

# Population status of migratory game birds in Canada - 2023



Canadian Wildlife Service  
Waterfowl Technical Committee  
CWS Migratory Birds Regulatory  
Report **Number 58**



Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

Canada

Cat. No.: CW69-16/58-2023E-PDF  
ISBN: 978-0-660-69144-2  
EC23227

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# Population Status of Migratory Game Birds in Canada - 2023

## Canadian Wildlife Service Waterfowl Technical Committee CWS Migratory Birds Regulatory Report Number 58

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### Recommended citation for this report:

Canadian Wildlife Service Waterfowl Committee. 2023. *Population Status of Migratory Game Birds in Canada: 2023*. CWS Migratory Birds Regulatory Report Number 58.

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## 1 Executive Summary

### 1.1 Eastern range

In 2023, there were approximately 1.84 million ducks (excluding sea ducks) in the Eastern Waterfowl Survey (EWS) area. Since 1990, Mallard numbers have increased. Other duck species (American Black Duck, Green-winged Teal, American Wigeon, and Ring-necked Duck) have shown no significant trends since 1990. From 2019 to 2023, numbers of all species have shown no discernable trend (American Black Duck, Green-winged Teal, American Wigeon, Mallard, and Ring-necked Duck). In 2023, the most common species were Mallard (548,000), American Black Duck (544,000), Ring-necked Duck (503,000) and Common Merganser (331,000).

### 1.2 Western range

In 2023, there were approximately 30.5 million ducks (excluding sea ducks) in the Traditional Survey Area of the Waterfowl Breeding Population and Habitat Survey (WBPHS). In the Traditional Survey Area, numbers of Blue-winged Teal, Gadwall, Northern Shoveler, Redhead, Ring-necked Duck, and Ruddy Duck have increased since 1970. Numbers of American Wigeon, Mallard, and Northern Pintail have decreased. Since 1970, other duck species (Green-winged Teal and Canvasback) have fluctuated but showed no significant trend. From 2019 to 2023, numbers of Green-winged Teal, American Wigeon, Gadwall, Mallard, and Northern Shoveler have decreased while the numbers of all other species (Blue-winged Teal, Canvasback, Northern Pintail, Redhead, Ring-necked Duck, and Ruddy Duck) have shown no discernable trend. In 2023, the most common species were Mallard (6.1 million), Blue-winged Teal (5.25 million), Scaup sp. (3.5 million), Northern Shoveler (2.85 million) and Gadwall (2.56 million).

### 1.3 Geese

There are 8 populations of geese monitored through Lincoln estimates. From the long-term record (1976-2022), 5 populations have increased (Cackling Goose, Arctic Greater White-fronted Goose, Mid-Continent Lesser Snow Goose, Western Arctic Lesser Snow Goose, and Ross's Goose) and one population has shown no significant trend (Atlantic Brant). From 2018 to 2022, six populations have decreased (Atlantic Brant, Cackling Goose, Arctic Greater White-fronted Goose, Mid-Continent Lesser Snow Goose, Western Arctic Lesser Snow Goose, and Ross's Goose). Populations monitored through other surveys are presented in the main text.

## 2 Background

Environment and Climate Change Canada (ECCC) is responsible for the conservation and management of migratory birds in Canada. Hunting regulations for migratory game birds are developed to ensure that harvest supports long-term sustainable populations of those hunted species. These regulations are reviewed and amended biennially by ECCC, with input from the provinces, territories, and other stakeholders. The population status of

migratory game birds is assessed on an annual basis to ensure that regulations are appropriate, and amendments can be made between review periods, if necessary, for conservation reasons. As part of the regulatory process to amend hunting regulations, the Canadian Wildlife Service (CWS) produces a series of regulatory reports.

The first report, *Population Status of Migratory Game Birds in Canada*, contains population and other biological information on migratory game birds. It thus provides the scientific basis for informing management decisions that ensure long-term sustainability of bird populations. ECCC publishes the *Population Status of Migratory Game Birds in Canada* to evaluate the status of migratory game birds and formally reviews the hunting regulations every two years. Additionally, CWS analyzes population trends after surveys are completed.

The second report, *Proposals to Amend the Canadian Migratory Birds Regulations*, outlines proposed changes to the hunting regulations and overabundant species regulations, as well as any other proposed amendments to the *Migratory Birds Regulations, 2022*. Proposed changes to hunting regulations are developed in accordance with the [Objectives and Guidelines for the Establishment of National Regulations for Migratory Bird Hunting](#). This report is also published every two years, concurrently with the revision of the hunting regulations.

The third report, *Migratory Birds Regulations in Canada*, summarizes the hunting regulations that were approved for the next two hunting seasons. This report is published every two years, concurrently with the revision of the hunting regulations.

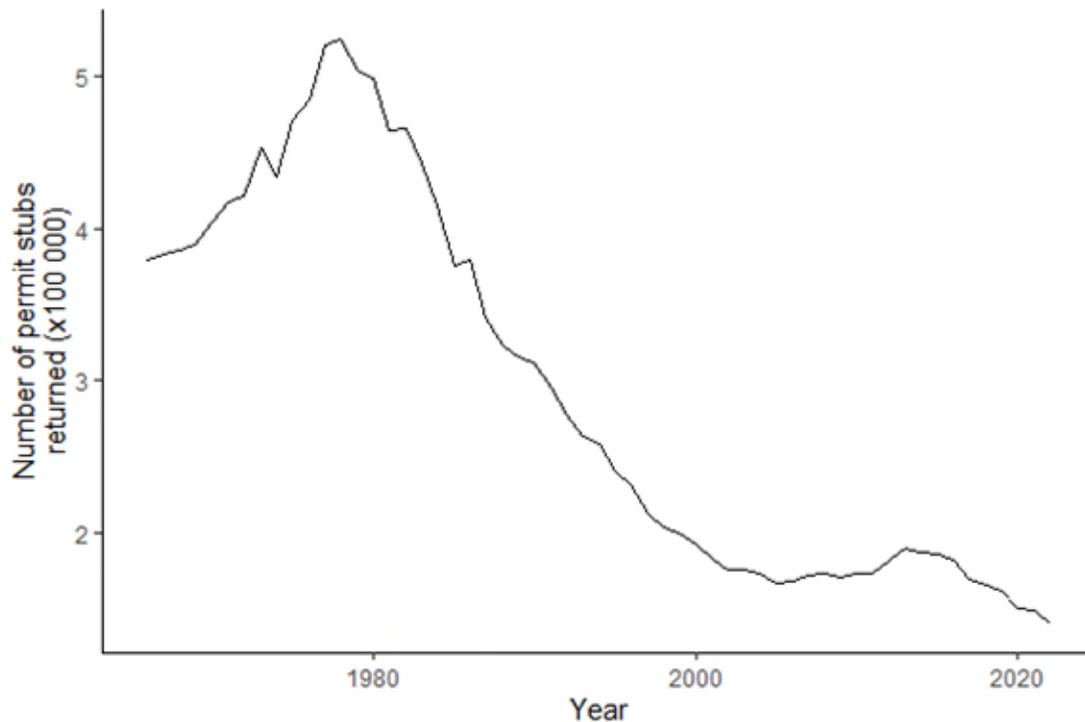
These three reports are distributed to organizations and individuals with an interest in migratory bird conservation to provide an opportunity for input on the development of hunting regulations in Canada. They are also available on the [ECCC website](#).

### **3 Migratory Game Bird Hunting Permit Sales and Harvest**

Information on the sale of Migratory Game Bird Hunting permits is available from 1966 onwards (Figure 3.1). Annual sales peaked in 1978 (524,946 permits sold) and subsequently declined to an all-time low in 2022, when sales were down to 140,133 permits.

In August 2014, ECCC launched a new online e-Permitting system to improve hunters' access to migratory Game Bird Hunting permits. Originally, this system allowed hunters to purchase a permit online, and the permit (along with the Canadian Wildlife Habitat Conservation [CWHC] stamp) would then be mailed to the hunter within 3 to 5 business days. As of August 2015, hunters can purchase their Migratory Game Bird Hunting permit and CWHC stamp online, receive electronic copies of the permit and stamp by email, and print these documents. Since the establishment of the e-Permitting system, the number of hunters that buy their permit online has steadily increased, and in 2022, 42% of hunters bought their permit online. More information on migratory Game Bird hunting permit sales in Canada is available on the [ECCC website](#).

In Canada, the [National Harvest Survey](#) was initiated in 1969 to estimate the annual harvest of migratory game birds and to determine trends in hunter activity across Canada. The survey is coordinated by CWS and uses data from hunters to determine the geographic distribution of harvest and to estimate annual species-specific harvest across Canada, provincially, and, if possible, at the Hunting District/Zone level. Participants (hunters) are randomly selected from the pool of permit holders, and responses are voluntary. The survey has two components: the Harvest Questionnaire Survey, which is used to estimate the total number of migratory game birds taken by hunters, and the Species Composition Survey, which helps determine the proportion of each species in the total harvest. Harvest estimates are generated by integrating the results of these two surveys (Smith, Villeneuve, and Gendron 2021), and the data are used in harvest management decisions and to estimate abundance of some species. Supplemental surveys are undertaken to estimate the numbers of geese harvested during the Spring Conservation Hunt, a special conservation measure put in place to attempt to control overabundant Snow Geese, Ross's Geese, and some Canada Geese.



*Figure 3.1: Number of Migratory Game Bird Hunting Permit stubs returned to Environment and Climate Change Canada. Note that permits that were sold, but for which stubs were not returned to Environment and Climate Change Canada, are excluded from the totals.*

## 4 Population Surveys

The CWS supports a variety of surveys to monitor migratory birds in their breeding, wintering, staging, and molting areas. Monitoring programs include surveys and banding programs. Surveys of migratory game birds are used to estimate population size. Banding

programs are used to estimate survival, harvest rates, and population size and help assess movements of birds and the distribution of harvest. Harvest surveys are used to estimate harvest size and productivity and to assess the impacts of hunting regulations on migratory game bird populations. This report presents data obtained from these monitoring programs. Where available, estimates are presented as means, with 95% confidence intervals. Data are used to assess the status of migratory game birds in Canada, thus providing a scientific basis for the management of migratory game birds and the implementation of hunting regulations to ensure the long-term sustainability of migratory game birds. CWS uses this information to ensure that hunting does not jeopardize the sustainability of migratory game bird populations. Due to COVID-19 restrictions, many surveys were not able to be conducted, and banding activities were also reduced substantially in 2020 and 2021.

#### **4.1 Waterfowl Breeding Population and Habitat Survey**

The Waterfowl Breeding Population and Habitat Survey (WBPHS) in western Canada and the northwestern United States of America (US) consists of extensive aerial transects to estimate the number of breeding waterfowl and to assess habitat conditions for waterfowl (i.e., the number of ponds). The survey is conducted annually between May and June and covers the Canadian Prairies and Parkland, the Canadian Western Boreal (northwestern Ontario, northern part of the Prairie provinces, northeast corner of British Columbia, western Northwest Territories, and Old Crow Flats in the Yukon), the north-central US (US Prairies), and parts of Alaska (Figure 4.1).

The survey, which uses fixed-wing aircraft, has been conducted since 1955. Breeding population estimates derived from this survey have been corrected for visibility bias (proportion of waterfowl that are not detected from the air) since 1961. Visibility correction factors are obtained from ground counts conducted by the CWS on a subset of transects in the Canadian Prairies and by the US Fish and Wildlife Service (USFWS) on a subset of transects in the northern US. In roadless areas of the Canadian Boreal Forest, correction factors are derived from a comparison of fixed-wing and helicopter counts conducted in the 1980s. Estimates of abundance derived from this survey provide important information used to set regulations for duck hunting in both Canada and the US.

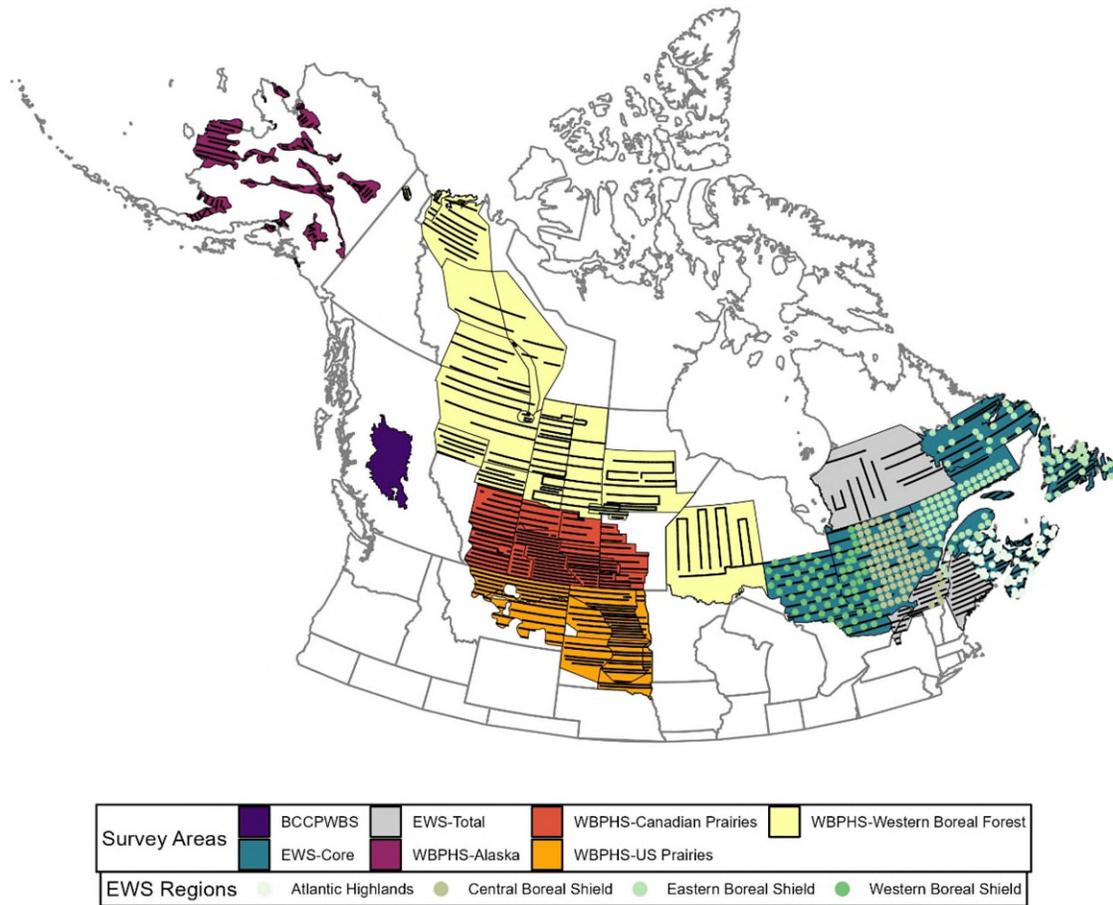


Figure 4.1: The Waterfowl Breeding Population and Habitat Survey in western Canada and northwestern US, the Eastern Waterfowl Survey, and the British Columbia Central Plateau Waterfowl Breeding Survey. Lines represent fixed-wing aircraft survey transects; dots represent helicopter survey plots.

## 4.2 Eastern Waterfowl Survey

The Eastern Waterfowl Survey (EWS) has been conducted annually since 1990. This early nesting breeding pair survey of waterfowl has two components: a helicopter plot survey and a fixed-wing transect survey. CWS carries out the helicopter plot survey in Boreal Shield Regions (from northeastern Ontario to Newfoundland and Labrador) and in the Atlantic Highlands Region (Gaspé Peninsula in Québec, New Brunswick, and Nova Scotia; Figure 4.1). The USFWS conducts the fixed-wing transect survey in parts of eastern Canada and the northeastern US. The EWS is usually conducted from late April to early June, depending on regional spring phenology.

Though originally designed to survey American Black Ducks in eastern Canada, the survey provides quantitative information on other duck and bird species, notably, Canada Geese, and Sandhill Crane. Historically, data from the two components of this survey (CWS helicopter plot survey and USFWS fixed-wing transect survey) were analyzed separately,

despite substantial overlap in geographic coverage. The two components were integrated into one survey in 2004. EWS results are analyzed based on four regions of the core EWS area: the Atlantic Highlands, the Eastern Boreal Shield, the Central Boreal Shield, and the Western Boreal Shield (Figure 4.1).

