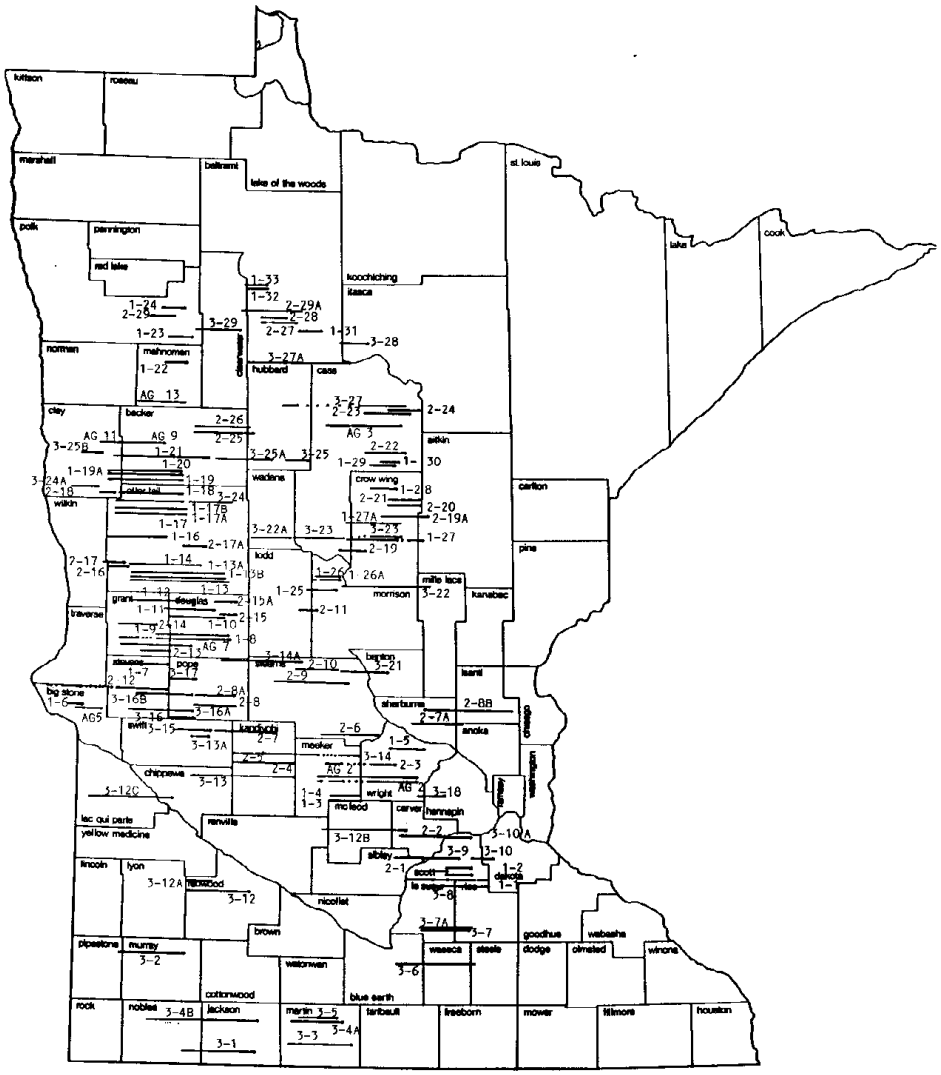
DEPARTMENT OF NATURAL RESOURCES

2024 WATERFOWL BREEDING POPULATION SURVEY, MINNESOTA



Updated Report 8/9/2024

TITLE: Waterfowl Breeding Population Survey for Minnesota

STRATA SURVEYED: Minnesota Strata 1, 2, and 3

DATES: 30 April – 17 May, 2024

DATA SUPPLIED BY: Minnesota Department of Natural Resources (MNDNR)
U.S. Fish and Wildlife Service (USFWS)

