



# 2016 Minnesota August Roadside Survey

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## **ABSTRACT**

An increase in grassland habitat acres combined with another relatively mild winter and favorable breeding season conditions led to increases in Minnesota's 2016 population indices for ring-necked pheasants and gray partridge. However, indices for both species remain below their long-term averages. Range-wide indices for cottontail rabbits and sandhill cranes were similar to 2015 but the index for juvenile cranes increased. The mourning dove index decreased in 2016 and remained below the long-term average. The white-tailed deer index increased and remains well above the long-term average.

For the first time since 2011, total acres of undisturbed grassland habitat increased across Minnesota's farmland region. Overall, 54,495 acres were gained statewide since 2015, including 24,307 acres of Conservation Reserve Program (CRP) habitat. Acres either held nearly steady or increased in all other private land conservation programs. Publically-owned grassland habitat also increased in 2016. Net habitat gains occurred in the pheasant range (61,525 acres) whereas the prairie chicken range (mostly represented by the Northwest region) lost 957 acres. The winter of 2015-16 was the second consecutive mild winter, and most regions had minimal snow during March. Spring and early summer temperatures varied widely but, on average, temperatures were at or above normal from April-June. Several regions were drier than normal but many areas in the southern regions had above-normal rainfall in May and June. Overall, weather conditions led to good overwinter survival and good nesting and brood-rearing conditions.

The 2016 range-wide pheasant index (52.1 birds/100 mi) increased 29% from 2015 but was 14% below the 10-year average and 48% below the long-term average. Although Minnesota's pheasant population has been declining since the mid-2000s in conjunction with a loss of CRP acres, this year marks the third consecutive year with an increase in the overall index. This increase can be attributed to the back-to-back mild winters, good nesting season conditions, and the gain in acres of habitat. The hen index (7.9 hens/100 mi) increased 31% from 2015 but was 16% below the 10-year average. The cock index (5.9 cocks/100 mi) increased 21% from 2015 but was 21% below the 10-year average. The hen:cock ratio (1.35) was greater than 2015 (1.27) and closer to the 1.42 average ratio for the CRP years (1987-2015). The pheasant brood index (8.7 broods/100 mi) increased 39% from last year but remained 7% below the 10-year average and 34% below the long-term average. Average brood size in 2016 (4.4 chicks/brood) was down slightly from the 2015 index and the 10-year average (both indices = 4.7 chicks/brood) and was 20% below the long-term average (5.5 chicks/brood). The range-wide median estimated hatch date for pheasants was 11 June 2016 but, notably, the median estimated hatch dates were later in the South Central (17 June) and Southwest (22 June) regions where rainfall early in the season may have interrupted nesting. Good harvest opportunities should be available in all regions except the Southeast.

The gray partridge index (3.7 birds/100 mi) increased 62% in 2016 and was similar to the 10-year average but 72% below the long-term average. Partridge observations were highest in the Southwest, South Central, and Southeast regions. The eastern cottontail rabbit index (7.2 rabbits/100 mi) was similar to 2015 and was above the 10-year and long-term averages (34% and 18%, respectively). Cottontail rabbit indices were highest in the East Central, South Central, and Southeast regions. The white-tailed jackrabbit index (0.1 rabbits/100 mi) did not change from last

year and was 90% below the long-term average. The jackrabbit population declined to low levels in the 1980s due to changes in agricultural land use and has not recovered. The white-tailed deer index (27.5 deer/100 mi) increased 30% from 2015 and was well above the 10-year and long-term averages (67% and 149%, respectively). The mourning dove index (144.1 doves/100 mi) decreased 22% from 2015 and was 29% below the 10-year average and 44% below the long-term average. Mourning dove counts were highest in the West Central, Southwest, Central, and South Central regions. Range-wide, the total sandhill crane index (15.7 total cranes/100 mi) was similar and the juvenile index (2.2 juvenile cranes/100 mi) increased 62% from 2015.

## INTRODUCTION

This report summarizes the 2016 Minnesota August Roadside Survey (ARS). Since 1955, the ARS has been conducted annually during the first two weeks of August by Minnesota Department of Natural Resources (MN DNR) wildlife and enforcement personnel throughout Minnesota's farmland regions (Fig. 1). The 2016 ARS consisted of 172 25-mile routes (1-4 routes/county); 151 routes were located in the ring-necked pheasant range.

Observers drove each route during 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 observed. 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. These data provide an **index of relative abundance** that are used to monitor annual changes and long-term trends in regional and range-wide populations. Results are reported by agricultural region (Fig. 1) and range-wide; however, population indices for species with low detection rates are imprecise and *should be interpreted cautiously*.

## HABITAT CONDITIONS<sup>1</sup>

In Minnesota's farmland region, total undisturbed grassland habitat acres increased last year for the first time since 2011. Statewide, 54,495 habitat acres were gained (pheasant range: 61,525 net acres; prairie chicken range: -957 net acres). Conservation Reserve Program (CRP) enrollment increased by 24,307 acres overall. Gains in CRP occurred within the pheasant range (37,263 acres) whereas losses of CRP occurred in the prairie chicken range (-8,331 acres, primarily in the Northwest region). Acres enrolled in the Conservation Reserve Enhancement Program (CREP) held nearly steady in 2016 while acres enrolled in Reinvest in Minnesota (RIM), Wetlands Reserve Program (WRP), and RIM-WRP increased statewide (7,765 acres, 1,029 acres, and 2,356 acres, respectively). Publically-owned acres also increased in 2016. Federally-owned Waterfowl Production Areas (WPA) and U.S. Fish and Wildlife Service (USFWS) refuges increased by 7,384 acres and state-owned Wildlife Management Areas (WMA) increased by 11,673 acres overall. More WMA acres were gained in the pheasant range (10,104 acres) than the prairie chicken range (1,536 acres). The USFWS added 6,219 acres of habitat in the pheasant range and 2,593 acres in the

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<sup>1</sup> An active CREP acreage report could not be obtained from the Farm Service Agency (FSA). Therefore, total statewide CRP acres reported for 2016 were reduced by 70,778 acres to avoid double-counting with CREP acres for which there are still active contracts.

prairie chicken range. Similar to 2015, remaining protected habitat accounts for 6.1% of the landscape within the pheasant range (range: 3.1-9.8%; Table 1).

