U.S. Fish & Wildlife Service

Waterfowl

Population Status, 2024

Waterfowl Population Status, 2024

August 20, 2024

In the United States, the process of establishing hunting regulations for waterfowl is conducted annually. This process involves a number of scheduled meetings in which information regarding the status of waterfowl is presented to individuals within the agencies responsible for setting hunting regulations. In addition, the proposed regulations are made available for public comment. This report includes the most current breeding population and production information available for waterfowl in North America and is a result of cooperative efforts by the U.S. Fish and Wildlife Service (USFWS), the Canadian Wildlife Service (CWS), various state and provincial conservation agencies, and private conservation organizations. In addition to providing current information on the status of populations, this report is intended to aid the development of waterfowl harvest regulations in the United States for the 2025–2026 hunting season.

Cover: 2024 winning artwork from the National Junior Duck Stamp Conservation and Design Program, by Emily Lian of Oregon, used with permission from the Federal Duck Stamp Office.

Acknowledgments

The information contained in this report is the result of the efforts of numerous individuals and organizations. Principal contributors include the Canadian Wildlife Service, U.S. Fish and Wildlife Service, state wildlife conservation agencies, and provincial conservation agencies from Canada. In addition, several conservation organizations, other state and federal agencies, universities, and private individuals provided information or cooperated in survey activities. Appendix A.1 provides a list of individuals responsible for the collection and compilation of data for the "Status of Ducks" section of this report. Appendix A.2 provides a list of individuals who were primary contacts for information included in the "Status of Geese and Swans" section. We apologize for any omission of individuals from these lists, and thank all participants for their contributions.

This report was compiled by the U.S. Fish and Wildlife Service, Division of Migratory Bird Management, branches of Assessment and Decision Support, Monitoring and Data Management, and Migratory Bird Surveys. The principal authors are Joshua Dooley, Walt Rhodes, and Nathan Zimpfer. The preparation of this report involved substantial efforts on the part of many individuals. Support for the processing of data and publication was provided by Emily Silverman, John Yeiser, Frank Rivera, and Jeff Hostetler. Kathy Fleming and Phil Thorpe provided the maps.

This report should be cited as: U.S. Fish and Wildlife Service. 2024. Waterfowl population status, 2024. U.S. Department of the Interior, Washington, D.C. USA.

All Waterfowl Population Status reports are available from our website (`https://www.fws.gov/library/collections/waterfowl-population-status-reports`).

Executive Summary

This report summarizes the most recent information about the status of North American waterfowl populations and their habitats to facilitate the development of harvest regulations. The annual status of these populations is monitored and assessed through abundance and harvest surveys. This report details abundance estimates; harvest survey results are discussed in separate reports. The data and analyses were those most currently available when this report was written. Future analyses may yield slightly different results as databases are updated and new analytical procedures become available.

Habitat conditions during the 2024 Waterfowl Breeding Population and Habitat Survey (WBPHS) generally declined over a large portion of the surveyed area relative to 2023. The majority of the decline was in the traditional survey area of the interior Canadian provinces and portions of the northcentral U.S. Despite above- to well- above-average winter temperatures across the Canadian prairies winter precipitation was below average and continued into early spring. Well-above-average spring precipitation had fallen but most of this arrived too late to benefit initial nesting. The U.S. prairies did have pockets where habitat quality declined but most areas remained good, with an immense improvement in southeastern South Dakota from winter precipitation. Most areas of eastern Canada and the Great Lakes continued to have good to excellent habitat quality since 2023. Minnesota and portions of Ontario and Quebec had vast improvements in habitat conditions whereas the only substantial habitat decline occurred across Maine, which was mainly from excellent to good conditions. In 2024, spring phenology was early or average across most areas in Alaska and the Canadian Arctic and Subarctic, similar to 2023. Many areas across the Canadian Arctic and Subarctic experienced above-average temperatures during May and June. The total pond estimate (Prairie Canada and northcentral U.S. combined) was 5.2 ± 0.2 million, which was similar to the 2023 estimate of 5.0 ± 0.1 million and the long-term average (Table 1, Figure 3). The 2024 estimate of ponds in Prairie Canada was 2.7 ± 0.1 million. This estimate was 19% below the 2023 estimate of 3.3 ± 0.1 million and 24% below the long-term average (3.5 ± 0.02 million). The pond estimate for the northcentral U.S. was 2.5 ± 0.1 million, which was 49% above the 2023 estimate (1.7 ± 0.08 million) and 45% above the long-term average of 1.7 ± 0.01 million.

Summary of Duck Populations

In the traditional survey area, which includes strata 1–18, 20–50, and 75–77, the total duck population estimate (excluding scoters [*Melanitta* spp.], eiders [*Somateria* spp. and *Polysticta* spp.], long-tailed ducks [*Clangula hyemalis*], mergansers [*Mergus* spp. and *Lophodytes cucullatus*], and wood ducks [*Aix sponsa*]) was 34.0 ± 0.6 million birds. This estimate was 5% above the 2023 estimate of 32.3 ± 0.6 million and 4% below the long-term average of 35.4 ± 0.09 million. Estimated total mallard (*Anas platyrhynchos*) abundance was 6.6 ± 0.3 million, which was similar to the 2023 estimate of 6.1 ± 0.2 million and 16% below the long-term average of 7.9 ± 0.04 million. The estimate for blue-winged teal (*Spatula discors*; 4.6 ± 0.2 million) was 12% below the 2023 estimate of 5.3 ± 0.3 million and 10% below to the long-term average of 5.1 ± 0.04 million. Estimated abundance of gadwall (*Mareca strepera*; 2.3 ± 0.1 million) was similar to the 2023 estimate and 11% above the long-term average of 2.1 ± 0.02 million. The estimate of green-winged teal (*A. crecca*; 3.0 ± 0.2 million) was similar to the 2023 estimate and 38% above the long-term average of 2.2 ± 0.02 million. The Northern pintail (*A. acuta*) estimate was 2.0 ± 0.1 million, which was similar to the 2023 estimate and 49% below the long-term average of 3.8 ± 0.03 million. The abundance estimate

for American wigeon (*Mareca americana*; 2.9 ± 0.2 million) was 55% above the 2023 estimate of 1.9 ± 0.2 million and similar to the long-term average of 2.6 ± 0.02 million. Estimates of northern shoveler (*Spatula clypeata*), redheads (*Aythya americana*), and canvasbacks (*A. valisineria*) were 2.6 ± 0.1 million, 0.8 ± 0.06 million, and 0.6 ± 0.05 million, respectively. All were similar to their 2023 estimates and their long-term averages. The combined estimate of lesser and greater scaup (*A. affinis* and *A. marila*; (4.1 ± 0.2 million) was 16% above the 2023 estimate of 3.5 ± 0.2 million and 17% lower than the long-term average of 4.9 ± 0.04 million.

A time series for assessing changes in green-winged teal, ring-necked duck (*A. collaris*), goldeneye (*Bucephala clangula* and *B. islandica*), merganser, and American black duck (*Anas rubripes*) population status in the eastern survey area is provided by breeding waterfowl surveys conducted by the U.S. Fish and Wildlife Service (USFWS) and Canadian Wildlife Service (CWS) in Maine and eastern Canada. The estimate of goldeneyes was 1.2 ± 0.3 million, which was 42% above the 2023 estimate and 76% above the long-term average. The estimates of Green-winged teal (0.5 ± 0.1 million) and mergansers (1.0 ± 0.1 million) were similar to their 2023 estimates and were 29% and 23% above their long-term averages, respectively. Ring-necked ducks (0.7 ± 0.1 million) were similar to their 2023 estimate and the long-term average. The 2024 estimate of American black ducks in the eastern survey area was 0.9 ± 0.1 million, which was 17% above the 2023 estimate and 23% above the long-term average. Eastern mallard population status is derived by integrating data from the eastern survey area and ground plot surveys conducted in the northeastern U.S. states of Virginia north to New Hampshire. The estimated abundance of mallards in eastern North America was 1.2 ± 0.1 million, which was similar to the 2023 estimate and 9% below the long-term average (Table 13, Figure 5, Appendix B.5).

Summary of Goose and Swan Populations

Of the 23 applicable goose and tundra swan (*Cygnus columbianus*) populations included in this year's report with updated estimates, the primary monitoring indices for 9 of these populations had significant ($P < 0.05$) negative trends (% change per year) during the most recent 10-year period: Dusky Canada geese (*Branta canadensis*; –6%), midcontinent (–7%) and cackling/minima (–9%) cackling geese (*B. hutchinsii*), Ross's geese (*Anser rossii*; –13%), Midcontinent Population lesser (–15%) and greater (–4%) snow geese (*A. caerulescens*), Pacific Population greater white-fronted geese (*A. albifrons*; –5%), emperor geese (*A. canagica*; –4%), and Western Population tundra swans (–6%). Of the 15 populations for which primary indices included variance estimates, the most recent estimate significantly increased from the prior year's estimate for greater snow geese (+7%) and decreased for 3 populations: cackling/minima cackling geese (–21%), Midcontinent Population greater white-fronted geese (–59%), and emperor geese (–23%). Of the 4 populations for which primary indices did not include variance estimates, the most recent count was less than the prior count for Mississippi Flyway Giant Population Canada geese (0%), Atlantic (–7%) and Pacific (–10%) brant (*B. bernicla*), and Eastern Population tundra swans (–53%).

Table of Contents

List of Tables and Figures

Tables **Page**

Figures

Status of Ducks

This section summarizes the most recent information about the status of North American duck populations and their habitats. The annual status of these populations is assessed using databases resulting from surveys which include estimates of breeding populations and harvest. This report details abundance estimates; harvest survey results are discussed in separate reports. The data and analyses were the most current available when this report was written. Future analyses may yield slightly different results as databases are updated and new analytical procedures become available.

Methods

Waterfowl Breeding Population and Habitat Survey (WBPHS)

Federal, provincial, and state agencies conduct surveys each spring to estimate the size of breeding waterfowl populations and to evaluate habitat conditions. These surveys are conducted by ground (Atlantic Flyway Breeding Waterfowl Survey; Sauer et al. 2014) or by airplanes and helicopters, and cover over 2.0 million square miles that encompass principal breeding areas of North America. The traditional survey area (strata 1–18, 20–50, and 75–77) comprises parts of Alaska, Canada, and the northcentral U.S., and covers approximately 1.3 million square miles (Figure 1). Specifics on the survey design are provided in Smith (1995). The eastern survey area (strata 51–53, 56, and 62–72) includes parts of Ontario, Quebec, Labrador, Newfoundland, Nova Scotia, Prince Edward Island, New Brunswick, and Maine, covering an area of approximately 0.7 million square miles (Figure 1). Historically, surveys in the east were also conducted in strata 54, 55, and 57–59. Surveys in strata 57–59 were discontinued in 2011 due to a reduction in aviation staff. In 2012, stratum 55 was discontinued primarily because it overlapped with an existing ground survey. In 2017, stratum 54 was discontinued due to increased aviation hazards such as wind turbines and power lines. None of the discontinued strata in the eastern survey are part of existing management frameworks. In Prairie and Parkland Canada and the northcentral U.S., aerial waterfowl counts are corrected annually for visibility bias by conducting ground counts along a subsample of survey segments. In some northern regions of the traditional survey area, visibility corrections were derived from comparisons between airplane and past helicopter surveys. In the eastern survey area, duck estimates are adjusted using visibility-correction factors derived from a comparison of airplane and helicopter counts. Annual estimates of duck abundance are available since 1955 for the traditional survey area and since 1996 for the eastern survey area (except stratum 69); however, some portions of the eastern survey area have been surveyed since 1990 (strata 51–53, 56, 63–64, 66–68, 70–72). In the traditional survey area, visibility-corrected estimates of pond abundance in Prairie Canada are available since 1961, and in the northcentral U.S. since 1974. Several provinces and states also conduct breeding waterfowl surveys using various methods; some have survey designs that allow for calculation of measures of precision for their estimates. Information about habitat conditions was supplied primarily by biologists working in those survey areas. Unless otherwise noted, z-tests were used for assessing statistical significance, with alpha levels set at 0.1; P-values are given in tables along with wetland and waterfowl estimates.

Since 1990, the U.S. Fish and Wildlife Service (USFWS) has conducted aerial transect surveys using airplanes in portions of the eastern survey area, similar to those in the traditional survey area, to estimate waterfowl abundance. Additionally, the Canadian Wildlife Service

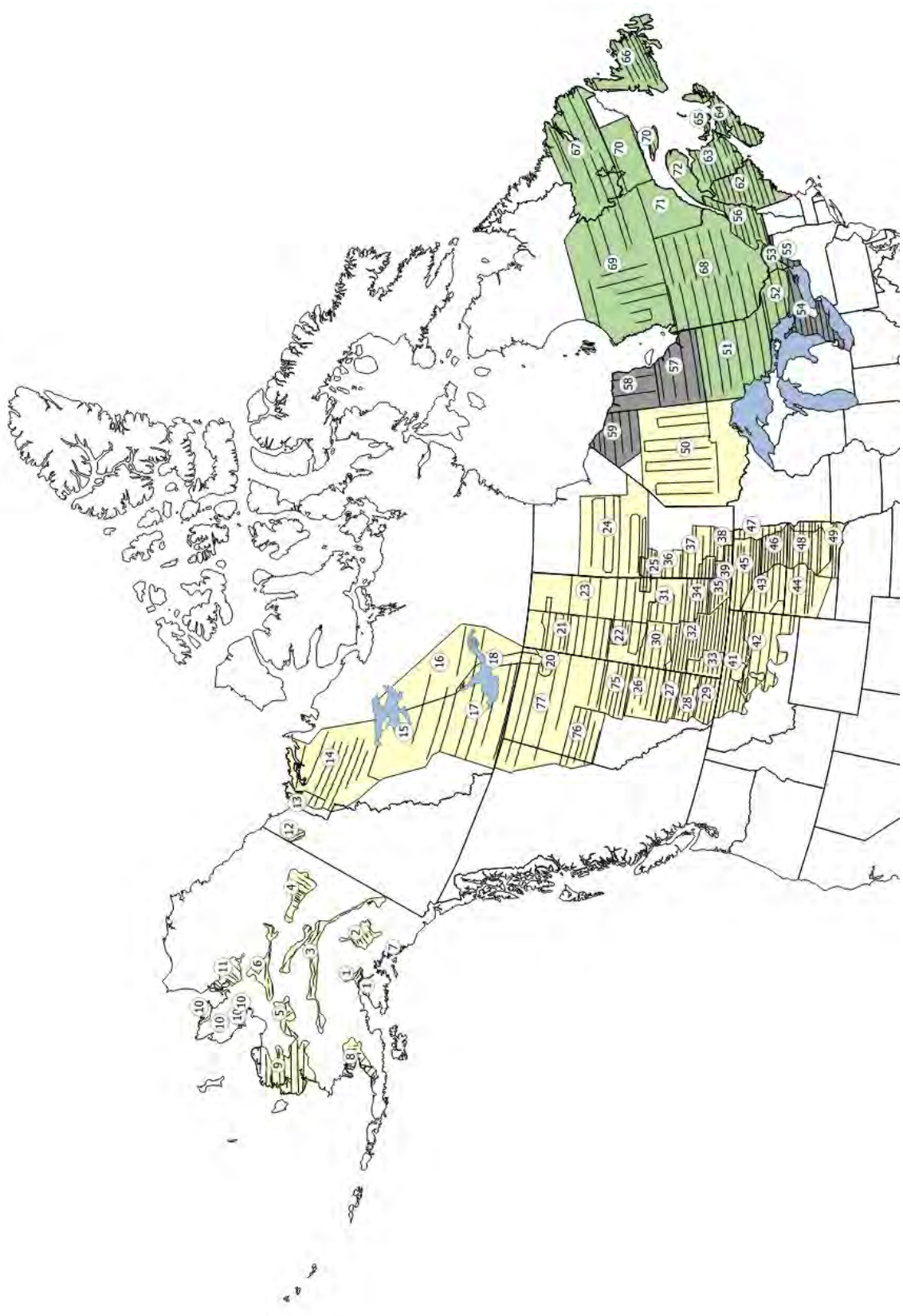

Figure 1. Strata and transects of the Waterfowl Breeding Population and Habitat Survey (yellow = traditional survey area, green = eastern survey area, grey = discontinued strata).

(CWS) has conducted a helicopter-based aerial plot survey in core American black duck (*Anas rubripes*) breeding regions of Ontario, Quebec, and the Atlantic Provinces. Initially, data from these surveys were analyzed separately despite overlap in geographic areas of inference. In 2004, the USFWS and CWS agreed to integrate the two surveys, produce composite estimates from both sets of survey data, and expand the geographic scope of the survey in eastern North America. Consequently, since 2005, waterfowl abundances for eastern North America have been estimated using a hierarchical-modeling approach that combines USFWS and CWS data (Zimmerman et al. 2012). In cases where the USFWS has traditionally not recorded observations to the species level (e.g., mergansers, goldeneyes), estimates are produced for multi-species groupings. Previously, this report provided composite estimates for the eastern survey area using only data collected in strata 51, 52, 63, 64, 66–68, and 70–72, which corresponds to the area covered by the CWS plot survey. These strata contain either (1) both USFWS airplane survey transects and CWS helicopter plots or (2) only helicopter plots (strata 71 and 72). Since 2018, eastern breeding waterfowl population estimates have been presented at the full eastern survey scale (strata 51–53, 56, 62–72) or eastern North America scale, depending on the breeding distribution of the species. The eastern North America scale includes the full eastern survey area plus data from the Atlantic Flyway Breeding Waterfowl Survey (AFBWS, Sauer et al. 2014). The AFBWS is a ground-based survey conducted annually from Virginia north to New Hampshire. The time series at these larger scales is shorter (1998–present) but provides a more complete assessment of the status of waterfowl in the east.

For widely distributed and abundant species including American black ducks, mallards (*A. platyrhynchos*), green-winged teal (*A. crecca*), ring-necked ducks (*Aythya collaris*), goldeneyes (common [*Bucephala clangula*] and Barrow's [*B. islandica*]) and mergansers (common [*Mergus merganser*], red-breasted [*M. serrator*], and hooded [*Lophodytes cucullatus*]), composite estimates of abundance were constructed using a hierarchical model (Zimmerman et al. 2012), which estimated the mean count per unit area surveyed for each stratum, year, and method (i.e., airplane or helicopter). These mean counts were then extrapolated over the area of each stratum to produce a stratum/year/method-specific population estimate. Estimates from the airplane surveys were adjusted for visibility bias by multiplying them by the total CWS helicopter survey estimates for all years, divided by the total USFWS airplane survey estimates for all years that the two surveys overlapped. For strata containing both CWS and USFWS surveys (51, 52, 63, 64, 66–68, and 70), USFWS estimates were adjusted by visibility-correction factors derived from CWS plot estimates, and the CWS and adjusted USFWS estimates were then averaged to derive stratum-level estimates. For strata containing just USFWS surveys (strata 53, 56, 62, 65, and 69) visibility-correction factors based on the ratio of counts from helicopters to fixed-wing aircraft along selected segments were used to adjust counts (Zimmerman et al. 2012). No visibility adjustments were made for strata with only CWS plots (strata 71 and 72). For two species groups, goldeneyes and mergansers, for which there are many survey units with no observations, a zero-inflated Poisson distribution (Martin et al. 2005) was used to fit the model. Using this technique, the binomial probability of encountering the species on a transect or a plot is modeled separately. Not enough green-winged teal, ring-necked ducks, goldeneyes, and mergansers were counted in the AFBWS to fit the models for those species at the eastern North America scale. Black duck and mallard counts were adequate to fit the model to the AFBWS data and derive breeding population estimates at the eastern North America scale. However, due to differences in how the indicated pairs are calculated between the eastern survey area and the AFBWS for American black ducks (described below), we did not combine data from these two surveys for this species. Therefore, we present estimates for American black ducks, green-winged teal,

ring-necked ducks, goldeneyes, and mergansers at the eastern survey scale, and estimates for mallards at the eastern North America scale. The zero-inflated Poisson modeling approach was not adequate for the following species that occur at lower densities and are more patchily distributed in the eastern survey area: scaup (lesser [*Aythya affinis*] and greater [*A. marila*]), scoters (black [*Melanitta americana*], white-winged [*M. deglandi*], and surf [*M. perspicillata*]), bufflehead (*Bucephala albeola*), and American wigeon (*Anas americana*). This model-based approach and changes in analytical procedures for some species may preclude comparisons with results from previous reports. We will continue to investigate methods that might allow us to estimate abundance of these rarer species within a hierarchical-modeling framework.

Since the implementation of the Eastern Breeding Waterfowl and Habitat Survey and associated composite estimation procedure (Zimmerman et al. 2012), American black duck total indicated pairs were calculated using the CWS method of scaling. The CWS scaling is based on sex-specific observations collected during previous CWS helicopter surveys in eastern Canada, which indicated that approximately 50% of black duck pair observations are actually two males. Thus, observed black duck pairs are scaled by 1.5 rather than the 1.0 scaling traditionally applied by the USFWS. These indicated pairs were then used to calculate indicated birds based on the USFWS protocol. The Black Duck Joint Venture completed a review of this estimation procedure using updated observation data from Quebec and New Jersey for the period 1990–2009. The results indicated the majority of 2-bird observations consisted of female/male pairings in similar proportions to mallards and green-winged teal. Therefore, starting in 2023 the time series for black duck total indicated pairs are estimated using the standard USFWS protocols that 2 birds equal 1 breeding pair. Further, total indicated birds are calculated using standard USFWS protocols.

Total Duck Species Composition

In the traditional survey area, our estimate of total ducks excludes scoters, eiders (common [*Somateria mollissima*], king [*S. spectabilis*], spectacled [*S. fisheri*], and Steller's [*Polysticta stelleri*]), long-tailed ducks (*Clangula hyemalis*), mergansers, and wood ducks (*Aix sponsa*) because the traditional survey area does not include a large portion of their breeding ranges (Smith 1995).

Results and Discussion

2024 Overall Habitat Conditions and Population Status

Habitat conditions during the 2024 WBPHS generally declined over a large portion of the surveyed area relative to 2023. The majority of the decline was in the traditional survey area of the interior Canadian provinces and portions of the northcentral U.S. Despite above- to well- above-average winter temperatures across the Canadian prairies, winter precipitation was below average and continued into early spring. Well-above-average spring precipitation has fallen but most of this arrived too late to benefit initial nesting. The U.S. prairies did have pockets where habitat quality declined but most areas remained good, with an immense improvement in southeastern South Dakota from winter precipitation. Most areas of eastern Canada and the Great Lakes continued to have good to excellent habitat quality since 2023. Minnesota and portions of Ontario and Quebec had vast improvements whereas the only substantial habitat decline occurred across Maine, which was mainly from excellent to good conditions. The total pond estimate (Prairie Canada and northcentral U.S. combined) was 5.2 ± 0.2 million, which was similar to the 2023 estimate of 5.0 ± 0.1 million and the long-term average (Table 1, Figure 3). The 2024 estimate of ponds in Prairie Canada was 2.7 ± 0.1 million. This estimate was 19% below the 2023 estimate of 3.3 ± 0.1 million and 24% below the long-term average (3.5 ± 0.02 million). The pond estimate for the northcentral

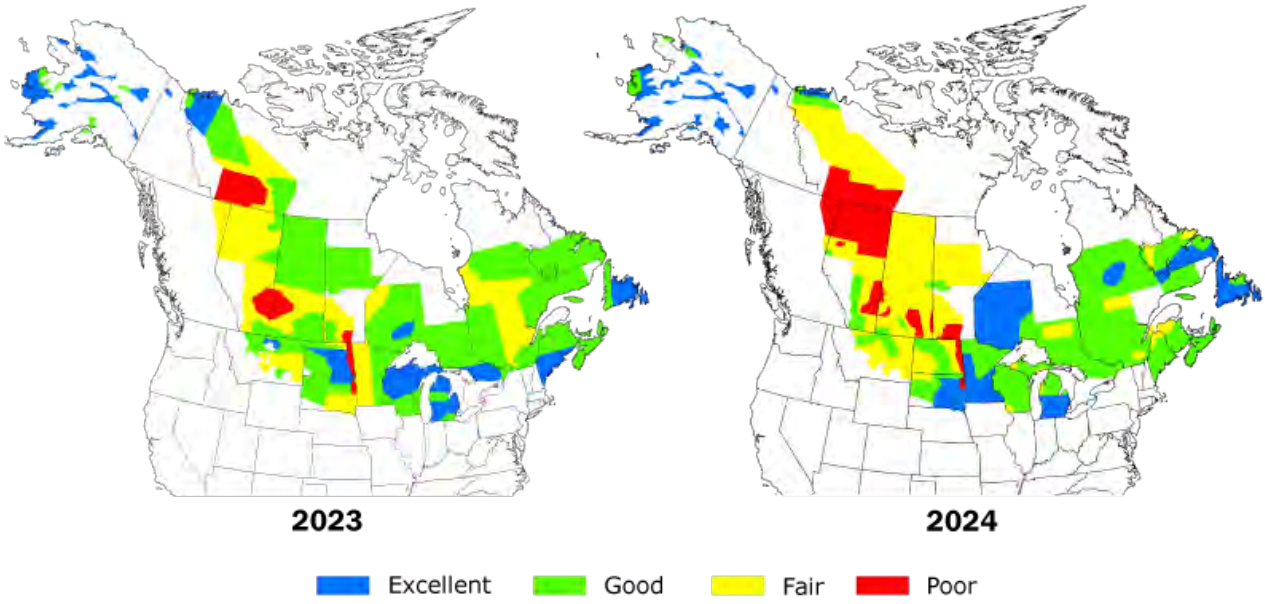

Figure 2. Breeding waterfowl habitat conditions during the 2023 and 2024 Waterfowl Breeding Population and Habitat Surveys, as judged by U.S. Fish and Wildlife Service and Canadian Wildlife Service biologists.

