

2020 Minnesota August Roadside Survey

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Summary

The 2020 range-wide pheasant index (53.5 birds/100 mi) increased 42% from 2019 (37.6 birds/100 mi). Favorable weather during the nesting season led to increased numbers of broods, which drove the increase this year. The range-wide indices for gray partridge and mourning doves also increased, while the white-tailed deer, eastern cottontail rabbit, and sandhill crane indices declined. White-tailed jackrabbit observations continue to be historically low across our survey area. Although good weather during the breeding season allowed the indexes of gamebirds to rebound from the previous year, future increases in abundance is limited by the amount of available habitat on the landscape.

Introduction

This report summarizes the 2020 Minnesota August Roadside Survey (ARS). Since 1955, the 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). The 2020 ARS consisted of 169 25-mile routes (1-4 routes/county); 153 routes were located in the ring-necked pheasant range. Routes were surveyed 1 August – 19 August 2020.

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 annual changes and 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) are imprecise and unreliable.

Habitat Conditions

Habitat on private lands increased by almost 16,000 acres in 2020. The availability of a general Conservation Reserve Program (CRP) sign-up led to a 10,000 acre net increase in CRP acres state wide. Reinvest in Minnesota (RIM), Wetland Reserve Program (WRP), and RIM-WRP all saw modest increases in the total number of acres, while the Conservation Reserve Enhancement Program (CREP) experienced a net decrease in habitat acres. Publically owned habitat also increased in 2020. Federally-managed U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Areas (WPA), wildlife refuges, and conservation easements increased by almost 20,000 acres. Beginning in 2020, a new data source was used to track habitat managed by MN DNR as Wildlife Management Areas (WMA). Therefore, no comparisons or estimates of habitat change are provided for MN DNR-managed property this year. Protected habitat accounts for 6.1% of the landscape within the pheasant range (range by agricultural regions: 3.4-9.8%; Table 1).

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. The program has grown each year since inception, and in 2020, features more than 250 sites totaling nearly 30,000 acres across 47 counties in the farmland regions of Minnesota. Sites are open to public hunting 1 September – 31 May where boundary signs are present. Hunters must purchase a \$3 WIA Validation which allows access to all WIA lands statewide. For more information, 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 on the [WIA program](#) website. The WIA program is primarily funded through a grant from the Natural Resources Conservation Service of the U.S. Department of Agriculture. Other funding sources include a surcharge on nonresident hunting licenses, a one-time appropriation from the Minnesota Legislature in 2012, and donations from hunters.

Weather Summary

Overall, the weather conditions for pheasants were favorable in 2020. Winter conditions were milder, with above average temperatures and shallower snowpack compared to 2019 (Table 2). Though spring temperatures were below the 30-year (1981-2010) averages, precipitation was also below average (Table 2). Summer temperatures were above and precipitation was generally near their respective 30-year averages (Table 2). The absence of spring snow storms and generally drier conditions throughout the breeding season enabled game bird populations to rebound from 2019. Weather data were obtained from the Midwest Regional Climate Center ([MRCC]; 2019).

Survey Conditions

Weather conditions during surveys were generally excellent. Surveyors reported heavier dew conditions, clearer skies, less wind, and cooler temperature than previous years. Collectively, detection of pheasants and their broods was higher than average in 2020.

Species Reports

Ring-necked Pheasant

The pheasant index increased 42% in 2020 (53.5 birds/100mi) compared to 2019 (37.6 birds/100mi; Table 3, Figure 2A). Although pheasant counts increased across all sex and age categories from 2019, the increase in the number of broods seen (+47%) was the primary driver of the overall increase in the index (Table 3). The 2020 roadside counts of pheasants within all sex and age categories also exceeded the 10-year averages (range: +21%, +37%; Table 3). The number of broods seen in 2020 also exceeded the 10-year average (+35%; Table 3), though the 10-year average now excludes recent peaks in pheasant abundance during the mid-late 2000s. Still, counts of pheasants among all classes remained below the long-term average (range: -33%, -44%; Table 3, Figure 2A). The ratio of broods per 100 hens, an indicator of breeding success, was greater than 2019 (+25%), the 10-year average (+6%) and the long-term average (+20%; Table 3). The number of chicks per brood also increased compared to 2019 (+6%) but remained below the long-term average (-15%; Table 3). Generally, this suggests that while pheasant numbers overall have declined in the long-term, breeding success of females has increased.

Annual changes in roadside counts among regions generally mirrored statewide trends. Pheasant numbers increased in most regions (range: +9%, +146%) with the greatest increase occurring in the Southwest region (+146%; Table 4). The boom in pheasant counts also resulted in 2020 indices being at or near the 10-year average (range: +35%, +57%), though the East Central and Southeast regions remained below their 10-year averages (-17% and -9%, respectively; Table 4). Hunting opportunities should be excellent throughout the farmland region in 2020.

Gray Partridge

The 2020 range-wide gray partridge index (3.7 birds/100mi) was greater than 2019 (+52%) and the 10-year average (+60%) but remained below the long-term average (-72%; Table 3, Figure 2B). Although the partridge index remained below the long-term averages in all regions, annual changes varied considerably among regions (Table 4). Gray partridge numbers increased in the Southeast (where no partridge were reported in 2019) and South Central regions (+30%), but were greatest in the Southwest region (+649%; Table 4). Gray partridge thrive in more arid grasslands, similar to their native range. Thus, the increase in the partridge index may be attributable to a drier than average breeding season across much of the farmland region. The Southwest, South Central, and Southeast regions will offer the best opportunities for harvesting gray partridge in 2020 (Table 4).