### 4.3 Other Waterfowl Surveys

British Columbia, Nunavut, and the Yukon are the only provinces and territories not covered (at least in part) by the WBPHS and EWS. Since 2006, British Columbia has instead monitored waterfowl using the Waterfowl Breeding Population Survey of the Central Interior Plateau of British Columbia (BCCPWBS), a small-scale helicopter survey. This survey is run cooperatively by CWS, Ducks Unlimited Canada, and the USFWS and covers 11 million hectares. The survey is accomplished by helicopter using a technique similar to that of the WBPHS, except that all waterfowl sightings are geo-referenced and associated with a unique habitat type (i.e., stream, wetland, river, lake, agricultural field) to subsequently support the development of species distribution and habitat use models.

Arctic goose population estimates and trends in abundance are now mainly calculated from band recovery data and total harvest estimates using Lincoln methods (Alisauskas, Drake, and Nichols 2009). Lincoln estimates represent population abundance during the goose banding season (July-August) and are typically not available for the current year because of the timing of data collection. Some Subarctic and temperate breeding Canada Goose populations (e.g., Atlantic and Southern Hudson and James Bay populations) are still monitored by surveys conducted while geese are paired on nests. The Greater Snow Goose population is monitored by a survey on spring staging areas in Quebec and Ontario.

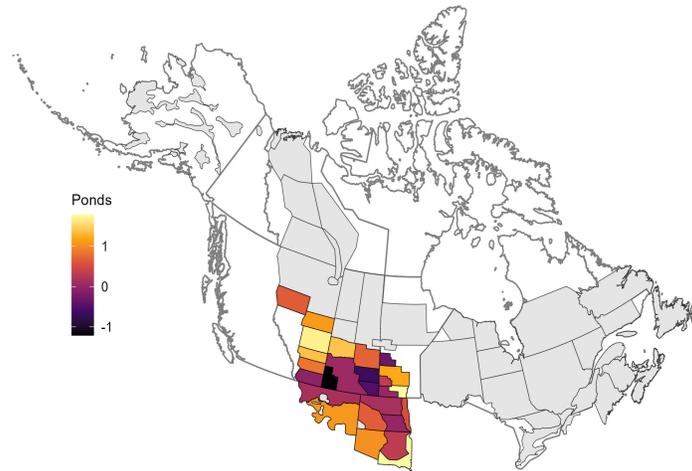
The Southern Ontario Waterfowl Plot Survey (SOWPS) was initiated in 1971 to monitor early-nesting duck populations and their habitat. Surveys are primarily ground-based, but some remote locations are surveyed by helicopter. Data from this survey have also been important in monitoring the population of temperate breeding Canada Geese in southern Ontario.

Supplemental information on waterfowl populations is provided by Midwinter Waterfowl Surveys (hereafter Midwinter Surveys) that are conducted in January on the wintering grounds in Ontario and the US. Since 1935, Midwinter Surveys have provided population indices for many species of waterfowl. Midwinter Surveys are not based on a statistical sampling plan, and some wintering habitats are not covered, so results are best used strictly for evaluating relative abundance and distribution in select wintering areas.

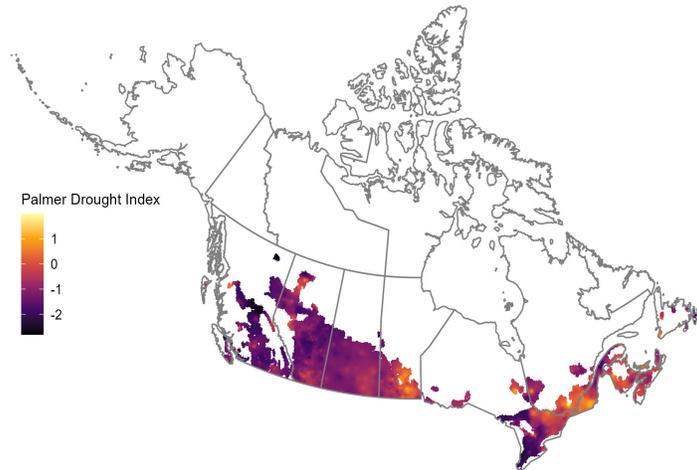
## 5 Habitat Conditions

Environmental conditions on the breeding grounds influence counts during surveys in two ways. First, high quality habitat can increase the *true* abundance of migratory birds on the landscape by increasing breeding success or attracting migrants. Second, environmental conditions can influence migratory birds' arrival and breeding phenology, changing the *perceived* abundance at the time of survey.

Moisture conditions in the Prairies are cyclic, and levels of precipitation heavily influence breeding success in the Prairies by changing the number of wetlands available for breeding and the persistence of ponds throughout the breeding season. During the WBPHS, observers count the number of ponds on the landscape in May as an indication of breeding conditions (Figure 5.1). The Palmer Drought Index is another widely used measure of habitat conditions in southern Canada. This index combines precipitation and temperature data to estimate overall dryness, with lower numbers representing drought conditions and higher numbers representing wet conditions (Figure 5.2).

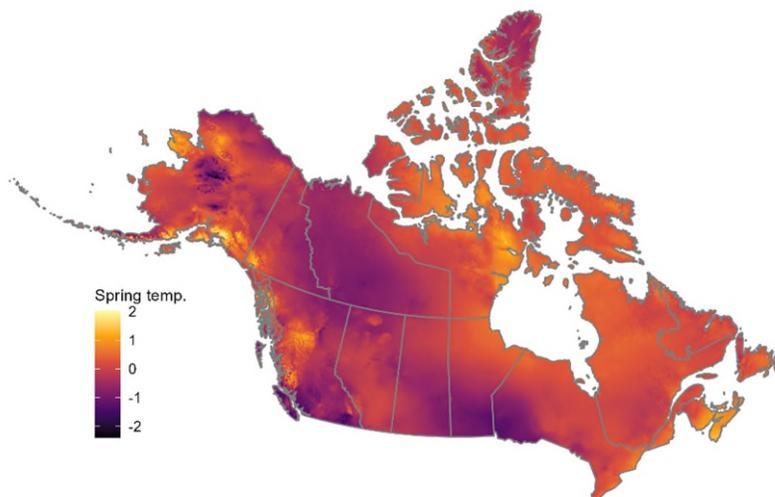


*Figure 5.1: The 2023 May Pond Index of the Waterfowl Breeding Population and Habitat Survey (WBPHS) compared to the 10-year regional average. Comparisons are mean-centered and scaled by standard deviation within each strata. Positive values represent areas with more ponds than the 10-year regional average, and negative values represent areas with fewer ponds than average. Grey areas represent strata of the WBPHS where ponds are not surveyed.*



*Figure 5.2: The 2023 agricultural year Palmer Drought Index (September 2022 - August 2023) compared to the 10-year average. Comparisons are mean-centered and scaled by standard deviation by location. Positive values represent areas that are wetter than the 10-year average for the area, and negative values represent areas that are dryer than average. Source: Agriculture and Agri-Food Canada, 2023.*

The timing of spring thaw also influences the total number and species of birds counted. Surveys must occur during the breeding period to provide accurate counts of breeding birds on the landscape. Spring temperatures and snow conditions influence when breeding begins for many species (Figures 5.3 and 5.4). Colder springs with late snowmelt may delay breeding, resulting in fewer birds being detected in northern breeding areas and/or higher counts in southern areas if the survey is conducted while birds are still migrating through the area (Naugle et al. 2000; Schummer et al. 2018; Roy et al. 2019;).



*Figure 5.3: The 2023 spring temperatures (mean daily highs for March to April) compared to the 10-year average. Comparisons are mean-centered and scaled by standard deviation by*

location. Positive values represent areas with warmer spring temperatures compared to the 10-year average for the area, while negative values represent areas with colder spring temperatures than average. Source: CPC Global Temperature data 2023 provided by the NOAA/OAR/ESRL PSL, Boulder, Colorado, USA.

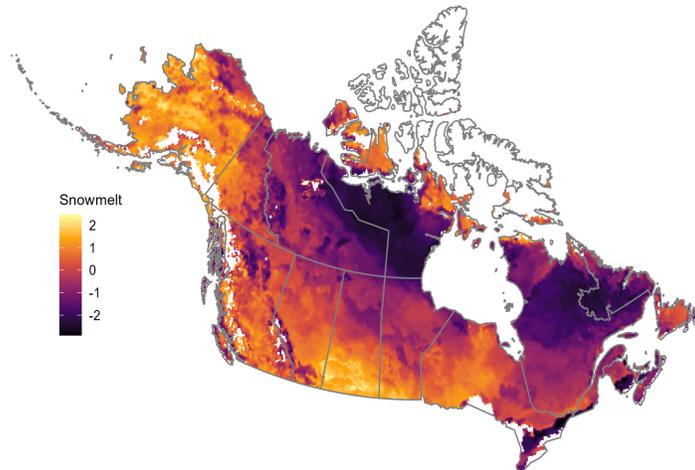


Figure 5.4: The 2023 snowmelt date compared to the 10-year average. Comparisons are mean-centered and scaled by standard deviation by location. Positive values represent areas where the snow melted later than 10-year average for the area, while negative values represent areas where snow melted earlier than average. Source: U.S. National Ice Center 2008.

## 6 Dabbling and Diving Ducks

### 6.1 Primary Surveys for Dabbling and Diving Ducks

Most dabbling and diving ducks are monitored through the WBPHS, which covers western Canada and the northwestern US, the EWS, which covers eastern Canada, and the BCCPWBS, which covers interior British Columbia. Multiple smaller scale waterfowl surveys provide additional regional information on waterfowl abundance and in some cases provide more detailed information for species that have restricted ranges or those that are not captured well by large-scale surveys. Unless the WBPHS, EWS, and BCCPWBS do not provide adequate information about a species' population status across their range, this report does not refer to smaller-scale waterfowl surveys.

### 6.2 Population Status of Dabbling and Diving Ducks

Abundances of most species of dabbling and diving ducks have shown no long term trend or are increasing in Canada. Of the 11 species of dabbling and diving ducks found in western Canada that are monitored by the WBPHS, 2 have shown no significant trend since 1970, 6 have increased, and 3 have decreased. Over the past five years, 6 have shown no significant trend and 5 have decreased. Of the 5 species found in eastern Canada, the EWS

indicated that 4 have shown no significant trend since 1970, and one species has increased. In the short-term (2015-2023), all 5 species have shown no significant trend.

There are currently approximately 30.5 million ducks in the WBPHS survey area; the most common species are Mallard, Blue-winged Teal, Scaup sp. and Northern Shoveler. In the EWS survey area, there are 1.84 million ducks, and the most common species are Mallard, American Black Duck, Ring-necked Duck and Green-winged Teal. In British Columbia, the BCCPWBS estimates there are 293 thousand ducks, and the most common species are Ring-necked Duck, Mallard, Scaup sp. and Green-winged Teal.

### **6.2.1 American Black Duck**

In the core area of the EWS, the population of American Black Duck has shown no significant trend both since 1990 and over the past five years (Figure 6.4). The Atlantic Highlands population has significantly increased since 1990 and the Western Boreal Shield population has significantly decreased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 544 (484-617) thousand American Black Ducks in the core survey area of the EWS. This represents a 15% increase from the 10-year average of 473 thousand birds.

### **6.2.2 Mallard**

In the core area of the EWS, since 1990, the population of Mallard has significantly increased, but over the past five years, this population has shown no significant trend (Figure 6.4). The Atlantic Highlands, Central Boreal Shield, and Western Boreal Shield populations have significantly increased since 1990. The Eastern Boreal Shield population showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 548 (381-824) thousand Mallards in the core survey area of the EWS. This represents a 19% increase from the 10-year average of 460 thousand birds.

In Southern Ontario, since 1971, the population of Mallard has significantly increased, but over the past five years, the population has shown no significant trend in this region. In 2023, there were 103 (84.7-125) thousand Mallard breeding pairs (Figure 6.1). This represents a 6.6% decrease from the 10-year average of 110 thousand breeding pairs.

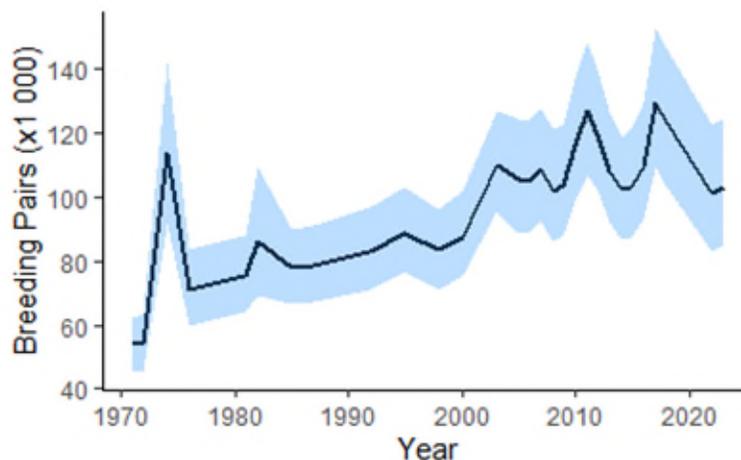


Figure 6.1: Indicated breeding pairs of Mallard in southern Ontario. Black line represents the breeding pair estimate, and the shaded area represents the 95% confidence interval.

In the Traditional Survey Area of the WBPHS, the abundance of Mallard has significantly decreased since 1970 (Figure 6.5). Abundance increased in Alaska, decreased in the Western Boreal Forest and the Canadian Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has significantly decreased over the past five years. Abundance increased in Alaska, decreased in the Western Boreal Forest and the Canadian Prairies, and exhibited no significant trend in all other regions. In 2023, there were 6.1 (5.69-6.5) million Mallards in the Traditional Survey Area of the WBPHS. This represents a 37% decrease from the 10-year average of 9.63 million birds. The 2023 Mallard population in this region was below the NAWMP long-term goal of 7.73 million birds.

In the British Columbia Central Plateau, the population of Mallard has significantly decreased since 2006, but over the past five years, this population has shown no significant trend (Figure 6.6). In 2023, there were 70.8 (58.9-82.6) thousand birds. This represents a 7.9% decrease from the 10-year average of 76.8 thousand birds.

### 6.2.3 Northern Pintail

In the Traditional Survey Area of the WBPHS, the abundance of Northern Pintail has significantly decreased since 1970 (Figure 6.5). Abundance increased in the Western Boreal Forest, decreased in the Canadian Prairies and the US Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in the Western Boreal Forest, decreased in the Canadian and US Prairies, and exhibited no significant trend in all other regions. In 2023, there were 2.21 (1.92-2.5) million Northern Pintails in the Traditional Survey Area of the WBPHS. This represents a 13% decrease from the 10-year average of 2.55 million birds. The 2023 Northern Pintail population in this region was below the NAWMP long-term goal of 4 million birds.

In the British Columbia Central Plateau, the population of Northern Pintail has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there

were 2.65 (0.765-4.54) thousand Northern Pintails. This represents a 34% decrease from the 10-year average of 4.04 thousand birds.

#### **6.2.4 Green-winged Teal**

In the core area of the EWS, the population of Green-winged Teal has shown no significant trend both since 1990 and over the past five years (Figure 6.4). The Atlantic Highlands population has significantly increased since 1990. Populations in all other regions of the EWS showed no significant trend during the same period of time. There were no significant five-year trends in any region of the EWS. In 2023, there were 231 (180-306) thousand Green-winged Teal in the core survey area of the EWS. This represents a 5% increase from the 10-year average of 220 thousand birds.

In the Traditional Survey Area of the WBPHS, the abundance of Green-winged Teal has shown no significant trend since 1970 (Figure 6.5). Abundance increased in the Western Boreal Forest, decreased in the Canadian Prairies and the US Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has significantly decreased over the past five years. Abundance increased in the Western Boreal Forest, decreased in the Canadian Prairies and the US Prairies, and exhibited no significant trend in all other regions. In 2023, there were 2.49 (1.94-3.05) million Green-winged Teal in the Traditional Survey Area of the WBPHS. This represents a 24% decrease from the 10-year average of 3.28 million birds. The 2023 Green-winged Teal population in this region was above the NAWMP long-term goal of 2.06 million birds.

#### **6.2.5 Blue-winged Teal**

In the Traditional Survey Area of the WBPHS, the abundance of Blue-winged Teal has significantly increased since 1970 (Figure 6.5). Abundance increased in the US Prairies, decreased in the Canadian Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. In the short term, abundance also increased in the US Prairies, decreased in the Canadian Prairies, and exhibited no trend in all other regions. In 2023, there were 5.25 (4.67-5.83) million Blue-winged Teal in the Traditional Survey Area of the WBPHS. This represents a 24% decrease from the 10-year average of 6.91 million birds, but still above the NAWMP long-term goal of 4.95 million birds.

In the British Columbia Central Plateau, the population of Blue-winged Teal has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 6.22 (4.07-8.36) thousand Blue-winged Teal. This represents a 13% decrease from the 10-year average of 7.18 thousand birds.