Grassland and wetland habitat conservation remains a priority concern for Minnesota. Private-land conservation programs, including CRP, continue to make up the largest portion of protected grassland habitat in the state (Fig. 2) but approximately 393,000 acres of CRP are set to expire by 2018. Recent low corn and soybean prices have increased landowner interest in farmland retirement programs; however, the current federal Farm Bill limits the number of acres that can be enrolled in CRP and the most recent CRP-sign up resulted in a low acceptance rate in Minnesota (i.e., only 9% of acres offered were accepted). Funding from the Legacy Amendment<sup>2</sup> has helped partially offset habitat losses but the pace has not kept up with the rate of CRP losses. Minnesota's [Prairie Conservation Plan](#) and [Pheasant Summit Action Plan](#) both offer a blueprint for moving forward with grassland and wetland habitat conservation strategies in the farmland regions, thereby helping partners prioritize lands acquired with Legacy Amendment funding.

Started in 2012, Minnesota's Walk-in Access (WIA) program continues to provide public hunting opportunities on private land that is already enrolled in existing conservation programs or has high quality natural habitat. In 2015, the U.S. Department of Agriculture (USDA) awarded a 3-year, \$1.67 million grant to help continue funding of the WIA program. As of August 2016, 216 sites are enrolled in the program for a total of 21,436 acres of private land that are open to public hunting. Sites are spread across the Southwest, South Central, West Central, Central, and Northwest regions of Minnesota. Walk-in Access sites are open for public hunting from September 1 – May 31 where boundary signs are present. Hunters must purchase a \$3 WIA Validation to legally access WIA lands. For more information on the WIA program, including the [code of conduct for WIA lands](#), a printable atlas of enrolled sites by county, aerial photos of each site, interactive maps, and Global Positioning System (GPS) downloads, visit the [WIA program](#) website. Minnesota DNR is still seeking permanent funding to continue the program into the future.

## **WEATHER SUMMARY**

Minnesota's winter 2015-2016 was generally mild with warmer than normal temperatures and near normal precipitation amounts. Monthly temperatures averaged 6.0° F above normal (range: 1.7° F to 9.7° F) across all farmland regions from December through March (Minnesota Climatology Working Group [MCWG], [Climate Summary Table](#)). Although snow cover was fairly continuous from late December through February throughout the farmland zone, snow depths exceeding 6 inches were intermittent across regions (MCWG, [MCWG Climate Summary](#), [Weekly snow depth maps](#)). All regions except the Northwest were nearly snow-free for most of March.

Spring temperatures and precipitation varied widely across the farmland regions. On average, temperatures were at or above normal for May and June. The Northwest, West Central, and East Central regions were drier than normal during May and June whereas localized areas in the Southwest region were wetter than normal. July had near-normal temperatures but was wetter

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<sup>2</sup> [Minnesota's Legacy Amendment](#), passed in 2008, is a 25-year constitutional amendment that increases the state sales tax by 3/8 of 1%. A large portion of the funding generated by this amendment is dedicated to protecting drinking water sources and protecting, enhancing, and restoring wetlands, prairies, and other wildlife habitat.

than normal. Averaged across all regions, July rainfall amounts were 2.69 inches above normal (range: 1.36 inches to 3.52 inches).

Overall, the conditions for over-winter survival of wildlife were above average throughout the farmland zone for the second year in a row. Although some localized areas received excessive rainfall during May and June (the prime period for nesting birds), temperatures were above average which would have been beneficial for chick survival and brood-rearing. Additionally, hens had plenty of time to re-nest if they lost their early-season nest attempts due to flooding.

### **SURVEY CONDITIONS**

The survey period was extended (28 July – 17 August) to allow all survey routes (n=172) to be completed in 2016. Weather conditions during the survey ranged from excellent (calm winds, heavy dew, clear sky) to medium (light dew and overcast skies). Medium to heavy dew conditions were present at the start of 97% of the survey routes which was comparable to 2015 (98%) and slightly above the 10-year average (93%). Similar to 2015, clear skies (<30% cloud cover) were present at the start of 82% of routes. Wind speeds <7 mph were recorded for 94% of the routes which was less favorable than 2015 (100%). Notably, several observers reported flooded road right-of-ways due to rainfall events before and during the survey period which may have reduced detectability of some species, particularly pheasants, partridge, and cottontail rabbits.

### **RING-NECKED PHEASANT**

In 2016, the average number of pheasants observed (52.1 birds/100 mi) increased 29% from 2015 but was 14% below the 10-year average (Table 2, Fig. 3A) and 48% below the long-term average. Total pheasants observed per 100 mi ranged from 17.9 birds in the Southeast region to 96.0 birds in the Southwest region (Table 3). The pheasant index showed substantial increases in the Central (72%) and South Central (70%) regions. Regional indices also increased in the East Central (27%), Southwest (25%), and West Central (10%) regions. Good harvest opportunities should exist in all regions with the exception of the Southeast where the index declined 31% compared to 2015.

The range-wide hen index (7.9 hens/100 mi) increased 31% from 2015 but was 16% below the 10-year average and 45% below the long-term average (Table 2). The hen index ranged from 2.9 hens/100 mi in the Southeast to 13.7 hens/100 mi in the Southwest. The 2016 hen index in the East Central region was similar to 2015 but increased in the West Central (19%), Southwest (20%), South Central (65%), and Central (77%) regions. The hen index declined 22% in the Southeast region.

Across their range, the cock index (5.9 cocks/100 mi) increased 21% from 2015 but remained 21% below the 10-year average and 47% below the long-term average (Table 2). The cock index ranged from 0.6 cocks/100 mi in the Southeast to 9.9 cocks/100 mi in the Southwest. The 2016 indices increased in the South Central (26%), Southwest (47%), and East Central (83%) regions and remained similar to 2015 in the West Central, Central, and Southeast regions.

The 2016 hen:cock ratio (1.35) was greater than the 2015 ratio (1.27) and closer to the average ( $1.42 \pm 0.35$ ) for the CRP years (1987-2015).

The 2016 range-wide brood index (8.7 broods/100 mi) increased 39% from last year (Table 2). The index was 7% below the 10-year average and 34% below the long-term average. Regional brood indices ranged from 3.6 broods/100 mi in the Southeast to 15.6 broods/100 mi in the Southwest. Brood indices increased in all regions (range: 14% to 103%) except the Southeast which remained similar to 2015's index. The average brood size in 2016 (4.4 chicks/brood) was down slightly from the 2015 index and the 10-year average (both indices = 4.7 chicks/brood) and was 20% below the long-term average (5.5 chicks/brood). The median estimated hatch date for pheasant broods across their range was 11 June 2016 ( $n = 330$  broods), which was similar to the 10-year average (12 June; Table 2). Notably, the median estimated hatch dates were later in the South Central (17 June) and Southwest (22 June) regions where rainfall may have disrupted early-season nest attempts.