Cottontail Rabbit and White-tailed Jackrabbit

The 2020 eastern cottontail rabbit index (4.7 rabbits/100mi) decreased from 2019 (-23%) and remains below the 10-year average (-15%) and the long-term average (-22%; Table 3, Figure 3A). Most regions reported declines in the cottontail index (range: -16%, -42%; Table 4). Only the Southwest region reported an increase in 2020 (+225%; Table 4). The best rabbit hunting opportunities will be in the East Central and Southeast regions, though hunters may also find good opportunities in the Central and Southwest Regions.

Single white-tailed jackrabbits were recorded on three survey routes in the West Central and Southwest regions in 2020 (Table 3) yielding a range-wide index of 0.1/100 mi. Although similar to 2019 when two jackrabbits were reported, the index remains >90% below the long-term average of 1.5 rabbits/100 mi (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 loss of preferred habitats (e.g., pasture, hayfields, and small grains).

White-tailed Deer

The 2020 white-tailed deer index (30.0 deer/100 mi) fell slightly (-8%) from 2019 (32.6 deer/100 mi) but remained above the 10-year average (+42%) and the long-term average (+150%; Table 3, Figure 4A). Regional indices for deer declined in the West Central, East Central, Southwest regions (range: -17%, -28%) but remained relatively constant in the Northwest, Southeast, and South Central regions (Table 4). Only the Central region reported an increase in the deer index (Table 4).

Mourning Dove

The 2020 range-wide mourning dove index (110.6 doves/100 mi) increased (+21%) compared to 2019, but remained below the 10-year (-31%) and long-term averages (-56%; Table 3, Figure 4B). The dove index increased across the majority of regions (range: +16%, +34%) compared to 2019, but stayed relatively constant in the East Central region (Table 4). The best opportunities for harvesting doves should be in the Southwest, South Central, and West Central regions.

Sandhill Crane

The 2020 roadside index of sandhill cranes (13.6 total cranes/100mi) decreased (-16%) from 2019 (Table 3). The decrease from 2019 was greater among juvenile cranes (-30%). The total crane index remains above the 10-year average (+14%), while the juvenile index is slightly below (-3%). Though the West Central, South Central, and Southeast regions reported either minor increases or no real change in the index value, the crane index is generally low in these regions (Table 4). The majority of cranes are reported in the Northwest, East Central and Central regions which exhibited either no change or a decline in 2020 (range: -48%, 1.8%; Table 4). Still, most regional crane indices remain at or above the 10-year average, though the Northwest and East Central regions are now below. Cranes have not yet been reported in roadside counts in the Southwest region.

Other Species

Notable incidental sightings recorded by observers included: Great Egrets (Rice and Watonwan counties), prairie chickens (Clay County), red-headed woodpeckers (Mower, Redwood, Renville, and Watonwan counties), sharp-tailed grouse (Red Lake, Roseau, and Polk counties), trumpeter swans (Kandiyohi and Sibley counties), and upland sandpipers (Murray, Freeborn, and Renville counties). American crows, Canada geese, American kestrels, and wild turkeys were reported in multiple counties.

Acknowledgments

We thank the many cooperators for completing the routes required for this survey; without their efforts, this survey would not be possible. Tonya Klinkner was invaluable in providing logistical assistance and entering route data. Tabor Hoek (Minnesota Board of Water and Soil Resources) provided enrollment data on cropland retirement programs in Minnesota, Jay Johnson and Adam Murkowski (MN DNR) provided MN DNR land acquisition information. Allison McCluskey (U.S. Fish and Wildlife Service) provided federal land acquisition data. Nicole Davros and John Giudice (MN DNR Wildlife Research) reviewed an earlier draft of this report. This work was funded in part through the Federal Aid in Wildlife Restoration Act.

Literature Cited

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Table 1. Abundance (total acres) and density (acres/mi²) of undisturbed grassland habitat within Minnesota's pheasant range, 2019, by agricultural region (AGREG).

AGREG	Cropland Retirement (private lands) ^a					Public Lands		Total	% of landscape	Density ac/mi ²
	CRP	CREP	RIM	RIM-WRP	WRP	USFWS ^b	MNDNR ^c			
WC	290,586	37,951	24,808	18,092	20,840	208,979	120,623	721,878	9.8	62.8
SW	114,563	24,784	20,573	2,553	766	24,954	65,858	254,050	6.7	13.1
C	132,684	14,380	39,966	7,026	3,078	92,508	58,407	348,049	5.4	34.9
SC	102,436	27,633	13,585	10,775	8,942	11,272	36,046	210,689	5.2	33.4
SE	69,820	2,702	7,405	1,070	976	37,028	56,067	175,068	4.7	30.2
EC	3,248	0	7,943	0	4	19,692	168,839	199,726	3.4	21.7
Total	713,337	107,450	114,280	39,516	34,606	394,433	505,840	1,909,460	6.1	39.2

^a Unpublished data, Tabor Hoek, BWSR, 25 August 2020.