U.S. was 2.5 ± 0.1 million, which was 49% above the 2023 estimate (1.7 ± 0.08 million) and 45% above the long-term average of 1.7 ± 0.01 million. In the WBPHS traditional survey area, the total duck population estimate was 34.0 ± 0.6 million birds. This estimate was 5% above the 2023 estimate of 32.3 ± 0.6 million and 4% below the long-term average of 35.4 ± 0.09 million.

In the eastern Dakotas and Montana–western Dakotas crew areas, total duck numbers were similar to their 2023 estimates and 12% above their long-term average of 5.3 ± 0.04 million. The total duck estimate in the southern Alberta region was 16% below the 2023 estimate and 38% below the long-term average. Total ducks in the southern Saskatchewan region were 16% and 31% below their 2023 estimate and long-term average, respectively. In southern Manitoba, the total duck population estimate was 14% below the 2023 estimate and 36% below the long-term average. The total duck estimate in central and northern Alberta–northeastern British Columbia–Northwest Territories was 35% above the 2023 estimate and 49% above the long-term average. The estimate in the northern Saskatchewan–northern Manitoba–western Ontario survey area was similar to the 2023 estimate and the long-term average. In the Alaska–Yukon Territory–Old Crow Flats region, the total duck estimate was 28% above the 2023 estimate and 33% below the long-term average.

Several states and provinces conduct breeding waterfowl surveys in areas outside the geographic extent of the WBPHS (estimates are provided in Appendix B.2). Where possible we report year-over-year changes relative to the last year surveyed. In California, Oregon, Washington, British Columbia, Michigan, and Wisconsin, measures of precision for estimates of total duck numbers are available (Table 2). The total duck estimate in California was 25% below the 2023 estimate and 31% below the long-term average (1992–2023). Oregon's 2024 total duck estimate was 53% above the 2023 estimate and similar to the long-term average (1994–2023). In Washington, the total duck estimate was 24% below the 2023 estimate and 21% below the long-term average (2010–2023). In Michigan, the total duck estimate was, 394% above the record low 2023 estimate and similar to the long-term

average (1991–2023). Wisconsin's 2024 total duck estimate was similar to the 2023 estimate and the long-term average (1973–2023). British Columbia's total duck estimate was 18% above the 2023 estimate and 24% above the long-term average (2006–2023). In Minnesota, which does not have a measure of precision for total duck numbers, the 2024 estimate of total ducks was 10% lower than the 2023 estimate and 28% below the long-term average (1968–2023).

Trends and annual breeding population estimates for 10 principal duck species for the traditional survey area are provided in this report (Tables 3–12, Figure 4, Appendix B.3). Percent change was computed prior to rounding of estimates and therefore may not match the rounded estimates presented in the tables and text. Estimated total mallard abundance was 6.6 ± 0.3 million, which was similar to the 2023 estimate of 6.1 ± 0.2 million and 16% below the long-term average of 7.9 ± 0.04 million (Table 3). In the eastern Dakotas, the mallard estimate was 0.8 ± 0.05 million, which was 16% below the 2023 estimate of 1.0 ± 0.07 million and 27% below the long-term average (1.1 ± 0.01 million). The mallard estimate in southern Alberta (0.6 ± 0.07 million) was similar to the 2023 estimate and 42% below the long-term average of 1.1 ± 0.01 million. In the central and northern Alberta–northeastern British Columbia–Northwest Territories region, the mallard estimate was 1.6 ± 0.2 million, which was 52% above the 2023 estimate (1.1 ± 0.1 million) and 39% above the long-term average (1.2 ± 0.02 million). The estimated abundance of mallards in the Montana–western Dakotas survey area (0.5 ± 0.05 million) was similar to their 2023 estimate and the long-term average. In the northern Saskatchewan–northern Manitoba–western Ontario survey area, the mallard estimate (1.2 ± 0.1 million) was similar to their 2023 estimates and the long-term average of 1.1 ± 0.02 million. In the southern Manitoba survey area, the estimate of mallards (0.2 ± 0.03 million) was similar to the 2023 estimate (0.3 ± 0.02 million) and 45% below the long-term average of 0.4 ± 0.01 million. Mallard numbers in southern Saskatchewan were similar to the 2023 estimate and 44% below the long-term average (2.1 ± 0.02 million). In the Alaska–Yukon Territory–Old Crow Flats survey area, the mallard estimate of 0.5 ± 0.06 million was 33% above the 2023 estimate and 30% above the long-term average of 0.4 ± 0.01 million.

The estimated abundance of mallards in eastern North America was 1.2 ± 0.1 million, which was similar to the 2023 estimate and 9% below the long-term average (Table 13). Estimates of mallards from the AFBWS have been integrated into the estimate of mallards for eastern North America since 2018, and are no longer reported separately. Mallard abundances with estimates of precision are also available for other areas where surveys are conducted (British Columbia, California, Michigan, Minnesota, Oregon, Washington, and Wisconsin; Table 3). In Washington, estimates of mallards were similar to their 2023 estimates and their long-term averages. The Wisconsin mallard estimate was 29% below the 2023 estimate and 35% below the long-term average (1973–2023). In British Columbia, estimates of mallards were 37% above 2023 estimates and 22% above the long-term average. The California, Oregon, and Minnesota mallard estimates were similar to the 2023 estimate and 45%, 20%, and 38% below their long-term averages (California: 1992–2023, Oregon: 1994–2023, Minnesota: 1968–2023). In Michigan, the 2024 mallard estimate was 203% above the 2023 estimate and similar to the long-term average (1991–2023).

In the traditional survey area the 2024 estimate for blue-winged teal (4.6 ± 0.2 million) was 12% below the 2023 estimate of 5.3 ± 0.3 million and 10% below the long-term average of 5.1 ± 0.04 million (Table 7). Estimated abundance of gadwall (2.3 ± 0.1 million) was similar to the 2023 estimate and 11% above the long-term average of 2.1 ± 0.02 million (Table 4). The estimate of green-winged teal (3.0 ± 0.2 million) was similar to the 2023 estimate and 38% above the long-term average of 2.2 ± 0.02 million (Table 6). The Northern pintail estimate was 2.0 ± 0.1 million, which was similar to the 2023 estimate and 49% below the long-term average of 3.8 ± 0.03 million (Table 9). The abundance estimate for American wigeon ($2.9 \pm$

Table 1. Estimated number (in thousands) of May ponds in portions of Prairie and Parkland Canada and the northcentral U.S.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Prairie & Parkland Canada							
S. Alberta	677	642	+5	0.669	780	−13	0.133
S. Saskatchewan	1,454	2,117	−31	<0.001	2,074	−30	<0.001
S. Manitoba	550	554	−1	0.952	657	−16	0.004
Subtotal	2,681	3,314	−19	<0.001	3,511	−24	<0.001
Prairie & Parkland Canada							
Montana & Western Dakotas	655	602	+9	0.329	590	+11	0.128
Eastern Dakotas	1,823	1,059	+72	<0.001	1,120	+63	<0.001
Subtotal	2,478	1,661	+49	<0.001	1,710	+45	<0.001
Total	5,159	4,975	+4	0.401	5,229	−1	0.689

[a] Long-term average. Prairie and Parkland Canada, 1961–2023; northcentral U.S. and Total 1974–2023.

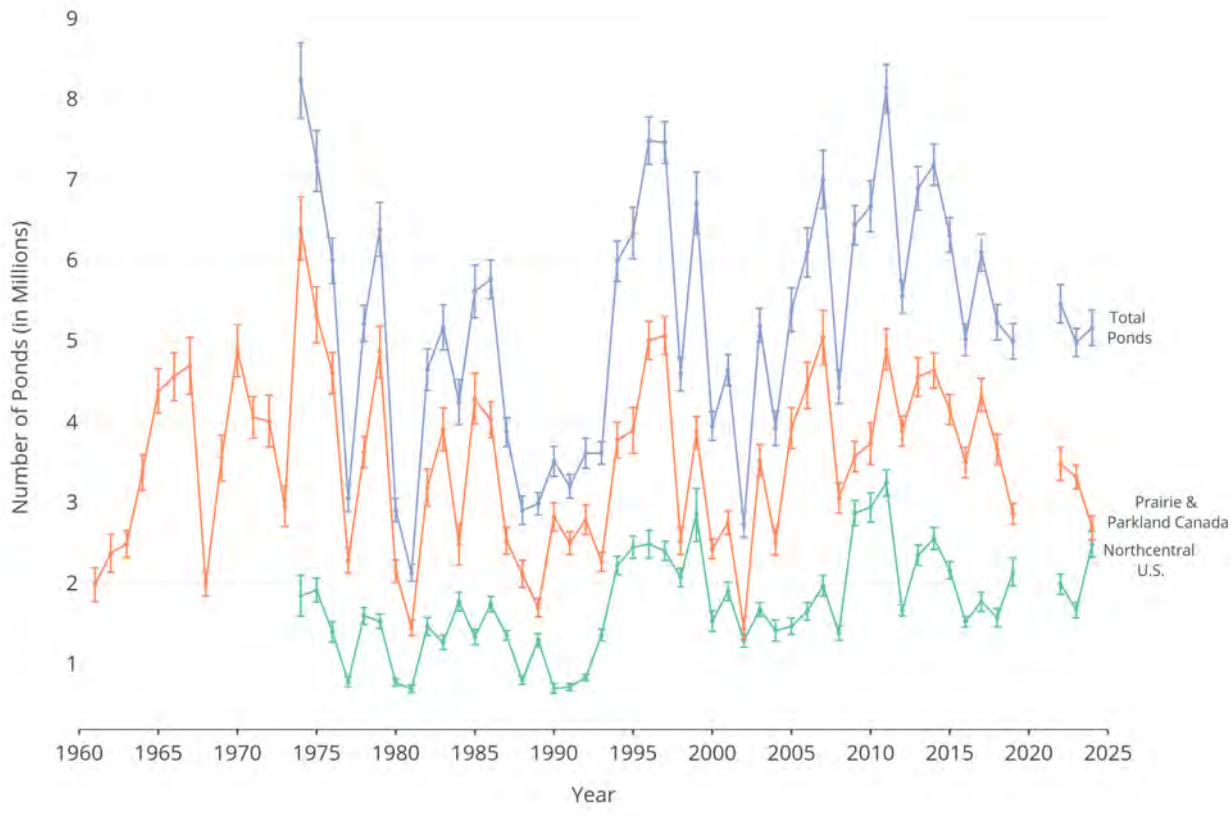

Figure 3. Number of ponds in May and 90% confidence intervals in Prairie and Parkland Canada, the northcentral U.S., and both areas combined (Total ponds).

Table 2. Total duck[a] breeding population estimates (in thousands) for regions in the traditional survey area and other regions.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[b]	%	*P*
Alaska Yukon Territory–Old Crow Flats	2,449	1,920	+28	0.004	3,657	−33	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	11,248	8,348	+35	<0.001	7,554	+49	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	3,290	3,139	+5	0.535	3,411	−4	0.527
S. Alberta	2,686	3,192	−16	0.021	4,332	−38	<0.001
S. Saskatchewan	5,476	6,508	−16	0.001	7,922	−31	<0.001
S. Manitoba	989	1,152	−14	0.055	1,548	−36	<0.001
Montana & Western Dakotas	1,942	2,161	−10	0.185	1,761	+10	0.150
Eastern Dakotas	5,908	5,884	0	0.943	5,253	+12	0.003
Total	33,988	32,305	+5	0.056	35,439	−4	0.019
Other Regions							
British Columbia	437	369	+18	0.024	353	+24	<0.001
California	374	495	−25	0.059	543	−31	<0.001
Michigan	674	136	+394	<0.001	599	+13	0.589
Oregon	302	197	+53	0.014	262	+15	0.318
Washington	156	205	−24	0.012	198	−21	0.001
Wisconsin	375	431	−13	0.375	448	−16	0.111

[a] Includes 10 species in Appendix B.3, plus American black ducks, ring-necked ducks, goldeneyes, bufflehead, and ruddy ducks (*Oxyura jamaicensis*); excludes eiders, long-tailed ducks, scoters, mergansers, and wood ducks. Compositions vary according to state-survey specific protocols.

[b] Long-term average for regions in the traditional survey area, 1955–2023; years for other regions vary (see Appendix B.2)

0.2 million) was 55% above the 2023 estimate of 1.9 ± 0.2 million and similar to the long-term average of 2.6 ± 0.02 million (Table 5). Estimates of northern shoveler, redheads, and canvasbacks were 2.6 ± 0.1 million, 0.8 ± 0.06 million, and 0.6 ± 0.05 million, respectively (Tables 8, 10, and 11). All were similar to their 2023 estimates and their long-term averages. The combined estimate of lesser and greater scaup (4.1 ± 0.2 million) was 16% above the 2023 estimate of 3.5 ± 0.2 million and 17% lower than the long-term average of 4.9 ± 0.04 million (Table 12).

In the eastern survey area, the estimate of goldeneyes was 1.2 ± 0.3 million, which was 42% above the 2023 estimate and 76% above the long-term average. The estimates of green-winged teal (0.5 ± 0.1 million) and mergansers (1.0 ± 0.1 million) were similar to their 2023 estimates and were 29% and 23% above their long-term averages, respectively. Ring-necked ducks (0.7 ± 0.1 million) were similar to their 2023 estimate and the long-term average (Table 13, Figure 5, Appendix B.5). The 2024 estimate of American black ducks in the eastern survey area was 0.9 ± 0.1 million, which was 17% above the 2023 estimate and 23% above the long-term average. In addition, black duck population estimates for northeastern states from New Hampshire south to Virginia were also available from the Atlantic Flyway Breeding Waterfowl Survey. For the northeastern states the estimate of black ducks was 27,000, which was unchanged from the 2023 estimate and 51% below the long-term (1993–2023) average of 55,500. These northeastern

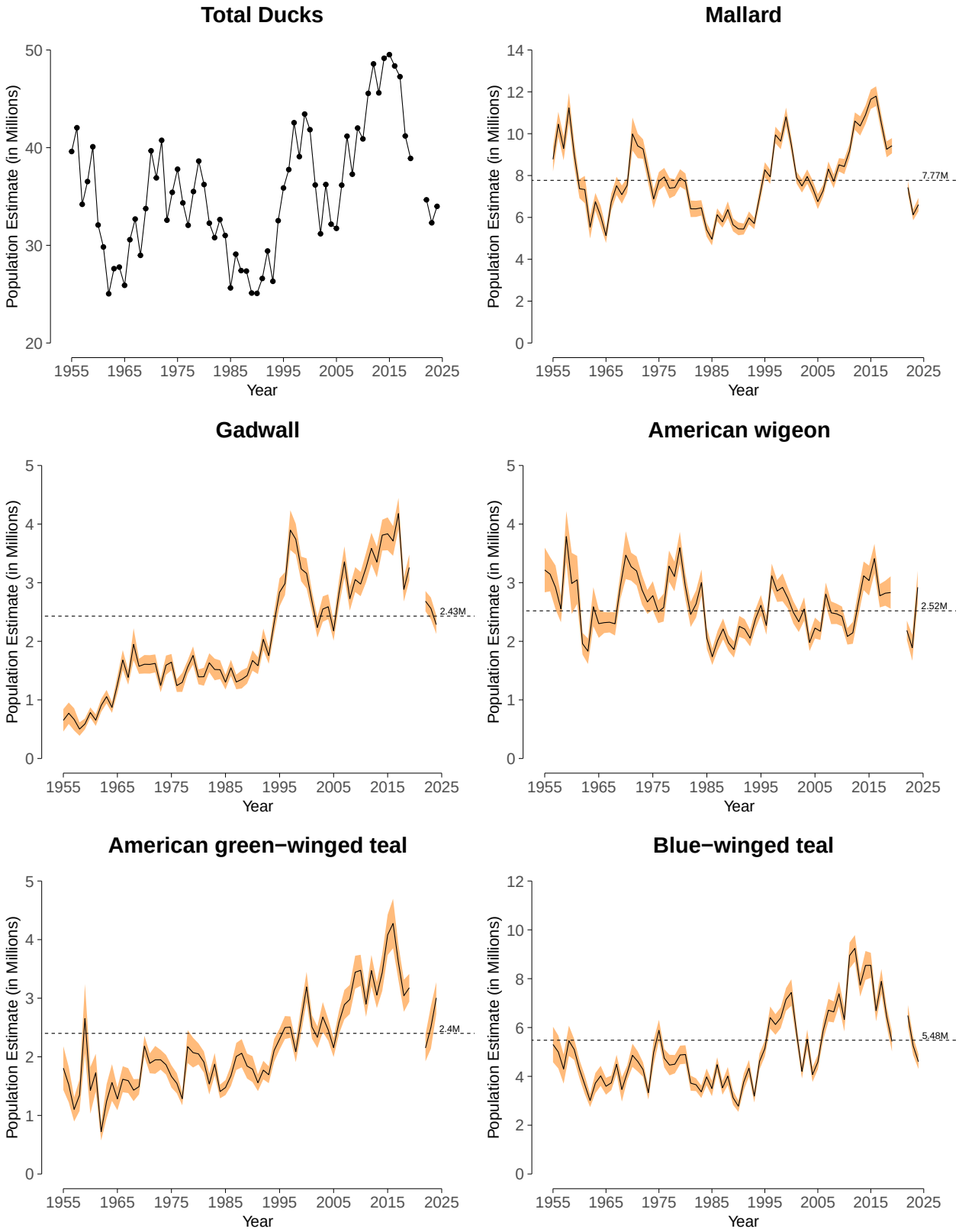

Figure 4. Breeding population estimates, 90% confidence intervals, and North American Waterfowl Management Plan population objectives (dashed line; North American Waterfowl Management Plan Committee 2024) for selected species in the traditional survey area (strata 1–18, 20–50, 75–77).

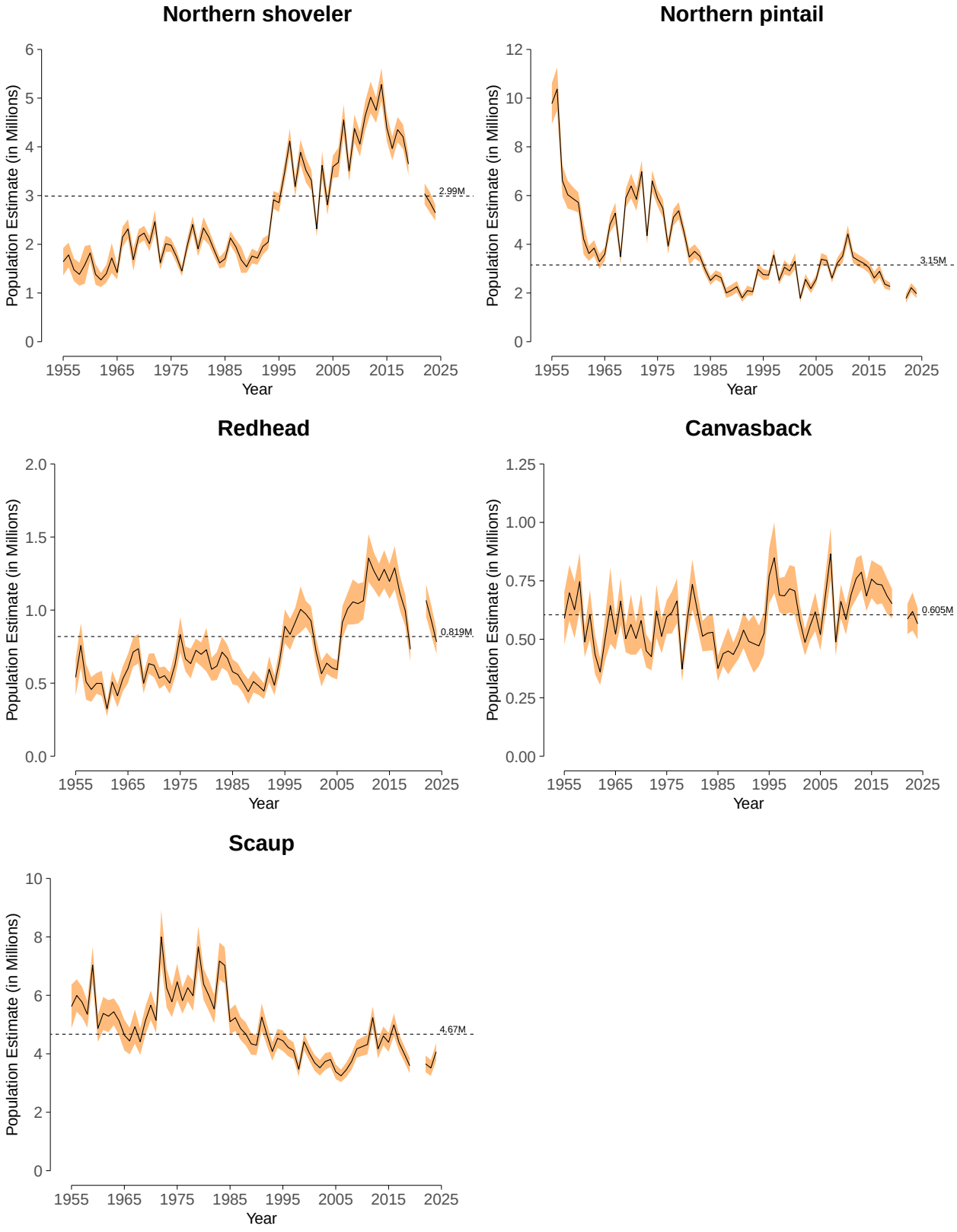

Figure 4. Continued.

Table 3. Mallard breeding population estimates (in thousands) for regions in the traditional survey area and other regions.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	507	381	+33	0.078	390	+30	0.043
C. & N. Alberta–N. E. British Columbia–NWT	1,606	1,060	+52	0.005	1,158	+39	0.006
N. Saskatchewan–N. Manitoba–W. Ontario	1,159	929	+25	0.177	1,144	+1	0.914
S. Alberta	630	740	−15	0.234	1,085	−42	<0.001
S. Saskatchewan	1,163	1,266	−8	0.365	2,087	−44	<0.001
S. Manitoba	216	256	−15	0.249	397	−45	<0.001
Montana & Western Dakotas	517	530	−2	0.832	536	−4	0.686
Eastern Dakotas	811	965	−16	0.098	1,111	−27	<0.001
Total	6,609	6,126	+8	0.139	7,907	−16	<0.001
Other Regions							
British Columbia	97	71	+37	0.007	79	+22	0.024
California	178	202	−12	0.497	324	−45	<0.001
Michigan	251	83	+203	<0.001	321	−22	0.110
Minnesota	140	222	−37	0.150	230	−39	0.001
Oregon	71	69	+4	0.803	89	−20	0.012
Washington	86	102	−15	0.271	92	−6	0.566
Wisconsin	118	167	−29	0.054	182	−35	<0.001

[a] Long-term average, 1955–2023; years for other regions vary (see Appendix B.2)

state estimates for American black ducks are not explicitly integrated with the eastern survey area as is done for mallards.

