

## 2023 Minnesota August Roadside Survey

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### Summary

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The 2023 range-wide pheasant index (53.3 birds/100 mi) increased moderately by 10% compared to 2022 (48.3 birds/100 mi). Despite a harsh winter with persistent, deep snow, warmer and drier conditions in spring and summer provided suitable breeding conditions in many parts of the state. Pheasants increased in the West Central and Southwest regions but decreased in the Central, East Central, South Central, and Southeast regions compared to 2022. Still, the pheasant indices in the Southwest, South Central and West Central regions were above the statewide average. Range-wide indices of other species exhibited variability in trends among regions. The gray partridge index increased substantially in the Southwest and Northwest regions in 2023. Collectively, weather appears to have had a large influence on species trends. The increase in pheasants and partridge in some regions may be associated with less severe drought conditions during the breeding season. Conversely, declines in other regions, particularly for pheasants, could be attributable to relatively more severe winters or because those regions experienced more severe drought during the breeding season.

### Introduction

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This report summarizes the 2023 Minnesota August Roadside Survey (ARS). Since 1955, Minnesota Department of Natural Resources (MN DNR) wildlife and enforcement personnel have conducted the annual ARS during the first two weeks of August throughout Minnesota's farmland regions (Figure 1). There are 172 established routes, with 152 located within the pheasant range. The 2023 ARS consisted of 167 25-mile routes (1-4 routes/county), of which 148 were located in the ring-necked pheasant range. Routes were surveyed from 28 July – 15 August 2023. Observers drove each route during the early morning (starting at or near sunrise) at 15-20 mi/hr and recorded the number of pheasants, gray (Hungarian) partridge, eastern cottontail rabbits, white-tailed jackrabbits, white-tailed deer, mourning doves, sandhill cranes, and other wildlife they observed including information on sex and age of these species. 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 long-term trends in regional and range-wide populations. Results are reported by agricultural region and range-wide; however, population indices for species with low detection rates (e.g., white-tailed jackrabbits, gray partridge) are imprecise and unreliable.

## Habitat Conditions

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Habitat acres on public and private lands in the primary pheasant range declined by approximately 9,000 acres in 2023 due to an 18,000 acre decline in lands enrolled in the Conservation Reserve Program (CRP, Table 1). The decline in CRP land was partially offset by increases in lands enrolled in state and federal easements and publicly owned land. There was an approximately 1,000 acre increase in lands in the Conservation Reserve Enhancement Program (CREP), Reinvest in Minnesota (RIM), and Wetland Reserve program (RIM-WRP) each (Table 1). Federally managed U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Areas, wildlife refuges and conservation easements increased by almost 4,000 acres, and Wildlife Management Areas managed by the DNR increased by approximately 1,300 acres (Table 1). Protected lands account for 6.6% of lands within the pheasant range, similar to the value in 2022 (6.7%). The Southwest and West Central regions have the highest proportion of protected lands (public and private) in the region and account for nearly 50% of all protected land in the pheasant range (Table 1).

Minnesota's Walk-in Access (WIA) program continues to provide public hunting opportunities on private land already enrolled in existing conservation programs or with natural habitat. The program has grown each year since inception and in 2023, it features more than 250 sites totaling more than 29,000 acres, primarily in the South Central, Southwest, and West Central regions but with additional sites within the Central, East Central, and Southeast regions. Sites are open to public hunting from 1 September – 31 May, where boundary signs are present. Hunters must purchase a \$3 WIA Validation that allows access to all WIA lands statewide. 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](#). The WIA program is currently funded through a grant from the Natural Resource Conservation Service and the U.S. Department of Agriculture. Other funding sources are provided through a surcharge on nonresident hunting licenses, a one-time appropriation from the Minnesota Legislature in 2012, and donations from hunters.

## Weather Summary

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Following National Oceanic and Atmospheric Administration conventions, the 30-year period used to calculate normal temperatures now includes 1991-2020. Weather conditions for pheasants were mixed in 2022-2023. Winter conditions across the state were more challenging than average, primarily because of exceptional amounts of snowfall throughout the state (Table 2). The average snow depth was near or greater than 6 inches throughout the winter in all regions. All regions, except the Southeast, experienced cooler-than-average winter temperatures (Table 2). Spring and summer were generally drier and warmer than average across the state (Table 2). Whereas most of the pheasant range was abnormally dry or under drought conditions throughout the spring and summer, the South Central region was an exception. It experienced above-average rainfall (0.2 inches above normal) during the

spring, associated with a single heavy rainfall event in early May that caused flooding in some areas within the region (Table 2).

## Survey Conditions

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Weather conditions during surveys were very good in 2023. Temperature, dew, wind, and sky cover conditions were all similar to 10-year averages. Thus, weather conditions in 2023 were unlikely to have a substantial influence on survey results.

## Species Reports

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### Ring-necked Pheasant

The total pheasant index increased by 10% in 2023 (53.3 birds/100 mi) compared to 2022 (48.3 birds/100 mi; Table 3, Figure 2A). Indices of hens, roosters, and broods also increased (20%, 22%, and 13%, respectively) compared to 2022 (Table 3). The number of chicks per brood (5.0) and broods per 100 hens (92.1) declined slightly compared to 2022 (Table 3). The total number of pheasants, hens, roosters, and broods per 100 miles all exceeded their 10-year averages, but the index of broods per 100 hens was slightly below the 10-year average. The number of chicks per brood in 2023 (5.0) was slightly greater than the 10-year average (4.7, Table 3). Though most indices of pheasants remain below the long-term average (Table 3), the number of broods per 100 hens in 2023 (92.1) is near the long-term average (89.7; Table 3). The index of chicks per brood in 2023 (5.0) is slightly less than the long-term average (5.6; Table 3). Collectively, this suggests good nesting and brood-rearing success in 2023.

Despite the increase state-wide, trends in the pheasant index varied greatly among regions. The pheasant index exhibited triple-digit increases in the Southwest region, where the index grew 101% (Table 4). The pheasant index exhibited a more modest increase in the West Central region (38%, Table 4). Indices in the Central, East Central, South Central, and Southeast regions decreased by 39%, 63%, 11%, and 50%, respectively (Table 4). Pheasant indices remain well below their long-term averages in all regions except the Southwest, but they are near or above their ten-year averages except for the East Central and Southeast regions (Table 4). The Southwest (116.8 birds/100 mi) and West Central (63.2 birds/100 mi) regions had the highest indices, followed by the South Central region (54.5 birds/100 mi). These regions should provide the best hunting opportunities in the state.