#### **6.2.6 American Wigeon**

In the core area of the EWS, the population of American Wigeon has shown no significant trend both since 1990 and over the past five years (Figure 6.4). The Western Boreal Shield population has significantly increased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year

trends in any region of the EWS. In 2023, there were 9.77 (0-19.8) thousand American Wigeon in the core survey area of the EWS. This represents an 18% decrease from the 10-year average of 12 thousand birds.

In the Traditional Survey Area of the WBPHS, the abundance of American Wigeon has significantly decreased since 1970 (Figure 6.5). Abundance increased in the US Prairies, decreased in the Canadian Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has significantly decreased over the past five years. Abundance increased in the US Prairies, decreased in the Canadian Prairies, and exhibited no significant trend in all other regions. In 2023, there were 1.85 (1.51-2.19) million American Wigeon in the Traditional Survey Area of the WBPHS. This represents a 33% decrease from the 10-year average of 2.75 million birds and remains below the NAWMP long-term goal of 2.6 million birds.

In the British Columbia Central Plateau, the population of American Wigeon has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 18.3 (13.1-23.5) thousand American Wigeon. This represents a 4.8% decrease from the 10-year average of 19.2 thousand birds.

#### **6.2.7 Gadwall**

In the Traditional Survey Area of the WBPHS, the abundance of Gadwall has significantly increased since 1970 (Figure 6.5). Abundance increased in the Western Boreal Forest, the Canadian Prairies, and the US Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has significantly decreased over the past five years. Abundance increased in the Western Boreal Forest, the Canadian Prairies, and the US Prairies and exhibited no significant trend in all other regions. In 2023, there were 2.56 (2.28-2.84) million Gadwall in the Traditional Survey Area of the WBPHS. This represents a 24% decrease from the 10-year average of 3.37 million birds, but still above the NAWMP long-term goal of 1.92 million birds.

In the British Columbia Central Plateau, the population of Gadwall has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 3.65 (0-7.37) thousand Gadwall. This represents a 21% decrease from the 10-year average of 4.63 thousand birds.

#### **6.2.8 Northern Shoveler**

In the Traditional Survey Area of the WBPHS, the abundance of Northern Shoveler has significantly increased since 1970 (Figure 6.5). Abundance increased in Alaska, the Western Boreal Forest, and the US Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has significantly decreased over the past five years. Abundance increased in Alaska, the Western Boreal Forest, and the US Prairies and exhibited no significant trend in all other regions. In 2023, there were 2.85 (2.53-3.18) million Northern Shovelers in the Traditional Survey Area of the WBPHS. This represents a 28% decrease from the 10-year average of 3.97 million birds. The 2023 Northern Shoveler population in this region was above the NAWMP long-term goal of 2.52 million birds.

### 6.2.9 Wood Duck

Estimating the breeding population of Wood Duck is difficult because the species' breeding behavior and habitat use result in low detection from traditional fixed-wing surveys (Zimmerman et al. 2015). In the south-eastern portion of its range, the Wood Duck is best surveyed by the SOWPS. Since 1971, the population of Wood Duck has significantly increased, but over the past five years, this population has shown no significant trend. In 2023, there were 40.4 (30-54.1) thousand Wood Duck breeding pairs in southern Ontario (Figure 6.2). This represents a 9.9% decrease from the 10-year average of 44.8 thousand breeding pairs.

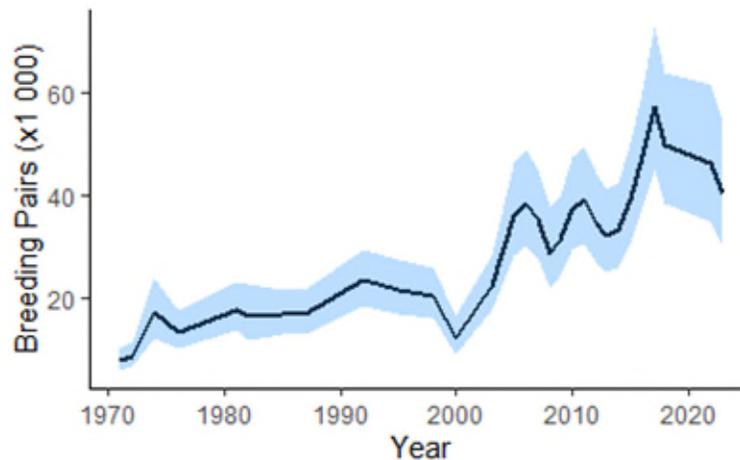


Figure 6.2: Indicated breeding pairs of Wood Duck in southern Ontario. The black line represents breeding pair estimate, and the shaded area represents the 95% confidence interval.

Wood ducks are also monitored through Lincoln estimates in eastern and western North America. The Lincoln method estimated that there were 3.2 (2.85-3.56) million Eastern Wood Ducks in 2022 (Figure 6.3). This represents a 17% decrease from the 10-year average of 3.88 million birds. Since 1961, the Eastern population of Wood Duck has significantly increased, but over the past five years, this population has significantly decreased. The Lincoln method indicates that the Eastern population peaked in 1998 at 6.34 (5.52-7.15) million birds.

The Lincoln method estimated that there were 68.5 (34.3-103) thousand Western Wood Ducks in 2022 (Figure 6.3). This represents a 21% decrease from the 10-year average of 86.7 thousand birds. Since 1961, the Western population of Wood Duck has significantly increased, but over the past five years, this population has shown no significant trend. The Lincoln method indicates that the Western population peaked in 2008 at 219 (142-296) thousand birds.

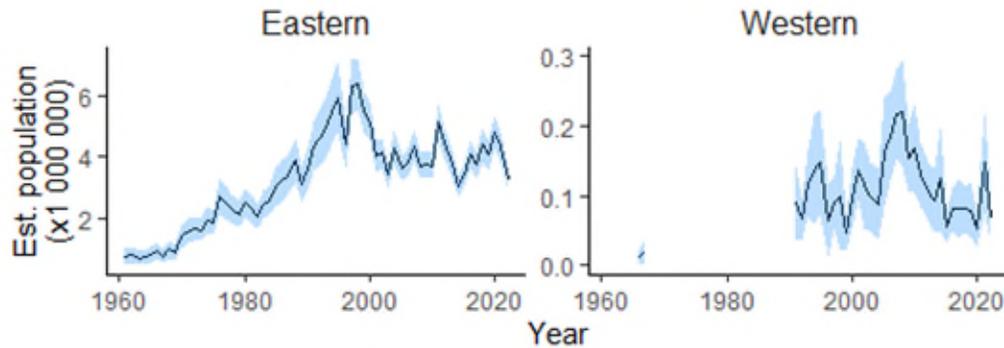


Figure 6.3: Lincoln estimates of population size for adult Wood Ducks in Eastern and Western North America. Lines represent population estimates, and shaded areas represent 95% confidence intervals. (Source: F. Baldwin, ECCC - CWS).

#### 6.2.10 Ring-necked Duck

In the core area of the EWS, the population of Ring-necked Duck has shown no significant trend both since 1990 and over the past five years (Figure 6.4). The Atlantic Highlands population has significantly increased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 503 (410-637) thousand Ring-necked Ducks in the core survey area of the EWS. This is similar to the 10-year average of 513 thousand birds.

In the Traditional Survey Area of the WBPHS, the abundance of Ring-necked Duck has significantly increased since 1970 (Figure 6.5). Abundance increased in the Western Boreal Forest and the Canadian Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in the Western Boreal Forest and the Canadian Prairies and exhibited no significant trend in all other regions. In 2023, there were 1.52 (1.28-1.76) million Ring-necked Ducks in the Traditional Survey Area of the WBPHS. This represents a 4.1% decrease from the 10-year average of 1.59 million birds.

In the British Columbia Central Plateau, the population of Ring-necked Duck has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 80 (62.1-97.9) thousand Ring-necked Ducks. This represents a 4.9% increase from the 10-year average of 76.3 thousand birds.

#### 6.2.11 Redhead

In the Traditional Survey Area of the WBPHS, the abundance of Redhead has significantly increased since 1970 (Figure 6.5). Abundance increased in the Canadian and US Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Short-term, abundance increased in the Canadian US Prairies and exhibited no

significant trend in all other regions. In 2023, there were 923 (765-1080) thousand Redheads in the Traditional Survey Area of the WBPHS. This represents a 14% decrease from the 10-year average of 1.07 million birds but remains above the NAWMP long-term goal of 701 thousand birds.

#### **6.2.12 Canvasback**

In the Traditional Survey Area of the WBPHS, the abundance of Canvasback has shown no significant trend since 1970 (Figure 6.5). Abundance increased in the US Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in the US Prairies and exhibited no significant trend in all other regions. In 2023, there were 608 (483-733) thousand Canvasbacks in the Traditional Survey Area of the WBPHS. This represents an 11% decrease from the 10-year average of 681 thousand birds but remains above the NAWMP long-term goal of 581 thousand birds.

#### **6.2.13 Ruddy Duck**

In the Traditional Survey Area of the WBPHS, the abundance of Ruddy Duck has significantly increased since 1970 (Figure 6.5). Abundance increased in the Canadian and US Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in the Canadian and US Prairies and exhibited no significant trend in all other regions. In 2023, there were 618 (444-791) thousand Ruddy Ducks in the Traditional Survey Area of the WBPHS. This represents a 22% decrease from the 10-year average of 788 thousand birds.

In the British Columbia Central Plateau, the population of Ruddy Duck has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 5.88 (2.26-9.5) thousand Ruddy Ducks. This represents a 69% increase from the 10-year average of 3.48 thousand birds.

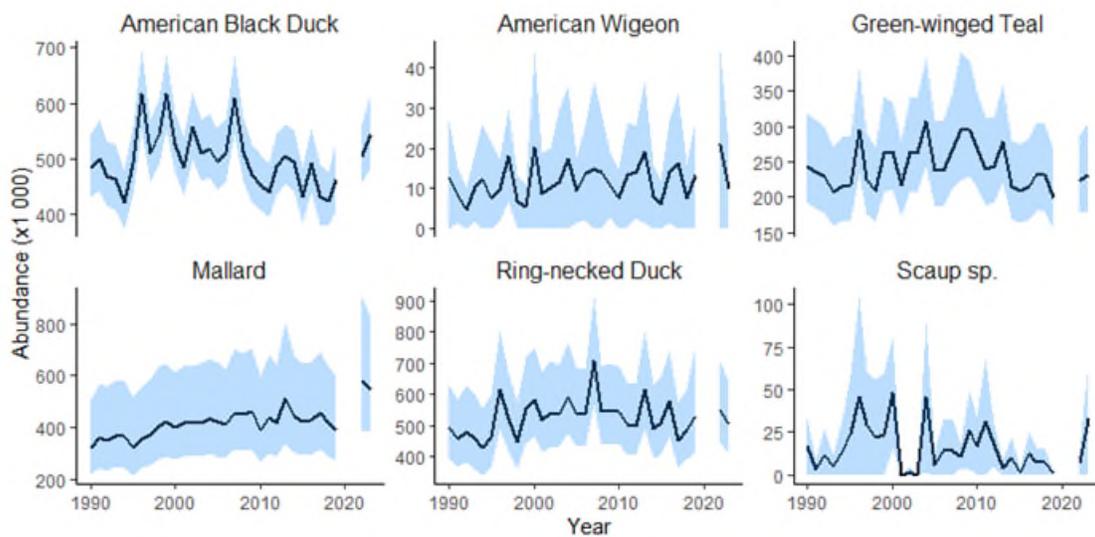
#### **6.2.14 Scaup sp.**

Lesser and Greater Scaup are closely related and nearly identical in their overall appearance, which can make it difficult to distinguish between them, particularly when observed from the air. As such, the abundance of Greater Scaup and Lesser Scaup are combined into Scaup sp for reporting, although Lesser Scaup make up a larger proportion of the continental Scaup sp population than do Greater Scaup (Anteau et al. 2020).

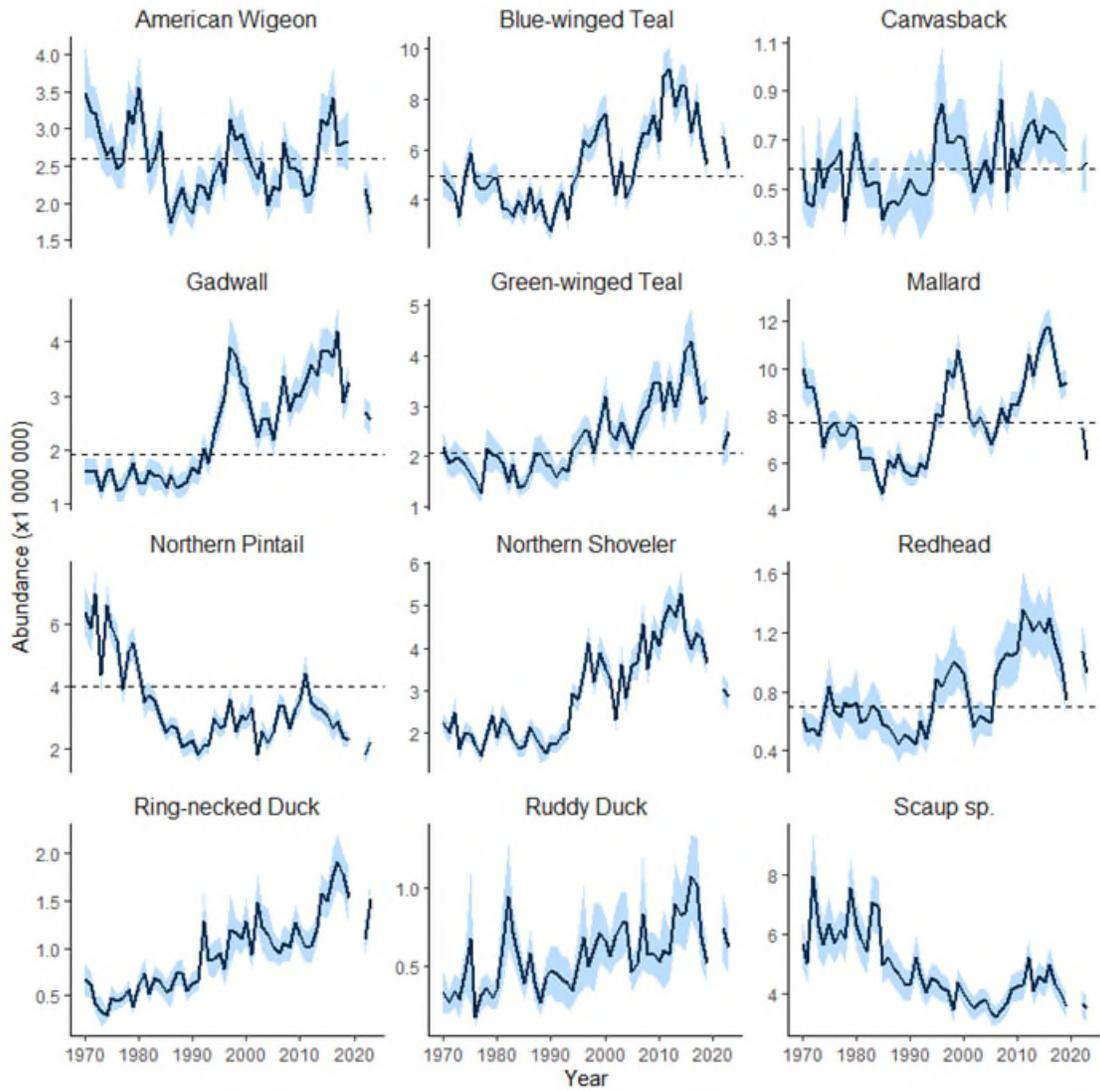
In the core area of the EWS, since 1990, the population of Scaup sp. has shown no significant trend, but over the past five years, this population has significantly increased (Figure 6.4). The Atlantic Highlands population has significantly increased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 32.9 (0-67.6) thousand Scaup sp. in the core survey area of the EWS; note, however, the EWS is not timed very well for monitoring breeding scaup.

In the Traditional Survey Area of the WBPHS, the abundance of Scaup sp. has significantly decreased since 1970 (Figure 6.5). Abundance increased in the US Prairies and decreased in Alaska, the Western Boreal Forest, and the Canadian Prairies. Short-term trends of the past five years across the entire survey area indicate that abundance has shown no trend over the past five years. Abundance increased in the US Prairies and decreased in Alaska, the Western Boreal Forest, and the Canadian Prairies. In 2023, there were 3.5 (3.08-3.91) million Scaup sp. in the Traditional Survey Area of the WBPHS. This represents a 15% decrease from the 10-year average of 4.14 million birds.

In the British Columbia Central Plateau, the population of Scaup sp. has shown no significant trend both since 2006 and over the past five years (Figure 6.6). In 2023, there were 58.2 (31.8-84.6) thousand Scaup sp. This represents a 33% increase from the 10-year average of 43.6 thousand birds.



