U.S. Fish & Wildlife Service

Waterfowl

Population Status, 2014

Waterfowl Population Status, 2014

July 24, 2014

In North America the process of establishing hunting regulations for waterfowl is conducted annually. In the United States the 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 published in the Federal Register to allow 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. This report is intended to aid the development of waterfowl harvest regulations in the United States for the 2014–2015 hunting season.

Cover: 2014–2015 Duck stamp, which features a pair of canvasbacks (*Aythya valisineria*) painted by Adam Grimm of South Dakota, winner of the 2013 federal duck stamp design competition.

Acknowledgments

Waterfowl Population and Habitat Information: 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, provincial conservation agencies from Canada, and Dirección General de Conservación Ecológica de los Recursos Naturales, Mexico. 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. Without this combined effort, a comprehensive assessment of waterfowl populations and habitat would not be possible.

This report was compiled by the U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Population and Habitat Assessment Branch. The principal authors were Kathy Fleming, Pamela Garrettson, Walt Rhodes, and Nathan Zimpfer. Support for the processing of data and publication was provided by Emily Silverman, Guthrie Zimmerman, and John Sauer. Tom Cooper, Rebecca Rau, and Guthrie Zimmerman provided helpful comments on earlier drafts. Kathy Fleming and Phil Thorpe provided the maps.

This report should be cited as: U.S. Fish and Wildlife Service. 2014. Waterfowl population status, 2014. U.S. Department of the Interior, Washington, D.C. USA.

All Division of Migratory Bird Management reports are available from our Web site (http://www.fws.gov/migratorybirds/NewsPublicationsReports.html).

Table of Contents

List of Tables and Figures

Tables **Page**

Figures Page

Status of Ducks

Abstract: 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 stelleri*], long-tailed ducks [*Clangula hyemalis*], mergansers [*Mergus* spp. and *Lophodytes cucullatus*], and wood ducks [*Aix sponsa*]) was 49.2 ± 0.8 [SE] million birds. This represents an 8% increase from last year's estimate of 45.6 ± 0.7 million, and is 43% higher than the long-term average (1955–2013). Estimated mallard (*Anas platyrhynchos*) abundance was 10.9 ± 0.3 million, which was similar to the 2013 estimate, and 42% above the long-term average of 7.7 ± 0.04 million. Estimated abundance of gadwall (*A. strepera*; 3.8 ± 0.2 million) was similar to the 2013 estimate and 102% above the long-term average (1.9 ± 0.02 million). The estimate for American wigeon (*A. americana*; 3.1 ± 0.2 million) was 18% above the 2013 estimate of 2.6 ± 0.2 million and 20% above the long-term average of 2.6 ± 0.02 million. The estimated abundance of green-winged teal (*A. crecca*) was 3.4 ± 0.2 million, which was similar to the 2013 estimate and 69% above the long-term average (2.0 ± 0.02 million). The estimate for blue-winged teal (*A. discors*; 8.5 ± 0.5 million) was similar to the 2013 estimate and 75% above the long-term average of 4.9 ± 0.04 million. The estimate for northern shoveler (*A. clypeata*; 5.3 ± 0.3 million) was similar to the 2013 estimate and 114% above the long-term average of 2.5 ± 0.02 million. The northern pintail estimate (*A. acuta*; 3.2 ± 0.2 million) was similar to the 2013 estimate and was 20% below the long-term average of 4.0 ± 0.04 million. Abundance estimates of redheads (*Aythya americana*; 1.3 ± 0.1 million) and canvasbacks (*A. valisineria*; 0.7 ± 0.05 million) were similar to their 2013 estimates and were 85% and 18% above their long-term averages of 0.7 ± 0.01 million and 0.6 ± 0.01 million, respectively. Estimated abundance of scaup (*A. affinis* and *A. marila* combined; 4.6 ± 0.3 million) was similar to the 2013 estimate and the long-term average of 5.0 ± 0.05 million. Spring was delayed even later than last year across most of the survey area. Habitat conditions during the survey were mostly improved or similar to last year, due to average to above-average annual precipitation. The exceptions were west-central Alberta and east of James Bay in Quebec. Alaska was the only region that experienced an early spring. The total pond estimate (Prairie Canada and U.S. combined) was 7.2 ± 0.2 million, which was similar to the 2013 estimate of 6.9 ± 0.2 million and 40% above the long-term average of 5.1 ± 0.03 million. The 2014 estimate of ponds in Prairie Canada was 4.6 ± 0.2 million. This estimate was similar to the 2013 estimate (4.6 ± 0.2 million) and 33% above the 1961–2013 average (3.5 ± 0.03 million). The 2014 pond estimate for the northcentral U.S. was 2.6 ± 0.1 million, which was similar to the 2013 estimate (2.3 ± 0.1 million) and 53% above the 1974–2013 average (1.7 ± 0.02 million). The projected mallard fall flight index is 13.4 ± 1.3 million birds. In the eastern survey area, estimated abundance of American black ducks (*Anas rubripes*) was 0.6 ± 0.04 million, which was similar to the 2013 estimate and the 1990–2013 average. The estimated abundance of mallards was 0.4 ± 0.1 million, which was similar to the 2013 estimate and the 1990–2013 average. Abundance estimates of green-winged teal (0.2 ± 0.04 million) and ring-necked ducks (*Aythya collaris*; 0.5 ± 0.1 million) were 19% and 22% below their 2013 estimates, and similar to their 1990–2013 averages, respectively. Abundance estimates for goldeneyes (common [*Bucephala clangula*] and Barrow's [*B. islandica*] combined) and mergansers were similar to last year's estimates and their 1990–2013 averages.

This section summarizes the most recent information about the status of North American duck populations and their habitats to facilitate the development of harvest regulations. The annual status of these populations is assessed using the databases resulting from surveys which include estimates of the size 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

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 using 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 (Appendix B). The eastern survey area (strata 51–72) includes parts of Ontario, Quebec, Labrador, Newfoundland, Nova Scotia, Prince Edward Island, New Brunswick, New York, and Maine, covering an area of approximately 0.7 million square miles (Appendix B). 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 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 all strata (except 57–59 and 69) in the eastern survey area; however, some portions of the eastern survey area have been surveyed since 1990. 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 calculation of measures of precision for their estimates. Information about habitat conditions was supplied primarily by biologists working in the survey areas. Unless otherwise noted, z-tests were used for assessing statistical significance, with alpha level 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 mid-continent, to estimate waterfowl abundance. Additionally, the Canadian Wildlife Service (CWS) has conducted a helicopter-based aerial plot survey in core American black duck breeding regions of Ontario, Quebec, and the Atlantic Provinces. Historically, 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, as of 2005, waterfowl population sizes for eastern North America (strata 51–72) are 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 (i.e., mergansers, goldeneyes), estimates were produced for multi-species groupings. Survey-wide composite estimates for the eastern survey area presented in this report currently correspond only to strata 51, 52, 63, 64, 66–68, and 70–72. These strata contain either (1) both USFWS airplane survey transects and CWS helicopter plots or (2) only helicopter plots (strata 71 and 72).

For widely distributed and abundant species

(American black ducks, mallards, green-winged teal, ring-necked ducks, goldeneyes and mergansers), composite estimates of population size 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 to the area of each stratum to produce a stratum/year/method- specific population estimate. Estimates for the airplane surveys were adjusted for visibility bias by multiplying them by the total CWS helicopter survey population estimates for all years divided by the total USFWS airplane survey population 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 for visibility by CWS plot estimates, and the CWS and adjusted USFWS estimates were then averaged to derive stratum-level estimates. In strata with only USFWS survey estimates (53, 54, 56–59, 62, 65, and 69), traditional visibility-correction factors were used. No visibility adjustments were made for strata with only CWS plots (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. This modified 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, scoters (black [*Melanitta americana*], white-winged [*M. fusca*], and surf [*M. perspicillata*]), bufflehead (*Bucephala albeola*), and American wigeon. In previous years, we used design-based estimates and an overall mean weighted by precision to derive integrated annual population indices until the hierarchical models could adequately analyze the data for these species. Due to concerns about (1) the appropriateness of weighting estimates from these surveys by their precision, and (2) whether estimates for some species should be integrated given the data quality and coverage in the eastern survey, we have discontinued deriving these estimates. We will continue to investigate methods that will allow us to estimate populations of these rarer species within the hierarchical-modeling framework.

To produce a consistent index for American black ducks, total indicated pairs are calculated using the CWS method of scaling observed pairs. The CWS scaling is based on sex-specific observations collected during the CWS survey in eastern Canada, which indicate that approximately 50% of black duck pair observations are actually two drakes. Thus, observed black duck pairs are scaled by 1.5 rather than the 1.0 scaling traditionally applied by the USFWS. These indicated pairs are then used to calculate indicated birds based on the USFWS protocol. For all other species, the USFWS definitions are used to calculate indicated pairs and indicated birds (see Zimmerman et al. 2012 for further details). This model-based approach and changes in analytical procedures for some species may preclude comparisons with results from previous reports.

Alaska (strata 1–11) Survey Data Selection for 2014

Due to regional staff changes, crews surveying the Alaskan strata contained observers with no prior experience with the Waterfowl Population and Habitat Survey and the crew expressed concern about the quality of some of the data. Evaluation of the differences between experienced and inexperienced observers indicated that the differences were outside normal variability, especially for the Alaskan strata, which have a history of minimal crew turnover. Because one observer had twenty-two years of experience on the survey, we deemed it appropriate and consistent to use only her observations to calculate the population estimates for the Alaskan strata. Expansion factors were adjusted to account for the reduced survey effort. An exception was made for stratum 2, where the experienced observer lost a significant amount of data due to a computer problem; for this stratum, both the pilot and the observer's data were used for estimation. This low-density stratum was the last surveyed by the crew and the two observers' counts appeared comparable.

Total Duck Species Composition

In the traditional survey area, our estimate of total ducks excludes scoters, eiders, long-tailed ducks, mergansers, and wood ducks, because the traditional survey area does not include a large portion of their breeding ranges.

Mallard Fall-flight Index

The mallard fall-flight index is a prediction of the size of the fall abundance of mallards originating from the mid-continent region of North America. For management purposes, the mid-continent population has historically been composed of mallards originating from the traditional survey area, as well as Michigan, Minnesota, and Wisconsin. However, as of 2008, the status of western mallards has been considered separately in setting regulations for the Pacific Flyway, and thus Alaska–Yukon mallards (strata 1–12) have been removed from the mid-continent stock. The fall-flight index is based on the mallard models used for adaptive harvest management and considers breeding population size, habitat conditions, adult summer survival, and the projected fall age ratio (young/adult). The projected fall age ratio is predicted from models that depict how age ratios vary with changes in spring population size and Canadian pond abundance. The fall-flight index represents a weighted average of the fall flights predicted by the four alternative models of mallard population dynamics used in adaptive harvest management (U.S. Fish and Wildlife Service 2014).

Review of Estimation Procedures

Since the inception of the Waterfowl Breeding Population and Habitat Survey in 1955, there have been continual modifications to the conduct of the survey and analysis of the data, but the last comprehensive review was completed almost 20 years ago (Smith 1995). During this time new analytical approaches, personnel, and equipment were put in place. In addition, environmental conditions and management needs have changed. Therefore, the USFWS has initiated a review of operational and analytical procedures. We are currently addressing several issues, including the delineation of survey strata, methods of variance estimation, visibility corrections, and population change detection. These analyses, along with results from related investigations, will entail some modification to the existing time series, so that new methods do not affect evaluation of long-term trends. We intend to implement improvements to our estimation procedures, and estimates presented in future reports will reflect updates made as a result of this review. In an effort to streamline and facilitate the regulations cycle and to expedite data requests from cooperators, we are also in the process of updating current data collection, storage, and access procedures.

Results and Discussion

2013 in Review

Despite a delayed spring, habitat conditions during the 2013 Waterfowl Breeding Population and Habitat Survey were improved or similar to last year in many areas due to average or above-average annual precipitation, with the exceptions of southeastern Canada, the northeast U.S., and portions of Montana and the Dakotas. The total pond estimate (Prairie Canada and U.S. combined) was 6.9 ± 0.2 million, which was 24% above the 2012 estimate of 5.5 ± 0.2 million and 35% above the long-term average of 5.1 ± 0.03 million. The 2013 estimate of ponds in Prairie Canada was 4.6 ± 0.2 million. This estimate was 17% above the 2012 estimate (3.9 ± 0.1 million) and 32% above the 1961–2012 average (3.5 ± 0.03 million). The 2013 pond estimate for the northcentral U.S. was 2.3 ± 0.1 million, which was 41% above the 2012 estimate (1.7 ± 0.1 million) and 42% above the 1974–2012 average (1.7 ± 0.02 million). In the traditional survey area, which includes strata 1–18, 20–50, and 75–77, the 2013 total duck population estimate was 45.6 ± 0.7 million birds. This represented a 6% decrease from the 2012 estimate of 48.6 ± 0.8 million, but was still 33% higher than the long-term average (1955–2012). Estimated mallard abundance in 2013 was 10.4 ± 0.4 million birds, which was similar to the 2012 estimate of 10.6 ± 0.3 million birds and 36% above the long-term average. Estimated abundance of gadwall in 2013 (3.3 ± 0.2 million) was similar to the 2012 estimate and 80% above the long-term average. Estimated abundance of American wigeon in 2013 (2.6 ± 0.2 million) was 23% above the 2012 estimate and similar to the long-term average. The 2013 estimated abundance of green-winged teal was 3.1 ± 0.2 million, which was similar to the 2012 estimate and 51% above their long-term average. The 2013 estimate of blue-winged teal abundance was 7.7 ± 0.4 million, which was 16% below the 2012 estimate and 60% above their long-term average. The estimate for northern pintails in 2013 (3.3 ± 0.2 million) was similar to the 2012 estimate, and 17% below the long-term average. The 2013 northern shoveler estimate was 4.8 ± 0.2 million, which was similar to the 2012 estimate and 96% above the long-term average. Redhead abundance in 2013 (1.2 ± 0.09 million) was similar to the 2012 estimate and 76% above the long-term average. The 2013 canvasback estimate (0.8 ± 0.06 million) was similar to the 2012 estimate and 37% above the long-term average. Estimated abundance of scaup in 2013 (4.2 ± 0.3 million) was 20% below the 2012 estimate and 17% below the long-term average.

In 2013, winter and spring temperatures in the eastern survey area were closer to normal than in the traditional survey area. Portions of northern Quebec experienced above-average winter temperatures. Most of the eastern survey area had average annual precipitation but southern Ontario and western Quebec experienced near record-low winter precipitation, with improvement to the north and east into the Maritimes. Abundant late-spring rains dominated much of eastern Canada, which may have inhibited waterfowl production. Habitat conditions ranged from fair in Maine and the southern Maritimes to good in Newfoundland and Labrador. Estimated abundance of American black ducks in the eastern survey area in 2013 was 0.6 ± 0.04 million which was similar to 2012 and the 1990–2012 average. The 2013 estimated abundance of mallards was 0.5 ± 0.2 million, which was similar to the 2012 estimate, and 25% above the 1990–2012 average. Abundance estimates of ring-necked ducks (0.6 ± 0.1 million) and goldeneyes (0.5 ± 0.1 million) in 2013 were 24% and 17% above their 2012 estimates and 25% and 10% above the long-term averages, respectively. Abundance estimates in 2013 for green-winged teal and mergansers were similar to the 2012 estimates and their 1990–2012 averages.

2014 Overall Habitat Conditions and Population Status

Spring was delayed even later than last year across most of the Waterfowl Population and Habitat Survey area. Habitat conditions during the survey were mostly improved or similar to last year, due to average to above-average annual precipitation. The exceptions were west-central Alberta and east of James Bay in Quebec (see Regional Habitat and Population Status). Alaska was the only region that experienced an early spring. The total pond estimate (Prairie Canada and U.S. combined) was 7.2 ± 0.2 million which was similar to the 2013 estimate of 6.9 ± 0.2 million and 40% above the long-term average of 5.1 ± 0.03 million (Table 1, Figure 1). In the traditional survey area, the majority of the Canadian prairies had below to well-below-average winter temperatures and average precipitation. Southern Manitoba benefitted from last year's summer and fall precipitation, whereas southern Saskatchewan and most of Alberta were aided by spring 2014 precipitation. The 2014 estimate of ponds in Prairie Canada was 4.6 ± 0.2 million. This estimate was similar to the 2013 estimate (4.6 ± 0.2 million) and 33% above the 1961–2013 average (3.5 ± 0.03 million). The Parklands remained in good condition from previous years' carry-over water and the boreal region has benefitted from above-average annual precipitation. Most of the Canadian portion of the traditional survey area was rated as good or excellent this year and the region continued to receive additional precipitation after the survey. Much of the U.S. prairies had average winter precipitation and well-below-average winter temperatures that continued into spring. Habitat conditions improved in the western Dakotas and Montana from 2013 but remained similar in the eastern Dakotas. The 2014 pond estimate for the northcentral U.S. was 2.6 ± 0.1 million which was similar to the 2013 estimate (2.3 ± 0.1 million) and 53% above the 1974–2013 average (1.7 ± 0.02 million). Waterfowl habitat in North Dakota remains under pressure from wetland drainage, loss of CRP grasses, and energy development. Winter and spring temperatures in the eastern survey area were also well below normal with most areas receiving average to above-average precipitation. Habitat conditions were similar to 2013 or improved, particularly in the northeastern United States. An exception was the area east of James Bay in Quebec which has experienced dry conditions and extensive wildfires. Less flooding was noted across the eastern survey area, in contrast to some years, and continued cool, damp spring conditions in the Maritimes could limit waterfowl production.

In the traditional survey area, which includes strata 1–18, 20–50, and 75–77 (Appendix B), the total duck population estimate was 49.2 ± 0.8 [SE] million birds. This represents an 8% increase over last year's estimate of 45.6 ± 0.7 million, and is 43% higher than the long-term average (1955–2013; Table 2, Appendix C.4). In the eastern Dakotas, total duck numbers were 18% lower than the 2013 estimate, but 76% above the long-term average. The total duck estimate in southern Alberta was 26% higher than last year's estimate and 33% above the long-term average. The total duck estimate was similar to last year in southern Saskatchewan, and 68% above the long-term average. In southern Manitoba, the total duck population estimate was 39% higher than last year's estimate and 43% above the long-term average. The total duck estimate in central and northern Alberta, northeastern British Columbia, and the Northwest Territories was 19% higher than last year's estimate and 39% above the long-term average. The estimate in the northern Saskatchewan–northern Manitoba–western Ontario survey area was 25% lower than the 2013 estimate and 26% lower than the long-term average. The total duck estimate in the Montana–western Dakotas area was 129% higher than the 2013 estimate and 119% above the long-term average. In the Alaska–Yukon Territory–Old Crow Flats region the total duck estimate was similar to last year and the long-term average.

Several states and provinces conduct breeding waterfowl surveys in areas outside the geographic extent of the Waterfowl Breeding Population and Habitat Survey of the USFWS and CWS (Appendix C.2). In California, Washington, Wisconsin, Michigan, and the northeast U.S., measures of precision for estimates of total duck numbers are available (Table 2). The total duck estimate in California was similar to the 2013 estimate and 23% below the long-term average. In Washington the total duck estimate was 13% higher than 2013 and similar to the long-term average (2010–2013). Wisconsin's total duck estimate was 25% lower than the 2013 estimate and similar to the long-term average. In Michigan, the total duck estimate was 42% lower than 2013 and 39% lower than the long-term average. The total breeding duck estimate in the northeast U.S. was similar to 2013 and the long-term average. Of the states without measures of precision for total duck numbers, the 2014 estimate of total ducks in Minnesota was lower than the 2013 estimate, and the total duck estimate decreased in Nevada and increased in Oregon (see Regional Habitat and Population Status for estimates).

Trends and annual breeding population estimates for 10 principal duck species from the traditional survey area are provided in this report (Tables 3–12, Figure 2, Appendix C.3). Percent change was computed prior to rounding and therefore may not match calculations that use the rounded estimates presented in the tables and text. Estimated mallard abundance was 10.9 ± 0.3 million, which was similar to the 2013 estimate, and 42% above the long-term average of 7.7 ± 0.04 million (Table 3). In the eastern Dakotas, the mallard estimate was 28% lower than last year's count, and 84% above the long-term average. The mallard estimate in southern Alberta was 27% higher than last year's and 34% above the long-term average. In the Montana–western Dakotas survey area, the

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

			Change from 2013			Change from LTA	
Region	2014	2013	%	*P*	LTA[a]	%	*P*
Prairie & Parkland Canada							
S. Alberta	1,218	1,127	+8	0.414	754	+62	<0.001
S. Saskatchewan	2,744	2,846	−4	0.635	2,061	+33	<0.001
S. Manitoba	668	578	+16	0.133	663	+1	0.917
Subtotal	4,630	4,551	+2	0.751	3,477	+33	<0.001
Northcentral U.S.							
Montana & western Dakotas	966	383	+152	<0.001	555	+74	<0.001
Eastern Dakotas	1,586	1,958	−19	0.004	1,113	+42	<0.001
Subtotal	2,551	2,341	+9	0.148	1,668	+53	<0.001
Total	7,181	6,892	+4	0.317	5,144	+40	<0.001

[a] Long-term average. Prairie and Parkland Canada, 1961–2013; northcentral U.S. and total, 1974–2013.

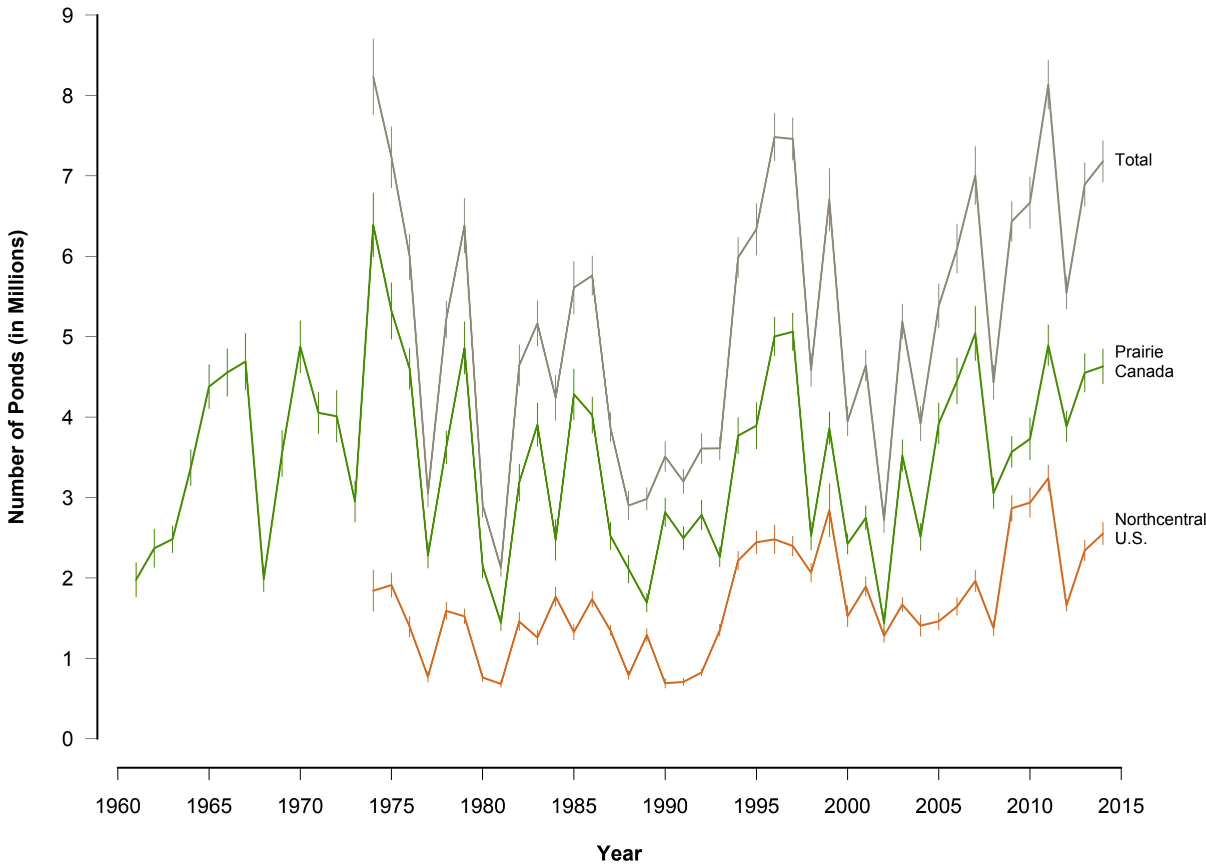


Figure 1. Number of ponds in May and 90% confidence intervals in Prairie Canada, the northcentral U.S., and both areas combined (total ponds).

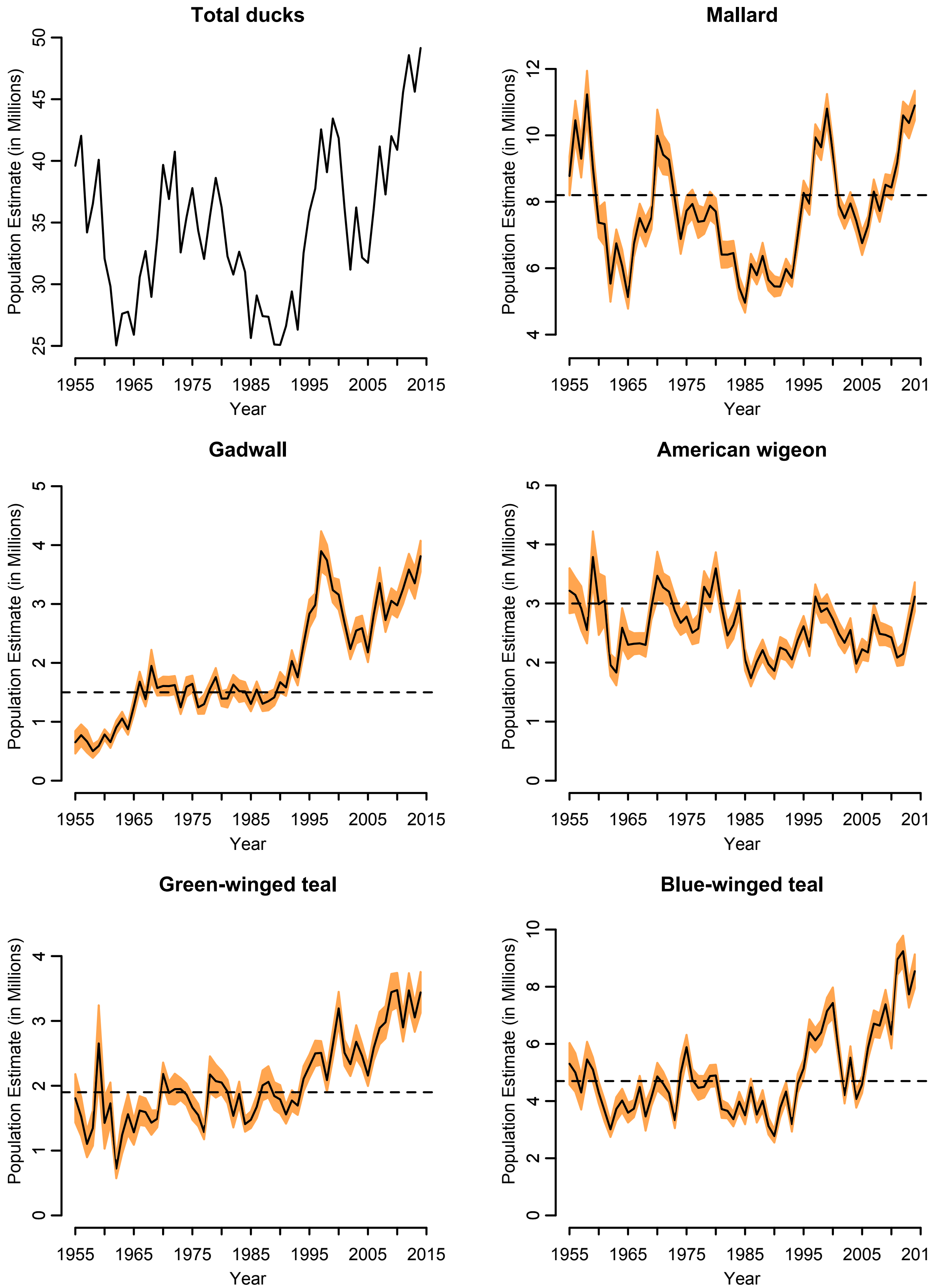


Figure 2. Breeding population estimates, 90% confidence intervals, and North American Waterfowl Management Plan population goals (dashed line) for selected species in the traditional survey area (strata 1–18, 20–50, 75–77).