### Gray Partridge

The 2023 range-wide gray partridge index (4.5 birds/100 mi) was greater than 2022 (3.8 birds/100 mi) and the 10-year average (2.4 birds/100 mi). The partridge index remains below the long-term average (-65%; Table 3, Figure 2B). Partridge are generally rare throughout the state but may be locally abundant. Gray partridge appear to have benefited from consecutive dry years in parts of their range. In 2023, the Northwest (14.9 birds/100 mi) region had the greatest number of partridge observed, while the Southwest (7.6 birds/100 mi), South Central (4.8 birds/100 mi), and Southeast (6.1 birds/100 mi) had more modest index values. These regions should provide the best opportunities for harvesting gray partridge (Table 4).

## Cottontail Rabbit and White-tailed Jackrabbit

Range-wide, the 2023 eastern cottontail rabbit index (5.5 rabbits/100 mi) decreased slightly from 2022 (6.2 rabbits/100 mi) and is slightly below the 10-year average (5.8 rabbits/100 mi) and the long-term average (5.9 rabbits/100 mi; Table 3, Figure 3A). The West Central, East Central, and Southwest regions saw increases in their cottontail index (Table 4). The greatest increase was in the Southwest, where the cottontail index increased 45% to 11.0 rabbits/100 mi. The best rabbit hunting opportunities will be in the Southwest, Southeast, East Central, and Central regions (Table 4).

White-tailed jackrabbits were observed on eight routes in the Southwest and West Central regions (Table 3). Five routes reported a single jackrabbit, while two or more jackrabbits were observed on three other routes. Jackrabbits are rarely detected, making annual or short-term trend comparisons difficult. Still, the jackrabbit index remains >90% below the long-term average (Table 3, Figure 3B). Minnesota's jackrabbit population peaked in the late 1950s, declined to low levels in the 1980s, and has remained at low levels since then. The long-term decline in jackrabbits can primarily be attributed to the loss of preferred habitats (e.g., pasture, hayfields, and small grains).

## White-tailed Deer

The 2023 white-tailed deer range-wide index (25.7 deer/100 mi) decreased by 26% compared to 2022 (34.6 deer/100 mi) and was 7% below the 10-year average (Table 3, Figure 4A). However, the range-wide index was 86% above the long-term average (13.5 deer/100 mi; Table 3, Figure 4A). Regional indices for deer decreased (range -23% to -46%) everywhere except the South Central and Southeast regions, which were similar to last year (Table 4).

## Mourning Dove

The 2023 range-wide mourning dove index (234.1 doves/100 mi) increased 88% compared to the 2022 index (124.8 doves/100 mi) and was 66% above the 10-year average (138.6 doves/100 mi); however, the index this year was heavily influenced by a few observations of abnormally large flocks (>100 birds) of mourning doves. The individuals in these large flocks might be transitory and may not represent an increase in the breeding population. Still, the dove index was 5% below the long-term average (239.5 doves/100 mi; Table 3, Figure 4B). The dove index showed large increases in the Northwest, West Central, Central, Southwest, and South Central regions (Table 3). The East Central and Southeast regions saw a 19% and 3% decline, respectively (Table 4). Dove indices were greatest in the Southwest (318.3 doves/100 mi), West Central (297.5 doves/100 mi), and South Central (288.4 doves/100 mi) regions; opportunities for harvesting doves should be greatest there as well.

## Sandhill Crane

The 2023 statewide index of sandhill cranes (10.6 total cranes/100 mi) was 15% lower than in 2022 (12.5 total cranes/100 mi; Table 3). Annual changes in regional indices varied greatly. The Northwest and East Central regions saw a 16% and 7% increase in the total crane index, respectively, whereas the Central region had a 34% decline (Table 4). Statewide, the crane index was slightly below the 10-year average (8% decline, Table 3). Regionally, the Northwest and Central indices were 51% and 17% below their 10-

year averages, respectively, but the East Central region was 63% above the 10-year index (Table 4). Crane observations during the August roadside surveys are less frequent in the West Central, South Central, and Southeast regions and have yet to be reported in the Southwest region.

## Other Species

Notable incidental sightings recorded by observers included: sharp-tailed grouse (Lac qui Parle and Marshall counties), red-headed woodpecker (Freeborn, Wabasha, and Mower counties), upland sandpiper (Rock and Martin counties), and a black bear (Red Lake county).

## Acknowledgments

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**Table 1. Abundance (total acres) and density (acres/mi<sup>2</sup>) of undisturbed grassland habitat within Minnesota's pheasant range, 2023, by agricultural region (AGREG).**

| AGREG        | Cropland Retirement (private lands) <sup>a</sup> |                |                |               |               | Public Lands       |                    | Total            | % of landscape | Density ac/mi <sup>2</sup> |
|--------------|--|----------------|----------------|---------------|---------------|--------------------|--------------------|------------------|----------------|----------------------------|
|              | CRP  | CREP           | RIM            | RIM-WRP       | WRP           | USFWS <sup>b</sup> | MNDNR <sup>c</sup> |                  |                |                            |
| WC           | 242,892  | 42,657         | 22,874         | 14,275        | 20,207        | 222,538            | 115,850            | 681,293          | 10.0%          | 64.2                       |
| SW           | 121,657  | 36,324         | 21,247         | 2,553         | 766           | 27,261             | 69,847             | 279,655          | 7.4%           | 47.3                       |
| C            | 124,246  | 21,715         | 49,429         | 7,026         | 3,158         | 94,202             | 55,916             | 355,692          | 5.9%           | 37.7                       |
| SC           | 102,983  | 36,400         | 13,664         | 10,780        | 9,107         | 12,495             | 39,159             | 224,588          | 5.6%           | 35.6                       |
| SE           | 74,947   | 3,885          | 7,290          | 1,070         | 1,577         | 37,180             | 58,650             | 184,599          | 5.0%           | 31.9                       |
| EC           | 2,392  | 0              | 1,477          | 0             | 4             | 4,994              | 97,144             | 106,011          | 3.3%           | 21.1                       |
| <b>Total</b> | <b>669,117</b>                                   | <b>140,981</b> | <b>115,981</b> | <b>35,704</b> | <b>34,819</b> | <b>398,670</b>     | <b>436,566</b>     | <b>1,831,838</b> | <b>6.6%</b>    | <b>42.5</b>                |

<sup>a</sup> Unpublished data, BWSR, 26 July 2023.