^b Includes Waterfowl Production Areas (WPA), USFWS refuges, & USFWS conservation easements

^c MN DNR Wildlife Management Areas (WMA). The data source for this field was changed in 2020 and comparisons to previous years are not valid.

Table 2. Average temperature, snow depth, and precipitation by season and agricultural region in Minnesota, 2020.

	Agricultural Region							STATE
	NW	WC	C	EC	SW	SC	SE	
Winter (December 1 - March 31)								
Temperature (average °F)	14.4	19.6	20.9	20.4	22.8	23.6	23.6	20.8
Departure from normal (°F) ^a	0.7	1.8	2.1	2.5	1.9	2.4	2.4	2
Snow Depth (average inches)	12.9	8.5	6.9	8	4.4	5.1	4.7	7.2
Spring (April 1 - May 31)								
Temperature (average °F)	44.6	47.8	49	47	48.8	50	50	48.2
Departure from normal (°F) ^a	-3.5	-2.8	-1.9	-2.1	-2.9	-2.2	-2.2	-2.5
Precipitation (total inches)	1.3	1.4	1.6	1.6	2.3	2.9	3.5	2.1
Departure from normal (inches) ^a	-0.8	-1.2	-1.3	-1.3	-0.9	-0.6	-0.2	-0.9
Summer (June 1 - July 31)								
Temperature (average °F)	69.6	71.8	71.4	69.6	73	72.8	72.8	71.6
Departure from normal (°F)	3.6	3.4	2.8	2.9	3.5	2.9	2.9	3.1
Precipitation (total inches)	5.7	4.2	4.7	4.7	3.7	4.4	4.7	4.6
Departure from normal (inches) ^a	1.9	0.4	0.5	0.5	-0.3	0	0.2	0.5

^a Departures calculated using 30-year NOAA average (1981-2010) over respective time period.

Table 3. Range-wide trends (% change) in number of wildlife observed per 100 miles driven, Minnesota August roadside survey, 1955-2020.

Species	Change from 2019 ^a					Change from 10-year average ^b				Change from long-term average (LTA) ^c				
	Subgroup	<i>n</i>	2019	2020	%	95% CI	<i>n</i>	2010-2019	%	95% CI	<i>n</i>	LTA	%	95% CI
Ring-necked pheasant														
Total pheasants	153	37.6	53.5	42	±25	149	38.9	37	±20	151	91.4	-42	±10	
Cocks	153	6.5	6.9	7	±21	149	5.7	21	±22	151	10.5	-35	±13	
Hens	153	6.3	7.5	18	±23	149	5.9	28	±19	151	13.3	-44	±10	
Broods	153	5.5	8.1	47	±28	149	6.1	35	±19	151	12.1	-33	±11	
Broods per 100 hens	153	84.3	105.2	25			101.5	6			88.4	21		
Chicks per brood ^d	301	4.6	5.0	7			4.6	6			5.7	-15		
Median hatch date ^d	301	20-Jun	8-Jun				12-Jun							
Gray partridge	169	2.4	3.7	52	±82	165	2.3	60	±84	151	13.6	-72	±16	
Eastern cottontail	169	6.1	4.7	-23	±32	165	5.7	-15	±34	151	6.6	-22	±30	
White-tailed jackrabbit	169	0	0.1	50	±4171	165	0.1	-35	±1756	151	1.5	-95	±129	
White-tailed deer	169	32.6	30.0	-8	±6.	165	21.2	42	±9	167	11.9	150	±17	
Mourning dove	169	91.3	110.6	21	±2	165	159.7	-31	±1	151	255.1	-56	±1	
Sandhill crane^e														
Total cranes	169	16.2	13.6	-16	±12	165	12.2	14	±16					
Juveniles	169	2.5	1.7	-30	±80	165	1.8	-3	±108					

^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 = long-term average during years 1955-2019, except for deer (1974-2019). 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.

^d Sample size is the total number of broods observed across all surveys rather than the number of routes run in 2019.

^e 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, 1955-2020.