The pheasant population has declined since the mid-2000s in conjunction with the loss of CRP acres (Fig. 2 & 3A) but 2016 represents the third consecutive year with an increase in the overall index. This increase can be mostly attributed to back-to-back mild winters combined with good weather conditions for nesting and brood-rearing but the gain in grassland habitat acres is also important. Winter conditions for pheasants are considered severe when the temperature is  $\leq 0^{\circ}$  F and snow depths exceed 6 inches. Heavier rains in some regions during May and June might have forced hens to re-nest but the above-normal temperatures were beneficial to brood-rearing and chick survival. One exception is the Southeast region, which has been hampered in consecutive years by late-season snowstorms and/or heavy rain events during the nesting season. The Southeast region also has the second lowest total of undisturbed grassland habitat acres within Minnesota's pheasant range (Table 1). The combination of poor weather conditions and lack of abundant habitat combine to make it difficult for the pheasant population to increase in this region of the state.

#### **GRAY PARTRIDGE**

The range-wide gray partridge index (3.7 birds/100 mi) increased 62% from 2015 and was similar to the 10-year average but remained 72% below the long-term average (Table 2, Fig. 3B). No partridge were observed in the Northwest, West Central, or East Central regions. Indices in regions where they were observed ranged from 2.5 birds/100 mi in the Central region to 9.7 birds/100 mi in the Southwest region.

Intensified agricultural land use (e.g., corn and soybeans) has reduced the amount of suitable habitat for gray partridge in Minnesota. Additionally, gray partridge in their native range (southeastern Europe and northern Asia) are associated with arid climates and their reproductive success in the Midwest is limited except during successive dry years. Thus, gray partridge are more adversely affected by excessive rainfall during the breeding season compared to pheasants. The Southwest, South Central, and Southeast regions will offer the best opportunities for harvesting gray partridge in 2016.

#### **COTTONTAIL RABBIT and WHITE-TAILED JACKRABBIT**

The range-wide eastern cottontail rabbit index (7.2 rabbits/100 mi) was similar to 2015 and was 34% above the 10-year average and 18% above the long-term average (Table 2, Fig. 4A). The cottontail rabbit index ranged from 2.1 rabbits/100 mi in the Northwest to 21.5 rabbits/100 mi in

the East Central region (Table 3). Good harvest opportunities should exist in the East Central, South Central, and Southeast regions.

Remaining at a historic low, the number of white-tailed jackrabbits observed (0.1 rabbits/100 mi) was 90% below the long-term average (1.7 rabbits/100 mi; Table 2, Fig. 4B). Minnesota's jackrabbit population peaked in the late 1950s, declined to low levels in the 1980s, and has continued to decline since then. The long-term decline in jackrabbits is due to the loss of their preferred habitats (i.e., pasture, hayfields, and small grains). The greatest potential for white-tailed jackrabbit hunting will be in the Southwest or West Central regions (Table 3).

### **WHITE-TAILED DEER**

The white-tailed deer index (27.5 deer/100 mi) increased 30% from 2015 and was 67% above the 10-year average and 149% above the long-term average (Table 2, Fig. 5A). Roadside indices for deer ranged from 7.5 deer/100 mi in the South Central region to 69.0 deer/100 mi in the Northwest (Table 3).

### **MOURNING DOVE**

The index for mourning doves (144.1 doves/100 mi) was 22% lower than 2015, 29% below the 10-year average, and 44% below the long-term average (Table 2, Fig. 5B). The index ranged from 62.9 doves/100 mi in the East Central region to 189.8 doves/100 mi in the West Central region. The best opportunities for harvesting doves should be in the West Central, Southwest, Central, and South Central regions.

### **SANDHILL CRANE**

The 2016 range-wide index of sandhill cranes was 15.7 total cranes/100 mi which was similar to 2015 (Table 2). Regional indices ranged from 0.0 total cranes/100 mi in the Southwest to 65.2 total cranes/100 mi in the Northwest (Table 3). The range-wide index of juveniles was 2.2 juvenile cranes/100 mi which was 62% greater than 2015 (1.3 juvenile cranes/100 mi; Table 2). Juvenile cranes were observed in all regions except the Southwest.

### **OTHER SPECIES**

Notable incidental sightings included: badger (Watonwan County), black bear (Todd County), beaver (Nobles County), black-billed magpie (Polk and Red Lake Counties), fisher (Todd County), merlin (Polk County), mink (Chippewa and Waseca Counties), northern harrier (Martin, Nobles, Polk, and Red Lake Counties), osprey (Wright County), pileated woodpecker (Stearns County), common raven (Red Lake County), red-headed woodpecker (Faribault and Redwood Counties), striped skunk (Becker, Faribault, Grant, and Red Lake Counties), and upland sandpiper (Cottonwood County). American kestrels, Canada geese, coyotes, domestic cats, red fox, red-tailed hawks, and wild turkeys were also noted in multiple counties.

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#### **LITERATURE CITED**

Minnesota Climatology Working Group (MCWG). 2016. [MCWG Weekly Snow Depth and Snow Depth Ranking Maps](#). Accessed on August 19, 2016.

Minnesota Climatology Working Group (MCWG). 2016. [MCWG Climate Summary Table](#). Accessed on August 19, 2016.



Table 1. Abundance (total acres) and density (acres/mi2) of undisturbed grassland habitat within Minnesota's pheasant range, 2016<sup>a</sup>, by agricultural region (AGREG).

AGREG	Cropland Retirement					USFWS <sup>c</sup>	MNDNR <sup>d</sup>	Total	% of Landscape	Density ac/mi2
	CRP <sup>b</sup>	CREP	RIM	RIM-WRP	WRP					
WC <sup>e</sup>	263,694	37,688	22,695	14,275	20,255	196,148	110,294	665,049	9.8	62.7
SW	98,585	24,764	19,809	2,556	766	23,090	69,508	239,078	6.3	40.3
C	126,050	14,326	34,370	6,591	3,339	90,100	49,726	324,502	5.4	34.6
SC	88,050	27,633	13,327	10,288	8,785	9,494	34,238	191,815	4.7	30.1
SE	67,622	2,706	7,360	1,070	985	36,754	53,158	169,655	4.6	29.4
EC	3,354	0	1,131	0	4	4,994	91,197	100,680	3.1	19.8
Total	647,355	107,117	98,692	34,780	34,133	360,580	408,121	1,690,778	6.1	39.0

<sup>a</sup> Unpublished data, Tabor Hoek, BWSR, 16 August 2016.

<sup>b</sup> Acres reduced to account for estimated active CREP contracts reported within CREP column.

<sup>c</sup> Includes Waterfowl Production Areas (WPA) and USFWS refuges.