<sup>b</sup> Includes USFWS Waterfowl Production Areas (WPA), USFWS refuges, & USFWS conservation easements.

<sup>c</sup> MN DNR Wildlife Management Areas (WMA). Comparisons to 2020 and earlier years are not valid due to changes in the data source.

**Table 2. Average temperature, snow depth, and precipitation by season and agricultural region in Minnesota, 2023.**

|   | Agricultural Region |      |      |      |      |      |      | STATE |
|---|---------------------|------|------|------|------|------|------|-------|
|   | NW                  | WC   | C    | EC   | SW   | SC   | SE   |       |
| <b>Winter (December 1 - March 31)</b>       |                     |      |      |      |      |      |      |       |
| Temperature (average °F)                    | 11.1                | 15.3 | 17.5 | 17.7 | 18.1 | 19.9 | 21.9 | 17.4  |
| Departure from normal (°F) <sup>a</sup>     | -2.8                | -2.8 | -1.6 | -0.7 | -3.0 | -1.7 | 0.1  | -1.8  |
| Snow Depth (average inches)                 | 14.7                | 11.9 | 12.2 | 13.7 | 9.8  | 8.6  | 5.8  | 11.0  |
| <b>Spring (April 1 - May 31)</b>            |                     |      |      |      |      |      |      |       |
| Temperature (average °F)                    | 47.0                | 50.0 | 50.8 | 48.7 | 52.6 | 53.1 | 52.5 | 50.7  |
| Departure from normal (°F) <sup>a</sup>     | -0.4                | 0.1  | 0.7  | 0.2  | 1.6  | 1.4  | 1.3  | 0.7   |
| Precipitation (total inches)                | 1.8                 | 1.9  | 2.4  | 2.4  | 3.0  | 4.1  | 3.5  | 2.7   |
| Departure from normal (inches) <sup>a</sup> | -0.4                | -0.8 | -0.8 | -0.7 | -0.4 | 0.2  | -0.6 | -0.5  |
| <b>Summer (June 1 - July 31)</b>            |                     |      |      |      |      |      |      |       |
| Temperature (average °F)                    | 67.7                | 70.4 | 70.5 | 68.2 | 71.0 | 70.9 | 69.7 | 69.8  |
| Departure from normal (°F)                  | 1.5                 | 1.8  | 1.8  | 1.4  | 1.4  | 0.9  | 0.6  | 1.4   |
| Precipitation (total inches)                | 2.3                 | 2.0  | 1.7  | 1.9  | 2.1  | 1.8  | 2.5  | 2.1   |
| Departure from normal (inches) <sup>a</sup> | -1.6                | -2.0 | -2.5 | -2.6 | -2.1 | -2.9 | -2.4 | -2.3  |

<sup>a</sup> Departures calculated using 30-year NOAA average (1991-2020) over respective time period.

**Table 3. Range-wide trends (% change) in wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2023.**

| Species<br>Subgroup                        | Change from 2022 <sup>a</sup> |        |        |     | Change from 10-year average <sup>b</sup> |          |           |     | Change from long-term average (LTA) <sup>c</sup> |          |       |     |        |
|--|-------------------------------|--------|--------|-----|--|----------|-----------|-----|--|----------|-------|-----|--------|
|  | <i>n</i>                      | 2022   | 2023   | %   | 95% CI                                   | <i>n</i> | 2013-2022 | %   | 95% CI   | <i>n</i> | LTA   | %   | 95% CI |
| <b>Ring-necked pheasant</b>                |                               |        |        |     |  |          |           |     |  |          |       |     |        |
| Total pheasants                            | 143                           | 48.3   | 53.3   | 10  | ±21                                      | 148      | 41.5      | 26  | ±21  | 147      | 89.3  | -43 | ±11    |
| Cocks                                      | 143                           | 7.0    | 8.5    | 22  | ±21                                      | 148      | 5.9       | 44  | ±24  | 147      | 10.3  | -18 | ±15    |
| Hens                                       | 143                           | 6.5    | 7.8    | 20  | ±24                                      | 148      | 6.3       | 23  | ±21  | 147      | 13.0  | -42 | ±11    |
| Broods                                     | 143                           | 6.7    | 7.6    | 13  | ±23                                      | 148      | 6.3       | 15  | ±20  | 147      | 11.9  | -40 | ±12    |
| Broods per 100 hens                        | 258                           | 97.4   | 92.1   | -5  |  |          | 99.4      | -7  |  |          | 89.7  | 3   |        |
| Chicks per brood <sup>d</sup>              | 258                           | 5.4    | 5.0    | -7  |  |          | 4.7       | 5   |  |          | 5.6   | -12 |        |
| Median hatch date <sup>d</sup>             | 258                           | 19-Jun | 16-Jun |     |  |          | 15-Jun    |     |  |          | 9-Jun |     |        |
| <b>Gray partridge</b>                      | 161                           | 3.8    | 4.5    | 19  | ±53                                      | 166      | 2.4       | 84  | ±84  | 165      | 12.4  | -65 | ±16    |
| <b>Eastern cottontail</b>                  | 161                           | 6.2    | 5.5    | -11 | ±32                                      | 166      | 5.8       | -2  | ±34  | 165      | 5.9   | -5  | ±33    |
| <b>White-tailed jackrabbit<sup>e</sup></b> | 161                           | 0.1    | 0.2    |     |  | 166      | 0.1       |     |  | 165      | 1.4   |     |        |
| <b>White-tailed deer</b>                   | 161                           | 34.6   | 25.7   | -26 | ±6                                       | 166      | 27.0      | -7  | ±7   | 165      | 13.5  | 86  | ±15    |
| <b>Mourning dove</b>                       | 161                           | 124.8  | 234.1  | 88  | ±2                                       | 166      | 138.6     | 66  | ±2   | 165      | 239.5 | -5  | ±1     |
| <b>Sandhill crane<sup>f</sup></b>          |                               |        |        |     |  |          |           |     |  |          |       |     |        |
| Total cranes                               | 161                           | 12.5   | 10.6   | -15 | ±16                                      | 166      | 12.7      | -8  | ±16  |          |       |     |        |
| Juveniles                                  | 161                           | 1.6    | 0.6    | -62 | ±126                                     | 166      | 1.6       | -62 | ±123   |          |       |     |        |

<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 1955-2023, except for deer (1974-2023). 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> Sample size is the total number of broods observed across all surveys rather than the number of routes run in 2023.