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ABSTRACT: The number of breeding waterfowl in a portion of Minnesota has been estimated annually 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 2024 aerial survey portion was flown from 30 April – 17 May. Conditions were extremely dry across most of the state just a few weeks prior to survey. However, in the days immediately prior to and during the survey, numerous large rain events changed the landscape from very dry to very wet quite quickly. Rivers were flooded beyond their banks, and many large wetlands expanded their footprints due to large amounts of runoff. With an earlier than normal ice-out throughout the state and dry conditions persisting through the ice-out period, settling conditions were likely poor and didn't attract many breeding ducks to the landscape. Overall, Numbers of wet Type I wetlands were 6X greater than in 2023, but wet Type II-V wetlands were fewer than 2023 and the extrapolated estimate was 20% below the long-term average.

The 2024 estimated mallard breeding population was 141,000 (estimates rounded to nearest 1000), which was statistically unchanged (P=0.15) from the 2023 estimate of 222,000. Mallard numbers were 41% below the 10-year average and 38% below the long-term average of 229,000 breeding mallards. The estimated blue-winged teal population was 160,000, which was 26% above last year's estimate of 126,000 blue-winged teal, but statistically unchanged (P=0.27). Blue-winged teal numbers were 9% below the 10-year average and 23% below the long-term average estimates. The combined population index of other ducks, excluding scaup, was 87,000 ducks, which was 32% below last year's estimate, 34% below the 10-year average and 43% below the long-term average estimates. Scaup, Wood Ducks, and Ring-necked ducks were the most abundant species of other ducks (Table 3).

The estimate of total duck abundance excluding scaup, was 387,000, which was 20% below last year's estimate, 35% below the 10-year average estimate, and 37% below the long-term average estimate. The estimated number of Canada geese was 106,000 and 7% lower than last year and 31% below the long-term average estimate.

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

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

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

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

Areas with less than two basins per township are not surveyed. 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

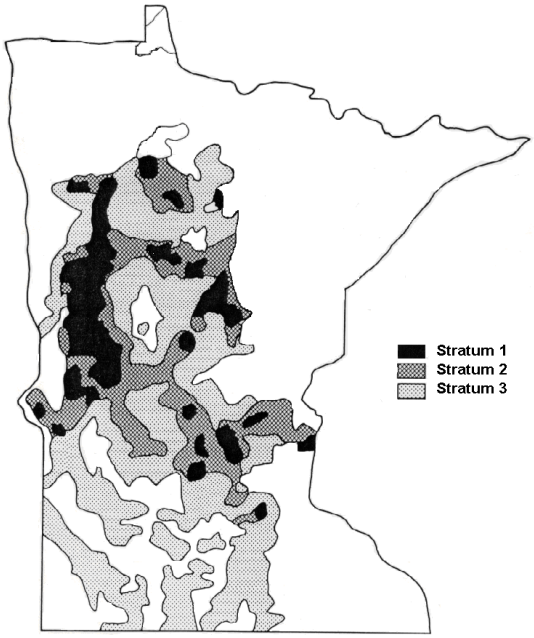

Fig. 1. Location of waterfowl breeding population survey strata in Minnesota.

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 2023 and 2024 were compared using two-tailed Z-tests.

SURVEY CHRONOLOGY: The 2024 aerial survey began on 30 April in southern Minnesota and concluded in northern Minnesota on 17 May. Transects were flown on 10 days and completed in 52 flight hours. Flight crew was on transect by 06:30 most days and flights were completed by approximately 12:00 PM most days.

WEATHER AND HABITAT CONDITIONS: Ice out was approximately 3-4 weeks earlier than historical median dates in southern Minnesota and about 2 weeks earlier than median dates in northern Minnesota. Conditions were extremely dry across most of the state in early April, but extensive rains fell immediately prior to and during the survey; these numerous large rain events changed the landscape from very dry to very wet quite quickly. Rivers were flooded beyond their banks, and many large wetlands expanded their footprints due to large amounts of runoff. Temperatures in April and May averaged 2.1°F above normal statewide and precipitation was 3.0 inches above normal statewide (http://climate.umn.edu). Precipitation from April until the survey was completed was well above average throughout the state with regions of southern and West Central Minnesota receiving the most rainfall (Appendix A).

