WETLAND WILDLIFE POPULATIONS

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WATERFOWL BREEDING POPULATION SURVEY FOR MINNESOTA

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ABSTRACT:

The number of breeding waterfowl in a portion of Minnesota has been estimated each year since 1968 as a part of the overall inventory of North American breeding waterfowl. The survey consists of aerial observations in addition to more intensive ground counts on selected routes to determine the proportion of birds counted by the aerial crew. Procedures used are similar to those used elsewhere across the waterfowl breeding grounds. The 2019 aerial survey portion was flown from May 6-21. Overall, it was a cold, wet, and late spring across the state. Spring ice-out dates were about 1 week behind median dates. Temperatures in April averaged 1.6°F below normal statewide; temperatures in May averaged 4.5°F below normal statewide. Precipitation was 0.59 inches above normal in April and 1.6 inches above normal in May. Overall, wetland numbers (Types II-V) were 19% higher than 2018, 14% above the 10-year and 23% above the long-term average.

The 2019 estimated mallard breeding population was 286,000, which was 3% lower than last year's estimate of 295,000 mallards and statistically unchanged (P=0.88). Mallard numbers were 14% above the 10-year average and 27% above the long-term average of 225,000 breeding mallards. The estimated blue-winged teal population was 223,000, which was 17% above last year's estimate of 191,000 blue-winged teal, but statistically unchanged (P=0.71). Blue-winged teal numbers were 33% above the 10-year average and 7% above the long-term average of 208,000 blue-winged teal. The combined population index of other ducks, excluding scaup, was 185,000 ducks, which was 10% below last year's estimate, unchanged from the 10-year average and 5% above the long-term average of 176,000 other ducks.

The estimate of total duck abundance (695,000), which excludes scaup, was unchanged from last year's estimate and 15% above the 10-year average and 14% above the long-term average of 610,000 ducks. The estimated number of Canada geese was 110,000 and 32% lower than last year and 28% below both the 10-year average and the long-term average.

METHODS:

The aerial survey is based on a sampling design that includes three survey strata (Table 1, Figure 1). The strata cover 39% of the state area and are defined by density of lake basins (>10 acres) exclusive of the infertile northeastern lake region. The strata include the following:
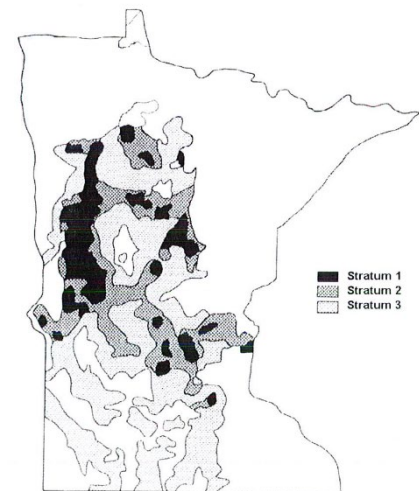

Figure 1. Location of waterfowl breeding population survey strata in Minnesota.

Stratum I: high density, 21 or more lake basins per township.

Stratum II: moderate density, 11 to 20 lake basins per township.

Stratum III: low density, 2 to 10 lake basins per township.

Areas with less than two basins per township are not surveyed. Strata boundaries were based upon "An Inventory of Minnesota Lakes" (Minnesota Conserv. Dept. 1968:12). Standard procedures for the survey follow those outlined in "Standard Operating Procedures for Aerial Waterfowl Breeding Ground Populations and Habitat Surveys in North America" (USFWS/CWS 1987). Changes in survey methodology were described in the 1989 Minnesota Waterfowl Breeding Population Survey report. Pond and waterfowl data for 1968-74 were calculated from Jessen (1969-72) and Maxson and Pace (1989).

All aerial transects in Strata I-III (Table 1) were flown using an American Champion Scout or Cessna 185. Wetlands were counted on only the observer's side of the plane (0.125 mile wide transect); a correction factor obtained in 1989 (123,000/203,000 = 0.606) was used to adjust previous estimates (1968-88) of wetland abundance (Type II-V; Table 2) that were obtained when the observer counted wetlands on both sides of the plane (0.25 mile wide transect). All wetland and waterfowl data were recorded on digital voice recorders and transcribed by the observer from the digital files.

Visibility correction factors (VCFs) were derived from intensive ground surveys on 14 selected routes flown by the aerial crew. Many of these routes use a county road as the mid-point of the transect boundary which aids in navigation and helps ensure the aerial and ground crews survey the same area. Ground routes each originally included about 100 wetland areas; however, drainage has reduced the number of wetlands on most of the routes. All observations from both ground crews and aerial crews were used to calculate the VCFs.

The SAS computer program was modified in 1992 to obtain standard errors for mallard and blue-winged teal breeding population estimates. These calculations were based upon SAS computer code written by Graham Smith, USFWS-Office of Migratory Bird Management. Estimates for 2018 and 2019 were compared using two-tailed Z-tests.

SURVEY CHRONOLOGY:

The 2019 aerial survey began on 6 May in southern Minnesota and concluded in northern Minnesota on 21 May. The survey start date was delayed a few days due to ice coverage still present in northern areas. Transects were flown on 9 days and completed in 49 flight hours. Flights began near 7 AM and were completed by 12:00 PM each day. The median date for survey completion was May 15, which was the same as last year.

WEATHER AND HABITAT CONDITIONS:

For most of the state, ice out was about 1 week behind historical median dates. On April 10-12, most of the state saw a late spring blizzard, with some isolated areas in western MN seeing 20+ inches of snow. Temperatures in April averaged 1.6°F below normal and precipitation was 0.59 inches above normal statewide. Temperatures in May averaged 4.5°F below normal statewide and precipitation was 1.8 inches above normal statewide (http://climate.umn.edu). Precipitation from early April until the survey was completed showed well above average precipitation in southern and central Minnesota and below average precipitation in northern Minnesota (Appendix A).

Overall wetland conditions in spring 2019 were improved from last year. In early May 2019, the U.S. drought monitor indicated 100% of the state was under no dryness designation. By late May, 93% of the state was under no drought designation and 7% was classified as abnormally

dry in extreme NW Minnesota. On May 6, statewide topsoil moisture indices were rated as 0% very short, 0% short, 58% adequate and 42% surplus moisture. By May 29, statewide topsoil moisture indices were rated as 1% very short, 2% short, 44% adequate and 53% surplus moisture (http://droughtmonitor.unl.edu).

Wetland numbers (Types II-V) in 2019 were 313,000 ponds which was 19% above last year's estimate of 263,000 ponds. Wetland numbers were 14% above the 10-year average and 23% above the long-term average (Table 2; Figure 2). The number of temporary (Type 1) sheet water wetlands was 237% higher than last year and 13% above the long-term average.
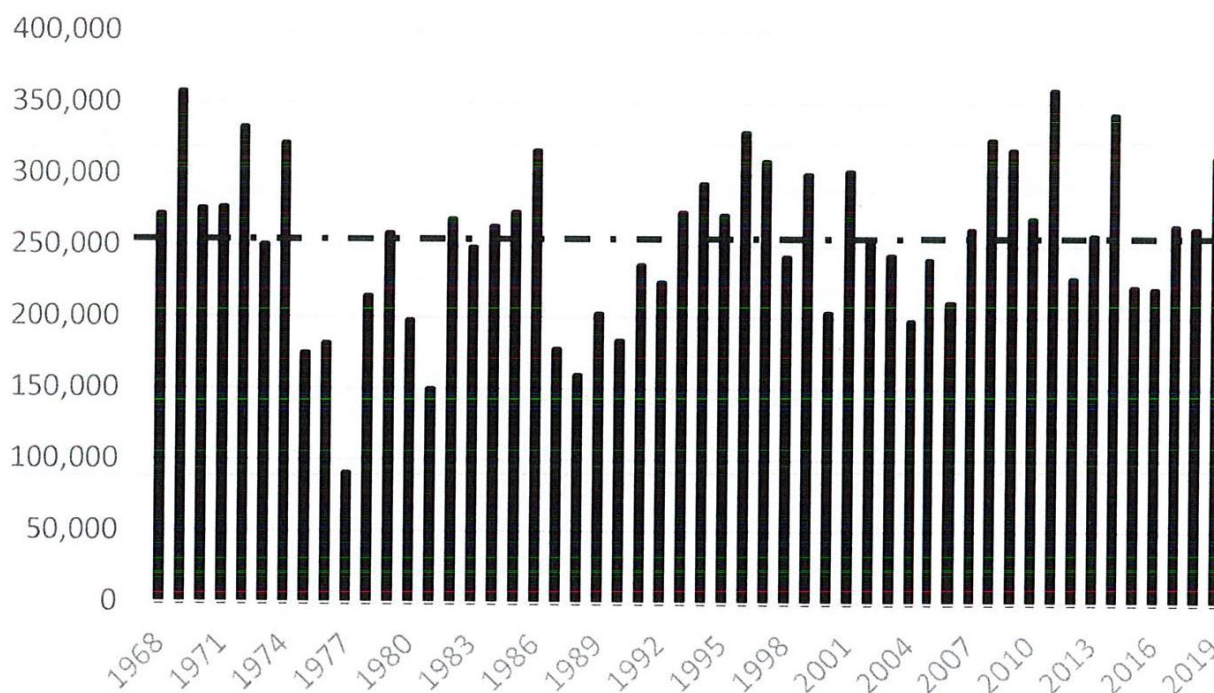

Figure 2. Number of May ponds (Type II-V) and long-term average (dashed line) in Minnesota, 1968-2019.

Planting dates for row crops were very late in 2019. By May 26, about 66% of the corn acres had been planted which was 8 days behind last year and 13 days behind average. By June 2rd, about 5% of alfalfa hay had been cut, 8 days behind last year and 13 days behind average (Minnesota Agricultural Statistics Service Weekly Crop Weather Reports, (http://www.nass.usda.gov/mn/).

WATERFOWL POPULATIONS:

The number of ducks, Canada geese, coots, and swans, by stratum, are shown in Tables 3-5; total numbers are presented in Table 6. These estimates are expanded for area but not corrected for visibility bias. Table 7 and Table 8 provide the unadjusted population index (Unad. PI), which is multiplied by the visibility correction factor (VCF) to obtain the population index (PI) for ducks and Canada geese. The standard error (SE) of the estimate is also provided for mallard and blue-winged teal estimates.

The 2019 breeding population estimate of mallards was 286,000 (SE = 35,570), which was 3% lower than the 2018 estimate of 295,000 mallards, but statistically unchanged (Z = 0.15, P = 0.88) (Table 7, Figure 3). Mallard numbers were 14% above the 10-year average and 27% above the long-term average of 225,000 mallards. In 2019, the mallard population was

comprised of 85% lone or flocked males, 12% pairs, and 3% flocked mallards. The 5-year average is 78% lone or flocked males, 14% pairs, and 8% flocked mallards.