<sup>e</sup> White-tailed jackrabbits are too rare to make annual or 10-year comparisons.

<sup>f</sup> Sandhill cranes were added to the survey in 2009; thus, long-term averages are not calculated.



**Table 4. Regional trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2023.**

| Region<br>Species                    | Change from 2022 <sup>a</sup> |       |       |     | Change from 10-year average <sup>b</sup> |          |           |     | Change from long-term average (LTA) <sup>c</sup> |          |       |     |        |
|--------------------------------------|-------------------------------|-------|-------|-----|--|----------|-----------|-----|--|----------|-------|-----|--------|
|                                      | <i>n</i>                      | 2022  | 2023  | %   | 95% CI                                   | <i>n</i> | 2013-2022 | %   | 95% CI   | <i>n</i> | LTA   | %   | 95% CI |
| <b>Northwest<sup>d</sup></b>         |                               |       |       |     |  |          |           |     |  |          |       |     |        |
| Gray partridge <sup>e</sup>          | 18                            | 2.2   | 14.9  | 572 | ±95                                      | 18       | 1.4       |     |  | 18       | 3.3   | 359 | ±65    |
| Eastern cottontail <sup>e</sup>      | 18                            | 0.9   | 1.3   |     |  | 18       | 1.1       |     |  | 18       | 0.9   |     |        |
| White-tailed jackrabbit <sup>e</sup> | 18                            | 0.0   | 0.7   |     |  | 18       | 0.1       |     |  | 18       | 0.5   |     |        |
| White-tailed deer                    | 18                            | 63.1  | 48.7  | -23 | ±3                                       | 18       | 57.4      | -15 | ±4   | 18       | 36.3  | 34  | ±6     |
| Mourning dove                        | 18                            | 45    | 194.2 | 332 | ±5                                       | 18       | 91.4      | 112 | ±2   | 18       | 118.3 | 64  | ±2     |
| Sandhill crane <sup>f</sup>          | 18                            | 16.2  | 18.8  | 16  | ±13                                      | 18       | 38.2      | -51 | ±6   |          |       |     |        |
| <b>West Central<sup>e</sup></b>      |                               |       |       |     |  |          |           |     |  |          |       |     |        |
| Ring-necked pheasant                 | 39                            | 45.7  | 63.2  | 38  | ±4                                       | 39       | 47.7      | 33  | ±4   | 37       | 91.2  | -34 | ±2     |
| Gray partridge <sup>e</sup>          | 39                            | 2.1   | 0.1   | -95 | ±99                                      | 39       | 0.4       |     |  | 37       | 8.3   | -99 | ±25    |
| Eastern cottontail                   | 39                            | 2.5   | 3.0   | 21  | ±82                                      | 39       | 2.8       | 7   | ±73  | 37       | 3.8   | -20 | ±54    |
| White-tailed jackrabbit <sup>e</sup> | 39                            | 0.1   | 0.2   |     |  | 39       | 0.1       |     |  | 37       | 1.9   | -89 | ±104   |
| White-tailed deer                    | 39                            | 37.7  | 26.6  | -30 | ±5                                       | 39       | 30.0      | -11 | ±7   | 37       | 13.5  | 86  | ±15    |
| Mourning dove                        | 39                            | 144.2 | 297.5 | 106 | ±1                                       | 39       | 172.7     | 72  | ±1   | 37       | 342.4 | -16 | ±1     |
| Sandhill crane <sup>f</sup>          | 39                            | 4.8   | 3.0   | -38 | ±42                                      | 39       | 3.4       | -11 | ±60  |          |       |     |        |
| <b>Central</b>                       |                               |       |       |     |  |          |           |     |  |          |       |     |        |
| Ring-necked pheasant                 | 28                            | 52.7  | 32.4  | -39 | ±4                                       | 30       | 36.7      | -12 | ±7   | 30       | 66.6  | -51 | ±3     |
| Gray partridge <sup>e</sup>          | 28                            | 4.4   | 1.3   | -71 | ±46                                      | 30       | 1.7       |     |  | 30       | 8.0   | -85 | ±26    |
| Eastern cottontail                   | 28                            | 6.7   | 5.9   | -13 | ±31                                      | 30       | 5.7       | -1  | ±36  | 30       | 6.2   | -9  | ±33    |
| White-tailed jackrabbit <sup>e</sup> | 28                            | 0.0   | 0.1   |     |  | 30       | 0.1       |     |  | 30       | 1.0   |     |        |
| White-tailed deer                    | 28                            | 40.0  | 21.4  | -46 | ±5                                       | 30       | 26.9      | -24 | ±8   | 30       | 9.7   | 112 | ±21    |
| Mourning dove                        | 28                            | 118.5 | 185.9 | 57  | ±2                                       | 30       | 114.6     | 61  | ±2   | 30       | 212.8 | -14 | ±1     |
| Sandhill crane <sup>f</sup>          | 28                            | 30.9  | 20.3  | -34 | ±7                                       | 30       | 24.0      | -17 | ±9   |          |       |     |        |
| <b>East Central</b>                  |                               |       |       |     |  |          |           |     |  |          |       |     |        |
| Ring-necked pheasant                 | 6                             | 23.3  | 8.7   | -63 | ±11                                      | 8        | 29.7      | -70 | ±8   | 9        | 83.5  | -82 | ±3     |
| Gray partridge <sup>e</sup>          | 6                             | 0.0   | 0.0   |     |  | 8        | 0.3       |     |  | 9        | 0.2   |     |        |
| Eastern cottontail                   | 6                             | 5.3   | 6.0   | 13  | ±48                                      | 8        | 11.4      | -39 | ±21  | 9        | 9.8   | -37 | ±24    |
| White-tailed jackrabbit <sup>e</sup> | 6                             | 0.0   | 0.0   |     |  | 8        | 0.0       |     |  | 9        | 0.2   | 0.0 |        |
| White-tailed deer                    | 6                             | 61.7  | 45.3  | -27 | ±4                                       | 8        | 36.6      | 5   | ±7   | 9        | 15.3  | 162 | ±15    |
| Mourning dove                        | 6                             | 86.0  | 69.3  | -19 | ±3                                       | 8        | 63.9      | 10  | ±4   | 9        | 105.9 | -28 | ±2     |
| Sandhill crane <sup>f</sup>          | 6                             | 90.6  | 96.7  | 7   | ±3                                       | 8        | 58.7      | 63  | ±4   |          |       |     |        |