*Figure 6.4: Breeding population estimates for dabbling and diving ducks in the Eastern Waterfowl Survey (EWS). Black lines represent population estimates, and shaded areas represent 95% credible intervals. Figure shows combined results of helicopter and fixed-wing aircraft surveys across the core survey area.*



*Figure 6.5: Breeding population estimates for dabbling and diving ducks based on the Waterfowl Breeding Population and Habitat Survey in western Canada and the northwestern US. Black lines represent population estimates in the Traditional Survey Area, shaded areas represent 95% confidence intervals, and horizontal dashed lines represent NAWMP long-term goals for the survey area.*

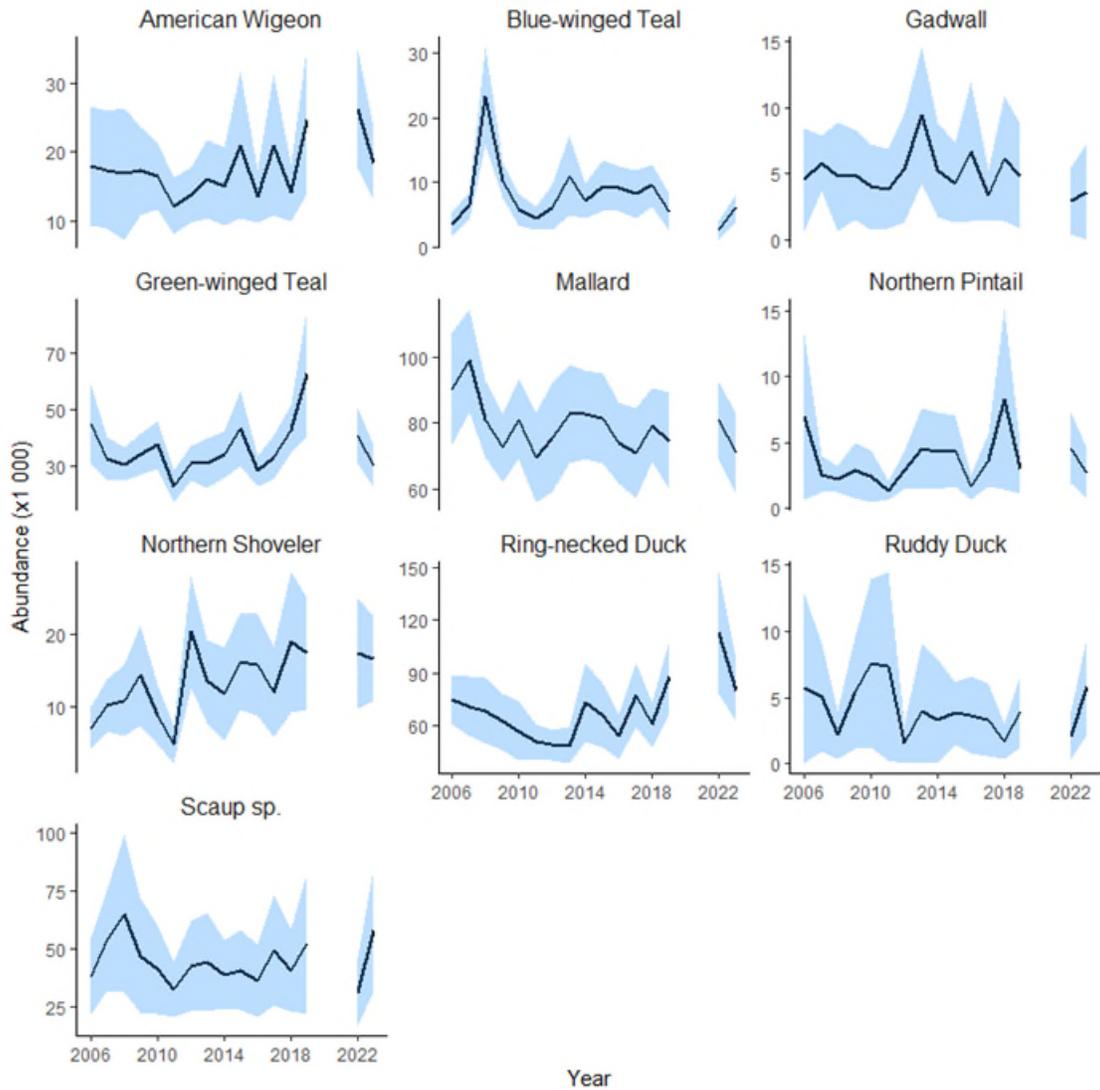


Figure 6.6: Breeding population estimates for dabbling and diving ducks in the British Columbia Central Plateau. Black lines represent population estimates, and shaded areas represent 95% confidence intervals.

### 6.3 Harvest of Dabbling and Diving Ducks

Annual dabbling and diving duck harvest peaked in 1976 when approximately 3.7 million ducks were harvested in Canada (Figure 6.7). Following declines in Migratory Game Bird Hunting permit sales, harvest of American Black Duck, Green-winged Teal, American Wigeon, Blue-winged Teal, Canvasback, Gadwall, Greater Scaup, Lesser Scaup, Mallard, Northern Pintail, Northern Shoveler, Redhead, Ring-necked Duck, Ruddy Duck, and Wood Duck has significantly decreased since harvest numbers were first surveyed. Harvest of American Black Duck, Green-winged Teal, American Wigeon, Canvasback, Greater Scaup, Lesser Scaup, Mallard, Northern Pintail, Redhead, Ring-necked Duck, and Wood Duck has significantly decreased over the past five years. Harvest of Blue-winged Teal, Gadwall,

Northern Shoveler, and Ruddy Duck remained stable over this period. In 2022, there were approximately 657 thousand ducks harvested. Mallards comprised 47% of the duck harvest, followed by American Black Ducks (7.4%), Green-winged Teal (7.2%), Wood Ducks (6.2%), and Blue-winged Teal (5.8%).

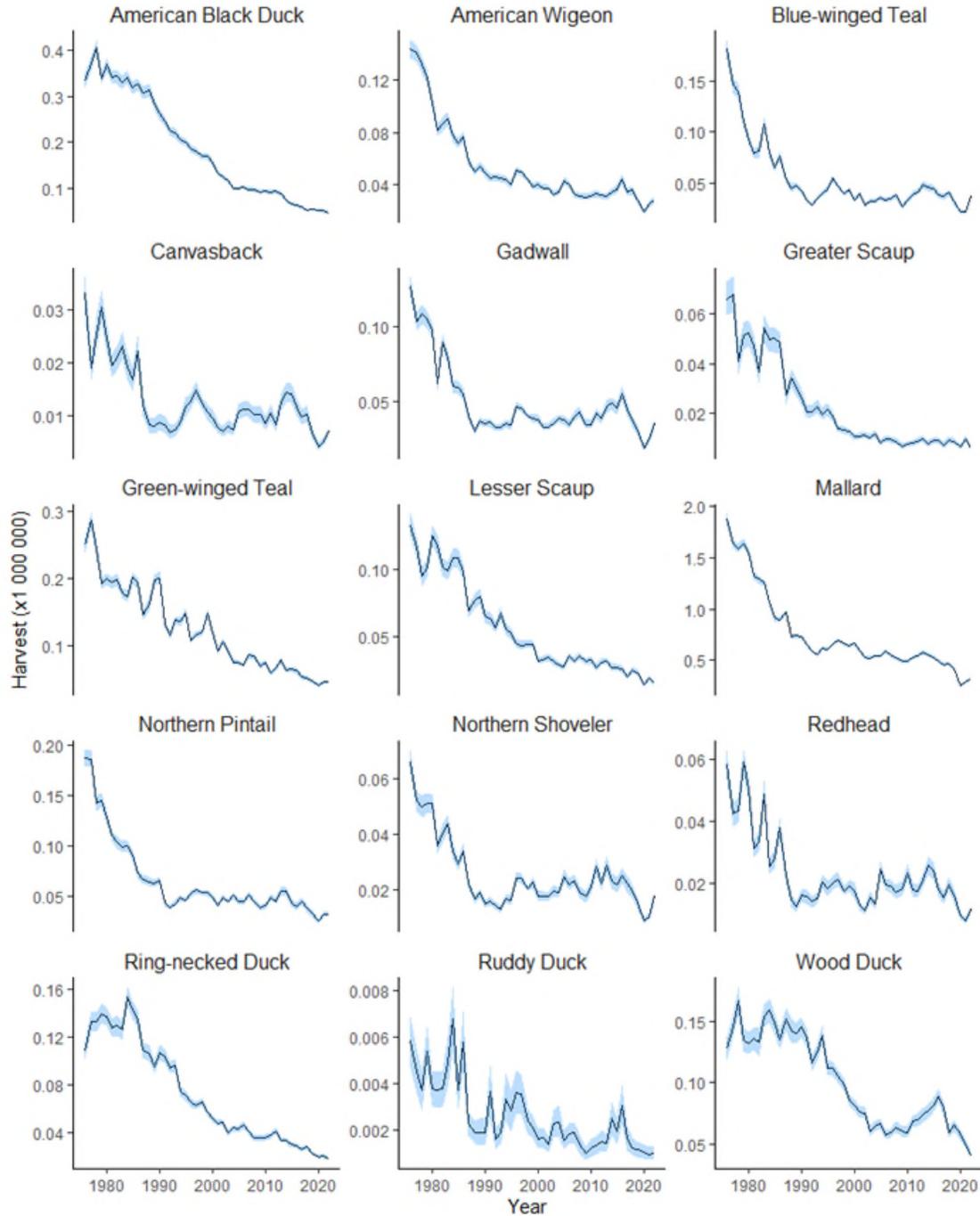


Figure 6.7: Estimated harvest in Canada of dabbling and diving ducks by species. Black line represents the harvest estimate, and the shaded area represents the 95% confidence interval.

Canadian harvest data were obtained from the National Harvest Survey (Smith, Villeneuve, and Gendron 2021).

## 7 Sea Ducks

### 7.1 Primary Surveys for Sea Ducks

Most species of sea ducks are poorly monitored by traditional waterfowl surveys. In particular, the WBPHS, which is used as a basis for monitoring the population and setting population goals for many North American waterfowl, is not well-suited to surveying sea duck populations. This is because the core breeding range of half of North America's sea duck species is not covered by the WBPHS, and the survey is conducted too early to effectively count breeding sea ducks, which generally nest later than dabbling and diving ducks. Additionally, some species of sea ducks are difficult to differentiate from a fixed-wing aircraft; therefore, WBPHS estimates represent pooled counts for some sea duck groups (e.g., scoters sp., goldeneyes sp., mergansers sp.). Helicopter surveys, such as the EWS, do allow observers to distinguish between species, but survey timing is earlier than is optimal for counting breeding sea ducks.

### 7.2 Population Status of Sea Ducks

#### 7.2.1 Bufflehead

The breeding range of Bufflehead in the core area of the EWS is primarily restricted to the Western Boreal Shield region. In this region, the population of Bufflehead has shown no significant trend both since 1990 and over the past five years (Figure 7.5). In 2023, across the Western Boreal Shield region of the EWS, there were 33.7 (5.88-61.5) thousand Buffleheads. This represents a 15% increase from the 10-year average of 29.4 thousand birds.

In the Traditional Survey Area of the WBPHS, the abundance of Bufflehead has significantly increased since 1970 (Figure 7.4). Abundance increased in the Western Boreal Forest and the Canadian Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in the Western Boreal Forest and the Canadian Prairies and exhibited no significant trend in all other regions. In 2023, there were 985 (840-1130) thousand Buffleheads in the Traditional Survey Area of the WBPHS. This represents a 21% decrease from the 10-year average of 1.25 million birds.

In the British Columbia Central Plateau, the population of Bufflehead has shown no significant trend both since 2006 and over the past five years (Figure 7.6). In 2023, there were 53.3 (43.4-63.2) thousand Buffleheads. This represents a 12% increase from the 10-year average of 47.5 thousand birds.

### 7.2.2 Long-tailed Duck

Because of its subarctic and arctic breeding distribution, the Long-tailed Duck is not regularly surveyed by any current monitoring program.

### 7.2.3 Harlequin Duck

There are two populations of Harlequin Ducks: the Eastern and the Western Populations. Neither population is surveyed regularly by any monitoring program.

The Eastern Population contains two distinct subpopulations that winter separately. One subpopulation breeds in the northern-half of Québec and Labrador, and winters in Greenland; the other subpopulation breeds in southern Labrador, Newfoundland, New Brunswick and the Gaspé Peninsula of Québec, and winters mostly in eastern North America (Québec, Maritimes, Saint-Pierre-et\_Miquelon [France] and Maine). There appears to be little interbreeding between these subpopulations (Scribner et al. 2000; Robert et al. 2008; Thomas et al. 2008). The Eastern Population declined in the 1980s and was listed as Special Concern under the Canadian *Species at Risk Act* in 2003. Hunting of this population has been closed since 1990. Based on the Christmas Bird Count, there are 5682 (5065-6354) Harlequin Ducks at the main wintering sites in Newfoundland, St. Pierre et Miquelon, New Brunswick and Nova Scotia. (Gutowsky et al. 2022). The number of Harlequin Ducks wintering in eastern Canada is increasing, and their distribution has widened, particularly in Nova Scotia (Gutowsky et al. 2022). In Quebec, 335 Harlequin Ducks were counted during the three-year Barrow's Goldeneye winter survey in February 2020 (CWS, unpublished data).

The Western Population breeds in Alaska, the Yukon, British Columbia, Alberta, Montana, Wyoming, Idaho, and Washington. The Western Population appears stable.

### 7.2.4 Common Goldeneye

The Common Goldeneye is surveyed in the east by the EWS and in the west by the WBPHS. Fixed-wing airplane survey protocols do not distinguish between Common Goldeneye and Barrow's Goldeneye, but Common Goldeneye largely dominate in the WBPHS survey area. Therefore, numbers presented for the WBPHS predominately represent Common Goldeneyes.

In the core area of the EWS, the population of Common Goldeneye has shown no significant trend both since 1990 and over the past five years (Figure 7.5). The Central Boreal Shield and Western Boreal Shield populations have significantly increased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 285 (218-351) thousand Common Goldeneyes in the core survey area of the EWS. This represents a 9.9% increase from the 10-year average of 259 thousand birds.

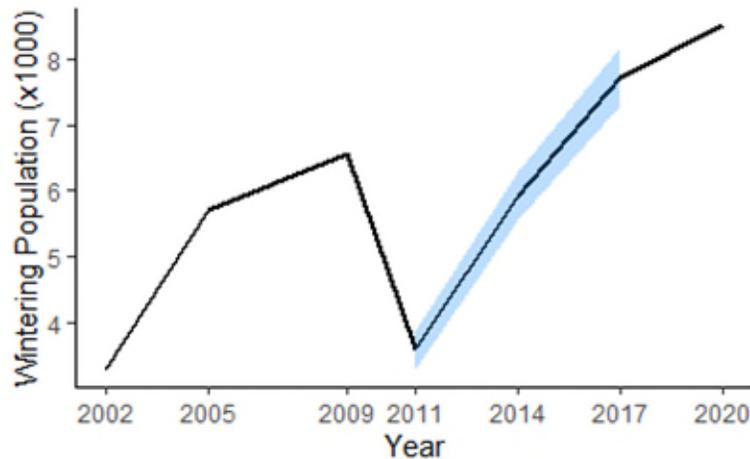
In the Traditional Survey Area of the WBPHS, the abundance of Common Goldeneye has significantly increased since 1970 (Figure 7.4). Abundance increased in the Canadian Prairies and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past

five years. Abundance increased in the Canadian Prairies and exhibited no significant trend in all other regions. In 2023, there were 596 (454-737) thousand Common Goldeneyes in the Traditional Survey Area of the WBPHS. This represents a 4.6% decrease from the 10-year average of 624 thousand birds.

### 7.2.5 Barrow's Goldeneye

There are two populations of Barrow's Goldeneye in Canada: the Eastern population and the Western population. The Eastern population was listed as Special Concern under Canada's Species at Risk Act in 2003.

Since 2002, the Eastern Population of Barrow's Goldeneye has been surveyed every three years by the Barrow's Goldeneye Winter Survey (Figure 7.1). This survey, conducted by helicopter to allow the distinction between Barrow's and Common Goldeneye, covers the St. Lawrence Estuary and the western portion of the Gulf of St. Lawrence, where more than 90% of the Eastern Population winters (Robert and Savard 2006; Environment Canada 2013; Robert 2013).