Wetland conditions in spring 2024 differed substantially from last year. In 2024, numbers of wet Type 1 wetlands increased by 640% from 2023 and were 85% above the long-term average. However, numbers of wet Type II-V wetlands were 29% lower than in 2023 and 20% below the long-term average. In early April 2024, the U.S. drought monitor indicated that nearly the entire state had abnormally dry to severe drought conditions, but by late May only about 12% of the state had any abnormally dry to drought designation. (http://droughtmonitor.unl.edu).

WATERFOWL POPULATIONS: The number of ducks, Canada geese, coots, and swans are shown in Table 3. These estimates are expanded for area but not corrected for visibility bias. Table 4 and Table 5 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 2024 breeding population estimate of mallards was 141,000 (SE = 27,000), which was 37% lower than the 2023 estimate of 222,000 mallards, but statistically unchanged (P = 0.16, Table 4). Mallard numbers were 41% below the 10-year average and 38% below the long-term average of 229,000 mallards.

The estimated blue-winged teal population was 160,000 (SE = 72,000), which was 26% higher than the 2023 estimate of 126,000 blue-winged teal, but statistically unchanged (P = 0.27). Blue-winged teal numbers were 9% below the 10-year average and 23% below the long-term average (Table 4).

The combined population estimate of other ducks (excluding scaup) was 87,000 which was 32% below last year's estimate of 133,000 other ducks, 34% below 10-year average and 43% below the long-term average (Table 4). Scaup, Wood Ducks, and Ring-necked ducks were the most abundant species of other ducks (Table 3). Scaup numbers (59,000) were 291% above last year's estimate and 2% below the long-term average.

The total duck population index, excluding scaup, was 387,000 ducks and was 20% below last year's index of 481,000 ducks, 35% below the 10-year average, and 37% below the long-term average (Table 4).

The population index for total ducks was 445,000 ducks, which was 10% below the 2023 estimate, 30% below the 10-year average and 34% below 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 4, Table 5). The mallard VCF (1.32) was 40% below the long-term average and the lowest ever recorded. The blue-winged teal VCF (3.87) was unchanged from the long-term average. The VCF for Canada geese (1.28) was 41% below the long-term average.

The population estimate of Canada geese (adjusted for visibility) was 106,000, which was 7% below last year's estimate and 31% below the long-term average (Table 5).

The estimated number of swans (likely all trumpeters) was 37,000, which is similar to last year's estimate of 39,000 (Table 3). 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: Thanks to the ground crews and the pilot for their efforts. This project was funded in part by the Wildlife Restoration (Pittman-Robertson) Program.

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Prepared by: Bruce Davis, Minnesota DNR, Wetland Wildlife Research Group, 31 July 2024.

Table 1. Survey design for Minnesota, May 2024.[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), 1968-2024.

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
			2020	No Survey	
			2021	No Survey	
			2022	100,000	341,000
			2023	15,000	286,000
			2024	111,000	204,000
		Averages:	10-year	48,600	271,600
			Long-term	59,900	256,000
		% change from:	2023	+640%	-29%
			10-year	+128%	-25%
			Long-term	+85%	-20%