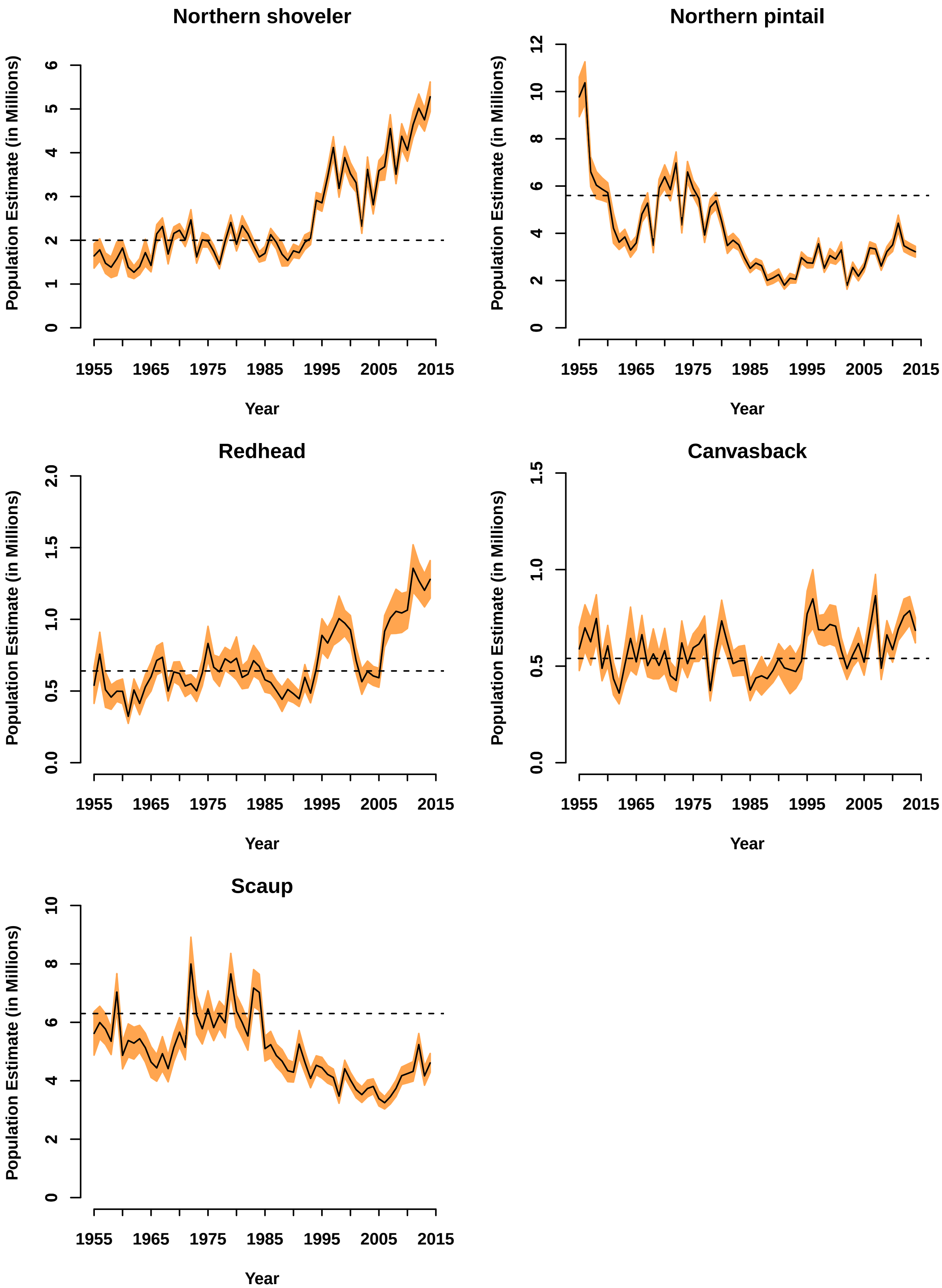


Figure 2. Continued.

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

			Change from 2013			Change from LTA	
Region	2014	2013	%	P	LTA[b]	%	P
Alaska–Yukon Territory–Old Crow Flats	3,510	3,296	+6	0.373	3,696	−5	0.261
C. & N. Alberta–N.E. British Columbia–NWT	9,946	8,323	+19	0.002	7,168	+39	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	2,566	3,441	−25	0.014	3,477	−26	<0.001
S. Alberta	5,644	4,471	+26	<0.001	4,256	+33	<0.001
S. Saskatchewan	12,893	12,258	+5	0.251	7,695	+68	<0.001
S. Manitoba	2,193	1,575	+39	<0.001	1,529	+43	<0.001
Montana & Western Dakotas	3,660	1,599	+129	<0.001	1,671	+119	<0.001
Eastern Dakotas	8,740	10,643	−18	0.001	4,967	+76	<0.001
Total	49,152	45,607	+8	0.002	34,458	+43	<0.001
Other regions							
California	449	451	−1	0.978	583	−23	0.059
Michigan	395	679	−42	0.005	653	−39	<0.001
Northeast U.S.[c]	1,344	1,282	+5	0.618	1385	−3	0.703
Washington	86	74	+17	0.288	77	+13	0.557
Wisconsin	395	527	−25	0.048	445	−11	0.198

[a] Includes 10 species in Appendix C.3 plus American black duck, ring-necked duck, goldeneyes, bufflehead, and ruddy duck (*Oxyura jamaicensis*); excludes eiders, long-tailed duck, scoters, mergansers, and wood duck.
[b] Long-term average for regions in the traditional survey area, 1955–2013; years for other regions vary (see Appendix C.2)
[c] Includes all or portions of CT, DE, MD, MA, NH, NJ, NY, PA, RI, VT, and VA.

mallard count was similar to the 2013 estimate and 96% above the long-term average. In the central and northern Alberta–northeastern British Columbia–Northwest Territories region the mallard estimate was 72% higher than 2013 and 62% above the long-term average. In the northern Saskatchewan–northern Manitoba–western Ontario survey area, the mallard estimate was similar to that of 2013 and the long-term average. Mallard numbers were 48% higher than the 2013 estimate and 33% above their long-term average in the Alaska–Yukon Territory–Old Crow Flats region. In the southern Manitoba survey area, the mallard estimate was 34% higher than last year and 56% above the long-term average. In southern Saskatchewan, mallard numbers were similar to last year and 23% above the long-term average.

In the eastern survey area, the estimated abundance of mallards was 0.4 ± 0.1 million, which was similar to the 2013 estimate and the 1990–2013 average (Table 13). We note that this value for mallards in the eastern survey is a composite estimate of CWS and USFWS data in several Canadian strata, and is not comparable to the eastern mallard estimate used for AHM (U.S. Fish and Wildlife Service 2014), which is based on data from northeast U.S. plot surveys and USFWS transect data from strata 51–54 and 56.

Mallard abundance with estimates of precision are also available for other areas where surveys are conducted (California, Nevada, Washington, Oregon, Wisconsin, the northeast U.S., as well as Michigan and Minnesota). Mallard numbers in California were similar to last year,

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	501	338	+48	0.018	377	+33	0.031
C. & N. Alberta–N.E. British Columbia–NWT	1,757	1,020	+72	<0.001	1,084	+62	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	1,126	1,427	−21	0.329	1,130	0	0.984
S. Alberta	1,444	1,141	+27	0.011	1,073	+34	<0.001
S. Saskatchewan	2,553	2,576	−1	0.907	2,073	+23	<0.001
S. Manitoba	602	448	+34	0.007	385	+56	<0.001
Montana & Western Dakotas	1,014	794	+28	0.106	516	+96	<0.001
Eastern Dakotas	1,903	2,627	−28	0.001	1,035	+84	<0.001
Total	10,900	10,372	+5	0.292	7,673	+42	<0.001
Eastern survey area	445	501	−12	– –[b]	404	+9	– –[b]
Other regions							
California	239	299	−20	0.428	362	−34	0.028
Michigan	230	288	−20	0.268	359	−36	<0.001
Minnesota	257	293	−12	0.653	228	+13	0.597
Northeast U.S.[c]	635	604	+5	0.640	741	−14	0.035
Oregon	85	84	+1	0.931	92	−8	0.429
Washington	177	157	+13	<0.001	161	10	0.519
Wisconsin	159	181	−12	0.461	183	−13	0.268

[a] Long-term average. Traditional survey area 1955–2013; eastern survey area 1990–2013; years for other regions vary (see Appendix C.2).
[b] P-values not provided because these data were analyzed with Bayesian methods.
[c] Includes all or portions of CT, DE, MD, MA, NH, NJ, NY, PA, RI, VT, and VA.

but 34% lower than the long-term average. In Washington, mallard numbers were similar to 2013 and the long-term average. The mallard estimate in Nevada was lower than in 2013. In Wisconsin and Oregon, mallard estimates were similar to last year and their long-term averages. The mallard estimate was similar to the 2013 estimate in the northeast U.S., but was 14% below the long-term average. In Michigan, the 2014 mallard estimate was similar to the 2013 estimate and 36% below the long-term average. In Minnesota, the 2014 mallard estimate was similar to last year's estimate and the long-term average.

In the traditional survey area the 2014 estimate for blue-winged teal (8.5 ± 0.5 million) was similar to the 2013 estimate and 75% above the long-term average of 4.9 ± 0.04 million (Table 7). Estimated abundance of gadwall (3.8 ± 0.2 million) was similar to the 2013 estimate and 102% above the long-term average (1.9 ± 0.02 million; Table 4). The estimate for American wigeon (3.1 ± 0.2 million) was 18% above the 2013 estimate of 2.6 ± 0.2 million and 20% above the long-term average of 2.6 ± 0.02 million (Table 5). The estimated abundance of green-winged teal was 3.4 ± 0.2 million, which was similar to the 2013 estimate and 69% above the long-term average (2.0 ± 0.02 million; Table 6). The northern shoveler esti-

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	0	2	−100	0.087	2	−100	<0.001
C. & N. Alberta–N.E. British Columbia–NWT	43	33	+29	0.363	51	−15	0.361
N. Saskatchewan–N. Manitoba–W. Ontario	36	13	+180	0.048	26	+37	0.342
S. Alberta	565	340	+66	0.020	318	+78	0.004
S. Saskatchewan	1,455	1,300	+12	0.334	632	+130	<0.001
S. Manitoba	236	133	+78	0.001	73	+224	<0.001
Montana & Western Dakotas	426	217	+96	0.014	207	+105	0.005
Eastern Dakotas	1,051	1,314	−20	0.193	580	+81	<0.001
Total	3,811	3,351	+14	0.113	1,889	+102	<0.001

[a] Long-term average, 1955–2013.

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	734	577	+27	0.101	554	+33	0.027
C. & N. Alberta–N.E. British Columbia–NWT	1,562	1,100	+42	0.031	891	+75	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	74	230	−68	0.002	236	−69	<0.001
S. Alberta	224	197	+14	0.554	280	−20	0.120
S. Saskatchewan	273	369	−26	0.057	407	−33	<0.001
S. Manitoba	14	10	+38	0.169	55	−75	<0.001
Montana & Western Dakotas	129	43	+198	0.001	110	+18	0.418
Eastern Dakotas	106	117	−9	0.812	56	+90	0.131
Total	3,117	2,644	+18	0.064	2,588	+20	0.006

[a] Long-term average, 1955–2013.

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	475	452	+5	0.744	405	+17	0.182
C. & N. Alberta–N.E. British Columbia–NWT	1,716	1,229	+40	0.058	810	+112	<0.001
N. Saskatchewan–N. Manitoba–W. Ontario	118	358	−67	<0.001	205	−43	<0.001
S. Alberta	368	195	+88	0.016	198	+86	0.008
S. Saskatchewan	466	575	−19	0.161	266	+75	<0.001
S. Manitoba	76	60	+27	0.285	53	+43	0.013
Montana & Western Dakotas	12	23	−48	0.265	41	−72	<0.001
Eastern Dakotas	209	161	+30	0.534	56	+276	0.001
Total	3,440	3,053	+13	0.201	2,034	+69	<0.001

[a] Long-term average, 1955–2013.

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	0	0	0	1.000	1	−100	<0.001
C. & N. Alberta–N.E. British Columbia–NWT	377	386	−2	0.938	272	+39	0.215
N. Saskatchewan–N. Manitoba–W. Ontario	46	40	+16	0.825	238	−81	<0.001
S. Alberta	834	752	+11	0.547	610	+37	0.034
S. Saskatchewan	3,109	2,759	+13	0.315	1,356	+129	<0.001
S. Manitoba	474	345	+37	0.060	373	+27	0.016
Montana & Western Dakotas	1,178	226	+421	<0.001	283	+316	<0.001
Eastern Dakotas	2,523	3,225	−22	0.074	1,754	+44	0.014
Total	8,542	7,732	+10	0.168	4,888	+75	<0.001

[a] Long-term average, 1955–2013.

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

			Change from 2013			Change from LTA	
Region	2014	2013	%	P	LTA[a]	%	P
Alaska–Yukon Territory–Old Crow Flats	372	226	+65	0.021	289	+29	0.141
C. & N. Alberta–N.E. British Columbia–NWT	372	348	+7	0.778	222	+67	0.006
N. Saskatchewan–N. Manitoba–W. Ontario	24	35	−32	0.438	40	−40	0.042
S. Alberta	914	853	+7	0.584	412	+122	<0.001
S. Saskatchewan	1,711	1,706	0	0.978	750	+128	<0.001
S. Manitoba	255	149	+71	0.004	110	+131	<0.001
Montana & Western Dakotas	521	170	+206	0.001	164	+219	<0.001
Eastern Dakotas	1,110	1,263	−12	0.432	481	+131	<0.001
Total	5,279	4,751	+11	0.114	2,468	+114	<0.001

[a] Long-term average, 1955–2013.

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

			Change from 2013			Change from LTA	
Region	2014	2013	%	P	LTA[a]	%	P
Alaska–Yukon Territory–Old Crow Flats	701	995	−30	0.075	932	−25	0.006
C. & N. Alberta–N.E. British Columbia–NWT	318	235	+35	0.260	356	−11	0.551
N. Saskatchewan–N. Manitoba–W. Ontario	5	10	−46	0.288	37	−86	<0.001
S. Alberta	461	368	+25	0.301	674	−32	0.007
S. Saskatchewan	739	825	−10	0.367	1,150	−36	<0.001
S. Manitoba	49	36	+38	0.255	101	−52	<0.001
Montana & Western Dakotas	252	88	+185	<0.001	260	−3	0.828
Eastern Dakotas	695	779	−11	0.510	507	+37	0.059
Total	3,220	3,335	−3	0.660	4,017	−20	<0.001

[a] Long-term average, 1955–2013.

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	0	1	−100	0.037	2	−100	<0.001
C. & N. Alberta–N.E. British Columbia–NWT	59	22	+167	0.009	39	+51	0.123
N. Saskatchewan–N. Manitoba–W. Ontario	2	5	−64	0.349	26	−94	<0.001
S. Alberta	263	204	+29	0.311	125	+110	0.002
S. Saskatchewan	542	437	+24	0.271	217	+150	<0.001
S. Manitoba	95	71	+35	0.260	73	+31	0.163
Montana & Western Dakotas	17	7	+125	0.236	11	+50	0.420
Eastern Dakotas	301	455	−34	0.040	198	+52	0.027
Total	1,279	1,202	+6	0.576	691	+85	<0.001

[a] Long-term average, 1955–2013.

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

Region	2014	2013	Change from 2013 %	Change from 2013 P	LTA[a]	Change from LTA %	Change from LTA P
Alaska–Yukon Territory–Old Crow Flats	21	35	−40	0.432	86	−76	<0.001
C. & N. Alberta–N.E. British Columbia–NWT	62	92	−33	0.329	75	−18	0.432
N. Saskatchewan–N. Manitoba–W. Ontario	23	30	−23	0.656	52	−56	0.014
S. Alberta	71	54	+32	0.362	65	+9	0.713
S. Saskatchewan	325	381	−15	0.279	196	+65	<0.001
S. Manitoba	59	62	−4	0.832	56	+6	0.663
Montana & Western Dakotas	15	13	+15	0.791	9	+68	0.325
Eastern Dakotas	108	119	−9	0.748	40	+174	0.004
Total	685	787	−13	0.185	580	+18	0.040

[a] Long-term average, 1955–2013.

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

			Change from 2013			Change from LTA	
Region	2014	2013	%	P	LTA[a]	%	P
Alaska–Yukon Territory–Old Crow Flats	578	548	+6	0.706	912	−37	<0.001
C. & N. Alberta–N.E. British Columbia–NWT	2,127	2,343	−9	0.430	2,533	−16	0.015
N. Saskatchewan–N. Manitoba–W. Ontario	201	315	−36	0.072	557	−64	<0.001
S. Alberta	247	150	+65	0.012	333	−26	0.011
S. Saskatchewan	850	475	+79	0.028	408	+108	0.005
S. Manitoba	164	38	+329	0.006	126	+30	0.400
Montana & Western Dakotas	22	14	+62	0.350	49	−55	0.002
Eastern Dakotas	422	282	+49	0.137	114	+269	<0.001
Total	4,611	4,166	+11	0.211	5,033	−8	0.101

[a] Long-term average, 1955–2013.

mate (5.3 ± 0.3 million) was similar to the 2013 estimate and 114% above the long-term average of 2.5 ± 0.02 million (Table 8). The estimate for northern pintails (3.2 ± 0.2 million) was similar to the 2013 estimate of 3.3 ± 0.2 million and 20% below the long-term average of 4.0 ± 0.04 million (Table 9). The estimated abundance of redheads (1.3 ± 0.1 million) and canvasbacks (0.7 ± 0.05 million) were similar to their 2013 estimates and were 85% and 18% above their long-term averages of 0.7 ± 0.01 million and 0.6 ± 0.01 million, respectively (Table 10 and 11). Estimated abundance of scaup (4.6 ± 0.3 million) was similar to the 2013 estimate and the long-term average of 5.0 ± 0.05 million (Table 12). In the eastern survey area, abundance estimates of green-winged teal (0.2 ± 0.04 million) and ring-necked ducks (0.5 ± 0.1 million) were 19% and 22% below their 2013 estimates, and similar to their 1990–2013 averages, respectively. Abundance estimates for goldeneyes and mergansers were similar to last year's estimates and their 1990–2013 averages (Table 13, Figure 3, Appendix C.5).

The longest time series of data available to assess the status of the American black duck is provided by the midwinter surveys conducted in January in states of the Atlantic and Mississippi flyways. Measures of precision are not available for the midwinter surveys. In 2014, the total midwinter count of American black ducks in both flyways combined was 288,800, which was 30% higher than the most recent 10-year average (2004–2013) of 221,300. In the Atlantic Flyway, the 2014 black duck midwinter index was 269,000, which was 34% above the flyway's 10-year average of 201,000. In the Mississippi Flyway, the black duck midwinter index in 2014 was 19,700, which was slightly below the 10-year flyway average of 20,300. Another time series for assessing changes in American black duck population status is provided by the breeding waterfowl surveys conducted by the USFWS and CWS in the eastern survey area (Table 13, Figure 3). The 2014 American black duck estimate in the eastern survey area was 619,000, similar to the 2013 estimate of 626,000 and the 1990–2013 average of 623,000. Black duck breeding population estimates for northeast states from New Hampshire south to Virginia are also available from the Atlantic Flyway Breeding Waterfowl Survey. The estimate from the 2014 survey (20,900) was similar to the 2013 estimate (23,400) and the 1993–2013 average (27,000).

Trends in wood duck populations are available from the North American Breeding Bird

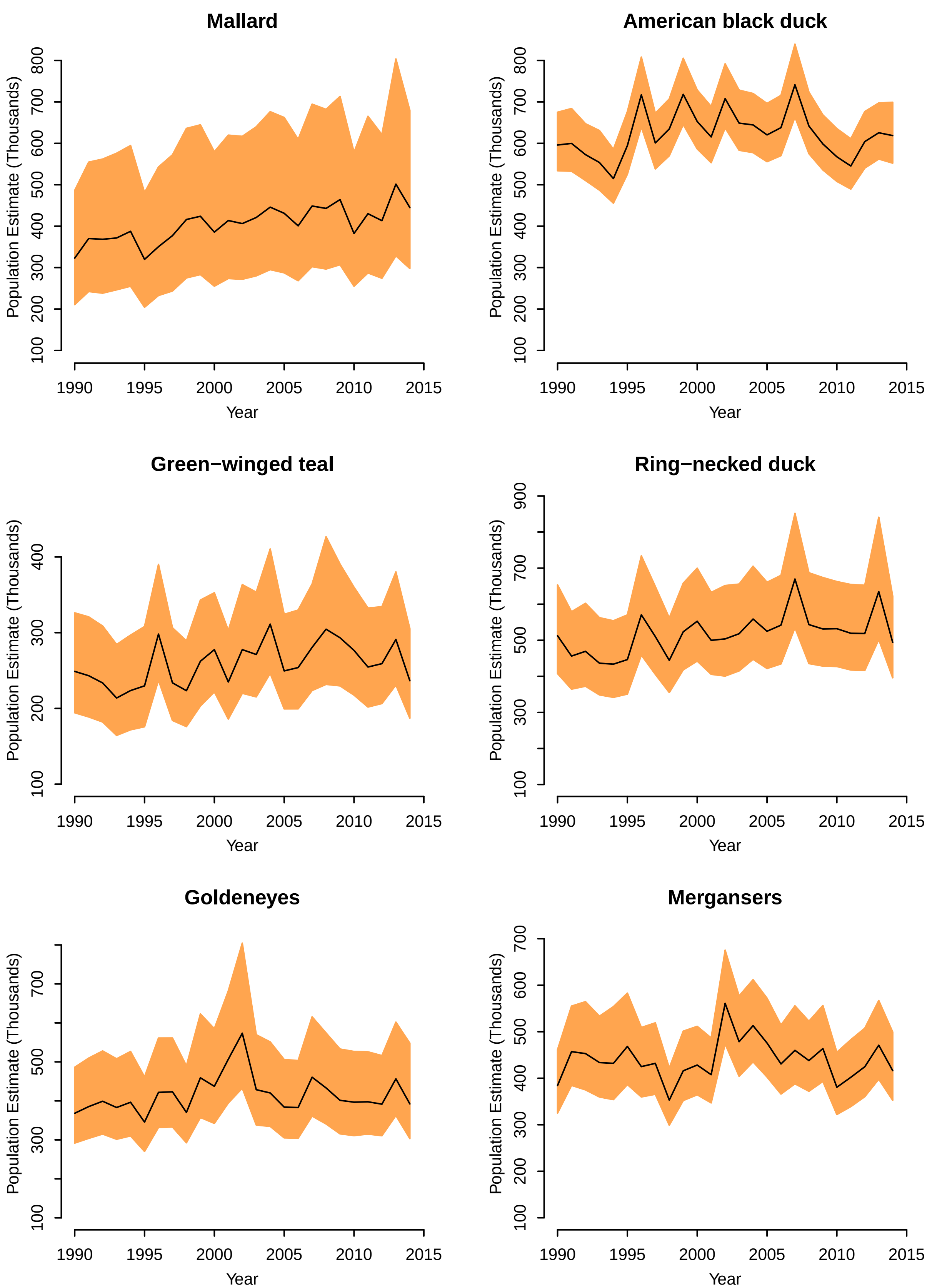


Figure 3. Breeding population estimates and 90% credible intervals from Bayesian hierarchical models for species in the eastern survey area (strata 51, 52, 63, 64, 66–68, 70–72).

Table 13. Duck breeding population estimates[a] (in thousands) for 6 most abundant species in the eastern survey area.

Species	2014	2013	% Change from 2013	Average[b]	% Change from average
Mallard	445	501	−12	404	+9
American black duck	619	626	−1	623	−1
Green-winged teal	236	291	−19[c]	260	−10
Ring-necked duck	494	635	−22[c]	519	−5
Goldeneyes (common and Barrow's)	392	457	−15	418	−7
Mergansers (common, red-breasted, and hooded)	416	471	−12	441	−6

[a] Estimates derived using FWS and CWS data from strata 51, 52, 63, 64, 66–68, 70–72.
[b] Average for 1990–2013.
[c] Indicates significant change. Significance ($P \leq 0.10$) determined by non-overlap of Bayesian credibility intervals.

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. Sauer, 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 % per year) and associated 95% credible intervals (LCL, UCL in parentheses following trend estimates) presented here. In the Atlantic and Mississippi flyways combined, the BBS wood duck index increased by an average of 1.5% (0.97%, 2.0%) per year over the entire survey period (1966–2013), 1.9% (1.2%, 2.7%) over the past 20 years (1994–2013), and 2.4% (1.2%, 3.6%) over the most recent (2004–2013) 10-year period. The Atlantic Flyway wood duck index increased by an average of 1.3% (0.6%, 2.0%) annually over the entire time series (1966–2013), by 2.1% (1.1%, 3.2%) over the past 20 years (1994–2013), and by 2.5% (0.4%, 4.4%) from 2004 to 2013. In the Mississippi Flyway, the corresponding BBS wood duck indices increased by 1.6% (0.9%, 2.3%, 1966–2013), 1.9% (0.9%, 2.9%, 1994–2013), and 2.3% (0.8%, 3.9%, 2004–2013; J. Sauer, U.S. Geological Survey/Biological Resources Division, unpublished data). An independent wood duck population estimate is available for the northeast states from New Hampshire south to Virginia, from the Atlantic Flyway Breeding Waterfowl Survey. The estimate from the 2014 survey (421,600) was similar to the 2013 estimate (361,200) and the 1993–2013 average (379,300).

Regional Habitat and Population Status

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 available under Waterfowl Breeding Population Surveys, Field Crew Reports located on the Division of Migratory Bird Management's website on the Publications page (http://www.fws.gov/migratorybirds/NewReportsPublications/PopulationStatus.html). Although these reports are no longer produced, habitat and population status for each region will continue to be summarized here. More detailed information on regional waterfowl and habitat conditions during the May waterfowl survey is also available on the flyways.us website (http://www.flyways.us/status-of-waterfowl).

