	1,579	885
Unknown	11	14	31	2	1	0	0	0	7	24	2	9
Total	1,625	2,261	2,299	2,423	1,629	1,928	2,839	3,214	3,241	2,653	3,788	2,221

Table 13. Marten harvest by date and sex, 2007-08 season.

Date	Sex			Total	% of Known Total	Cumulative %
	Male	Female	Unknown			
Nov. 24	6	3		9	0.41	0.41
Nov. 25	230	136		366	16.48	16.88
Nov. 26	246	136	2	384	17.29	34.17
Nov. 27	218	135		353	15.89	50.07
Nov. 28	179	136		315	14.18	64.25
Nov. 29	125	86	1	212	9.55	73.80
Nov. 30	110	106		216	9.73	83.52
Dec. 1	128	80		208	9.37	92.89
Dec. 2	47	52		99	4.46	97.34
Unknown	38	21		59	2.66	100%
Total	1,327	891	3	2,221	100%	

Table 14. Distribution of marten harvest* among trappers, 1993-2007.

Number (%) of Takers	Number Taken						
	1	2	3	4	5	Total Takers	Ave. Take
1993-94	76 (10)	681 (90)	----	----	----	757	1.9
1994-95	165 (20)	681 (80)	----	----	----	846	1.8
1995-96	78 (10)	711 (90)	----	----	----	789	1.9
1996-97	157 (18)	734 (82)	----	----	----	891	1.8
1997-98	161 (13)	1050 (87)	----	----	----	1211	1.9
1998-99	187 (15)	1056 (85)	----	----	----	1243	1.8
1999-00	164 (17)	318 (34)	213 (23)	246 (26)	----	941	2.6
2000-01	188 (28)	190 (28)	123 (18)	173 (26)	----	674	2.4
2001-02	147 (23)	175 (27)	138 (21)	187 (29)	----	647	2.6
2002-03	149 (21)	138 (19)	147 (21)	123 (17)	160 (22)	717	1.9
2003-04	126 (15)	135 (16)	159 (19)	170 (20)	265 (31)	855	1.8
2004-05	165 (17)	153 (16)	171 (18)	164 (18)	282 (30)	935	1.8
2005-06	191 (22)	158 (18)	139 (16)	156 (18)	215 (25)	859	1.8
2006-07	206 (18)	201 (17)	226 (19)	203 (17)	335 (29)	1171	1.8
2007-08	176 (23)	160 (21)	147 (19)	141 (18)	142 (19)	766	2.0

* 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, 2007-08. (Combined limit = 5)

Number of Takers		Number of Marten					
		0	1	2	3	4	5
Number of Fisher	0		87	63	55	70	142
	1	221	43	39	43	70	
	2	105	16	22	50		
	3	56	14	34			
	4	51	17				
	5	57			Total takers of at least 1 fisher or marten		1255