Region Species	Change from 2019 ^a					Change from 10-year average ^b				Change from long-term average (LTA) ^c			
	<i>n</i>	2019	2020	%	95% CI	<i>n</i>	2010-2019	%	95% CI	<i>n</i>	LTA	%	95% CI
Northwest^d													
Gray partridge	16	2.5	2.5	0	±85	16	1.0	145	±209	16	3.2	-23	±66
Eastern cottontail	16	1.5	1.2	-17	±142	16	0.9	32	±225	16	1.0	21	±207
White-tailed jackrabbit	16	0	0			16	0.1	-100	±1426	16	0.5	-100	±416
White-tailed deer	16	61.5	61.0	-1	±4	16	47.7	28	±5	16	34.2	78	±6
Mourning dove	16	69.1	80.0	16	±3	16	94.8	-16	±2	16	116.9	-32	±2
Sandhill crane ^e	16	29.2	29.7	2	±7	16	39.7	-25	±5				
West Central^f													
Ring-necked pheasant	39	48.8	63.3	30	±4	35	45.4	40	±5	37	93.2	-36	±2
Gray partridge	39	1.3	0.2	-85	±152	35	0.5	-54	±413	37	8.6	-98	±24
Eastern cottontail	39	3.8	2.4	-38	±53	35	2.5	7	±83	37	3.8	-35	±53
White-tailed jackrabbit	39	0.2	0.1	-50	±987	35	0.2	-25	±1334	37	2.0	-95	±100
White-tailed deer	39	43.9	36.5	-17	±5	35	24.5	52	±8	37	12.4	193	±16
Mourning dove	39	122.6	144.3	18	±2	35	205.4	-31	±1	37	349.8	-60	±1
Sandhill crane ^e	39	2.3	6.7	186	±87	35	2.1	253	±96				
Central													
Ring-necked pheasant	30	39.8	55.4	39	±5	30	35.2	57	±6	30	67.9	-18	±3
Gray partridge	30	4.0	2.8	-30	±51	30	1.3	108	±152	30	8.3	-66	±25
Eastern cottontail	30	9.1	5.5	-40	±23	30	5.2	6	±40	30	6.2	-12	±33
White-tailed jackrabbit	30	0	0			30	0.1			30	1.1	-100	±188
White-tailed deer	30	31.5	35.1	11	±7	30	18.7	88	±11	30	8.1	336	±25
Mourning dove	30	78.2	95.8	23	±3	30	143.1	-33	±1	30	216.8	-56	±1
Sandhill crane ^e	30	28.7	26.9	-6	±7	30	20.5	31	±10				
East Central													
Ring-necked pheasant	13	29.3	32	9	±7	13	38.7	-17	±6	13	80.8	-60	±3
Gray partridge	13	0	0			13	0.2			13	0.2	-100	±1423
Eastern cottontail	13	13.2	7.7	-42	±17	13	13.1	-41	±17	13	9.2	-17	±24
White-tailed jackrabbit	13	0	0			13	0			13	0.1	-100	±1493
White-tailed deer	13	41.8	30.7	-27	±5	13	24.2	27	±9	13	11.9	158	±18
Mourning dove	13	49.8	49.5	-1	±4	13	75.2	-34	±3	13	111.6	-56	±2
Sandhill crane ^e	13	89.5	47	-48	±2	13	48.6	-3	±5				

Table 4. Continued.

Region Species	Change from 2019 ^a					Change from 10-year average ^b				Change from long-term average (LTA) ^c			
	<i>n</i>	2019	2020	%	95% CI	<i>n</i>	2009-2019	%	95% CI	<i>n</i>	LTA	%	95% CI
Southwest													
Ring-necked pheasant	19	36.8	90.5	146	±6	19	60.4	50	±4	19	110.1	-18	±2
Gray partridge	19	1.3	9.5	649	±166	19	4.8	99	±44	19	36.5	-74	±6
Eastern cottontail	19	1.7	5.5	225	±125	19	5.1	7	±41	19	7.7	-29	±27
White-tailed jackrabbit	19	0	0.4			19	0.3	33	±665	19	3.4	-88	±63
White-tailed deer	19	21.7	15.6	-28	±10	19	20.2	-23	±10	19	10.7	45	±20
Mourning dove	19	92.0	123.6	34	±2	19	212.4	-42	±1	19	297.1	-58	±1
Sandhill crane ^e	19	0	0			19	0						
South Central													
Ring-necked pheasant	32	43.7	52.6	21	±5	32	38.9	35	±5	32	118.2	-56	±2
Gray partridge	32	5.4	7	30	±38	32	4.6	51	±44	32	16.9	-59	±12
Eastern cottontail	32	5.4	4.5	-16	±38	32	7.4	-39	±28	32	7.6	-41	±27
White-tailed jackrabbit	32	0	0			32	0.1	-100	±2053	32	1.5	-100	±135
White-tailed deer	32	14.6	14.1	-3	±14	32	7.8	82	±26	32	4.6	209	±45
Mourning dove	32	114.0	138.5	22	±2	32	199.7	-31	±1	32	247.0	-44	±1
Sandhill crane ^e	32	4.4	4.1	-6	±47	32	1.8	129	±113				
Southeast													
Ring-necked pheasant	20	8.7	11.8	37	±24	20	13.0	-9	±16	20	64.9	-82	±3
Gray partridge	20	0	4.2			20	3.6	18	±59	20	12.4	-66	±17
Eastern cottontail	20	10.8	8.8	-18	±19	20	9.3	-5	±23	20	8.0	10	±26
White-tailed jackrabbit	20	0	0			20	0	0		20	0.5	-100	±409
White-tailed deer	20	22.0	23.4	6	±10	20	18.3	28	±12	20	12.1	94	±17
Mourning dove	20	58.0	74.5	29	±4	20	97.3	-23	±2	20	203.7	-63	±1
Sandhill crane ^e	20	0.6	0.8	33	±349	20	0.3	136	±618				

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

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

^c LTA = long-term average during years 1955-2019, except for Northwest region (1982-2019) and white-tailed deer (1974-2019). Estimates based on routes (*n*) surveyed ≥40 years (1955-2019), 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.

^e Sandhill cranes were added to the survey in 2009; thus, long-term averages are not calculated.

^f Two routes were added to the West Central region in 2014.