Southern Alberta (strata 26–29, 75–76)
reported by Jim Bredy

Southern Alberta had a variable weather pattern throughout the fall, winter, and spring. Moist weather in the fall and early winter gave way to overall drier conditions in the late winter and spring. Wintry weather was present at the planned start of the survey with high winds and snow throughout southern Alberta. It is possible this winter storm adversely affected some of the early nesters. Most of Alberta between the Montana border and Edmonton exhibited good habitat conditions. Some of the survey segments had a record number of ponds. The exception was the shortgrass prairie area in far southeast Alberta, which had fair conditions due to many dry wetland basins. Habitat conditions became drier proceeding north. Between Edmonton, Slave Lake, and Peace River (strata 75–76), pond levels were noticeably lower than last year but the actual survey pond counts were significantly higher than 2013. This could be due to several reasons. Some of the large peat bogs and boreal ponds with higher water levels may have been counted as one pond, whereas what once was one large pond may have been observed as multiple small ponds due to lower water levels and uneven terrain even though the amount of water present was actually less. Multiple small storms passed through southern Alberta during the month of May, depositing in some instances significant amounts of moisture. On 31 May, it appeared that wetland conditions had improved since the beginning of the month. Thus, the stage may be set for an overall good production year in this survey area. One of the greatest impediments to a good duck hatch is degradation of the surrounding wetland's upland habitats. Proximity to adequate upland cover is critical to nesting hens. Thus, protecting upland cover around wetlands is probably as important as protecting the wetland itself (J. Sands, personal communication).

Overall, in southern Alberta May ponds were similar to the 2013 estimate and 62% above the long-term average. The total duck estimate was 26% higher than 2013 and 33% above the long-term average. The mallard estimate was 27% higher than 2013 and 34% above the long-term average. Gadwall were 66% higher than their 2013 estimates and 78% above their long-term averages. The American wigeon estimate was similar to last year and the long-term average. Green-winged teal were 88% higher than the 2013 estimate and 86% higher than the long-term average. Blue-winged teal and northern shoveler estimates were similar to 2013, and 37% and 122% above the long-term average, respectively. Northern pintails were similar to 2013 and 32% below the long-term average. Redheads were similar to 2013 and 110% higher than their long-term average. Canvasbacks were similar to 2013 and their long-term average. Scaup estimates were 65% higher than last year, but 26% below their long-term average.

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

Late summer and fall were characterized by normal precipitation, except in the northwest grasslands and western parklands where precipitation was below normal. Temperatures were normal to slightly below normal during the fall of 2013 (Agriculture and Agri-Food Canada 2014). The winter of 2013–2014 was characterized by drier conditions in the southern grasslands, above normal precipitation in the northwest grasslands and central parklands, and normal precipitation across the remainder of the survey area. Temperatures were well-below normal from December 2013 through April 2014 and this was evident in the phenology of the vegetation. Leaf-out was not observed on the survey until 17 May, although there was some bias in this observation since the survey progressed northward, and leaf-out in the south could have been much earlier. Ice was observed on larger lakes throughout the survey area and as late as 22 May on the Quill Lakes, which was a first for me in the last 18 years of surveying the crew area. Precipitation in April and May 2014 was concentrated during the last two weeks in April when well-above normal precipitation (>200% of normal) was received across the province (Agriculture and Agri-Food Canada 2014). This well-timed precipitation event filled wetlands and created ephemeral and temporary wetlands (i.e., sheetwater) just as many waterfowl were arriving in the province. Normally, these shallow wetlands provide invertebrates for breeding waterfowl before larger wetlands warm up and start producing a more consistent invertebrate biomass for waterfowl broods later in the spring. This year, given the cold spring and very cold soils, few invertebrates were observed. It is unknown if these shallow wetlands had lower than average invertebrate loads and, if so, how this would affect egg production and renesting attempts by early-nesting species such as mallards and northern pintails. The majority of the survey area continued to have good production potential for waterfowl. Good soil moisture from spring rains should have resulted in good upland nesting cover and the full wetland basins should provide abundant habitat for broods. A swath of habitat conditions extending from the southern Missouri Coteau and north into the central Parklands has the potential for excellent waterfowl production. Average wetland conditions in the southwest and western grasslands and little observed sheetwater during the survey may result in lower use of the area by waterfowl, and so production from this area is expected to be average or fair. The northeast parklands were drier and received less precipitation over the winter and into the spring. Wetlands were still flooded beyond their margins, primarily from carry-over water from previous years, and this should have supported broods into the summer. I would expect average or fair production from this region. Overall, another good year is expected from southern Saskatchewan.

The 2014 May pond estimate in this survey area was similar to 2013, and 33% higher than the long-term average. Total duck numbers were similar to 2013, and 68% above the long-term average. Mallards were similar to 2013 and 23% above the long-term average. Green-winged teal and blue-winged teal were similar to last year, and 75% and 129% above their long-term averages, respectively. Northern shovelers were similar to 2013 and 128% above the long-term average. The gadwall estimate was similar to last year, but still 130% above its long-term average. American wigeon were 26% lower than last year and 33% lower than the long-term average. Northern pintails were similar to 2013, and 36% below the long-term average. Redheads were similar to 2013 and 150% above their long-term average. The canvasback estimate was similar to 2013 and 65% higher than the long-term average. The scaup estimate was 79% higher than 2013 and 108% above the long-term average.

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

Habitat conditions for nesting and brooding waterfowl were observed to be good to excellent throughout southern Manitoba and southeastern Saskatchewan. The presence of water on the landscape throughout the survey area was vastly improved from 2012 and 2013, with much more sheetwater observed in 2014. Frequent summer and fall rains in 2013 provided good habitat conditions going into the winter with an excellent frost seal. Permanent water bodies were flooded and temporary wetlands and potholes were abundant in all strata. In particular, stratum 39 and 40 were extremely wet, and ground and air crews observed record numbers of birds in these areas. Agricultural field activities seem delayed and much less activity was observed in May of 2014 compared with 2013 due to the wet conditions last fall and this spring. Southeastern Saskatchewan was observed to be drier than Manitoba and per usual there were some drier areas near the Saskatchewan–Manitoba border. While stratum 38 did have improved conditions from last year (especially near the U.S. border), in general, it was drier than the other strata and lacking quality habitat for waterfowl. Stratum 36 and the northern lines looked similar to last year with good-to-excellent water levels observed in 2014.

Precipitation during the late summer and fall of 2013 was above normal. During the agricultural year (September 2013 thru June 2014) rainfall was above normal in southwestern Manitoba (stratum 39), southeastern Saskatchewan (stratum 34, 35), and the northern survey areas (stratum 36, 37, and 40; Agriculture and Agri-Food Canada 2014). Winter precipitation was variable this past year with some areas receiving below-normal precipitation (southwestern Manitoba, near Melita) and more northern areas receiving average- to above-average winter precipitation. Southeastern Saskatchewan received normal levels (with some above-normal accumulations near Regina) and there were below-normal readings near the Manitoba border. Winter and spring temperatures, similar to 2013, were well-below average. During the winter of 2013–2014 temperatures averaged −20.5 to −19.9 degrees Celsius from December to February near Winnipeg (Agriculture and Agri-Food Canada 2014). March was seven degrees colder than normal with temperatures averaging −12.5 degrees Celsius. Snow cover was observed in shady areas and eastern facing slopes throughout the entire survey. Precipitation at the time of the survey was well-above normal throughout most of the survey area. Below-normal levels are being recorded in the southeastern Manitoba, mostly in stratum 38. With the wet conditions and reduced field activities in large portions of the survey area it is looking like good-to-excellent conditions will persist and 2014 should be an above-average year for waterfowl recruitment in southern Manitoba and southeastern Saskatchewan.

The 2014 May pond estimate in this crew area was similar to the 2013 estimate and the long-term average. The total duck estimate was 39% higher than 2013 and 43% above the long-term average. Mallard numbers were 34% higher than 2013 and 56% higher than the long-term average. The gadwall estimate was 78% higher than last year and 224% above the long-term average. American wigeon were similar to last year and 75% below the long-term average. The blue-winged teal estimate was 37% higher than last year and 27% higher than the long-term average. Green-winged teal were similar to last year but 43% above the long-term average. The northern shoveler estimate was 71% higher than last year's estimate and 131% higher than the long-term average. Northern pintails were similar to the 2013 estimate, and 52% lower than the long-term average. Redhead and canvasback estimates were similar to last year's estimates and their long-term averages. The scaup estimate was 329% higher than last year and similar to the long-term average in this survey area.

Montana and Western Dakotas (strata 41–44)
reported by Rob Spangler

Over this past water year, the climate in Montana and the western Dakotas was characterized by above-average precipitation and average temperatures. In June–August, precipitation averaged 125–200% of normal, with the exception of western South Dakota and southwestern North Dakota where precipitation averaged 75% of normal (National Weather Service 2014). In August 2013, most areas experienced above-average temperatures. A large amount of snow fell across the survey area in December and most areas experienced precipitation from 150–400% of normal with below-normal temperatures. This helped to build a significant snow pack. Western North and South Dakota were drier in January (50–75% of normal) but the wetter trend continued in Montana. February and March 2014 brought additional moisture (125–200% of normal) across the Western Dakotas and Montana survey area. Although southern Montana dried some in April, all other areas received precipitation that was 150–200% of normal. In May, western South Dakota and central Montana received precipitation that was 50–75% of normal while eastern Montana and western North Dakota had even more precipitation ranging from 100–200% of normal (National Weather Service 2014).

The wetter hydrologic cycle over this past year has benefitted wetland conditions across the entire survey area, which was a stark contrast to 2013 when many areas were in poor-to-fair condition. With the large amount of precipitation, it was surprising we did not observe flooding; however, much of the increased precipitation this last summer and fall was absorbed into the overly dry soil before winter. The above-average snowfall combined with moist soil conditions increased runoff and filled many wetlands this spring. The higher soil moisture content also improved upland vegetation growth and increased available cover near wetlands. Nevertheless, the large amount of cattle grazing and agricultural activities across the survey area may have again affected wetland edge cover but likely less than last year. Wetland conditions in western South Dakota (stratum 44) were mostly good with some fair areas, and many wetlands, dugouts, and reservoirs averaged 90% of capacity. In western North Dakota (stratum 43), conditions improved over last year with wetlands averaging 90–100% of capacity, and habitat was considered good. Habitat conditions were considered mostly good in southern Montana (stratum 42), but some drier areas with fair habitat were observed in the central portions of strata 42 and 41 with more dry wetlands, small stream, and reservoirs at only at 50% of capacity. The area just north of Malta, Montana was particularly dry. The majority of strata 41 was classified as good, with ponds and reservoirs that averaged 75–90% of capacity. Overall, mostly good and some fair waterfowl production is expected across the Western Dakotas and Montana survey area.

Overall, the 2014 May pond count in this crew area was 152% higher than last year, and 74% higher than the long-term average. Total duck numbers increased by 129% from 2013, and were 119% higher than the long-term average. The mallard estimate was similar to 2013 and 96% above the long-term average. The gadwall estimate was 96% higher than last year and 105% above the long-term average. The American wigeon estimate was 198% higher than 2013 and similar to the long-term average. Green-winged teal were similar to last year, but 72% lower than the long-term average. Blue-winged teal were 421% higher than last year and 316% higher than the long-term average. Northern shovelers were 206% higher than last year and 219% above the long-term average. The northern pintail estimate was 185% higher than 2013 and similar to the long-term average. Redhead and canvasback estimates were similar to 2013 and their long-term averages. The scaup estimate was similar to last year, but 55% lower than the long-term average.

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

May 2014 habitat conditions in the survey area changed little as the survey progressed. The South Dakota portion of the survey area was dry as or drier than observed in 2013 despite average to slightly above-average precipitation during the summer through winter period of 2013–2014. The dry trend from 2012 continued throughout much of 2013 and through the winter of 2014 in southeastern South Dakota. Much of the precipitation the state has received in the past two years tended to miss the southeastern portion of the state. The northcentral and northeastern portions of South Dakota saw average to slightly above-average snowfall and well below-average temperatures during the winter of 2013–2014. Despite that, most of South Dakota was extremely dry during the survey and without adequate spring and summer precipitation it appeared as if the area could easily slip back into a drought. With an abnormally cold winter and spring, upland vegetation remained dormant and trees were early in the bud stage. Spring phenology was considerably delayed again this year. In stratum 48 and 49 in South Dakota, conditions were judged to be fair at best on the coteau and poor in the prairie areas of the drift plain. Many semi-permanent wetland basins and nearly all ephemeral wetlands were dry south of Aberdeen. There were pockets of fairly good conditions but on the whole South Dakota was pretty dry. Very few wetlands were more than 50% full except in the coteau regions. All streams and rivers were well within their banks and some streams were dry. Farming activity was delayed due to the below-average winter and spring temperatures; only about 5% of corn had been planted and beans were being planted during the survey. Production should be good in the coteau regions of the state but probably below average in the drift plain regions. Conditions improved slightly as we moved north, particularly the northeast region around Aberdeen again. Observed conditions in stratum 45 and 46 in North Dakota were considerably better, with most of the state considered to be fair to good. The drift plain portions of North Dakota were better than South Dakota and the coteau regions were good. Sheetwater was observed for the first time during the survey in North Dakota, particularly in areas around Jamestown and

Minot. Again, virtually all of the permanent wetland basins in the coteau regions were at least 60% full but vegetation margins were present. Semi-permanent and seasonal wetlands were puddles of water to <50% full. Many seasonal wetlands held good water but should be noted many were void of ducks. Stratum 45 appeared fair to good in nearly all parts, with a few of the coteau segments looking excellent. The Souris River was well within its banks and Devil's Lake and Lake Sakakawea had no exposed beach areas, although this may be a result of the extensive draining of wetlands occurring in the state more so than average or above-average precipitation rates. There are few intact wetlands remaining in stratum 47 and most of the segments were void of wetlands and waterfowl. Observed habitat conditions across North Dakota continue to decline as a result of wetland draining, conversion of grass to row crops, and energy development. Many areas observed with good numbers of wetlands have very little nesting habitat. Many areas observed with ample nesting habitat have poor wetland densities either naturally or as a result of the continual trend of increased wetland drainage. Most of the coteau regions remain intact and should produce an average number of waterfowl in 2014.

On the whole, conditions in the eastern Dakotas are fair at best with much of South Dakota poor. The coteau regions of both states were rated as good and it should be an average year for waterfowl production there. The cold spring did not seem to delay breeding for the early nesters, and ratios of pairs to lone drakes were good all the way to survey completion on 20 May. Courtship behavior was still being observed for some of the late-arriving species, such as blue-winged teal. Few flocks of drakes larger than 3 or 4 were observed. The same regions that were poor in 2013 were poor again in 2014, with some expansion due to drier conditions in South Dakota. Stratum 47 remained poor and probably always will with the extensive draining that has occurred there.

In the eastern Dakotas, the 2014 May pond estimate was 19% lower than 2013, but 42% higher than the long-term average. The total duck estimate was 18% below last year and 76% above the long-term average. Mallard numbers were 28% lower than 2013 and 84% higher than the long-term average. The gadwall estimate was similar to 2013 and 81% above the long-term average. The American wigeon estimate was similar to 2013 and the long-term average. Green-winged teal were similar to 2013, but were 276% higher than the long-term average. Blue-winged teal were 22% lower than last year and 44% higher than their long-term average. Northern shovelers were similar to last year and 131% above their long-term average. The northern pintail estimate was similar to the 2013 estimate, and 37% higher than their long-term average. The redhead estimate was 34% lower than last year and 52% above the long-term average. The canvasback estimate was similar to 2013 and 174% above their long-term average. Scaup numbers were similar to last year and 269% above their long-term average in this survey area.

Northern Saskatchewan, Northern Manitoba, and Western Ontario (strata 21–25, 50)
reported by Walt Rhodes

This survey area experienced one the longest periods of below-average temperatures on record and generally received above-average precipitation. Temperatures during fall and winter 2013–2014 were extremely below normal across the entire survey area. September 2013 was slightly above average and October 2013 was average, but from November 2013 to May 2014 mean-monthly average temperatures were often > 5 degrees Celsius below normal across the survey area (Agriculture and Agri-Food Canada 2014). The exception was a small area of northeast Manitoba near Churchill, where May 2014 was 2–4 degrees Celsius above average, the only region that had average or above-average temperatures since October 2013. A reconnaissance flight on 22 May revealed substantial ice cover remaining on Lac La Ronge and Montreal Lake and only the very smallest wetlands had thawed in the southern portions of the survey area. Precipitation from September 2013 through June 2014 was normal to above average (85–150%). Winter precipitation (November 2013–March 2014) was above average, with southern regions from Prince

Albert, Saskatchewan, eastward through Flin Flon, Manitoba, towards Thompson, Manitoba, wetter than more northern areas near Stony Rapids, Saskatchewan. Most of the winter precipitation fell during November 2013 and January 2014 while February and March 2014 were below average. Spring precipitation (April–June 2014) was above- to well-above normal (>115%), particularly through central Saskatchewan and Manitoba and southward. During the survey period, very little wildfire activity was noted due to the late ice-out and wet conditions. Overall, habitat conditions were good throughout the survey area, but the late spring probably displaced some breeding waterfowl.

Winter and spring in western Ontario (stratum 50) were similar to the rest of the survey area. Habitat conditions were excellent, but a broad area of flooding in the northcentral area of the province resulted from the rapid melt of the abundant snow accumulation. Early nesting waterfowl in these wetlands and drainages were likely impacted by the late-season flooding. Throughout western Ontario beaver-maintained habitats remained strong and beaver marshes were abundant offering great habitat for nesting birds.

The 2014 total duck estimate in this survey area was 25% lower than last year and 26% lower than the long-term average. The mallard estimate was similar to last year and to the long-term average. Gadwall numbers were 180% higher than 2013 and similar to the long-term average. The American wigeon estimate was 68% lower than 2013, and 69% lower than the long-term average. Green-winged teal were 67% lower than last year and 43% lower than the long-term average. Blue-winged teal estimates were similar to 2013 but 81% lower than the long-term average. Northern shovelers were similar to last year but 40% lower than the long-term average. Northern pintails were similar to last year and 86% lower than the long-term average. The redhead estimate was similar to 2013 and 94% lower than the long-term average. Canvasback were similar to 2013 and 56% lower than the long-term average. The scaup estimate was 36% lower than 2013 and 64% lower than the long-term average.

Central and Northern Alberta, Northeastern British Columbia, and Northwest Territories (strata 13–18, 20, 77)
reported by Fred Roetker

Spring 2014 came exceptionally late over most of the region, even more so than the spring of 2013. A prolonged winter and one of the latest break-ups in years was a reoccurring comment we heard as we progressed through the survey. Smaller wetlands thawed first and birds seem to immediately occupy these desirable habitats. Larger lakes were slower to thaw as usual, and birds were also observed in good numbers in these shoreline habitats. The habitat ranked good throughout the region. No significant spring flooding was observed on the Mackenzie River Delta.

In this crew area, the total duck estimate for 2014 was 19% higher than the 2013 estimate and 39% higher than the long-term average. Mallard numbers were 72% higher than 2013 and 62% above the long-term average. The American wigeon estimate was 42% higher than the 2013 estimate and 75% higher than the long-term average. Gadwall were similar to last year and the long-term average. Green-winged teal were 40% higher than 2013 and 112% above the long-term average. Blue-winged teal were similar to 2013 and the long-term average. Northern shovelers were similar to the 2013 estimate and 67% above the long-term average. Northern pintails were similar to last year and the long-term average. Redheads were 167% higher than 2013 and similar to the long-term average. The canvasback estimate was similar to last year and to the long-term average. The scaup estimate was similar to last year but 16% below the long-term average.

Alaska, Yukon Territory, and Old Crow Flats (strata 1–12)
reported by Debbie Groves

Much of Alaska experienced an early spring and a mild breakup of river ice with essentially no flooding. Water levels in slough and pond habitats adjacent to rivers are slightly below average. Elsewhere, water levels were average to slightly below average. The combination of an early spring and lack of flooding in all of the

Alaska strata should result in good-to-excellent duck production in Alaska in 2014.

The 2014 total duck estimate in this survey area was similar to 2013 and the long-term average. Mallard numbers were 48% higher than last year and 33% higher than the long-term average. American wigeon were similar to last year and 33% above their long-term average. Green-winged teal were similar to last year and their long-term average. No blue-winged teal have been counted in this crew area in the last 3 years. The northern shoveler estimate was 65% higher than last year and similar to the long-term average. Northern pintails were 30% lower than 2013 and 25% below their long-term average. No redheads or gadwall were counted in this crew area in 2014, resulting in a 100% decrease from 2013 and the long-term average. The canvasback estimate was similar to 2013 but 76% lower than the long-term average. The scaup estimate was similar to 2013 and 37% lower than the long-term average.

Eastern survey area (strata 51–72)
reported by Stephen Earsom, Mark Koneff, and Jim Wortham

Most of southern Ontario and western Quebec experienced near- or somewhat below-average winter precipitation between early November and late March 2014. This trend continued for extreme southern Ontario through May. However, the rest of the region experienced precipitation well above average during April and May. Below-average temperatures resulted in a later ice melt, leaving the vast majority of water bodies nearly full and water evident throughout the landscape. The late melt combined with several spring storms caused the St. Lawrence River to be quite high between Montreal and Quebec City, and riparian wetlands that often hold high concentrations of migrating and nesting waterfowl were completely inundated. High water along rivers also occurred in stratum 57 (not surveyed) where the village of Attawapiskat, situated along the banks of the river of the same name, was evacuated in mid-May due to flooding. Tree leaf-out appeared somewhat late when we began surveys on 7 May in stratum 54, and ice floes were evident on Lakes Erie and Huron. Some tree species had swollen buds but few had leaves. The southern transects of stratum 68, the last to be surveyed, had mostly leafed out when they were surveyed on 3–4 June. Throughout the survey, ice on all water bodies was melted though a very few patches of snow were noted on north-facing slopes. Despite finishing the survey near the end of the apparent vegetative phenological window, we did not see any goose or duck broods. Overall, nearly all of southern Ontario and western Quebec merited a good or excellent rating, and we would not expect habitat to be a limiting factor for waterfowl production in 2014.

Winter in northern Quebec was characterized by colder-than-normal conditions, but normal to below-normal winter precipitation. Spring conditions came slightly late, and during the time of our survey, many of the larger lakes still had remnants of ice. The eastern areas along the James Bay had recently suffered extensive wildfires, many of which appeared to have burned quite hot, consuming the trees and underlying peat and leaving only the bare bedrock exposed. These same areas were also drier than in past years, possibly an effect of impacts to the frost seal. As a result, waterfowl habitat along the eastern side of the James Bay was judged to be in fair-to-poor condition. Moving eastward from James Bay toward Labrador, habitat conditions improved with adequately charged wetlands and lakes at normal levels. Habitats were judged to be fair from mid-northern Quebec to the border with Labrador. Much of northern and eastern stratum 70 has suffered from wildfires during the past two years. Confounding these effects was drier-than-normal conditions along the north shore of the St. Lawrence River. Despite these setbacks, habitat conditions in the western reaches of the area were good while conditions in the east were judged to be only fair.

December was colder and snowier than normal throughout the Maine and Atlantic Canada survey area. Several January thaws coincided with periods of heavy rain or mixed precipitation, particularly in Maine and the Maritimes. This, combined with frozen ground, led to local flooding events. Early spring brought normal to above-normal precipitation in Maine and the Maritimes and normal to below-normal precipitation throughout Newfoundland and Labrador. Soil moisture indices were near normal across the region at the start of the survey period, in contrast with drier conditions that prevailed in Maine and the Maritimes in 2013 at the time of the survey. Late winter and early spring across the survey area saw temperatures colder than normal, with Maine experiencing the coldest March on record. A slow start to spring resulted in a gradual thawing, though some ice jamming and flooding occurred in Maine and New Brunswick. Spring phenology was later than in recent years, though waterfowl-breeding activity was timed fairly normally or was slightly delayed. Despite a slightly later start, habitats across the region were in good condition for breeding waterfowl. Wetlands in surveyed areas that were drier in 2013, in particular Maine and parts of the Maritimes, were at capacity. Except for portions of northern Maine and New Brunswick, particularly the Saint John River watershed, little flooding was observed. Persistent cool, damp conditions throughout the region prevented a classification of conditions as excellent. Conditions for waterfowl production could improve further, should more seasonal temperatures and drier conditions prevail during the primary brood-rearing period.

Estimated abundance of mallards in the eastern survey area was similar to the 2013 estimate and the long-term average (1990–2013). The estimated abundance of American black ducks was similar to the 2013 estimate and the long-term average. Green-winged teal abundance was 19% below 2013 and similar to the long-term average. The abundance of ring-necked ducks was 22% lower than 2013 and similar to the long-term average. Goldeneyes were similar to 2013 and the long-term average. Mergansers were similar to last year's estimate and their 1990–2013 average.

Other areas

In the Pacific Flyway, below-normal winter precipitation and snowpack led to continued poor habitat conditions in many areas. In California, habitat conditions were very poor, with 2013 one of the driest water years on record. All regions recorded minimal rainfall, and many artificial water systems were not sufficient to provide wildlife areas with water. In the Sacramento Valley, where the highest impact on breeding ducks is expected, rice agriculture was reduced by 35% and winter wheat by 41%. In California, the total duck estimate in 2014 was 448,700, which was similar to last year's estimate and 23% lower than their long-term average of 582,500. The mallard estimate in 2014 was 238,700, the lowest estimate since the survey was standardized in 1992. This was similar to the 2013 estimate, but 34% lower than the long-term average. In Nevada, winter precipitation and run-off was well below normal for the third consecutive year. Most wetlands in northern Nevada including the Carson Sink area (Stillwater NWR, Carson Lake WMA) had only 20–30% coverage. Reservoir storage for this area was at only 26% of capacity so little additional water is forthcoming. Northern Nevada Great Basin reservoir and run-off are similarly below average. Eastern Nevada wetlands are only slightly better with 30–40% coverage, however, snowpack in Clover and Franklin River Basin was slightly above average with run-off running at average into May. The total duck estimate for Nevada was 23,700, which was lower than 2013. The Nevada mallard estimate was 4,200, which was lower than 2013. In Oregon, winter precipitation was below normal in the western and southeastern regions of the state. Spring precipitation improved habitat conditions in western Oregon; however, southeastern Oregon remained relatively dry, reducing the amount of available habitat for waterfowl. Average precipitation in northeastern Oregon improved habitat conditions in many areas. Due to budget reductions and safety concerns, river segments in the Oregon Breeding Waterfowl Survey were not surveyed in 2014. To allow for comparison with the reduced effort this year, the historical time series of estimates has been adjusted (Appendix C.2). In Oregon, the total duck estimate in 2014 was 315,200, which was higher than 2013. The 2014 mallard count was 85,300, which was similar to last year (84,300) and the long-term average (92,200). In Washington, the spring was the wettest on record for much of the western part of the state, while the winter was the driest on record. Spring monthly precipitation was up from 2013, more closely matching 2012. However, the ponds appeared drier than in 2012. The estimate for total ducks in Washington (177,200) was 13% higher than the 2013 estimate (156,500). The mallard estimate in Washington was 86,500, which was similar to last year's estimate and the long-term average. Habitat conditions in 2014 were poor in the prime waterfowl areas of southern British Columbia and average in the northern part of the province. Winter precipitation was below or near average in the B.C. interior. Below-normal temperatures and above-normal precipitation in late April led to increased snow-pack (British Columbia Ministry of Forests, Lands, and Natural Resource Operations 2014). The transition from accumulating to melting snow was delayed, with more higher-elevation wetlands frozen in early May compared to previous years. In the southern part of the B.C. interior, which contains the most productive waterfowl habitat in the province, wetland water levels were marginally lower than last year and below the long-term average, while northern interior wetlands had near-average water levels. In British Columbia, the total duck estimate was 324,500, which was similar to last year (305,300) and the long-term average (327,400). The 2014 mallard estimate was 81,600, which was similar to last year's estimate of 77,200 and the long-term average (79,700).