[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-III combined, expanded for area coverage but not for visibility, 2004-2024.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022	2023	2024
Dabblers:																			
Mallard	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	125,575	123,710	107,141
Black Duck	174	56	0	174	174	0	0	0	174	507	167	339	0	56	117	0	174	552	111
Gadwall	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	4,375	3,670	807
American Wigeon	4,634	1,327	174	404	810	230	754	1,155	513	804	341	1,911	1,215	1,393	400	927	1,354	693	228
Green-winged Teal	678	230	694	167	278	400	172	230	404	813	351	988	111	626	174	987	2,782	1,104	289
Blue-winged Teal	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	44,832	36,638	41,235
Northern Shoveler	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	2,842	1,216	1,258
Northern Pintail	404	174	230	582	230	56	174	345	174	285	284	396	522	285	633	172	756	408	348
Wood Duck	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	23,463	19,904	23,177
Dabbler subtotal	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	206,153	187,895	174,594
Divers:																			
Redhead	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	3,752	1,091	1,028
Canvasback	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	2,763	2,411	1,291
Scaup	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	17,850	5,865	33,592
Ring-necked Duck	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	17,866	12,394	13,098
Goldeneye	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	4,235	2,023	2,795
Bufflehead	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	7,319	2,018	3,944
Ruddy Duck	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	1,214	305	850
Hooded Merganser	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	4,253	2,913	339
Large Merganser	234	723	957	626	1,032	681	681	519	230	456	256	400	1,042	1,124	172	172	1,159	1,914	694
Diver subtotal	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	60,411	30,934	57297
Total Ducks	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	266,564	218,829	231,891
Other:																			
Coot	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	57,317	3,276	13,459
Canada Goose	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	84,545	75,651	82,854
Swan	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	25,113	38,527	36,592

Table 4. Mallard, blue-winged teal, and other duck (excluding scaup) populations in Minnesota, 1968-2024.

	Mallard				Blue-winged teal				Other ducks (exc. scaup)		
Year	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
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

Table 4. Cont.

	Mallard				Blue-winged teal				Other ducks (exc. scaup)		
Year	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI	SE	Unad. PI	VCF	PI
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
2020							No Survey				
2021							No Survey				
2022	125,575	1.84	231,058	38,411	44,832	3.60	161,395	69,123	78,307	2.23	174,625
2023	123,710	1.79	222,185	49,387	36,638	3.45	126,401	65,470	52,616	2.52	132,592
2024	107,141	1.32	140,941	27,378	41,235	3.87	159,514	71,991	50,257	1.72	86,565
Averages: 10-year	111,266	2.16	239,622	42,421	45,398	3.95	175,876	60,431	68,857	3.03	177,225
Long-term	103,941	2.21	228,575	37,900	56,338	3.87	208,980	46,543	62,373	2.59	177,357
% change from											
2023	-13%	-35%	-37%		13%	12%	26%		-4%	-32%	-34%
10-year average	-4%	-39%	-41%		-9%	-2%	-9%		-27%	-34%	-51%
Long-term average	3%	-40%	-38%		-27%	0%	-23%		-19%	-43%	-51%

Table 5. Scaup, total ducks (excluding scaup), total ducks, and Canada goose populations in Minnesota, 1968-2024.