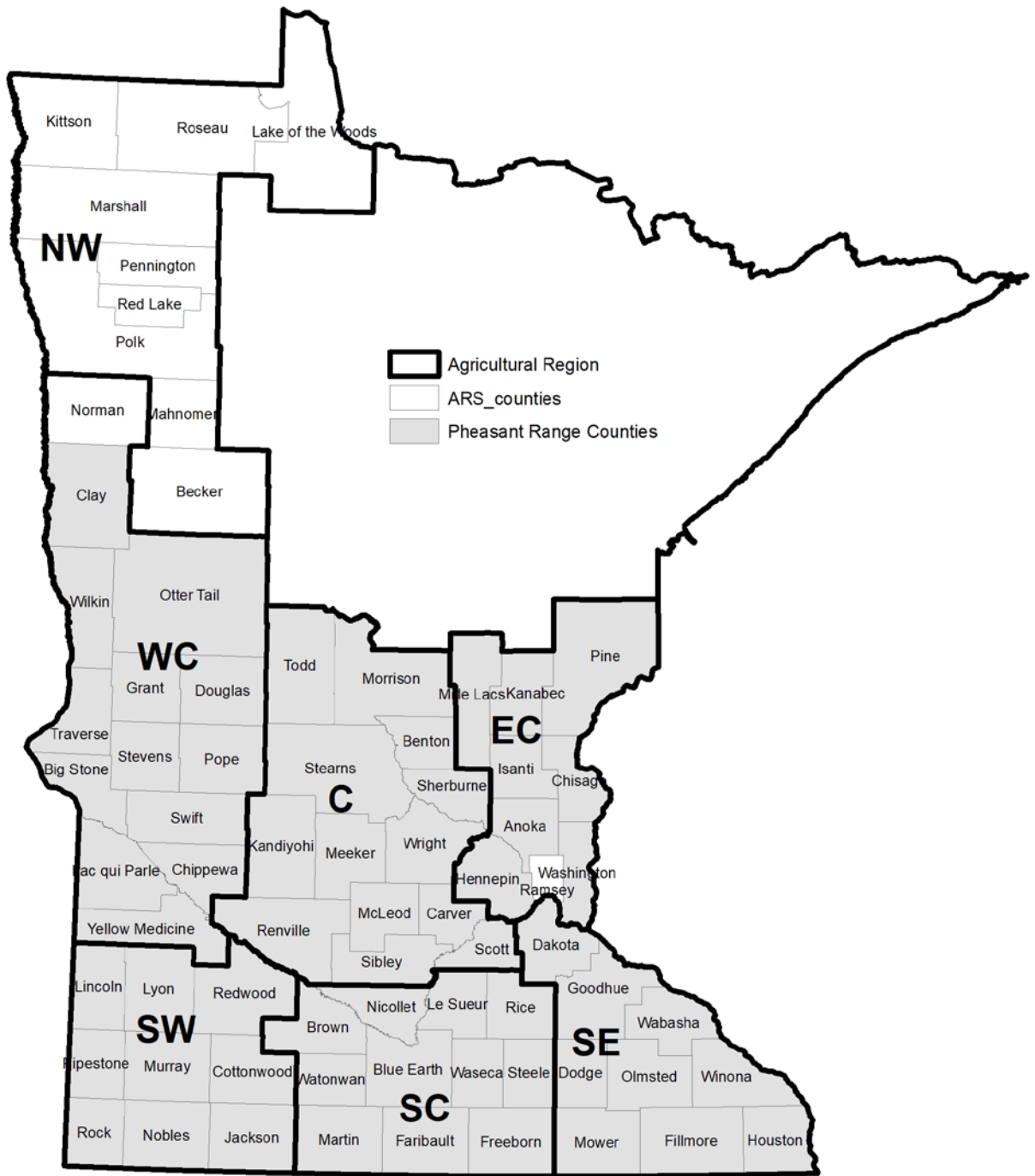


Figure 1. Survey regions and ring-necked pheasant range delineation for Minnesota's August roadside survey, 2020.