<sup>d</sup> MN DNR Wildlife Management Areas (WMA).

<sup>e</sup> Does not include Norman County.

Table 2. Range-wide trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2016.

Species Subgroup	Change from 2015 <sup>a</sup>					Change from 10-year average <sup>b</sup>				Change from long-term average <sup>c</sup>			
	<i>n</i>	2015	2016	%	95% CI	<i>n</i>	2006-15	%	95% CI	<i>n</i>	LTA	%	95% CI
<b>Ring-necked pheasant</b>													
Total pheasants	149	40.7	52.1	29	±21	148	58.4	-14	±13	149	95.3	-48	±10
Cocks	149	4.9	5.9	21	±23	148	7.3	-21	±14	149	10.8	-47	±12
Hens	149	6.1	7.9	31	±24	148	9.0	-16	±14	149	13.8	-45	±11
Broods	149	6.3	8.7	39	±26	148	9.1	-7	±14	149	12.6	-34	±12
Chicks per brood	330	4.7	4.4	-7			4.7	-7			5.5	-20	
Broods per 100 hens	149	103.0	109.6	7			100.2	9			101.4	8	
Median hatch date	330	9 June	11 June				12 June						
<b>Gray partridge</b>	168	2.3	3.7	62	±89	167	3.6	2	±58	149	14.7	-72	±19
<b>Eastern cottontail</b>	168	7.1	7.2	1	±24	167	5.4	34	±24	149	6.6	18	±22
<b>White-tailed jackrabbit</b>	168	0.1	0.1	51	±140	167	0.2	-23	±66	149	1.7	-90	±14
<b>White-tailed deer</b>	168	21.2	27.5	30	±23	167	16.5	67	±26	168	10.9	149	±40
<b>Mourning dove</b>	168	184.2	144.1	-22	±16	167	203.2	-29	±11	149	267.2	-44	±8
<b>Sandhill crane<sup>d</sup></b>													
Total cranes	168	16.0	15.7	-2	±26								
Juveniles	168	1.3	2.2	62	±57								

<sup>a</sup> Includes Northwest region, except for pheasants. Estimates based on routes (*n*) surveyed in both years.

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

<sup>c</sup> LTA = long-term average during years 1955-2015, except for deer (1974-2015). Estimates for all species except deer based on routes (*n*) surveyed ≥40 years; estimates for deer based on routes surveyed ≥25 years. Thus, Northwest region (8 counties in Northwest were added to survey in 1982) included only for deer.

<sup>d</sup> Cranes were added to the survey in 2009; thus, 10-year and long-term averages are not calculated.

Table 3. Regional trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2016.

Region Species	Change from 2015 <sup>a</sup>					Change from 10-year average <sup>b</sup>				Change from long-term average <sup>c</sup>			
	<i>n</i>	2015	2016	%	95% CI	<i>n</i>	2006-15	%	95% CI	<i>n</i>	LTA	%	95% CI
<b>Northwest<sup>d</sup></b>													
Gray partridge	19	0.8	0.0	-100	±144	19	0.6	-100	±101	19	3.2	-100	±66
Eastern cottontail	19	1.3	2.1	64	±153	19	0.5	277	±315	19	0.8	155	±199
White-tailed jackrabbit	19	0.2	0.0	-100	±210	19	0.3	-100	±64	19	0.6	-100	±42
White-tailed deer	19	58.7	69.0	18	±53	19	43.4	59	±67	19	32.2	114	±80
Mourning dove	19	85.3	116.2	36	±52	19	89.7	30	±54	19	118.4	-2	±38
Sandhill crane <sup>e</sup>	19	65.7	65.2	-1	±37								
<b>West Central<sup>f</sup></b>													
Ring-necked pheasant	39	46.3	50.8	10	±38	35	67.5	-30	±22	37	96.9	-54	±15
Gray partridge	39	0.2	0.0	-100	±202	35	0.8	-100	±96	37	9.4	-100	±21
Eastern cottontail	39	2.6	3.4	32	±67	35	2.6	31	±56	37	3.9	-18	±32
White-tailed jackrabbit	39	0.1	0.3	200	±405	35	0.2	97	±209	37	2.2	-85	±26
White-tailed deer	39	17.4	31.5	81	±58	35	15.9	110	±58	37	10.4	205	±104
Mourning dove	39	281.4	189.8	-33	±23	35	245.6	-22	±18	37	366.5	-48	±13
Sandhill crane	39	3.7	1.7	-53	±92								
<b>Central</b>													
Ring-necked pheasant	27	26.7	45.8	72	±74	29	48.3	-11	±39	28	70.9	-39	±26
Gray partridge	27	0.0	2.5			29	1.3	87	±297	28	9.1	-73	±47
Eastern cottontail	27	4.6	7.3	58	±78	29	4.7	46	±85	28	6.2	15	±62
White-tailed jackrabbit	27	0.0	0.0			29	0.1	-100	±97	28	1.1	-100	±23
White-tailed deer	27	20.4	23.3	14	±39	29	11.5	94	±60	28	6.2	260	±132
Mourning dove	27	123.1	145.1	18	±67	29	176.6	-16	±37	28	227.6	-33	±31
Sandhill crane	27	20.3	25.5	25	±64								
<b>East Central</b>													
Ring-necked pheasant	13	46.2	54.1	27	±56	13	53.8	1	±52	13	85.0	-36	±42
Gray partridge	13	0.0	0.0			13	0.0			13	0.1	-100	±147
Eastern cottontail	13	8.8	21.5	143	±103	13	10.3	109	±80	13	8.7	148	±102
White-tailed jackrabbit	13	0.0	0.0			13	0.0			13	0.2	-100	±64
White-tailed deer	13	22.4	30.1	34	±41	13	17.3	74	±67	13	10.1	198	±116
Mourning dove	13	75.2	62.9	-16	±41	13	101.3	-38	±20	13	116.4	-46	±27
Sandhill crane	13	54.6	42.3	-23	±66								

Table 3. Continued.