*Figure 7.1: Eastern Population Barrow's Goldeneye Winter Survey. From 2011 onward, numbers are corrected from photos (corrections have not been applied yet to the 2020 estimates). Black line represents the population estimate, and the shaded area represents the 95% confidence interval.*

The British-Columbia Central Plateau Waterfowl Breeding Survey best monitors the Western population of Barrow's Goldeneye. Though the survey does not distinguish between Common Goldeneye and Barrow's Goldeneye, Barrow's Goldeneye heavily dominate counts in this region. In 2023, there were 21.3 (16.5-26.1) thousand Barrow's Goldeneye in the British Columbia Central Plateau (Figure 7.6). The population of Barrow's Goldeneye has shown no significant trend both since 2006 and over the past five years.

### 7.2.6 Common Eider

There are four populations of Common Eider (Pacific, Northern, Hudson Bay, and American). The populations of the Pacific Common Eider and the Hudson Bay Common Eider are not monitored regularly.

The Northern Common Eider (*Somateria mollissima borealis*) has been monitored on its wintering grounds in eastern Canada, and Saint-Pierre and Miquelon (France), since 2003. When this survey was last conducted in 2018, there were 160 (125-195) thousand male Common Eiders. This represents a 23% increase since 2015, when there were 130 (117-143) thousand male Common Eiders (Figure 7.2).

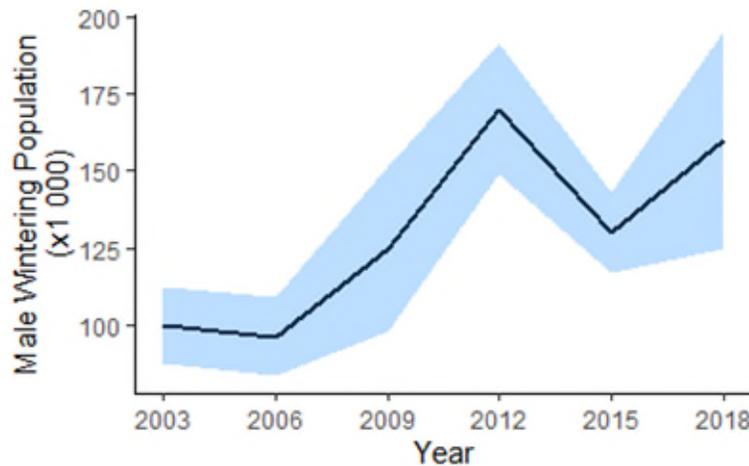


Figure 7.2: Estimated number of wintering adult male Northern Common Eider. Black line represents the population estimate, and the shaded area represents the 95% confidence interval.

American Common Eider (*S. m. dresseri*) has been monitored during the breeding season on the New Brunswick coast since 1991 and in the St. Lawrence Estuary and Gulf in Québec since 2003. Both surveys indicate long-term population declines (Figure 7.3). In New Brunswick, Common Eider are surveyed every three years, and in 2017, there were 2.56 thousand breeding pairs in this location (Figure 7.3a). In 2023, there were 12.4 thousand Common Eider nests in the four largest breeding colonies in the St. Lawrence Estuary, Québec (Figure 7.3b). In 2022, there were 13.1 thousand Common Eider nests in the Gulf of St. Lawrence Migratory Bird Sanctuaries, Québec (Figure 7.3c).

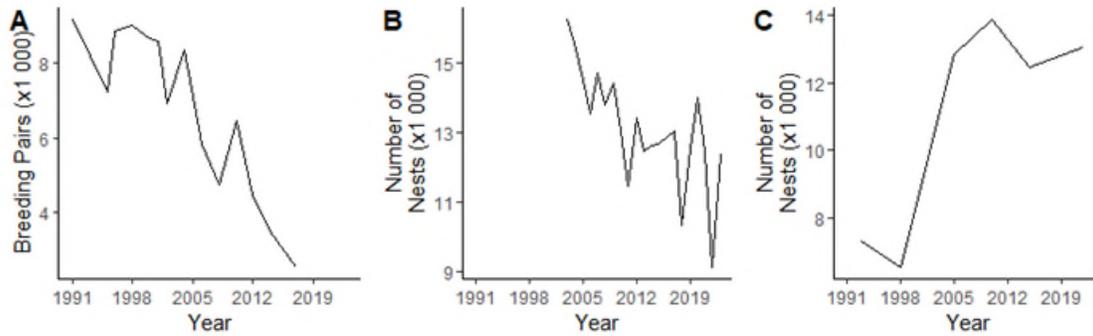


Figure 7.3: American Common Eider breeding populations. A) Estimated number of breeding pairs of American Common Eider in New Brunswick. B) Number of American Common Eider nests at the four largest breeding colonies in the St. Lawrence Estuary, Québec. These colonies are Bicquette (*Société protectrice des eiders de l'estuaire, unpubl. data*), Pommes, Blanche, and Fraises Islands (*Société Duvetnor Ltée, unpubl. data*). C) Number of American Common Eider nests in the Gulf of St. Lawrence Migratory Bird Sanctuaries.

### 7.2.7 King Eider

Because of its breeding distribution in the Arctic, the King Eider is not regularly surveyed by any current monitoring program.

### 7.2.8 Merganser sp

Neither the WBPHS nor the BCCPWBS distinguishes between the three species of North American Mergansers (Common, Red-breasted, and Hooded Mergansers). Abundance counts of mergansers provided by the WBPHS represent all three species, and counts provided by the BCCPWBS represent combined counts of Common and Hooded Mergansers. In the eastern Canada, the EWS does provide abundance counts for each of the three Merganser species, given the distinction of the species is possible during the helicopter survey. However, the EWS does not capture Red-breasted Mergansers well because it only covers part of their breeding range and they nest too late to be appropriately captured by this survey. Migrating Red-breasted Mergansers may therefore be erroneously included in EWS breeding counts (Lepage 2013).

In the core area of the EWS, the population of Common Merganser has significantly increased both since 1990 and over the past five years (Figure 7.5). The Atlantic Highlands, Eastern Boreal Shield, and Central Boreal Shield populations have significantly increased since 1990. Populations in the Western Boreal Shield of the EWS showed no significant trend during this time. Short-term trends indicate that the Eastern Boreal Shield and Central Boreal Shield populations have significantly increased and populations in all other regions of the EWS showed no trend. In 2023, there were 331 (258-404) thousand Common Mergansers in the core survey area of the EWS. This represents a 6% increase from the 10-year average of 312 thousand birds.

In the core area of the EWS, since 1990, the population of Red-breasted Merganser has significantly increased, but over the past five years, this population has shown no

significant trend (Figure 7.5). The Eastern Boreal Shield population has significantly increased since 1990 and the Atlantic Highlands population has significantly decreased since 1990. Populations in all other regions of the EWS showed no significant trend during this time. There were no significant five-year trends in any region of the EWS. In 2023, there were 33.3 (10.1-56.5) thousand Red-breasted Mergansers in the core survey area of the EWS. This represents a 36% increase from the 10-year average of 24.4 thousand birds.

In the core area of the EWS, the population of Hooded Merganser has significantly increased both since 1990 and over the past five years (Figure 7.5). The Atlantic Highlands, Eastern Boreal Shield, Central Boreal Shield, and Western Boreal Shield populations have significantly increased since 1990. Short term, the Eastern Boreal Shield, Central Boreal Shield, and Western Boreal Shield populations have significantly increased, and populations in the Atlantic Highlands showed no trend. In 2023, there were 707 (521-894) thousand Hooded Mergansers in the core survey area of the EWS. This represents a 140% increase from the 10-year average of 298 thousand birds.

In the Traditional Survey Area of the WBPHS, the abundance of Merganser sp. has significantly increased since 1970 (Figure 7.4). Abundance increased in Alaska and the Western Boreal Forest and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. Abundance increased in Alaska and the Western Boreal Forest and exhibited no significant trend in all other regions. In 2023, there were 757 (540-975) thousand Merganser sp. in the Traditional Survey Area of the WBPHS. This represents a 6.3% decrease from the 10-year average of 808 thousand birds.

In the British Columbia Central Plateau, since 2006, the population of Merganser sp. has significantly decreased, but over the past five years, this population has shown no significant trend (Figure 7.6). In 2023, there were 9.81 (6.4-13.2) thousand Merganser sp. This represents an 8.2% decrease from the 10-year average of 10.7 thousand birds.

### 7.2.9 Scoter sp.

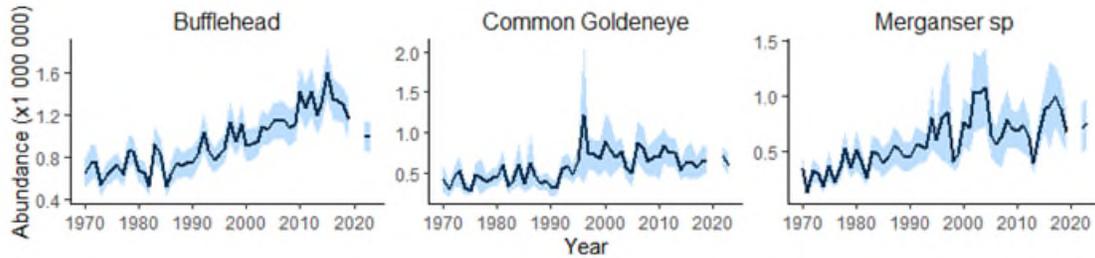
Scoters are poorly surveyed across Canada since they breed later and farther north than dabbling ducks and diving ducks. The BCCPWBS does not distinguish between the three species of North American scoters (White-winged, Surf, and Black Scoters). The EWS does distinguish between scoter species but only covers a portion of the Surf Scoter and Black Scoter breeding range and does not cover the breeding range of the White-winged Scoter.

In the core area of the EWS, the population of Surf Scoter has shown no significant trend both since 1990 and over the past five years (Figure 7.5). There were no significant long-term trends in any region of the EWS. There has been a significant decline in the population in the Central Boreal Shield over the last five years. Populations in all other regions of the EWS showed no significant trend from 1990 to 2023. In 2023, there were 73.7 (28.9-119) thousand Surf Scoters in the core survey area of the EWS. This represents a 35% decrease from the 10-year average of 114 thousand birds.

In the core area of the EWS, since 1990, the population of Black Scoter has significantly increased, but over the past five years, this population has shown no significant trend

(Figure 7.5). There were no significant long-term trends in any region of the EWS. There were no significant five-year trends in any region of the EWS. In 2023, there were 19.7 (0-41.7) thousand Black Scoters in the core survey area of the EWS. This represents a 34% decrease from the 10-year average of 29.8 thousand birds.

In the British Columbia Central Plateau, since 2006, the population of Scoter sp. has significantly increased, but over the past five years, this population has shown no significant trend (Figure 7.6). In 2023, there were 8.57 (3.04-14.1) thousand Scoter sp.. This represents an 8.5% decrease from the 10-year average of 9.36 thousand birds.



*Figure 7.4: Sea duck breeding population estimates based on the Waterfowl Breeding Population and Habitat Survey in western Canada and the northwestern US (WBPHS). Black lines represent population estimates in the Traditional Survey Area, shaded areas represent 95% confidence intervals.*

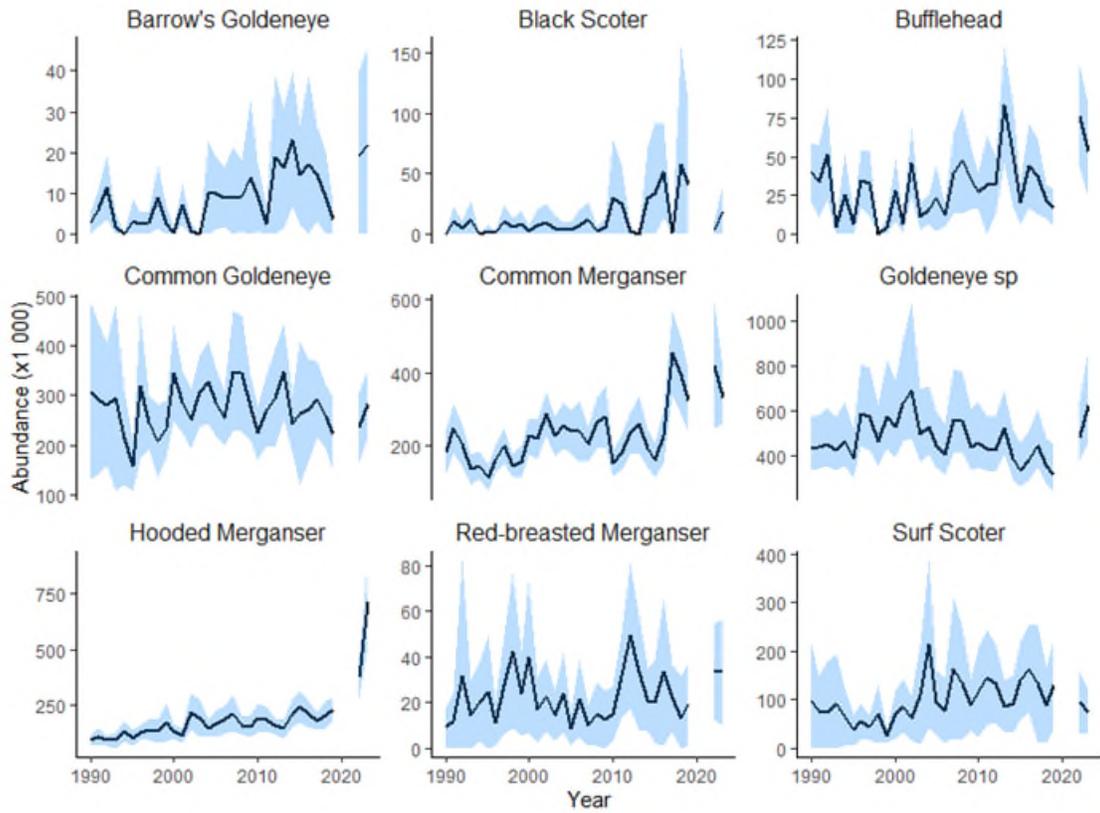


Figure 7.5: Breeding population estimates for sea ducks in the Eastern Waterfowl Survey (EWS). Black lines represent population estimates, and shaded areas represent 95% credible intervals. Figure shows the combined results of helicopter and fixed-wing aircraft surveys across the core survey area for Bufflehead and Goldeneye sp. For other species, population estimates are design-based estimates from the helicopter component of this survey.

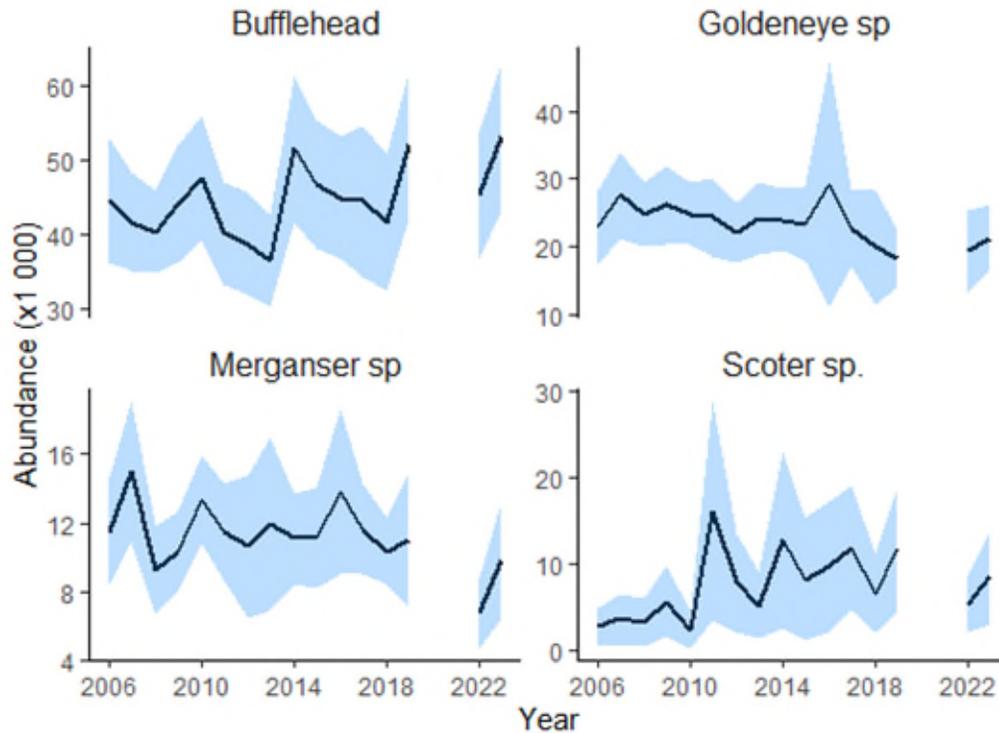


Figure 7.6: Total spring breeding population estimates for sea ducks in the British Columbia Central Plateau. Black lines represent population estimates, and shaded areas represent 95% confidence intervals.