Trends in wood duck populations are available from the North American Breeding Bird Survey (BBS). The BBS, a series of roadside routes surveyed during May and June each year, provides the only long-term range-wide breeding population index for this species. Wood ducks are encountered with low frequency along BBS routes, which limits the amount and quality of available information (Sauer and Droege 1990). However, hierarchical analysis of these data (J. Hostetler, U.S. Geological Survey Biological Resources Division, unpublished data) incorporated adjustments for spatial and temporal variation in BBS route quality, observer skill, and other factors that may affect detectability (Link and Sauer 2002). This analysis also produces annual abundance indices and measures of variance, in addition to the trend estimates (average % change per year) and associated 95% credible intervals (lower, upper credible interval in parentheses following trend estimates) presented in this report. In the Atlantic and Mississippi flyways combined, the BBS wood duck index increased by an average of 0.58% per year (0.14%, 1.00%) over the entire survey period (1966–2023), while the 10-year (2014–2023) and 20-years trend indices (2004–2023) declined by an average of −0.17% (−1.69%, 1.36%) and −0.31% (−1.15%, 0.55%), respectively. The Atlantic Flyway wood duck index increased 0.13% (−0.49%, 0.74%) annually over the entire time series (1966–2023), but declined by −0.21% (−1.28%, 1.00%) over the past 20 years (2004–2023), and there was no trend (0.00%; −1.99%, 2.12%) for the most recent 10-

Table 4. Gadwall breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	1	0	+100	0.125	2	–65	0.010
C. & N. Alberta–N. E. British Columbia–NWT	124	61	+105	0.014	53	+136	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	5	18	–74	0.316	25	–80	<0.001
S. Alberta	389	442	–12	0.554	348	+12	0.495
S. Saskatchewan	649	967	–33	0.004	707	–8	0.261
S. Manitoba	77	109	–29	0.170	82	–6	0.625
Montana & Western Dakotas	213	278	–23	0.240	229	–7	0.709
Eastern Dakotas	826	687	+20	0.209	621	+33	0.017
Total	2,284	2,561	–11	0.148	2,065	+11	0.082

[a] Long-term average, 1955–2023

Table 5. American wigeon breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	212	111	+91	<0.001	554	–62	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	1,928	1,029	+87	<0.001	948	+103	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	174	251	–31	0.093	224	–22	0.060
S. Alberta	72	156	–54	<0.001	273	–74	<0.001
S. Saskatchewan	191	112	+71	0.015	385	–50	<0.001
S. Manitoba	4	6	–39	0.297	49	–92	<0.001
Montana & Western Dakotas	114	117	–3	0.908	112	+1	0.956
Eastern Dakotas	226	107	+112	0.007	63	+258	<0.001
Total	2,922	1,890	+55	<0.001	2,608	+12	0.154

[a] Long-term average, 1955–2023

Table 6. Green-winged teal breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	220	126	+74	0.027	413	−47	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	1,829	1,581	+16	0.465	924	+98	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	217	276	−21	0.234	201	+8	0.641
S. Alberta	86	165	−48	0.028	207	−58	<0.001
S. Saskatchewan	280	187	+50	0.032	277	+1	0.938
S. Manitoba	42	31	+35	0.374	56	−26	0.157
Montana & Western Dakotas	63	72	−12	0.735	42	+52	0.265
Eastern Dakotas	268	64	+317	<0.001	64	+321	<0.001
Total	3,005	2,503	+20	0.155	2,184	+38	<0.001

[a] Long-term average, 1955–2023

Table 7. Blue-winged teal breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	0	0	0	0	1	−100	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	677	570	+19	0.516	303	+124	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	72	61	+17	0.658	218	−67	<0.001
S. Alberta	588	451	+30	0.269	646	−9	0.564
S. Saskatchewan	930	1,405	−34	0.009	1,445	−36	<0.001
S. Manitoba	197	204	−3	0.835	369	−47	<0.001
Montana & Western Dakotas	442	551	−20	0.261	318	+39	0.049
Eastern Dakotas	1,693	2,009	−16	0.183	1,830	−7	0.361
Total	4,599	5,250	−12	0.085	5,130	−10	0.025

[a] Long-term average, 1955–2023

Table 8. Northern shoveler breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	205	128	+60	0.019	299	−32	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	430	420	+2	0.914	252	+71	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	18	33	−47	0.253	38	−53	0.002
S. Alberta	306	299	+2	0.906	445	−31	<0.001
S. Saskatchewan	828	924	−10	0.454	804	+3	0.777
S. Manitoba	62	83	−25	0.176	113	−45	<0.001
Montana & Western Dakotas	228	282	−19	0.325	181	+26	0.228
Eastern Dakotas	569	689	−17	0.206	516	+10	0.326
Total	2,646	2,858	−7	0.305	2,647	0	0.992

[a] Long-term average, 1955–2023

Table 9. Northern pintail breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	548	546	0	0.991	901	−39	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	540	390	+39	0.188	375	+44	0.074
N. Saskatchewan–N. Manitoba–W. Ontario	7	8	−2	0.964	34	−78	<0.001
S. Alberta	43	152	−72	<0.001	622	−93	<0.001
S. Saskatchewan	214	286	−25	0.187	1,059	−80	<0.001
S. Manitoba	7	11	−39	0.168	92	−93	<0.001
Montana & Western Dakotas	142	183	−23	0.279	252	−44	<0.001
Eastern Dakotas	475	643	−26	0.083	507	−6	0.595
Total	1,975	2,219	−11	0.242	3,842	−49	<0.001

[a] Long-term average, 1955–2023

Table 10. Redhead breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	1	0	+100	0.286	1	–43	0.441
C. & N. Alberta–N. E. British Columbia–NWT	61	39	+56	0.351	42	+45	0.356
N. Saskatchewan–N. Manitoba–W. Ontario	4	4	–6	0.935	24	–84	<0.001
S. Alberta	71	155	–54	0.018	134	–47	<0.001
S. Saskatchewan	261	295	–12	0.597	241	+8	0.666
S. Manitoba	60	130	–54	0.120	77	–23	0.254
Montana & Western Dakotas	31	35	–10	0.808	12	+162	0.066
Eastern Dakotas	294	272	+8	0.654	206	+43	0.008
Total	782	930	–16	0.153	737	+6	0.489

[a] Long-term average, 1955–2023

Table 11. Canvasback breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	68	56	+22	0.662	83	–18	0.505
C. & N. Alberta–N. E. British Columbia–NWT	56	85	–35	0.405	79	–29	0.386
N. Saskatchewan–N. Manitoba–W. Ontario	29	19	+56	0.427	49	–41	0.070
S. Alberta	45	60	–24	0.461	67	–33	0.062
S. Saskatchewan	197	243	–19	0.413	202	–3	0.857
S. Manitoba	85	82	+4	0.901	58	+49	0.058
Montana & Western Dakotas	14	16	–10	0.799	10	+38	0.350
Eastern Dakotas	72	58	+23	0.506	44	+65	0.097
Total	566	619	–8	0.524	592	–4	0.630

[a] Long-term average, 1955–2023

Table 12. Scaup (greater and lesser combined) breeding population estimates (in thousands) for regions in the traditional survey area.

			Change from 2023			Change from LTA	
Region	2024	2023	%	*P*	LTA[a]	%	*P*
Alaska Yukon Territory–Old Crow Flats	553	477	+16	0.380	877	–37	<0.001
C. & N. Alberta–N. E. British Columbia–NWT	2,191	1,840	+19	0.195	2,481	–12	0.150
N. Saskatchewan–N. Manitoba–W. Ontario	361	426	–15	0.331	529	–32	<0.001
S. Alberta	251	291	–14	0.582	327	–23	0.102
S. Saskatchewan	274	238	+15	0.546	412	–33	0.003
S. Manitoba	56	52	+8	0.806	122	–54	<0.001
Montana & Western Dakotas	60	58	+3	0.956	46	+28	0.532
Eastern Dakotas	324	136	+139	<0.001	133	+143	<0.001
Total	4,069	3,517	+16	0.079	4,927	–17	<0.001

[a] Long-term average, 1955–2023

year period (2014–2023). In the Mississippi Flyway, the corresponding BBS wood duck indices increased by 0.79% (0.21%, 1.31%, 1966–2023), decreased by –0.36% (–1.39%, 0.70%) from 2004 to 2023, and decreased by –0.24% (–2.18%, 1.69%) from 2014 to 2023 (J. Hostetler, U.S. Geological Survey Biological Resources Division, unpublished data). A model-based estimate of wood duck populations using data from the Atlantic Flyway which incorporates the Atlantic Flyway Breeding Waterfowl Survey data for the northeast states from New Hampshire south to Virginia with the Breeding Bird Survey. The 2024 estimate of wood ducks in the Atlantic Flyway was 0.9 ± 0.1 million which was similar to the long-term average.

Regional Habitat Conditions

A description of habitat conditions and duck populations for each of the major breeding areas follows. In the past this information was taken from more detailed reports of specific regions. Although these reports are no longer produced, habitat and population status for each region will continue to be summarized in this report. More detailed information on regional waterfowl and habitat conditions during the May waterfowl survey is also available on the USFWS website (`https://www.fws.gov/library/collections/waterfowl-breeding-population-and-habitat-survey-field-reports`).

Southern Alberta (strata 26–29, 75–76)
reported by biologist-pilot Rob Spangler

Southern Alberta continued to suffer from drought conditions despite some recent precipitation. Precipitation from November 2023 through March 2024 was below (60–85%) to well-below average (<40%) across most of the crew area, except for the far western edge through Calgary and Lethbridge that received average precipitation. Above-average temperatures (2 to greater than 5°C) occurred since Fall 2023, with only January and March 2024 slightly below average. Spring precipitation upwards of 200% of normal improved habitat conditions near Lethbridge, Calgary, and Edmonton, however, much of the rain came too late as birds had migrated through the region, leaving many recently filled ponds void of breeding pairs. Recent rains were not enough either to relieve drought conditions near Medicine Hat and Lloydminster where poor habitat conditions remained similar to 2023. Conditions improved moving north

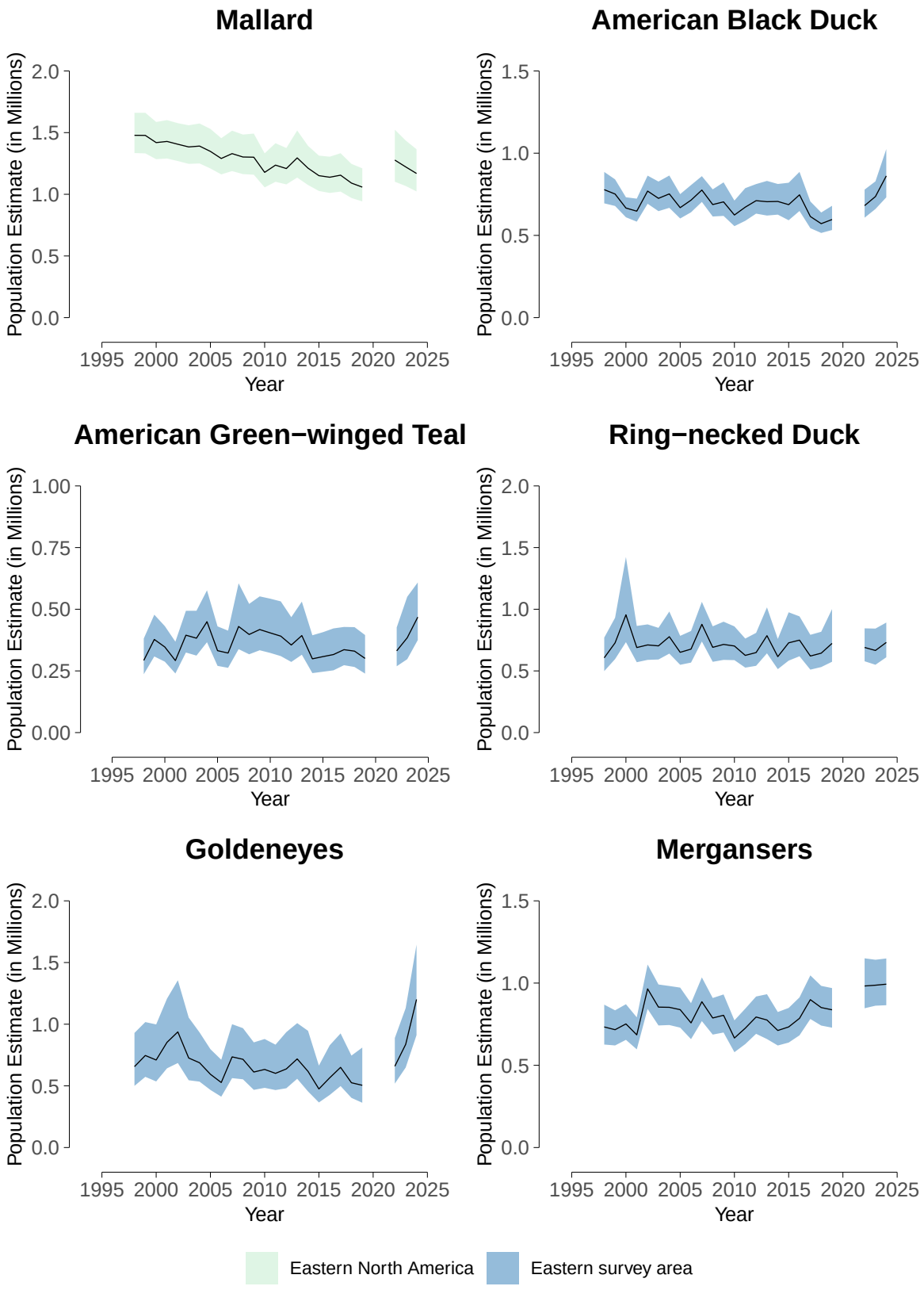

Figure 5. Breeding population estimates and 90% credible intervals from Bayesian hierarchical models for species in the eastern survey area. Time series are presented for two spatial scales: eastern survey area (Blue; strata 51–53, 56, 62–72 for black ducks, green-winged teal, ring-necked ducks, goldeneye, and mergansers) and eastern North America (Light green; eastern survey area plus the northeastern states from Virginia north to New Hampshire for mallards).

Table 13. Duck breeding population estimates, in thousands for the six most abundant species in the eastern survey area. Estimates for black ducks, green-winged teal, ring-necked ducks, goldeneye, and mergansers are at the eastern survey scale (strata 51–53, 56, 62–72) and mallards at the eastern North America scale (eastern survey area plus Virginia north to New Hampshire).

	2024	2023	% Change from 2023	Average[a]	% Change from average
Mallard	1,169	1,222	–4	1,282	–9[b]
American Black Duck	862	736	+17[b]	696	+23[b]
American Green-winged Teal	468	384	+20	358	+29[b]
Ring-necked Duck	731	666	+9	707	+2
Goldeneye (common and Barrows's)	1,201	836	+42[b]	663	+76[b]
Merganser (common, red-breasted, and hooded)	993	987	+1	808	+23[b]

[a] Average for 1998–2023.
[b] Indicates significant change. Significance ($P \leq 0.10$) determined by non-overlap of Bayesian credibility intervals.

towards Cold Lake and Grand Prairie, but the area continued to be abnormally dry. The area north of Grand Prairie and south of Peace River would have been considered poor; however, the larger permanent wetlands still held considerable water and good edge vegetation needed for nesting. Apart from the good habitat found in the higher precipitation areas near the Rocky Mountains, most of the province was considered fair for waterfowl production with large areas of poor habitat in eastern portions of the province.

Southern Saskatchewan (strata 30–33)
reported by biologist-pilot Phil Thorpe

Southern Saskatchewan once again had a mix of wetland conditions in 2024 but overall habitat had declined compared to 2023. Fall and winter precipitation was average in the grasslands but below average (40–85%) in the Parklands. Spring started off dry but by late May average precipitation fell in the grasslands and the Parklands received well-above-average precipitation (115–200%). Temperatures during the late summer and fall 2023 were average. Winter temperatures were well-above average (greater than 5°C) across the crew area whereas March 2024 was well-below average (-2 to -5°C) and the remainder of spring was slightly below (-2 to 2°C). Poor to fair recruitment is expected over central and western grasslands of southern Saskatchewan where few ephemeral or temporary ponds were observed, and seasonal and semi-permanent wetlands had varied conditions based on where recent rains had fallen. Some where recharged enough for brood rearing whereas others were severely drawn down or dry. Southwestern Saskatchewan was a bright spot and good production and recruitment was expected. It was the wettest this area has been in many years. The Parklands were once again drier than previous years and poor-to-fair production was expected.

Southern Manitoba (strata 34–40; includes southeast Saskatchewan)
reported by biologist-pilot Sarah Yates

Southern Manitoba and southeastern Saskatchewan have continued to experience dry conditions, and habitats appeared to have further deteriorated compared to 2023. Winter was mild with above- to well-above temperatures (2 to greater than 5°C) and below- to well-below average precipitation (85 to less than 40%). Although portions of Manitoba had some holdover moisture from previous years in 2023, it appeared to have disappeared. Dried-up seasonal wetlands, ditches devoid of water, and even larger semi-permanent wetlands receding or dry persisted throughout the entire survey

area. The only areas observed to have decent habitat for waterfowl production were pockets of fair conditions in strata 35, 39, and 40, which are characterized by larger and deeper semi-permanent and permanent wetlands. The Parkland and boreal forest farther to the north in Manitoba (strata 36 and 37) remained in drought and forest fires were an issue. Lake Winnipeg was its lowest level for May in 35 years and the Winnipeg and Saskatchewan rivers were both flowing below their average volumes at the end of May. Above- to well-above average precipitation (85 to greater than 200%) began in late spring across both Saskatchewan and Manitoba portions of the crew area. We observed a significant amount of runoff as well as standing water at the very end of the survey in areas that had been dry in early May, which should improve habitat conditions for late-nesting species.

Montana and western Dakotas (strata 41–44)
reported by biologist-pilots Terry Liddick and Phil Thorpe

The fall in the western mountains and the Hi-Line (the northern grasslands of Montana along and north of U.S. Highway 2; strata 41 and 42) continued to dry out, and the drought intensity according to the U.S. Drought Monitor was moderate to severe for the northern quarter of Montana. Conditions deteriorated into winter, and some level of drought covered the entire state, ranging from extreme drought in the western mountains to abnormally dry over much of the plains. Fall and winter temperatures were well-above average. Spring brought some relief to the center of the state, but the rest of the state remained in a drought with moderate drought spreading to the eastern quarter of the state. Temperatures during spring were near average for the period between March and May 2024. By mid-May, the middle of the state, the Missouri river drainage, the Hi-Line and into the Yellowstone River drainage were free from any drought classification. Drought conditions ranged from abnormally dry to moderate in the western mountains and along the Wyoming and North and South Dakota borders. May was characterized by above- to well-above-average precipitation for the areas east of the Rocky Mountains. Although the precipitation was welcomed, the severity of the drought will require more than a month of above-average precipitation to replenish the water deficit. The above-average precipitation recharged many ponds and there is fair-to-good habitat east of the mountains for waterfowl nesting and wetlands should last long enough for broods to fledge.

Western portions of the Dakotas (strata 43 and 44) were no longer in drought status. Despite below-average winter precipitation, habitat conditions improved substantially with 13–20cm of rain in April. While conditions were not as good west of the Missouri River as to the east, the vast improvement and continued precipitation should provide adequate breeding conditions.

Eastern Dakotas (strata 45–49)
reported by biologist-pilot Terry Liddick

Habitat conditions in the eastern Dakotas crew area improved in the southeast and remained in good shape in a northerly direction. Much of the two-state region benefitted from above-average rain in April 2024, with less vacant habitat in North Dakota possibly due to the timing of ducks moving through the state. South Dakota improved in early spring 2023 but below-average moisture fell from June to December 2023. Well-above-average snowfall and below-average winter temperatures across the state benefitted conditions. Even with below-average spring precipitation and temperatures, nearly all wetland basins were full, especially north of Huron. North Dakota has drastically improved. The state experienced well-above-average snowfall, with central and southeastern regions having record amounts. Above-average May rain in central and northwest North Dakota further recharged wetlands. Nearly all basins east of the Missouri Coteau and south of Devil's Lake were full as was the coteau itself. The drift plain region significantly improved as well but vacant habitats were observed. North and northeast of Devil's Lake remained dry due to drainage activity. Seasonal wetlands in both

states had been plowed during the drought and only now were beginning to again provide quality waterfowl habitat with more moisture.

In strata 48 and 49 in South Dakota, conditions were good west of the James River and fair to poor to the east. Most wetlands were more than 50% full in stratum 48 and all streams and rivers were flowing. Wetland conditions were as good as I have seen them south of Mitchell, remained excellent around Huron, and were good in the Aberdeen area. Production should be average to slightly above average in South Dakota.

Habitat conditions remained good since 2023 in strata 45 and 46 in North Dakota, with most of the state rated as good or excellent. Permanent and semi-permanent wetlands were 70–100% full, and the drift plain region was as good as it was in 2023. While there was a lot of water on the landscape, most seasonal wetlands have been plowed through during the last several years of drought and are just beginning to improve. Stratum 47 remained poor as expected.

Overall, the eastern Dakotas crew area was rated good to excellent. This was mainly a result of April 2024 precipitation. The coteau regions of both states were rated as good and should produce average numbers of waterfowl. South Dakota was excellent south of Interstate 90, excellent from Interstate 90 north to Aberdeen, and good from Aberdeen to the North Dakota border. North Dakota remained similar to 2023 and should have good to excellent production.

Northern Saskatchewan, northern Manitoba, and western Ontario (strata 21–25, 50)
reported by biologist-pilots Walt Rhodes and Jim Wortham

Northern Saskatchewan and northern Manitoba (strata 21–25) generally experienced above-average temperatures and below-average precipitation amounts since September 2023. Temperatures routinely ran 2–4°C above average through April 2024, with December 2023 being extremely well-above average (>5°C). Only October 2023 and May 2024 had average temperatures and the only month below average (-2 to -4°C) was March 2024. Precipitation continued to run below- (40–60%) to well-below average (<40%) through March 2024, with the only exception being average precipitation on the far eastern edge of the crew area from Thompson and Norway House, MB, east to Shamattawa, MB. The overall drought conditions heading into spring immediately resulted in numerous wildfires springing up, with a particularly large one just east of Flin Flon, MB. However, nearly all of these fires were squelched by late May from above-average spring precipitation (150–200%). Ice-out was later than 2023 but still slightly early and no staging snow geese were observed in the Parklands and very few staging tundra swans remained on the Saskatchewan River Delta along the Saskatchewan–Manitoba border. Several flocks of molt-migrant Canada geese were observed in early June heading north across Manitoba. Parkland and Boreal wetlands remained low and combined with damp, cool conditions possibly affecting brood survival fair to good waterfowl production was predicted.

Western Ontario (stratum 50) was characterized by winter temperatures average to well-above average (>5°C) and precipitation average to slightly-below average (60–85%). Spring temperatures and precipitation were average. Despite the lack of winter snow wetland conditions were characterized as excellent throughout the stratum. Spring conditions arrived by the second week of May and almost all habitats were thawed and available to arriving birds. Beaver populations in the area remained robust and many habitats were enhanced by their work.

Central and northern Alberta, northeastern British Columbia, and Northwest Territories (strata 13–18, 20, 77)
reported by biologist-pilot Garrett Wilkerson

Winter and early spring in northern Alberta, northeastern British Columbia and the southern portion of the Northwest Territories was the driest in over 50 years. Most of the region had well-below-average precipitation (<50%) from October 2023 through March 2024. Many weather stations had reported <40 mm of precipitation. Temperatures were above average (1.5–3°C) during the same period. The drought's

impact to the landscape was noticeable, with most of the breeding habitat south and southwest of Yellowknife, NT, categorized as poor. Semi-permanent wetlands were largely dry and permanent wetlands were markedly lower. The drought in the Peace-Athabasca River Delta was striking, with it estimated that less than half of the wetland area was available for breeding waterfowl compared to 2023. Underscoring the impact of the drought, the Mackenzie River water level was too low for barging operations, forcing remote, northern communities to rely solely upon air transport to deliver necessities. Habitat north and west of the Yellowknife up to Colville Lake, NT, area was in slightly better condition due to that region receiving more snowfall. Norman Wells, NT, for example, received 131.2 mm of snowfall from October 2023 through March 2024. Conditions in this region were fair to good for breeding waterfowl, with the snow melt and timely spring rains beginning to pool in wetlands. While semi-permanent wetlands were not full, they held adequate water to support nesting waterfowl. Slow ice breakup, average winter snowfall, and early spring rains resulted in good-to-excellent conditions in the Mackenzie River Delta east to Paulatuk, NT. Wetland habitats were well charged. Ice-out was slightly (3–4 days) earlier than normal, and many white-fronted goose and swan nests were observed. The area continued to receive isolated to scattered afternoon showers through June, and waterfowl production was expected to be excellent.

Alaska, Yukon Territory, and Old Crow Flats (strata 1–12)
reported by biologist-pilots Heather Wilson and Tamara Zeller

Most of Alaska experienced an average spring in 2024. The exception was parts of western and northwestern Alaska where many lakes remained frozen during the survey. The National Weather Service characterized the spring breakup as more thermal than dynamic, which tends to be less severe in terms of ice jams and flooding as the ice merely rots in place. There was above-average snowmelt for much of the state but no significant flooding was noted. Late-April temperatures in the eastern interior were warm, which helped thaw low-elevation snowpack and river ice without flooding across the middle and upper Tanana River as well as portions of the upper Yukon River. Interior Alaska (stratum 3) was further along in phenology than other areas with full-foliage trees and rivers and lakes ice free. Below-average temperatures led to a delayed breakup across western Alaska. Although the Kuskokwim River broke up earlier than average, many parts of the Yukon River were later than average and ice persisted into early June on the Yukon-Kuskokwim River Delta, particularly in coastal areas. Tundra areas were mostly devoid of snow and nest initiation had begun for several goose species, however, farther north snow remained on the tundra and large lakes were almost entirely ice covered in northwestern Alaska. South-central Alaska (strata 1 and 7) had an average to slightly later spring 2024. Above-average winter snowpack combined with average spring temperatures led to an abundance of water but no notable flooding. Overall, good to excellent waterfowl production is expected across Alaska.