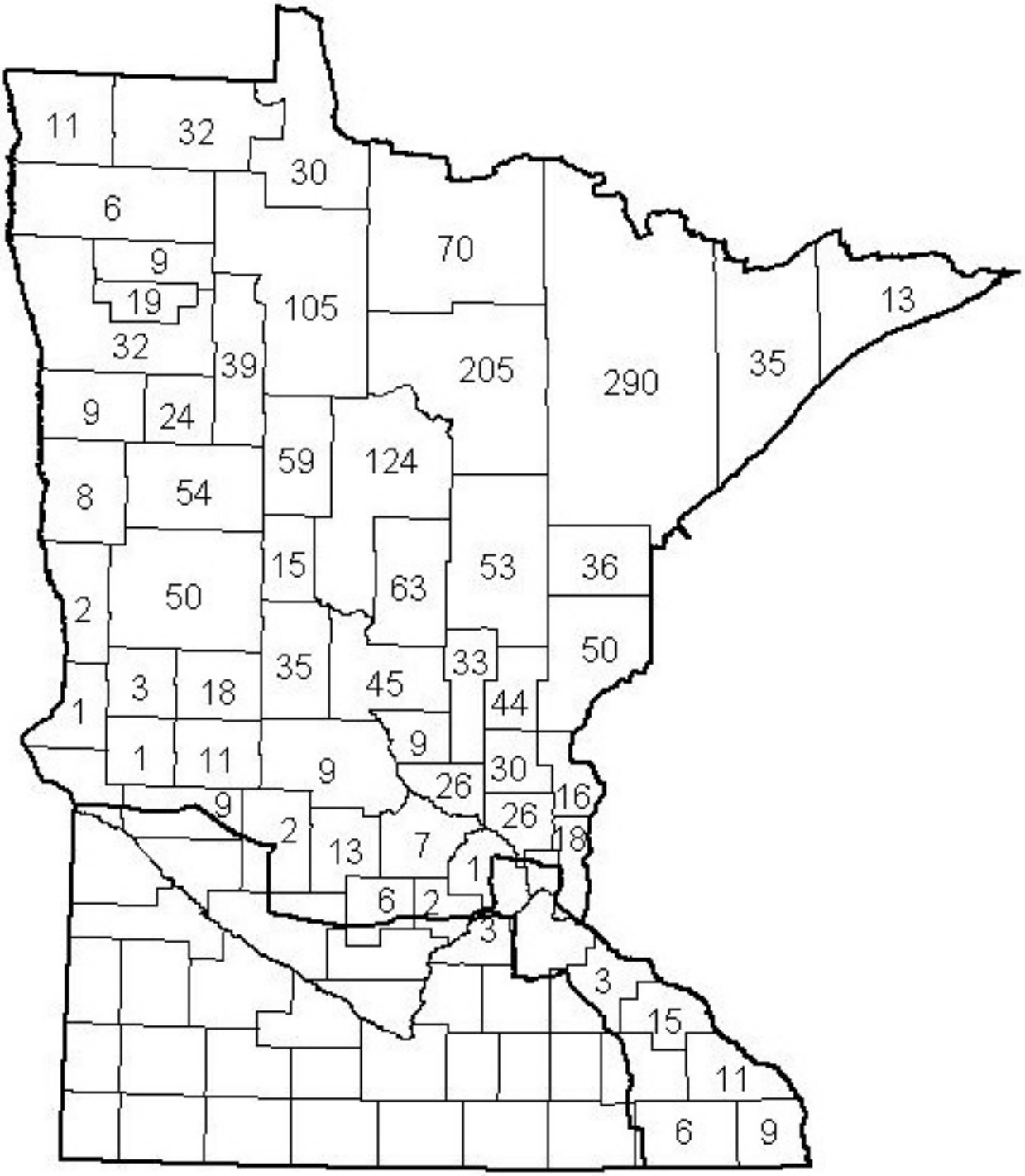

Figure 4. Otter harvest by county, 2007-08.

Table 16. Otter harvest by county and sex, 2007-08 season.

County	Sex			Total
	Male	Female	Unknown	
Aitkin	29	24		53
Anoka	18	8		26
Becker	29	25		54
Beltrami	52	53		105
Benton	3	6		9
Carlton	20	16		36
Carver	0	2		2
Cass	85	39		124
Chisago	13	3		16
Clay	0	8		8
Clearwater	23	16		39
Cook	9	4		13
Crow Wing	31	32		63
Douglas	12	6		18
Fillmore	0	6		6
Goodhue	2	1		3
Grant	2	1		3
Hennepin	0	1		1
Houston	5	4		9
Hubbard	39	20		59
Isanti	11	19		30
Itasca	105	100		205
Kanabec	20	24		44
Kandiyohi	1	1		2
Kittson	6	5		11
Koochiching	32	38		70
Lake	20	15		35
Lake of the Woods	18	12		30
McLeod	4	2		6
Mahnomen	13	11		24
Marshall	4	2		6
Meeker	6	7		13
Mille Lacs	15	18		33
Morrison	20	19	6	45
Norman	8	1		9
Ottertail	27	23		50
Pennington	7	2		9
Pine	30	20		50
Polk	13	15	4	32
Pope	7	4		11
Red Lake	10	9		19
Roseau	18	14		32
St. Louis	156	133	1	290
Scott	2	1		3
Sherburne	15	11		26
Stearns	4	5		9
Stevens	1	0		1
Swift	6	3		9
Todd	20	15		35
Traverse	1	0		1
Wabasha	11	4		15
Wadena	10	5		15
Washington	9	9		18
Wilkin	1	1		2
Winona	7	4		11
Wright	3	4		7
Unknown	4	2		6
Total	1,017	833	11	1,861