The estimated blue-winged teal population was 223,000 (SE = 42,000), which was 17% higher than the 2018 estimate of 191,000 blue-winged teal, but statistically unchanged (Z = 0.37, P = 0.71). Blue-winged teal numbers were 33% above the 10-year average and 7% above the long-term average (Table 7, Figure 4). The blue-winged teal population was comprised of 10% lone males, 52% pairs, and 38% flocks. The 5-year average is 8% lone males, 42% pairs, and 50% flocks.

The combined population estimate of other ducks (excluding scaup) was 185,000 which was 10% below last year's estimate of 207,000 other ducks, unchanged from the 10-year average and 5% above the long-term average (Table 7, Figure 5). Ring-necked ducks and wood ducks were the most abundant species of other ducks (Table 6). Scaup numbers (40,000) were 28% above last year's estimate and 32% below the long-term average.

The total duck population index, excluding scaup, was 695,000 ducks and was unchanged from last year's index of 693,000 ducks and 15% above the 10-year average and 14% above the long-term average (Table 8, Figure 6).

The population index for total ducks was 735,000 ducks, which was 2% above last year, 16% above the 10-year average and 10% above the long-term average.

Annual Visibility Correction Factors (VCFs) are calculated and used for mallards, blue-winged teal, other ducks combined, and Canada geese (Table 7, Table 8). The mallard VCF (2.63) was 5% above the 10-year average. The blue-winged teal VCF (4.56) was 22% above the 10-year average. The VCF for other ducks (2.58) was 5% below the 10-year average. The VCF for Canada geese (1.45) was 28% below the 10-year average and the lowest recorded since 1990. Due to the extremely late spring, leaf out and wetland vegetation emergence was not an issue during the survey.

The population estimate of Canada geese (adjusted for visibility) was 110,410, which was 32% below last year's estimate and 28% below the long-term average (Table 8, Figure 7). The population estimate (unadjusted for visibility bias) was identical to the 10-year average. A total of 9 Canada goose broods were observed, compared to 2 in 2018. This was one of the lowest numbers observed in the past 15 years, but nesting effort was improved from last year and goose production is expected to be near average.

The estimated coot population, uncorrected for visibility, was 4,645 compared to 27,000 in 2018.

The estimated number of swans (likely all trumpeters) was 23,200 compared to last year's estimate of 22,850 (Table 6; Figure 8). Lone swans are not doubled and the estimate is expanded for area but not visibility, although visibility of swans is extremely high. Trumpeter swans continue to expand their range and dramatically increase in number.

ACKNOWLEDGMENTS:

Data supplied by: Minnesota Department of Natural Resources (MNDNR) and U.S. Fish and Wildlife Service (USFWS)

Air Crew:

Pilot/Observer: Bob Geving, Conservation Officer Pilot, MNDNR, Division of Enforcement

Observer: Steve Cordts, Waterfowl Staff Specialist, MNDNR, Division of Wildlife

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Kelly VanBeek, Migratory Birds, USFWS, Region III, Madison, WI; Wayne Brininger, USFWS, Tamarac National Wildlife Refuge; Dan Hertel and Natalie Yates, USFWS, Fergus Falls; Tom Cooper, Jacob Hernandez and John Riens, USFWS, Twin Cities; Ed Zlonis, Minnesota DNR; Greg Dehmer, USFWS, Sherburne National Wildlife Refuge

Ground Crew Assistants:

John Maile, Minnesota DNR; Gina Kemper, Chuck Becker, Ken Mattson, Larry Michelson, USFWS, Tamarac National Wildlife Refuge; Andy Forbes, Kyle Daly, Anna Sidle-Slettdahl, USFWS; Joe Orr, Chris Kringstad, C. Beyer, K. Jensen, USFWS

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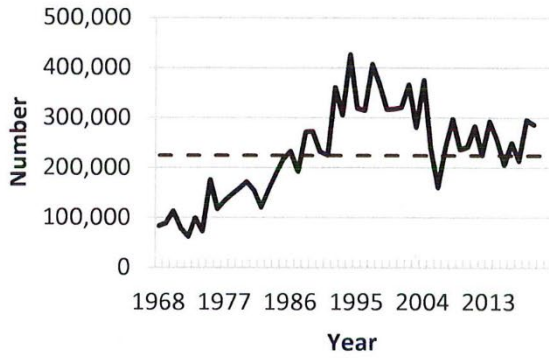
Figure 3. Mallard population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2019.
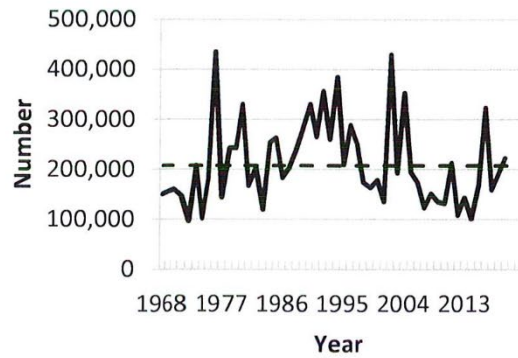
Figure 4. Blue-winged teal population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2019.
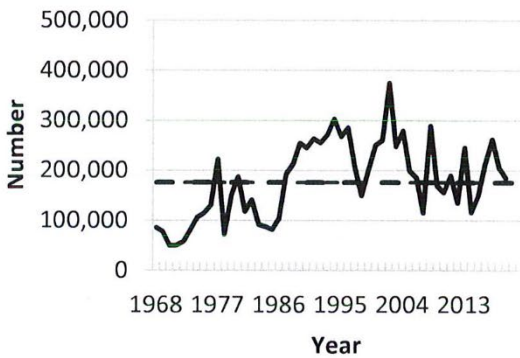
Figure 5. Other duck (excluding scaup) population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2019
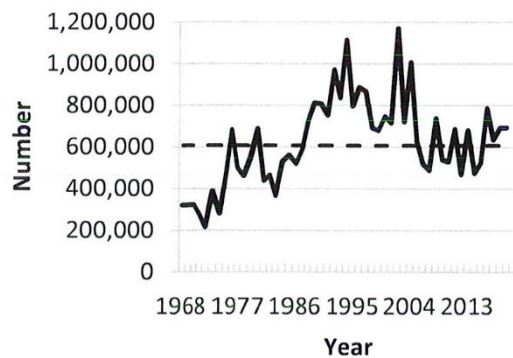
Figure 6. Total duck (excluding scaup) population estimates (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1968-2019
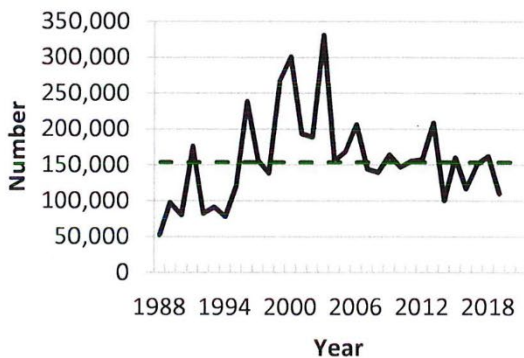
Figure 7. Canada goose population (adjusted for visibility bias) and long-term average (dashed line) in Minnesota, 1988-2019.
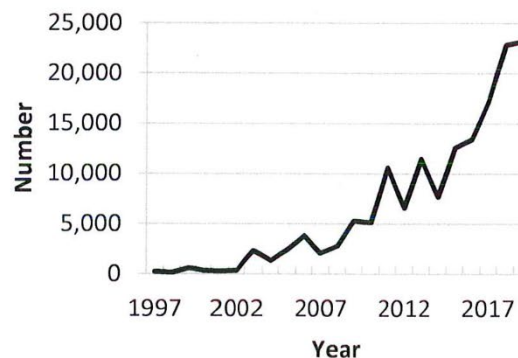
Figure 8. Trumpeter swan population in Minnesota, 1997-2019.

Table 1. Survey design for Minnesota, May 2019.[1]

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

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

Table 2. Estimated May ponds (Type 1 and Types II-V), 1968-2019.

Year	Number of Ponds[1]	Year	Type 1 wetlands	Number of Ponds[1]
1968	272,000	1991	83,000	237,000
1969	358,000	1992	10,000	225,000
1970	276,000	1993	200,000	274,000
1971	277,000	1994	124,000	294,000
1972	333,000	1995	140,000	272,000
1973	251,000	1996	148,000	330,000
1974	322,000	1997	31,000	310,000
1975	175,000	1998	21,000	243,000
1976	182,000	1999	153,000	301,000
1977	91,000	2000	5,000	204,000
1978	215,000	2001	66,000	303,000
1979	259,000	2002	31,000	254,000
1980	198,000	2003	34,000	244,000
1981	150,000	2004	9,000	198,000
1982	269,000	2005	31,000	241,000
1983	249,000	2006	57,000	211,000
1984	264,000	2007	32,000	262,000
1985	274,000	2008	70,000	325,000
1986	317,000	2009	39,000	318,000
1987	178,000	2010	27,000	270,000
1988	160,000	2011	89,000	360,000
1989	203,000	2012	31,000	228,000
1990	184,000	2013	10,000	258,000
		2014	54,000	343,000
		2015	22,000	222,000
		2016	34,000	221,000
		2017	54,000	265,000
		2018	20,000	263,000
		2019	66,000	313,000
	Averages:	10-year	38,000	275,000
		Long-term	58,000	255,000
	% change from:	2018	237%	19%
		10-year	73%	14%
		Long-term	13%	23%