Eastern survey area (strata 51–72)
reported by biologist-pilots Mark Koneff, John Rayfield, and Jim Wortham

Central and southern Ontario (strata 51 and 52) had a mild winter with temperatures well-above average (2 to greater than 5°C). As a result of the early spring, the survey began 12 days earlier than 2023 and 22 days earlier than 2022. The region experienced average (85–115%) to slightly below-average (60–85%) precipitation between 1 November 2023 and 31 March 2024. Spring 2024 precipitation was well-above average (115 to greater than 200%), with the greatest amounts along the Ontario–Quebec border. Habitats were slightly drier to the north with water levels not reaching vegetation. Habitats were rated mostly good with a small pocket of fair, which was similar to 2023.

Strata 53 and 56 in southern Quebec were also judged fair to good. Weather patterns were similar to central and southern Ontario, result-

ing in mainly good water levels but drier areas where below-normal precipitation was recorded. Conditions in central Quebec (stratum 68) since 2023 were not much different than elsewhere in the crew area. Ice was almost completely thawed except for some of the higher terrain. Good waterfowl production was expected.

Spring arrived on time in northern Quebec (stratum 69) following a winter of average temperatures and snowfall. Habitats in the areas between the James Bay and Labrador were much improved over the conditions observed in 2023 and were available and ready for nesting waterfowl. Scarring from past fires continue to heal, and the habitats overall were characterized as good to excellent across the region. Habitats along the North Shore of Quebec between the Gulf of St. Lawrence and Labrador (Stratum 70) were characterized as good. Wetlands had benefitted from abundant water but continue to be pressured by shoreline development in areas along the Gulf.

Precipitation levels in Maine from fall 2023 to early spring 2024 were generally average to slightly above average, with the exception of the northwest part of the state where precipitation was below average. Precipitation across the state from late April to May was below average and at the time of the survey wetlands in northwest Maine were showing obvious signs of drying. In Canadian portions of the crew area, fall, winter and early spring precipitation was average, except in southeastern Quebec along the Maine border and parts of Labrador. The Maritime provinces experienced below-average precipitation from late April to late May while the rest of Atlantic Canada had generally average levels. At the time of the survey, as in Maine, notable drying of some wetlands was observed in New Brunswick. Wetlands across the rest of Atlantic Canada were generally in good condition with the exception of portions of northern and western Labrador where some drying of wetlands and reduced water levels in lakes and bogs was noticeable. Maine and Atlantic Canada experienced an early warm up and many southern areas of the crew area were significantly devoid of ice and snow by early March. Temperatures cooled across the region later in March and throughout April, but overall spring phenology was substantially advanced for the crew area. Advanced phenology and generally good wetland conditions led to habitats across much of the crew area being rated as good to excellent for waterfowl production, while some drier areas of northwestern Maine and New Brunswick as well as portions of Labrador were rated as fair.

Other areas

Pacific Flyway breeding-waterfowl habitat conditions were generally dry in northern regions and improved to average in a southward direction. There was minimal snowpack in interior British Columbia, which resulted in drier conditions compared to 2023. British Columbia mallard estimates were 37% above the 2023 estimate and 22% above the long-term average. Conditions across Washington remained below normal. The west side was categorized mostly as abnormally dry to a smaller area as moderate drought. The only region not in any drought status were portions of the Chehalis stratum. East side habitat conditions were improved from 2023, one of the driest years on record, but still had a large area in abnormally dry to moderate drought status. The Irrigated stratum was the wettest region and not in any drought status. Oregon snowpack was near average in western Oregon and the Cascade eastern slopes, above average in the southeast, and slightly below average in northeast watersheds. Improved habitat conditions were observed in eastern Oregon basins after a second consecutive year of average to above-average winter precipitation. Western Oregon habitat conditions are less affected by snowpack but are typically correlated with low-elevation rain that charges Willamette Valley wetlands. There was minimal rainfall in the month prior to the survey and the lack of sheet water and flooded ditches was noticeable. Precipitation was near long-term average across all California strata. Central Valley water storage levels were at or above historical averages for all reservoirs except San Luis, which was 94% of its historical average. Water allocations for wetland

management was 100% for all Central Valley Project management areas. Klamath Basin National Wildlife Refuge Complex in northeastern California water allocation was currently unknown; however, water deliveries were expected to remain limited. Other areas in northeastern California should have adequate water supply for wetland management.

The midwestern U.S. was dry in the west but improved as spring progressed and generally wet across the Great Lakes region. Minnesota started early spring 2024 severely dry and in poor condition, with the worst habitat conditions in northcentral Minnesota. By mid-May, above-average precipitation had made the southern half of the state very wet and the northern half about normal. The entire state was very wet by late spring, with flooding conditions in many places. Habitat conditions were classified as good north of a line from Duluth to St. Cloud to East Grand Forks and excellent across the remainder of Minnesota. However, considering a much earlier than normal ice-out throughout most of the state and dry conditions settling was likely poor and improved habitats only benefitted late-nesting birds. Michigan habitat conditions remained good to excellent across the state, with fair conditions found in the western Upper Peninsula and along the Lake Michigan shoreline in the Upper Peninsula and northern Lower Peninsula. The statewide wetland index increased slightly (2%) since 2023 and was 3% above its long-term average. Great Lakes water levels remained above to well above their long-term average, except Lake Superior which was slightly below its long-term average. Similar to Minnesota, Wisconsin was drier compared to 2023, however, both linear and non-linear wetland types remained well above their long-term average. Excellent production was expected.

The early part of spring in the Atlantic Flyway, particularly March, was wetter and warmer than normal. Temperatures and precipitation were normal in April and May 2024, resulting in good-to-excellent breeding-habitat conditions in the flyway.

References

Link, W. A., and J. R. Sauer. 2002. A hierarchical analysis of population change with application to Cerulean warblers. Ecology 83:2832–2840.

Martin, T. G., B. A. Wintle, J. R. Rhodes, P. M. Kuhnert, S. A. Field, S. J. Low-Choy, A. J. Tyre, H. P. Possingham, and M. Anderson. 2005. Zero tolerance ecology: improving ecological inference by modeling the source of zero observations. Ecology Letters 8:1235–1246.

North American Waterfowl Management Plan Committee. 2024. Draft 2024 North American Waterfowl Management Plan Update. Technical report. URL `https://nawmp.org/sites/default/files/2024-04/nawmp_2024_update_draft-4-5-24.pdf`.

Sauer, J. R., and S. Droege. 1990. Wood duck population trends from the North American Breeding Bird Survey. Pages 159–165 *in* L. H. Fredrickson, G. V. Burger, S. P. Havera, D. A. Graber, R. E. Kirby, and T. S. Taylor, editors. Proceedings of the 1988 North American Wood Duck Symposium, 20–22 February 1988. St. Louis, MO.

Sauer, J. R., G. S. Zimmerman, J. D. Klimstra, and W. A. Link. 2014. Hierarchical Model Analysis of the Atlantic Flyway Breeding Waterfowl Survey. Journal of Wildlife Management 78:1050–1059.

Smith, G. W. 1995. A critical review of the aerial and ground surveys of breeding waterfowl in North America. U.S. Department of Interior Biological Science Report 5, Washington, D.C.

Zimmerman, G. S., J. R. Sauer, W. A. Link, and M. Otto. 2012. Composite analysis of black duck breeding population surveys in eastern North America. Journal of Wildlife Management 76:1165–1176.

Status of Geese and Swans

This section summarizes information on the status of goose and swan populations in North America. Information was compiled from a broad geographic area and is provided to assist managers in regulating harvest. Most populations of geese and swans in North America nest in the Arctic and Subarctic regions of Alaska and northern Canada (Figure 6), but several Canada goose (*Branta canadensis*) populations nest in temperate regions of the United States and southern Canada ("temperate-nesting" populations). Arctic-nesting geese rely predominantly on stored reserves for egg production. Thus, persistent snow cover reduces nest site availability, delays nesting activity, and often results in depressed reproductive effort and productivity. In general, goose productivity will be above average if nesting begins by late May in western and central portions of the Arctic and by early June in the eastern Arctic. Production usually is poor if nest initiation is delayed much beyond 15 June. For temperate-nesting Canada goose populations, productivity is generally less variable among years, but recruitment can be affected by local factors such as drought or weather events.

Methods

We have used common nomenclature for various goose and swan populations, but they may differ from other published information. Species nomenclature follows the List of Migratory Birds in Title 50 of the Code of Federal Regulations, Section 10.13, revised 31 July 2023 (88 FR 49310). Some of the goose populations described herein are composed of more than one subspecies, and some light goose populations contain two species (i.e., snow and Ross's geese). Population estimates for geese (Appendices C.1, C.2, and C.3) are derived from a variety of surveys conducted by biologists from federal, state, and provincial agencies, or from universities (Appendices A.2). Surveys include the Waterfowl Breeding Population and Habitat Survey (WBPHS), the Midwinter Survey (MWS), the Yukon–Kuskokwim Delta (YKD) Coastal Zone Survey, the Arctic Coastal Plain (ACP) Survey, and surveys that are specifically designed for various goose populations. Where survey methodology allowed, 95% confidence intervals were calculated. Trends of population estimates were calculated by regressing the natural logarithms of survey results on year, and slope coefficients were presented and tested for equality to zero (t-statistic). Changes in population indices between the most recently available and previous years were calculated and, where possible, assessed with a two-tailed z-test using the sum of sampling variances for the two estimates. All statistical tests and analyses were conducted using an alpha level of 0.05. Primary abundance indices used as management plan population objectives are described, graphed, and included in appendices. Beginning in 2019, we only report the primary abundance indices for goose populations. Other survey information can be found in the Flyway Databooks at: `https://fws.gov/library/collections/migratory-bird-flyway-data-books`. Information was the best available at the time of finalizing this report but can differ from final estimates or observed conditions.

Results and Discussion

Conditions in the Arctic and Subarctic

In 2024, spring phenology was early or average across most areas in Alaska and the Canadian Arctic and Subarctic, similar to 2023. Many areas across the Canadian Arctic and Subarctic experienced above-average temperatures during May and June. The snow and ice cover graphics

Figure 6. Important goose and swan nesting areas in Arctic and Subarctic North America.

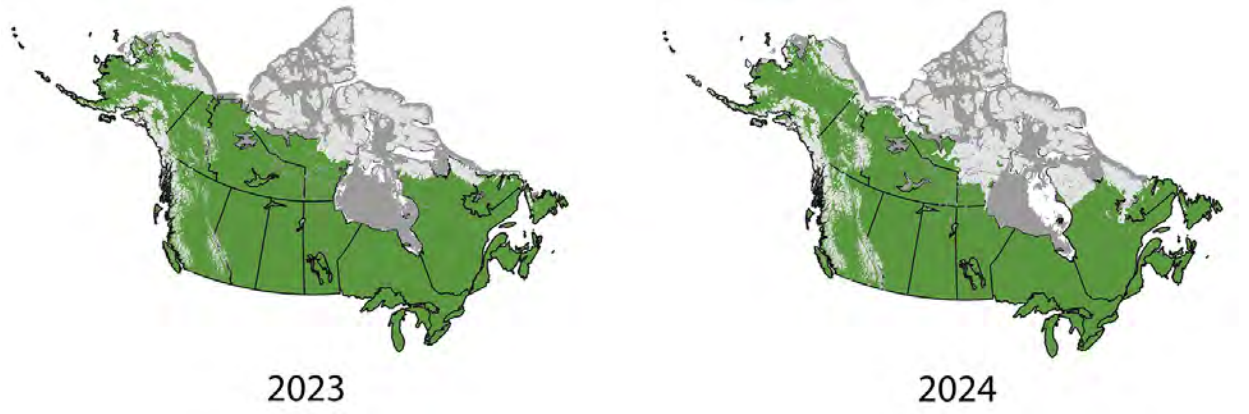

Figure 7. The extent of snow (light gray) and ice (dark gray) cover in North America on 2 June 2023 and 2 June 2024 (National Ice Center 2024).

(Figure 7) illustrate that ice or snow cover on 2 June 2024 compared to the same date in 2023 was similar in Alaska and the western and central Canadian Arctic and Subarctic and more extensive in the eastern Canadian Arctic and Subarctic (National Ice Center 2024).

Conditions in Southern Canada and the United States

In 2024, habitat conditions in the lower 48 U.S. states and southern Canada improved in many areas compared to 2023. Precipitation during late spring and early summer in western and central states and provinces generally improved ongoing drought conditions, although habitat conditions still remained below-average in some areas. Biologists noted early spring phenology among many areas in the Central, Mississippi, and Atlantic Flyways and above-average precipitation in some central, upper midwest, and southeastern states.

Description of Populations and Primary Monitoring Surveys

Canada and Cackling Geese

See Figure 10, Table 14, and Appendices C.1.

North Atlantic Population

North Atlantic Population Canada geese (NAP) principally nest in Newfoundland and Labrador. They commingle during winter with other Atlantic Flyway Canada goose populations, although NAP Canada geese have a more coastal distribution than other populations (Figure 8). In 2016, biologists revised the index used to monitor this population to a composite estimate that combines data from both the Canadian Wildlife Service (CWS) helicopter plot survey and the WBPHS (strata 66, 67, and 70). The new composite time series is updated annually due to the estimation procedure. Estimates presented are mean and 2.5% and 97.5% Bayesian credible intervals.

Atlantic Population

Atlantic Population (AP) Canada geese nest throughout much of Quebec, especially along Ungava Bay, the eastern shore of Hudson Bay, and on the Ungava Peninsula. This population winters from New England to South Carolina, but the largest concentrations occur on the Delmarva Peninsula (Figure 8). This population is monitored by a spring survey of the Ungava Peninsula in northern Quebec (Atlantic Flyway Council 2008).

Atlantic Flyway Resident Population

Atlantic Flyway Resident Population Canada geese (AFRP) were introduced and established throughout the Atlantic Flyway during the early 20^{th} century and are composed of various subspecies. This population of large Canada geese inhabits all states of the Atlantic Flyway and southern portions of Quebec and the Maritime provinces (Figure 8). The breeding population is estimated during the spring via the Atlantic Flyway Breeding Waterfowl Plot Survey (Atlantic Flyway Council 2011).

Southern Hudson Bay Population

Southern Hudson Bay Population Canada geese (SHBP) nest in the Hudson Bay Lowlands, on Akimiski Island, and along the eastern and southern portions of Hudson and James Bays, and they concentrate during fall and winter throughout Manitoba, Ontario, and the Mississippi Flyway states (Figure 8). SHBP Canada geese are comprised of the former Southern James Bay, Mississippi Valley, and Eastern Prairie Populations of Canada geese. In 2016 a new aerial survey was developed to monitor SHBP Canada geese along the south and west coastal areas of the Hudson and James Bays (Mississippi Flyway Council 2021*a*).

Mississippi Flyway Giant Population

Mississippi Flyway Giant Population Canada geese (MFGP) nest in the Mississippi Flyway states and in southern Ontario and southern Manitoba. Giant Canada geese were reestablished or introduced in all Mississippi Flyway states (Figure 8), and they now represent a large proportion of all Canada geese in the Mississippi Flyway. The total population is estimated during spring surveys within the Mississippi Flyway states and provinces (Mississippi Flyway Council 2021*a*).

Western Prairie and Great Plains Populations (WPP/GPP)

WPP Canada geese nest in eastern Saskatchewan and western Manitoba. GPP Canada geese are composed of large Canada geese resulting from restoration efforts in Saskatchewan, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. These two populations are managed jointly. Geese from these breeding populations commingle during migration and winter with Canada geese from other populations (Figure 8). The WBPHS (strata 21–25, 31, 34–40, 43–49) provides indices of this population within its primary breeding range.

Midcontinent Cackling Geese

Midcontinent cackling geese (*B. hutchinsii*) nest across the Canadian Arctic and winter throughout the Central and Mississippi Flyways (Figure 8). Lincoln estimates of the adult cohort are the primary management indices for this population. Lincoln estimates are derived from annual estimates of total harvest and harvest rate and represent an indirect measure of abundance. Due to the methodology, Lincoln estimates are typically not available from the most recent years. Alternative nomenclature, Central Flyway Arctic Nesting geese (Central and Mississippi Flyway Councils 2013), has also been used for this population.

Hi-line Population (HLP)

HLP Canada geese nest in southeastern Alberta, southwestern Saskatchewan, eastern Montana and Wyoming, and Colorado. This population winters in these states and New Mexico (Figure 8). A breeding index of HLP geese is based on the WBPHS estimates from portions of Alberta (strata 26–29), Saskatchewan (strata 30, 32, 33), and Montana (strata 41–42; Central Flyway Council 2010).

Western Population (WP)

WP Canada geese nest and winter in the Pacific Flyway west of the Rocky Mountains from northern Alberta and British Columbia to southern California and Arizona (Figure 8). The Pacific Flyway Council updated the management plan for WP Canada geese in 2023, which

replaced prior management guidelines for Pacific and Rocky Mountain Populations of Canada geese. An index of breeding WP geese is based on standardized surveys in British Columbia, Washington, Oregon, and California and the WBPHS estimates from strata 76 in Alberta, portions of strata 26–29 in Alberta, and portions of strata 41–42 in Montana (Pacific Flyway Council 2023).

Dusky Canada Geese

Dusky Canada geese nest on the Copper River Delta of south-central Alaska and winter in the Willamette and Lower Columbia River Valleys of Oregon and Washington (Figure 8). Dusky Canada geese are surveyed on their breeding grounds on the Copper River Delta and Middleton Island, Alaska (Pacific Flyway Council 2015).

Cackling/minima Cackling Geese

Cackling/minima cackling geese nest on the YKD of western Alaska and primarily winter in the Willamette and Lower Columbia River Valleys of Oregon and Washington (Figure 8). The total fall population is estimated from counts of adults during the YKD Coastal Zone Survey during the spring, expanded by a ratio derived from neck-collared individuals observed in the fall and winter (Pacific Flyway Council 2016*a*).

Lesser Canada Geese

Lesser Canada geese nest throughout interior and south-central Alaska and winter in Washington, Oregon, and California (Figure 8). Population indices are based on WBPHS estimates in stratum 1 (Kenai–Susitna), stratum 2 (Nelchina), stratum 3 (Tanana–Kuskokwim), stratum 4 (Yukon Flats), and stratum 12 (Old Crow Flats).

Taverner's Cackling Geese

Taverner's cackling geese nest throughout tundra areas of the North Slope and western Alaska and winter in Washington, Oregon, and California (Figure 8). Population indices are derived from three breeding survey efforts: the Arctic Coastal Plain Survey, the YKD Coastal Zone Survey, and the WBPHS (stratum 9 [inland portions of the YKD], stratum 10 [Seward Peninsula], and stratum 11 [Kotzebue Sound]).

Aleutian Cackling Geese

Aleutian cackling geese nest primarily on the Aleutian Islands and winter along the Pacific Coast as far south as central California (Figure 8). The total population during the fall and winter is estimated from mark-resight observations of neck-banded geese (Pacific Flyway Council 2006*a*).

Light Geese

See Figure 11, Table 15, and Appendices C.2.

The term light geese collectively refers to Ross's geese (*Anser rossii*) and both the lesser (*A. caerulescens caerulescens*) and greater (*A. c. atlantica*) snow goose subspecies (including all hybrids and both white and blue color phases). There are three populations of lesser snow geese based on their breeding ranges (Wrangel Island, Western Arctic, and Midcontinent). Lesser snow geese and Ross's geese occur in many wintering areas together and are not typically differentiated during the Midwinter Survey, so we report indices of light geese from this survey.

Ross's Geese

Ross's geese nest primarily in the Queen Maud Gulf region, but increasing numbers are nesting in other areas of the central and eastern Arctic and along the western coast of Hudson Bay. Ross's geese primarily winter in California, New Mexico, Texas, and Mexico, with increasing numbers wintering in other portions of the Central and Mississippi Flyways (Figure 9). The management plan for Ross's geese was updated in 2021 (Mississippi Flyway Council 2021*b*), and Lincoln estimates of the adult cohort are now the primary management indices.

Midcontinent Population (MCP)

MCP lesser snow geese winter in the Central and Mississippi Flyways and nest primarily from Banks Island in the western Arctic to Baffin Island in the eastern Arctic (Figure 9). The management plan for MCP lesser snow geese was updated in 2018 and replaced prior management guidelines for MCP and Western Central Flyway Population (WCFP; wintering population) lesser snow geese (Mississippi Flyway Council 2018, Central Flyway Council 2018). Lincoln estimates of the adult cohort are now the primary management indices.

Western Arctic (WA) and Wrangel Island (WI) Populations

Lesser snow geese in the Pacific Flyway originate from nesting colonies in the western and central Arctic and on Wrangel Island, Russia. WA lesser snow geese nest primarily on Banks Island, with smaller colonies in coastal areas of the Northwest Territories, and along the Alaskan Arctic Coastal Plain. WI lesser snow geese nest on Wrangel Island. WA and WI lesser snow geese mix during winter and also occur with MCP lesser snow geese and Ross's geese. WA lesser snow geese primarily winter in central and southern California, the western Central Flyway, and the northern highlands of Mexico. WI lesser snow geese principally winter in the Skagit–Fraser River Deltas in British Columbia and Washington and in northern and central California (Figure 9). Light geese in the Pacific Flyway (Pacific Flyway Population) are indexed by fall and winter surveys in California, Oregon, Washington and British Columbia. Breeding ground surveys are periodically conducted for WA (Pacific Flyway Council 2013) and WI lesser snow geese (Pacific Flyway Council 2006*b*).

Greater Snow Geese

Greater snow geese nest on Bylot, Axel Heiberg, Ellesmere, and Baffin Islands, and in Greenland, and winter along the Atlantic coast from New Jersey to North Carolina (Figure 9). This population is monitored on spring staging areas near the St. Lawrence Valley in Quebec by an annual aerial photographic survey (Atlantic Flyway Council 2009).

Greater White-fronted Geese

See Figure 12, Table 16, and Appendices C.3.

Pacific Population

Pacific Population greater white-fronted geese (*A. albifrons*) primarily nest on the YKD in Alaska and winter in the Central Valley of California (Figure 9). This population is monitored using a predicted fall population index, which is based on the number of indicated total birds from the YKD Coastal Zone Survey and the WBPHS in the Bristol Bay area (stratum 8) and interior portions of the YKD (stratum 9) and expanded by a factor derived from the correlation of these indices with past fall counts in Oregon and California (Pacific Flyway Council 2003).

Midcontinent Population

Midcontinent Population greater white-fronted geese nest from central and northwestern Alaska to the west coast of Hudson Bay and the Melville Peninsula. This population concentrates in southern Saskatchewan and Alberta during the fall and in southern Central and Mississippi Flyway states and Mexico during the winter (Figure 9). The management plan for this population was updated in 2023, and Lincoln estimates of the adult cohort are now the primary management indices (Central, Mississippi, and Pacific Flyway Councils 2023).

Brant

See Figure 12, Table 16, and Appendices C.3.

Atlantic Brant

Atlantic brant (*B. bernicla hrota*) primarily nest on islands in the eastern Canadian Arctic and winter along the Atlantic Coast from Massachusetts to North Carolina (Figure 9). The Midwinter Survey provides an index of

this population within its winter range in the Atlantic Flyway (Atlantic Flyway Council 2002).

Pacific Brant

Pacific brant include black brant (*B. b. nigricans*) and western high arctic brant (*B. b. hrota*). Black brant nest across the YKD and North Slope in Alaska, Banks Island, other islands of the western and central Arctic, the Queen Maud Gulf, and Russia. They stage during fall at Izembek Lagoon, Alaska, and winter as far south as Mexico. Western high arctic brant nest on the Parry Islands of the Northwest Territories and Nunavut. They stage during fall at Izembek Lagoon, Alaska, and predominantly winter in the Padilla, Samish, and Fidalgo Bays of Washington and near Boundary Bay, British Columbia, although some individuals have been observed as far south as Mexico (Figure 9). Fall and winter counts in the U.S., Canada, and Mexico are the primary management indices for PACB (Pacific Flyway Council 2018).