### 7.3 Harvest of Sea Ducks

Annual sea duck harvest peaked in 1977 when approximately 384 thousand sea ducks were harvested in Canada (Figure 7.7). Following declines in Migratory Game Bird Hunting permit sales, harvest of Barrow’s Goldeneye, Black Scoter, Bufflehead, Common Eider, Common Goldeneye, Common Merganser, Harlequin Duck, Hooded Merganser, King Eider, Long-tailed Duck, Red-breasted Merganser, Surf Scoter, and White-winged Scoter has significantly decreased since harvest numbers were first surveyed. Harvest of Barrow’s Goldeneye, Black Scoter, Bufflehead, Common Eider, Common Goldeneye, Common Merganser, Hooded Merganser, Long-tailed Duck, Red-breasted Merganser, and Surf Scoter has significantly decreased over the past five years. Harvest of Harlequin Duck, King Eider, and White-winged Scoter remained stable over this period. In 2022, there were approximately 42.6 thousand sea ducks harvested in Canada. Buffleheads comprised 30% of the sea duck harvest, followed by Common Goldeneyes (19%), Hooded Mergansers (14%), Common Eiders (12%), and Common Mergansers (6.5%).

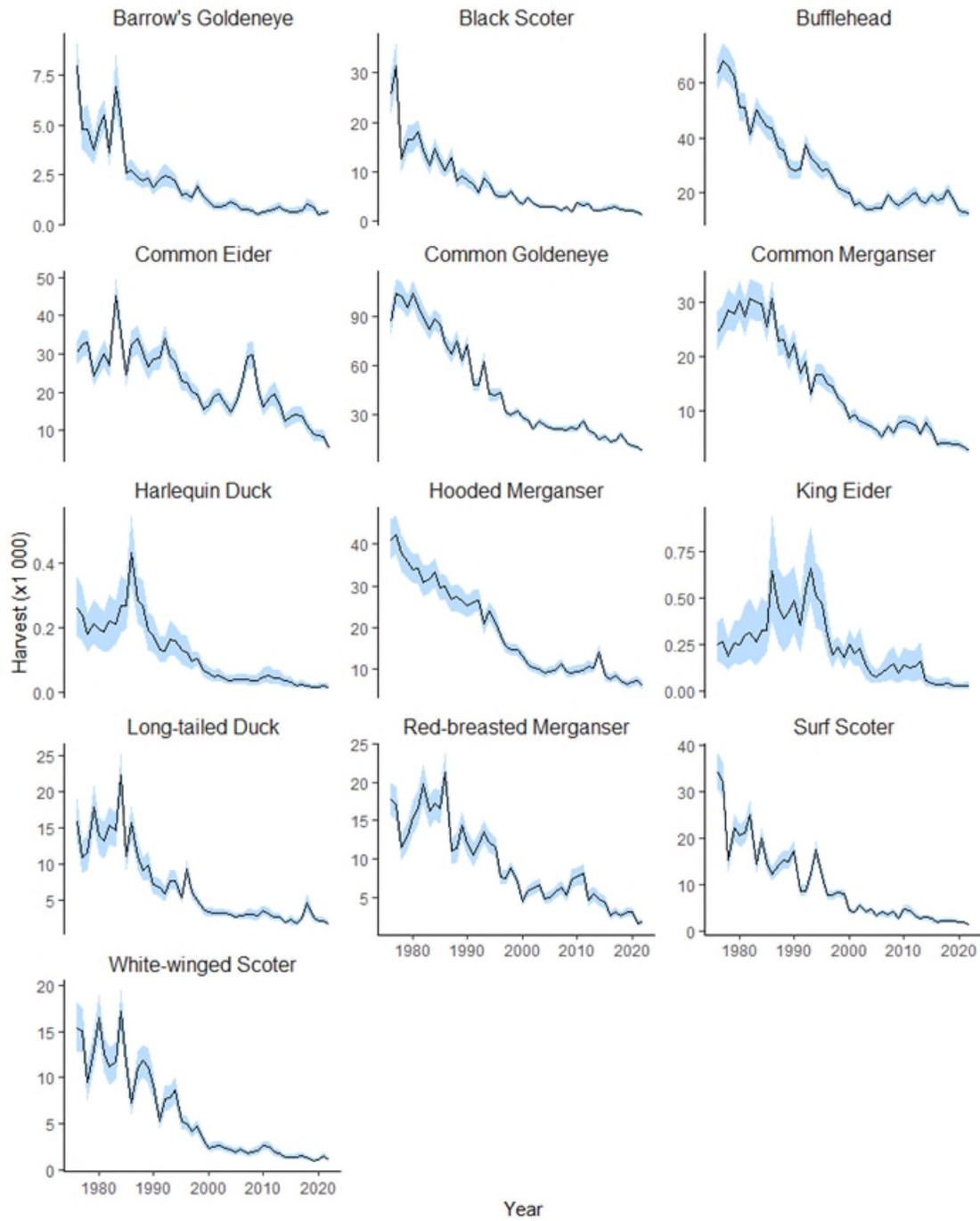


Figure 7.7: Estimated harvest of sea ducks by species in Canada. Black lines represent harvest estimates, and shaded areas represent 95% confidence intervals. Harlequin Duck graph represents the harvest that is occurring in the Western population. Canadian harvest data were obtained from the National Harvest Survey (Smith, Villeneuve, and Gendron 2021).

## 8 Geese and Swans

### 8.1 Primary Surveys for Geese and Swans

Most goose population estimates and trends in abundance are primarily calculated from band recovery data and harvest estimates using Lincoln methods. Some goose and swan populations are also monitored through specific annual or occasional surveys carried out during the breeding season or, in some cases, during migration or wintering periods.

### 8.2 Population Status of Geese

#### 8.2.1 Population Status of Overabundant Geese

An overabundant species is defined in the *Migratory Birds Regulations, 2022* as one that, 'as a result of the rate of increase of the population of that species or its overabundance, is injurious to or threatens agricultural, environmental or other similar interests'. Liberalization of the hunting regulations and amendments to the *Migratory Birds Regulations, 2022* in Canada and the *Migratory Bird Treaty Act* in the US allowed harvests to occur outside of the normal hunting season (i.e., September to March). Greater Snow Geese and mid-continent population of Lesser Snow Geese were designated as overabundant in Canada in 1998 and 1999, respectively. Ross's Geese were declared overabundant in 1999 in the US, and in 2014 in Canada. Lesser Snow Geese nesting in the western Arctic were declared as overabundant in 1999. The Western Arctic population of Lesser Snow Goose was also designated as overabundant in Canada in 2014. Temperate-breeding Canada Geese were designated as overabundant in southern Manitoba in 2020.

Concerns about the impact of light geese on sensitive Arctic and Subarctic ecosystems prompted managers to increase hunter harvest of some species of geese. Light Goose (Lesser Snow Goose, Greater Snow Goose, and Ross's Goose) foraging significantly alters plant communities in Arctic and Subarctic staging and nesting areas where abundance is particularly high. In these areas, foraging by geese has reduced ground cover of their preferred forage plant species and has changed the soil chemistry (Iacobelli and Jefferies 1991; Alisauskas, Charlwood, and Kellett 2006). The amount of habitat affected by foraging geese has increased as populations have grown, and there are concerns that continued expansion of the area affected by geese could eventually lead to loss of ecosystem function and significant impacts on other species.

Temperate-breeding Canada Geese were designated as overabundant in southern Manitoba following rapid population growth which led to agricultural damage and human safety concerns.

##### 8.2.1.1 Lesser Snow Goose

There are three populations of Lesser Snow Goose: the Mid-continent population, the Western Arctic population, and the Wrangel Island population. Lesser Snow Geese nest in coastal and inland areas of the Arctic in colonies that range from a few hundred to several hundred thousand birds. For management purposes, these colonies are grouped into three regions: eastern, central, and western Arctic regions. The eastern and central Arctic

colonies collectively form the Mid-continent population of Lesser Snow Geese, which migrates through the Prairie provinces and mainly winters in the Central and Mississippi Flyways. Those nesting on Banks Island, on the mainland near the Mackenzie River Delta, and on the north slope of Alaska, comprise the Western Arctic population. These birds migrate through Alberta and western Saskatchewan, and mainly winter in the Pacific Flyway. The Wrangel Island population nests on Wrangel Island, off the northeast coast of Siberia, and winters on the Pacific Coast at the mouth of the Fraser-Skagit Rivers in British Columbia and Washington, in the Central Valley of California, and in smaller numbers in Oregon. All three populations overlap somewhat during migration and in the wintering areas.

The Lincoln method estimated that there were 3.11 (2.44-3.77) million adult Mid-continent Lesser Snow Geese in 2022 (Figure 8.8). Since 1976, the Mid-continent population of Lesser Snow Goose has significantly increased, but over the past five years, this population has significantly decreased and represents a 58% decrease from the 10-year average of 7.35 million geese. The Lincoln method indicates that the Mid-continent population peaked in 2008 at 14.6 (11.5-17.7) million individuals.

The Western Arctic population of Lesser Snow Geese is monitored through Lincoln estimates. The Lincoln method estimated that there were 1.07 (0.751-1.38) million adult Western Arctic Lesser Snow Geese in 2022 (Figure 8.8). Since 1976, the Western Arctic population of Lesser Snow Goose has significantly increased, but over the past five years, this population has significantly decreased and represents 19% decrease from the 10-year average of 1.32 million birds. The Lincoln method indicates that the Western Arctic population peaked in 2018 at 2.06 (1.39-2.72) million individuals.

The Wrangel Island population of Lesser Snow Geese are monitored through a ground survey conducted by Russian biologists during the breeding season. The Wrangel Island population of Lesser Snow Goose has significantly increased in the short term (2015-2016) and long term (1966-2019). In 2019, there were approximately 442 thousand Lesser Snow Geese on Wrangel Island (Figure 8.1). This represents a 77% increase from the 10-year average of 250 thousand birds.

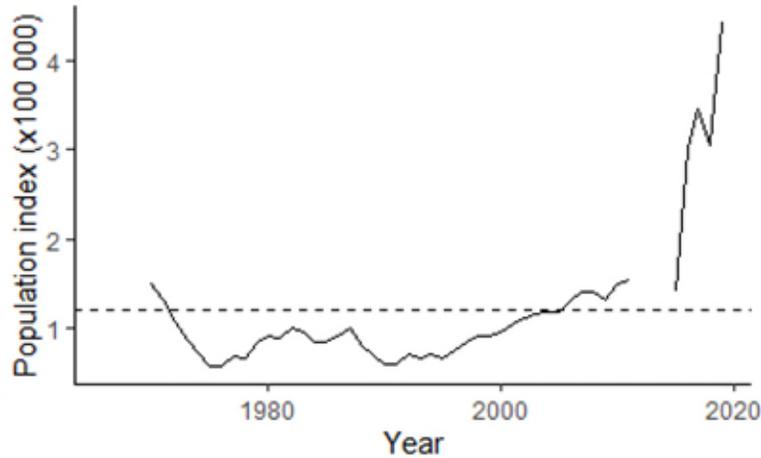


Figure 8.1: Population index of Lesser Snow Geese on Wrangel Island, Russia. Data were not gathered in 2012 and 2014; Source: Olson 2019 (Horizontal dashed line represents the NAWMP long-term goal for the survey area).

#### 8.2.1.2 Greater Snow Goose

Greater Snow Geese are monitored on their spring staging areas in southern Québec and eastern Ontario, where they have been surveyed during spring migration since 1965. The spring survey has expanded greatly since the 1960s and now covers a large territory extending from Lac Champlain (south) to Lac St. Jean (north) and from eastern Ontario (west) to Chaleur Bay (east). Since 1965, the population of Greater Snow Goose has significantly increased, but over the past five years, this population has significantly decreased (Figure 8.2). Since being designated as overabundant in 1998, the Greater Snow Goose population has fluctuated between 585 thousand and 1.01 million birds. In 2023, there were 585 (567-603) thousand Greater Snow Geese, which is within the NAWMP long-term goal of 500 to 700 thousand birds.

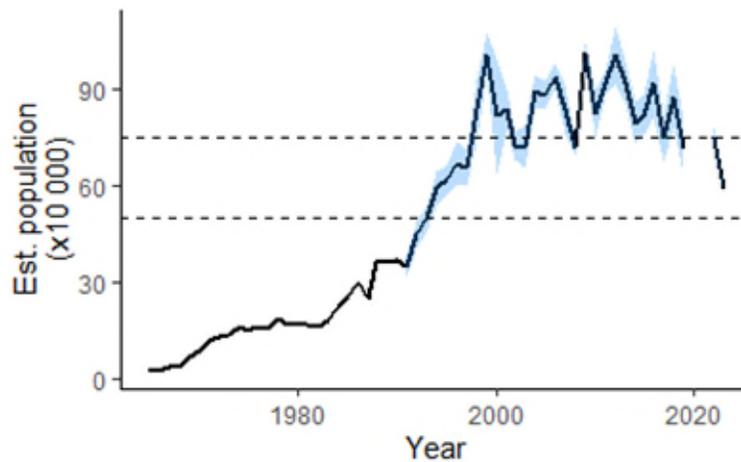


Figure 8.2: Greater Snow Goose population estimates during the spring staging period in southern Québec and eastern Ontario. Shaded area represents the 95% confidence intervals.

Estimates from 1998 to 2000 were corrected for flocks not observed during the survey, using data from a telemetry study. Estimates from 2002 onward are based on a revised methodology. Horizontal dashed lines represent upper and lower NAWMP long-term goals for the survey area.

### 8.2.1.3 Ross's Goose

The Lincoln method estimated that there were 532 (363-700) thousand Ross's Geese in 2022 (Figure 8.8), which represents a 74% decrease from the 10-year average of 1.51 million birds. Since 1976, the population of Ross's Goose has significantly increased, but over the past five years, this population has significantly decreased. The Lincoln method indicates that the population peaked in 2014 at 3.86 (2.82-4.91) million geese.

In addition to being monitored through Lincoln methods, a single colony of Ross's Goose has been monitored at Karrak Lake in the Queen Maud Gulf (Ahiak) Bird Sanctuary, Nunavut since 1993. Since 1993, the population of Ross's Goose at Karrak Lake has shown no significant trend, but over the past five years, this population has significantly decreased. In 2019, there were 233 (212-254) thousand Ross's Geese nesting at Karrak Lake (Figure 8.3). This represents a 60% decrease from the 10-year average of 583 thousand birds.

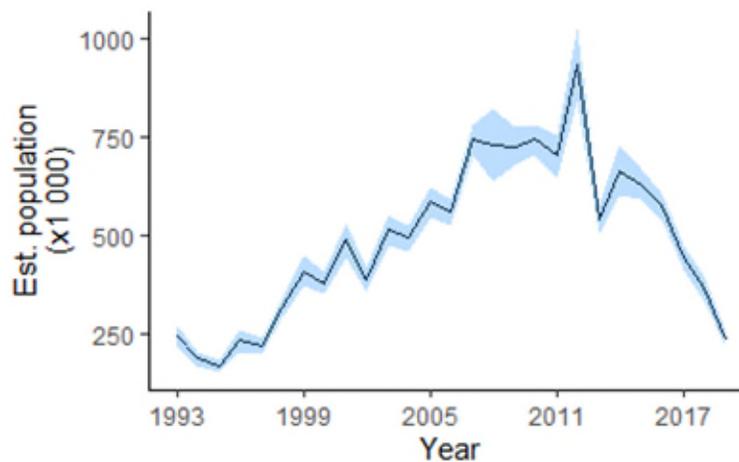


Figure 8.3: Estimated numbers of Ross's Geese that attempted to nest at Karrak Lake, Nunavut, 1993-2019. Black line represents the population estimate, and shaded area represents the 95% confidence interval.

## 8.2.2 Population Status of Other Geese and Swans

### 8.2.2.1 Canada Goose

Canada geese are divided into Subarctic breeding populations and temperate breeding populations.

### 8.2.2.1.1 Subarctic Canada Geese

There are three populations of Subarctic breeding Canada Geese: the North Atlantic, Atlantic, and Southern Hudson Bay populations.

The North Atlantic population breeds in Labrador, insular Newfoundland, eastern Québec, and western Greenland, and winters primarily in southern Atlantic Canada and New England. The North Atlantic population is monitored by the EWS in Canada. The North Atlantic population of Canada Goose has shown no significant trend both since 1990 and over the past five years. There were 48.2 (35.5-66.7) thousand Canada Goose breeding pairs in 2023 (Figure 8.4). This represents a 6.4% decrease from the 10-year average of 51.5 thousand breeding pairs.