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

Table 3. Minnesota waterfowl breeding populations by species for Stratum I (high wetland density), expanded for area but not visibility, 2001-2019.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dabblers:																			
Mallard	28,742	29,297	25,937	29,381	19,050	16,829	16,357	25,104	19,467	18,439	19,856	18,911	21,161	19,522	19,633	26,020	21,688	23,160	23,632
Black Duck	0	0	0	0	56	0	0	0	0	0	0	0	333	167	222	0	56	0	0
Gadwall	1,333	944	1,250	2,111	1,166	1,444	889	1,166	1,055	1,000	167	1,389	722	555	1,083	1,000	2,138	1,888	167
American Wigeon	111	0	56	555	167	0	56	111	56	56	111	222	222	167	111	111	167	167	111
Green-winged Teal	56	278	222	444	56	56	167	278	167	56	56	56	0	0	56	111	278	0	0
Blue-winged Teal	7,387	14,218	9,664	23,771	9,303	5,665	5,332	9,942	5,998	7,304	4,665	5,110	4,193	3,388	4,360	6,998	8,609	4,888	3,860
Northern Shoveler	305	1,277	278	1,166	333	167	56	1,000	666	1,027	111	56	333	722	111	666	916	333	500
Northern Pintail	389	56	111	56	0	56	0	56	56	0	111	0	111	167	222	0	111	111	56
Wood Duck	6,720	2,888	4,499	8,081	5,498	3,555	2,666	6,665	4,277	3,999	3,416	4,138	3,249	2,527	2,222	5,610	4,971	6,498	5,276
Dabbler Subtotal	45,043	48,958	42,017	65,565	35,629	27,772	25,523	44,322	31,742	31,881	28,493	29,882	30,324	27,215	28,020	40,516	38,934	37,045	33,602
Divers:																			
Redhead	1,444	750	333	805	666	666	916	1,389	472	944	805	750	861	1,333	583	2,166	1,000	333	639
Canvasback	2,027	1,833	1,333	666	972	833	1,000	2,277	1,333	1,222	833	722	1,555	1,777	1,027	1,944	2,666	1,277	1,250
Scaup	5,832	2,444	2,055	5,971	4,110	111	555	6,276	8,553	2,777	2,222	1,055	1,000	1,250	5,526	10,969	7,359	1,500	2,694
Ring-necked Duck	2,444	2,777	1,361	5,165	1,722	2,055	1,555	21,494	6,859	3,138	4,804	2,666	3,582	4,554	3,110	8,220	12,608	4,221	6,220
Goldeneye	333	111	0	222	222	56	222	278	278	222	56	56	333	444	278	278	1,000	500	111
Bufflehead	111	222	111	389	167	222	56	1,611	833	389	278	56	611	56	278	500	2,444	611	222
Ruddy Duck	83	1,305	417	305	1,222	305	0	1,027	861	28	56	0	305	111	694	1,500	222	1,722	305
Hooded Merganser	722	555	333	278	333	555	111	666	944	555	500	555	333	666	1,000	1,222	1,222	1,222	2,333
Large Merganser	111	0	972	0	111	0	278	333	333	333	111	56	222	139	167	56	167	56	56
Diver Subtotal	13,107	9,997	6,915	13,801	9,525	4,803	4,693	35,351	20,466	9,608	9,665	5,916	8,802	10,330	12,663	26,855	28,688	11,442	13,830
Total Ducks	58,150	58,955	48,932	79,366	45,154	32,575	30,216	79,673	52,208	41,489	38,158	35,798	39,126	37,545	40,683	67,371	67,622	48,487	47,432
Other:																			
Coot	1,722	2,888	2,666	21,411	2,444	639	139	16,829	2,166	139	2,194	444	10,386	2,360	1,972	10,608	13,191	7,137	83
Canada Goose	24,882	24,104	22,160	23,160	22,938	21,633	29,797	18,717	16,523	16,440	13,691	26,437	23,771	18,578	23,077	17,995	18,273	25,854	18,717
Swan	0	111	1,000	305	417	861	389	694	500	694	1,611	1,277	2,944	1,944	2,472	3,693	4,054	3,804	4,665

Table 4. Minnesota waterfowl breeding populations by species for Stratum II (medium wetland density), expanded for area but not visibility, 2001-2019.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dabblers:																			
Mallard	44,650	43,773	34,715	44,474	26,883	25,130	24,779	27,935	23,494	21,507	30,974	29,689	27,409	28,987	24,078	32,085	26,299	26,533	33,312
Black Duck	117	0	0	0	0	0	0	0	0	0	0	0	0	0	117	0	0	117	0
Gadwall	1,636	701	584	3,565	584	1,052	234	3,039	1,169	1,286	935	1,987	701	234	818	1,286	4,442	2,805	4,091
American Wigeon	0	0	0	2,513	117	0	0	351	0	351	0	117	234	0	234	234	1,052	234	468
Green-winged Teal	117	468	234	234	0	117	0	0	234	117	0	0	117	351	584	0	0	0	117
Blue-winged Teal	9,701	21,390	15,955	30,624	11,513	9,000	8,416	12,740	11,104	8,474	12,390	9,000	4,383	7,364	5,026	10,753	15,487	8,007	9,760
Northern Shoveler	1,052	2,221	1,403	1,753	234	584	351	468	701	2,513	1,052	0	351	935	877	935	3,857	584	2,279
Northern Pintail	117	0	117	0	0	0	234	0	0	0	234	0	0	117	0	0	0	0	117
Wood Duck	7,831	5,143	4,558	8,766	3,273	1,753	2,221	6,546	5,260	6,312	6,955	5,143	4,792	1,636	1,753	4,149	4,851	5,961	4,792
Dabbler subtotal	65,221	73,696	57,566	91,929	42,604	37,636	36,235	51,079	41,962	40,560	52,540	45,936	37,987	39,624	33,487	49,442	55,988	44,241	54,936
Divers:																			
Redhead	2,455	234	584	1,110	292	175	935	935	584	760	1,578	468	468	526	468	1,110	818	117	175
Canvasback	0	468	1,052	234	0	0	1,169	468	234	117	584	117	935	1,286	1,169	1,403	2,338	234	701
Scaup	3,039	5,961	2,279	7,188	2,981	468	643	3,097	2,104	0	1,929	935	2,045	2,396	4,909	5,318	5,260	1,344	1,052
Ring-necked Duck	3,799	6,370	2,455	5,377	1,929	3,331	1,578	13,149	9,117	2,396	11,455	1,695	6,253	5,143	4,325	4,792	9,292	4,968	3,214
Goldeneye	468	234	234	351	117	117	0	351	584	468	468	584	935	1,519	935	1,169	818	234	234
Bufflehead	0	1,169	117	468	351	117	117	1,403	818	643	1,403	468	0	818	0	234	2,279	584	234
Ruddy Duck	0	1,870	2,688	0	351	58	0	0	175	409	58	234	117	0	351	643	468	0	1,461
Hooded Merganser	1,403	701	701	234	234	351	234	584	701	117	2,221	1,636	701	234	1,169	2,455	3,448	1,403	2,045
Large Merganser	117	0	0	234	351	0	0	351	0	0	234	0	234	117	234	117	0	117	117
Diver subtotal	11,281	17,007	10,110	15,196	6,606	4,617	4,676	20,338	14,317	4,910	19,930	6,137	11,688	12,039	13,560	17,241	24,721	9,001	9,233
Total Ducks	76,502	90,703	67,676	107,125	49,210	42,253	40,911	71,417	56,279	45,470	72,470	52,073	49,675	51,663	47,047	66,683	80,709	53,242	64,169
Other:																			
Coot	468	4,909	1,519	8,007	584	292	409	23,961	0	117	292	292	2,571	877	0	0	6,370	584	1,169
Canada Goose	24,604	20,688	22,091	28,461	20,688	26,825	25,890	19,753	22,675	18,935	14,201	23,260	22,442	20,572	24,312	17,533	21,799	27,994	19,286
Swan	117	292	994	701	1,461	994	468	1,519	2,922	2,279	7,188	3,507	6,604	3,740	5,318	4,325	5,084	10,169	10,344

Table 5. Minnesota waterfowl breeding populations by species for Stratum III (low wetland density), expanded for area but not visibility, 2001-2019.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dabblers:																			
Mallard	72,642	72,121	55,156	84,561	36,539	30,884	35,843	50,371	35,408	40,976	51,415	47,848	62,638	62,899	51,154	59,593	56,983	57,505	51,937
Black Duck	0	0	0	174	0	0	174	174	0	0	0	174	174	0	0	0	0	0	0
Gadwall	10,701	3,306	1,566	6,960	2,001	5,568	4,176	870	1,392	1,392	4,089	1,566	5,220	1,914	2,088	9,570	5,046	7,134	6,873
American Wigeon	174	1,218	174	1,566	1,044	174	348	348	174	348	1,044	174	348	174	1,566	870	174	0	348
Green-winged Teal	1,392	522	174	0	174	522	0	0	0	0	174	348	696	0	348	0	348	174	870
Blue-winged Teal	20,618	56,374	21,140	39,758	27,578	23,663	15,659	18,095	20,183	16,964	44,716	35,669	18,617	21,227	24,098	53,155	39,323	42,455	35,321
Northern Shoveler	10,701	6,264	870	3,828	348	522	870	4,002	2,088	6,873	2,088	8,265	6,786	522	1,914	4,959	3,219	1,392	696
Northern Pintail	522	0	174	348	174	174	348	174	0	174	0	174	174	0	174	522	174	522	0
Wood Duck	17,225	13,572	12,702	20,705	7,482	7,308	5,394	14,442	10,266	12,354	13,659	10,962	12,180	9,657	8,265	8,700	16,094	11,919	10,875
Dabbler subtotal	133,975	153,377	91,956	157,900	75,340	68,815	62,812	88,476	69,511	79,081	117,185	105,180	106,833	96,393	89,607	137,369	121,361	121,101	106,920
Divers:																			
Redhead	3,654	1,305	174	1,740	1,479	0	522	783	870	174	4,350	3,306	1,827	1,566	1,305	1,044	3,480	1,914	1,131
Canvasback	522	696	1,131	2,784	0	0	348	1,566	1,218	348	1,044	1,044	696	522	696	348	1,914	522	696
Scaup	6,873	4,611	783	17,747	5,307	1,392	696	5,481	1,914	522	5,133	696	8,874	2,871	435	3,915	22,271	8,091	11,919
Ring-necked Duck	8,526	7,395	1,479	5,133	10,179	6,699	1,392	8,526	6,525	3,045	6,264	9,135	6,960	5,568	3,480	4,089	18,095	6,177	5,742
Goldeneye	1,566	3,132	1,305	696	1,044	1,044	870	348	522	174	870	0	348	174	1,218	870	1,566	1,392	1,044
Bufflehead	0	1,218	783	2,088	0	174	696	1,218	870	174	2,871	174	3,915	4,698	522	2,523	1,740	348	3,132
Ruddy Duck	696	18,878	87	2,262	870	696	261	87	348	0	3,828	522	522	174	0	87	1,305	783	1,218
Hooded Merganser	174	2,175	174	1,740	1,218	870	174	696	348	1,218	1,044	1,044	348	348	522	1,392	1,653	3,132	1,914
Large Merganser	0	522	0	0	261	957	348	348	348	348	174	174	0	0	0	870	957	0	0
Diver subtotal	22,011	39,932	5,916	34,190	20,358	11,832	5,307	19,053	12,963	6,003	25,578	16,095	23,490	15,921	8,178	15,138	52,981	22,359	26,796
Total Ducks	155,986	193,309	97,872	192,090	95,698	80,647	68,119	107,529	82,474	85,084	142,763	121,275	130,323	112,314	97,785	152,507	174,342	143,460	133,716
Other:																			
Coot	3,132	14,007	7,134	77,427	8,613	14,702	5,742	15,137	7,047	435	1,479	25,664	27,578	15,746	7,917	5,829	10,962	19,139	3,393
Canada Goose	39,932	33,407	43,412	46,717	39,758	27,230	42,629	31,841	28,274	30,710	32,711	37,496	48,022	24,707	43,498	31,145	30,101	38,888	38,192
Swan	174	0	348	348	522	2,001	1,218	609	1,914	2,175	1,827	1,827	2,088	2,001	4,785	5,394	8,091	8,874	8,178