Region Species	Change from 2015					Change from 10-year average				Change from long-term average			
	<i>n</i>	2015	2016	%	95% CI	<i>n</i>	2006-15	%	95% CI	<i>n</i>	LTA	%	95% CI
<b>Southwest</b>													
Ring-necked pheasant	19	76.4	96.0	26	±55	19	110.4	-13	±31	19	113.8	-16	±33
Gray partridge	19	1.9	9.7	411	±732	19	10.7	-9	±140	19	39.1	-75	±36
Eastern cottontail	19	10.7	6.1	-43	±61	19	6.1	0	±69	19	8.0	-24	±51
White-tailed jackrabbit	19	0.4	0.4	0	±153	19	0.7	-41	±106	19	3.6	-88	±20
White-tailed deer	19	18.5	27.8	50	±73	19	17.1	62	±64	19	10.1	176	±110
Mourning dove	19	263.8	182.1	-31	±37	19	307.2	-41	±18	19	309.7	-41	±21
Sandhill crane	19	0.0	0.0										
<b>South Central</b>													
Ring-necked pheasant	32	31.0	52.6	70	±48	32	56.2	-6	±25	32	124.3	-58	±17
Gray partridge	32	6.1	7.5	22	±83	32	7.0	7	±72	32	18.1	-59	±39
Eastern cottontail	32	11.6	9.5	-18	±39	32	8.1	18	±38	32	7.7	24	±36
White-tailed jackrabbit	32	0.0	0.1			32	0.1	0	±224	32	1.6	-92	±27
White-tailed deer	32	6.1	7.5	22	±66	32	5.8	29	±59	32	3.9	94	±87
Mourning dove	32	199.9	144.1	-28	±44	32	264.1	-45	±27	32	256.4	-44	±8
Sandhill crane	32	0.9	2.1	143	±165								
<b>Southeast</b>													
Ring-necked pheasant	19	26.0	17.9	-31	±64	20	14.3	19	±67	20	69.1	-75	±35
Gray partridge	19	6.5	6.5	0	±106	20	5.2	20	±156	20	13.2	-53	±58
Eastern cottontail	19	13.4	7.5	-44	±45	20	7.5	0	±42	20	7.8	-6	±50
White-tailed jackrabbit	19	0.0	0.0			20	0.0			20	0.6	-100	±42
White-tailed deer	19	19.1	14.9	-22	±67	20	15.3	0	±52	20	10.9	42	±56
Mourning dove	19	133.1	94.3	-29	±34	20	145.9	-37	±17	20	214.1	-57	±18
Sandhill crane	19	0.4	1.5	246	±365								

<sup>a</sup> Based on routes (*n*) surveyed in both years.

<sup>b</sup> Based on routes (*n*) surveyed at least 9 of 10 years.

<sup>c</sup> LTA = long-term average during years 1955-2015, except for Northwest region (1982-2015) and white-tailed deer (1974-2015). Estimates based on routes (*n*) surveyed  $\geq 40$  years (1955-2015), except for Northwest ( $\geq 20$  years) and white-tailed deer ( $\geq 25$  years).

<sup>d</sup> Eight Northwestern counties (19 routes) were added to the August roadside survey in 1982.

<sup>e</sup> Cranes were added to the survey in 2009; thus, 10-year and long-term averages are not calculated.

<sup>f</sup> Two routes were added to the West Central region in 2014.

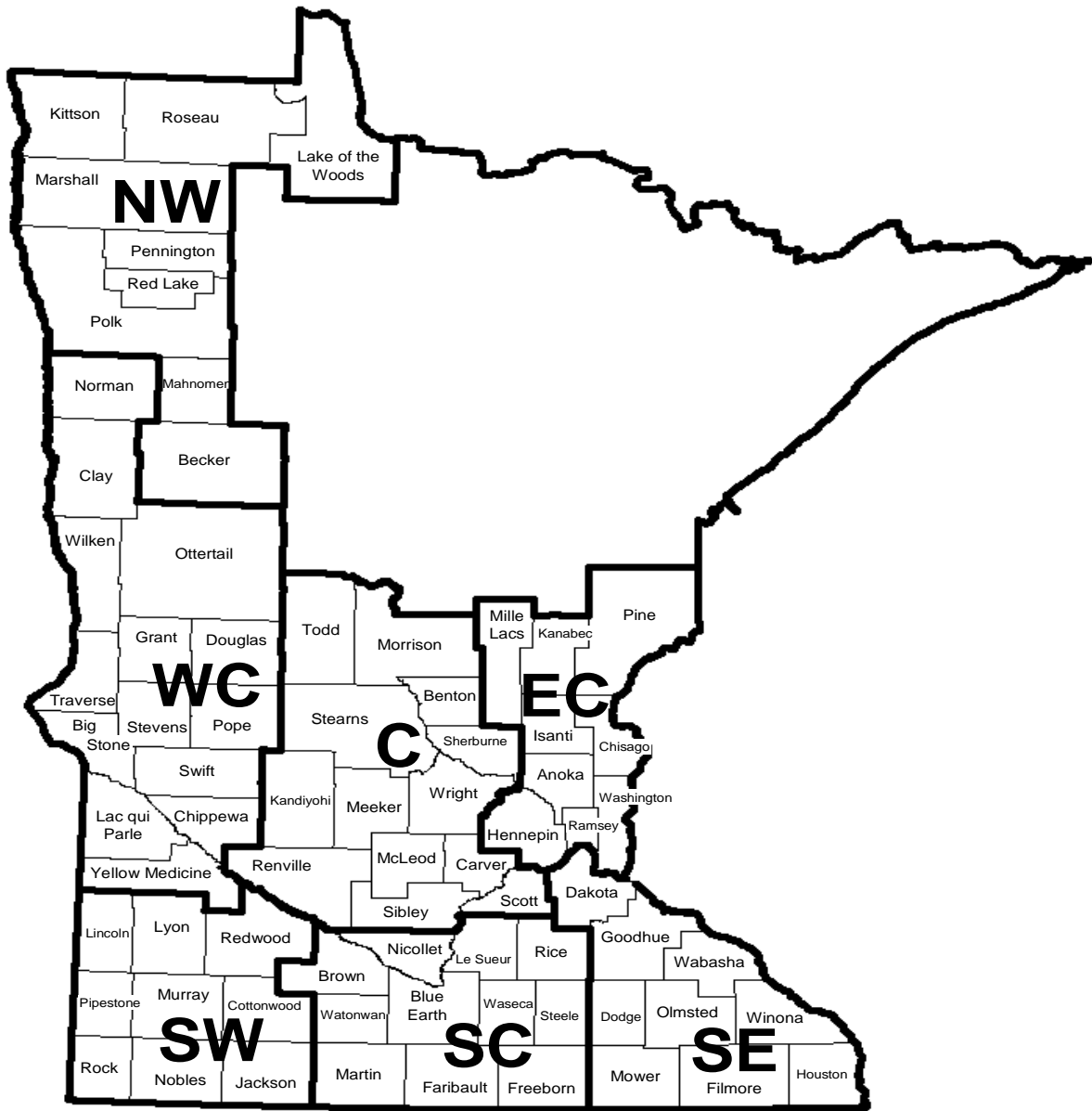


Figure 1. Survey regions for Minnesota's August roadside survey, 2016.