**Table 4. Continued.**

| Region<br>Species                    | Change from 2022 <sup>a</sup> |       |       |     |        | Change from 10-year average <sup>b</sup> |           |     |        | Change from long-term average (LTA) <sup>c</sup> |       |     |        |
|--------------------------------------|-------------------------------|-------|-------|-----|--------|--|-----------|-----|--------|--|-------|-----|--------|
|                                      | <i>n</i>                      | 2022  | 2023  | %   | 95% CI | <i>n</i>                                 | 2013-2022 | %   | 95% CI | <i>n</i>   | LTA   | %   | 95% CI |
| <b>Southwest</b>                     |                               |       |       |     |        |  |           |     |        |  |       |     |        |
| Ring-necked pheasant                 | 19                            | 58.1  | 116.8 | 101 | ±4     | 19                                       | 64.0      | 83  | ±3     | 19   | 108.7 | 8   | ±2     |
| Gray partridge                       | 19                            | 2.7   | 7.6   | 176 | ±77    | 19                                       | 4.3       | 76  | ±49    | 19   | 35.1  | -79 | ±6     |
| Eastern cottontail                   | 19                            | 7.6   | 11.0  | 45  | ±28    | 19                                       | 5.8       | 90  | ±36    | 19   | 7.7   | 42  | ±27    |
| White-tailed jackrabbit <sup>e</sup> | 19                            | 0.6   | 0.6   |     |        | 19                                       | 0.3       |     |        | 19   | 3.2   | -80 | ±65    |
| White-tailed deer                    | 19                            | 29.7  | 19.9  | -33 | ±7     | 19                                       | 22.0      | -10 | ±10    | 19   | 11.5  | 73  | ±18    |
| Mourning dove                        | 19                            | 166.4 | 318.3 | 91  | ±1     | 19                                       | 191.2     | 67  | ±1     | 19   | 293.4 | 9   | ±1     |
| Sandhill crane <sup>e,f</sup>        | 19                            | 0.0   | 0.0   |     |        | 19                                       | 0.0       |     |        |  |       |     |        |
| <b>South Central</b>                 |                               |       |       |     |        |  |           |     |        |  |       |     |        |
| Ring-necked pheasant                 | 32                            | 61.1  | 54.5  | -11 | ±3     | 32                                       | 43.8      | 24  | ±5     | 32   | 115.3 | -53 | ±2     |
| Gray partridge                       | 32                            | 6.2   | 4.8   | -24 | ±33    | 32                                       | 4.6       | 4   | ±45    | 32   | 16.4  | -71 | ±12    |
| Eastern cottontail                   | 32                            | 5.4   | 4.8   | -12 | ±38    | 32                                       | 7.6       | -38 | ±27    | 32   | 7.5   | -37 | ±27    |
| White-tailed jackrabbit <sup>e</sup> | 32                            | 0.0   | 0.0   |     |        | 32                                       | 0.0       |     |        | 32   | 1.4   |     |        |
| White-tailed deer                    | 32                            | 12.0  | 12.4  | 3   | ±17    | 32                                       | 10.0      | 24  | ±20    | 32   | 5.0   | 146 | ±41    |
| Mourning dove                        | 32                            | 153.9 | 288.4 | 87  | ±1     | 32                                       | 163.2     | 77  | ±1     | 32   | 244.4 | 18  | ±1     |
| Sandhill crane <sup>f</sup>          | 32                            | 4.0   | 2.5   | -37 | ±51    | 32                                       | 2.7       | -6  | ±76    |  |       |     |        |
| <b>Southeast</b>                     |                               |       |       |     |        |  |           |     |        |  |       |     |        |
| Ring-necked pheasant                 | 19                            | 23.9  | 12.0  | -50 | ±9     | 20                                       | 16.0      | -26 | ±13    | 20   | 62.7  | -81 | ±3     |
| Gray partridge                       | 19                            | 5.8   | 6.1   | 6   | ±37    | 20                                       | 3.5       | 67  | ±60    | 20   | 12.1  | -52 | ±17    |
| Eastern cottontail                   | 19                            | 18.7  | 9.9   | -47 | ±11    | 20                                       | 10.7      | 1   | ±20    | 20   | 8.2   | 32  | ±26    |
| White-tailed jackrabbit <sup>e</sup> | 19                            | 0.0   | 0.0   |     |        | 20                                       | 0.0       |     |        | 20   | 0.5   |     |        |
| White-tailed deer                    | 19                            | 27.7  | 30.1  | 9   | ±8     | 20                                       | 22.4      | 27  | ±9     | 20   | 13.1  | 119 | ±16    |
| Mourning dove                        | 19                            | 91.6  | 88.8  | -3  | ±2     | 20                                       | 91.3      | -2  | ±2     | 20   | 199.1 | -55 | ±1     |
| Sandhill crane <sup>e,f</sup>        | 19                            | 0.0   | 1.5   |     |        | 20                                       | 0.7       |     |        |  |       |     |        |

<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.