	Scaup			Total Ducks (exc. scaup)		Total ducks		Canada geese		
Year	Unad. PI	VCF	PI	Unad. PI	PI	Unad. PI	PI	Unad. PI	VCF	PI
1968	22,834	2.08	47,495	144,392	320,994	167,226	368,488			
1969	9,719	2.27	22,062	132,952	323,213	142,671	345,275			
1970	12,105	1.62	19,610	129,967	324,219	142,072	343,829			
1971	5,713	1.71	9,764	119,667	277,137	125,380	286,901			
1972	12,062	1.69	20,379	132,928	217,181	144,990	237,560	366		
1973	10,633	2.45	26,093	142,857	389,486	153,490	415,580	1,965		
1974	18,378	2.79	51,201	122,534	281,605	140,912	332,806	8,835		
1975	9,563	3.31	31,649	135,626	471,608	145,189	503,257	5,997		
1976	22,494	3.35	75,323	198,236	684,082	220,730	759,405	5,409		
1977	2,971	11.95	35,517	116,641	501,099	119,612	536,616	7,279		
1978	14,774	3.35	48,812	106,677	462,502	121,451	511,314	7,865		
1979	92,134	3.79	348,948	148,200	552,416	240,334	901,364	4,843		
1980	12,602	3.97	50,070	182,063	690,593	194,665	740,663	6,307		
1981	19,844	3.88	75,451	175,055	439,769	194,899	515,220	10,156		
1982	21,556	4.32	93,204	127,153	465,195	148,709	558,399	6,600		
1983	9,551	2.84	27,077	148,392	367,142	157,943	394,219	11,081		
1984	15,683	2.18	34,111	224,736	529,679	240,419	563,790	14,051		
1985	7,409	2.35	17,430	221,516	562,898	228,925	580,328	16,658		
1986	6,247	2.67	16,678	215,463	520,787	221,710	537,465	19,599		
1987	10,306	2.51	25,910	345,107	588,954	355,413	614,864	29,960		
1988	10,545	2.61	27,553	338,240	725,238	348,785	752,791	39,057	1.36	53,004
1989	71,898	2.89	207,991	302,771	813,615	374,669	1,021,606	51,946	1.88	97,898
1990	40,075	1.97	78,892	372,587	807,870	412,662	886,761	58,425	1.37	80,147
1991	40,727	2.81	114,480	313,595	753,710	354,322	868,191	42,231	4.18	176,465
1992	66,071	2.33	153,939	347,012	973,323	413,083	1,127,262	33,965	2.43	82,486
1993	11,801	3.28	38,750	271,053	837,172	282,854	875,921	43,858	2.08	91,369
1994	57,670	3.55	204,536	294,477	1,115,558	352,147	1,320,095	48,595	1.68	77,878
1995	28,421	4.05	115,096	256,390	797,144	284,811	912,241	58,065	2.08	120,775
1996	65,585	2.64	173,351	318,619	889,057	384,204	1,062,408	60,870	3.92	238,708
1997	31,138	2.72	84,834	282,220	868,137	313,358	952,971	60,449	2.59	156,817
1998	28,416	1.64	46,528	328,238	693,084	356,654	739,612	79,147	1.75	138,507
1999	14,041	2.49	35,002	285,778	680,463	299,819	715,465	80,012	3.35	268,168
2000	32,376	2.09	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

Table 5. Cont.

	Scaup			Total Ducks (exc. scaup)		Total ducks		Canada geese		
Year	Unad. PI	VCF	PI	Unad. PI	PI	Unad. PI	PI	Unad. PI	VCF	PI
2002	13,016	4.04	52,606	327,951	1,171,537	340,967	1,224,143	78,200	2.42	189,353
2003	5,117	5.30	27,120	209,529	721,805	214,646	748,925	87,663	3.78	331,094
2004	30,906	2.94	90,926	347,673	1,008,324	378,579	1,099,250	98,339	1.58	155,859
2005	12,397	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	2.70	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	2.20	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
2020						No Survey				
2021						No Survey				
2022	17,850	2.23	39,806	248,714	567,078	266,564	606,884	84,545	1.36	114,981
2023	5,865	2.52	14,780	212,964	481,178	218,829	495,958	75,651	1.52	114,990
2024	33,592	0.02	*57,860	198,693	387,020	232,225	444,880	82,854	1.28	106,094
Averages:										
10-year	16,830	2.42	40,875	225,527	592,723	242,351	633,517	79,780	1.68	134,710
Long-term	20,498	2.99	58,780	222,631	615,040	243,122	673,806	52,549	2.16	153,853
% change from										
2023	473%	-99%	291%	-6%	-20%	6%	-10%	10%	-16%	-7%
10-year average	100%	-99%	41%	-11%	-35%	-4%	-30%	4%	-24%	-21%
Long-term average	63%	-99%	-2%	-11%	-37%	-4%	-34%	58%	-41%	-31%

*Calculated using VCF derived excluding scaup.

Appendix A. Precipitation in selected regions of Minnesota, 1 April - 17 May 2024 (Source: Minnesota DNR; http://www.dnr.state.mn.us/climate/historical/summary.html).

Region	Precipitation	Departure from normal
Northwest	4.25	+1.44
North Central	4.13	+0.88
Northeast	4.07	+0.32
West Central	6.25	+2.41
Central	6.57	+1.89
East Central	5.63	+0.90
Southwest	7.36	+2.27
South Central	8.37	+2.48
Southeast	6.79	+0.85
Statewide	6.30	+1.51