Emperor Geese

Emperor geese (*A. canagica*; Figure 12, Table 16, and Appendices C.3) breed along coastal areas of the Bering Sea, with the largest concentration on the YKD in Alaska. Emperor geese stage along the Alaska Peninsula during the fall and spring and winter along the Aleutian Islands (Figure 9). This population is monitored during spring by the YKD Coastal Zone Survey (Pacific Flyway Council 2016*b*).

Swans

See Figure 12, Table 16, and Appendices C.3.

Western Population Tundra Swans

Western Population tundra swans (*Cygnus columbianus*) nest along the coastal lowlands of western Alaska, and the YKD is a primary breeding area. Western Population tundra swans primarily winter in California, Utah, and the Pacific Northwest (Figure 9). The management plan for Western Population tundra swans was updated in 2017, and the primary management indices are derived from the YKD Coastal Zone Survey and the WBPHS (stratum 8 [Bristol Bay], stratum 9 [inland portions of the YKD], stratum 10 [Seward Peninsula], and stratum 11 [Kotzebue Sound]; Pacific Flyway Council 2017).

Eastern Population Tundra Swans

Eastern Population tundra swans nest from the Seward Peninsula of Alaska to the northeast shore of Hudson Bay and Baffin Island. The Mackenzie River Delta and adjacent areas in the Northwest Territories are of particular importance. This population predominantly winters in coastal areas from Maryland to North Carolina (Figure 9). The Midwinter Survey provides an index of this population within its winter range of the Atlantic and Mississippi Flyways (Atlantic, Mississippi, Central, and Pacific Flyway Councils 2007).

Trumpeter Swans

Trumpeter swans (*C. buccinator*) nest south of the Brooks Range and east of the YKD in Alaska and within localized areas of Yukon Territory, western Northwest Territories, southern Canadian provinces from British Columbia to Quebec, and some northern U.S. states from Washington to New York. There are three recognized North American populations: the Pacific Coast, Rocky Mountain, and Interior Populations. Trumpeter swan information can be found at: `https://www.fws.gov/species/trumpeter-swan-cygnus-buccinator`.

References

Atlantic Flyway Council. 2002. Atlantic Brant Management Plan.

Atlantic Flyway Council. 2008. A Management Plan for the Atlantic Population of Canada Geese.

Atlantic Flyway Council. 2009. Management Plan for Greater Snow Geese in the Atlantic Flyway.

Atlantic Flyway Council. 2011. Atlantic Flyway Resident Canada Goose Management Plan.

Atlantic, Mississippi, Central, and Pacific Flyway Councils. 2007. Management Plan for the Eastern Population of Tundra Swans.

Central and Mississippi Flyway Councils. 2013. Management Guidelines for the Central Flyway Arctic Nesting Canada Geese.

Central Flyway Council. 2010. Management Guidelines for Hi-Line Canada Geese.

Central Flyway Council. 2018. Management Guidelines for Midcontinent Lesser Snow Geese in the Central Flyway.

Central, Mississippi, and Pacific Flyway Councils. 2023. Management Plan for Midcontinent Greater White-fronted Geese.

Mississippi Flyway Council. 2018. Management Plan for Midcontinent Lesser Snow Geese in the Mississippi Flyway.

Mississippi Flyway Council. 2021*a*. A Management Plan for Mississippi Flyway Canada Geese.

Mississippi Flyway Council. 2021*b*. Management Plan for Ross's Geese in the Mississippi Flyway.

National Ice Center. 2024. IMS daily Northern Hemisphere snow and ice analysis at 1 km and 4 km resolution. Digital media. URL `https://nsidc.org/data/g02156/`.

Pacific Flyway Council. 2003. Pacific Flyway Management Plan for the Greater White-fronted Goose.

Pacific Flyway Council. 2006*a*. Pacific Flyway Management Plan for the Aleutian Goose.

Pacific Flyway Council. 2006*b*. Pacific Flyway Management Plan for the Wrangel Island Population of Lesser Snow Geese.

Pacific Flyway Council. 2013. Pacific Flyway Management Plan for the Western Arctic Population of Lesser Snow Geese.

Pacific Flyway Council. 2015. Pacific Flyway Management Plan for the Dusky Canada Goose.

Pacific Flyway Council. 2016*a*. Management Plan for the Cackling Canada Goose.

Pacific Flyway Council. 2016*b*. Management Plan for the Emperor Goose.

Pacific Flyway Council. 2017. Management Plan for the Western Population of Tundra Swans.

Pacific Flyway Council. 2018. Management Plan for the Pacific Population of Brant.

Pacific Flyway Council. 2023. Management Plan for the Pacific Flyway Population of Western Canada Geese.

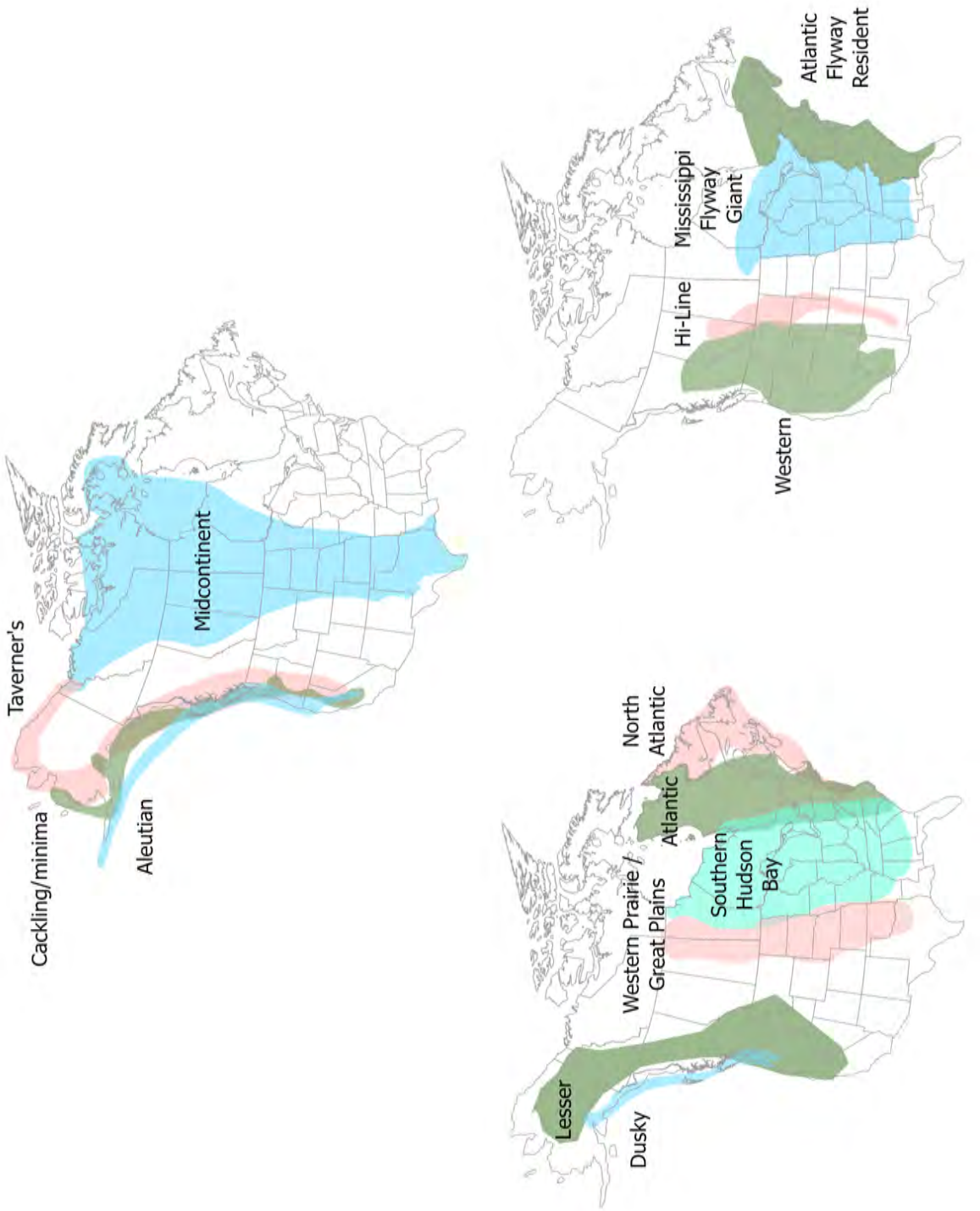

Figure 8. Approximate ranges of Canada and cackling goose populations in North America.

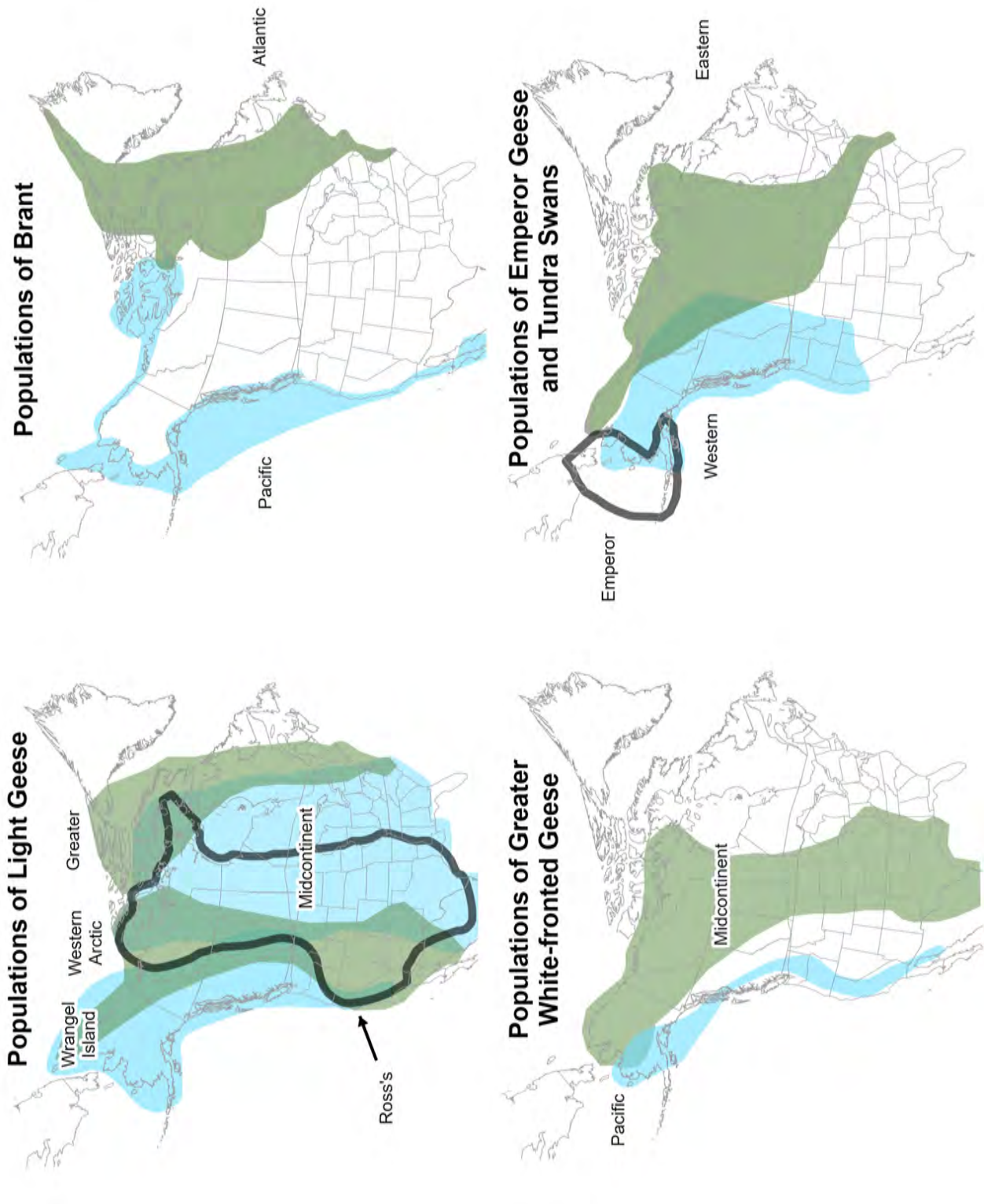

Figure 9. Approximate ranges of light goose, brant, greater white-fronted goose, emperor goose, and tundra swan populations in North America.

Table 14. Canada and cackling goose indices (in thousands) from primary monitoring surveys.

	Estimate/Count		Change from 2023		10-year Trend	
Population	2024	2023	%	*P*	%/yr[a]	*P*
North Atlantic	54	48	+12	0.642	0	0.972
Atlantic	89	115	–23	0.082	–5	0.071
Atlantic Flyway Resident	933	948	–2	0.898	0	0.893
Southern Hudson Bay	–	95	–	–	–	–
Mississippi Flyway Giant	1,340	1,342	0	–	–1	0.190
Western Prairie and Great Plains	1,128	1,028	+10	0.330	–1	0.523
Midcontinent[b]	1,563	–	–	–	–7	0.037
Hi-Line	329	325	+1	0.934	–1	0.456
Western	320	387	–17	0.417	–2	0.285
Dusky	8	10	–15	0.219	–6	0.015
Cackling/minima	126	161	–21	0.013	–9	0.001
Lesser	3	–	–	–	–6	0.525
Taverner's	38	30	+29	0.187	–3	0.102
Aleutian	194	193	+1	0.983	+1	0.537

[a] Rounded values mask change in estimates.
[b] Years presented refer to year – 2.

Table 15. Light goose (Ross's and snow goose) indices (in thousands) from primary monitoring surveys.

	Estimate/Count		Change from 2023		10-year Trend	
Population	2024	2023	%	*P*	%/yr	*P*
Ross's geese[a]	1,100	–	–	–	–13	0.027
Midcontinent Population lesser snow geese[a]	4,742	–	–	–	–15	0.002
Pacific Flyway Population light geese	–	1,270	–	–	–	–
Wrangel Island Population lesser snow geese	–	–	–	–	–	–
Greater snow geese	628	585	+7	0.006	–4	0.015

[a] Years presented refer to year – 2.

Table 16. Greater white-fronted goose, brant, emperor goose, and tundra swan indices (in thousands) from primary monitoring surveys.

	Estimate/Count		Change from 2023		10-year Trend	
Population	2024	2023	%	*P*	%/yr	*P*
White-fronted goose						
Pacific Population	423	432	−2	0.879	−5	0.048
Midcontinent Population[a]	1,338	3,236	−59	0.001	−7	0.059
Brant						
Atlantic	113	122	−7	–	−3	0.186
Pacific	108	120	−10	–	−2	0.243
Emperor goose	19	24	−23	0.003	−4	0.015
Tundra swan						
Western	74	73	+2	0.895	−6	0.009
Eastern	64	138	−53	–	−4	0.153

[a] Years presented refer to year − 2.

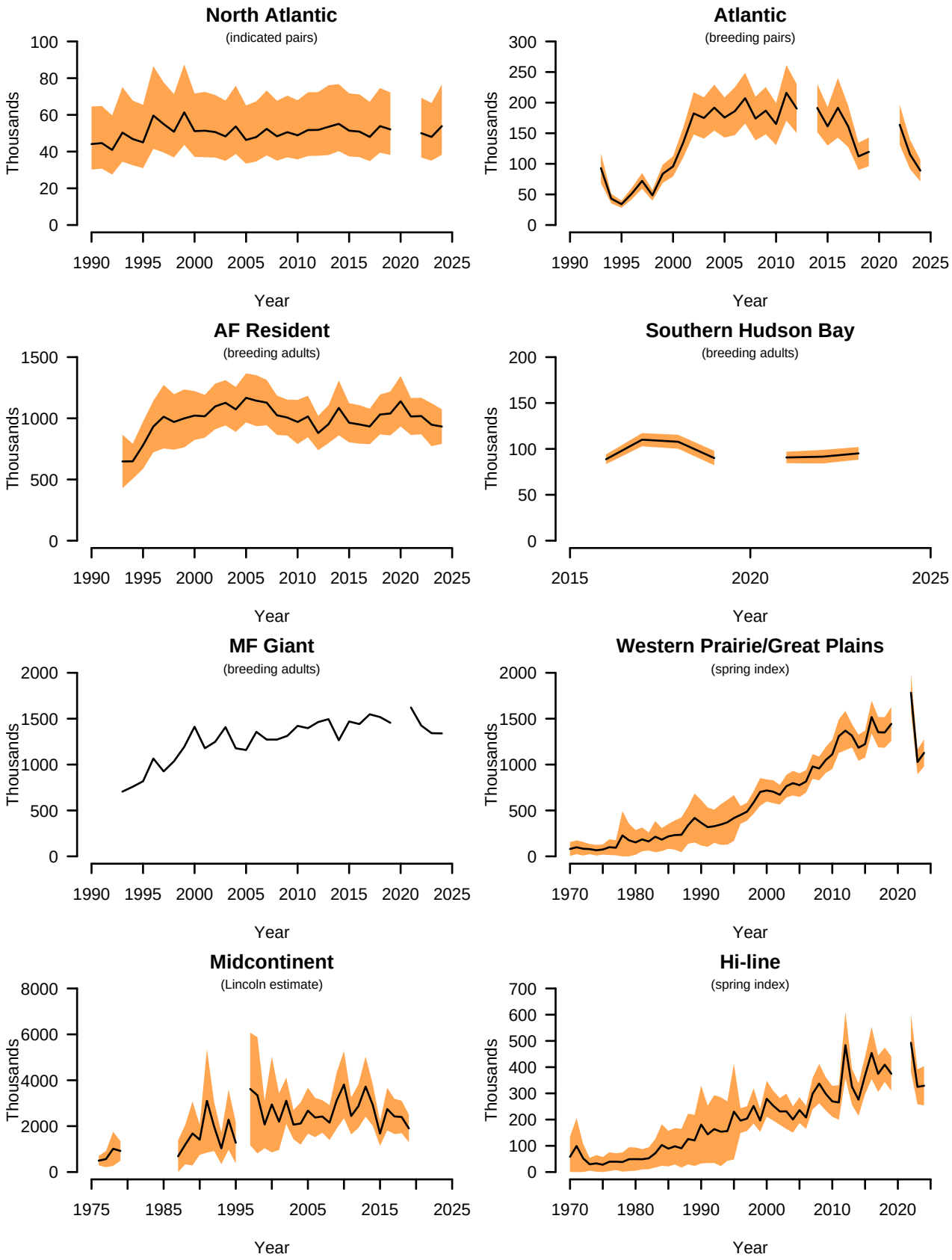

Figure 10. Abundance indices (and 95% confidence intervals, where applicable) of Canada and cackling goose populations based on primary management surveys.

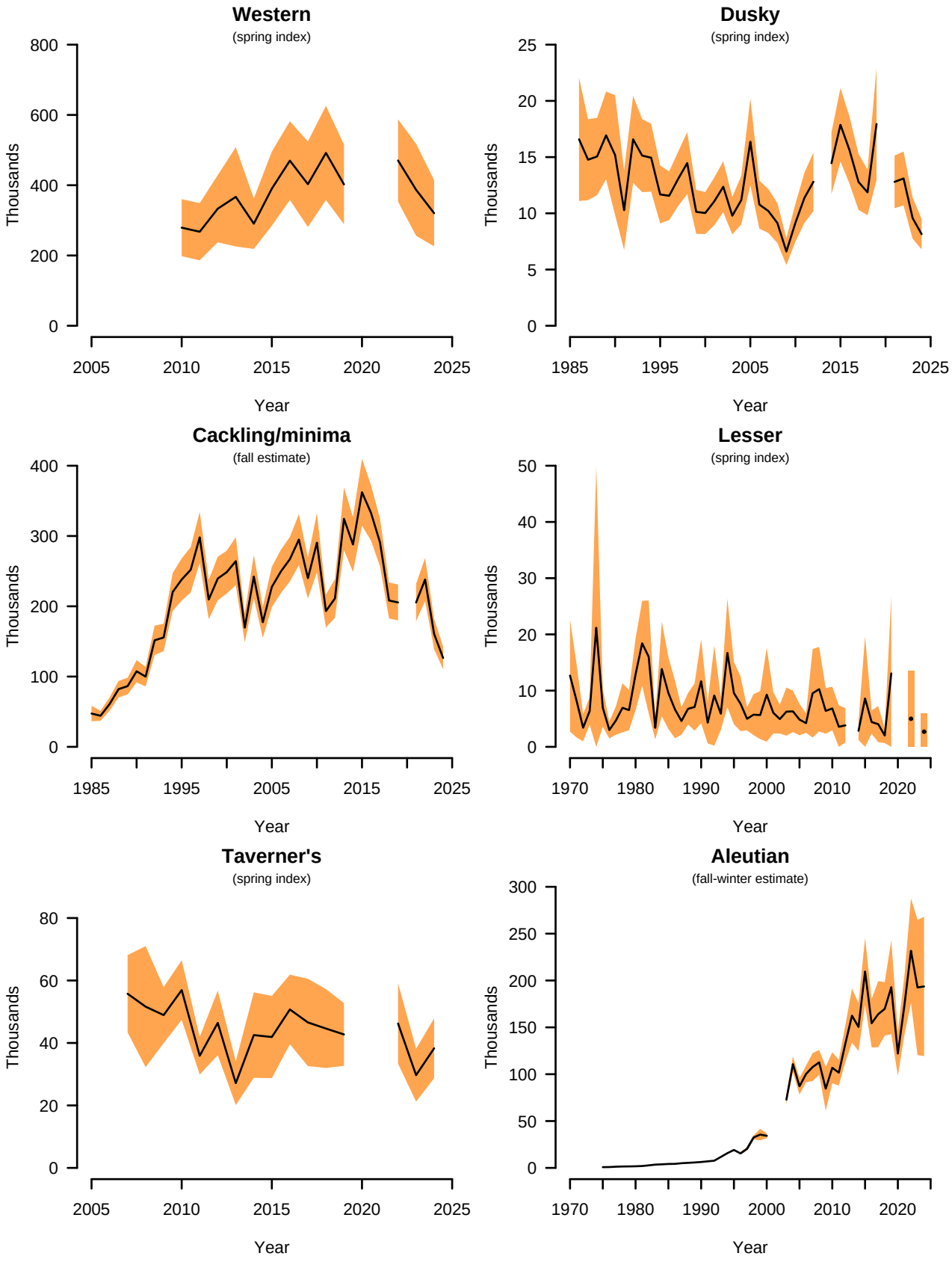

Figure 10. Continued.

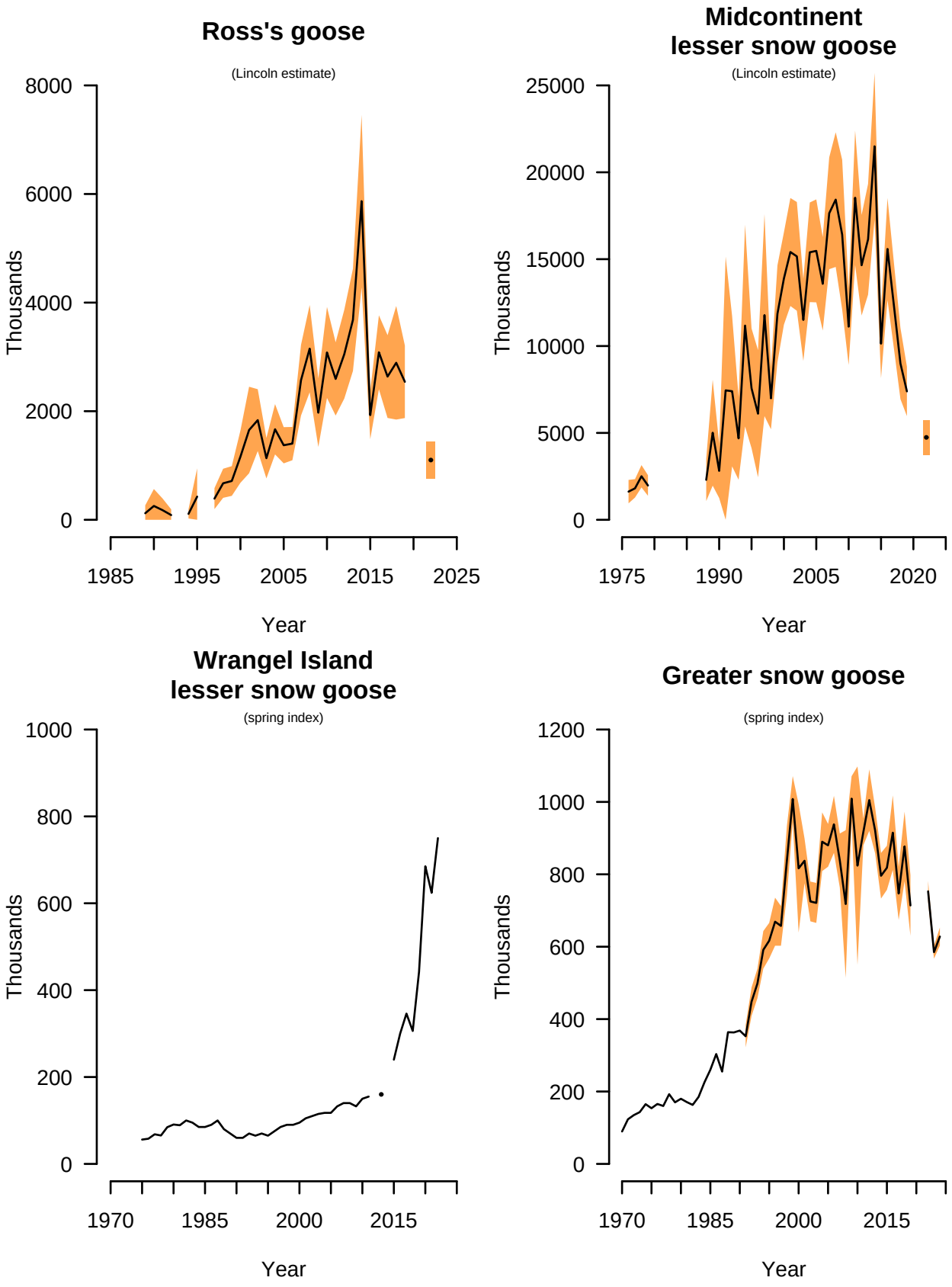

Figure 11. Abundance indices (and 95% confidence intervals, where applicable) of light goose (Ross's and snow goose) populations based on primary management surveys.