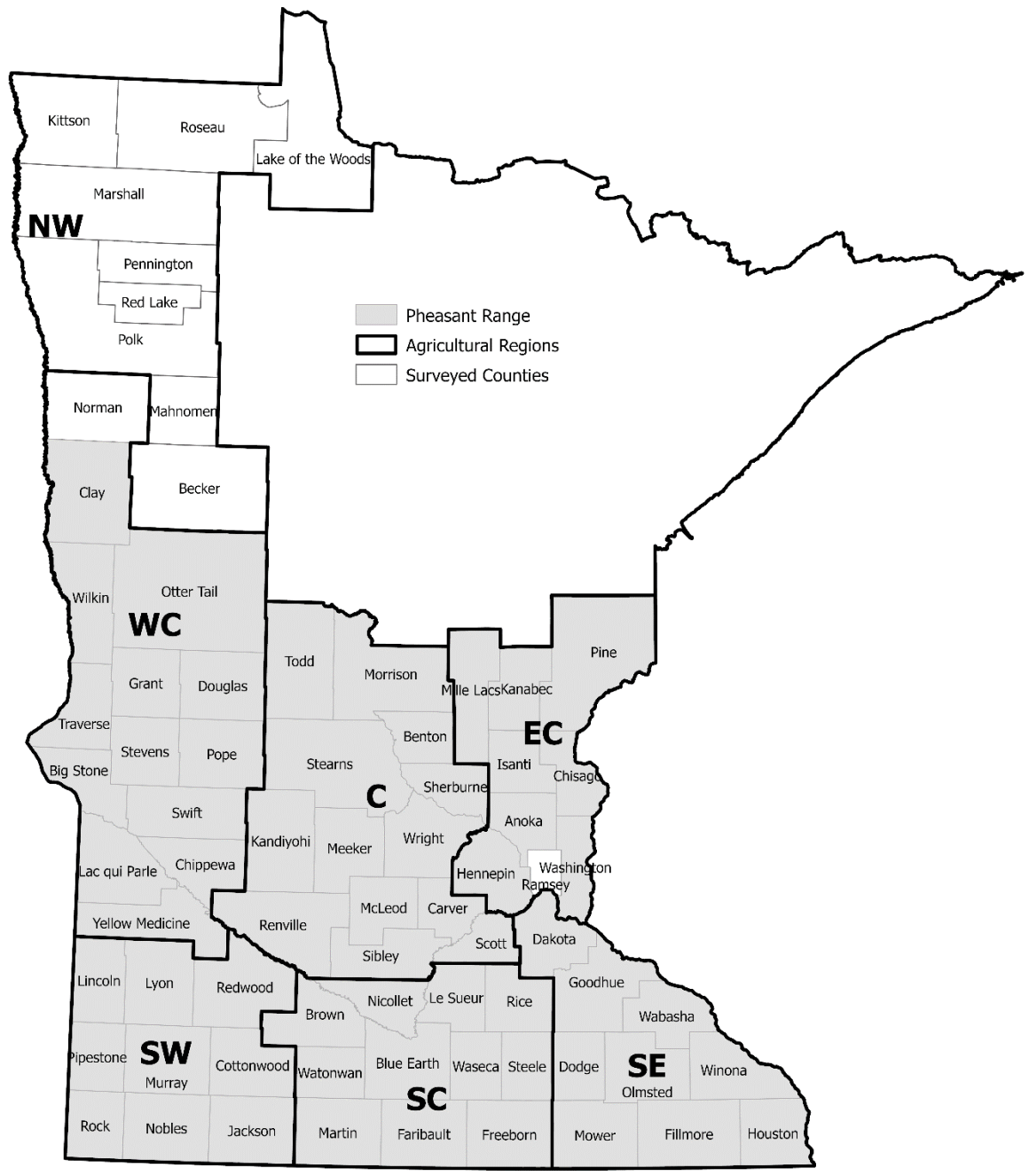
<sup>c</sup> LTA = long-term average during years 1955-2023, except for Northwest region (1982-2023) and white-tailed deer (1974-2023). Estimates based on routes (*n*) surveyed ≥40 years (1955-2023), except for Northwest (≥20 years) and white-tailed deer (≥25 years).

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

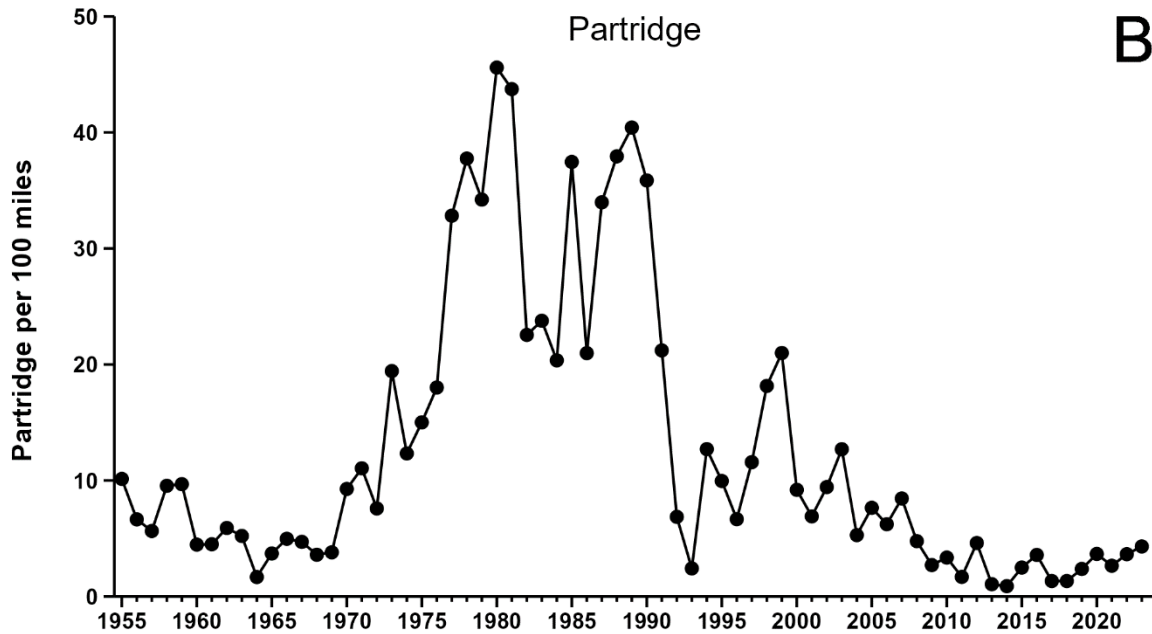
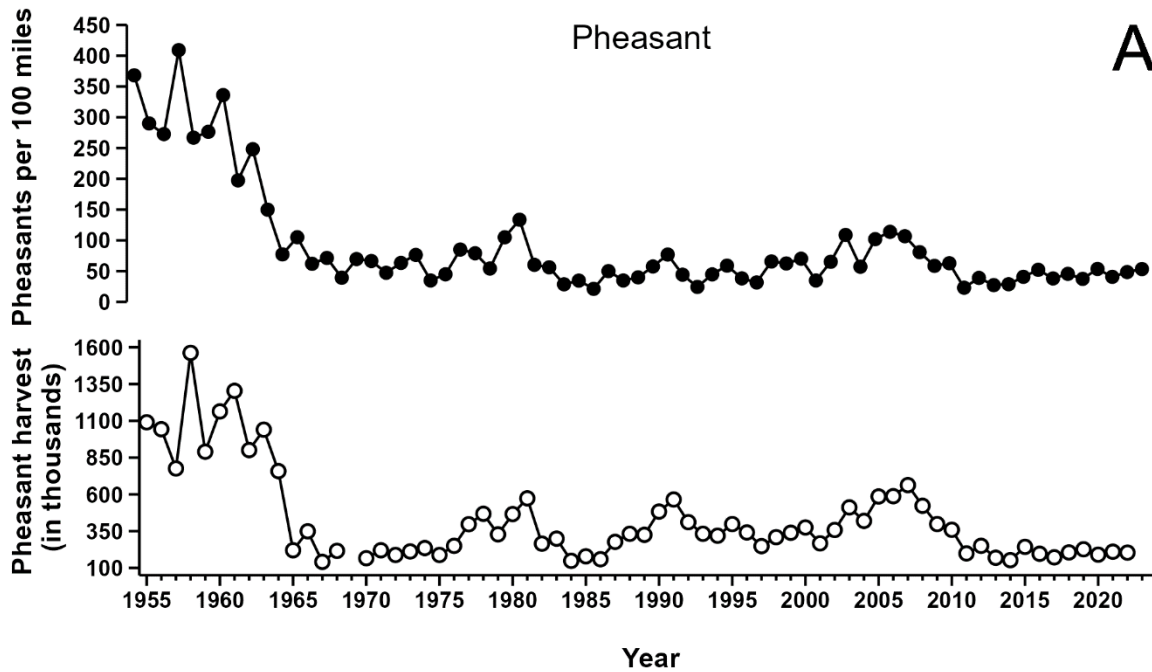
<sup>e</sup> Species may be too infrequently observed to calculate some trends.