Table 6. Minnesota waterfowl breeding populations by species for Stratum I-III combined, expanded for area coverage but not for visibility, 2001-2019.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Dabblers:																			
Mallard	146,034	145,191	115,974	158,416	82,472	72,843	76,979	103,411	78,368	80,922	102,245	96,448	111,208	111,408	94,866	117,698	104,970	107,198	108,881
Black Duck	117	0	0	174	56	0	174	174	0	0	0	174	507	167	339	0	56	117	0
Gadwall	13,670	4,951	3,400	12,635	3,752	8,064	5,298	5,075	3,616	3,677	5,191	4,941	6,643	2,703	3,989	11,855	11,626	11,827	11,130
American Wigeon	285	1,218	230	4,634	1,327	174	404	810	230	754	1,155	513	804	341	1,911	1,215	1,393	400	927
Green-winged Teal	1,564	1,267	630	678	230	694	167	278	400	172	230	404	813	351	988	111	626	174	987
Blue-winged Teal	37,706	91,982	46,759	94,152	48,394	38,328	29,407	40,777	37,286	32,742	61,772	49,779	27,194	31,979	33,484	70,907	63,418	55,349	48,941
Northern Shoveler	12,058	9,762	2,550	6,747	915	1,273	1,276	5,469	3,456	10,413	3,251	8,320	7,470	2,179	2,902	6,560	7,992	2,310	3,475
Northern Pintail	1,028	56	402	404	174	230	582	230	56	174	345	174	285	284	396	522	285	633	172
Wood Duck	31,777	21,603	21,759	37,553	16,253	12,616	10,281	27,652	19,802	22,664	24,029	20,242	20,221	13,820	12,240	18,459	25,916	24,378	20,943
Dabbler subtotal	244,239	276,030	191,704	315,393	153,573	134,222	124,568	183,876	143,214	151,518	198,218	180,995	175,145	163,232	151,115	227,327	216,282	202,386	195,456
Divers:																			
Redhead	7,552	2,289	1,092	3,656	2,438	842	2,373	3,107	1,926	1,878	6,733	4,523	3,155	3,425	2,356	4,320	5,298	2,364	1,945
Canvasback	2,549	2,996	3,516	3,684	972	833	2,517	4,311	2,785	1,687	2,461	1,883	3,186	3,585	2,892	3,694	6,918	2,033	2,647
Scaup	15,743	13,016	5,117	30,906	12,397	1,971	1,894	14,854	12,571	3,299	9,283	2,686	11,919	6,517	10,870	20,202	34,890	10,934	15,664
Ring-necked Duck	14,768	16,542	5,294	15,675	13,829	12,085	4,525	43,169	22,501	8,579	22,523	13,495	16,795	15,265	10,915	17,101	39,995	15,365	15,177
Goldeneye	2,367	3,477	1,539	1,269	1,383	1,216	1,092	976	1,384	864	1,393	640	1,616	2,138	2,431	2,317	3,384	2,126	1,389
Bufflehead	111	2,609	1,011	2,944	517	513	868	4,231	2,521	1,206	4,551	697	4,526	5,572	800	3,257	6,463	1,543	3,588
Ruddy Duck	779	22,054	3,192	2,567	2,443	1,060	261	1,114	1,384	437	3,942	756	944	285	1,045	2,229	1,995	2,505	2,984
Hooded Merganser	2,299	3,432	1,209	2,251	1,785	1,776	519	1,947	1,993	1,890	3,765	3,236	1,383	1,248	2,691	5,068	6,323	5,756	6,292
Large Merganser	228	522	972	234	723	957	626	1,032	681	681	519	230	456	256	400	1,042	1,124	172	172
Diver subtotal	46,396	66,937	22,942	63,186	36,487	21,253	14,675	74,741	47,746	20,521	55,170	28,146	43,980	38,291	34,400	59,230	106,390	42,798	49,858
Total Ducks	290,635	342,967	214,646	378,579	190,060	155,475	139,243	258,617	190,960	172,039	253,388	209,141	219,125	201,523	185,515	286,557	322,672	245,184	245,314
Other:																			
Coot	5,321	21,804	11,319	106,845	11,641	15,633	6,290	55,927	9,213	691	3,965	26,401	40,535	18,984	9,888	16,437	30,523	26,861	4,645
Canada Goose	89,418	78,200	87,663	98,339	83,384	75,688	98,316	70,311	67,473	66,085	60,603	87,193	94,235	63,857	90,887	66,672	70,172	92,735	76,195
Swan	291	403	2,341	1,355	2,400	3,855	2,074	2,823	5,336	5,148	10,626	6,611	11,500	7,700	12,575	13,412	17,230	22,847	23,187

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Table 7. Mallard, blue-winged teal, and other duck (excluding scaup) populations in Minnesota, 1968-2019.

Year	Mallard				Blue-winged teal				Other ducks (exc. scaup)		
	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI
1968	41,030	2.04	83,701		61,493	2.44	151,141		41,419	2.08	86,152
1969	53,167	1.67	88,789		45,180	3.45	155,871		34,605	2.27	78,553
1970	67,463	1.69	113,945		31,682	5.06	160,343		30,822	1.62	49,932
1971	47,702	1.65	78,470		42,445	3.49	148,218		29,520	1.71	50,450
1972	49,137	1.27	62,158		49,386	1.96	96,895		34,405	1.69	58,127
1973	56,607	1.76	99,832		53,095	3.92	208,292		33,155	2.45	81,362
1974	44,866	1.62	72,826		39,402	2.59	102,169		38,266	2.79	106,609
1975	55,093	3.19	175,774		45,948	3.95	181,375		34,585	3.31	114,459
1976	69,844	1.69	117,806		89,370	4.87	435,607		39,022	3.35	130,669
1977	60,617	2.21	134,164		37,391	3.86	144,187		18,633	11.95	222,748
1978	56,152	2.61	146,781		28,491	8.53	242,923		22,034	3.30	72,798
1979	61,743	2.57	158,704	28,668	46,708	5.21	243,167	62,226	39,749	3.79	150,545
1980	83,775	2.05	171,957	22,312	50,966	6.49	330,616	40,571	47,322	3.97	188,020
1981	79,562	1.95	154,844	16,402	64,546	2.59	167,258	23,835	30,947	3.80	117,667
1982	51,655	2.33	120,527	17,078	42,772	4.75	203,167	34,503	32,726	4.32	141,501
1983	73,424	2.12	155,762	15,419	42,728	2.81	119,980	20,809	32,240	2.84	91,400
1984	94,514	1.99	188,149	24,065	89,896	2.82	253,821	33,286	40,326	2.18	87,709
1985	96,045	2.26	216,908	32,935	90,453	2.91	263,607	33,369	35,018	2.35	82,383
1986	108,328	2.16	233,598	30,384	68,235	2.69	183,338	28,204	38,900	2.67	103,851
1987	165,881	1.16	192,289	23,500	102,480	1.99	203,718	32,289	76,746	2.51	192,947
1988	155,543	1.75	271,718	38,675	101,183	2.38	240,532	39,512	81,514	2.61	212,988
1989	124,362	2.19	272,968	26,508	90,300	3.16	285,760	39,834	88,109	2.89	254,887
1990	140,879	1.65	232,059	26,316	107,177	3.09	330,659	44,455	124,531	1.97	245,152
1991	128,315	1.75	224,953	28,832	91,496	2.90	265,138	42,057	93,784	2.81	263,619
1992	144,126	2.50	360,870	43,621	93,107	3.83	356,679	53,619	109,779	2.33	255,774
1993	123,771	2.47	305,838	31,103	64,670	4.02	260,070	36,307	82,612	3.28	271,263
1994	138,482	3.08	426,455	66,240	70,324	5.48	385,256	82,580	85,671	3.55	303,847
1995	142,557	2.24	319,433	48,124	47,737	4.40	210,043	40,531	66,096	4.05	267,668
1996	153,473	2.05	314,816	53,461	57,196	5.05	288,913	64,064	107,950	2.64	285,328
1997	160,629	2.54	407,413	65,771	45,496	5.57	253,408	67,526	76,095	2.72	207,316
1998	188,972	1.95	368,450	61,513	47,788	3.66	174,848	33,855	91,478	1.64	149,786
1999	169,213	1.87	316,394	51,651	36,106	4.53	163,499	36,124	80,459	2.49	200,570

	Mallard				Blue-winged teal				Other ducks (exc. scaup)		
Year	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI
2000	157,853	2.02	318,134	36,857	60,288	2.97	179,055	32,189	120,158	2.09	250,590
2001	146,034	2.20	320,560	39,541	37,706	3.60	135,742	19,631	91,152	2.85	260,051
2002	145,191	2.53	366,625	46,264	91,982	4.67	429,934	87,312	92,778	4.04	374,978
2003	115,974	2.42	280,517	34,556	46,759	4.13	193,269	36,176	46,796	5.30	248,019
2004	158,416	2.37	375,313	57,591	94,152	3.75	353,209	56,539	95,105	2.94	279,802
2005	82,472	2.89	238,500	28,595	48,394	4.01	194,125	37,358	46,797	4.26	199,355
2006	72,843	2.21	160,715	24,230	38,328	4.53	173,674	60,353	42,333	4.41	186,719
2007	76,979	3.15	242,481	30,020	29,407	4.20	123,588	20,055	30,963	3.73	115,390
2008	103,411	2.88	297,565	27,787	40,777	3.74	152,359	24,157	99,575	2.91	289,629
2009	78,368	3.02	236,436	36,539	37,286	3.63	135,262	32,155	62,725	2.70	169,568
2010	80,922	2.99	241,884	33,940	32,742	4.04	132,261	27,430	55,076	2.84	156,599
2011	102,245	2.77	283,329	49,845	61,772	3.46	213,584	88,720	79,743	2.39	190,586
2012	96,448	2.33	224,965	45,057	49,779	2.18	108,607	31,971	60,228	2.24	135,017
2013	111,208	2.64	293,239	58,463	27,194	5.29	143,927	46,635	68,804	3.57	245,729
2014	111,408	2.31	256,996	55,366	31,979	3.18	101,640	24,089	51,619	2.24	115,751
2015	94,866	2.17	206,229	37,498	33,484	5.04	168,615	56,787	46,295	3.23	149,330
2016	117,698	2.13	250,204	42,850	70,907	4.57	323,916	94,952	77,750	2.74	212,967
2017	104,970	2.04	213,644	32,704	63,418	2.51	159,483	55,100	119,394	2.20	262,867
2018	107,198	2.76	295,370	46,578	55,349	3.45	190,695	77,961	71,703	2.88	206,505
2019	108,881	2.63	286,357	35,570	48,941	4.56	223,171	42,200	71,828	2.58	185,316
Averages: 10-year	100,533	2.52	250,230	43,884	46,391	3.74	167,799	53,580	69,334	2.70	184,492
Long-term	100,989	2.19	224,828	37,921	56,288	3.80	208,143	44,978	61,106	3.03	176,453
% change from											
2018	2%	-5%	-3%	-24%	-12%	32%	17%	-46%	0%	-10%	-10%
10-year average	8%	5%	14%	-19%	5%	22%	33%	-21%	4%	-5%	0%
Long-term average	8%	20%	27%	-6%	-13%	20%	7%	6%	18%	-15%	5%

Table 8. Scaup, total ducks (excluding scaup), total ducks, and Canada goose populations in Minnesota, 1968-2019.