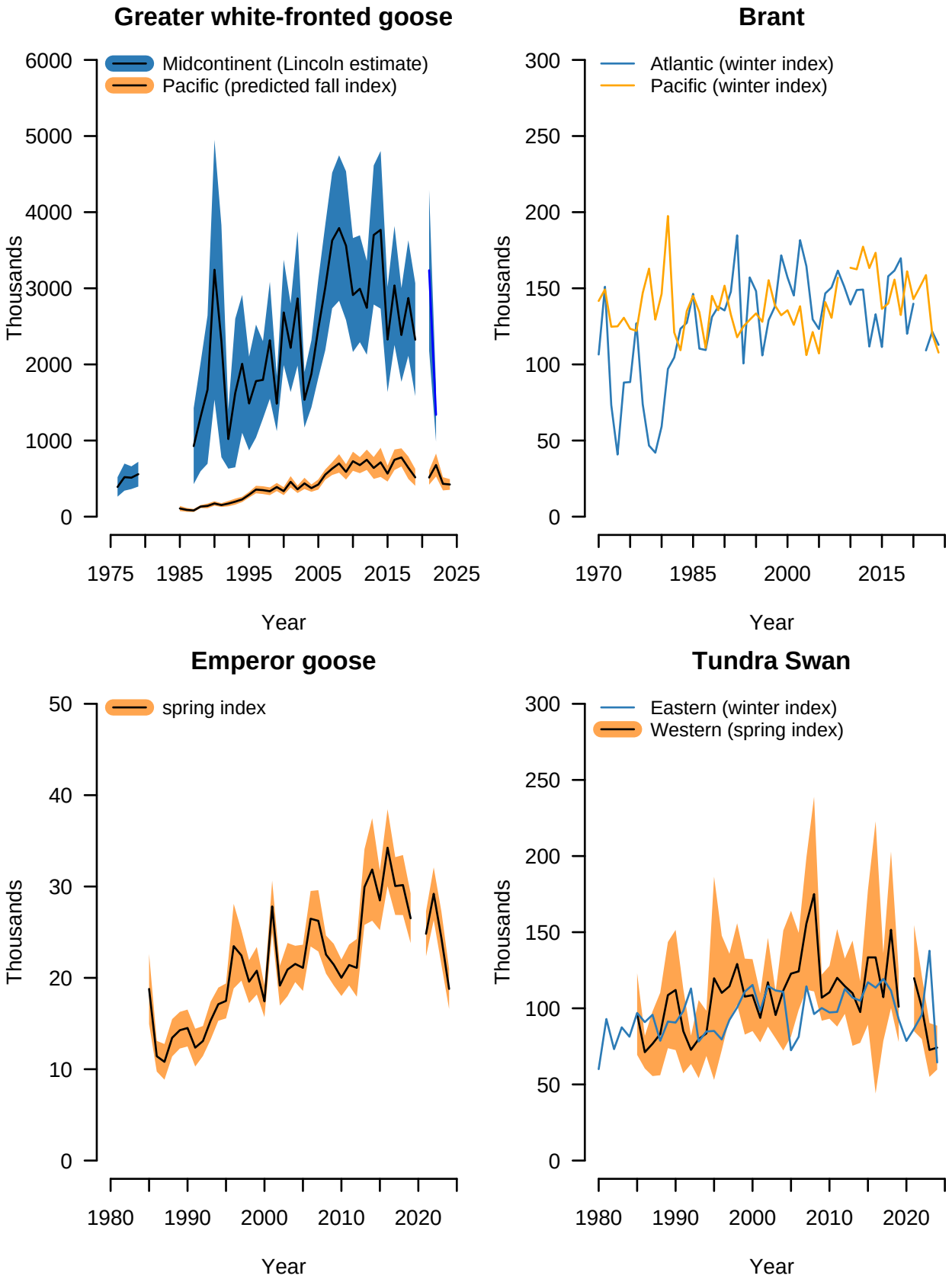

Figure 12. Abundance indices (and 95% confidence intervals, where applicable) of greater white-fronted goose, brant, emperor goose, and tundra swan populations based on primary management surveys.

A. Individuals who supplied information for the generation of this report

A.1: Individuals who supplied information on the status of ducks.

Alaska, Yukon Territory, and Old Crow Flats (Strata 1–12)

Air	H. Wilson and W. Schock
Air	B. Nigus and T. Zeller

Northern Alberta, Northeastern British Columbia, and Northwest Territories (Strata 13–18, 20, and 77)

Air	G. Wilkerson and P. Stinson

Northern Saskatchewan and Northern Manitoba (Strata 21–25)

Air	W. Rhodes and C. Cain

Southern and Central Alberta (Strata 26–29, 75, and 76)

Air	R. Spangler, J. Sands, and S. Barlow
Ground	G. Raven[a], J. Caswell[b], E. Beck[a], G. Mack[b], D. Gettis[a], J. Melsted[a], C. Lietz[a], and D. Raven[a]

Southern Saskatchewan (Strata 30–33)

Air	P. Thorpe and S. Chandler
Ground	B. Bartzen[a], C. DeMeyer[a], F. Moore[a], B. Arsenault[a], J. Raccio[a], H. Johnston[a], M. Tan[a], E.Ramirez-Hughes[a], A. Fisher[a], and P. Bergen[a]

Southern Manitoba (Strata 34–40)

Air	S. Yates and S. Salvevold
Ground	M. Schuster[a], J. Leafloor[a], F. Baldwin[a], P. Bergen[a], R. Bruce[a], O. Andrushuk[a], H. Singer[c]

Montana and Western Dakotas (Strata 41–44)

Air	P. Thorpe and S. Chandler
Air	R. Spangler and J. Sands
Air	T. Liddick and J. Drahota
Ground	T. Cooper, J. Dooley, A. Ryba, and D. Fronczak

Eastern Dakotas (Strata 45–49)

Air	T. Liddick and J. Drahota
Ground	Q. Ali, S. Bishir, D. Collins, and E. Marjonen

Western Ontario and Central Quebec (Strata 50, 69–70)

Air	J. Wortham and S. Catino

Eastern Ontario and Southern Quebec (Strata 53, 56, 69)

Air	J. Rayfield, A. Zilka[d], J. Bidwell[e]

Maine and Atlantic Canada (Strata 62–67)

Air	M. Koneff and K. Richkus

Canadian Wildlife Service helicopter plot survey

Quebec	C. Lepage[a], C. Marcotte, S. Orichefsky[a], M. Tétreault[a], L. Brem[d], and P. Tajan[d]
Ontario	S. Meyer[a], R. Wood[a], D. Sadler[a], C. Sharp[a], and W. Kay[d]
New Brunswick & Nova Scotia	T. Barney[a], M. English[a], R. Johnstone[a], A. Hicks[a], and D. Johnston[d], and G. Fischer[d]
Newfoundland & Labrador	M. English[a], B. Rogers[a], C. Ward[a], and R. Johnstone[a]

British Columbia

Air	Megan Ross[b], William O'Shea[b], Kyla Bas[c], and Bruce Harrison[c]

California

Air	M. Weaver[b] and C. Brady[b]

Michigan

Air	B. Barlow[b], B. Dybas-Berger[b], C. Dole[b], C. Fedewa[b], N. Kalejs[b], T. McFadden[b], M. Richardson[b], and J. Robison[b]

Minnesota

Air	B. Geving[b] and B. Davis[b]
Ground	J. Riens, K. Spaeth, G. Dehmer, M. Fitzpatrick[b], N. Yates, W. Brininger, J. Strege[b], A. Forbes, G. Smith, L. Langston, G. Cohen, G. Smith, K. Emerson, S. Schaumann, L. Brouellette, and A. Peters

Oregon

Air	B. Reishus[b], K. Walton[b], Z. Slick[b], C. Crossley[b], J. Journey[b], and helicopter service provided by JL Aviation Inc.[d]

Washington

Air	J. Evenson[b], M. Hamer[b], M. Wilson[b], M. Kernekr[d], and T. Wild[d]

Wisconsin

Air	L. Waskow[b], T. Finger[b], P. Eyers[b] and S. Burns[b]
Ground	E. Borchert[b], E. Canania[b], M. Carlisle[b], N. Christel[b], J. Christopher[b], M. Cochran[b], J. Cotter[b], H. Docter[b], S. Easterly[b], C. Erickson[b], M. Feyereisen[b], D. Goltz[b], J. Hopp[b], R. Jaquish[b], D. Johnson[b], T. Klein[b], C. Knab[b], E. Kroening[b], A. Krsnich[b], D. Mittelstaedt[b], C. Mogen[b], K. Musser[b], E. Oskey[b], C. Rollman[b], A. Seitz[b], T. Shaurette[b], E. Snelson[b], B. Stefanski[b], T. Torstenson-Harris[b], C. Wehler[b], G. Wolf[b], B. Woodall[b], B. Woodbury[b], M. Worth[b], C. Young[b], C. Ziolkowski[b], and Z. Zuleger[b]

A.2: Individuals who supplied information on the status of geese and swans.

Flyway and Regional Survey Reports

P. Devers, J. Fischer, C. Frost, S. Olson, E. Osnas, A. Roberts, D. Safine, T. Sanders, W. Schock, M. Swaim, and H. Wilson

Information from the Waterfowl Breeding Population and Habitat Survey

See Appendix A.1

Atlantic Population Canada Geese

J. Lefebvre[a], R. Spangler, and F. St-Pierre[a]

Southern Hudson Bay Population Canada Geese

R. Brook[b]

Mississippi Flyway Population Giant Canada Geese

O. Jones[b]

Midcontinent Cackling Geese

F. Baldwin[a], J. Leafloor[a], R. Raftovich, A. Smith[a], and L. Walker[c]

Ross's Geese and Midcontinent Lesser Snow Geese

R. Alisauskas[a]

Wrangel Island Population Lesser Snow Geese

V. Baranyuk[c]

Greater Snow Geese

J. Lefebvre[a]

Midcontinent Population White-fronted Geese

J. Fischer, V. Patil[c], R. Raftovich, G. Raven[a], A. Smith[a], and L. Walker[c]

---

[a]Canadian Wildlife Service
[b]State, Provincial or Tribal Conservation Agency
[c]Ducks Unlimited Canada
[d]Other Organization
[e]U.S. Fish & Wildlife Service Retired
All others—U.S. Fish & Wildlife Service
[a]Canadian Wildlife Service
[b]State, Provincial or Tribal Conservation Agency
[c]Other Organization
All others–U.S. Fish and Wildlife Service

B. Historical estimates of May ponds and regional waterfowl populations

Table B.1. Estimated number of May ponds and standard errors (in thousands) in portions of Prairie and Parkland Canada and the northcentral U.S.

	Prairie Canada		Northcentral U.S.[a]		Total	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1961	1,977.2	165.4				
1962	2,369.1	184.6				
1963	2,482.0	129.3				
1964	3,370.7	173.0				
1965	4,378.8	212.2				
1966	4,554.5	229.3				
1967	4,691.2	272.1				
1968	1,985.7	120.2				
1969	3,547.6	221.9				
1970	4,875.0	251.2				
1971	4,053.4	200.4				
1972	4,009.2	250.9				
1973	2,949.5	197.6				
1974	6,390.1	308.3	1,840.8	197.2	8,230.9	366.0
1975	5,320.1	271.3	1,910.8	116.1	7,230.9	295.1
1976	4,598.8	197.1	1,391.5	99.2	5,990.3	220.7
1977	2,277.9	120.7	771.1	51.1	3,049.1	131.1
1978	3,622.1	158.0	1,590.4	81.7	5,212.4	177.9
1979	4,858.9	252.0	1,522.2	70.9	6,381.1	261.8
1980	2,140.9	107.7	761.4	35.8	2,902.3	113.5
1981	1,443.0	75.3	682.8	34.0	2,125.8	82.6
1982	3,184.9	178.6	1,458.0	86.4	4,642.8	198.4
1983	3,905.7	208.2	1,259.2	68.7	5,164.9	219.2
1984	2,473.1	196.6	1,766.2	90.8	4,239.3	216.5
1985	4,283.1	244.1	1,326.9	74.0	5,610.0	255.1
1986	4,024.7	174.4	1,734.8	74.4	5,759.5	189.6
1987	2,523.7	131.0	1,347.8	46.8	3,871.5	139.1
1988	2,110.1	132.4	790.7	39.4	2,900.8	138.1
1989	1,692.7	89.1	1,289.9	61.7	2,982.7	108.4
1990	2,817.3	138.3	691.2	45.9	3,508.5	145.7
1991	2,493.9	110.2	706.1	33.6	3,200.0	115.2
1992	2,783.9	141.6	825.0	30.8	3,608.9	144.9
1993	2,261.1	94.0	1,350.6	57.1	3,611.7	110.0
1994	3,769.1	173.9	2,215.6	88.8	5,984.8	195.3
1995	3,892.5	223.8	2,442.9	106.8	6,335.4	248.0
1996	5,002.6	184.9	2,479.7	135.3	7,482.2	229.1

Table B.1. Continued.

	Prairie Canada		Northcentral U.S.[a]		Total	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1997	5,061.0	180.3	2,397.2	94.4	7,458.2	203.5
1998	2,521.7	133.8	2,065.3	89.2	4,586.9	160.8
1999	3,862.0	157.2	2,842.2	256.8	6,704.3	301.2
2000	2,422.5	96.1	1,524.5	99.9	3,946.9	138.6
2001	2,747.2	115.6	1,893.2	91.5	4,640.4	147.4
2002	1,439.0	105.0	1,281.0	63.4	2,720.0	122.7
2003	3,522.3	151.8	1,667.8	67.4	5,190.1	166.1
2004	2,512.6	131.0	1,407.0	101.7	3,919.6	165.8
2005	3,920.5	196.7	1,460.7	79.7	5,381.2	212.2
2006	4,449.5	221.5	1,644.4	85.4	6,093.9	237.4
2007	5,040.2	261.8	1,962.5	102.5	7,002.7	281.2
2008	3,054.8	147.6	1,376.6	71.9	4,431.4	164.2
2009	3,568.1	148.0	2,866.0	123.1	6,434.0	192.5
2010	3,728.7	203.4	2,936.3	142.3	6,665.0	248.2
2011	4,892.7	197.5	3,239.5	127.4	8,132.2	235.0
2012	3,885.1	146.5	1,658.9	52.7	5,544.0	155.6
2013	4,550.5	185.5	2,341.2	99.0	6,891.7	210.2
2014	4,629.9	168.3	2,551.3	106.5	7,181.2	199.2
2015	4,151.0	146.3	2,156.8	86.0	6,307.7	169.7
2016	3,494.5	147.2	1,518.0	52.7	5,012.5	156.4
2017	4,330.3	157.7	1,765.7	92.2	6,096.0	182.7
2018	3,660.2	147.6	1,567.2	90.2	5,227.4	173.0
2019	2,855.6	103.8	2,134.7	137.3	4,990.3	172.1
2020	No Survey					
2021						
2022	3,473.5	157.5	1,983.4	98.2	5,456.9	185.6
2023	3,313.6	114.2	1,661.5	75.2	4,975.1	136.7
2024	2,681.2	117.4	2,478.2	125.5	5,159.5	171.9

[a] No comparable survey data available for the northcentral U.S. during 1961–1973.

Table B.2. Breeding population estimates (in thousands) for total ducks[a] and mallards for states, provinces, or regions that conduct spring surveys.

	British Columbia		California		Michigan		Minnesota	
Year	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard
1959								
1960								
1961								
1962								
1963								
1964								
1965								
1966								
1967								
1968							321.0	83.7
1969							323.2	88.8
1970							324.2	113.9
1971							277.1	78.5
1972							217.2	62.2
1973							389.5	99.8
1974							281.6	72.8
1975							471.6	175.8
1976							684.1	117.8
1977							501.1	134.2
1978							462.5	146.8
1979							552.4	158.7
1980							690.6	172.0
1981							439.8	154.8
1982							465.2	120.5
1983							367.1	155.8
1984							528.7	188.1
1985							562.9	216.9
1986							520.8	233.6
1987							589.0	192.3
1988							725.2	271.7
1989							813.6	273.0
1990							807.9	232.1
1991					408.4	289.3	753.7	225.0
1992			497.4	375.8	867.5	385.8	973.3	360.9
1993			666.7	359.0	742.8	437.2	837.2	305.8
1994			483.2	311.7	683.1	420.5	1,115.6	426.5
1995			589.7	368.5	791.9	524.1	797.1	319.4
1996			843.7	536.7	680.5	378.2	889.1	314.8
1997			824.3	511.3	784.0	489.3	868.1	407.4
1998			706.8	353.9	1,068.5	523.0	693.1	368.4
1999			851.0	560.1	744.6	466.1	680.5	316.4

Table B.2. Continued.

	British Columbia		California		Michigan		Minnesota	
Year	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard
2000			562.4	347.6	793.9	427.2	747.8	318.1
2001			413.5	302.2	497.8	324.2	716.4	320.6
2002			392.0	265.3	742.5	323.2	1,171.5	366.6
2003			533.7	337.1	535.4	298.9	721.8	280.5
2004			412.8	262.4	624.5	342.0	1,008.3	375.3
2005			615.2	317.9	468.3	258.1	632.0	238.5
2006	364.5	90.4	649.4	399.4	412.2	244.6	521.1	160.7
2007	383.9	98.8	627.6	388.3	641.9	337.7	488.5	242.5
2008	377.1	81.1	554.3	297.1	437.5	200.5	739.6	297.6
2009	349.7	72.5	510.8	302.0	493.6	258.9	541.3	236.4
2010	339.2	81.1	541.4	367.9	595.3	338.3	530.7	241.9
2011	277.8	69.7	558.5	314.7	471.4	258.6	687.5	283.3
2012	313.7	75.6	529.7	387.1	860.1	439.3	468.6	225.0
2013	333.6	82.9	451.3	298.6	678.6	288.4	682.9	293.2
2014	355.8	82.6	448.7	238.7	395.3	230.1	474.4	257.0
2015	365.8	81.4	315.6	173.9	431.1	237.8	524.2	206.2
2016	321.3	74.0	417.8	263.8	520.6	278.1	787.1	250.2
2017	351.3	70.9	393.7	198.4	684.5	298.1	636.0	213.6
2018	346.3	79.3	549.2	272.9	452.4	251.4	692.6	295.4
2019	409.2	74.5	470.8	239.8	333.9	179.2	694.8	286.4
2020								
2021					973.1	310.0		
2022	390.6	80.9	379.9	179.4	202.0	138.7	606.9	231.1
2023	369.1	70.8	495.4	202.1	136.4	82.7	496.0	222.2
2024	437.2	96.7	373.9	177.8	673.8	250.6	444.9	140.9

[a] Species composition for the total duck estimate varies by region.

Table B.2. Continued.

	Nevada[b]	Oregon		Washington		Wisconsin	
Year	Mallard	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard
1959	2.1						
1960	2.1						
1961	2.0						
1962	1.7						
1963	2.2						
1964	3.0						
1965	3.5						
1966	3.4						
1967	1.5						
1968	1.2						
1969	1.4						
1970	1.5						
1971	1.1						
1972	0.9						
1973	0.7					412.7	107.0
1974	0.7					435.2	94.3
1975	0.6					426.9	120.5
1976	0.6					379.5	109.9
1977	1.0					323.3	91.7
1978	0.6					271.3	61.6
1979	0.6					265.7	78.6
1980	0.9					248.1	116.5
1981	1.6					505.0	142.8
1982	1.1					218.7	89.5
1983	1.5					202.3	119.5
1984	1.4					210.0	104.8
1985	1.5					192.8	73.9
1986	1.3					262.0	110.8
1987	1.5					389.8	136.9
1988	1.3					287.1	148.9
1989	1.3					462.5	180.7
1990	1.3					328.6	151.4
1991	1.4					435.8	172.4
1992	0.9					683.8	249.7
1993	1.2					379.4	174.5
1994	1.4	323.5	116.4			571.2	283.4
1995	1.0	214.9	77.5			592.4	242.2
1996	1.7	287.5	102.2			536.3	314.4
1997	2.5	359.0	121.2			409.3	181.0
1998	2.1	341.8	124.9			412.8	186.9
1999	2.3	319.1	125.6			476.6	248.4

Table B.2. Continued.

	Nevada[b]	Oregon		Washington		Wisconsin	
Year	Mallard	Total duck	Mallard	Total duck	Mallard	Total duck	Mallard
2000	2.1	313.2	110.9			744.4	454.0
2001	2.0					440.1	183.5
2002	0.7	263.5	104.5			740.8	378.5
2003	1.7	245.5	89.0			533.5	261.3
2004	1.7	228.5	82.5			651.5	229.2
2005	0.7	208.9	74.1			724.3	317.2
2006	1.8	250.2	81.1			522.6	219.5
2007	2.1	318.8	92.5			470.6	210.2
2008	1.9	223.5	75.4			626.9	188.4
2009	12.7	185.4	72.6			502.4	200.5
2010	8.9	204.8	66.8	200.9	92.9	386.5	199.1
2011	2.3	158.0	61.6	157.1	71.4	513.7	187.9
2012	4.1	260.9	88.8	169.0	89.5	521.1	196.9
2013	8.8	250.9	84.3	157.2	74.4	527.3	181.2
2014	4.2	313.6	85.3	177.0	86.3	395.1	158.7
2015	5.5	278.7	87.4	193.1	86.4	372.8	176.2
2016	14.4	213.3	87.3	121.5	59.9	390.5	164.1
2017	6.3	238.8	71.7	242.2	103.4	479.1	180.9
2018	13.9	293.5	97.1	281.1	124.9	439.4	216.7
2019	10.0	251.0	83.9	248.3	126.2	413.7	204.3
2020							
2021		260.1	76.3			585.0	147.4
2022		344.0	79.4	219.7	87.4	647.1	185.6
2023		197.5	68.6	204.9	102.0	431.1	166.7
2024		302.1	71.0	156.0	86.4	375.1	117.7

[b] Survey redesigned in 2009, and not comparable with previous years.

Table B.3. Breeding population estimates and standard errors (in thousands) for 10 species of ducks from the traditional survey area (strata 1–18, 20–50, 75–77), 1955–2024.