In the Midwest, spring was delayed in most areas, but ample precipitation resulted in overall good habitat conditions. In Minnesota, spring ice-out on lakes was approximately two weeks later than average. Spring temperatures were well below normal in March, April, and May. Wetland conditions were very good overall, with drier conditions in southwest Minnesota and very wet conditions in east-central Minnesota. The number of permanent or semi-permanent wetlands increased 33% from 2013 and was 28% higher than both the 10-year and long-term averages. The estimate of total duck abundance in Minnesota, excluding scaup, was 474,400, which was lower than last year's estimate (682,900) and the long-term average of 621,400 ducks. The estimated mallard breeding population was 257,000, which was similar to last year's estimate of 293,200 mallards and the long-term average. In Michigan, wetland habitat conditions improved across the state in 2014 with pond estimates for the northern forested region increasing by 6% compared to conditions in 2013, and the number of ponds increasing by 14% in southern Michigan. The estimate for total ducks was 395,300, which was the lowest recorded on this survey; this estimate was 42% lower than last year and 39% lower than the 1991–2013 average. The Michigan mallard estimate was 230,100, which was similar to last year but 36% lower than the long-term average. In Wisconsin, winter precipitation was 16% above normal and spring 2014 was very late in coming. It was a very cold and late winter in northern Wisconsin, with ice cover remaining on many lakes in early May. The initiation of the spring waterfowl survey was delayed one week with a start date of 5 May, but even with this delay some water bodies were surveyed that had only become ice free a few days before the survey. The above-average winter precipitation, the late melt, and spring precipitation 20% above normal created a very wet landscape during the survey period. Most temporary and season wetlands were full and more permanent water bodies have recovered from low levels of two years ago. The total Wisconsin breeding duck population estimate was 395,100, which was 25% lower than 2013 (527,300) and similar to the long-term average. The 2014 total mallard population estimate of 158,700 was similar to the 2013 estimate of 181,200 and the long-term average. In Nebraska, winter conditions varied across the Sandhills. Areas in the western Sandhills received early spring precipitation, and water levels were full at the onset of the nesting season. However, the eastern Sandhills were much drier and did not receive ample precipitation until mid-May to early June. Spring appeared earlier and warmer than the spring of 2013, and upland nesting cover was better than last year. Although some wetland areas were full for early nesting, and probably some re-nesting efforts, the drier conditions in the eastern Sandhills were not conducive for production. Overall, production in the Sandhills should be slightly below average in 2014. Nebraska has not conducted a spring waterfowl survey in recent years.

In the northeast U.S., spring was colder than average, with many states reporting snow and ice persisting through March, and abundant rainfall which resulted in good habitat conditions for nesting waterfowl. Spring was delayed up to a week, or longer along the Atlantic Coast. Extensive ice cover on the Great Lakes, and large numbers of ring-necked and black ducks observed in New Jersey in mid-April suggested delayed migration in the eastern U.S. Northern states experienced a cold winter with abundant snowpack that recharged lakes and marshes. In Vermont, spring rains and melting snow restored below-normal water levels, leading to lush grassland nesting sites. Flooding occurred early during ice out, which limited impacts to nesting waterfowl. Last year's near-drought conditions in Massachusetts were returned to normal by spring rains and a heavy snow pack. Colder temperatures than normal may have delayed spring vegetation growth in Rhode Island, which appeared to have resulted in later nesting compared to recent years. Similarly, in Pennsylvania vegetation phenology was delayed 1–2 weeks, with first hatches of mallards occurring a week later than normal. In some states, heavy rains in April and May may have impacted early nesting efforts. Likewise, in Delaware, severe rains in early May caused substantial nest failure for Canada geese in some northern plots. Significant storms in Virginia led to higher than normal tides which may have flooded some waterfowl nests near tidal areas. Otherwise, however, nesting conditions in most of the Northeast were good, and average to above-average production is expected. Total duck numbers from the 2014 Atlantic Flyway Breeding Waterfowl survey were 1.34 million, which was similar to the 2013 estimate and the long-term (1993–2013) average of 1.39 million. Mallard numbers (634,600) were similar to the 2013 estimate of 604,200 and 14% below the long-term average of 740,600.

Mallard Fall-flight Index

The mid-continent mallard population is composed of mallards from the traditional survey area (revised in 2008 to exclude Alaska mallards), Michigan, Minnesota, and Wisconsin, and is estimated to be 13.4 ± 1.3 million birds in 2014 (Figure 4). This is similar to the 2013 estimate of 13.1 ± 1.2 million.

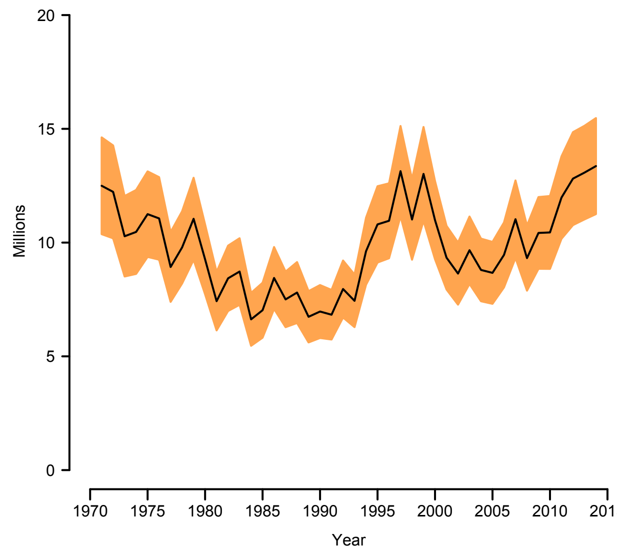


Figure 4. Estimates and 90% confidence intervals for the predicted size of the mallard population in the fall.

References

Agriculture and Agri-Food Canada. 2014. Current Conditions. Accessed May–June 2014. URL http://www4.agr.gc.ca/DW-GS/current-actuelles.jspx?lang=eng&jsEnabled=true.

British Columbia Ministry of Forests, Lands, and Natural Resource Operations. 2014. Water Supply and Snow Survey Bulletin. Accessed May 2014. URL http://bcrfc.env.gov.bc.ca/bulletins/watersupply/archive.htm.

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.

National Weather Service. 2014. Advanced Hydrologic Prediction Service. Accessed May–June 2014. URL http://water.weather.gov/precip/.

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.

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.

U.S. Fish and Wildlife Service. 2014. Adaptive Harvest Management: 2014 Hunting Season. U.S. Department of Interior Technical report, Washington, D.C. URL http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/AHM/AHM-intro.htm.

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. URL http://onlinelibrary.wiley.com/doi/10.1002/jwmg.351/abstract.

Status of Geese

Abstract: We provide information on the population status and productivity of North American Canada geese (*Branta canadensis*), brant (*B. bernicla*), snow geese (*Chen caerulescens*), Ross's geese (*C. rossii*), emperor geese (*C. canagica*), white-fronted geese (*Anser albifrons*), and tundra swans (*Cygnus columbianus*). Production of arctic-nesting geese depends heavily upon the timing of snow and ice melt, and spring and early summer temperatures. In 2014, conditions in the arctic and boreal areas important for geese were variable. Conditions in the north-central Arctic were very poor for nesting as spring was very late, with snow cover persisting into July. By contrast, spring was early in many of the more southern regions in the Central Arctic. At Karrak Lake on the Queen Maude Gulf, ice break-up was 14 days earlier than average, so biologists expected above-average production by the snow and Ross's geese, and Mid-continent white-fronted geese that nest there. Conditions in many areas of the eastern Arctic were favorable for breeding waterfowl. Spring phenology was early on Southampton and Bylot Islands, and excellent production by the greater snow geese that nest on Bylot was expected. Spring was slightly early on the Ungava Peninsula, and biologists predicted slightly above-average production of the Atlantic Population Canada geese that nest there. Spring was cold and wet in Newfoundland and Labrador, but the timing of nesting was normal, and the outlook for production of North Atlantic Population Canada geese was good. Alaska experienced a very early, warm spring, with little or no flooding, so the outlook for the many goose and swan populations nesting there was excellent. The favorable conditions on Alaska's Yukon–Kuskokwim Delta (YKD), were a welcome contrast to 2013, when a late ice break-up and a storm-surge flood made for very poor production. Predicted production of Emperor geese, cackling Canada geese, and white-fronted geese should be much improved in 2014. On the Copper River Delta, the early phenology and the highest Dusky Canada goose index in 20 years suggests an excellent year for this population. Of the Canada goose populations that migrate to the Mississippi Flyway, predicted production was above-average for the Eastern Prairie Population, but below-average for the Mississippi Valley and the Southern James Bay populations, the latter for the second year in a row. Indices of wetland abundance in the Canadian and U.S. prairies in 2014 continued to improve, with the exception of the eastern two-thirds of South Dakota and the Red River Valley in North Dakota. Although early spring was cold and wet in many goose nesting areas of the U.S., the outlook for production was generally good. Breeding populations of most temperate-nesting geese remained high in 2014, despite efforts to reduce or stabilize them. Production and fall flights of temperate-nesting Canada geese over most of North America should be average in 2014.

Primary abundance indices increased for 9 goose populations and decreased for 11 goose populations in 2014 compared to 2013. Primary abundance indices for both populations of tundra swans decreased in 2014 from 2013 levels. The following populations displayed significant positive trends during the most recent 10-year period ($P < 0.05$): Short Grass Prairie, North Atlantic, Aleutian Canada geese, Mid-continent, Western Central Flyway, and Western Arctic Wrangel Island light geese, Eastern swans, and the Pacific population of white-fronted geese. Only the Atlantic Flyway Resident, and the Tall Grass Prairie Populations showed a significantly negative 10-year trend. The forecast for the production of geese and swans in North America is variable, depending on the population and its breeding area.

This section summarizes information regarding the status, annual production of young, and expected fall flights of goose and tundra 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 5), but several Canada goose populations nest in temperate regions of the United States and southern Canada ("temperate-nesting" populations). The annual production of young by northern-nesting geese is influenced greatly by weather conditions on the breeding grounds, especially the timing of spring snowmelt and its impact on the initiation of nesting activity (i.e., phenology). 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 better than 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 initiations are delayed much beyond 15 June. For temperate-nesting Canada goose populations, recruitment rates are less variable, but productivity is influenced by localized drought and flood events.

Methods

We have used the most widely accepted nomenclature for various waterfowl 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 1 March 2010 (79 FR 9282). 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 D.1, D.2, and D.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 Midwinter Survey (MWS, conducted each January in wintering areas), the Waterfowl Breeding Population and Habitat Survey (WBPHS, see Status of Ducks section of this report), and surveys that are specifically designed for various goose populations. Where survey methodology allowed, 95% confidence intervals are presented in parentheses following population estimates. The 10-year trends of population estimates were calculated by regressing the natural logarithm of survey results on year, and slope coefficients were presented and tested for equality to zero (t-statistic). Changes in population indices between the current and previous year 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, those related to management plan population objectives, are described first in population-specific sections and graphed when data are available. Because this report was completed prior to final annual assessments of goose and swan reproduction, the annual productivity of most populations is only predicted qualitatively. Information on habitat conditions and forecasts of productivity were primarily based on observations made during various waterfowl surveys and interviews with field biologists. These reports provide reliable information for specific locations, but may not provide accurate assessment over the vast geographic range of waterfowl populations.

Results and Discussion

Conditions in the Arctic and Subarctic

Production of Arctic-nesting geese depends heavily upon the timing of snow and ice melt, and spring and early summer temperatures. In 2014, snowmelt timing varied considerably among important goose breeding areas, very early in Alaska, late in the north-central Arctic, and early in the south-central Arctic, and variable in the eastern Arctic. The snow and ice cover graphics (Figure 6) illustrate that the area covered with ice or snow on 2 June 2014 was

Figure 5. Important goose and swan nesting areas in Arctic and subarctic North America.

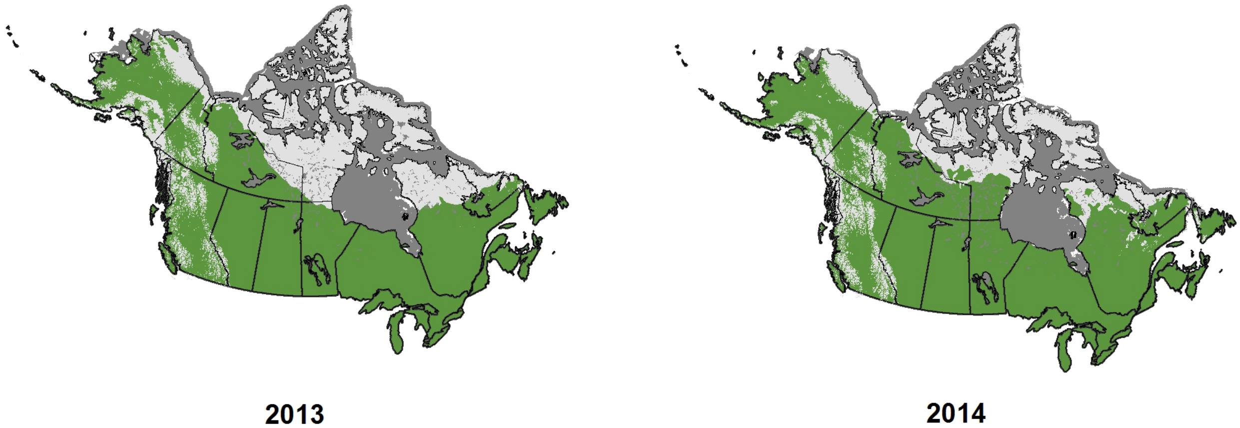


Figure 6. The extent of snow (light gray) and ice (dark gray) cover in North America on 2 June 2013 and 2 June 2014 (National Ice Center 2014).

less extensive than on the same date in 2013, especially along the western coast of Hudson Bay (National Ice Center 2014). However, in areas along the coast of the Beaufort Sea along the northeastern coast of Alaska, ice and snow cover was more extensive than in 2013, in contrast to the excellent conditions in the rest of Alaska.

Gosling production of Canada goose populations that breed further to the south and migrate to the Atlantic and Mississippi Flyways will likely vary. Good production is forecast for greater snow geese, and the Atlantic and Eastern Prairie Canada goose populations. Production by the Southern James Bay and Mississippi Valley Canada goose populations are predicted to be below-average in 2014.

Conditions in Southern Canada and the United States

Conditions that influence the productivity of Canada geese vary less from year to year in these temperate regions than in the Arctic and subarctic. Given adequate wetland numbers and the absence of flooding, temperate-nesting Canada geese are reliably productive. Wetland conditions were good throughout the Canadian and U.S. prairies in 2014, with the exception of the eastern two-thirds of South Dakota, and the Red River Valley in North Dakota. Although this spring was cold and wet in many goose nesting areas of the U.S., the outlook for production was still good. Breeding populations of most temperate-nesting geese remained high in 2014, despite efforts to reduce or stabilize them. Production of temperate-nesting Canada geese from most of their North American range is expected to be average in 2014.

Status of Canada Geese

North Atlantic Population (NAP)

NAP Canada geese principally nest in Newfoundland and Labrador. They generally commingle during winter with other Atlantic Flyway Canada goose populations, although NAP geese have a more coastal distribution than other populations (Figure 7). The NAP goose estimate (Figure 8.1) is calculated using data from the Waterfowl Breeding and Habitat Survey (WBPHS) in Newfoundland and Labrador (strata 66–67). In 2014, the NAP estimate was 76,000 (36,700–115,200) for total indicated pairs, and the estimate of total indicated birds was 183,600 (87,400–279,700). Because of mechanical problems with the USFWS Kodiak aircraft typically used to fly strata 66 and 67, these areas were not surveyed in 2013 by the USFWS, so we have no comparison between 2013 and 2014. However, over the past 10 years, the total indicated pair estimate has not shown a significant trend ($P = 0.144$), while total indicated bird estimates have increased by an average of 5% per year ($P = 0.045$). For several years, biologists have been considering revising the index used to monitor

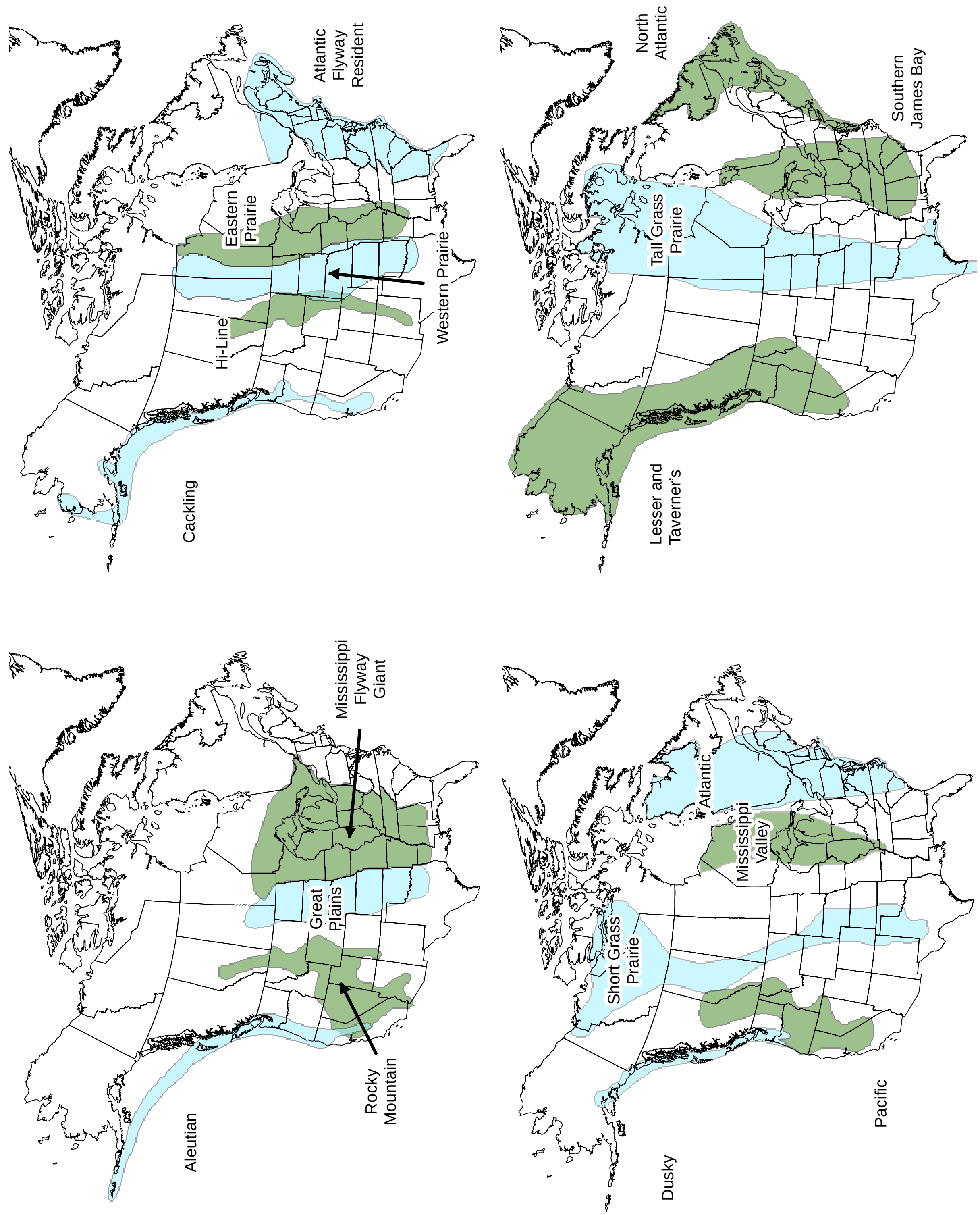
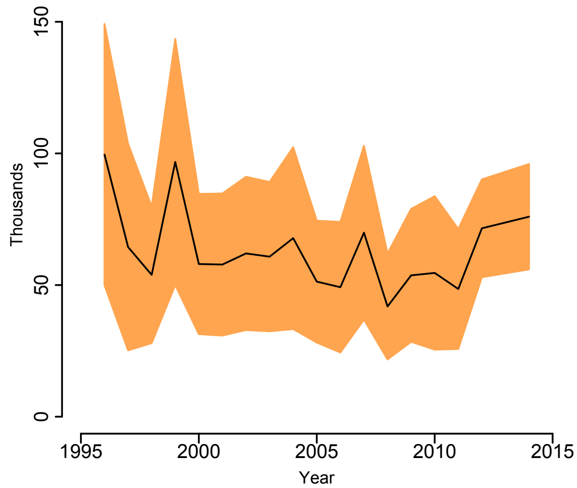
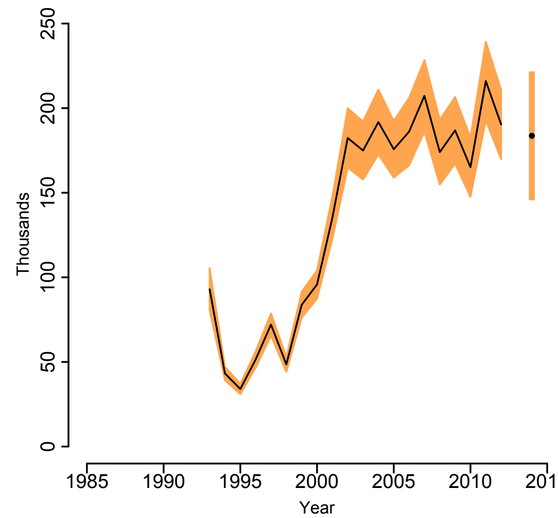


Figure 7. Approximate ranges of Canada goose populations in North America.



8.1: North Atlantic Population



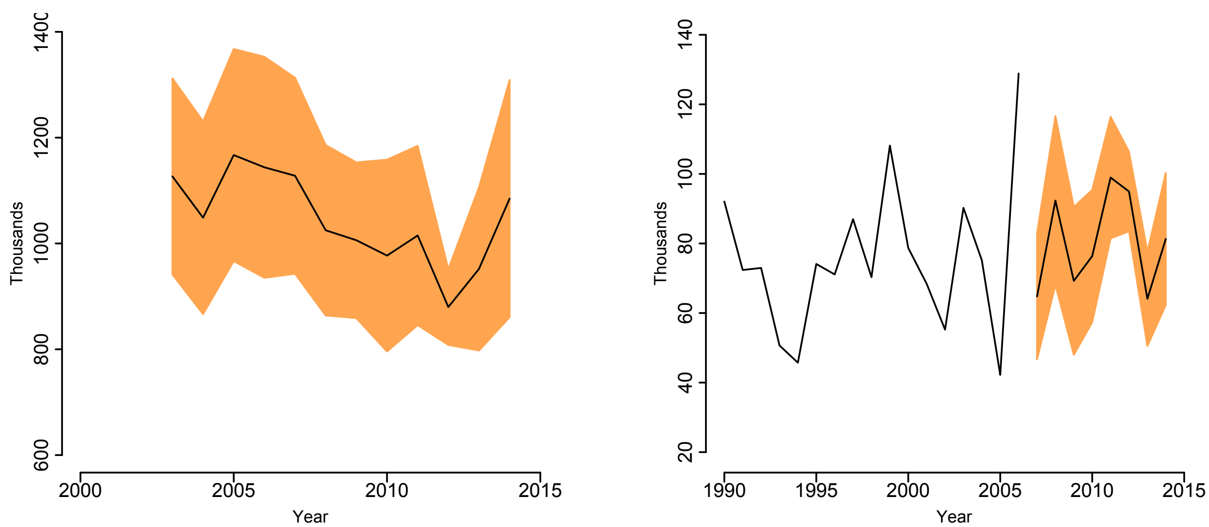
8.2: Atlantic Population

Figure 8. Estimated numbers (and 95% confidence intervals) of North Atlantic Population (indicated pairs; 1996–2014) and Atlantic Population (breeding pairs; 1988–2014) Canada geese.

this population to one that combines both the WBPHS transect and Canadian Wildlife Service (CWS) helicopter plot survey data, but that new index has not yet been adopted. December was colder and snowier than normal, and early spring brought normal to below-normal precipitation throughout Newfoundland and Labrador. Late winter and early spring temperatures were colder than normal. The slow start to spring resulted in a gradual thawing, and although spring phenology was later than in recent years, the timing of waterfowl breeding activity was still normal or slightly delayed. Because of the persistent cool, damp conditions, the outlook for NAP goose production was rated good rather than excellent. An average or slightly below-average fall flight of NAP geese was expected.

Atlantic Population (AP)

AP Canada geese nest throughout much of Quebec, especially along Ungava Bay, the eastern shore of Hudson Bay, and on the Ungava Peninsula (Figure 8.2). The AP winters from New England to South Carolina, but the largest concentrations occur on the Delmarva Peninsula (Figure 7). This population is monitored using estimates from a spring survey of the Ungava Peninsula in northern Quebec. The estimated number of breeding pairs was 183,600 (145,000–222,300), and the total population estimate (breeding pairs and grouped birds) was 785,600 (616,500–954,600). The total population estimate may contain large numbers of molt migrant geese and should be interpreted cautiously. Both estimates are uncorrected for visibility bias and thus represent an index to the population. Similar to the NAP goose survey, aircraft mechanical problems prevented this survey from being flown last year, so 2013 estimates were not available for comparison. Over the past 10 years, the breeding pair estimates are stable, and the total population estimates have decreased by an average of 6% per year ($P = 0.007$). Habitat conditions appeared favorable for nesting, particularly along the Hudson Bay coast. The proportion of indicated pairs observed as single geese (63%) was above the long-term average of 51% (1993–2014; range = 34–63%). A high proportion of single geese usually forecasts above-average production. In addition, a model that uses May temperatures and June snowfall to predict recruitment suggested a nesting season that is slightly above average (Sheaffer and Malecki 1996). Thus, an above-average fall flight of AP geese was expected.



9.1: Atlantic Flyway Resident Population

9.2: Southern James Bay Population

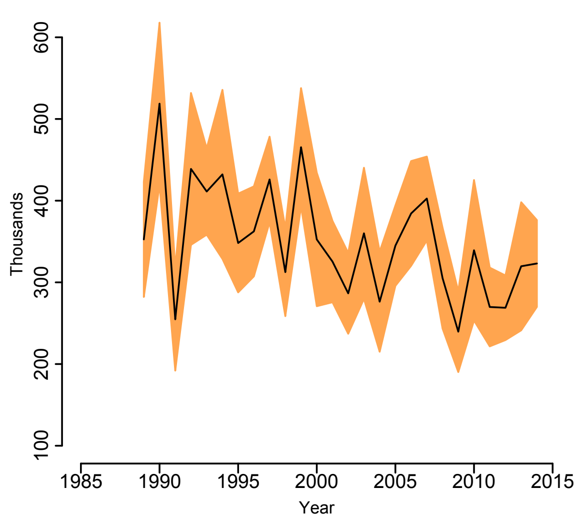
Figure 9. Estimated numbers (and 95% confidence intervals) of Atlantic Flyway Resident Population (breeding adults) and Southern James Bay Population (breeding adults) Canada geese.