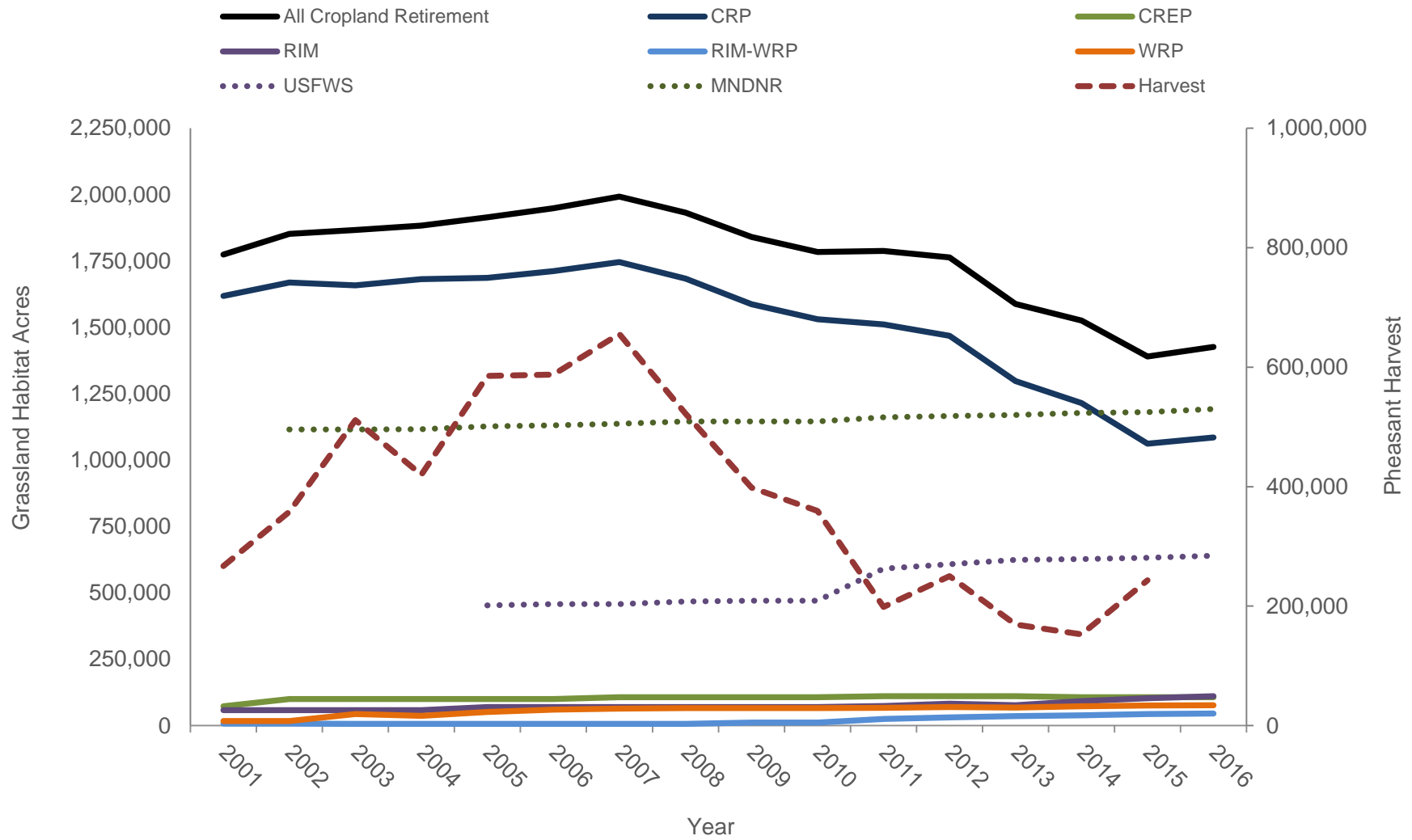


Figure 2. Acres enrolled in private and public land habitat conservation programs vs. ring-necked pheasant harvest trends in Minnesota, 2001-2016. Acres are calculated for the entire state.