	Mallard		Gadwall		American wigeon		Green-winged teal		Blue-winged teal	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1955	8,777.3	457.1	651.5	149.5	3,216.8	297.8	1,807.2	291.5	5,305.2	567.6
1956	10,452.7	461.8	772.6	142.4	3,145.0	227.8	1,525.3	236.2	4,997.6	527.6
1957	9,296.9	443.5	666.8	148.2	2,919.8	291.5	1,102.9	161.2	4,299.5	467.3
1958	11,234.2	555.6	502.0	89.6	2,551.7	177.9	1,347.4	212.2	5,456.6	483.7
1959	9,024.3	466.6	590.0	72.7	3,787.7	339.2	2,653.4	459.3	5,099.3	332.7
1960	7,371.7	354.1	784.1	68.4	2,987.6	407.0	1,426.9	311.0	4,293.0	294.3
1961	7,330.0	510.5	654.8	77.5	3,048.3	319.9	1,729.3	251.5	3,655.3	298.7
1962	5,535.9	426.9	905.1	87.0	1,958.7	145.4	722.9	117.6	3,011.1	209.8
1963	6,748.8	326.8	1,055.3	89.5	1,830.8	169.9	1,242.3	226.9	3,723.6	323.0
1964	6,063.9	385.3	873.4	73.7	2,589.6	259.7	1,561.3	244.7	4,020.6	320.4
1965	5,131.7	274.8	1,260.3	114.8	2,301.1	189.4	1,282.0	151.0	3,594.5	270.4
1966	6,731.9	311.4	1,680.4	132.4	2,318.4	139.2	1,617.3	173.6	3,733.2	233.6
1967	7,509.5	338.2	1,384.6	97.8	2,325.5	136.2	1,593.7	165.7	4,491.5	305.7
1968	7,089.2	340.8	1,949.0	213.9	2,298.6	156.1	1,430.9	146.6	3,462.5	389.1
1969	7,531.6	280.2	1,573.4	100.2	2,941.4	168.6	1,491.0	103.5	4,138.6	239.5
1970	9,985.9	617.2	1,608.1	123.5	3,469.9	318.5	2,182.5	137.7	4,861.8	372.3
1971	9,416.4	459.5	1,605.6	123.0	3,272.9	186.2	1,889.3	132.9	4,610.2	322.8
1972	9,265.5	363.9	1,622.9	120.1	3,200.1	194.1	1,948.2	185.8	4,278.5	230.5
1973	8,079.2	377.5	1,245.6	90.3	2,877.9	197.4	1,949.2	131.9	3,332.5	220.3
1974	6,880.2	351.8	1,592.4	128.2	2,672.0	159.3	1,864.5	131.2	4,976.2	394.6
1975	7,726.9	344.1	1,643.9	109.0	2,778.3	192.0	1,664.8	148.1	5,885.4	337.4
1976	7,933.6	337.4	1,244.8	85.7	2,505.2	152.7	1,547.5	134.0	4,744.7	294.5
1977	7,397.1	381.8	1,299.0	126.4	2,575.1	185.9	1,285.8	87.9	4,462.8	328.4
1978	7,425.0	307.0	1,558.0	92.2	3,282.4	208.0	2,174.2	219.1	4,498.6	293.3
1979	7,883.4	327.0	1,757.9	121.0	3,106.5	198.2	2,071.7	198.5	4,875.9	297.6
1980	7,706.5	307.2	1,392.9	98.8	3,595.5	213.2	2,049.9	140.7	4,895.1	295.6
1981	6,409.7	308.4	1,395.4	120.0	2,946.0	173.0	1,910.5	141.7	3,720.6	242.1
1982	6,408.5	302.2	1,633.8	126.2	2,458.7	167.3	1,535.7	140.2	3,657.6	203.7
1983	6,456.0	286.9	1,519.2	144.3	2,636.2	181.4	1,875.0	148.0	3,366.5	197.2
1984	5,415.3	258.4	1,515.0	125.0	3,002.2	174.2	1,408.2	91.5	3,979.3	267.6
1985	4,960.9	234.7	1,303.0	98.2	2,050.7	143.7	1,475.4	100.3	3,502.4	246.3
1986	6,124.2	241.6	1,547.1	107.5	1,736.5	109.9	1,674.9	136.1	4,478.8	237.1
1987	5,789.8	217.9	1,305.6	97.1	2,012.5	134.3	2,006.2	180.4	3,528.7	220.2
1988	6,369.3	310.3	1,349.9	121.1	2,211.1	139.1	2,060.8	188.3	4,011.1	290.4
1989	5,645.4	244.1	1,414.6	106.6	1,972.9	106.0	1,841.7	166.4	3,125.3	229.8
1990	5,452.4	238.6	1,672.1	135.8	1,860.1	108.3	1,789.5	172.7	2,776.4	178.7
1991	5,444.6	205.6	1,583.7	111.8	2,254.0	139.5	1,557.8	111.3	3,763.7	270.8
1992	5,976.1	241.0	2,032.8	143.4	2,208.4	131.9	1,773.1	123.7	4,333.1	263.2
1993	5,708.3	208.9	1,755.2	107.9	2,053.0	109.3	1,694.5	112.7	3,192.9	205.6
1994	6,980.1	282.8	2,318.3	145.2	2,382.2	130.3	2,108.4	152.2	4,616.2	259.2
1995	8,269.4	287.5	2,835.7	187.5	2,614.5	136.3	2,300.6	140.3	5,140.0	253.3
1996	7,941.3	262.9	2,984.0	152.5	2,271.7	125.4	2,499.5	153.4	6,407.4	353.9

Table B.3. Continued.

	Mallard		Gadwall		American wigeon		Green-winged teal		Blue-winged teal	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1997	9,939.7	308.5	3,897.2	264.9	3,117.6	161.6	2,506.6	142.5	6,124.3	330.7
1998	9,640.4	301.6	3,742.2	205.6	2,857.7	145.3	2,087.3	138.9	6,398.8	332.3
1999	10,805.7	344.5	3,235.5	163.8	2,920.1	185.5	2,631.0	174.6	7,149.5	364.5
2000	9,470.2	290.2	3,158.4	200.7	2,733.1	138.8	3,193.5	200.1	7,431.4	425.0
2001	7,904.0	226.9	2,679.2	136.1	2,493.5	149.6	2,508.7	156.4	5,757.0	288.8
2002	7,503.7	246.5	2,235.4	135.4	2,334.4	137.9	2,333.5	143.8	4,206.5	227.9
2003	7,949.7	267.3	2,549.0	169.9	2,551.4	156.9	2,678.5	199.7	5,518.2	312.7
2004	7,425.3	282.0	2,589.6	165.6	1,981.3	114.9	2,460.8	145.2	4,073.0	238.0
2005	6,755.3	280.8	2,179.1	131.0	2,225.1	139.2	2,156.9	125.8	4,585.5	236.3
2006	7,276.5	223.7	2,824.7	174.2	2,171.2	115.7	2,587.2	155.3	5,859.6	303.5
2007	8,307.3	285.8	3,355.9	206.2	2,806.8	152.0	2,890.3	196.1	6,707.6	362.2
2008	7,723.8	256.8	2,727.7	158.9	2,486.6	151.3	2,979.7	194.4	6,640.1	337.3
2009	8,512.4	248.3	3,053.5	166.3	2,468.6	135.4	3,443.6	219.9	7,383.8	396.8
2010	8,430.1	284.9	2,976.7	161.6	2,424.6	131.5	3,475.9	207.2	6,328.5	382.6
2011	9,182.6	267.8	3,256.9	196.9	2,084.0	110.1	2,900.1	170.7	8,948.5	418.2
2012	10,601.5	324.0	3,585.6	208.7	2,145.0	145.6	3,471.2	207.9	9,242.3	425.1
2013	10,371.9	360.6	3,351.4	204.5	2,644.3	169.2	3,053.4	173.7	7,731.7	363.2
2014	10,899.8	347.6	3,811.0	206.0	3,116.7	190.4	3,439.9	247.4	8,541.5	461.9
2015	11,643.3	361.8	3,834.1	219.4	3,037.0	199.2	4,080.9	269.8	8,547.3	401.1
2016	11,792.5	367.4	3,712.0	197.3	3,411.3	196.4	4,275.4	329.8	6,689.4	340.1
2017	10,488.5	333.9	4,180.0	209.0	2,777.1	156.0	3,605.3	233.3	7,888.9	395.8
2018	9,255.2	298.9	2,885.9	161.7	2,820.4	166.5	3,042.7	213.9	6,450.5	307.7
2019	9,423.4	284.5	3,258.7	173.5	2,832.1	215.8	3,178.2	184.4	5,427.6	318.8
2020										
2021					No Survey					
2022	7,434.3	243.3	2,684.7	135.3	2,186.9	128.7	2,150.9	178.2	6,491.1	337.5
2023	6,125.7	206.1	2,561.4	145.1	1,889.7	173.3	2,502.6	284.0	5,250.3	297.0
2024	6,609.3	253.8	2,284.4	124.6	2,922.0	219.1	3,005.5	210.2	4,599.0	233.7

Table B.3. Continued.

	Northern shoveler		Northern pintail		Redhead		Canvasback		Scaup	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1955	1,642.8	218.7	9,775.1	656.1	539.9	98.9	589.3	87.8	5,620.1	582.1
1956	1,781.4	196.4	10,372.8	694.4	757.3	119.3	698.5	93.3	5,994.1	434.0
1957	1,476.1	181.8	6,606.9	493.4	509.1	95.7	626.1	94.7	5,766.9	411.7
1958	1,383.8	185.1	6,037.9	447.9	457.1	66.2	746.8	96.1	5,350.4	355.1
1959	1,577.6	301.1	5,872.7	371.6	498.8	55.5	488.7	50.6	7,037.6	492.3
1960	1,824.5	130.1	5,722.2	323.2	497.8	67.0	605.7	82.4	4,868.6	362.5
1961	1,383.0	166.5	4,218.2	496.2	323.3	38.8	435.3	65.7	5,380.0	442.2
1962	1,269.0	113.9	3,623.5	243.1	507.5	60.0	360.2	43.8	5,286.1	426.4
1963	1,398.4	143.8	3,846.0	255.6	413.4	61.9	506.2	74.9	5,438.4	357.9
1964	1,718.3	240.3	3,291.2	239.4	528.1	67.3	643.6	126.9	5,131.8	386.1
1965	1,423.7	114.1	3,591.9	221.9	599.3	77.7	522.1	52.8	4,640.0	411.2
1966	2,147.0	163.9	4,811.9	265.6	713.1	77.6	663.1	78.0	4,439.2	356.2
1967	2,314.7	154.6	5,277.7	341.9	735.7	79.0	502.6	45.4	4,927.7	456.1
1968	1,684.5	176.8	3,489.4	244.6	499.4	53.6	563.7	101.3	4,412.7	351.8
1969	2,156.8	117.2	5,903.9	296.2	633.2	53.6	503.5	53.7	5,139.8	378.5
1970	2,230.4	117.4	6,392.0	396.7	622.3	64.3	580.1	90.4	5,662.5	391.4
1971	2,011.4	122.7	5,847.2	368.1	534.4	57.0	450.7	55.2	5,143.3	333.8
1972	2,466.5	182.8	6,979.0	364.5	550.9	49.4	425.9	46.0	7,997.0	718.0
1973	1,619.0	112.2	4,356.2	267.0	500.8	57.7	620.5	89.1	6,257.4	523.1
1974	2,011.3	129.9	6,598.2	345.8	626.3	70.8	512.8	56.8	5,780.5	409.8
1975	1,980.8	106.7	5,900.4	267.3	831.9	93.5	595.1	56.1	6,460.0	486.0
1976	1,748.1	106.9	5,475.6	299.2	665.9	66.3	614.4	70.1	5,818.7	348.7
1977	1,451.8	82.1	3,926.1	246.8	634.0	79.9	664.0	74.9	6,260.2	362.8
1978	1,975.3	115.6	5,108.2	267.8	724.6	62.2	373.2	41.5	5,984.4	403.0
1979	2,406.5	135.6	5,376.1	274.4	697.5	63.8	582.0	59.8	7,657.9	548.6
1980	1,908.2	119.9	4,508.1	228.6	728.4	116.7	734.6	83.8	6,381.7	421.2
1981	2,333.6	177.4	3,479.5	260.5	594.9	62.0	620.8	59.1	5,990.9	414.2
1982	2,147.6	121.7	3,708.8	226.6	616.9	74.2	513.3	50.9	5,532.0	380.9
1983	1,875.7	105.3	3,510.6	178.1	711.9	83.3	526.6	58.9	7,173.8	494.9
1984	1,618.2	91.9	2,964.8	166.8	671.3	72.0	530.1	60.1	7,024.3	484.7
1985	1,702.1	125.7	2,515.5	143.0	578.2	67.1	375.9	42.9	5,098.0	333.1
1986	2,128.2	112.0	2,739.7	152.1	559.6	60.5	438.3	41.5	5,235.3	355.5
1987	1,950.2	118.4	2,628.3	159.4	502.4	54.9	450.1	77.9	4,862.7	303.8
1988	1,680.9	210.4	2,005.5	164.0	441.9	66.2	435.0	40.2	4,671.4	309.5
1989	1,538.3	95.9	2,111.9	181.3	510.7	58.5	477.4	48.4	4,342.1	291.3
1990	1,759.3	118.6	2,256.6	183.3	480.9	48.2	539.3	60.3	4,293.1	264.9
1991	1,716.2	104.6	1,803.4	131.3	445.6	42.1	491.2	66.4	5,254.9	364.9
1992	1,954.4	132.1	2,098.1	161.0	595.6	69.7	481.5	97.3	4,639.2	291.9
1993	2,046.5	114.3	2,053.4	124.2	485.4	53.1	472.1	67.6	4,080.1	249.4
1994	2,912.0	141.4	2,972.3	188.0	653.5	66.7	525.6	71.1	4,529.0	253.6
1995	2,854.9	150.3	2,757.9	177.6	888.5	90.6	770.6	92.2	4,446.4	277.6
1996	3,449.0	165.7	2,735.9	147.5	834.2	83.1	848.5	118.3	4,217.4	234.5
1997	4,120.4	194.0	3,558.0	194.2	918.3	77.2	688.8	57.2	4,112.3	224.2

Table B.3. Continued.

	Northern shoveler		Northern pintail		Redhead		Canvasback		Scaup	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1998	3,183.2	156.5	2,520.6	136.8	1,005.1	122.9	685.9	63.8	3,471.9	191.2
1999	3,889.5	202.1	3,057.9	230.5	973.4	69.5	716.0	79.1	4,411.7	227.9
2000	3,520.7	197.9	2,907.6	170.5	926.3	78.1	706.8	81.0	4,026.3	205.3
2001	3,313.5	166.8	3,296.0	266.6	712.0	70.2	579.8	52.7	3,694.0	214.9
2002	2,318.2	125.6	1,789.7	125.2	564.8	69.0	486.6	43.8	3,524.1	210.3
2003	3,619.6	221.4	2,558.2	174.8	636.8	56.6	557.6	48.0	3,734.4	225.5
2004	2,810.4	163.9	2,184.6	155.2	605.3	51.5	617.2	64.6	3,807.2	202.3
2005	3,591.5	178.6	2,560.5	146.8	592.3	51.7	520.6	52.9	3,386.9	196.4
2006	3,680.2	236.5	3,386.4	198.7	916.3	86.1	691.0	69.6	3,246.7	166.9
2007	4,552.8	247.5	3,335.3	160.4	1,009.0	84.7	864.9	86.2	3,452.2	195.3
2008	3,507.8	168.4	2,612.8	143.0	1,056.0	120.4	488.7	45.4	3,738.3	220.1
2009	4,376.3	224.1	3,225.0	166.9	1,044.1	106.3	662.1	57.4	4,172.1	232.3
2010	4,057.4	198.4	3,508.6	216.4	1,064.2	99.5	585.2	50.8	4,244.4	247.9
2011	4,641.0	232.8	4,428.6	267.9	1,356.1	128.3	691.6	46.0	4,319.3	261.1
2012	5,017.6	254.2	3,473.1	192.4	1,269.9	99.2	759.9	68.5	5,238.6	296.8
2013	4,751.0	202.3	3,335.0	188.4	1,202.2	90.5	787.0	57.6	4,165.7	250.8
2014	5,278.9	265.3	3,220.3	179.7	1,278.7	102.5	685.3	50.7	4,611.1	253.3
2015	4,391.4	219.0	3,043.0	182.5	1,195.9	92.9	757.3	63.3	4,395.3	252.5
2016	3,966.9	189.0	2,618.5	204.2	1,288.8	115.4	736.5	68.8	4,991.7	297.6
2017	4,353.1	202.3	2,889.2	206.2	1,115.4	91.8	732.5	61.7	4,371.7	228.7
2018	4,207.9	196.5	2,365.3	150.2	999.0	85.3	686.1	59.1	3,989.3	212.5
2019	3,649.2	169.0	2,268.5	123.3	732.2	63.7	651.9	49.1	3,590.8	207.0
2020										
2021					No Survey					
2022	3,036.3	167.1	1,783.6	150.1	1,066.6	87.1	586.6	50.6	3,655.1	223.8
2023	2,858.4	165.1	2,218.5	148.3	929.9	80.6	618.9	63.9	3,517.1	211.7
2024	2,645.8	125.0	1,975.0	146.1	782.0	64.8	566.3	52.3	4,069.1	231.8

Table B.4. Total breeding duck estimates for the traditional survey area, in thousands.

	Traditional Survey Area[a]	
Year	$\widehat{N}$	$\widehat{SE}$
1955	39,603.6	1,264.0
1956	42,035.2	1,177.3
1957	34,197.1	1,016.6
1958	36,528.1	1,013.6
1959	40,089.9	1,103.6
1960	32,080.5	876.8
1961	29,829.0	1,009.0
1962	25,038.9	740.6
1963	27,609.5	736.6
1964	27,768.8	827.5
1965	25,903.1	694.4
1966	30,574.2	689.5
1967	32,688.6	796.1
1968	28,971.2	789.4
1969	33,760.9	674.6
1970	39,676.3	1,008.1
1971	36,905.1	821.8
1972	40,748.0	987.1
1973	32,573.9	805.3
1974	35,422.5	819.5
1975	37,792.8	836.2
1976	34,342.3	707.8
1977	32,049.0	743.8
1978	35,505.6	745.4
1979	38,622.0	843.4
1980	36,224.4	737.9
1981	32,267.3	734.9
1982	30,784.0	678.8
1983	32,635.2	725.8
1984	31,004.9	716.5
1985	25,638.3	574.9
1986	29,092.8	609.3
1987	27,412.1	562.1
1988	27,361.7	660.8
1989	25,112.8	555.4
1990	25,079.2	539.9
1991	26,605.6	588.7
1992	29,417.9	605.6
1993	26,312.4	493.9
1994	32,523.5	598.2
1995	35,869.6	629.4
1996	37,753.0	779.6

Table B.4. Continued.

Year	Traditional Survey Area[a]	
	$\widehat{N}$	$\widehat{SE}$
1997	42,556.3	718.9
1998	39,081.9	652.0
1999	43,435.8	733.9
2000	41,838.3	740.2
2001	36,177.5	633.1
2002	31,181.1	547.8
2003	36,225.1	664.7
2004	32,164.0	579.8
2005	31,734.9	555.2
2006	36,160.3	614.4
2007	41,172.2	724.8
2008	37,276.5	638.3
2009	42,004.8	701.9
2010	40,893.8	718.4
2011	45,554.3	766.5
2012	48,575.3	796.8
2013	45,607.3	749.8
2014	49,152.2	831.1
2015	49,521.7	812.1
2016	48,362.8	827.6
2017	47,265.6	773.6
2018	41,193.2	662.1
2019	38,898.9	658.3
2020	No Survey	
2021		
2022	34,657.2	613.6
2023	32,304.8	633.0
2024	33,988.1	610.7

[a] Total ducks in the traditional survey area include species in Appendix B.3 plus American black ducks, ring-necked duck, goldeneyes, bufflehead, and ruddy duck.

Table B.5. Breeding population estimates and 90% credibility intervals (in thousands) for the 6 most abundant species of ducks in the eastern survey area, 1998–2024[a].

	Mallard		American black duck		Green-winged teal		Ring-necked duck		Goldeneyes[b]		Mergansers[c]	
Year	$\hat{N}$	90% CI	$\hat{N}$	90% CI	$\hat{N}$	90% CI	$\hat{N}$	90% CI	$\hat{N}$	90% CI	$\hat{N}$	90% CI
1998	1,478.2	(1,334.4, 1,660.6)	778.1	(694.9, 885.9)	292.4	(236.6, 381.2)	606.4	(498.2, 770.1)	655.8	(499.8, 929.2)	733.3	(626.3, 868.7)
1999	1,477.6	(1,331.7, 1,661.0)	751.7	(679.0, 840.8)	377.6	(308.7, 477.9)	727.3	(595.7, 930.9)	746.2	(573.2, 1,017.3)	716.6	(620.8, 834.4)
2000	1,419.0	(1,284.6, 1,586.4)	666.4	(610.2, 731.8)	346.9	(287.4, 431.5)	954.5	(733.1, 1,423.1)	709.7	(535.8, 998.0)	751.7	(654.8, 871.4)
2001	1,428.5	(1,290.1, 1,601.5)	647.3	(583.6, 723.4)	291.9	(239.6, 368.5)	689.5	(570.5, 864.6)	853.1	(642.2, 1,207.3)	685.1	(597.0, 791.8)
2002	1,405.7	(1,269.5, 1,576.6)	769.6	(692.4, 863.4)	394.8	(324.5, 493.6)	710.6	(589.5, 877.2)	937.5	(685.1, 1,356.2)	964.9	(842.7, 1,112.8)
2003	1,383.9	(1,246.6, 1,559.4)	725.4	(647.4, 827.5)	382.7	(312.1, 493.8)	702.9	(592.6, 849.1)	725.7	(545.4, 1,053.5)	853.8	(742.2, 991.5)
2004	1,390.9	(1,250.0, 1,574.1)	752.4	(667.6, 864.1)	449.4	(366.3, 576.7)	777.4	(640.3, 981.4)	687.3	(534.2, 933.4)	852.6	(744.9, 982.2)
2005	1,347.7	(1,209.4, 1,530.0)	668.8	(602.8, 751.0)	332.1	(270.4, 430.6)	650.7	(549.5, 784.2)	594.0	(467.1, 797.3)	838.4	(729.1, 972.3)
2006	1,290.2	(1,161.3, 1,454.9)	714.2	(640.4, 806.0)	322.4	(262.5, 413.2)	676.7	(567.5, 823.7)	527.1	(412.3, 711.8)	757.8	(659.1, 877.8)
2007	1,329.6	(1,188.2, 1,515.8)	775.8	(703.7, 860.2)	430.1	(338.2, 605.1)	877.7	(738.5, 1,059.9)	735.0	(562.6, 999.8)	886.5	(768.7, 1,034.4)
2008	1,302.3	(1,163.5, 1,484.3)	687.5	(614.9, 780.0)	397.7	(317.4, 521.6)	691.0	(573.7, 861.5)	715.5	(553.1, 967.9)	787.7	(686.8, 909.3)
2009	1,300.8	(1,158.8, 1,492.3)	703.9	(618.6, 822.6)	417.7	(333.8, 552.2)	714.7	(589.3, 899.0)	612.1	(467.6, 852.7)	804.2	(699.4, 930.8)
2010	1,177.7	(1,056.0, 1,332.0)	623.9	(556.3, 711.9)	404.1	(322.9, 542.8)	701.9	(587.3, 861.0)	633.2	(483.9, 879.8)	666.0	(579.7, 773.5)
2011	1,236.4	(1,101.3, 1,414.0)	671.8	(588.8, 787.4)	391.0	(310.0, 531.8)	625.9	(526.5, 762.2)	601.4	(466.0, 834.0)	725.6	(628.9, 844.5)
2012	1,208.7	(1,080.3, 1,375.1)	711.2	(632.4, 812.0)	354.9	(286.3, 468.0)	648.8	(541.2, 808.3)	637.2	(480.6, 935.8)	793.7	(691.5, 918.4)
2013	1,295.2	(1,135.4, 1,517.1)	705.0	(620.7, 831.4)	393.3	(315.7, 530.9)	785.9	(642.6, 1,015.2)	718.5	(557.5, 1,008.6)	775.4	(659.5, 932.2)
2014	1,211.7	(1,075.1, 1,392.5)	706.4	(626.3, 812.7)	299.0	(241.1, 394.5)	615.7	(514.3, 759.0)	617.3	(454.6, 946.2)	711.7	(620.5, 824.0)
2015	1,151.0	(1,027.0, 1,313.5)	687.0	(592.2, 820.1)	307.9	(246.7, 407.0)	727.8	(583.4, 975.3)	475.0	(365.5, 664.4)	733.3	(638.2, 848.9)
2016	1,138.3	(1,010.8, 1,304.7)	746.8	(648.6, 886.1)	316.3	(252.3, 422.2)	749.5	(618.7, 942.1)	565.7	(426.3, 829.3)	785.6	(682.3, 913.1)
2017	1,154.9	(1,021.8, 1,332.9)	614.9	(544.0, 706.3)	336.1	(273.1, 428.2)	620.6	(510.3, 792.7)	649.9	(498.3, 925.2)	899.3	(781.6, 1,046.6)
2018	1,091.0	(970.0, 1,246.6)	571.3	(514.9, 639.2)	330.1	(265.9, 427.5)	643.6	(531.2, 817.4)	525.2	(402.7, 745.4)	851.0	(741.7, 983.1)
2019	1,058.2	(942.2, 1,210.4)	596.7	(532.7, 680.1)	300.7	(239.1, 395.4)	723.1	(574.3, 1,001.2)	504.6	(363.1, 810.3)	837.5	(728.8, 969.6)
2020												
2021						No Survey						
2022	1,277.3	(1,101.9, 1,523.7)	680.9	(607.7, 778.3)	331.3	(268.9, 426.1)	690.1	(578.2, 845.0)	658.9	(518.2, 888.1)	982.3	(846.9, 1,150.6)
2023	1,222.1	(1,067.4, 1,436.3)	736.3	(660.5, 828.7)	384.3	(297.5, 550.6)	665.7	(549.9, 843.2)	836.5	(648.6, 1,130.5)	987.0	(862.5, 1,141.8)
2024	1,168.8	(1,023.2, 1,364.9)	861.8	(731.7, 1,025.0)	468.1	(375.0, 608.6)	731.0	(610.6, 892.1)	1,200.9	(911.4, 1,645.2)	993.3	(865.4, 1,149.7)

[a] Estimates for mallards, American black ducks, green-winged teal, ring-necked duck, goldeneyes, and mergansers from Bayesian hierarchical analysis using FWS and CWS data from strata 51, 52, 63, 64, 66–68, 70–72.