Atlantic Flyway Resident Population (AFRP)

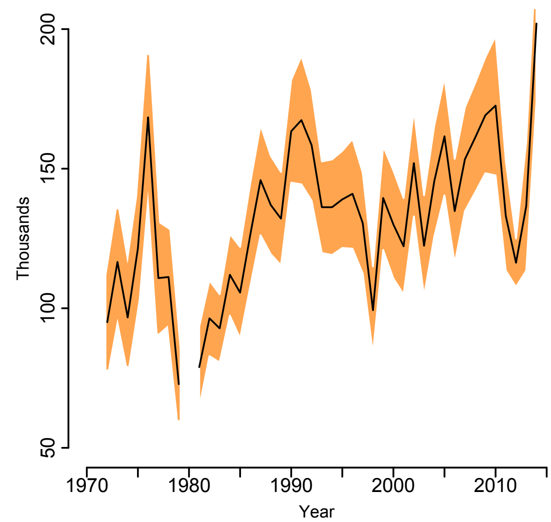
This population of large Canada geese inhabits southern Quebec, the southern Maritime provinces, and all states of the Atlantic Flyway (Figure 7). They are counted during the spring via the Atlantic Flyway Breeding Waterfowl Plot Survey. Since 2003, total indicated bird indices have been calculated by doubling pairs and single birds and adding them to grouped birds. A breeding population of 1,084,900 (860,800–1,309,100) AFRP Canada geese was estimated during the spring of 2014, similar ($P = 0.339$) to the 2013 estimate of 951,900 (796,900–1,107,000); Figure 9.1), and similar to the long-term (1993–2014) average ($P = 0.6$). These indices have declined by an average of 2% per year since 2005 ($P = 0.040$). Spring came late, and was cold and wet throughout the Northeastern and Mid-Atlantic states, which delayed Canada goose nesting in many areas. In addition, heavy rains and flooding during the peak hatch period in New Jersey and northern Delaware caused widespread nest losses. However, melt from heavy snowpack and abundant rains improved wetland conditions in several northern states that had experienced dry conditions in 2013, especially in Massachusetts, where near-drought conditions were brought back to normal. Below-average production was expected in New Jersey, Delaware, Pennsylvania, Connecticut, Rhode Island, and Massachusetts. Biologists expected average production in Maryland, New York, and Vermont, and average to above-average production in Virginia.

Southern James Bay Population (SJBP)

This population nests on Akimiski Island and in the Hudson Bay Lowlands to the west and south of James Bay. The SJBP winters from southern Ontario and Michigan to Mississippi, Alabama, Georgia, and South Carolina (Figure 7). The estimated number of breeding SJBP geese in spring 2014 was 78,200 (59,500–96,900), similar to ($P = 0.139$) the 2013 estimate of 60,900 (47,600–74,100). The total population index of 81,300 (62,300–100,300) was similar to ($P = 0.148$) last year's index of 64,100 (50,500–77,600; Figure 9.2). Neither of these indices of SJBP geese showed a trend over the 2004–2013 time series ($P \geq 0.847$). Transect level analyses indicated higher breeding pair numbers in 2014 relative to the previous 5-year average on Akimiski Island, but no significant change was detected on the mainland. Spring phenology was much later in 2014 than in 2013, later than the short-term (5-year) average, but



10.1: Mississippi Valley Population



10.2: Eastern Prairie Population

Figure 10. Estimated numbers (and 95% confidence intervals) of Mississippi Valley Population (breeding adults) Canada geese and Eastern Prairie Population (indicated pairs) Canada geese.

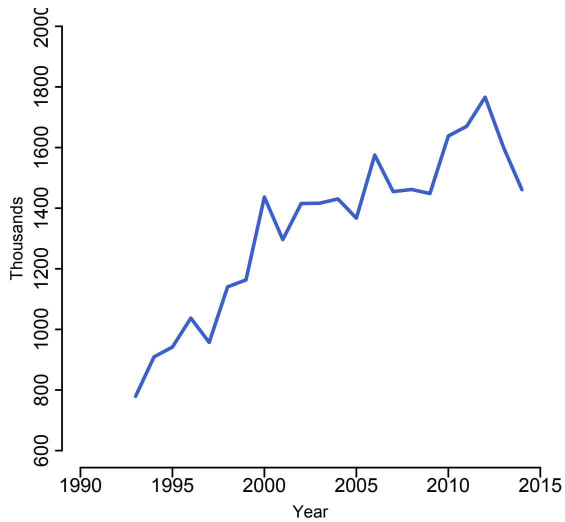
similar to the long-term average. There was an above-average snow pack on SJBP range last winter and March, April and May were characterized by below-average temperatures. The timing of peak hatch at Akimiski Island (15–18 June) was similar to 2013, and later than average. A below-average fall flight was expected.

Mississippi Valley Population (MVP)

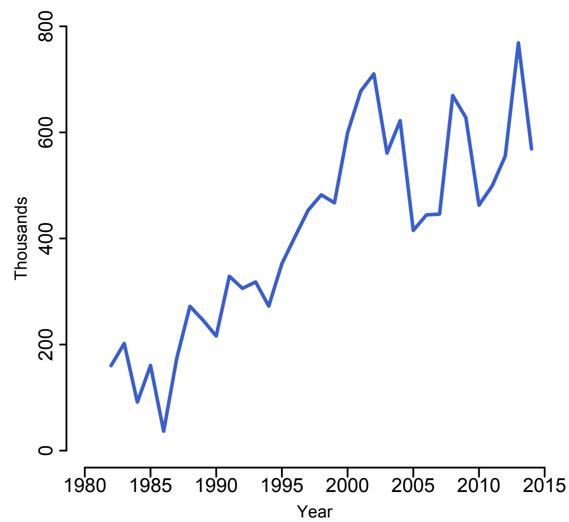
The nesting range of this population is in northern Ontario, principally in the Hudson Bay lowlands, west of Hudson and James bays. MVP Canada geese primarily concentrate during fall and winter in Wisconsin, Illinois, and Michigan (Figure 7). Breeding ground surveys conducted in 2014 produced an estimate of 323,100 (269,900–376,300) MVP breeding adults, similar to the 319,700 (241,700–397,700) counted in 2013 ($P = 0.944$; Figure 10.1). Estimates of breeding adults have declined by 2% per year during 2005–2014, but this decrease was not statistically significant ($P = 0.202$). Similarly, 2014 transect level breeding pair numbers were statistically similar to the 2009–2013 average ($P = 0.43$). Surveys indicated a total population of 466,700 (295,700–637,600), similar to the 2013 estimate of 390,700 (278,800–502,600). Spring phenology was later than the 5-year average, but comparable to 2013 and the longer-term average. There was an above-average snow pack on MVP range last winter and March, April, and May were characterized by below-average temperatures. Snow melt and river break-ups were later than in 2013 and were also similar to the long-term average. June and early July temperatures were average over the MVP range with near-average wetland conditions. Biologists at the Burntpoint Creek camp east of Peawanuck, Ontario reported little snow and average wetland conditions as of 4 June, and estimated peak hatch at 19–20 June. Breeding effort was average to below-average with much higher levels of nest predation (approximately 56%) than in 2013, so a below-average fall flight was expected for MVP geese.

Eastern Prairie Population (EPP)

These geese nest in the Hudson Bay Lowlands of Manitoba and concentrate primarily in Manitoba, Minnesota, and Missouri during winter (Figure 7), and they are surveyed annually on their breeding grounds. Because of the variable influence of molt migrants, EPP geese are monitored using the estimate of geese counted as singles and pairs, as they represent geese nesting in the current year and those likely to nest



11.1: Mississippi Flyway Giant Population



11.2: Western Prairie/Great Plains Population

Figure 11. Numbers of Mississippi Flyway Giant Population (breeding adults) Canada geese and Western Prairie/Great Plains Population Canada geese (winter geese).

in the near future. The 2014 estimate of 157,800 (133,700–181,900) single and paired EPP geese was similar to last year's estimate of 136,600 (113,500–159,700; $P = 0.213$; Figure 10.2). The 2014 spring estimate of 202,000 total geese was similar to the 176,900 (154,700–199,100) estimated in 2013 ($P = 0.166$). Neither of these estimates exhibited a trend over the 2005–2014 time series ($P \geq 0.406$). The estimate of productive geese in 2014 ($73,800 \pm 14,000$) increased relative to the 2013 estimate ($50,300 \pm 8,200$). The timing of spring was near average throughout the EPP Canada goose range. May temperatures in Churchill were warmer than in 2013, and warmer than the 1970–2013 average. Biologists sampled nests near the town of Churchill and predicted a median hatch date of 16 June and average EPP production this year. An average fall flight was expected for EPP geese in 2014.

Mississippi Flyway Giant Population (MFGP)

Giant Canada geese have been reestablished or introduced in all Mississippi Flyway states. This subspecies now represents a large proportion of all Canada geese in the Mississippi Flyway (Figure 7). Biologists estimated 1,461,000 MFGP geese during the spring of 2014, 9% lower than the revised 2013 estimate of 1,600,700 (Figure 11.1). Over the past 10 years, this population now does not show a significant trend ($P = 0.137$), following many years of increasing trends. This is considered an over-abundant population, currently managed with the goal of reducing it. Variable goose abundance and nesting conditions across the Flyway make it difficult to generalize about MFGP Canada goose fall abundance; however, Canada geese remain abundant across the flyway and hunters may not perceive significant changes in abundance in 2014 compared to 2013.

Western Prairie and Great Plains Populations (WPP/GPP)

The WPP is composed of mid-sized and large Canada geese that nest in eastern Saskatchewan and western Manitoba. The GPP is composed of large Canada geese resulting from restoration efforts in Saskatchewan, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Geese from these breeding populations commingle during migration with other Canada geese along the Missouri River in the Dakotas and on reservoirs from southwestern Kansas to Texas (Figure 7). These two populations are managed jointly and surveyed during winter. During the 2014 Midwinter Survey, 568,800

WPP/GPP geese were counted, 26% less than the 768,800 recorded in 2013 (Figure 11.2). Midwinter indices have shown no trend from 2005 to 2014 ($P = 0.07$). In 2014, the estimated spring population in the portion of WPP/GPP range included in the WBPHS (strata 21–25, 30–40, 43–49) was 1,381,200 (1,226,400–1,536,000) geese, similar to last year's estimate of 1,551,500 (1,406,600–1,696,300; $P = 0.115$). The WBPHS estimates have increased an average of 10% per year since 2005 ($P \leq 0.001$). Conditions were rated as good to excellent over most of the WPP/GPP range, even though spring was more than a week later than normal. The exceptions were eastern South Dakota and the Red River Valley in North Dakota where last year's drought conditions continued, and worsened in some areas. Overall however, a high breeding population and improved wetland conditions make a very high fall flight probable.

Central Flyway Arctic Nesting Canada Geese (CFAN)

As of 2014, the Short Grass Prairie (SGPP) and Tall Grass Prairie (TGPP) populations are now managed as one population, Central Flyway Arctic Nesting Canada geese (CFAN). More information about this decision and other management issues is available in the CFAN Management Plan (Central and Mississippi Flyway Councils 2013). These small Canada geese nest in different areas, but mix on their wintering areas, which makes it difficult to estimate the size of the winter populations separately. During the 2014 Midwinter Survey in the Central Flyway, 567,300 CFAN geese were counted, 9% greater than the 2013 index of 519,500 (Figure 12). Over the past 10 years, the Midwinter counts of the CFAN population have not exhibited a significant trend ($P = 0.450$). Information on TGPP (now East-tier) and SGPP (now West-tier) CFAN from the Mid-winter surveys is still reported separately in the Central Flyway Databook (Kruse, K. L., compiler 2014).

East-tier CFAN (formerly TGPP) Canada geese nest on Baffin (particularly on the Great Plain of the Koukdjuak), Southampton, and King William islands; north of the Maguse and McConnell Rivers on the Hudson Bay coast; and in the eastern Queen Maud Gulf region. East-tier CFAN winter mainly in Oklahoma, Texas, and northeastern Mexico (Figure 7). Because the birds from this segment of the CFAN population nest outside of the area covered by the WBPHS, no breeding ground abundance estimates are available specifically for these birds. Biologists reported early nesting phenology on Southampton Island. Ice breakup was 14 days earlier than average, and the first gosling was seen 6 days earlier than average at Karrak Lake in the Queen Maud Gulf Sanctuary. Overall, available information suggests that the production of East-tier CFAN Canada geese will be higher than that of 2013.

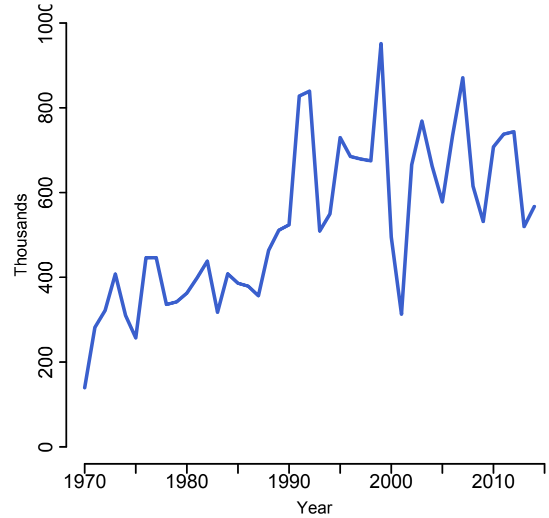
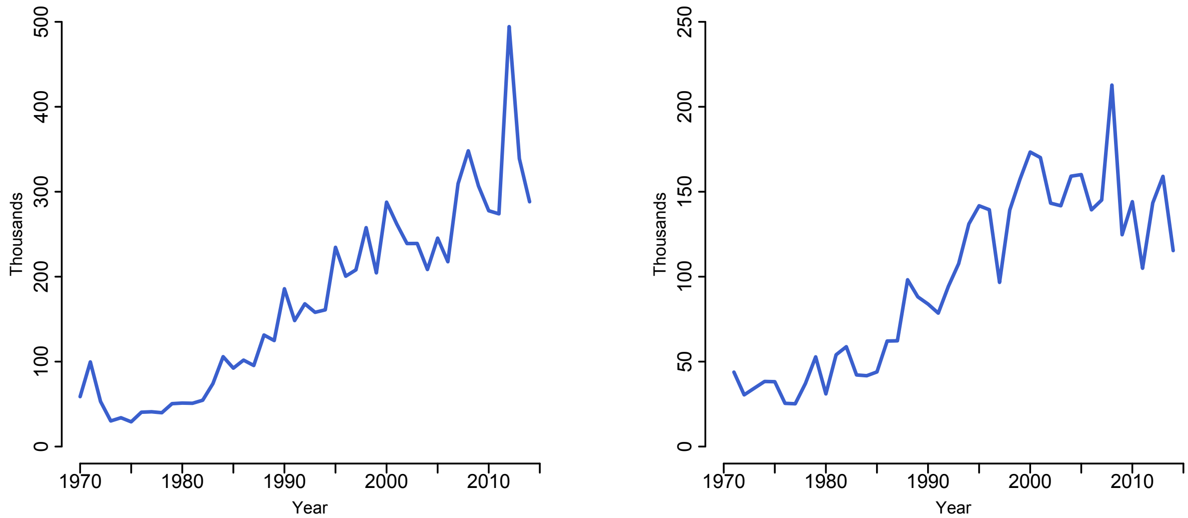


Figure 12. Estimated numbers of Central Flyway Arctic Nesting Canada geese estimated during winter surveys.

West-tier CFAN (formerly SGPP) Canada geese nest on Victoria and Jenny Lind Islands and on the mainland from the Queen Maud Gulf west and south to the Mackenzie River and northern Alberta. These geese winter in southeastern Colorado, northeastern New Mexico, and the Oklahoma and Texas panhandles (Figure 7). In 2014, the estimated spring abundance of West-tier CFAN geese in the Northwest Territories (WBPHS strata 13–18) was 184,800(117,100–252,400), similar to last year's estimate of 176,700 (123,600–229,800, $P = 0.855$). WBPHS estimates have increased an average of 7% per year since 2005 ($P = 0.033$). Nesting phenology in



13.1: Hi-line Population

13.2: Rocky Mountain Population

Figure 13. Estimated numbers of Hi-line Population (breeding adults) and Rocky Mountain Population (breeding adults) Canada geese.

the Queen Maud Gulf Sanctuary was very early, approximately 14 days earlier than average at Karrak Lake. Wetland conditions in boreal forest West-tier CFAN nesting areas were assessed as good, and there was no flooding on the Mackenzie River Delta this year. However, the Northwest Territories experienced a prolonged winter and one of the latest ice break-ups in years. Thus, production of West-tier CFAN geese in 2014 was expected to be average.

Hi-line Population (HLP)

These large Canada geese nest in southeastern Alberta, southwestern Saskatchewan, eastern Montana and Wyoming, and in Colorado. They winter in these states and central New Mexico (Figure 7). The primary index of this population is based on the WBPHS estimates from portions of Alberta (strata 26–29), Saskatchewan (strata 30–33), and Montana (strata 41–42), and state surveys in Wyoming. In 2014, these surveys yielded an estimate of 288,200 geese, a 15% drop from last year's value of 338,900 (Figure 13.1). The breeding population survey indices have increased by 4% over the 2005–2014 time frame, but this trend was not significant ($P = 0.141$). The midwinter survey index for 2014 was 281,300, 18% lower than last year's count of 341,300. Over the past 10 years, midwinter indices for this population have increased by an average of 5% per year ($P = 0.013$). Wetland conditions were much improved relative to 2013, and most of the HLP range was rated good to excellent. Although spring phenology was late, this has relatively little effect on temperate-nesting geese, and good production and an above-average fall flight was expected.

Rocky Mountain Population (RMP)

These large Canada geese nest in southern Alberta and western Montana, and the intermountain regions of Utah, Idaho, eastern Nevada, Wyoming, and Colorado. They winter mainly in central and southern California, Arizona, Nevada, Utah, Idaho, and Montana (Figure 7). The spring population index is calculated based on WBPHS estimates from portions of Alberta (strata 26–29) and Montana (strata 41–42), plus state surveys in Arizona, Colorado, Idaho, Nevada, Utah, and Wyoming. The index for 2014 was 116,700 geese, 26% lower than the index from 2013, which totaled 159,100 (Figure 13.2). RMP indices exhibited no trend over the 2005–2014 time series ($P = 0.277$). Wetland conditions were good over much of Montana and Alberta. Conditions in eastern Montana were much improved compared to the previous year's drought conditions. Indices were similar to 2013 in Nevada, Wyoming, and Arizona. The fall flight of RMP geese was expected to be average.

Pacific Population (PP)

These large Canada geese nest and winter west of the Rocky Mountains from northern Alberta and British Columbia south through the Pacific Northwest to California (Figure 7). The PP goose index is based on breeding ground surveys in Alberta, British Columbia, Washington, Oregon, California, Nevada, Idaho, and Montana. The total PP goose index in 2014 was 161,800, 26% lower than the 220,400 counted in 2013. There was no trend ($P = 0.860$) in the total PP index from 2006 to 2014. Most PP geese are surveyed in Alberta (WBPHS strata 76–77) where 67,800 (55,300–92,100) were estimated in 2014, similar to ($P = 0.094$), the 2013 estimate of 128,100 (94,300–194,000). The 10-year trend for PP geese counted in the WBPHS strata was non-significant ($P = 0.278$). Conditions were good over much of the PP range in Alberta, though fair to poor in the west-central portion of the province. Gosling production in 2014 should be higher than average, and a fall flight similar to last year's was expected.

Dusky Canada Geese

These mid-sized Canada geese predominantly nest on the Copper River Delta of southeastern Alaska, and winter principally in the Willamette and Lower Columbia River Valleys of Oregon and Washington (Figure 7). Dusky Canada geese are surveyed near the Copper River Delta and Middleton Island, Alaska.

As specified in the Pacific Flyway Management Plan, the Copper River Delta Breeding Pair Survey is the management index for dusky Canada geese (Figure 14). The management index is based on the sum of indicated pairs (corrected for detection rate and re-nesting), indicated flocked birds, and the indicated adult birds from Middleton Island. In 2014, the estimate for breeding Dusky Canada geese was

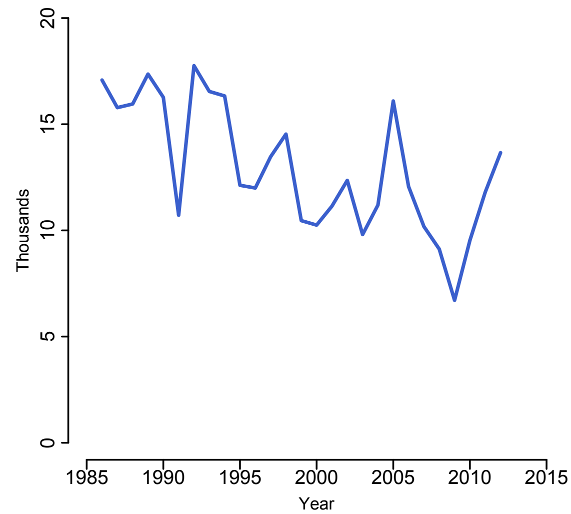


Figure 14. Estimated numbers of breeding adult Dusky Canada geese, 1986–2012.

15,600. This estimate, along with the aerial indicated breeding bird index (3,600) and aerial indicated total birds index (5,100), were among the highest recorded in 20 years. Population increases could be due in part to high production on the Copper River Delta from 2008–2011. In 2013, the lack of aircraft availability and significant weather delays prevented the survey from taking place, so we have no 2013 number for comparison. Over the past 10 years, Dusky Canada goose breeding bird indices have not shown a significant trend ($P = 0.768$). Snow and ice conditions vary between years on the Copper River Delta. In 2014, south-central Alaska experienced a warm spring. No snow was observed on the survey area, which was somewhat unusual as some snow and ice are usually present. Above-average production and an above-average fall flight was expected for Dusky Canada geese.

Cackling Canada Geese

Cackling Canada geese nest on the Yukon–Kuskokwim Delta (YKD) of western Alaska. They primarily winter in the Willamette and Lower Columbia River Valleys of Oregon and Washington (Figure 7). The analyses used to calculate the primary index of this population were changed in 2011. From 1998 to 2010 an estimated fall population was derived based on the historical relationship between spring

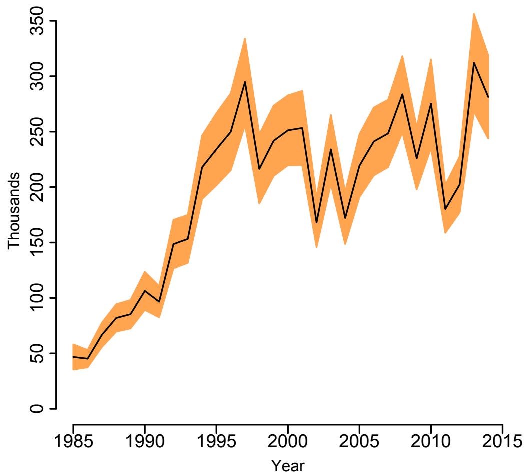


Figure 15. Estimated numbers of Cackling Canada geese (predicted fall goose population, with 95% confidence intervals).

surveys of adults on the YKD and direct counts conducted in the fall. Now, estimates of adults on the YKD are adjusted by the ratio of fall estimates based on observations of neck-banded birds and spring YKD estimates. Thus we present the revised time series of predicted fall populations (Appendix D.1). The estimate for 2014 was 281,300 (243,700–318,800) geese, similar to ($P = 0.295$) last year's estimate of 312,200 (268,200–356,200). Over the 2005–2014 time series, there has been no trend overall for the estimates ($P = 0.581$; Figure 15). In contrast to the previous two years, spring phenology on the YKD was very early in 2014, so above-average production and a fall flight higher than last year were expected.

Lesser and Taverner's Canada Geese

These populations nest throughout Alaska and winter in Washington, Oregon, and California (Figure 7). Nesting Taverner's geese are more strongly associated with tundra areas of the North Slope and western Alaska, while lesser Canada geese tend to nest in Alaska's interior. However, these geese mix with other Canada geese throughout the year and estimates of separate populations have not been presented in the past. We present the total estimate for the two populations combined first, followed by the population-specific ones that have recently been developed. The 2014 estimate of Canada geese within WBPHS strata predominantly occupied by these populations (1–6, 8, and 10–12) was 72,400 (36,300–108,600), similar to the 40,300 (22,500–58,100) estimated in 2013 ($P = 0.118$). However, in 2013, strata 1 and 6 were not flown, so the 2013 estimate is not directly comparable with those from other years. Lesser and Tavener's WBPHS estimates have not shown a trend over the period between 2005 and 2014 ($P = 0.383$).

Population indices for Taverner's Canada goose in Alaska are based on expanded counts from three breeding pair survey efforts: the Arctic Coastal Plain Breeding Pair Survey, the Yukon Delta Coastal Zone Breeding Pair Survey, and stratum 10 (Seward Peninsula), stratum 11 (Kotzebue Sound), and stratum 9 (inland portions of the Yukon–Kuskokwim Delta) of the WBPHS. The 2014 indicated breeding bird index was 32,600, 64% higher than the 2013 index (19,900). The 3-year (2012–2014) average of the indicated breeding bird index was 29,500, 2% higher than the 2011–2013 average (28,900). The 2014 indicated total bird index was 43,800, 58% higher than the 2013 index (27,700). The 3-year (2012–14) average of the indicated total bird index was 39,600, 6% higher than the 2011–2013 average (37,400). The estimated average annual growth rate of indicated total Taverner's Canada geese was 0.987 ($SE = 0.004$, 95% CI = 0.979–0.996) from 1986–2014, and 0.975 ($SE = 0.020$, 95% CI = 0.933–1.019) from 2004–2014.

Within the Alaska–Yukon region, lesser Canada geese are found in boreal forest habitat. Population indices for the Alaska–Yukon region are based on the expanded counts of Canada geese in stratum 1 (Kenai–Susitna), stratum 2 (Nelchina), stratum 3 (Tanana–Kuskokwim), stratum 4 (Yukon Flats), and stratum 12 (Old Crow Flats) of the WBPHS. The 2014 indicated breeding bird index was 1,200, 41% lower than the 2013 index (2,000). The 3-year (2012–2014) average of the indicated breeding bird indices was 1,500, 24% lower than the 2011–2013 average (2,000). The 2014 indicated total bird index was 2,300, 44% lower than the 2013 index (4,100). The 3-year (2012–2014) average of the indicated total bird indices was 3,400, 11% lower than the 2011–2013 average (3,800). The estimated average annual growth rate of indicated total lesser Canada geese was 0.999 ($SE = 0.006$, 95% CI = 0.987–1.012) from 1964–2014 and 0.927 ($SE = 0.037$, 95% CI = 0.852–1.008) from 2004–2014.