Table 17. Comparison of otter harvest by county, 1996-2007.

County	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Aitkin	78	95	87	103	82	100	78	87	113	132	124	53
Anoka	13	21	23	25	14	17	17	13	32	22	16	26
Becker	54	85	30	64	45	125	104	105	178	107	117	54
Beltrami	133	133	81	103	74	108	127	173	216	170	154	105
Benton	1	4	6	2	7	10	6	7	19	14	16	9
Carlton	33	43	39	45	29	33	40	38	53	36	39	36
Carver	0	0	0	0	0	0	0	0	0	0	0	2
Cass	184	189	149	109	107	197	189	198	255	231	236	124
Chisago	13	20	20	13	12	26	18	22	20	28	33	16
Clay	2	7	0	7	3	1	7	7	15	18	35	8
Clearwater	57	25	18	29	25	47	61	52	62	48	41	39
Cook	28	29	48	30	26	26	31	41	56	46	39	13
Crow Wing	73	84	81	77	76	96	108	119	141	102	111	63
Douglas	5	7	7	1	1	1	0	12	27	16	30	18
Fillmore	0	0	0	0	0	0	0	0	0	0	0	6
Goodhue	0	0	0	0	0	0	0	0	0	0	0	3
Grant	0	0	0	0	0	0	0	0	0	0	0	3
Hennepin	0	0	0	0	0	0	0	0	0	0	0	1
Houston	0	0	0	0	0	0	0	0	0	0	0	9
Hubbard	89	95	28	23	19	61	64	70	91	80	72	59
Isanti	17	29	26	20	28	33	33	27	35	38	30	30
Itasca	383	371	339	220	296	337	310	382	483	362	334	205
Kanabec	20	43	24	29	32	56	40	38	57	79	62	44
Kandiyohi	0	0	0	0	0	0	0	0	0	0	0	2
Kittson	0	2	1	0	0	1	2	3	3	3	5	11
Koochiching	139	109	126	63	107	118	96	164	167	131	118	70
Lake	62	57	77	44	70	57	57	81	88	65	60	35
LOW	16	24	32	36	18	17	21	42	31	34	24	30
McLeod	0	0	0	0	0	0	0	0	0	0	0	6
Mahnomen	11	6	9	10	10	17	7	23	24	29	26	24
Marshall	14	14	5	8	16	13	35	34	29	18	7	6
Meeker	0	0	0	0	0	0	0	0	0	0	0	13
Mille Lacs	27	18	17	15	12	20	22	33	48	51	21	33
Morrison	20	25	18	30	17	45	36	46	64	77	60	45

Table 17 (continued). Comparison of otter harvest by county, 1996-2007.