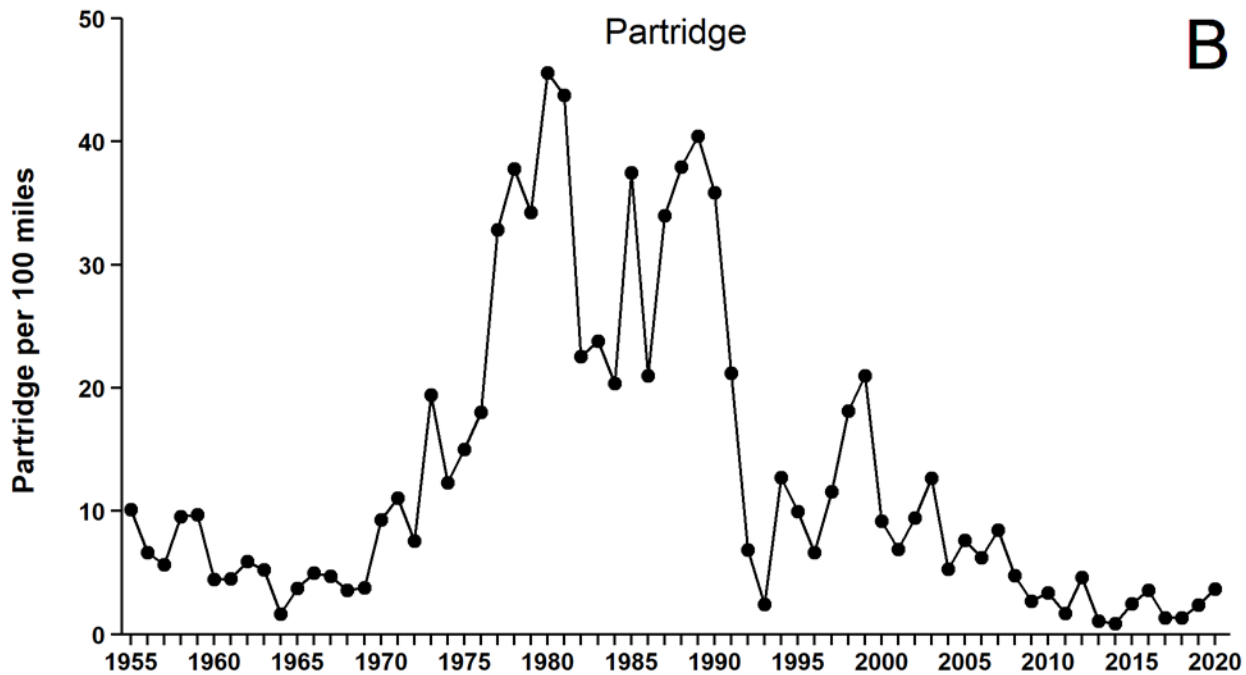
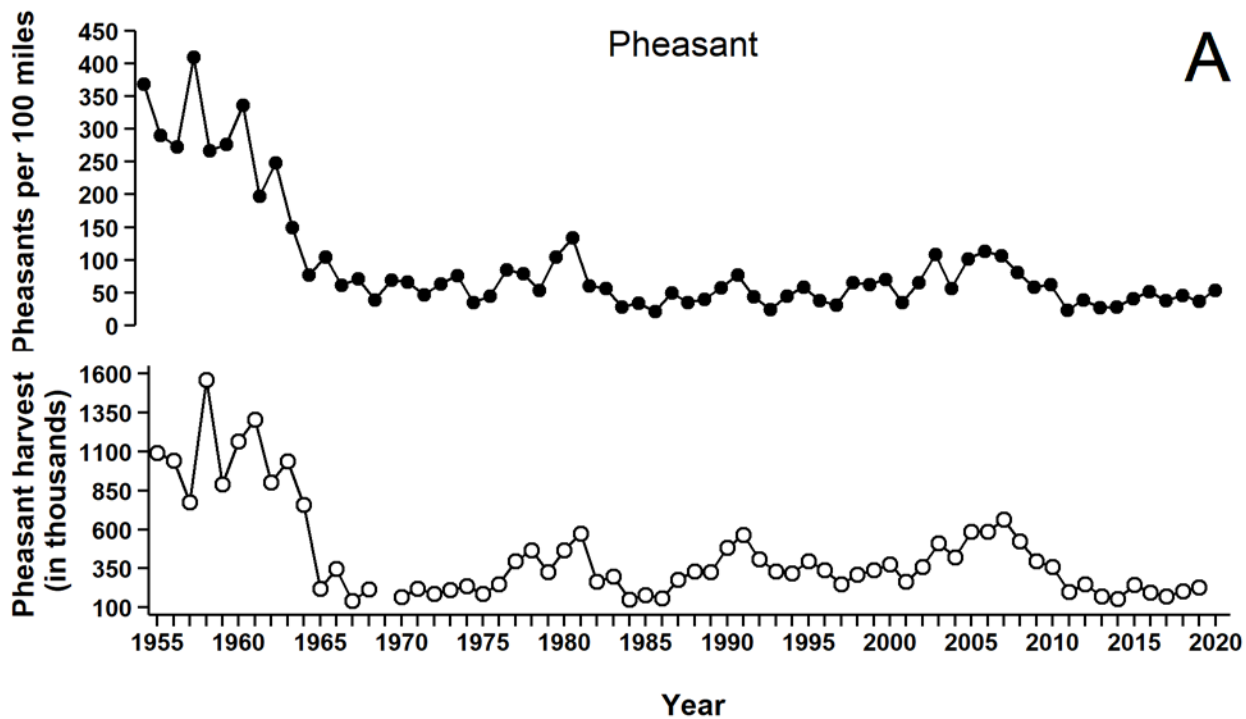


Figure 2. Range-wide index of ring-necked pheasants (A) and gray partridge (B) seen per 100 miles driven in Minnesota, 1955-2020. Does not include the Northwest region. Based on all survey routes completed.