Aleutian Canada Geese

The Aleutian Canada goose was listed as an endangered population in 1967 (the population numbered approximately 800 birds in 1974), was downgraded to threatened in 1990, and was removed from protection under the Endangered Species Act in 2001. These geese now nest primarily on the Aleutian Islands, although historically they nested from near Kodiak Island, Alaska to the Kuril Islands in Asia. They now winter along the Pacific Coast as far south as central California (Figure 7). Aleutian goose population estimates since 1996 are based on a mark-resight analysis of observations of neck-banded geese in California, and thus this time series is revised annually. The preliminary population estimate during the winter of 2014 was 146,900 (121,500–172,300), similar to the revised 2013 estimate of 158,700 (130,800–186,700; $P = 0.538$; Figure 16). These estimates have increased an average of 5% per year since 2005 ($P = 0.011$), and the latest is well above the 1996 revised estimate of 15,400 (14,300–16,500).

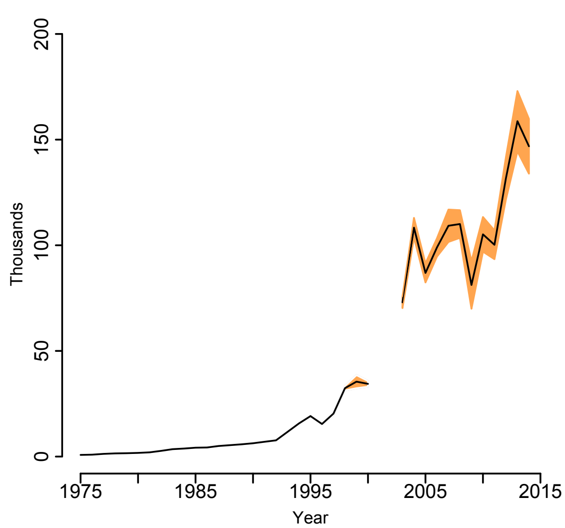


Figure 16. Estimated numbers of Aleutian Canada geese (winter geese, with 95% confidence intervals).

Status of Light Geese

The term light geese refers to both snow geese and Ross's geese (including both white and blue color phases), and the lesser (*C. c. caerulescens*) and greater (*C. c. atlantica*) snow goose subspecies. Another collective term, mid-continent light geese, includes lesser snow and Ross's geese of two populations: the Mid-continent Population and the Western Central Flyway Population.

Ross's Geese

Most Ross's geese nest in the Queen Maud Gulf region, but increasing numbers are nesting on Southampton, Baffin, and Banks islands, and along the western coast of Hudson Bay. Ross's geese are present in the winter ranges of three different populations of light geese and primarily winter in California, New Mexico, Texas, and Mexico, with increasing numbers in Louisiana and Arkansas (Figure 17). Ross's geese are annually surveyed at only one of their numerous nesting colonies. More comprehensive aerial photography inventories and groundwork (to identify proportions of snow and Ross's geese within colonies) are conducted periodically. Since 1993, the proportion of Ross's geese has been growing, and they have outnumbered snow geese at Karrak Lake since 2007. The largest Ross's goose colonies are in the Queen Maud Gulf Sanctuary, and estimates of their abundance are not available until after the current year's breeding season and the publication of this report, so we typically present the previous year's estimate (Figure 18). Population estimates of nesting Ross's Geese and Lesser Snow Geese at Karrak Lake are not yet available from the 2014 breeding season. Nevertheless, biologists reported that population growth over the longer term seems to have slowed and stabilized at about 700,000 nesting Ross's Geese. There was a substantial decline in numbers of Ross's geese nesting between 2012 and 2013, but Ross's Geese still outnumber snow geese nesting at Karrak Lake. In 2014, ice breakup at the Karrak Lake colony was 14 days earlier than the long-term average (1991–2014), and the earliest on record.

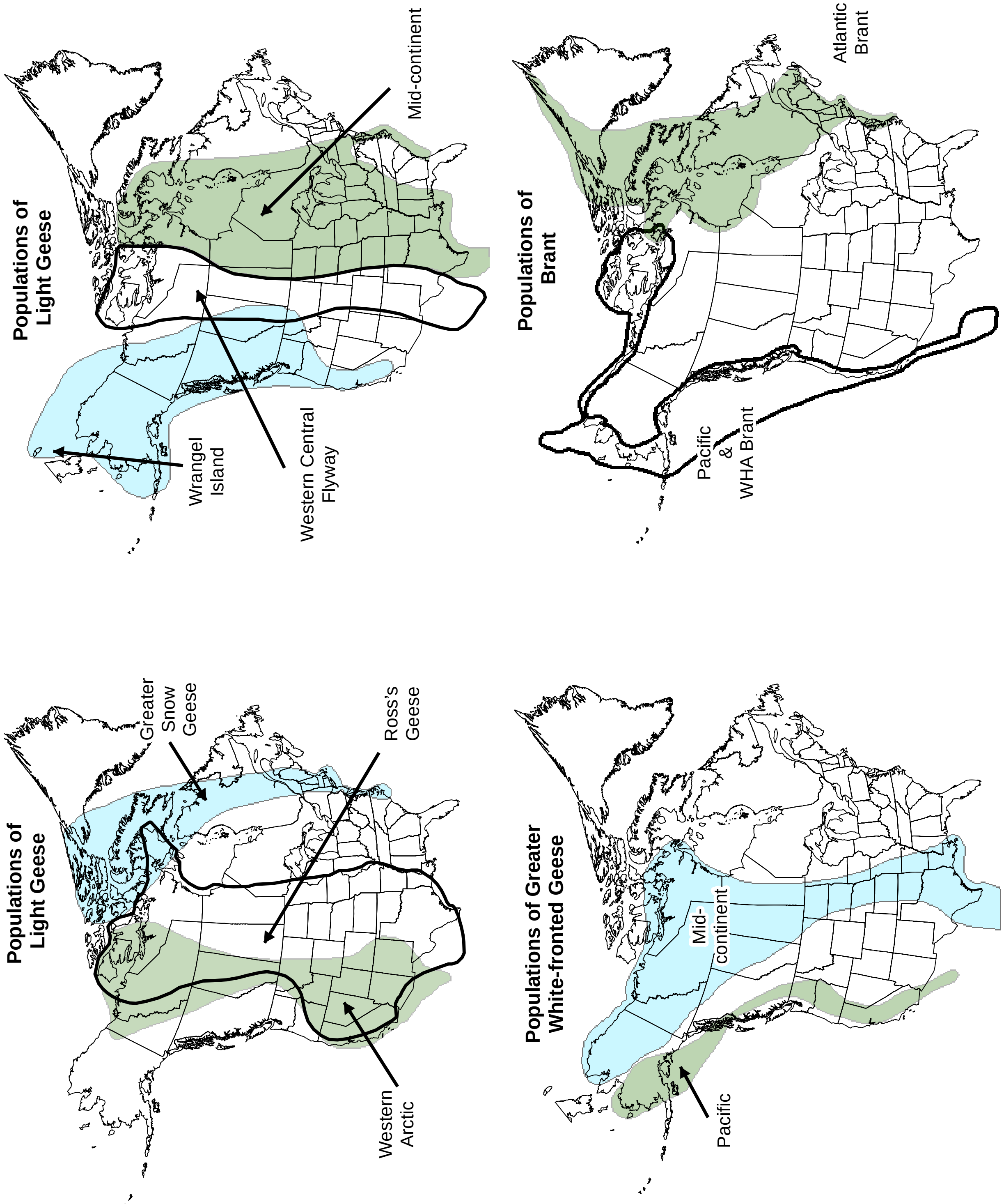


Figure 17. Approximate ranges of brant and snow, Ross's, and white-fronted goose populations in North America.

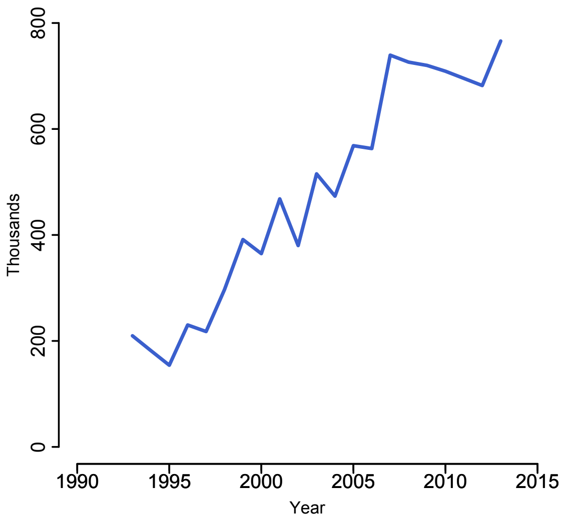


Figure 18. Estimated numbers of nesting adult Ross's geese at the Karrak Lake colony, Nunavut (1993–2013).

In addition, the first goslings were seen 6 days earlier than average. Conditions for Ross's geese nesting on Southampton Island were also good. Overall, above-average production and an above-average fall flight were expected for Ross's geese.

Mid-continent Population Light Geese (MCP)

This population includes lesser snow geese and increasing numbers of Ross's geese. Geese of the MCP nest on Baffin and Southampton islands, with smaller numbers nesting along the west coast of Hudson Bay (Figure 17). These geese winter primarily in eastern Texas, Louisiana, and Arkansas. During the 2014 Midwinter Survey, biologists counted 3,814,700 light geese, a 17% decrease relative to the 2013 index of 4,614,000 (Figure 19). Winter indices during 2005–2014 increased by an average of 7% per year ($P < 0.001$). Phenologies on Southampton Island and at Cape Churchill were earlier than average for both. Overall, available information suggested an above-average fall flight of MCP snow geese.

Western Central Flyway Population (WCFP)

Historically, this population included predominantly snow geese, but Ross's geese continue to increase and now represent nearly one third of all WCFP geese. Geese of the WCFP nest in the central and western Canadian Arctic, with large nesting colonies near the Queen Maud Gulf and on Banks Island. These geese stage during fall in eastern Alberta and western Saskatchewan and concentrate during winter in southeastern Colorado, New Mexico, the Texas Panhandle, and the northern highlands of Mexico (Figure 17). WCFP geese wintering in the U.S. portion of their range are surveyed annually, but their entire winter range, including Mexico, is usually surveyed once every three years. However, surveys in Mexico have not been conducted since 2009 due to socio-political unrest in that country. During the 2014 surveys in the U.S. portion of WCFP range, 264,800 geese were counted, 17% more than the 225,900 geese that were counted in 2013 (Figure 20). These population indices increased 6% per year from 2005 to 2014 ($P = 0.013$). In 2014, ice breakup at the Karrak Lake colony was 14 days earlier than the long-term (1991–2014) average, and the earliest on record. In addition, the first goslings were seen 6 days earlier than average. This suggested that, as in 2013, production was expected to be higher than average for snow geese in the Queen Maud Gulf Sanctuary in 2014.

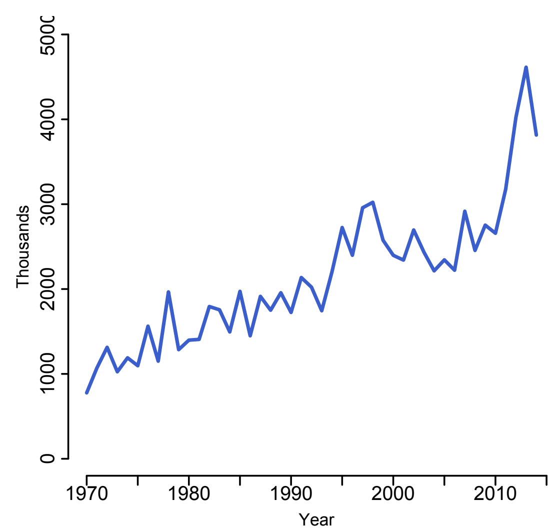


Figure 19. Estimated numbers of Mid-continent Population snow geese (winter geese).

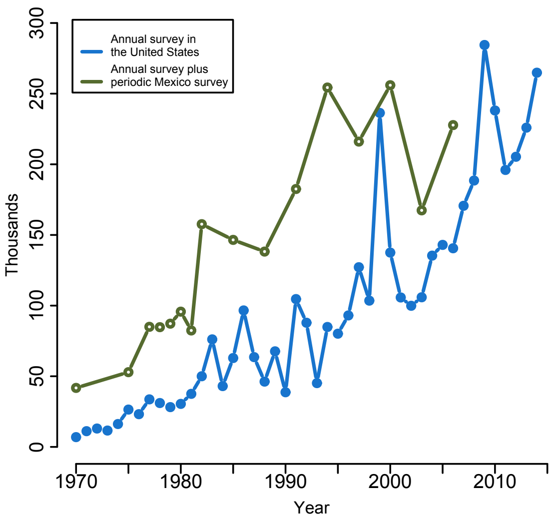


Figure 20. Estimated numbers of Western Central Flyway Population snow and Ross's geese (winter geese).

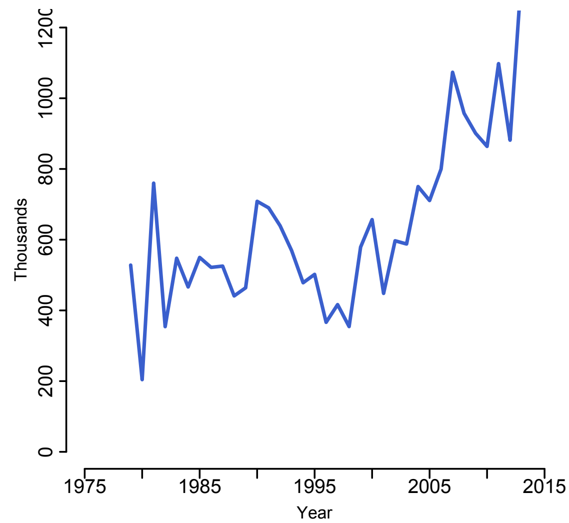


Figure 21. Estimated numbers of Western Arctic/Wrangel Island population snow geese (fall geese).

Western Arctic/Wrangel Island Population (WAWI)

Most of the snow geese in the Pacific Flyway originate from nesting colonies in the western and central Arctic (WA: Banks Island, the Anderson and Mackenzie river deltas, and the western Queen Maud Gulf region) or Wrangel Island (WI), located off the northern coast of Russia. The WA segment of the population winters in central and southern California, New Mexico, and Mexico; the WI segment winters in the Puget Sound area of Washington and in northern and central California (Figure 17). In winter, WA and WI segments commingle with light geese from other populations in California, complicating surveys. Thus, a fall index based on a special white goose survey in California and the Skagit/Fraser midwinter survey is calculated. The fall 2013 estimate of WAWI snow geese was 1,351,200, 53% higher than the 881,400 counted in 2012 (Figure 21). These indices have increased an average of 5% per year from 2004 to 2013 ($P = 0.017$). No breeding ground surveys were conducted in 2014. However, a biologist with knowledge of the area reported that based on Wrangel Island temperature indicators and snow-pack, 2014 had similar weather during the breeding season as in 2008 and 2010, when very few goslings were produced on the colony. Below-average production from the Wrangel Island was predicted, likely with a fall population consisting of fewer than 10% juveniles.

Greater Snow Geese

This subspecies principally nests on Bylot, Axel Heiberg, Ellesmere, and Baffin Islands, and on Greenland, and winters along the Atlantic coast from New Jersey to North Carolina (Figure 17). This population is typically monitored on their spring staging areas near the St. Lawrence Valley in Quebec, where the Canadian Wildlife Service (CWS) conducts an annual aerial photographic survey. Since 2008, estimates have been calculated using a revised sampling methodology. The preliminary estimate from spring surveys in 2014 was 796,000 (733,000–859,000) geese, 14% lower than the 921,000 (858,000–984,000) estimated last year ($P = 0.006$; Figure 22). Spring estimates of greater snow geese have shown no trend over the past 10 years ($P = 0.896$), which provides some evidence that this over-abundant population is stabilizing. However, biologists remain concerned about their high numbers. The number of snow geese counted during the 2014 Mid-winter Survey in the Atlantic Flyway was 271,600, 26% lower than the 366,500 counted during the 2013 survey. Breeding conditions for

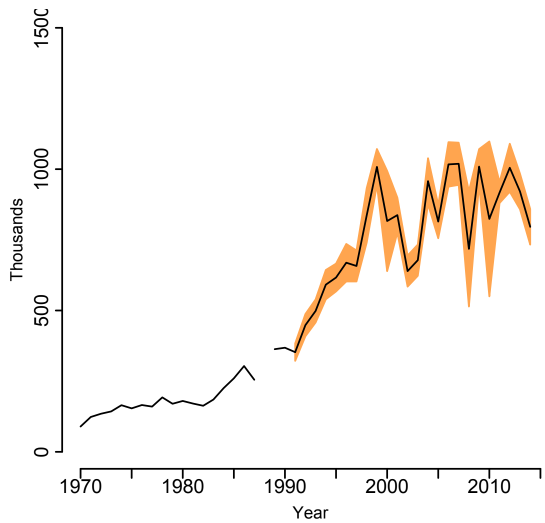


Figure 22. Estimated numbers of greater snow geese (spring staging geese, with 95% confidence intervals), 1970–2014.

greater snow geese were excellent as of 5 July on Bylot Island. The winter snow pack was sparse and snow melt was fairly rapid in early June. Spring and early summer weather was somewhat cool, but very dry and sunny. Goose arrival was normal, most nest sites were snow-free, and thus breeding effort was high. In addition, lemming abundance was high, which provides alternate prey for predators that might otherwise focus on goose nests. Mean nest initiation date (10 June) was earlier than the 20-year average, and mean clutch size (4.03 eggs/nest) and mean nesting success to late incubation (95%) were both higher than the long-term average. A very good fall flight was expected for greater snow geese in 2014.

Status of Greater White-fronted Geese

Pacific Population White-fronted Geese

These geese primarily nest on the Yukon–Kuskokwim Delta (YKD) of Alaska and winter in the Central Valley of California (Figure 17). The fall population index for Pacific White-fronted geese is based on the correlation between indicated total birds from June breeding pair surveys (the Yukon–Kuskokwim Delta Coastal Zone Survey and the Alaska–Yukon Breeding Population and Habitat Survey) and fall counts when both fall and June surveys were conducted between 1985 and 1998. This predicted fall population has been used since 1999. The 2014 predicted fall estimate is 637,200, 9% higher than the 2013 estimate of 579,900 (Figure 23). Over the past 10 years these estimates have increased an average of 3% per year ($P = 0.049$). The 2014 YKD Coastal Zone survey reported a Pacific population indicated total birds index of $205,100 \pm 31,800$ and an indicated breeding birds index of $86,100 \pm 12,000$. The indicated total bird and the indicated breeding bird indices were 25% higher and 8% lower respectively than those of 2013, perhaps because survey timing was late relative to the early spring phenology. On the YKD, annual growth rates for indicated total birds measured 1.105 for the first 22 years of the survey (1985–2006) and 1.020 over the past 8 years of the survey (2007–2014). The annual growth rate for indicated breeding birds from 2001 to 2014 measured 1.050, and has not exhibited the same level of stabilization that the indicated total bird index has. Spring phenology on the YKD was very early, so above-average production and a fall flight higher than last year are expected.

Mid-continent Population White-fronted Geese

These white-fronted geese nest across a broad region from central and northwestern Alaska to the central Arctic and the Foxe Basin. They concentrate in southern Saskatchewan during the fall and in Texas, Louisiana, Arkansas, and Mexico during winter (Figure 17). Typically these geese are counted during a special fall survey in Saskatchewan and Alberta, but the survey could not be completed in 2013 because of the U.S. federal government shutdown(Figure 23). Over the prior 10-year period, 2003–2012, these estimates did not exhibit a significant trend ($P = 0.093$), as reported last year. As in 2013, eastern portions (e.g., Queen Maud Gulf, Rasmussen Lowlands) of MCP white-fronted goose range experienced earlier than average ice break-ups and nesting activities began earlier than average. At Karrak Lake, ice breakup was a record 14 days earlier than the long-term average.

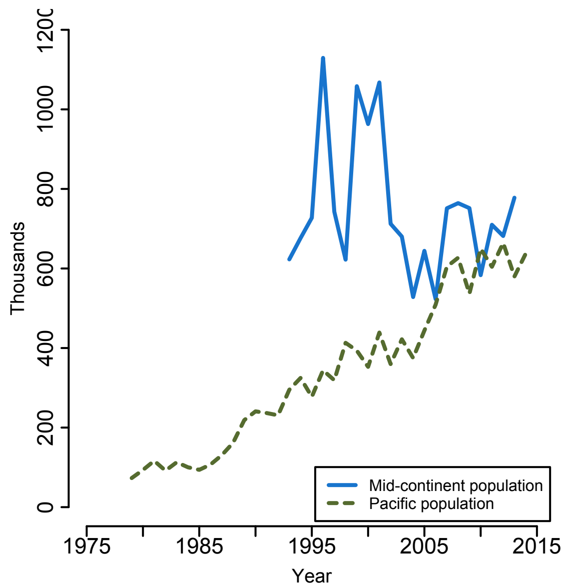


Figure 23. Estimated numbers of mid-continent population and Pacific population white-fronted geese (fall geese).

Conditions were also good, with no flooding reported, near the Mackenzie River Delta. White-fronted goose production is expected to be above average in 2014.

Status of Brant

Atlantic Brant (ATLB)

Most of this population nests on islands of the eastern Canadian Arctic. These brant winter along the Atlantic Coast from Massachusetts to North Carolina (Figure 17). The 2014 MWS index for brant in the Atlantic Flyway was 132,900, 19% higher than the 2013 estimate of 111,800 (Figure 24). These estimates have shown no trend over the 2005–2014 time period ($P = 0.465$). The productivity of the previous year is estimated by the percentage of juveniles counted during November and December. In the fall of 2013, juvenile birds comprised 3.4% of the population, well below the long-term average of 18.3%. The snow pack at East Bay on Southampton Island was light this winter and snowmelt occurred quickly. As a result, brant nesting occurred early, and clutch sizes were good. The peak hatch date of 12–13 July was similar to that in 2010, but 4–7 days earlier than was typical in the early 1980's. Biologists observed heavy fox predation at East Bay, and brant were especially hard-hit, with a nest success rate of less than 15%. Thus, despite their early arrival, below-average production of Atlantic brant was expected in 2014.

Pacific Brant (PACB)

These brant nest across Alaska's Yukon–Kuskokwim Delta (YKD) and North Slope, Banks Island, other islands of the western and central Arctic, the Queen Maud Gulf, and Wrangel Island. They winter as far south as Baja California and the west coast of Mexico (Figure 17). There have been several changes to the method for calculating the wintering Pacific Brant index. Western High Arctic brant are now included in the total, British Columbia winter counts are now included, and no index is given for years during which brant were not surveyed in Mexico (2009, 2011, 2012, 2014). Therefore, the time series we present is not comparable to those previously reported. The last complete MWS estimate of brant in the Pacific Flyway and Mexico (2013) was 162,900, slightly higher than the previous complete estimate (in 2010) of 161,700 (Figure 24). Winter estimates increased an average of 4% per year from 2005 to 2014 ($P = 0.073$), though this trend is not statistically significant. Although the Yukon Delta Coastal Breeding Waterfowl Survey was not specifically designed to assess populations of colonial nesting species, the survey data may be useful in helping to better understand population trends and distribution. The 2014 indicated total birds index from this survey (28,300) was 18% higher than the 2013 index (24,000) and the 2014 indicated breeding birds index (4,000) was 69% lower than the 2013 index (13,100). The indicated total birds and indicated breeding birds annual growth rates were 1.012 and 1.005, respectively. Spring was early on the YKD, which usually indicates good production. However, it was not clear whether the apparent decline in singles and pairs counted in 2014 relative to 2013 represented poor nesting effort, or was a function how the observer classified groupings of brant, so the prediction for production on the YKD was equivocal.

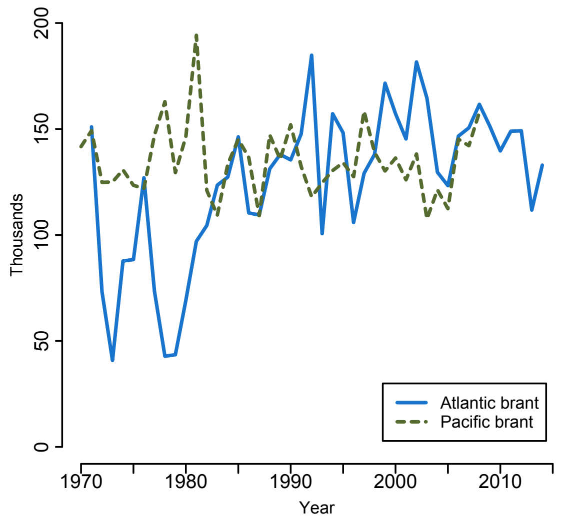


Figure 24. Numbers of Atlantic and Pacific brant estimated during winter surveys.

Western High Arctic Brant (WHAB)

This population of brant nests on the Parry Islands of the Northwest Territories and Nunavut (Figure 17). The population stages in fall at Izembek Lagoon, Alaska. They predominantly winter in Padilla, Samish, and Fidalgo Bays of Washington and near Boundary Bay, British Columbia, although some individuals have been observed as far south as Mexico. This population is no longer monitored separately, as there is considerable mixing with other Pacific Brant during the midwinter survey. Satellite imagery for the breeding area in the Parry Islands indicates that 2014 appears to be a poor year for breeding, with extensive snow cover in late June.

Status of Emperor Geese

The breeding range of emperor geese is restricted to coastal areas of the Bering Sea, with the largest concentration on the Yukon–Kuskokwim Delta (YKD) in Alaska. Emperor geese migrate relatively short distances and primarily winter in the Aleutian Islands (Figure 25). Since 1981, emperor geese have been surveyed annually on spring staging areas in southwestern Alaska. As specified in the management plan for emperor geese, the Pacific Flyway Council recognizes the management index as the 3-year average of estimates derived from the spring population survey on the Alaska Peninsula (Figure 26.1). The 2014 spring count of emperor geese was 79,900. In 2013, mechanical difficulties with aircraft prevented the survey from being conducted, so no count is available from last year for comparison. The 10-year trend for these estimates is non-significant ($P = 0.344$). Additional estimates for emperor geese are available from the Yukon Delta Coastal Survey. In 2014, the emperor goose indices on the Yukon–Kuskokwim Delta for indicated total birds ($32,600 \pm 3,000$) and indicated breeding birds ($16,200 \pm 1,100$) were 9% higher and 16% lower than the respective 2013 indices ($29,800 \pm 2,200$ and $19,400 \pm 1300$). However, the confidence intervals for indicated breeding birds overlapped, so those indices did not differ statistically between years. From 1985–2014, the population growth rates for indicated total birds (1.018) and indicated breeding birds (1.025) were positive. The winter of 2013–14 was mild across the emperor goose range. The biologists who surveyed the southwest Alaska staging area reported that ice-breakup was early, with about 5% snow cover from Nanvek Bay northward, and none on the coastal lowlands area as of late April. In 2014, spring phenology and ice break-up on the Yukon–Kuskokwim Delta were very early. Above-average production is expected.