Year	Scaup			Total Ducks (exc. scaup)		Total ducks		Canada geese		
	Unad. PI	VCF	PI	Unad. PI	PI	Unad. PI	PI	Unad. PI	VCF	PI
1968	22,834	2.08	47,495	144,392	320,994	167,226	368,488			
1969	9,719	2.27	22,062	132,952	323,213	142,671	345,275			
1970	12,105	1.62	19,610	129,967	324,219	142,072	343,829			
1971	5,713	1.71	9,764	119,667	277,137	125,380	286,901			
1972	12,062	1.69	20,379	132,928	217,181	144,990	237,560	366		
1973	10,633	2.45	26,093	142,857	389,486	153,490	415,580	1,965		
1974	18,378	2.79	51,201	122,534	281,605	140,912	332,806	8,835		
1975	9,563	3.31	31,649	135,626	471,608	145,189	503,257	5,997		
1976	22,494	3.35	75,323	198,236	684,082	220,730	759,405	5,409		
1977	2,971	11.95	35,517	116,641	501,099	119,612	536,616	7,279		
1978	14,774	3.35	48,812	106,677	462,502	121,451	511,314	7,865		
1979	92,134	3.79	348,948	148,200	552,416	240,334	901,364	4,843		
1980	12,602	3.97	50,070	182,063	690,593	194,665	740,663	6,307		
1981	19,844	3.88	75,451	175,055	439,769	194,899	515,220	10,156		
1982	21,556	4.32	93,204	127,153	465,195	148,709	558,399	6,600		
1983	9,551	2.84	27,077	148,392	367,142	157,943	394,219	11,081		
1984	15,683	2.18	34,111	224,736	529,679	240,419	563,790	14,051		
1985	7,409	2.35	17,430	221,516	562,898	228,925	580,328	16,658		
1986	6,247	2.67	16,678	215,463	520,787	221,710	537,465	19,599		
1987	10,306	2.51	25,910	345,107	588,954	355,413	614,864	29,960		
1988	10,545	2.61	27,553	338,240	725,238	348,785	752,791	39,057	1.36	53,004
1989	71,898	2.89	207,991	302,771	813,615	374,669	1,021,606	51,946	1.88	97,898
1990	40,075	1.97	78,892	372,587	807,870	412,662	886,761	58,425	1.37	80,147
1991	40,727	2.81	114,480	313,595	753,710	354,322	868,191	42,231	4.18	176,465
1992	66,071	2.33	153,939	347,012	973,323	413,083	1,127,262	33,965	2.43	82,486
1993	11,801	3.28	38,750	271,053	837,172	282,854	875,921	43,858	2.08	91,369
1994	57,670	3.55	204,536	294,477	1,115,558	352,147	1,320,095	48,595	1.68	77,878
1995	28,421	4.05	115,096	256,390	797,144	284,811	912,241	58,065	2.08	120,775
1996	65,585	2.64	173,351	318,619	889,057	384,204	1,062,408	60,870	3.92	238,708
1997	31,138	2.72	84,834	282,220	868,137	313,358	952,971	60,449	2.59	156,817

Year	Scaup Unad. PI	VCF	PI	Total Ducks (exc. scaup) Unad. PI	PI	Total ducks Unad. PI	PI	Canada geese Unad. PI	VCF	PI
1998	28,416	1.64	46,528	328,238	693,084	356,654	739,612	79,147	1.75	138,507
1999	14,041	2.49	35,002	285,778	680,463	299,819	715,465	80,012	3.35	268,168
2000	32,376	2.09	67,520	338,299	747,779	370,675	815,299	105,932	2.84	301,298
2001	15,743	2.85	44,914	274,892	716,353	290,653	761,267	89,418	2.17	193,887
2002	13,016	4.04	52,606	327,951	1,171,537	340,967	1,224,143	78,200	2.42	189,353
2003	5,117	5.3	27,120	209,529	721,805	214,646	748,925	87,663	3.78	331,094
2004	30,906	2.94	90,926	347,673	1,008,324	378,579	1,099,250	98,339	1.58	155,859
2005	12,397	4.26	52,811	177,663	631,980	190,060	684,791	83,384	2.02	168,469
2006	1,971	4.41	8,692	153,504	521,109	155,475	529,801	75,688	2.73	206,757
2007	1,894	3.73	7,058	137,349	488,517	139,243	495,575	98,316	1.47	144,289
2008	14,854	2.91	43,205	243,763	739,553	258,617	782,758	70,311	1.99	139,708
2009	12,571	2.7	33,979	178,379	541,266	190,950	575,245	67,473	2.44	164,405
2010	3,299	2.84	9,380	168,740	530,744	172,039	540,124	66,085	2.22	146,960
2011	9,283	2.39	22,186	244,105	687,499	253,043	709,685	60,603	2.57	155,750
2012	2,686	2.24	6,021	206,455	468,589	209,141	474,610	87,193	1.81	157,706
2013	11,919	3.57	42,568	207,206	682,895	219,125	725,463	94,235	2.22	208,825
2014	6,517	2.24	14,614	195,006	474,387	201,523	489,001	63,857	1.57	100,255
2015	10,870	3.23	35,062	174,645	524,174	185,515	559,236	90,887	1.77	160,427
2016	20,202	2.74	55,336	266,355	787,087	286,557	842,423	66,672	1.75	117,096
2017	34,890	2.2	76,817	287,782	635,994	322,672	712,811	70,172	2.16	151,740
2018	10,934	2.88	31,490	234,250	692,570	245,184	724,060	92,735	1.75	162,286
2019	15,664	2.58	40,413	229,650	694,844	245,314	735,257	76,195	1.45	110,410
Averages:										
10-year	12,317	2.7	32,745	216,292	602,521	228,575	635,266	75,991	2.03	152,545
Long-term	20,277	3.03	59,232	218,359	609,559	238,630	668,791	49,182	2.19	154,325
% change from 2018	43%	-10%	28%	-2%	0%	0%	2%	-18%	-17%	-32%
10-year average	27%	-5%	23%	6%	15%	7%	16%	0%	-28%	-28%
Long-term average	-23%	-15%	-32%	5%	14%	3%	10%	55%	-34%	-28%

Appendix A. Precipitation in selected regions of Minnesota, 1 April - 21 May 2019 (Source: Minnesota DNR; http://www.dnr.state.mn.us/climate/historical/summary.html).

Region	Precipitation	Departure from normal
Northwest	2.40	-0.64
North Central	3.08	-0.52
Northeast	4.19	-0.01
West Central	5.89	1.76
Central	7.50	2.66
East Central	7.01	2.14
Southwest	8.34	3.06
South Central	7.73	1.54
Southeast	7.62	1.84
Statewide	6.30	1.51

WATERFOWL POPULATION STATUS, 2019

Waterfowl information is taken from the U.S. Fish and Wildlife Service report <u>Waterfowl Population Status, 2019</u> by Joshua Dooley, Walt Rhodes, and Nathan Zimpfer. The entire report is available on the Division of Migratory Bird Management website (https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/Waterfowl/WaterfowlPopulationStatusReport19.pdf)
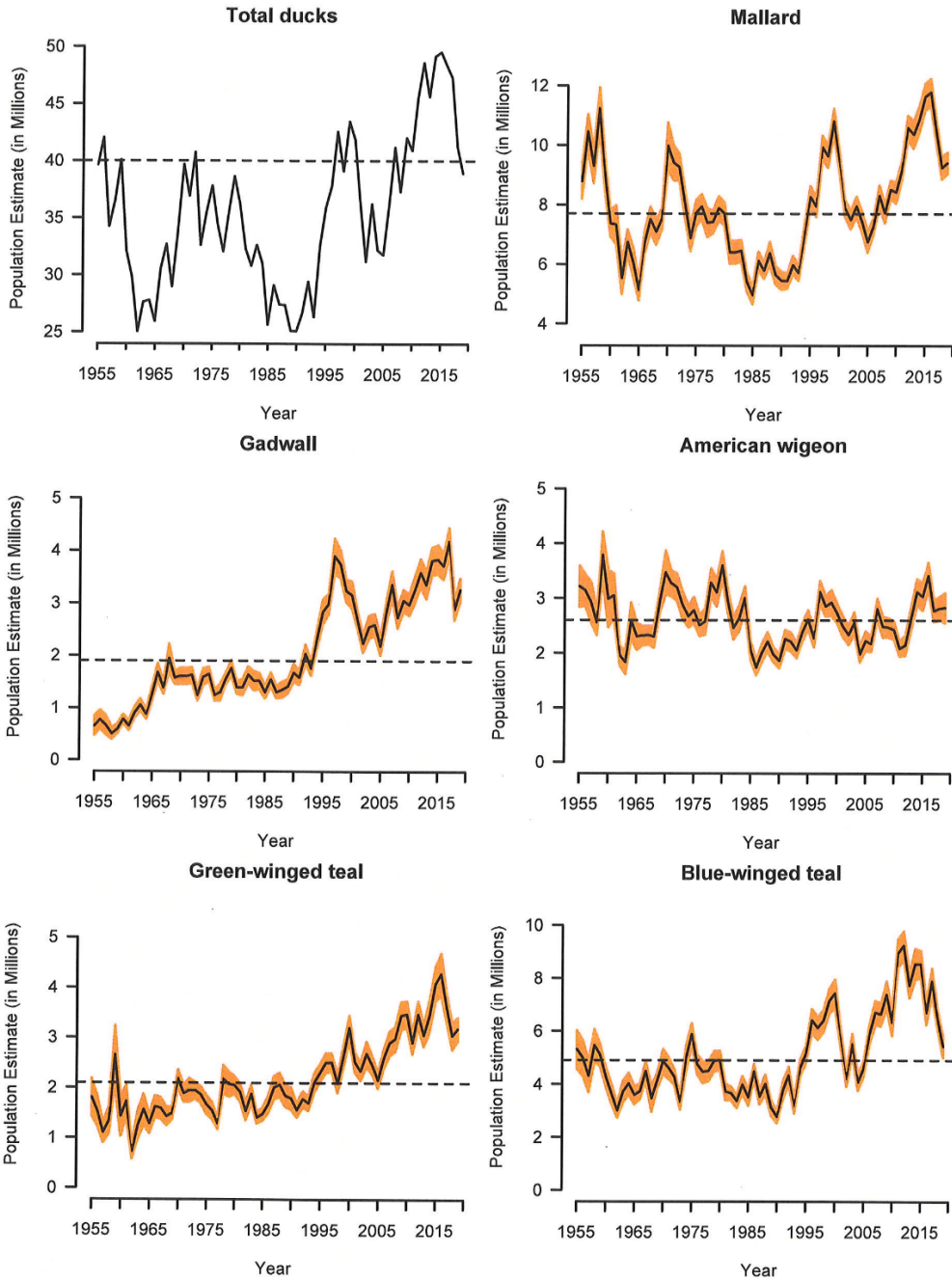
Figure 1 Estimates of North American breeding populations, 90% confidence intervals, and North American Waterfowl Management Plan population goal (dashed line) for selected species and number of water areas in May in Prairie Canada and Northcentral U.S (from: U.S. Fish and Wildlife Service 2019).