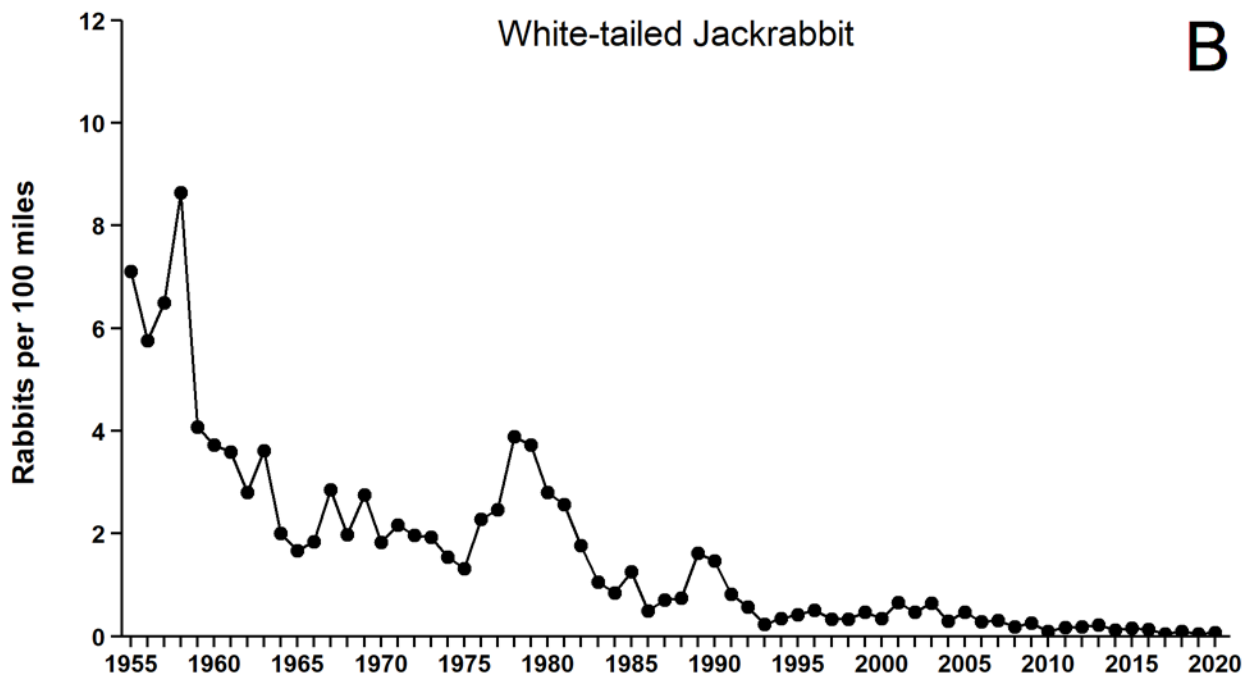
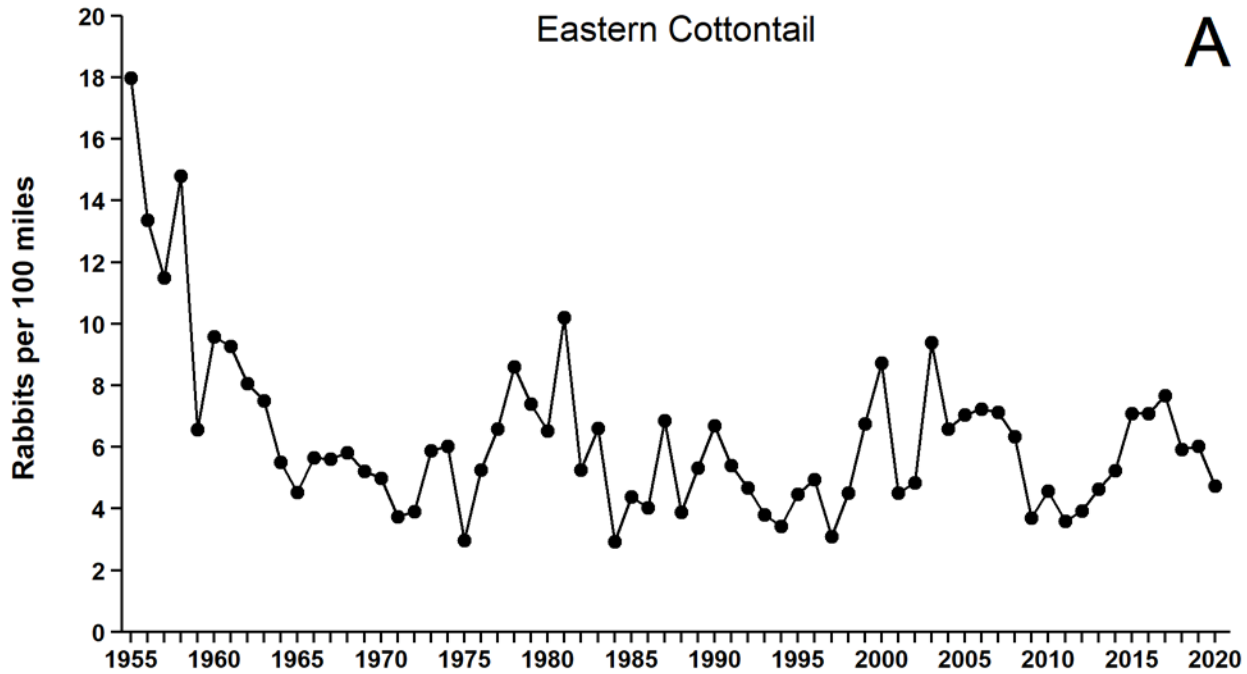


Figure 3. Range-wide index of eastern cottontail (A) and white-tailed jackrabbits (B) seen per 100 miles driven in Minnesota, 1955-2020. Does not include the Northwest region. Based on all survey routes completed.