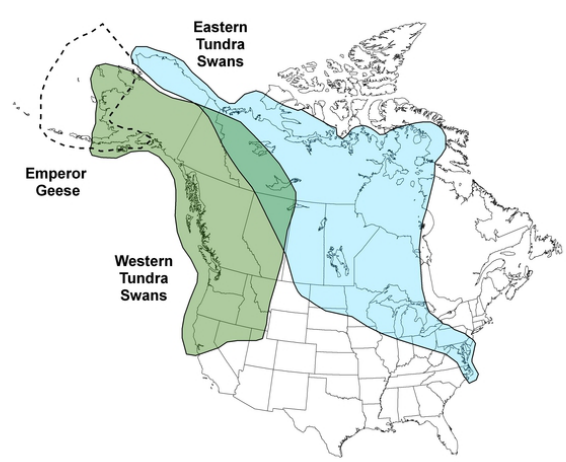
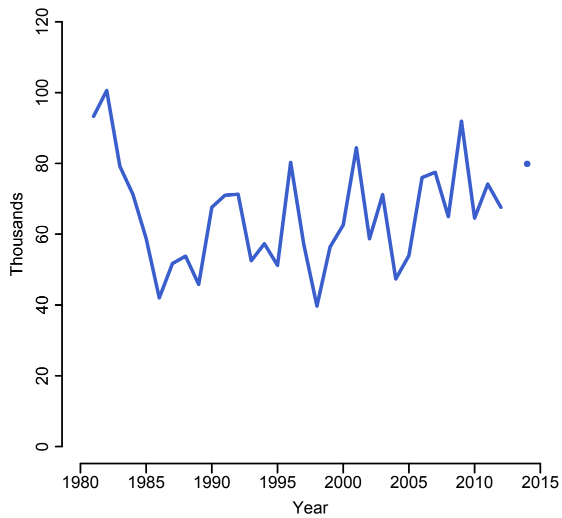
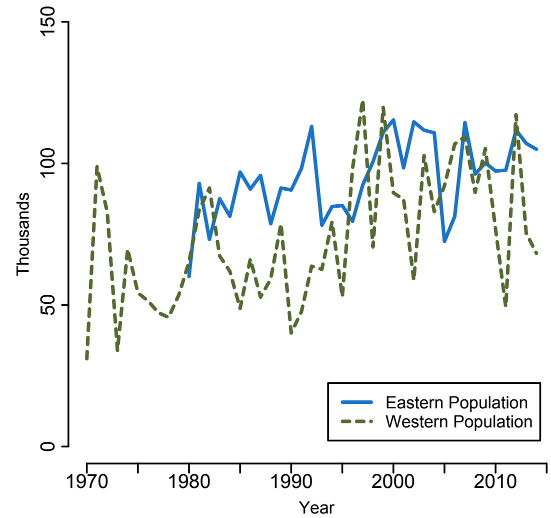


Figure 25. Approximate ranges of emperor geese, and Eastern and Western Populations of tundra swans in North America.



26.1: Emperor geese



26.2: Tundra swans

Figure 26. Estimated numbers of emperor geese (spring staging geese; 1986–2014), and Eastern and Western populations of tundra swans (winter swans).

Status of Tundra Swans

Western Population Tundra Swans

These swans nest along the coastal lowlands of western Alaska, particularly between the Yukon and Kuskokwim Rivers. They winter primarily in California, Utah, and the Pacific Northwest (Figure 25). However, MWS survey effort has been variable. The 2014 Midwinter Survey estimate of western population swans was 68,200, 9% lower than last year's estimate of 75,300 (Figure 26.2). MWS estimates have shown no trend over the last 10 years ($P = 0.165$). The Yukon–Kuskokwim Delta (YKD) is the core breeding area for this population of tundra swans in Alaska. The indicated total bird index from the 2014 YKD Coastal Zone survey (27,400) was 33% higher than the 2013 index (19,600). The average annual (1985–2014) growth rates for indicated total birds, singles and pairs, and nests were all positive. Since spring phenology on the YKD was early and bird indices were up, above-average production was expected.

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 are of particular importance. These birds winter in coastal areas from Maryland to North Carolina (Figure 25). The primary index for these tundra swans includes swans counted during winter in Ontario and the Atlantic and Mississippi Flyways. During the 2014 Midwinter Survey, 105,000 swans were observed, 2% fewer than the 107,100 counted in 2013 (Figure 26.2). These estimates have increased by an average of 3% per year during the 2005–2014 time frame ($P = 0.034$). The productivity of the previous year is estimated by the percentage of juveniles counted during November and December. In the fall of 2013, juveniles comprised 10.2% of the population, slightly below the long-term average of 13.6%. Spring phenology was later than average in the central Arctic and on the Mackenzie River Delta. However, there was essentially no flooding on the Mackenzie River in 2014, which is good news for nesting swans. Overall, swan production in 2014 is expected to be average.

References

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

Report in the files of the Central Flyway Representative. Denver, CO.

Kruse, K. L., compiler. 2014. Central Flyway harvest and population survey data book. U.S. Fish and Wildlife Service Technical report, Lakewood, CO.

National Ice Center. 2014. IMS daily Northern Hemisphere snow and ice analysis at 4 km and 24 km resolution. Digital media. URL http://www.natice.noaa.gov/ims/.

Sheaffer, S. E., and R. E. Malecki. 1996. Predicting breeding success of Atlantic Population Canada Geese from meterological variables. Journal of Wildlife Management 60:882–890.

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. Larned[e] (Strata 1)
Air	H. Wilson and D. Groves (Strata 7)
Air	B. Shults and D. Groves (Strata 2–6, 8–11)
Air	F. Roetker and S. Olson (Strata 12)

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

Air	F. Roetker and S. Olson

Northern Saskatchewan and Northern Manitoba (Strata 21–25)

Air	W. Rhodes and M. Simmons

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

Air	J. Bredy and J. Sands
Ground	G. Raven[a], M. Gillespie[c], J. Caswell[b], K. Zimmer[a], M. Watmough[a], T. Coffin[d], and M. Chupik[d]

Southern Saskatchewan (Strata 30–33)

Air	P. Thorpe and S. Chandler
Ground	B. Bartzen[a], K. Dufour[a], K. Warner[a], P. Bergen[c], S. Leach[a], S. Heap[a], and J. Porter[a]

Southern Manitoba (Strata 34–40)

Air	S. Yates and J. Bidwell[e]
Ground	M. Schuster[a], J. Leafloor[a], D. Walker[c], G. Ball[c], M. Ross[a], R. Bazin[a], J. Ingram[a], and R. Buss[c]

Montana and Western Dakotas (Strata 41–44)

Air	R. Spangler and B. Kelly[b]
Ground	P. Garrettson and B. West

Eastern Dakotas (Strata 45–49)

Air	T. Liddick and D. Fronczak
Ground	K. Kruse, S. LeJeune, M. Nelson, and F. Healy

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

Air	J. Wortham and B. Pendley

Eastern Ontario and Southern Quebec (Strata 51-54, 56)

Air S. Earsom and N. Wirwa

Maine and Maritimes (Stratum 62–67)

Air M. Koneff and R. Mickley[d] (Strata 62–65)

Air M. Koneff and J. Bidwell[e] (Strata 66 and 67)

Canadian Wildlife Service helicopter plot survey

Quebec	D. Bordage[a], C. Lepage[a], C. Marcotte[a], and S. Orichefsky[a]
Ontario	S. Meyer[a], C. Sharp[a], S. Badzinski[a], and D. Sadler[a]
New Brunswick & Nova Scotia	R. Hicks[a] and A. Hicks[a]
Newfoundland & Labrador	S. Gilliland[a], P. Ryan[a], R. Wells[a], and B. Pollard[a]

California

Air M. Weaver[b] and D. Skalos[b]

Ground C. Brady[d] and B. Huber[d]

Michigan

Air B. Barlow[b], B. Dybas-Berger[b], C. Fedewa[b], J. Heise[b], N. Kalejs[b], D. Luukkonen[b], T. Maples[b], T. McFadden[b], M. Mills[b], H. Singer[b], and B. Sova[b]

Minnesota

Air B. Geving[b] and S. Cordts[b]

Ground S. Kelly, W. Brininger, D. Hertel, F. Oslund, J. Kelley, T. Cooper, B. Davies[b], G. Dehmer, S. Zodrow, B. Nylin[d], R. Olsen[b], L. Deede, G. Kemper, P. Soler, T. Hewitt, N. Williams, J. Dubay, P. Richert, and D. Fronczak

Nebraska

M. Vrtiska

Northeastern U.S.

Data Analysis	P. Padding
Connecticut	M. Huang[b] and K. Kubik[b]
Delaware	M. DiBona[b], J. Baird[b]
Maryland	P. Bendel[b], J. Bennett[b], W. Bradford[b], T .Decker[b], B. Evans[b], C. Harris[b], J. Homyack[b], R. Norris[b], N. Sagwitz[b], G. Timko[b], H. Walbridge[b], R. Walls[b], and D. Webster[b]
Massachusetts	Massachusetts Division of Fisheries and Wildlife personnel and cooperators
New Hampshire	P. Tate[b], K. Rines[b], T. Walski[b], K. Bordeau[b], A. Timmins[b], W. Staats[b], and J. Kilborn[b]
New Jersey	T. Nichols[b], J. Garris[b], B. Kirkpatrick[d], J. Powers[b], K. Tinnes[b], M. Hamer[b], C. Meyer[b], L. Widjeskog[b], A. Burnett[b], and P. Castelli

New York	New York State Department of Environmental Conservation personnel and cooperators
Pennslyvania	D. Brauning[b], M. Casalena[b], R. Coup[b], J. Dunn[b], B. Ellis[b], J. Gilbert[b], M. Giles[b], I. Gregg[b], D. Gross[b], T. Hardisky[b], T. Hoppe[b], K. Jacobs[b], T. Keller[b], W. Knepp[b], M. Lovallo[b], J. Morgan[b], J. Stempka[b], M. Ternent[b], S. Trusso[b], M. Weaver[b], K. Wenner[b], and L. Williams[b]
Rhode Island	J. Beuth[b], J. Osenkowski[b], C. Brown[b], and S. Vito
Vermont	D. Morin[b], J. Buck[b], J. Austin[b], D. Blodgett[b], J. Gobeille[b], T. Appleton[b], D. Sausville[b], J. Flewelling[b], J. Mlcuch[b], F. Hammond[b], M.B. Adler[b], and R. Smith[b]
Virginia	A. Edwards[b], A. Bourgeois[b], B. Moyer[b], B. Stinson[b], C Dobyns[b], M. Dye[b], D. Johnson[b], D. Kocka[b], D. Lovelace[b], D. Ellinghausen[b], F. Frenzel[b], G. Costanzo[b], G. Sours[b], M. Gautier[b], B. Bassinger[b], J. Bowman[b], J. Watson[b], M. Frank[b], B. Lewis[b], T. Engelmeyer[b], B. Mohler[b], K. Martin[b], T. Moss[b], J. Blevins[b], P. Acker[b], and T. Willingham[b]

Nevada

Air	K. Neill[b], and B. Sedinger[d]

Washington

Air	J. Evenson[b], D. Blodgett[d], T. Cyra[b], R. Finger[b], B. Murphie[b], D. Base[b], P. De Bruyn[b], S. Gregory[b], and A. Prince[b]

Wisconsin

Air	L. Waskow[b], P. Berringer[b], C. Cold[b], C. Milestone[b], and R. Lichtie[b]
Ground	G. Bedient[b], J. Carstens[b], N. Christel[b], J. Christopoulos[b], C. Cole[b], B. Dart[b], E. Eilert[b], M. Engel[b], S. Fisher[b], E. Grossman[b], R. Haffele[b], N. Hayden[b], S. Heistand[b], J. Hopp[b], J. Huff[b], E. Kroening[b], D. Matheys[b], R. McDonough[b], C. Mogen[b], K. Mogen[b], J. Pritzl[b], P. Samerdyke[b], M. Schmidt[b], M. Sparrow[b], K. Van Beek[b], J. Wanner[b], D. Weidert[b], M. Woodford[b], G. Hamilton, J. Lutes, S. Otto, J. Jaworski, and G. Van Vreede

[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.2: Individuals that supplied information on the status of geese and swans.

Flyway-wide and Regional Survey Reports

A. Anderson, C. Dau, J. Dubovsky, J. Fischer, D. Fronczak, D. Groves, J. Hodges, J. Kelley, K. Kruse, J. Leafloor[a], S. Olson, R. Platte, P. Padding, T. Sanders, E. Taylor, and H. Wilson

Information from the Breeding Population and Habitat Survey

See Appendix A.1

North Atlantic Population of Canada Geese

J. Bidwell[e], S. Gilliland[a], R. Hicks[a], M. Koneff, P. Ryan[a], B. Pollard[a], and R. Wells[a]

Atlantic Population of Canada Geese

S. Earsom, B. Harvey[b], E. Reed[a], and J. Rodrigue[a]

Atlantic Flyway Resident Population of Canada Geese

T. Nichols[b], G. Costanzo[b], W. Crenshaw[b], M. DiBona[b], I. Gregg[b], B. Harvey[b], H. Heusmann[b], L. Hindman[b], R. Hossler[b], M. Huang[b], K. Jacobs[b], K. Kubik[b], J. Osenkowski[b], P. Padding, P. Ricard[b], D. Sausville[b], G. Somogie[b], and B. Swift[b]

Southern James Bay Population of Canada Geese

K. Bennett[b], R. Brook[b], J. Hughes[a], and B. Rizzuto[b]

Mississippi Valley Population of Canada Geese

K. Bennett[b], R. Brook[b], J. Hughes[a], and B. Rizzuto[b]

Mississippi Flyway Population Giant Canada Geese

G. Anderson[b], F. Baldwin[b], S. Cordts[b], J. Easterwood[b], M. Ervin[b], H. Havens[b], J. Hughes[a], O. Jones[b], J. Leafloor[a], D. Luukkonen[b], L. Naylor[b], A. Phelps[b], R. Pritchert[b], A. Radeke[b], D. Rave[b], L. Reynolds[b], R. Smith[b], and K. Van Horn[b]

Eastern Prairie Population of Canada Geese

F. Baldwin[b], J. Bredy, and J. Wollenberg[b]

Western Prairie and Great Plains Populations of Canada Geese

J. Bidwell[e], S. Chandler, D. Fronczak, B. Kelly[b], T. Liddick, W. Rhodes, M. Simmons, R. Spangler, P. Thorpe, S. Yates, B. Bartzen[a], K. Dufour[a], K. Warner[a], P. Bergen[c], S. Leach[a], S. Heap[a], J. Porter[a], M. Schuster[a], J. Leafloor[a], D. Walker[c], G. Ball[c], M. Ross[a], R. Bazin[a], J. Ingram[a], R. Buss[c], P. Garrettson, B. West, K. Kruse, S. LeJeune, M. Nelson, and F. Healy

Tall Grass Prairie Population of Canada Geese

R. Alisauskas[a], D. Kellett[a], K. Abraham[d], C. Nissley[d], W. Wiese[d], J. Noble[d], A. Lutto[d], and K. Kruse

Central Flyway Arctic Nesting Canada Geese

R. Alisauskas[a], D. Kellett[a], K. Kruse, S. Olson, and F. Roetker

Hi-Line Population of Canada Geese

J. Bredy, S. Chandler, B. Kelly[b], J. Sands, P. Thorpe, E. Silverman, L. Roberts,[b], R. Spangler, G. Raven[a], M. Gillespie[c], J. Caswell[b], K. Zimmer[a], M. Watmough[a], T. Coffin[d], M. Chupik[d], B. Bartzen[a], K. Dufour[a], K. Warner[a], P. Bergen[c], S. Leach[a], S. Heap[a], J. Porter[a], P. Garrettson, and B. West

Rocky Mountain Population of Canada Geese

J. Bredy, B. Kelly footnotemark[2], R. Spangler, J. Sands, E. Silverman, R. Woolstenhulme[b], G. Raven[a], M. Gillespie[c], J. Caswell[b], K. Zimmer[a], M. Watmough[a], T. Coffin[d], M. Chupik[d], P. Garrettson, and B. West

Pacific Population of Canada Geese

A. Breault[b], J. Bredy, D. Kraege[b], S. Olson, B. Reishus[b], T. Sanders, J. Sands, M. Weaver[b], R. Woolstenhulme[b], G. Raven[a], M. Gillespie[c], J. Caswell[b], K. Zimmer[a], M. Watmough[a], T. Coffin[d], and M. Chupik[d]

Dusky Canada Geese

W. Larned, D. Marks, H. Wilson, M. Petrula, E. Taylor, J. Fischer, J. Hodges, B. Eldridge, B. Stehn[e], and D. Rosenberg

Lesser and Taverner's Canada Geese

D. Groves and B. Shults

Cackling Canada Geese

A. Anderson, J. Fischer, J. Hodges[e], R. Platte, and T. Sanders

Aleutian Canada Geese

K. Griggs, R. Lowe, E. Nelson, S. Olson, B. Reishus[b], T. Sanders, S. Stephensen, M. Weaver[b], D. Woolington, M. Strassburger, J. Sands, E. Taylor, H. Renner, and D. Brazil[d]

Greater Snow Geese

B. Audet[d], J. Bachand[d], F. Bolduc[a], R. Cotter[a], M. Dionne[a], G. Gauthier[d], K. Hannah[a], J. Hughes[a], M. Labonté[d], C. Maurice[a], J. Rodrigue[a], and F. Saint-Pierre[d]

Mid-continent Population Light Geese

R. Alisauskas[a], D. Kellett[a], K. Abraham[d], C. Nissley[d], W. Wiese[d], J. Noble[d], F. Baldwin[b], and A. Lutto[d]

Western Central Flyway Population Light Geese

R. Alisauskas[a], D. Kellett[a], J. Rausch[a]

Western Arctic/Wrangel Island Population of Lesser Snow Geese

T. Anderson, V. Baranyuk[e], R. Corcoran, M. Creegen, J. Hailine, J. Isola, D. Kraege[b], C. Langner[b], B. Lubinski, T. Keldsen, M. Robertson[a], M. Weaver[b], M. Wolder, and D. Woolington

Ross's Geese

K. Abraham[d], C. Nissley [d], W. Wiese[d], J. Noble[d], A. Lutto[d], R. Alisauskas[a], and D. Kellett[a]

Pacific Population White-fronted Geese

A. Anderson, J. Fischer, J. Hodges[e], R. Platte, and T. Sanders

Mid-continent Population White-fronted Geese

R. Alisauskas[a], D. Kellett[a], D. Groves, K. Kraii[b], M. Robertson, M. Spindler, and K. Warner[a]

Pacific Brant

A. Anderson, J. Fischer, J. Hodges[e], R. Platte

Atlantic Brant

S. Earsom, S. Campbell, M. DiBona[b], D. Faith, M. Fisher, J. Fuller[b], G. Gilchrist[a], I. Gregg[b], W. Harper, J. Heise, L. Hindman[b], M. Hoff, D. Howell[b], P. Jayne, O. Jones[b], S. Meyer, T. Nichols[b], P. Padding, W. Stanton, J. Stanton, D. Stewart, B. Swift[b], H. Walbridge, D. Webster, M. Whitbeck, T. Willis, K. Abraham[d], C. Nissley [d], W. Wiese[d], J. Noble[d], and A. Lutto[d]

Western High Arctic Brant

D. Kraege[b], J. Rausch[a]

Emperor Geese

A. Anderson, C. Dau, J. Hodges[e], R. Platte, and H. Wilson

Western Population of Tundra Swans

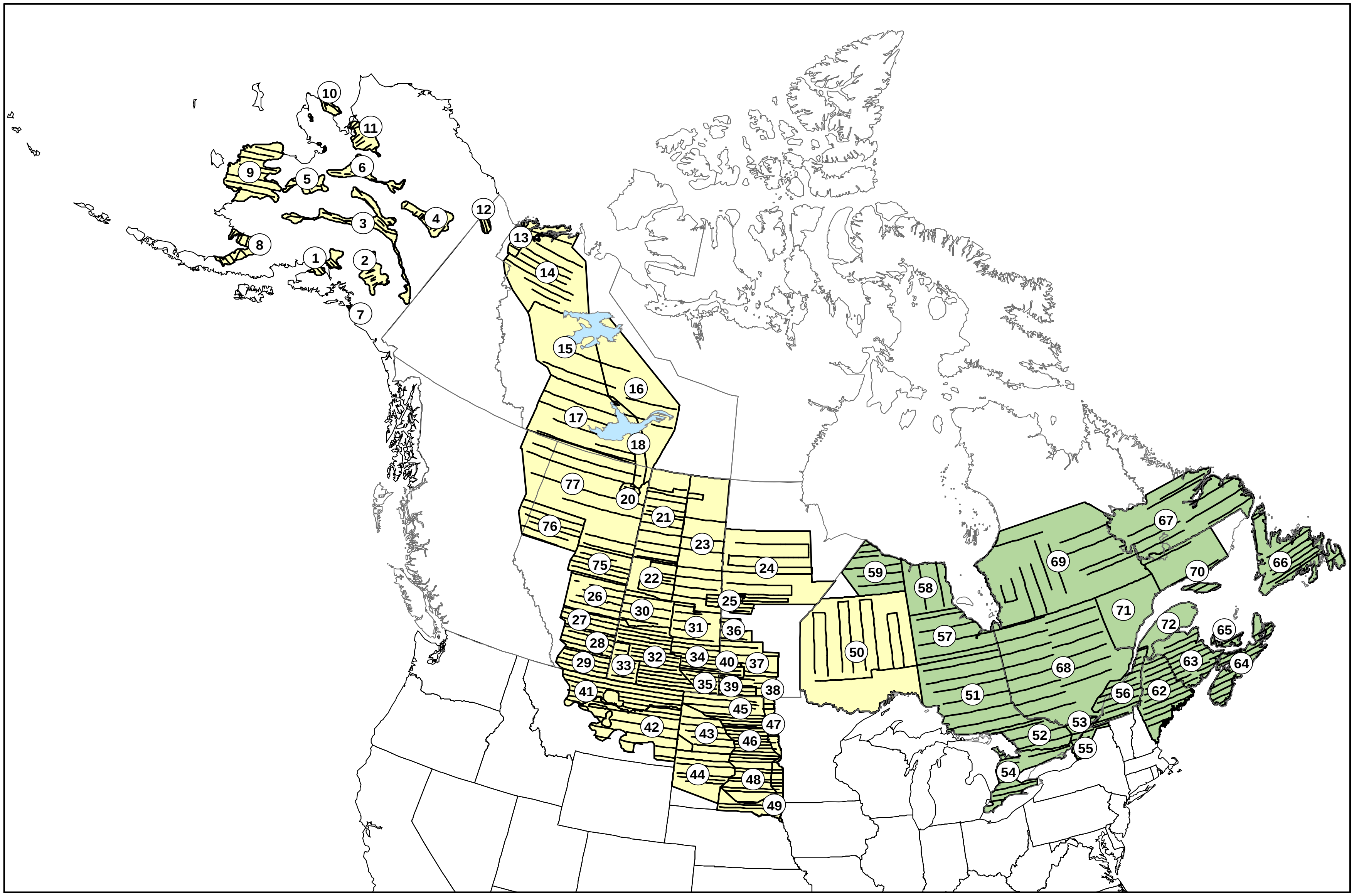
A. Anderson, J. Hodges[e], R. Platte, and S. Olson

Eastern Population of Tundra Swans

S. Earsom, S. Campbell, M. DiBona[b], D. Faith, M. Fisher, D. Fronzcak, J. Fuller[b], I. Gregg[b], W. Harper, J. Heise, L. Hindman[b], M. Hoff, D. Howell[b], P. Jayne, O. Jones[b], B. Lubinski, S. Meyer, T. Nichols[b], P. Padding, M. Robertson[a], W. Stanton, J. Stanton, D. Stewart, B. Swift[b], H. Walbridge, D. Webster, M. Whitbeck, and T. Willis

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

B. Waterfowl Breeding Population and Habitat Survey map



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

C. Historical estimates of May ponds and regional waterfowl populations

Table C.1. Estimated number of May ponds and standard errors (in thousands) in portions of Prairie 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	1,977.20	165.40				
1962	2,369.10	184.60				
1963	2,482.00	129.30				
1964	3,370.70	173.00				
1965	4,378.80	212.20				
1966	4,554.50	229.30				
1967	4,691.20	272.10				
1968	1,985.70	120.20				
1969	3,547.60	221.90				
1970	4,875.00	251.20				
1971	4,053.40	200.40				
1972	4,009.20	250.90				
1973	2,949.50	197.60				
1974	6,390.10	308.30	1,840.80	197.20	8,230.90	366.00
1975	5,320.10	271.30	1,910.80	116.10	7,230.90	295.10
1976	4,598.80	197.10	1,391.50	99.20	5,990.30	220.70
1977	2,277.90	120.70	771.10	51.10	3,049.10	131.10
1978	3,622.10	158.00	1,590.40	81.70	5,212.40	177.90
1979	4,858.90	252.00	1,522.20	70.90	6,381.10	261.80
1980	2,140.90	107.70	761.40	35.80	2,902.30	113.50
1981	1,443.00	75.30	682.80	34.00	2,125.80	82.60
1982	3,184.90	178.60	1,458.00	86.40	4,642.80	198.40
1983	3,905.70	208.20	1,259.20	68.70	5,164.90	219.20
1984	2,473.10	196.60	1,766.20	90.80	4,239.30	216.50
1985	4,283.10	244.10	1,326.90	74.00	5,610.00	255.10
1986	4,024.70	174.40	1,734.80	74.40	5,759.50	189.60
1987	2,523.70	131.00	1,347.80	46.80	3,871.50	139.10
1988	2,110.10	132.40	790.70	39.40	2,900.80	138.10
1989	1,692.70	89.10	1,289.90	61.70	2,982.70	108.40
1990	2,817.30	138.30	691.20	45.90	3,508.50	145.70
1991	2,493.90	110.20	706.10	33.60	3,200.00	115.20
1992	2,783.90	141.60	825.00	30.80	3,608.90	144.90
1993	2,261.10	94.00	1,350.60	57.10	3,611.70	110.00
1994	3,769.10	173.90	2,215.60	88.80	5,984.80	195.30
1995	3,892.50	223.80	2,442.90	106.80	6,335.40	248.00
1996	5,002.60	184.90	2,479.70	135.30	7,482.20	229.10

Table C.1. Continued.