Northern shoveler

Northern pintail

Redhead

Canvasback

Scaup

MAY PONDS
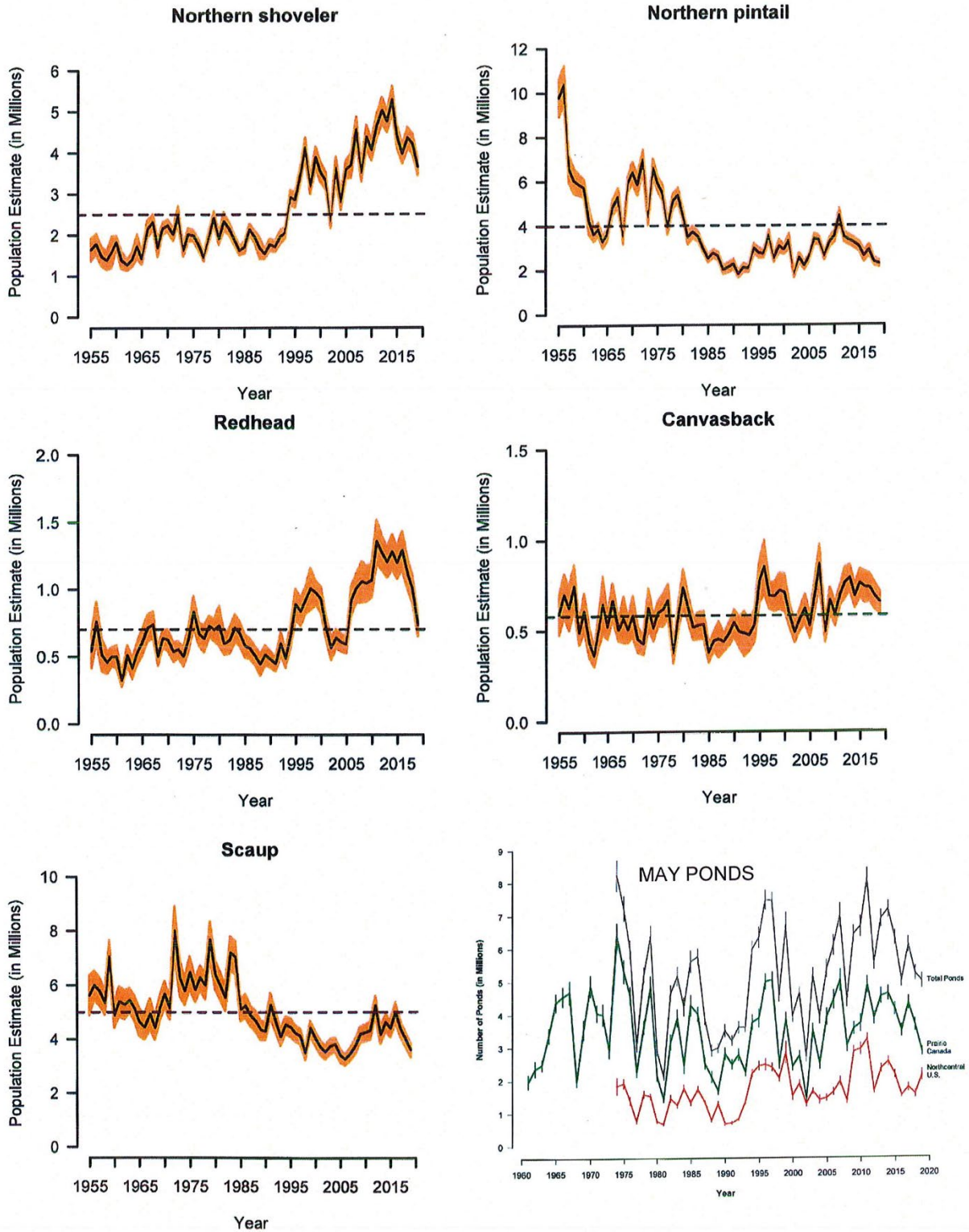
Figure 1 (continued).

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MOURNING DOVE POPULATION STATUS, 2019.

Mourning dove information is taken from the U.S. Fish and Wildlife Service report by Seamans, M.E. 2019. Mourning dove population status, 2019. U.S. Department of the Interior, Fish and Wildlife Service, Div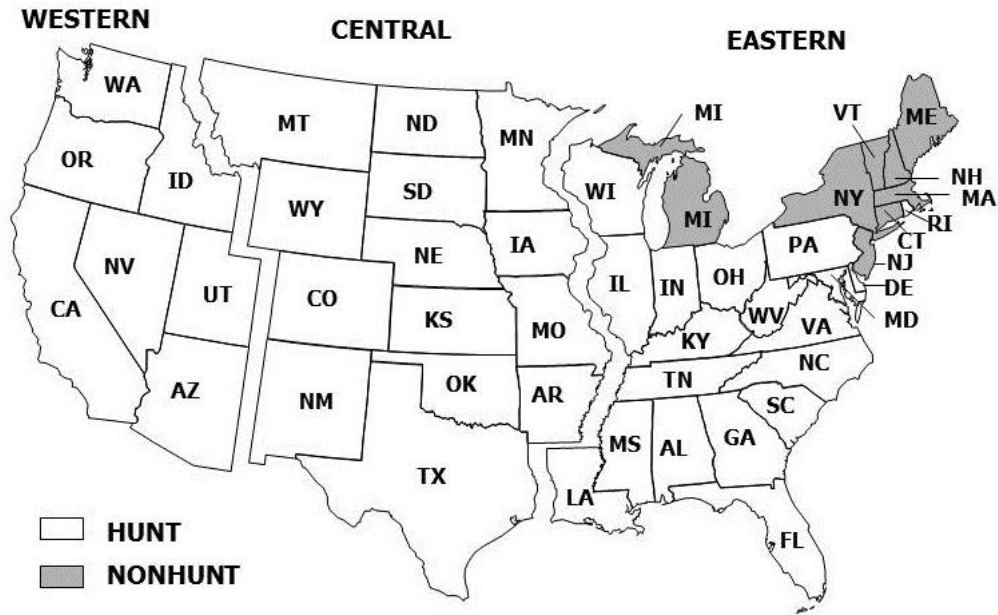ision of Migratory Bird Management, Washington, D.C. 22 pp. The entire report is available on the Division of Migratory Bird Management web site

(https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/MourningDove/MourningDovePopulationStatus19.pdf).

Figure 1. Breeding and wintering ranges of the mourning dove (adapted from Mirarchi and Baskett 1994). (From: Seamans, M.E. 2019. Mourning dove population status, 2019. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. 22 pp.)

Figure 2. Mourning dove management units with 2018 -19 hunting and non-hunting states. (From: Seamans, M.E. 2019. Mourning dove population status, 2019. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. 22 pp.)
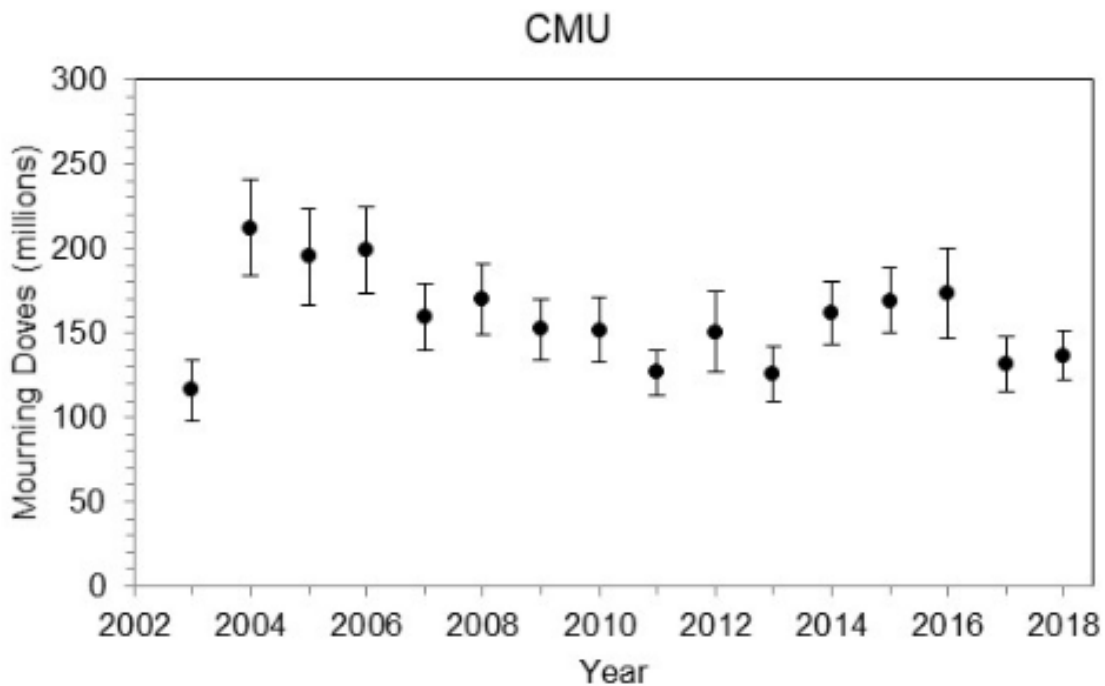
Figure 3. Estimates and 95% confidence intervals of mourning dove absolute abundance by in the Central Management Unit (CMU), 2003-18. Estimates based on band recovery and harvest data. (From: Seamans, M.E. 2019. Mourning dove population status, 2019. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. 22 pp.)