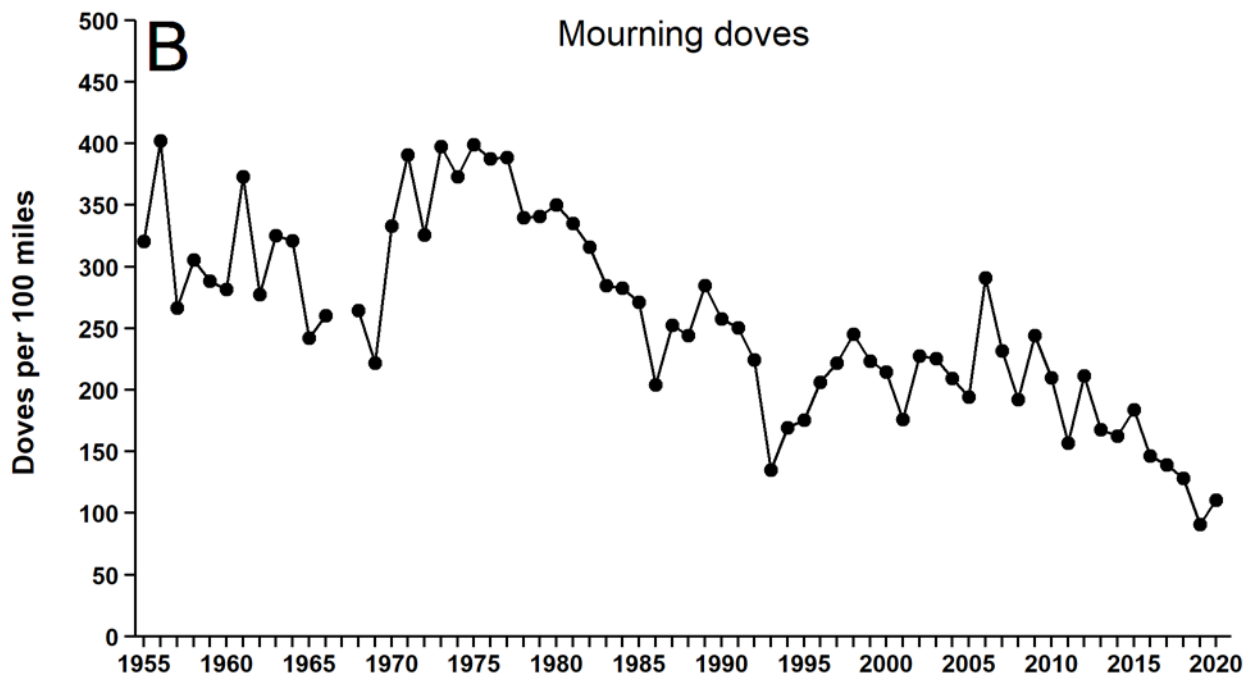
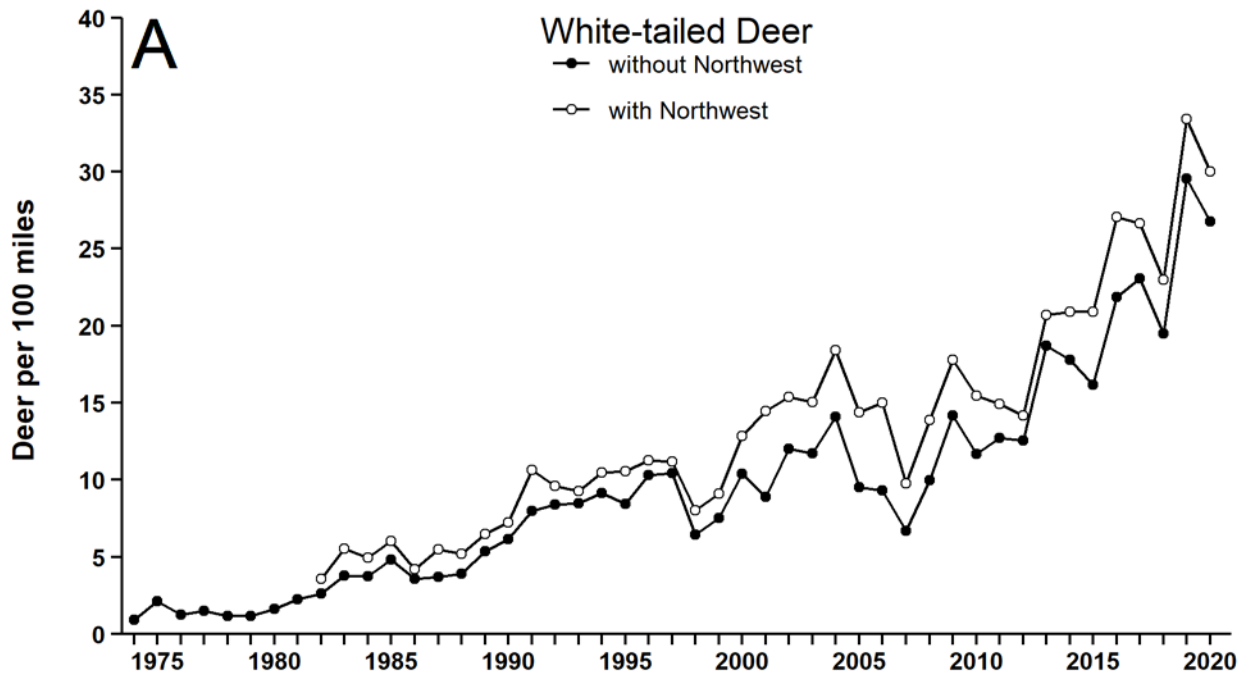


Figure 4. Range-wide index of: (A) white-tailed deer seen per 100 miles driven in Minnesota, 1974-2020, with and without the Northwest region included; and (B) mourning doves seen per 100 miles driven in Minnesota, 1955-2020. Doves were not counted in 1967 and the dove index does not include the Northwest region. Based on all survey routes completed.