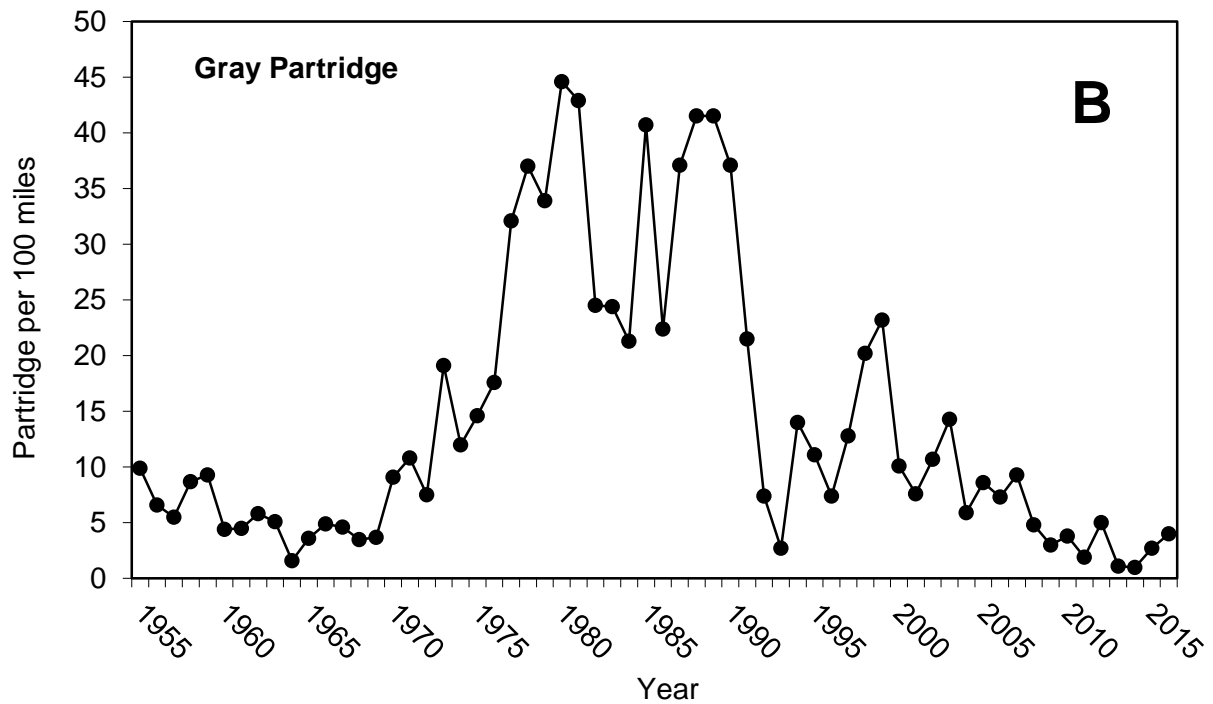
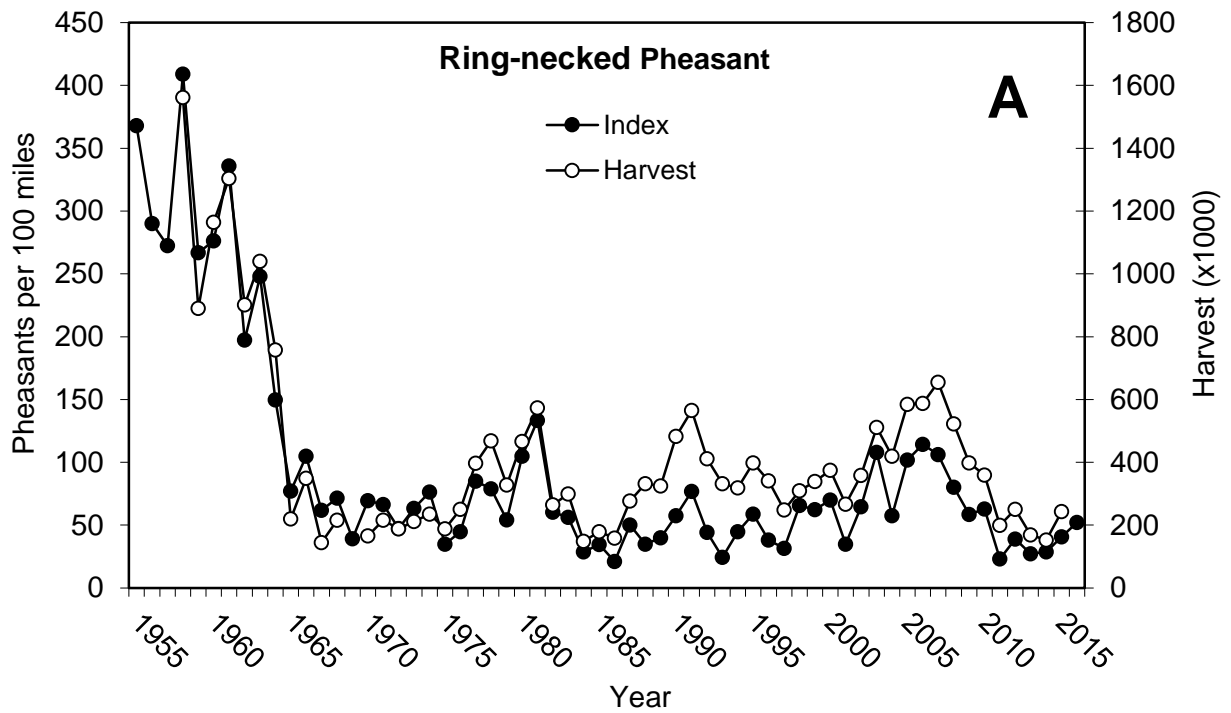


Figure 3. Range-wide index of ring-necked pheasants (A) and gray partridge (B) seen per 100 miles driven in Minnesota, 1955-2016. Does not include the Northwest region. Based on all survey routes completed.

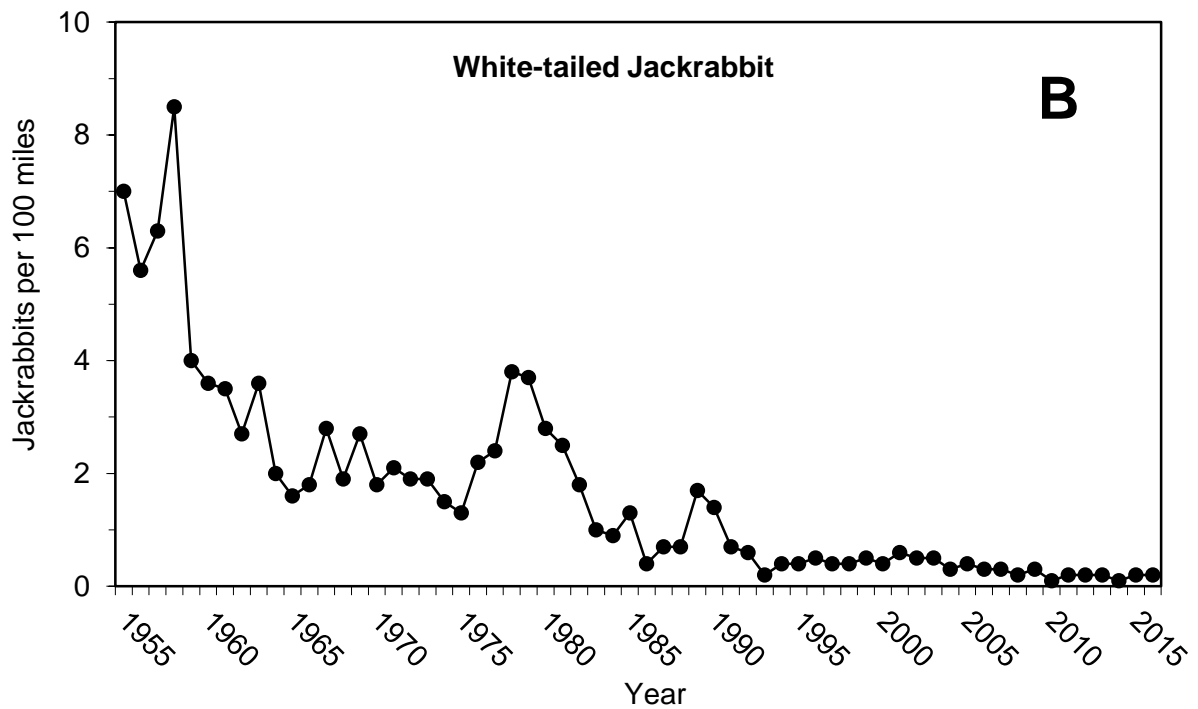
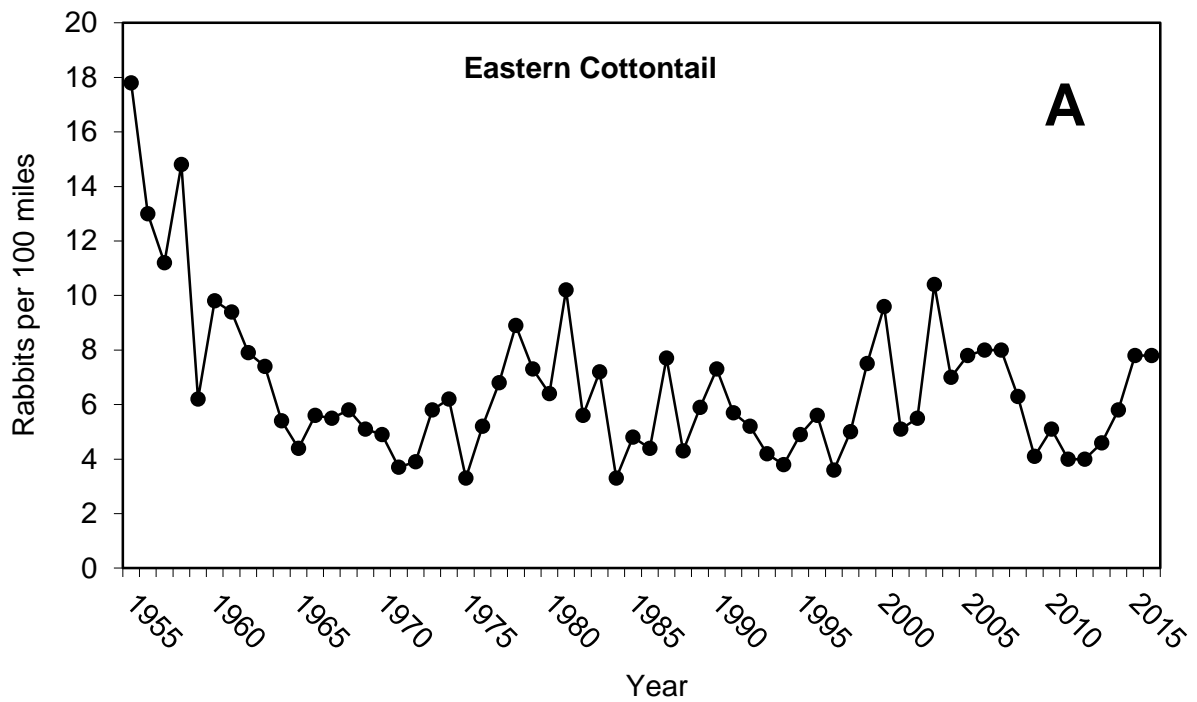