<sup>f</sup> Sandhill cranes were added to the survey in 2009; thus, long-term averages are not calculated.

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



**Figure 1. Survey regions and ring-necked pheasant range delineation for Minnesota's August roadside survey, 2023.**



**Figure 2. Range-wide index of ring-necked pheasants (A) and gray partridge (B) seen per 100 miles driven in Minnesota, 1955-2023. Based on all survey routes completed.**

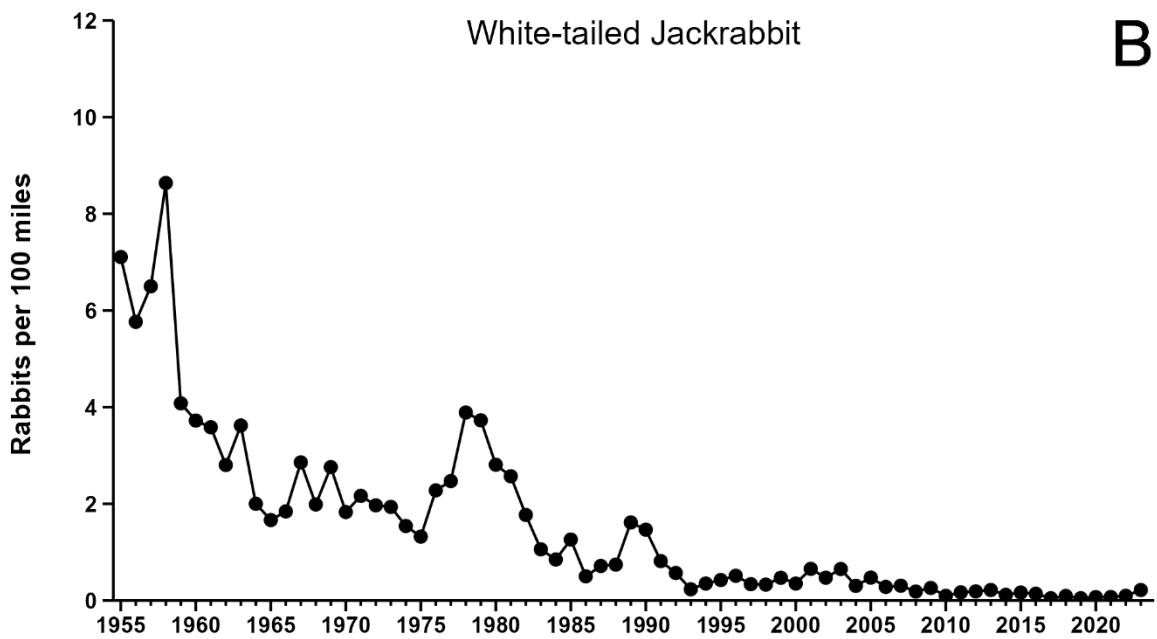
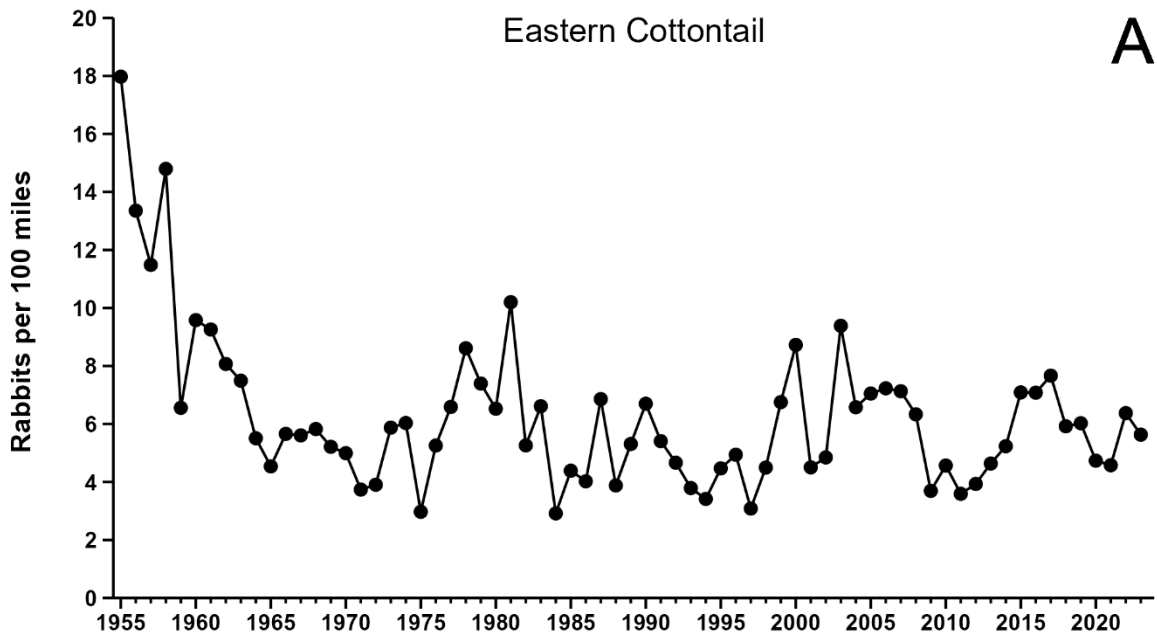