Table 1. Preliminary estimates and 95% confidence intervals (CI, expressed as the interval half width in percent) of mourning dove harvest and hunter activity for the Central management unit during the 2016, 2017 and 2018 seasons [a]. (From: Seamans, M.E. 2019. Mourning dove population status, 2019. U.S. Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C. 22 pp.)

Management unit / State	Active Hunters			Hunter Days Afield			Total Harvest		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
CENTRAL	430,400 [b]	332,200 [b]	332,900	1,344,400 ±13	1,058,800 ±11	852,100 ±6	7,334,600 ±14	5,462,800 ±10	4,749,100 ±6
AR	16,300 ±28	16,200 ±29	12,400 ±21	36,200 ±27	35,500 ±30	24,500 ±21	258,200 ±29	287,100 ±35	170,600 ±26
CO	13,100 ±18	11,300 ±19	10,000 ±11	29,700 ±19	24,100 ±20	20,200 ±13	141,200 ±20	117,600 ±25	121,500 ±14
IA	9,700 ±15	11,200 ±13	9,000 ±11	25,300 ±17	28,300 ±17	23,500 ±13	128,100 ±19	134,900 ±16	107,800 ±11
KS	28,600 ±12	21,800 ±24	22,900 ±17	77,200 ±17	58,300 ±35	44,300 ±17	427,600 ±18	290,600 ±34	337,600 ±22
MN	6,500 ±58	6,800 ±63	7,100 ±34	18,000 ±55	16,200 ±45	16,900 ±32	96,700 ±79	39,100 ±30	55,300 ±25
MO	25,200 ±14	27,400 ±13	26,000 ±8	65,100 ±21	65,700 ±16	48,300 ±9	321,600 ±20	367,200 ±18	309,400 ±12
MT	1,900 ±44	1,300 ±57	1,200 ±29	3,500 ±43	2,200 ±63	3,500 ±32	16,000 ±53	8,900 ±45	9,800 ±22
NE	9,700 ±19	12,300 ±16	11,600 ±11	24,500 ±18	31,000 ±15	33,700 ±14	132,000 ±22	177,900 ±16	189,100 ±18
NM	4,400 ±18	5,500 ±57	9,900 ±10	12,800 ±33	16,800 ±70	28,200 ±12	47,900 ±26	73,900 ±51	126,900 ±16
ND	5,300 ±24	4,100 ±26	3,900 ±16	15,800 ±35	11,400 ±31	11,800 ±24	76,900 ±30	59,400 ±26	65,200 ±23
OK	23,800 ±14	17,500 ±16	13,600 ±15	58,500 ±21	45,600 ±24	29,200 ±15	400,400 ±28	315,600 ±29	181,300 ±16
SD	5,600 ±22	5,700 ±22	4,900 ±12	17,100 ±33	18,400 ±26	11,500 ±13	112,400 ±46	111,600 ±31	69,400 ±15
TX	278,700 ±13	190,500 ±13	199,100 ±9	956,800 ±18	703,300 ±17	553,200 ±9	5,155,300 ±19	3,469,500 ±14	2,990,400 ±9
WY	1,700 ±27	700 ±42	1,400 ±18	3,700 ±36	2,200 ±84	3,200 ±21	20,100 ±40	9,400 ±57	14,800 ±20

[a] Hunter number estimates at the Management Unit and national levels may be biased high, because the HIP sample frames are state specific; therefore hunters are counted more than once if they hunt in >1 state. Variance is inestimable.
[b] No estimate available.

AMERICAN WOODCOCK POPULATION STATUS, 2019.

American Woodcock information is taken from the U.S. Fish and Wildlife Service report American Woodcock Population Status, 2019. Seamans, M.E. and R.D. Rau. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.

The entire report is available on the Division of Migratory Bird Management home page https://www.fws.gov/migratorybirds/pdf/surveys-and-data/Population-status/Woodcock/AmericanWoodcockStatusReport19.pdf)
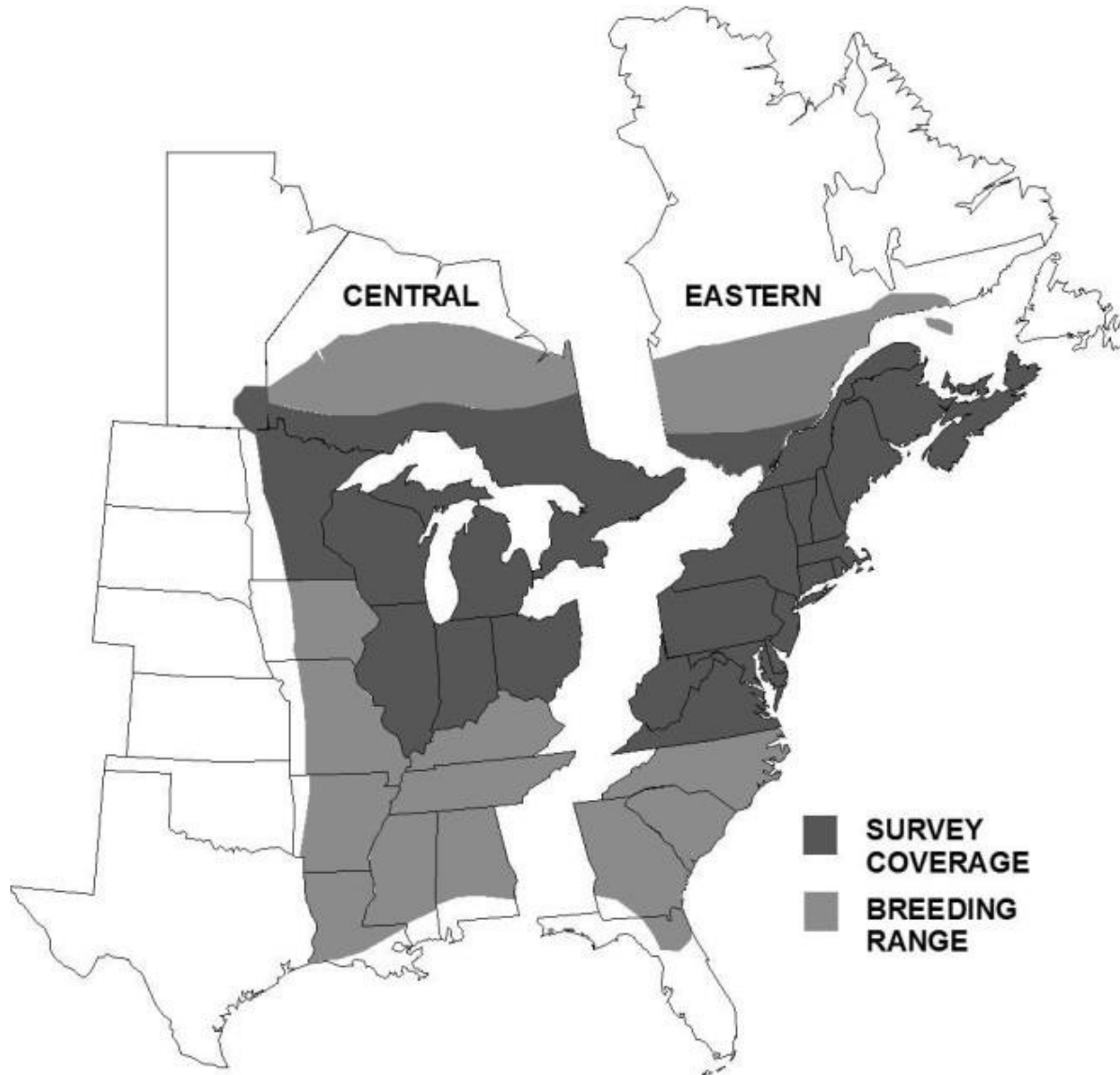

Figure 1. Woodcock management regions, breeding range, singing-ground survey coverage. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).

Table 1. Short term (2018–19), 10 –year (2009-2019), and long-term (1968-2019) trends (% change per year [a]) in the number of American woodcock heard during the Singing-ground Survey as determined by using the hierarchical log-linear modeling technique (Sauer et al. 2008) (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).

Management Unit/State	Number of Routes[b]	n[c]	2018-19			2009-19			1968-19		
			% Change	95% CI[d]		% Change	95% CI[d]		% Change	95% CI[d]	
				lower	upper		lower	upper		lower	upper
CENTRAL	481	758	3.43	-3.70	11.14	-0.78	-1.62	0.02	-0.89	-1.12	-0.68
IL	27	47	-1.65	-67.59	203.75	-1.51	-11.05	9.26	-1.09	-3.69	1.66
IN	15	62	-13.99	-52.05	36.86	-3.96	-9.08	1.16	-4.10	-5.34	-3.02
MB[e]	19	30	5.33	-21.14	43.99	0.65	-2.56	4.18	0.18	-1.35	1.65
MI	114	158	12.23	-1.26	27.79	-0.67	-2.03	0.69	-1.01	-1.36	-0.67
MN	87	124	-6.43	-20.03	9.72	0.43	-1.22	2.15	0.49	-0.06	1.07
OH	35	73	6.44	-14.14	39.11	-1.65	-4.21	0.84	-1.45	-2.16	-0.74
ON	87	166	-3.32	-17.62	12.65	-2.24	-4.17	-0.37	-1.32	-1.77	-0.88
WI	97	128	11.76	-5.08	31.76	-0.21	-1.61	2.08	-0.26	-0.72	0.20

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

[b] Total number of routes surveyed in 2019 for which data were received by 10 July, 2019.

[c] Number of routes with at least one year of non-zero data between 1968 and 2019.

[d] 95% credible interval, if the interval overlaps zero, the trend is considered non-significant.