Figure 4. Range-wide index of eastern cottontail (A) and white-tailed jackrabbits (B) seen per 100 miles driven in Minnesota, 1955-2016. Does not include the Northwest region. Based on all survey routes completed.



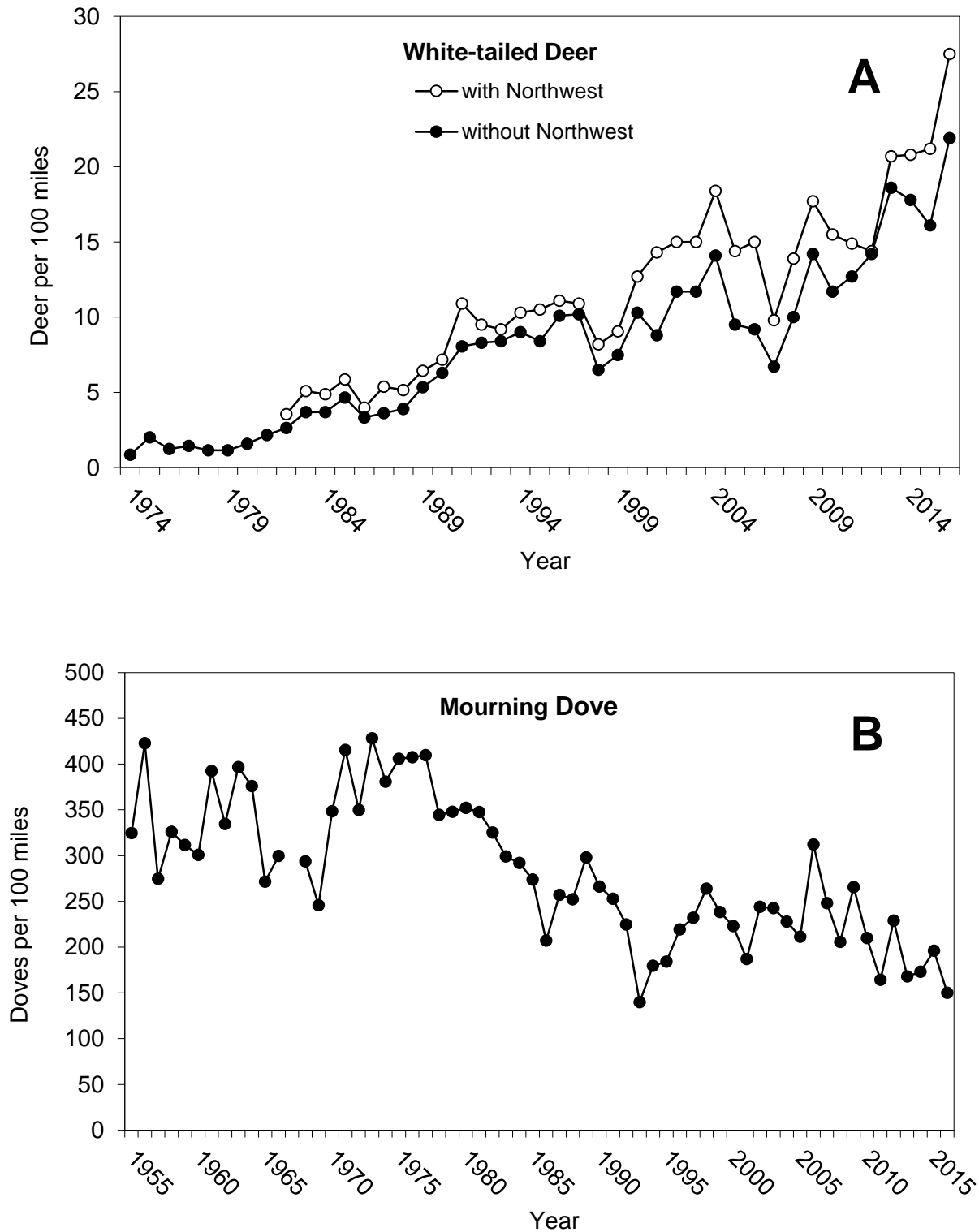


Figure 5. Range-wide index of: **(A)** white-tailed deer seen per 100 miles driven in Minnesota, 1974-2016, with and without the Northwest region included; and **(B)** mourning doves seen per 100 miles driven in Minnesota, 1955-2016. Doves were not counted in 1967 and the dove index does not include the Northwest region. Based on all survey routes completed.