County	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Norman	3	1	0	2	4	3	4	1	16	17	11	9
Ottertail	14	41	29	20	14	51	32	45	113	85	81	50
Pennington	5	6	2	10	2	6	12	16	18	33	15	9
Pine	72	73	62	21	35	42	61	78	99	51	111	50
Polk	45	35	23	21	34	60	63	72	104	45	47	32
Pope	0	0	0	0	0	0	0	0	0	0	0	11
Red Lake	9	9	7	8	22	18	27	35	58	26	30	19
Roseau	24	41	40	37	40	36	27	72	69	60	53	32
St. Louis	473	332	421	353	255	453	316	483	508	428	344	290
Scott	0	0	0	0	0	0	0	0	0	0	0	3
Sherburne	12	15	13	14	10	11	11	24	25	15	29	26
Stearns	15	15	11	7	5	5	17	13	22	21	33	9
Stevens	0	0	0	0	0	0	0	0	0	0	0	1
Swift	0	0	0	0	0	0	0	0	0	0	0	9
Todd	22	22	23	16	22	24	30	49	53	63	81	35
Traverse	0	0	0	0	0	0	0	0	0	0	0	1
Wabasha	0	0	0	0	0	0	0	0	0	0	0	15
Wadena	14	8	6	13	3	23	23	35	34	38	32	15
Washington	7	4	6	4	4	4	12	10	8	11	16	18
Wilkin	0	0	0	0	0	0	0	0	0	0	0	2
Winona	0	0	0	0	0	0	0	0	0	0	0	11
Wright	0	0	0	0	0	0	1	2	3	2	5	7
Unknown	32	8	12	3	2	3	0	14	13	14	22	6
Totals	2,219	2,145	1,946	1,635	1,578	2,301	2,145	2,766	3,450	2,846	2,720	1,861

Table 18. Otter harvest by sex and week, 2007-08 season.

Date	Sex			Total Harvest	% of Total	Cumulative %
	Male	Female	Unknown			
Oct.27 - Nov.2	164	157	1	322	17.30	17.30
Nov.3 - Nov.9	190	144	1	335	18.00	35.30
Nov.10 - Nov.16	178	149	1	328	17.62	52.93
Nov.17 - Nov.23	104	113	4	221	11.88	64.80
Nov.24 - Nov.30	164	106	3	273	14.67	79.47
Dec.1 - Dec.7	76	40		116	6.23	85.71
Dec.8 - Dec.14	30	23		53	2.85	88.55
Dec.15 - Dec.21	42	29		71	3.82	92.37
Dec.22 - Dec.28	35	36		71	3.82	96.18
Dec.29 - Jan.6*	30	32	1	63	3.39	99.57
Unknown	4	4		8	0.43	100%
Total	1,017	833	11	1,861	100%	

* 9-day interval.

Table 19. Distribution of otter harvest* among trappers, 1993-2007.

Number (%) of Takers	Number Taken					
	1	2	3	4	Total Takers	Ave. Take
1993-94	193 (33)	115 (19)	100 (17)	184 (31)	592	2.5
1994-95	250 (27)	185 (20)	143 (15)	349 (38)	927	2.6
1995-96	183 (31)	134 (23)	88 (15)	180 (31)	585	2.5
1996-97	257 (29)	205 (23)	140 (16)	283 (32)	885	2.5
1997-98	304 (33)	235 (26)	117 (13)	255 (28)	911	2.4
1998-99	263 (32)	183 (23)	139 (17)	226 (28)	811	2.4
1999-00	222 (33)	124 (19)	99 (15)	217 (33)	662	2.5
2000-01	206 (32)	122 (19)	108 (17)	201 (32)	637	2.5
2001-02	147 (23)	175 (27)	138 (21)	187 (29)	647	2.6
2002-03	253 (33)	147 (19)	122 (16)	241 (32)	763	2.5
2003-04	269 (27)	201 (20)	152 (16)	361 (37)	983	2.6
2004-05	302 (25)	235 (19)	182 (15)	498 (41)	1217	2.7
2005-06	291 (27)	213 (20)	186 (17)	386 (36)	1076	2.6
2006-07	372 (34)	216 (19)	194 (17)	328 (30)	1110	2.4
2007-08	319 (39)	164 (20)	120 (15)	209 (26)	812	2.3

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