[b] Common and Barrow's.

[c] Common, red-breasted, and hooded.

C. Historical estimates of goose and swan populations

Table C.1. Abundance indices (in thousands) for North American Canada and cackling goose populations, 1969–2024.

	North Atlantic[a,b]		Atlantic[a,b]		Atlantic Flyway Resident[a]		Southern Hudson Bay[a]		Mississippi Flyway Giant[a]
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$
1969/70									
1970/71									
1971/72									
1972/73									
1973/74									
1974/75									
1975/76									
1976/77									
1977/78									
1978/79									
1979/80									
1980/81									
1981/82									
1982/83									
1983/84									
1984/85									
1985/86									
1986/87									
1987/88									
1988/89									
1989/90	44.1	8.8							
1990/91	44.6	8.8							
1991/92	40.9	8.2							
1992/93	50.3	10.4	93.0	12.5	647.5	111.8			705.5
1993/94	46.8	9.0	43.2	4.0	648.7	73.0			758.6
1994/95	45.0	8.8	34.0	3.0	780.0	98.8			818.0
1995/96	59.6	11.5	51.5	4.8	932.7	107.4			1,065.8
1996/97	55.0	9.8	72.1	6.6	1,013.3	132.5			926.1
1997/98	50.8	8.9	48.6	4.5	970.1	115.7			1,035.7
1998/99	61.4	11.1	83.8	7.6	999.5	120.8			1,193.5
1999/00	51.1	8.8	95.8	8.4	1,022.3	101.9			1,412.4
2000/01	51.4	9.1	135.2	12.5	1,016.6	89.3			1,178.0
2001/02	50.7	8.7	182.4	17.6	1,097.1	95.1			1,248.0
2002/03	48.3	8.4	174.9	17.2	1,126.7	94.5			1,408.3
2003/04	53.7	9.5	191.8	19.2	1,073.1	93.8			1,177.2
2004/05	46.3	8.1	175.7	16.7	1,167.1	102.3			1,158.9
2005/06	47.9	8.4	186.1	20.0	1,144.0	106.2			1,356.5
2006/07	52.4	9.0	207.3	21.1	1,128.0	94.5			1,272.5

Table C.1. Continued.

Year	North Atlantic[a,b]		Atlantic[a,b]		Atlantic Flyway Resident[a]		Southern Hudson Bay[a]		Mississippi Flyway Giant[a]
	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$
2007/08	48.3	8.3	174.0	18.2	1,024.9	82.1			1,272.5
2008/09	50.6	8.6	186.8	19.7	1,006.1	74.8			1,312.7
2009/10	48.9	8.2	165.1	17.5	969.9	92.1			1,421.5
2010/11	51.7	8.9	216.0	23.2	1,015.1	86.5			1,396.8
2011/12	51.8	8.8	190.3	20.4	879.8	71.6			1,463.5
2012/13	53.5	9.7			951.9	79.1			1,495.0
2013/14	55.1	9.3	191.2	20.0	1,084.9	114.4			1,264.6
2014/15	51.4	8.8	161.3	16.0	963.8	81.7			1,469.2
2015/16	50.9	8.7	191.5	24.9	950.0	80.1	88.7	2.7	1,441.1
2016/17	48.0	8.3	161.1	17.2	933.3	74.0	110.1	3.7	1,547.9
2017/18	53.9	9.0	112.2	11.3	1,030.9	83.2	107.8	3.9	1,517.6
2018/19	52.1	8.7	119.5	12.0	1,039.5	91.3	90.0	4.0	1,455.4
2019/20					1,139.6	105.6			
2020/21					1,014.8	77.0	90.7	3.2	1,621.6
2021/22	50.0	8.3	163.7	16.7	1,018.7	76.4	91.5	3.8	1,425.6
2022/23	48.0	8.0	115.3	12.2	947.5	89.6	95.1	3.5	1,342.2
2023/24	53.9	9.8	88.9	9.1	932.8	72.3			1,339.5

Table C.1. Continued.

Year	W. Prairie & Great Plains[a]		Midcontinent[c]		Hi-line[a]		Western[a]	
	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1969/70	80.4	38.8			58.3	39.2		
1970/71	98.9	38.3			99.0	54.3		
1971/72	83.0	38.0			52.4	27.8		
1972/73	78.8	28.2			29.5	12.5		
1973/74	66.8	29.7			32.9	16.2		
1974/75	74.4	28.5			28.0	14.9		
1975/76	99.9	43.7	496.2	107.2	39.3	18.3		
1976/77	94.0	42.0	563.0	179.3	39.4	16.3		
1977/78	227.9	135.4	1,014.0	380.9	38.1	18.8		
1978/79	174.7	92.0	919.8	217.2	48.9	23.2		
1979/80	152.1	69.0			49.3	22.5		
1980/81	184.9	66.2			48.7	19.8		
1981/82	162.1	50.1			52.4	21.3		
1982/83	214.2	86.5			71.5	27.7		
1983/84	182.4	64.2			103.1	40.5		
1984/85	217.7	68.7			89.1	34.6		
1985/86	232.1	81.3			98.2	35.4		
1986/87	235.0	97.1	685.9	355.5	90.6	37.8		
1987/88	338.9	103.3	1,197.9	440.7	126.0	49.3		
1988/89	418.3	136.2	1,680.8	711.8	120.6	49.7		
1989/90	366.3	126.5	1,409.2	336.4	180.9	75.6		
1990/91	318.2	109.6	3,102.0	1,153.2	143.7	55.9		
1991/92	328.1	91.9	1,980.4	544.0	163.8	66.0		
1992/93	346.5	113.1	1,031.0	348.5	153.7	67.0		
1993/94	371.0	124.5	2,279.9	669.6	156.2	57.8		
1994/95	417.7	127.5	1,275.4	456.5	230.3	93.1		
1995/96	451.4	49.8			196.2	24.1		
1996/97	487.3	50.0	3,619.9	1,252.5	203.7	24.1		
1997/98	587.1	63.0	3,343.5	1,292.7	252.0	34.3		
1998/99	702.1	76.8	2,071.6	526.9	196.6	22.3		
1999/00	717.7	61.6	2,943.3	1,065.3	279.3	34.9		
2000/01	704.5	63.8	2,194.1	628.4	252.8	29.0		
2001/02	670.9	54.6	3,104.3	518.0	231.0	26.1		
2002/03	764.1	62.8	2,064.6	324.8	231.5	34.4		
2003/04	797.7	68.5	2,116.2	470.0	200.5	25.6		
2004/05	775.6	65.9	2,674.5	510.7	236.2	25.2		
2005/06	816.1	62.8	2,375.5	436.2	208.0	22.2		
2006/07	979.6	68.3	2,420.5	362.7	298.8	30.5		

Table C.1. Continued.

Year	W. Prairie & Great Plains[a]		Midcontinent[c]		Hi-line[a]		Western[a]	
	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
2007/08	957.1	66.5	2,153.3	389.1	337.3	38.4		
2008/09	1,049.7	71.8	3,125.1	627.7	298.4	32.5		
2009/10	1,111.1	82.0	3,809.7	746.6	269.5	29.9	279.2	41.4
2010/11	1,309.9	93.4	2,442.0	410.7	265.4	33.6	267.6	41.5
2011/12	1,369.6	109.0	2,869.9	485.6	483.6	64.4	333.2	48.8
2012/13	1,314.7	65.5	3,722.9	668.5	325.5	35.3	366.8	72.1
2013/14	1,183.4	72.8	2,917.1	462.0	275.9	31.5	290.6	36.7
2014/15	1,223.1	75.3	1,676.9	272.6	368.5	36.6	390.2	53.9
2015/16	1,517.7	91.2	2,742.9	475.0	453.9	50.8	469.9	57.2
2016/17	1,352.8	84.8	2,423.4	392.7	374.6	35.4	402.9	62.1
2017/18	1,349.7	85.2	2,398.8	360.4	409.2	33.4	491.9	68.4
2018/19	1,443.4	94.4	1,900.7	306.7	374.9	33.5	402.4	57.8
2019/20								
2020/21								
2021/22	1,783.0	107.5	1,563.3	202.1	492.7	56.5	470.3	59.8
2022/23	1,028.1	68.6			324.8	34.1	387.0	66.7
2023/24	1,127.7	75.7			329.0	38.0	320.3	48.2

[a] Surveys conducted in spring.
[b] Number of breeding pairs.
[c] Lincoln estimates of adults.
[d] Fall-winter indices

Table C.1. Continued.

	Dusky[a]		Cackling/minima[d]		Lesser[a]		Taverner's[a]		Aleutian[d]	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1969/70					12.7	5.1				
1970/71					8.2	3.3				
1971/72					3.4	1.2				
1972/73					6.4	1.3				
1973/74					21.2	14.6				
1974/75					6.9	1.7			0.8	
1975/76					3.0	0.8			0.9	
1976/77					4.7	1.3			1.3	
1977/78					6.9	2.2			1.5	
1978/79					6.5	1.8			1.6	
1979/80					12.9	3.3			1.7	
1980/81					18.4	3.9			2.0	
1981/82					16.0	5.1			2.7	
1982/83					3.4	1.1			3.5	
1983/84					13.8	4.3			3.8	
1984/85			47.4	5.6	9.6	3.3			4.2	
1985/86	16.6	2.8	44.2	3.7	6.7	2.6			4.3	
1986/87	14.8	1.8	60.8	4.8	4.6	1.2			5.0	
1987/88	15.1	1.8	82.1	6.0	6.8	1.4			5.4	
1988/89	16.9	2.0	86.4	6.1	7.1	2.1			5.8	
1989/90	15.2	2.7	107.5	8.1	11.7	3.8			6.3	
1990/91	10.3	1.8	99.9	7.1	4.3	1.9			7.0	
1991/92	16.6	2.0	151.6	10.6	9.1	4.5			7.7	
1992/93	15.1	1.7	155.6	10.0	5.9	1.5			11.7	
1993/94	14.9	1.5	220.3	13.8	16.7	4.9			15.7	
1994/95	11.7	1.3	238.1	15.3	9.6	2.8			19.1	
1995/96	11.6	1.1	252.0	16.5	7.7	2.5			15.5	0.6
1996/97	13.1	1.2	298.1	18.5	5.0	1.1			20.4	0.8
1997/98	14.5	1.4	209.6	14.3	5.7	1.9			32.5	1.1
1998/99	10.1	1.0	239.4	15.8	5.7	2.2			35.5	3.1
1999/00	10.0	1.0	248.6	15.6	9.3	4.3			34.3	1.3
2000/01	11.1	1.1	264.2	17.4	6.1	1.9				
2001/02	12.4	1.2	169.7	10.7	4.9	1.3				
2002/03	9.8	0.9	242.2	15.7	6.3	2.2			72.9	2.7
2003/04	11.2	1.1	177.4	11.4	6.3	1.9			110.7	4.3
2004/05	16.4	2.0	227.6	14.6	4.8	1.4			87.2	4.6
2005/06	10.8	1.1	249.5	15.7	4.2	0.9			100.3	4.5
2006/07	10.2	1.0	267.0	16.2	9.5	4.0	55.8	6.3	107.6	7.6

Table C.1. Continued.

	Dusky[a]		Cackling/minima[d]		Lesser[a]		Taverner's[a]		Aleutian[d]	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
2007/08	9.1	0.9	294.9	18.5	10.3	3.8	51.6	9.9	112.6	6.8
2008/09	6.6	0.6	240.1	14.8	6.4	2.1	48.9	4.6	84.5	11.9
2009/10	9.2	0.9	290.5	21.6	6.8	2.0	56.9	4.9	106.9	8.5
2010/11	11.4	1.1	193.2	11.9	3.6	2.0	35.9	3.1	101.6	7.0
2011/12	12.8	1.3	211.2	14.0	3.8	1.6	46.4	5.3	132.7	10.1
2012/13			324.5	22.7			27.1	3.6	162.5	14.7
2013/14	14.5	1.4	287.9	19.9	2.8	0.8	42.5	7.0	150.4	13.1
2014/15	17.9	1.7	362.3	24.3	8.6	5.6	41.9	6.7	209.5	18.3
2015/16	15.6	1.5	332.8	20.1	4.4	1.1	50.7	5.7	154.4	13.1
2016/17	12.8	1.3	290.7	17.3	4.0	1.6	46.6	7.1	164.0	18.0
2017/18	11.9	1.0	208.2	13.0	2.0	0.7	44.6	6.4	169.7	14.6
2018/19	17.9	2.5	205.5	13.1	13.1	7.0	42.7	5.1	192.8	25.6
2019/20									122.0	12.1
2020/21	12.8	1.2	205.4	13.6					173.4	16.1
2021/22	13.1	1.2	238.1	15.6	5.0	4.3	46.2	6.6	231.7	28.5
2022/23	9.6	0.9	160.6	11.0			29.7	4.3	192.6	36.8
2023/24	8.2	0.7	126.4	8.2	2.7	1.6	38.3	4.9	193.7	37.9

[a] Surveys conducted in spring.
[b] Number of breeding pairs.
[c] Lincoln estimates of adults.
[d] Fall-winter indices

Table C.2. Abundance indices (in thousands) for light goose (Ross's and snow goose) populations, 1969–2024.

			Snow Goose					
	Ross's goose[a]		Midcontinent[a]		Pacific Flyway[b]	Wrangel Island[c]	Greater[c]	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{N}$	$\widehat{N}$	$\widehat{SE}$
1969/70							89.6	
1970/71							123.3	
1971/72							134.8	
1972/73							143.0	
1973/74							165.0	
1974/75						56.0	153.8	
1975/76			1,621.5	344.1		58.0	165.6	
1976/77			1,810.7	270.3		68.2	160.0	
1977/78			2,505.8	327.4		65.4	192.6	
1978/79			1,974.4	302.4		84.5	170.1	
1979/80					528.1	90.7	180.0	
1980/81					204.2	89.0	170.8	
1981/82					759.9	100.0	163.0	
1982/83					354.1	95.0	185.0	
1983/84					547.6	85.0	225.4	
1984/85					466.3	85.0	260.0	
1985/86					549.8	90.0	303.5	
1986/87					521.7	100.0	255.0	
1987/88			2,299.6	623.0	525.3	80.0	363.8	
1988/89	120.4	74.3	5,010.7	1,554.1	441.0	70.0	363.2	
1989/90	255.0	158.8	2,816.8	798.0	463.9	60.0	368.3	
1990/91	177.5	110.1	7,449.0	3,926.1	708.5	60.0	352.6	15.7
1991/92	86.9	53.9	7,399.6	2,206.3	690.1	70.0	448.1	20.1
1992/93			4,686.1	1,215.7	639.3	65.0	498.4	20.8
1993/94	109.1	43.7	11,177.2	2,962.2	569.2	70.0	591.4	26.5
1994/95	426.8	265.9	7,567.2	1,758.1	478.2	65.0	616.6	25.1
1995/96			6,107.2	1,866.5	501.4	75.0	669.1	33.9
1996/97	389.7	98.4	11,778.8	2,964.8	366.3	85.0	657.5	28.0
1997/98	672.3	136.7	6,993.5	908.7	416.4	90.0	836.6	49.2
1998/99	714.6	139.6	11,857.2	1,420.9	354.3	90.0	1,008.0	32.3
1999/00	1,162.7	245.5	13,884.5	1,355.4	579.0	95.0	816.5	90.5
2000/01	1,653.4	406.6	15,411.6	1,585.4	656.8	105.0	837.4	31.6
2001/02	1,835.4	290.6	15,160.1	1,596.4	448.2	110.0	725.0	28.0
2002/03	1,134.4	190.0	11,504.0	1,203.6	596.8	115.0	721.0	28.2
2003/04	1,667.4	236.4	15,395.7	1,462.6	587.8	117.5	890.0	41.4
2004/05	1,373.0	170.0	15,476.0	1,512.0	750.3	117.5	880.0	30.2
2005/06	1,403.3	156.4	13,581.7	1,371.3	710.7	132.5	938.0	40.2
2006/07	2,571.4	332.1	17,642.2	1,641.8	803.0	140.0	838.0	38.1
2007/08	3,152.0	410.1	18,426.6	1,976.6	1,073.5	140.0	718.0	104.1

Table C.2. continued.

			Snow Goose					
	Ross's goose[a]		Midcontinent[a]		Pacific Flyway[b]	Wrangel Island[c]	Greater[c]	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{N}$	$\widehat{N}$	$\widehat{SE}$
2008/09	1,972.9	321.9	16,410.8	2,199.1		132.5	1,009.0	31.6
2009/10	3,081.8	427.4	11,117.2	1,125.3	906.0	150.0	824.0	139.8
2010/11	2,594.6	344.1	18,534.6	1,972.6	863.8	155.0	917.0	18.9
2011/12	3,050.0	417.1	14,651.0	1,476.5	1,097.9		1,005.0	43.4
2012/13	3,681.8	480.2	16,142.8	1,626.8	891.6	160.0	921.0	32.1
2013/14	5,868.2	810.4	21,494.8	2,156.1	1,345.6		796.0	32.1
2014/15	1,928.1	226.6	10,138.5	1,012.6	1,208.1	240.0	818.0	31.1
2015/16	3,085.1	347.4	15,585.0	1,496.5		300.0	915.0	52.6
2016/17	2,637.7	389.0	12,301.2	1,256.4	1,906.8	346.0	747.0	37.2
2017/18	2,891.8	533.6	8,996.5	1,045.3	1,355.2	306.0	877.0	49.0
2018/19	2,541.5	340.7	7,390.5	725.6	1,413.8	442.0	714.0	42.9
2019/20						685.1		
2020/21						624.0		
2021/22	1,100.5	172.6	4,742.0	505.6		750.0	753.0	14.8
2022/23					1,269.6		585.0	9.2
2023/24							628.0	12.8

[a] Lincoln estimates of adults.
[b] Fall-winter indices.
[c] Surveys conducted in spring.

Table C.3. Abundance indices (in thousands) of North American greater white-fronted goose, brant, emperor goose, and tundra swan populations, 1969–2024.

	White-fronted goose				Brant				Tundra swan		
	Pacific[a]		Midcontinent[b]		Atlantic[a]	Pacific[a]	Emperor goose[c]		Western[c]		Eastern[a]
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{N}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$
1969/70					106.5	141.7					
1970/71					151.0	149.2					
1971/72					73.3	124.8					
1972/73					40.8	125.0					
1973/74					88.1	130.7					
1974/75					88.4	123.4					
1975/76			390.4	65.2	127.0	122.0					
1976/77			519.3	90.7	73.8	147.0					
1977/78			511.9	76.0	46.7	162.9					
1978/79			558.1	82.9	42.0	129.4					
1979/80					59.2	146.4					60.1
1980/81					97.0	197.5					93.0
1981/82					104.5	121.0					73.2
1982/83					123.5	109.3					87.5
1983/84					127.3	135.0					81.4
1984/85	107.7	17.3			146.3	145.1	18.8	2.0	96.3	13.7	96.9
1985/86	89.0	13.0			110.4	134.2	11.4	0.9	71.2	5.5	90.9
1986/87	81.2	10.4	927.0	254.8	109.4	110.9	10.8	1.0	76.7	10.8	95.8
1987/88	132.3	10.2	1,311.7	364.4	131.2	145.0	13.4	1.0	83.2	13.8	78.7
1988/89	141.2	15.6	1,668.9	496.9	137.9	135.6	14.3	1.0	108.7	17.8	91.3
1989/90	173.2	14.9	3,243.9	870.6	135.4	151.7	14.5	1.0	112.0	20.1	90.6
1990/91	152.2	12.7	2,305.9	778.2	147.7	132.7	12.4	1.1	85.0	14.1	98.2
1991/92	171.5	18.1	1,019.5	198.4	184.8	117.8	13.1	0.8	72.7	4.8	113.0
1992/93	197.2	20.3	1,624.5	498.1	100.6	125.0	15.3	1.1	79.8	13.1	78.2
1993/94	226.8	17.9	2,007.9	462.2	157.2	129.3	17.1	0.9	83.5	7.6	84.8
1994/95	288.2	18.9	1,486.4	314.1	148.2	133.5	17.5	1.0	119.7	34.1	85.1
1995/96	356.0	25.2	1,781.0	378.6	105.9	128.0	23.5	2.4	110.1	19.2	79.5
1996/97	348.5	26.0	1,796.7	259.5	129.1	155.3	22.5	1.4	114.5	10.9	92.4
1997/98	333.6	25.8	2,317.2	392.1	138.0	138.8	19.6	1.2	129.1	13.7	100.6
1998/99	389.4	27.3	1,484.1	184.6	171.6	132.3	20.8	1.3	107.7	12.7	111.0
1999/00	335.4	26.8	2,682.7	353.2	157.2	135.6	17.4	0.9	108.7	12.1	115.3
2000/01	457.5	38.0	2,218.1	296.8	145.3	126.0	27.8	1.4	93.7	8.2	98.4
2001/02	359.4	25.2	2,867.0	450.4	181.6	138.2	19.2	1.1	117.1	14.9	114.7
2002/03	437.0	37.6	1,535.4	186.0	164.5	106.1	20.9	1.5	95.6	7.8	111.7
2003/04	374.8	24.7	1,876.1	225.2	129.6	121.3	21.5	1.0	111.7	20.1	110.8
2004/05	422.5	34.0	2,471.9	331.0	123.2	107.2	21.1	1.3	122.8	21.1	72.5
2005/06	552.2	34.7	3,009.3	420.1	146.6	141.0	26.5	1.5	124.2	12.9	81.3
2006/07	631.2	42.9	3,627.6	454.6	150.6	130.6	26.2	1.7	155.6	22.1	114.4
2007/08	698.8	62.1	3,791.2	487.5	161.6	157.0	22.5	1.1	175.0	32.6	96.2

Table C.3. continued.

	White-fronted goose				Brant				Tundra swans		
	Pacific[a]		Midcontinent[b]		Atlantic[a]	Pacific[a]	Emperor goose[c]		Western[c]		Eastern[a]
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{N}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$
2008/09	588.1	51.6	3,559.3	498.5	151.3		21.5	1.2	107.0	7.7	100.2
2009/10	727.9	63.9	2,911.4	381.9	139.3	163.5	20.0	1.0	110.5	8.9	97.3
2010/11	677.0	54.1	2,993.8	358.3	148.9	162.5	21.4	1.1	120.0	16.3	97.6
2011/12	747.1	68.2	2,743.2	314.2	149.2	177.3	21.1	1.6	114.5	9.3	112.7
2012/13	639.9	73.4	3,700.2	466.0	111.8	163.3	29.9	2.1	109.9	17.6	107.1
2013/14	713.5	97.9	3,767.8	528.2	132.9	173.3	31.9	2.9	97.5	10.3	105.0
2014/15	565.5	53.3	2,326.8	352.6	111.4	136.5	28.5	1.7	133.5	22.6	117.1
2015/16	747.2	68.8	3,036.7	398.5	157.9	140.0	34.2	2.1	133.4	45.6	113.6
2016/17	778.2	61.0	2,386.6	314.1	161.7	155.7	30.0	1.6	107.3	14.7	119.3
2017/18	642.5	75.4	2,871.9	387.2	169.7	132.4	30.2	1.7	151.6	26.2	111.6
2018/19	516.3	56.7	2,324.5	378.7	120.1	161.2	26.5	1.4	101.0	11.9	92.8
2019/20					139.9	142.9					78.6
2020/21	514.2	48.3	3,236.4	538.0		150.6	24.8	1.3	119.8	17.8	86.7
2021/22	678.2	77.1	1,337.6	180.0	109.2	158.7	29.2	1.5	100.7	10.7	95.7
2022/23	431.5	44.2			121.5	119.9	24.3	1.5	72.6	9.0	137.8
2023/24	422.9	35.6			112.8	107.8	18.8	1.1	74.2	7.4	64.4

[a] Fall-winter indices.
[b] Lincoln estimates of adults.
[c] Surveys conducted in spring.

Division of Migratory Bird Management
11510 American Holly Dr.
Laurel, MD 20708-4016

U.S. Fish & Wildlife Service
https://www.fws.gov

For state transfer relay service
TTY/Voice: 711