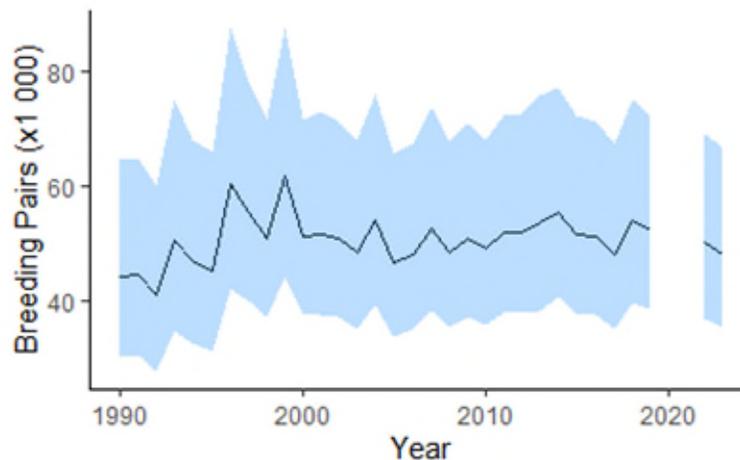


Figure 8.4: Estimated number of breeding pairs in the North Atlantic Canada Goose population based on integrated fixed-wing airplane and helicopter counts from the EWS.

The Atlantic population nests in northern Québec, especially along the shores of Ungava Bay and eastern Hudson Bay (where 80% of breeding birds are found), and in the interior of the Ungava Peninsula. The Atlantic population winters from New England to South Carolina, with the largest concentration occurring on the Delmarva Peninsula. The Atlantic population has been monitored on their breeding grounds since 1993. The spring survey covers the flat coastal tundra of Ungava Bay and Hudson Bay and associated taiga and inland tundra, the areas of highest Canada Goose densities (Malecki and Trost 1990; Rodrigue 2013; Harvey, Rodrigue, and Earsom 2019). The southern part of the Atlantic population range is monitored by the EWS in the Québec boreal forest.

On the Ungava peninsula, since 1990, the Atlantic population of Canada Goose has significantly increased, but over the past five years, this population has shown no significant trend. There were 115 (91.4-139) thousand Canada Goose breeding pairs in 2023 (Figure 8.5A). This represents a 24% decrease from the 10-year average of 152 thousand breeding pairs. The Atlantic population in Ungava is below the NAWMP objective of 225,000 breeding pairs. In the Quebec boreal forest, the Atlantic population of Canada Goose has shown no significant trend both since 1990 and over the past five years. There

were 13.5 (9.57-17.3) thousand breeding pairs in 2023 (Figure 8.5B). This represents a 4% increase from the 10-year average of 12.9 thousand breeding pairs.

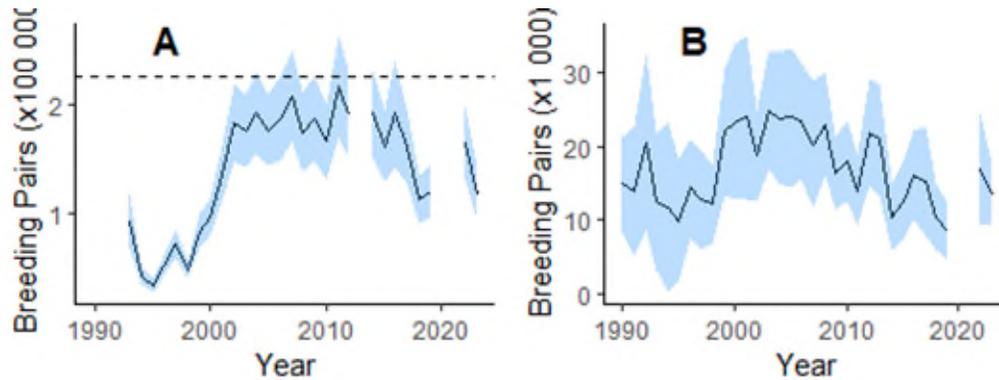


Figure 8.5: A) Estimated number of Atlantic population Canada Goose breeding pairs on the Ungava Peninsula. B) Estimated number of Atlantic population Canada Goose breeding pairs in the boreal forest in Québec based on the EWS (helicopter portion of the survey only). Black lines represent breeding pair estimates, and shaded areas represent 95% confidence intervals. Horizontal dashed line represents NAWMP long-term goal for the survey area.

The Southern Hudson-James Bay population nests along western and southern James Bay, southern Hudson Bay, and in adjacent interior lowland muskeg of Ontario and Manitoba, and winters in the Mississippi and Atlantic Flyway. This population is monitored through fixed-wing transect surveys, conducted by Ontario Ministry of Natural Resources and Forestry. In 2023, there were 95.1 (87-103) thousand Canada Geese in the Southern Hudson and James Bay population (Figure 8.6). This represents a 3.9% decrease from the 10-year average of 99 thousand geese.

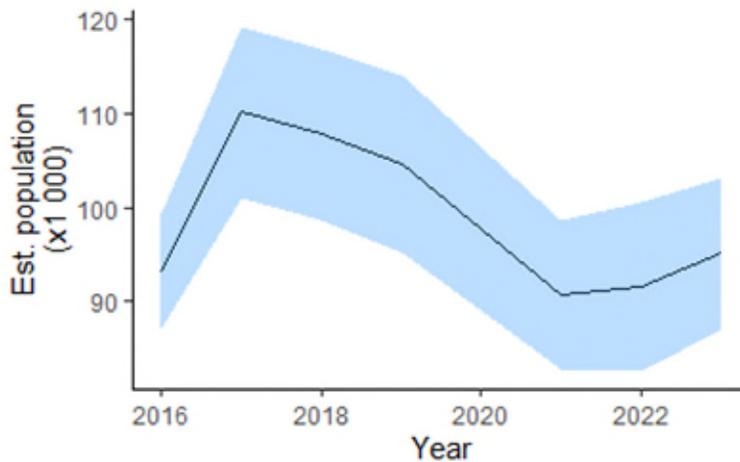


Figure 8.6: Abundance of Southern Hudson-James Bay lowlands population of Canada Geese surveyed by Ontario Ministry of Natural Resources and Forestry. Black line represents the population estimate, and shaded area represents the 95% confidence interval.

#### 8.2.2.1.2 Temperate Canada Geese

Temperate-breeding Canada Geese breed in central and southern Ontario, southern Québec, the Maritimes, southern areas of Prairie provinces, and British Columbia.

In southern Québec, temperate Canada Geese are monitored by the EWS and the St. Lawrence Lowlands Breeding Waterfowl Survey, a helicopter plot survey. The population of Canada Goose has significantly increased both since 2004 and over the past five years. Combining numbers obtained through these surveys, there were 23.5 (11.9-35.1) thousand breeding pairs of temperate Canada Geese in Québec in 2023 (Figure 8.7A). This represents a 52% increase from the 10-year average of 15.4 thousand breeding pairs.

In southern Ontario, temperate Canada Geese are monitored by the SOWPS. Since 1971, the population of Canada Goose has significantly increased, but over the past five years, this population has shown no significant trend. In 2023, there were 56.5 (44.7-70.8) thousand breeding pairs of Canada Geese in southern Ontario (Figure 8.7B). This represents a 15% increase from the 10-year average of 49.3 thousand breeding pairs.

Temperate Canada Geese nesting in the Prairie Parklands are monitored by the WBPHS in strata 26–40. Since 1970, the population of Canada Goose has significantly increased, but over the past five years, this population has shown no significant trend. In 2023, there were 868 (737-999) thousand Canada Geese in the Prairie Parklands (Figure 8.7C). This represents a 22% decrease from the 10-year average of 1.11 million geese.

Temperate Canada Geese nesting in southern British Columbia are monitored by the BCCPWBS. The population of Canada Goose has significantly decreased both since 2006 and over the past five years. In 2023, there were 20.7 (16.4-25) thousand Canada Geese on the Central Plateau (Figure 8.7D). This represents a 37% decrease from the 10-year average of 32.6 thousand breeding pairs.

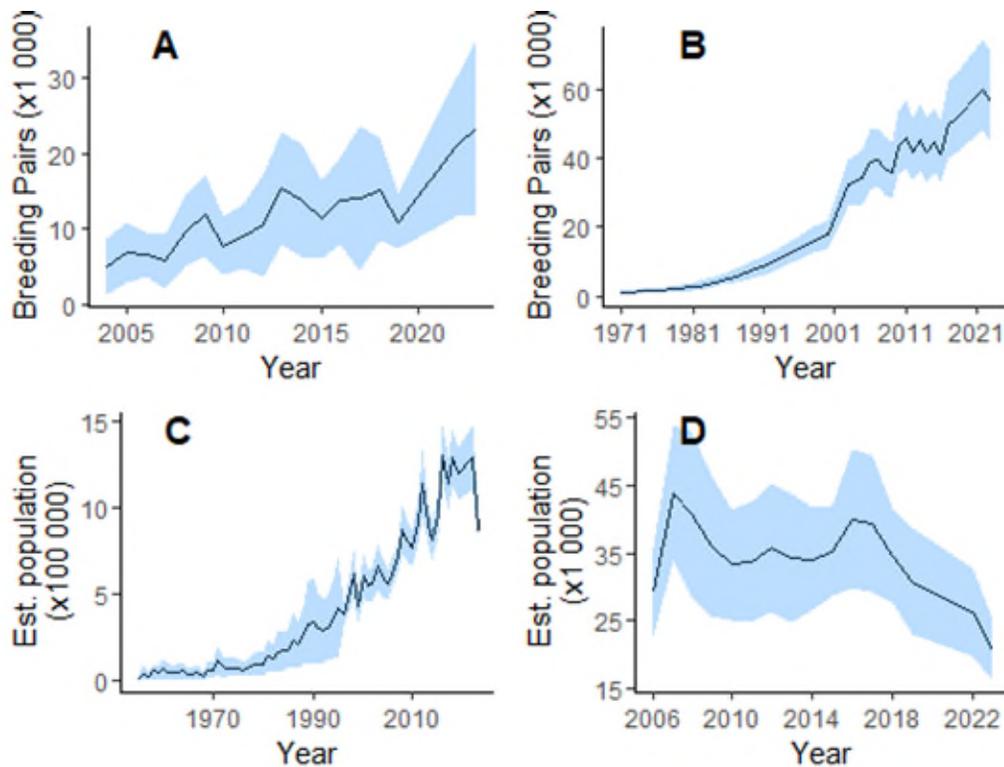


Figure 8.7: Temperate-breeding Canada Geese. A) estimated breeding pairs in southern Québec based on the St. Lawrence Lowlands Survey and the EWS, B) estimated breeding pairs in southern Ontario based on the SOWPS, C) estimated population in strata 26-40 of the WBPHS, and D) estimated population in the British Columbia Central Plateau based on the BCCPWBS. Black lines represent breeding pair (A, B) or population (C, D) estimates, and shaded areas represent 95% confidence intervals.

#### 8.2.2.2 Cackling Goose

The Lincoln method estimated that there were 1.6 (1.19-2.01) million Cackling Geese in 2022 (Figure 8.8). Since 1976, the population of Cackling Goose has significantly increased, but over the past five years, this population has significantly decreased. This represents a 43% decrease from the 10-year average of 2.42 million birds. The Lincoln method indicates that the population peaked in 2010 at 3.81 (2.35-5.27) million geese.

#### 8.2.2.3 Greater White-fronted Goose

There are three populations of Greater White-fronted Goose: the Mid-continent, Tule, and Pacific populations. The Tule and Pacific populations breed in southern Alaska and winter primarily in California. These populations are not discussed in this report. The Mid-continent population includes all White-fronted Geese that breed in Canada and in interior and northern Alaska, and that winter in the Central and Mississippi Flyways of the US.

The Lincoln method estimated that there were 1.37 (1.01-1.74) million Greater White-fronted Geese in 2022 (Figure 8.8). Since 1976, the population of Greater White-fronted Goose has significantly increased, but over the past five years, this population has

significantly decreased. This represents a 51% decrease from the 10-year average of 2.78 million birds. The Lincoln method indicates that the Arctic population peaked in 2008 at 3.79 (2.84-4.75) million geese.

The Midwinter Survey provides an abundance index for Greater White-fronted Goose. This survey indicates that there were 627 thousand Greater White-fronted Geese in 2022. This represents a 29% increase from the 10-year average of 486 thousand birds.

#### *8.2.2.4 Brant*

There are four distinct populations of Brant recognized in North America: the Atlantic, Eastern High Arctic, Black, and Western High Arctic populations. The Atlantic Brant population nests on islands in the Canadian eastern Low Arctic and winters on the Atlantic Coast from Massachusetts to North Carolina. The Eastern High Arctic population breeds on islands in Canada's eastern High Arctic, and winters in Ireland; this population is not surveyed in Canada. Black Brant nest in the central and western Canadian Low Arctic, Alaska, and western Russia, and winters along the Pacific Coast. Western High Arctic Brant nest on islands in the western High Arctic and winter mainly in Puget Sound, Washington.

The Lincoln method estimated that there were 38.8 (22.5-55.1) thousand Atlantic Brant in 2022 (Figure 8.8). Since 1976, the population of Atlantic Brant has shown no significant trend, but over the past five years, this population has significantly decreased. This represents a 77% decrease from the 10-year average of 167 thousand birds. The Lincoln method indicates that the Atlantic population peaked in 2009 at 520 (337-703) thousand Brant.

Black and Western High Arctic Brant are surveyed annually during the Midwinter Survey in the Pacific. During aerial surveys, it is difficult to separate the two types of Brant that winter on the west coast of North America. However, the Midwinter Survey indicates that there were 159 thousand Brant in 2022. This represents a 4.8% increase from the 10-year average of 151 thousand birds. The Midwinter Survey indicates that the Brant population size peaked in 2012 at 177 thousand birds.

#### *8.2.2.5 Tundra Swan*

The Midwinter Survey provides an abundance index for Tundra Swan. This survey indicates that there were 95.7 thousand Tundra Swans in 2022. This represents a 6.8% decrease from the 10-year average of 103 thousand birds.

#### *8.2.2.6 Trumpeter Swan*

There are no recent surveys for Trumpeter Swan.

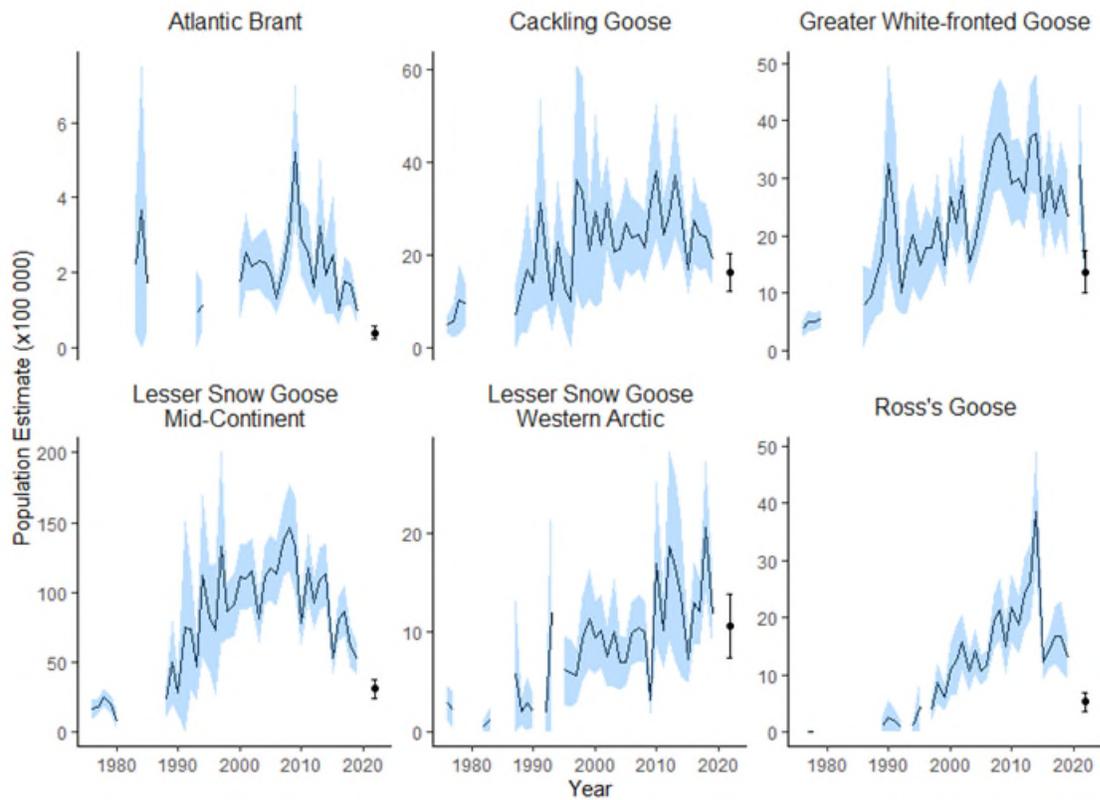


Figure 8.8: Lincoln estimates of population size for adult geese. Black lines represent population estimates, and shaded areas represent 95% confidence intervals. (Source: J. Dooley, USFWS, unpubl. data).