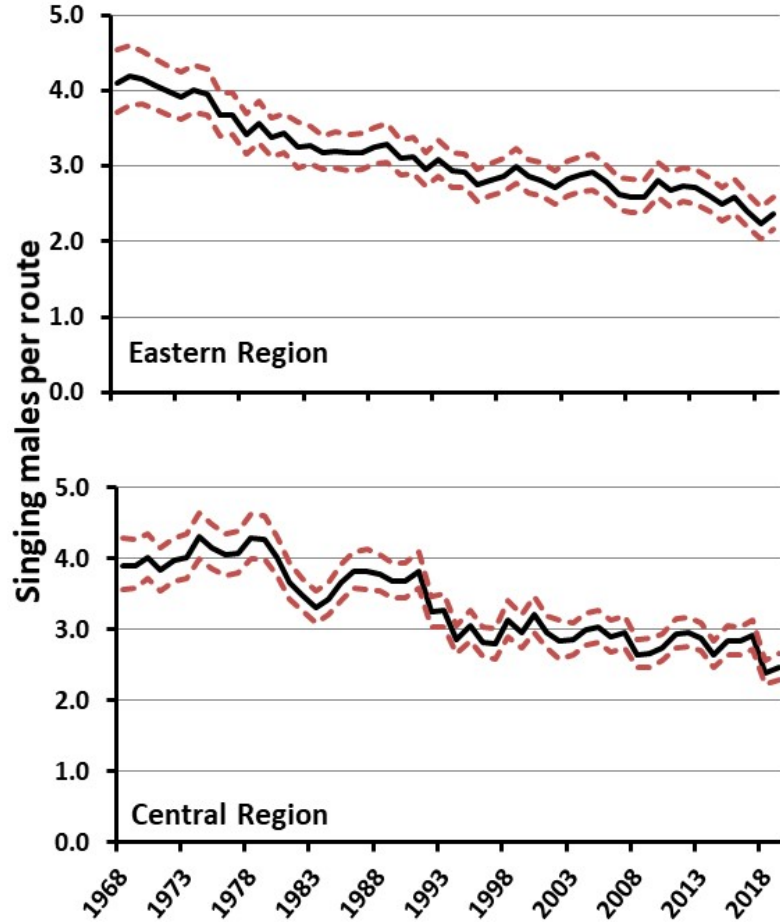[e] Manitoba began participating in the Singing-ground survey in 1992.

Figure 2. Annual indices of the number of woodcock heard on the Singing-ground Survey, 1968-2019. The dashed lines represent the 95 % credible interval. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).
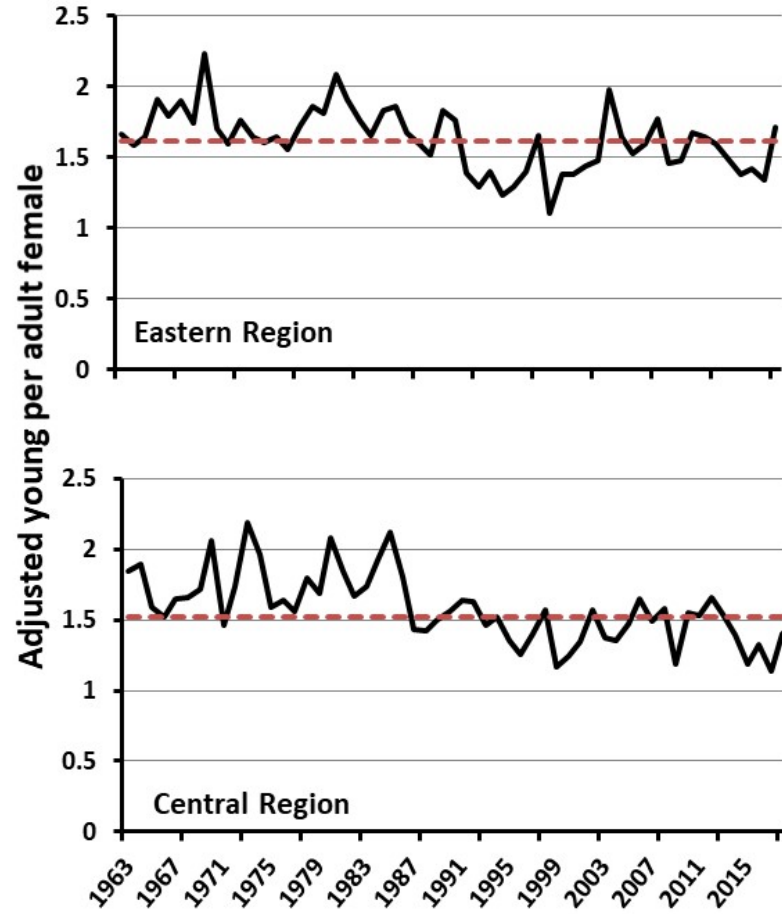
Figure 3. Weighted annual indices of American woodcock recruitment, 1963-2018. Dashed line is the 1963-2017 average. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).

Table 2. Preliminary estimates of woodcock hunter numbers, days afield, and harvest for selected states, from the 2015-16 2016-17, 2017-18 and 2018-19 Harvest Information Program surveys. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).

Management Unit / State	Active woodcock hunters [a]				Days afield [a, c]				Harvest [a, c]			
	2015-16	2016-17	2017-18	2018-19	2015-16	2016-17	2017-18	2018-19	2015-16	2016-17	2017-18	2018-19
Central Region	n.a. [b]	n.a. [b]	n.a. [b]	n.a. [b]	284,200 ±16	300,200 ±32,500	272,400 ±22,800	246,000 ±35,800	145,700 ± 19	158,000 ±16,300	140,900 ±15,500	130,600 ±16,400
IL	1,000 ± 170	1,500 ±1,000	100 <100	<100 <100	1,300 ± 133	13,200 ±11,000	300 ±100	100 ±100	200 ± 114	1,600 ±1,400	400 ±300	0 0
IN	400 ± 99	300 ±200	1,100 ±400	100 <100	1,100 ± 83	1,300 ±500	2,900 ±1,000	200 ±100	600 ± 56	900 ±200	1,500 ±1,100	200 ±100
MI	26,000 ± 18	24,100 ±2,300	24,100 ±2,300	29,300 ±3,700	124,700 ± 21	107,100 ±11,600	122,800 ±15,200	135,800 ±31,900	63,200 ± 23	64,900 ±8,600	66,100 ±10,300	59,600 ±10,400
MN	13,500 ±34	13,500 ±2,300	11,900 ±2,100	10,400 ±2,100	47,600 ± 40	46,000 ±8,200	45,700 ±8,200	41,500 ±9,700	25,600 ± 42	25,900 ±4,700	26,700 ±5,000	22,500 ±3,900
OH	1,900 ± 80	2,600 ±900	1,900 ±800	500 ±100	7,500 ± 95	8,200 ±3,700	5,000 ±1,800	800 ±300	2,100 ± 85	3,200 ±1,300	400 ±200	600 ±400
WI	14,700 ± 27	11,700 ±1700	11,700 ±1,800	10,800 ±2,100	66,600 ± 29	55,100 ±8,900	52,400 ±7,700	45,900 ±9,300	31,000 ± 25	35,100 ±4,400	31,100 ±4,600	25,500 ±4,300

[a]   All 95% Confidence Intervals are expressed as a % of the point estimate.

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

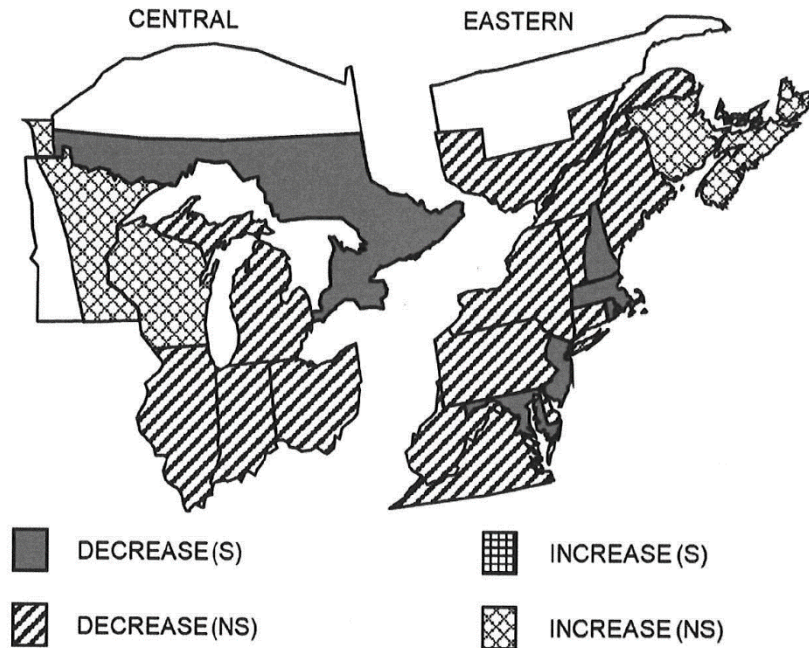[c]. Days afield and Harvest estimates are for the entire 18 state Central Region.

Figure 4. Ten-year trends in number of American woodcock heard on the Singing-ground Survey; 2009-19, as determined by the hierarchical modeling method. A significant trend (S) does not include zero in the 95% credible interval, while a non-significant (NS) trend does include zero. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).
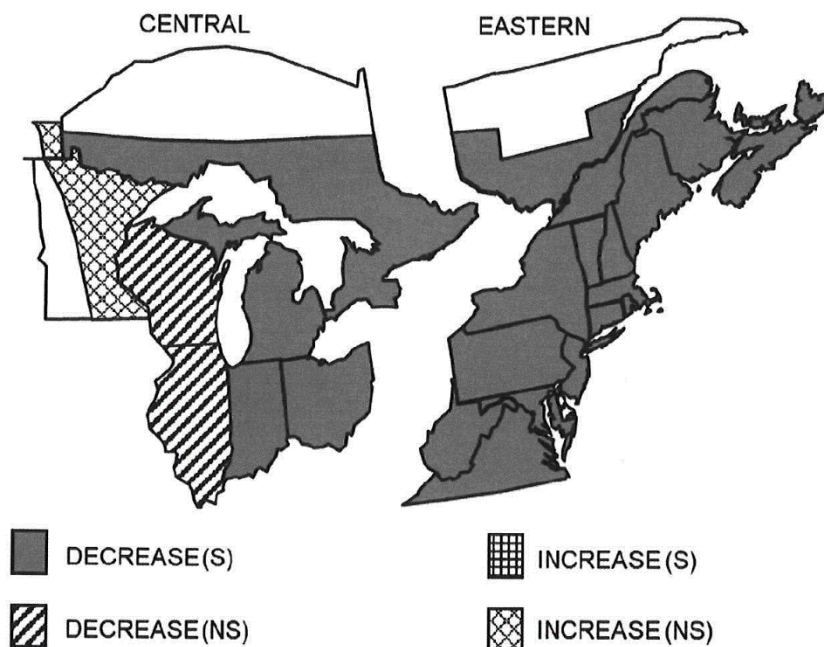

Figure 5. Long-term trends in number of American woodcock heard on the Singing-ground Survey; 1968-2019, as determined by the hierarchical modeling method. A significant trend (S) does not include zero in the 95% credible interval, while a non-significant (NS) trend does include zero. (from: Seamans, M.E. and R.D. Rau. 2019. American woodcock population status, 2019. U.S. Fish and Wildlife Service, Laurel, MD. 20 pp.).