	Prairie Canada		Northcentral U.S.[a]		Total	
Year	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
1997	5,061.00	180.30	2,397.20	94.40	7,458.20	203.50
1998	2,521.70	133.80	2,065.30	89.20	4,586.90	160.80
1999	3,862.00	157.20	2,842.20	256.80	6,704.30	301.20
2000	2,422.50	96.10	1,524.50	99.90	3,946.90	138.60
2001	2,747.20	115.60	1,893.20	91.50	4,640.40	147.40
2002	1,439.00	105.00	1,281.00	63.40	2,720.00	122.70
2003	3,522.30	151.80	1,667.80	67.40	5,190.10	166.10
2004	2,512.60	131.00	1,407.00	101.70	3,919.60	165.80
2005	3,920.50	196.70	1,460.70	79.70	5,381.20	212.20
2006	4,449.50	221.50	1,644.40	85.40	6,093.90	237.40
2007	5,040.20	261.80	1,962.50	102.50	7,002.70	281.20
2008	3,054.80	147.60	1,376.60	71.90	4,431.40	164.20
2009	3,568.10	148.00	2,866.00	123.10	6,434.00	192.50
2010	3,728.70	203.40	2,936.30	142.30	6,665.00	248.20
2011	4,892.70	197.50	3,239.50	127.40	8,132.20	235.00
2012	3,885.10	146.50	1,658.90	52.70	5,544.00	155.60
2013	4,550.50	185.50	2,341.20	99.00	6,891.70	210.20
2014	4,629.90	168.30	2,551.30	106.50	7,181.20	199.20

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

Table C.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		Nebraska	
Year	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards
1955									101.5	32.0
1956									94.9	25.8
1957									154.8	26.8
1958									176.4	28.1
1959									99.7	12.1
1960									143.6	21.6
1961									141.8	43.3
1962									68.9	35.8
1963									114.9	37.4
1964									124.8	66.8
1965									52.9	20.8
1966									118.8	36.0
1967									96.2	27.6
1968							321.0	83.7	96.5	24.1
1969							323.2	88.8	100.6	26.7
1970							324.2	113.9	112.4	24.5
1971							277.1	78.5	96.0	22.3
1972							217.2	62.2	91.7	15.2
1973							389.5	99.8	85.5	19.0
1974							281.6	72.8	67.4	19.5
1975							471.6	175.8	62.6	14.8
1976							684.1	117.8	87.2	20.1
1977							501.1	134.2	152.4	24.1
1978							462.5	146.8	126.0	29.0
1979							552.4	158.7	143.8	33.6
1980							690.6	172.0	133.4	37.3
1981							439.8	154.8	66.2	19.4
1982							465.2	120.5	73.2	22.3
1983							367.1	155.8	141.6	32.2
1984							529.7	188.1	154.1	36.1
1985							562.9	216.9	75.4	28.4
1986							520.8	233.6	69.5	15.1
1987							589.0	192.3	120.5	41.7
1988							725.2	271.7	126.5	27.8
1989							813.6	273.0	136.7	18.7
1990							807.9	232.1	81.4	14.7
1991					408.4	289.3	753.7	225.0	126.3	26.0
1992			497.4	375.8	867.5	385.8	973.3	360.9	63.4	24.4
1993			666.7	359.0	742.8	437.2	837.2	305.8	92.8	23.8
1994			483.2	311.7	683.1	420.5	1,115.6	426.5	118.9	17.5
1995			589.7	368.5	791.9	524.1	797.1	319.4	142.9	42.0
1996			843.7	536.7	680.5	378.2	889.1	314.8	132.3	38.9
1997			824.3	511.3	784.0	489.3	868.1	407.4	128.3	26.1
1998			706.8	353.9	1,068.5	523.0	693.1	368.5	155.7	43.4
1999			851.0	560.1	744.6	466.1	680.5	316.4	251.2	81.1

Table C.2. Continued.

	British Columbia		California		Michigan		Minnesota		Nebraska	
Year	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards
2000			562.4	347.6	793.9	427.2	747.8	318.1	178.8	54.3
2001			413.5	302.2	497.8	324.2	716.4	320.6	225.3	69.2
2002			392.0	265.3	742.5	323.2	1,171.5	366.6	141.8	50.6
2003			533.7	337.1	535.4	298.9	721.8	280.5	96.7	32.9
2004			412.8	262.4	624.5	342.0	1,008.3	375.3	69.9	23.2
2005			615.2	317.9	468.3	258.1	632.0	238.5	117.1	29.3
2006	401.8	102.1	649.4	399.4	412.2	244.6	521.1	160.7		
2007	374.8	98.5	627.6	388.3	641.9	337.7	488.5	242.5		
2008	348.7	73.7	554.3	297.1	437.5	200.5	739.6	297.6		
2009	321.6	67.0	510.8	302.0	493.6	258.9	541.3	236.4		
2010	307.8	72.4	541.3	367.9	595.3	338.3	530.7	241.9		
2011	260.7	68.3	558.6	314.7	471.4	258.6	687.5	283.3		
2012	298.0	78.7	529.7	387.1	860.1	439.3	468.6	225.0		
2013	305.3	77.2	451.3	298.6	678.6	288.4	682.9	293.2		
2014	324.5	81.6	448.7	238.7	395.3	230.1	474.4	257.0		

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

Table C.2. Continued.

	Nevada[b]		Northeast U.S.[c]		Oregon		Washington		Wisconsin	
Year	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards
1955										
1956										
1957										
1958										
1959	14.2	2.1								
1960	14.1	2.1								
1961	13.5	2.0								
1962	13.8	1.7								
1963	23.8	2.2								
1964	23.5	3.0								
1965	29.3	3.5								
1966	25.7	3.4								
1967	11.4	1.5								
1968	10.5	1.2								
1969	18.2	1.4								
1970	19.6	1.5								
1971	18.3	1.1								
1972	19.0	0.9								
1973	20.7	0.7							412.7	107.0
1974	17.1	0.7							435.2	94.3
1975	14.5	0.6							426.9	120.5
1976	13.6	0.6							379.5	109.9
1977	16.5	1.0							323.3	91.7
1978	11.1	0.6							271.3	61.6
1979	12.8	0.6					98.6	32.1	265.7	78.6
1980	16.6	0.9					113.7	34.1	248.1	116.5
1981	26.9	1.6					148.3	41.8	505.0	142.8
1982	21.0	1.1					146.4	49.8	218.7	89.5
1983	24.3	1.5					149.5	47.6	202.3	119.5
1984	24.0	1.4					196.3	59.3	210.0	104.8
1985	24.9	1.5					216.2	63.1	192.8	73.9
1986	26.4	1.3					203.8	60.8	262.0	110.8
1987	33.4	1.5					183.6	58.3	389.8	136.9
1988	31.7	1.3					241.8	67.2	287.1	148.9
1989	18.8	1.3					162.3	49.8	462.5	180.7
1990	22.2	1.3					168.9	56.9	328.6	151.4
1991	14.6	1.4					140.8	43.7	435.8	172.4
1992	12.4	0.9					116.3	41.0	683.8	249.7
1993	14.1	1.2	1,158.1	686.6			149.8	55.0	379.4	174.5
1994	19.2	1.4	1,297.3	856.3	323.6	116.4	123.9	52.7	571.2	283.4
1995	17.9	1.0	1,408.5	864.1	215.9	77.5	147.3	58.9	592.4	242.2
1996	26.4	1.7	1,430.9	848.6	288.4	102.2	163.3	61.6	536.3	314.4
1997	25.3	2.5	1,423.5	795.2	359.5	121.2	172.8	67.0	409.3	181.0
1998	27.9	2.1	1,444.0	775.2	345.1	124.9	185.3	79.0	412.8	186.9
1999	29.9	2.3	1,522.7	880.0	320.0	125.6	200.2	86.2	476.6	248.4

Table C.2. Continued.

	Nevada[b]		Northeast U.S.[c]		Oregon		Washington		Wisconsin	
Year	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards	Total ducks	Mallards
2000	26.1	2.1	1,933.5	762.6	314.9	110.9	143.6	47.7	744.4	454.0
2001	22.2	2.0	1,397.4	809.4			146.4	50.5	440.1	183.5
2002	11.7	0.7	1,466.2	833.7	364.6	104.5	133.3	44.7	740.8	378.5
2003	21.1	1.7	1,266.2	731.9	246.1	89.0	127.8	39.8	533.5	261.3
2004	12.0	1.7	1,416.9	805.9	229.8	82.5	114.9	40.0	651.5	229.2
2005	10.7	0.7	1,416.2	753.6	210.4	74.1	111.5	40.8	724.3	317.2
2006	37.4	1.8	1,384.2	725.2	251.2	81.1	135.4	45.5	522.6	219.5
2007	11.4	2.1	1,500.1	687.6	319.1	92.5	128.3	46.1	470.6	210.0
2008	11.5	1.9	1,197.1	619.1	224.3	75.4	120.9	50.6	626.9	188.4
2009	105.5	12.7	1,271.1	666.8	186.0	72.6	116.5	47.5	502.4	200.5
2010	68.9	8.9	1,302.0	651.7	205.1	66.8	176.0	81.2	386.5	199.1
2011	11.7	2.3	1,265.0	586.1	158.4	61.6	141.5	62.6	513.7	187.9
2012	23.9	4.1	1,309.9	612.6	263.5	88.8	168.9	89.4	521.1	197.0
2013	40.1	8.8	1,281.8	604.2	251.7	84.3	156.5	74.1	527.3	181.2
2014	23.7	4.2	1,343.8	634.6	315.2	85.3	117.2	86.5	395.1	158.7

[b] Survey redesigned in 2009, and not comparable with previous years.
[c] Includes all or portions of Connecticut, Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia.

Table C.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; 1955–2014).

	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 C.3. Continued.

Year	Mallard $\widehat{N}$	Mallard $\widehat{SE}$	Gadwall $\widehat{N}$	Gadwall $\widehat{SE}$	American wigeon $\widehat{N}$	American wigeon $\widehat{SE}$	Green-winged teal $\widehat{N}$	Green-winged teal $\widehat{SE}$	Blue-winged teal $\widehat{N}$	Blue-winged teal $\widehat{SE}$
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

Table C.3. Continued.

Year	Northern shoveler		Northern pintail		Redhead		Canvasback		Scaup	
	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$	$\widehat{N}$	$\widehat{SE}$
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 C.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

Table C.4. Total breeding duck estimates (1955–2014) 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 C.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

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

Table C.5. Breeding population estimates and 90% credibility intervals (in thousands) for the 6 most abundant species of ducks in the eastern survey area, 1990–2014[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
1990	322.8	(210.6, 486.3)	595.9	(533.8, 675.0)	248.9	(194.3, 326.2)	512.4	(407.6, 653.5)	368.2	(291.8, 486.2)	384.4	(325.1, 461.4)
1991	370.2	(242.2, 554.6)	599.8	(532.7, 684.1)	243.2	(188.7, 320.9)	456.2	(364.5, 579.1)	385.3	(303.8, 509.7)	457.2	(384.6, 555.1)
1992	368.3	(238.2, 561.9)	572.7	(510.3, 647.4)	233.6	(182.1, 308.8)	469.3	(372.5, 602.5)	399.1	(314.9, 528.0)	453.0	(375.0, 564.6)
1993	371.5	(246.3, 576.1)	553.6	(487.0, 630.8)	213.7	(164.4, 284.4)	436.4	(348.5, 562.6)	383.0	(301.6, 508.0)	433.7	(359.7, 533.4)
1994	387.6	(255.0, 594.7)	514.8	(455.6, 585.6)	223.6	(171.7, 296.8)	433.8	(341.8, 554.1)	396.5	(310.1, 526.7)	432.0	(354.0, 553.9)
1995	319.8	(204.3, 481.1)	594.6	(525.5, 676.7)	229.8	(175.8, 308.1)	446.4	(350.7, 570.3)	345.6	(270.3, 461.6)	468.5	(386.4, 583.0)
1996	350.4	(232.6, 542.8)	717.1	(639.7, 808.2)	298.2	(237.2, 390.2)	570.4	(458.9, 734.0)	421.9	(331.9, 561.2)	425.0	(359.8, 509.1)
1997	377.1	(243.5, 572.2)	600.9	(538.2, 672.6)	233.8	(184.1, 306.5)	510.4	(405.6, 649.2)	423.2	(333.0, 561.3)	432.0	(365.5, 519.1)
1998	416.1	(275.0, 636.0)	634.7	(569.9, 707.1)	223.4	(176.0, 289.2)	444.3	(355.1, 561.9)	370.4	(292.5, 489.8)	353.0	(299.0, 422.1)
1999	423.9	(283.1, 644.6)	718.2	(645.4, 805.5)	262.3	(203.2, 343.1)	523.4	(417.9, 658.0)	459.2	(357.4, 622.9)	416.0	(352.0, 501.2)
2000	385.6	(255.1, 579.7)	652.7	(586.6, 728.8)	277.6	(221.8, 352.7)	552.8	(442.3, 699.8)	437.4	(342.3, 585.1)	428.4	(364.4, 511.6)
2001	413.6	(273.6, 619.7)	615.4	(553.3, 689.0)	234.9	(185.9, 303.0)	499.8	(405.6, 632.7)	506.9	(394.6, 682.2)	407.6	(347.0, 486.7)
2002	406.2	(271.8, 616.9)	707.9	(637.1, 792.0)	277.6	(220.0, 363.5)	503.8	(400.7, 651.7)	573.6	(432.6, 804.6)	561.0	(473.9, 675.4)
2003	420.9	(280.1, 639.9)	648.7	(583.2, 728.4)	271.2	(215.2, 353.5)	518.0	(415.1, 655.7)	428.7	(338.1, 569.6)	478.6	(404.2, 577.0)
2004	445.9	(295.0, 676.4)	644.4	(577.5, 720.3)	311.3	(246.2, 410.6)	558.9	(447.2, 705.3)	420.3	(334.5, 551.2)	513.1	(435.2, 611.9)
2005	431.1	(287.4, 662.3)	620.4	(555.6, 696.3)	249.5	(199.4, 324.3)	524.9	(421.7, 660.7)	384.0	(305.2, 506.1)	475.7	(402.6, 572.1)
2006	400.8	(268.3, 609.5)	637.8	(570.2, 715.8)	253.9	(199.5, 329.9)	541.9	(434.4, 680.0)	383.0	(304.3, 503.4)	430.7	(366.0, 514.3)
2007	448.7	(302.3, 694.6)	741.4	(663.4, 839.4)	280.6	(223.6, 364.2)	669.8	(534.7, 851.9)	460.7	(361.0, 615.6)	460.0	(388.0, 555.7)
2008	442.9	(296.5, 682.0)	641.8	(575.0, 723.6)	304.6	(231.7, 426.7)	543.4	(435.3, 687.0)	433.2	(340.8, 574.2)	438.0	(372.0, 522.6)
2009	464.2	(306.9, 713.2)	598.4	(535.7, 668.5)	293.3	(229.8, 390.6)	531.2	(428.4, 673.9)	401.4	(315.4, 532.9)	463.8	(393.1, 556.4)
2010	382.4	(255.0, 578.3)	567.5	(508.1, 635.6)	276.6	(217.6, 360.0)	532.0	(427.2, 662.7)	396.7	(311.0, 526.7)	380.6	(322.0, 455.8)
2011	430.1	(287.1, 665.3)	545.2	(489.5, 611.0)	254.6	(201.8, 332.5)	519.3	(417.6, 654.5)	397.6	(314.8, 525.8)	402.0	(339.0, 482.8)
2012	413.3	(274.3, 621.1)	604.2	(540.1, 676.7)	259.1	(206.4, 334.3)	518.8	(416.2, 652.5)	391.6	(310.7, 516.1)	424.7	(360.3, 507.5)
2013	501.5	(328.4, 803.8)	625.5	(562.0, 697.5)	291.1	(230.9, 380.3)	634.9	(502.0, 841.1)	456.5	(362.5, 602.0)	471.0	(398.0, 567.1)
2014	444.7	(297.8, 679.2)	618.7	(552.1, 699.1)	236.5	(187.0, 305.2)	494.0	(395.9, 622.0)	392.2	(303.2, 547.8)	416.4	(352.6, 499.3)

[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.

D. Historical estimates of goose and swan populations

Table D.1. Abundance indices (in thousands) for North American Canada goose populations, 1969–2014.

Year	North Atlantic[a,b]	Atlantic[a,b]	Atlantic Flyway Resident[a]	Southern James Bay[a]	Miss. Valley[a]	Miss. Flyway Giant[a]	Eastern Prairie[a]
1969/70							
1970/71							
1971/72							95.0
1972/73							116.6
1973/74							96.7
1974/75							121.5
1975/76							168.4
1976/77							110.8
1977/78							111.2
1978/79							72.8
1979/80							
1980/81							78.9
1981/82							96.4
1982/83							92.8
1983/84							112.0
1984/85							105.6
1985/86							126.4
1986/87							145.9
1987/88							137.0
1988/89					352.5		132.1
1989/90				92.1	518.8		163.4
1990/91				72.4	254.8		167.4
1991/92				73.0	438.9		158.4
1992/93		93.0		50.7	411.2	779.4	136.2
1993/94		43.2		45.7	432.2	909.4	136.2
1994/95		34.0		74.1	348.2	941.6	139.0
1995/96	99.6	51.5		71.1	362.4	1,037.3	141.0
1996/97	64.4	72.1		87.0	426.0	957.0	130.5
1997/98	53.9	48.6		70.3	312.5	1,140.5	99.3
1998/99	96.8	83.8		108.1	465.5	1,163.3	139.5
1999/00	58.0	95.8		78.7	352.6	1,436.7	130.0
2000/01	57.8	135.2		68.4	325.4	1,296.3	122.2
2001/02	62.0	182.4		55.2	286.5	1,415.2	152.0
2002/03	60.8	174.9	1,126.7	90.2	360.1	1,416.3	122.4
2003/04	67.8	191.8	1,048.7	75.2	276.3	1,430.4	145.5
2004/05	51.3	175.7	1,167.1	42.2	344.9	1,367.0	161.6
2005/06	49.2	186.1	1,144.0	128.9	384.4	1,575.2	134.8
2006/07	69.9	207.3	1,128.0	64.8	402.6	1,454.7	153.4
2007/08	41.9	174.0	1,024.9	92.3	305.2	1,461.7	161.1
2008/09	53.7	186.8	1,006.1	69.2	239.6	1,448.3	169.2
2009/10	54.6	165.1	977.1	76.4	339.3	1,638.0	172.6
2010/11	48.5	216.0	1,015.1	99.0	269.8	1,670.3	133.1
2011/12	71.6	190.3	879.8	94.9	268.9	1,766.2	116.3
2012/13			951.9	64.1	319.7	1,600.7	136.6
2013/14	76.0	183.6	1,084.9	81.3	323.1	1,461.0	202.0

Table D.1. Continued

Year	W. Prairie & Great Plains[c]	Central Flyway Arctic Nesting[c]	Hi-line[a]	Rocky Mountain[a]	Dusky	Cackling[d]	Aleutian[d]
1969/70		139.6	58.8				
1970/71		281.9	99.6	43.8			
1971/72		321.9	53.0	30.4			
1972/73		407.8	30.1	34.4			
1973/74		310.1	33.9	38.3			
1974/75		257.2	29.1	38.2			0.8
1975/76		446.2	40.5	25.4			0.9
1976/77		446.4	40.9	25.2			1.3
1977/78		335.9	39.8	37.2			1.5
1978/79		342.2	50.5	52.8			1.6
1979/80		362.8	51.2	31.0			1.7
1980/81		398.8	51.0	54.0			2.0
1981/82	0.2	438.3	54.5	58.8			2.7
1982/83	0.2	317.6	74.1	42.1			3.5
1983/84	0.1	408.3	105.8	41.7			3.8
1984/85	0.2	386.1	92.3	43.9		46.8	4.2
1985/86	0.0	379.2	101.8	62.1	17.1	45.2	4.3
1986/87	0.2	356.5	95.4	62.2	15.8	66.7	5.0
1987/88	0.3	463.7	131.3	98.2	16.0	82.0	5.4
1988/89	0.2	511.2	124.8	88.1	17.4	85.3	5.8
1989/90	0.2	523.9	185.8	83.9	16.3	106.4	6.3
1990/91	0.3	827.7	148.3	78.5	10.7	96.6	7.0
1991/92	0.3	839.2	168.0	94.4	17.8	148.6	7.7
1992/93	0.3	509.2	158.0	107.7	16.5	153.2	11.7
1993/94	0.3	549.6	160.9	131.1	16.3	217.8	15.7
1994/95	0.4	729.8	234.6	141.7	12.1	234.1	19.1
1995/96	0.4	685.1	200.5	139.4	12.0	249.8	15.4
1996/97	0.5	679.1	208.0	96.6	13.5	294.8	20.3
1997/98	0.5	674.8	257.7	139.2	14.5	216.4	32.4
1998/99	0.5	951.4	204.5	157.3	10.5	241.8	35.5
1999/00	0.6	495.0	287.7	173.4	10.2	251.2	34.4
2000/01	0.7	313.2	261.9	170.1	11.1	253.3	
2001/02	0.7	665.6	239.0	143.3	12.4	168.1	
2002/03	0.6	768.5	239.1	141.7	9.8	234.0	73.0
2003/04	0.6	662.3	208.4	159.2	11.2	172.1	108.3
2004/05	0.4	578.0	245.4	160.1	16.1	219.4	86.9
2005/06	0.4	734.5	217.6	139.3	12.1	241.1	99.0
2006/07	0.4	870.8	309.5	145.1	10.2	248.4	109.2
2007/08	0.7	615.1	348.2	212.8	9.1	283.7	110.1
2008/09	0.6	531.5	306.7	124.7	6.7	225.9	81.2
2009/10	0.5	707.8	277.6	144.1	9.5	275.3	105.2
2010/11	0.5	737.7	274.0	104.9	11.8	180.2	100.2
2011/12	0.6	743.6	494.4	143.4	13.7	202.3	131.8
2012/13	0.8	519.5	338.9	159.1		312.2	158.7
2013/14	0.6	567.3	288.2	115.3	15.6	281.3	146.9

[a] Surveys conducted in spring.
[b] Breeding pairs
[c] Surveys conducted in January.
[d] Surveys conducted in fall through 1998; from 1999 to present a fall index is predicted from breeding ground surveys (total indicated birds).

Table D.2. Abundance indices for snow, Ross's, white-fronted, and emperor goose populations, 1969–2014.

	Snow and Ross's geese				White-fronted geese		
Year	Greater snow geese[a]	Mid-continent[b]	Western Central Flyway[c]	Western Arctic & Wrangel Isl.[d]	Mid-continent[d]	Pacific[e]	Emperor geese[a]
1969/70	89.6	777.0	6.9				
1970/71	123.3	1,070.2	11.1				
1971/72	134.8	1,313.4	13.0				
1972/73	143.0	1,025.3	11.6				
1973/74	165.0	1,189.8	16.2				
1974/75	153.8	1,096.6	26.4				
1975/76	165.6	1,562.4	23.2				
1976/77	160.0	1,150.3	33.6				
1977/78	192.6	1,966.4	31.1				
1978/79	170.1	1,285.7	28.2			73.1	
1979/80	180.0	1,398.1	30.4	528.1		93.5	
1980/81	170.8	1,406.7	37.6	204.2		116.5	93.3
1981/82	163.0	1,794.1	50.0	759.9		91.7	100.6
1982/83	185.0	1,755.5	76.1	354.1		112.9	79.2
1983/84	225.4	1,494.5	43.0	547.6		100.2	71.2
1984/85	260.0	1,973.0	62.9	466.3		93.8	58.8
1985/86	303.5	1,449.4	96.6	549.8		107.1	42.0
1986/87	255.0	1,913.8	63.5	521.7		130.6	51.7
1987/88		1,750.7	46.2	525.3		161.5	53.8
1988/89	363.2	1,956.2	67.6	441.0		218.8	45.8
1989/90	368.3	1,724.3	38.7	463.9		240.8	67.6
1990/91	352.6	2,135.8	104.6	708.5		236.5	71.0
1991/92	448.1	2,021.9	87.9	690.1		230.9	71.3
1992/93	498.4	1,744.1	45.1	639.3	622.9	295.1	52.5
1993/94	591.4	2,200.8	84.9	569.2	676.3	324.8	57.3
1994/95	616.6	2,725.1	80.1	478.2	727.3	277.5	51.2
1995/96	669.1	2,398.1	93.1	501.9	1,129.4	344.1	80.3
1996/97	657.5	2,957.7	127.2	366.3	742.5	319.0	57.1
1997/98	836.6	3,022.2	103.5	416.4	622.2	413.1	39.7
1998/99	1,008.0	2,575.7	236.4	354.3	1,058.3	393.4	56.4
1999/00	816.5	2,397.3	137.5	579.0	963.1	352.7	62.6
2000/01	837.4	2,341.3	105.8	656.8	1,067.6	438.9	84.4
2001/02	639.3	2,696.1	99.9	448.1	712.3	359.7	58.7
2002/03	678.0	2,435.0	105.9	596.9	680.2	422.0	71.2
2003/04	957.6	2,214.3	135.4	587.8	528.2	374.9	47.4
2004/05	814.6	2,344.2	143.0	750.3	644.3	443.9	54.0
2005/06	1,016.9	2,221.7	140.6	710.7	522.8	509.3	76.0
2006/07	1,019.0	2,917.1	170.6	799.7	751.3	604.7	77.5
2007/08	718.0	2,455.1	188.5	1,073.5	764.3	627.0	64.9
2008/09	1,009.0	2,753.4	284.4	957.4	751.7	536.8	91.9
2009/10	824.0	2,657.5	238.1	901.0	583.2	649.8	64.6
2010/11	917.0	3,175.2	196.0	863.8	709.8	604.3	74.2
2011/12	1,005.0	4,021.2	205.3	1,097.9	681.7	664.2	67.6
2012/13	921.0	4,614.0	225.9	881.4	777.9	579.9	
2013/14	796.0	3,814.7	264.8	1,351.2		637.2	79.9

[a] Surveys conducted in spring.
[b] Surveys conducted in December until 1997/98; surveys since 1998/99 were conducted in January.
[c] Surveys conducted in January.
[d] Surveys conducted in autumn.
[e] Surveys conducted in fall through 1998; from 1999 to present a fall index is predicted from breeding ground surveys (total indicated birds).

Table D.3. Abundance indices of North American brant and swan populations from January surveys, 1969–2014.

	Brant		Tundra swans	
Year	Atlantic	Pacific[a]	Western	Eastern
1969/70		141.7	31.0	
1970/71	151.0	149.2	98.8	
1971/72	73.2	124.8	82.8	
1972/73	40.8	125.0	33.9	
1973/74	87.7	130.7	69.7	
1974/75	88.4	123.4	54.3	
1975/76	127.0	122.0	51.4	
1976/77	73.6	147.0	47.3	
1977/78	42.8	162.9	45.6	
1978/79	43.5	129.4	53.5	
1979/80	69.2	146.4	65.2	
1980/81	97.0	194.2	83.6	
1981/82	104.5	121.0	91.3	73.2
1982/83	123.5	109.3	67.3	87.5
1983/84	127.3	133.4	61.9	81.4
1984/85	146.3	145.1	48.8	96.9
1985/86	110.4	136.6	66.2	90.9
1986/87	109.4	109.1	52.8	95.8
1987/88	131.2	147.2	59.2	78.7
1988/89	138.0	135.7	78.7	91.3
1989/90	135.4	152.0	40.1	90.6
1990/91	147.7	132.3	47.6	98.2
1991/92	184.8	118.0	63.7	113.0
1992/93	100.6	124.6	62.2	78.2
1993/94	157.2	130.4	79.4	84.8
1994/95	148.2	134.1	52.9	85.1
1995/96	105.9	127.5	98.1	79.5
1996/97	129.1	158.4	122.5	92.4
1997/98	138.0	139.0	70.5	100.6
1998/99	171.6	130.2	119.8	111.0
1999/00	157.2	136.3	89.6	115.3
2000/01	145.3	126.0	87.3	98.4
2001/02	181.6	138.2	58.7	114.7
2002/03	164.5	107.6	102.7	111.7
2003/04	129.6	121.3	82.95[b]	110.8
2004/05	123.2	112.4	92.1	72.5
2005/06	146.6	145.2	106.9	81.3
2006/07	150.6	142.1	109.4	114.4
2007/08	161.6	157.9	89.7	96.2
2008/09	151.3		105.2	100.2
2009/10	139.7	161.7	76.7	97.3
2010/11	148.9		49.3[b]	97.7
2011/12	149.2		117.2	111.7
2012/13	111.8	162.9	75.3	107.1
2013/14	132.9		68.2	105.0

[a] Beginning in 1986, counts of Pacific brant in Alaska were included with the Pacific flyway.
[b] Incomplete or preliminary.

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

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

For state transfer relay service
TTY/Voice: 711