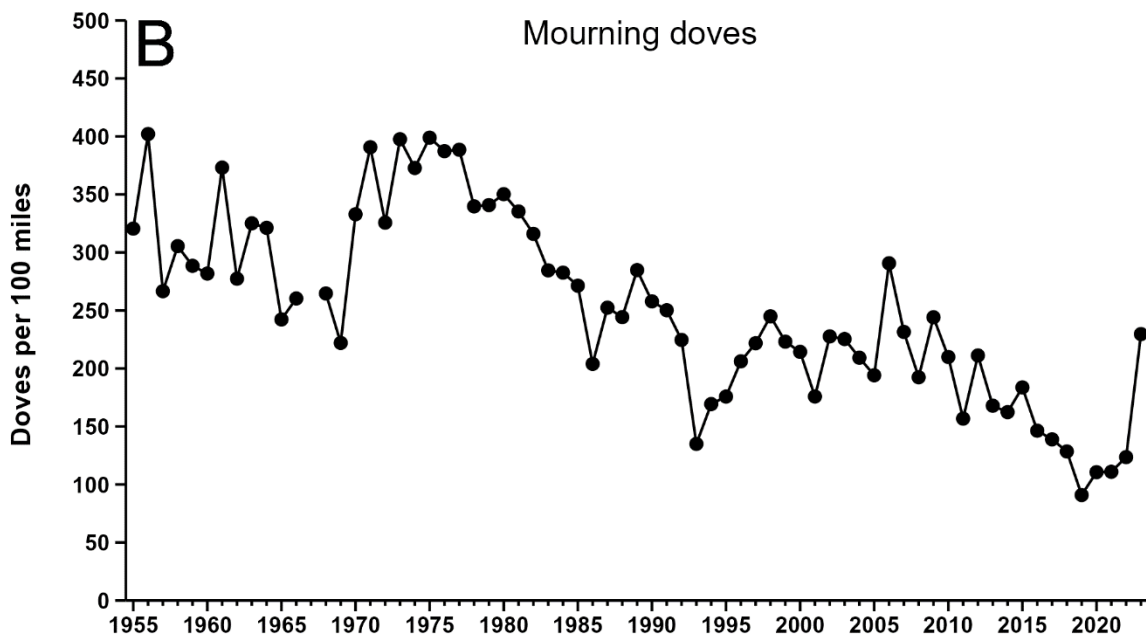
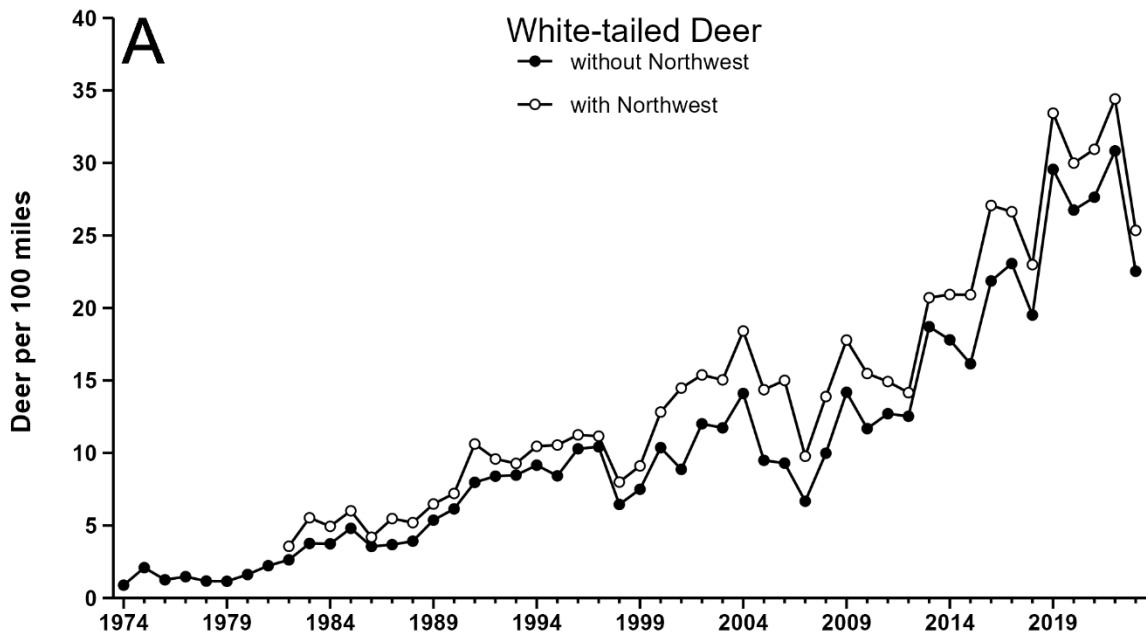


Figure 3. Range-wide index of eastern cottontail (A) and white-tailed jackrabbits (B) seen per 100 miles driven in Minnesota, 1955-2023. Based on all survey routes completed.



**Figure 4. Range-wide index of: (A) white-tailed deer seen per 100 miles driven in Minnesota, 1974-2023, with and without the Northwest region included; and (B) mourning doves seen per 100 miles driven in Minnesota, 1955-2023. Doves were not counted in 1967. Based on all survey routes completed.**