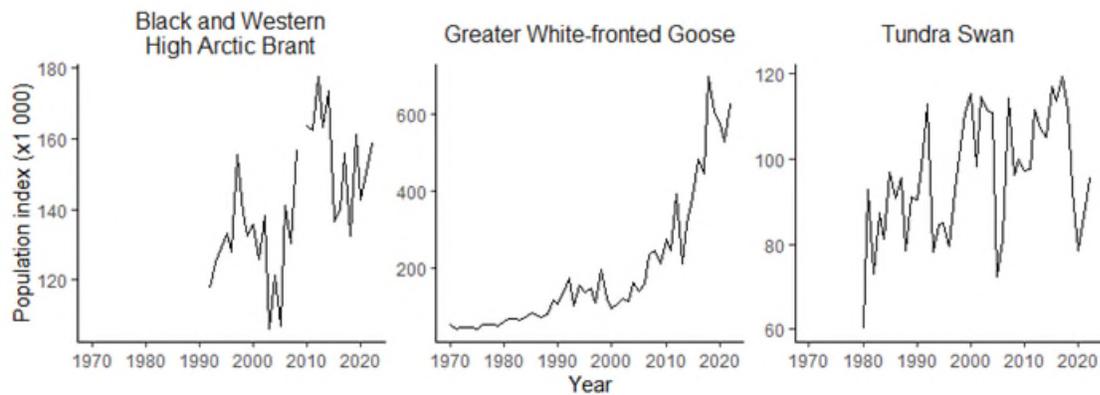


Figure 8.9: Midwinter population indices for geese and swans surveyed by the Midwinter Waterfowl Survey.

### 8.3 Harvest of Geese and Swans

Goose harvest has not declined following declines in Migratory Game Bird Hunting permit sales, but has instead increased since the late 1990s. Harvest of Cackling Goose, Canada Goose, and Ross's Goose has significantly increased. Harvest of Atlantic Brant, Greater

White-fronted Goose, and Snow Goose has shown no significant trend since first surveyed. Harvest of Ross's Goose has significantly increased over the past five years. Harvest of Canada Goose has significantly decreased over the past five years. Harvest of Atlantic Brant, Cackling Goose, Greater White-fronted Goose, and Snow Goose remained stable over this period. In 2022, there were 788 thousand geese harvested in Canada. Canada Geese comprised 63% of the harvest, followed by Snow Geese (14%), Cackling Geese (12%), Greater White-fronted Geese (8.5%), and Ross's Geese (3.1%). Harvest of swans is currently prohibited in Canada, though there are hunting seasons in several Central and Atlantic Flyway states in the US.

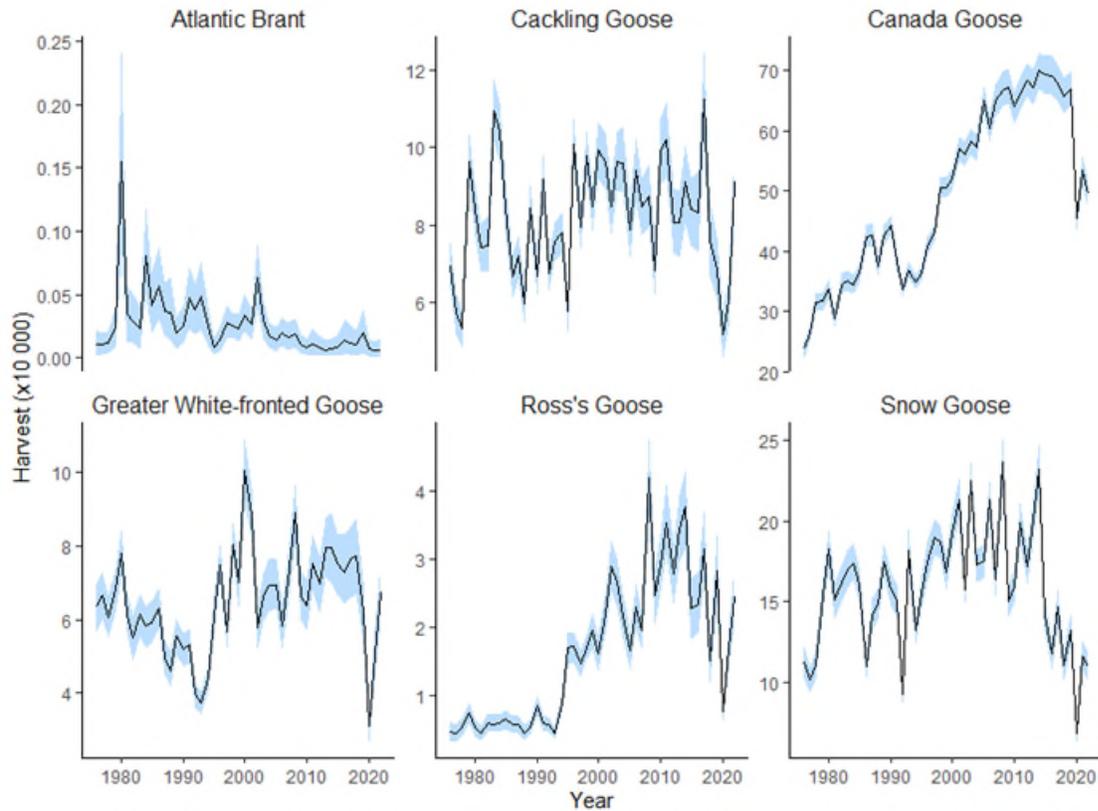


Figure 8.10: Estimated harvest of geese by species in Canada. Black lines represent harvest estimates, and shaded areas represent 95% confidence intervals. Canadian harvest data were obtained from the National Harvest Survey (Smith, Villeneuve, and Gendron 2021).

## 9 Other Harvested Species

### 9.1 Primary Surveys for Other Harvested Species

There is no unifying survey used to monitor populations of other harvested game birds across Canada. Instead, many of these species have species-specific monitoring strategies or are monitored only at localized sites. Species-specific surveys are described in this report along with their results.

Band-tailed Pigeon, Wilson’s Snipe, Virginia Rail, and Mourning Dove are monitored by the [North American Breeding Bird Survey \(BBS\)](#). The BBS is an international avian survey conducted annually since 1966 in the US and Canada. It is designed to monitor trends in relative abundance of North American breeding birds at the continental, national, and regional levels, and primarily focuses on land birds.

Sora, Virginia Rail, and Common Gallinule are monitored by the Great Lakes Marsh Monitoring Program (GLMMP) in Ontario. The GLMMP is a bi-national, long-term monitoring program that has coordinated citizen scientists throughout the Great Lakes basin of Ontario and the US since 1995. The program is designed to collect information about the presence and abundance of bird and amphibian species in Great Lakes coastal and inland marshes.

### 9.2 Population Status of Other Harvested Species

#### 9.2.1 Thick-billed Murre

Because of its breeding distribution, the Thick-billed Murre is not regularly surveyed by any current monitoring program.

#### 9.2.2 Common Murre

Because of its breeding distribution, the Common Murre is not regularly surveyed by any current monitoring program.

#### 9.2.3 American Woodcock

American Woodcock are monitored in North America using indices from the American Woodcock Singing-Ground Survey, which consists of a spring count of male courtship displays at dusk (Seamans and Rau 2019). The survey covers the central and northern portions of the American Woodcock breeding range. In Canada, American Woodcock are currently managed based on two regions: the Eastern Management Region and the Central Management Region. American Woodcock breeding in Manitoba and Ontario belong to the Central Management Region, while those breeding in Québec and the Maritimes are part of the Eastern Management Region. Since the inception of the survey, there have been significant long-term declines in all provinces, except Manitoba where there is no significant long-term trend. There were no significant trends for any province from 2017 to 2023.

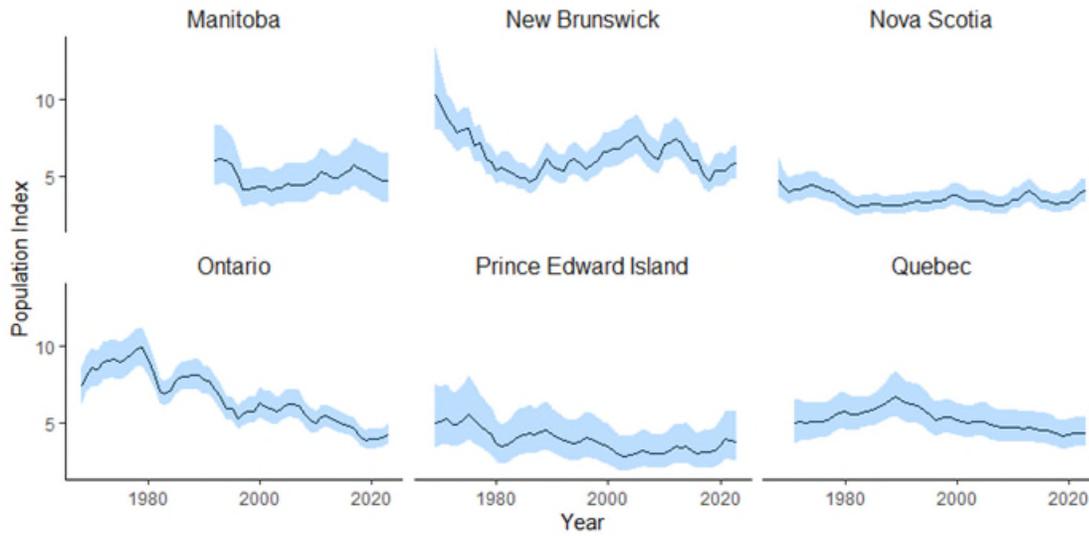


Figure 9.1: American Woodcock breeding population indices by province. Black lines represent population estimates, and shaded areas represent 95% confidence intervals (Source: Seamans and Rau 2023).

#### 9.2.4 American Coot

In the Traditional Survey Area of the WBPHS, the abundance of American Coot has shown no significant trend since 1970 (Figure 9.2). Abundance increased in the US Prairies, decreased in the Canadian Prairies, and exhibited no significant trend in all other regions. Short-term trends across the entire survey area indicate that abundance has shown no significant trend over the past five years. In 2023, there were 964 (687-1240) thousand American Coots in the Traditional Survey Area of the WBPHS. This represents a 56% decrease from the 10-year average of 2.18 million birds.

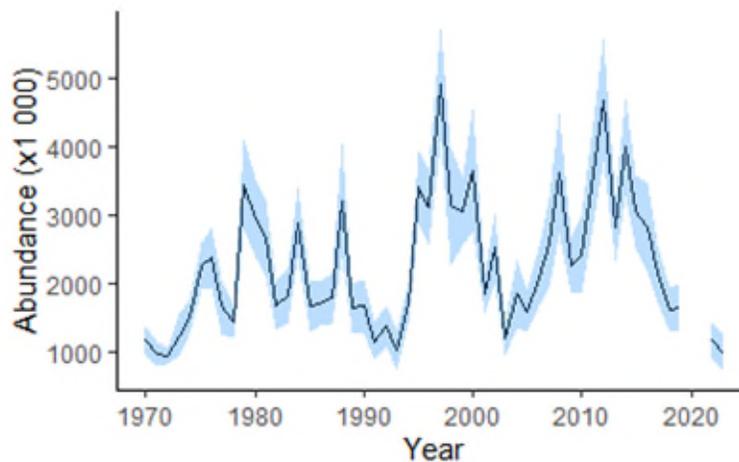


Figure 9.2: American Coot breeding population estimates based on the Waterfowl Breeding Population and Habitat Survey in Western Canada and the Northwestern US. Black line

represents population estimate in the Traditional Survey Area, and shaded area represents the 95% confidence interval.

### 9.2.5 Common Gallinule

In Ontario, the GLMMP indicates that there was a density of 0.0602 (0.0407-0.0889) Common Gallinules per monitoring station in 2022. This represents a 55% decrease from the 10-year average of 0.135 birds per station. The population index of Common Gallinule has significantly decreased both since 1995 and over the past five years (Figure 9.4).

### 9.2.6 Mourning Dove

Mourning Dove are monitored through the BBS (Figure 9.5). Across the Canadian range, the Mourning Dove population index has shown no significant trend in the short term (2011 – 2021) but has significantly increased in the long-term (1970 – 2021). Since 1970, populations indices in Alberta and Saskatchewan have significantly increased, populations indices in Québec have significantly decreased, and populations indices in British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, and Ontario have remained stable. In the short term, populations in Alberta and Saskatchewan have significantly increased, populations in Québec have significantly decreased, and populations in British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, and Ontario have remained stable.

### 9.2.7 Wilson's Snipe

Wilson's Snipe are monitored through the BBS (Figure 9.5). Across the Canadian range, Wilson's Snipe has shown no significant trend in the short term (2011 – 2021) and long-term (1970 – 2021). Since 1970, the population index in Alberta has significantly increased, populations indices in New Brunswick and the Yukon have significantly decreased, and populations indices in British Columbia, Manitoba, Newfoundland and Labrador, Northwest Territories, Ontario, Québec, and Saskatchewan have remained stable. In the short term, the populations index in Alberta have significantly increased, populations indices in New Brunswick and the Yukon have significantly decreased, and populations indices in British Columbia, Manitoba, Newfoundland and Labrador, Northwest Territories, Ontario, Québec, and Saskatchewan have remained stable.

### 9.2.8 Sandhill Crane

There are three Sandhill Crane populations in Canada: the Central Valley population, the Mid-continent population, and the Eastern population.

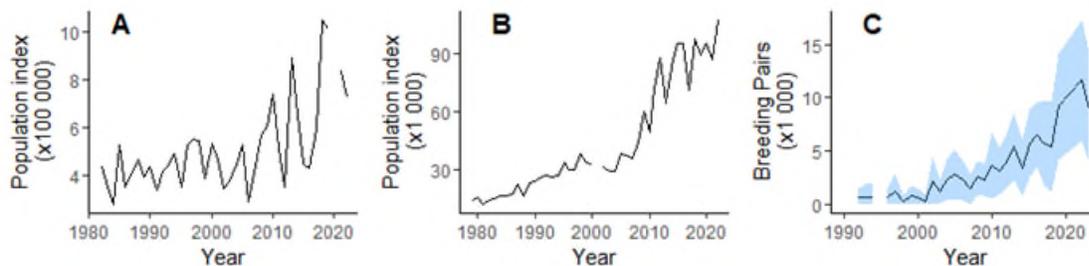
The Central Valley population primarily breeds in California, but its range extends into the lower Fraser Valley and northern Vancouver Island in British Columbia. There are no surveys to monitor the Canadian portion of this population.

The Mid-continent Population breeds across Canada from eastern British Columbia to northern Ontario, south from the Prairies and north to Siberia, Alaska, the Yukon, Northwest Territories and Nunavut; approximately two-thirds of this population are Lesser Sandhill Cranes (*Grus canadensis canadensis*), and the remainder are Greater Sandhill

Cranes (*G. c. tabida*; Rhymer et al. 2001; Jones et al. 2005). The Mid-continent population of Sandhill Cranes is monitored through a spring aerial transect survey in its key staging areas in Nebraska, US, as more than 90% of the Mid-continent Population is found in that area when this survey occurs (Dubovsky 2019). The Mid-Continent population of Sandhill Crane has shown no significant trend both since 1982 and over the past five years. The photo corrected population index in 2022 was 730 thousand Sandhill Cranes, which was 10% lower than in 2021, and the photo-corrected three-year average (2020–2022) was 783 thousand birds (Figure 9.3a). This is similar to the 10-year average of 739 thousand cranes.

The Eastern Population of Sandhill Crane breeds from central Québec through eastern Ontario and down to the lower Great Lakes. This population is monitored by the fall index survey of migratory staging areas in the Mississippi and Atlantic Flyways. Since 1979, the Eastern population of Sandhill Crane has significantly increased, but over the past five years, this population has shown no significant trend. In 2022, there were 107 thousand Eastern Sandhill Cranes (Figure 9.3b). This represents a 21% increase from the 10-year average of 88.6 thousand birds.

In Québec, the EWS monitors a large breeding area of Sandhill Cranes. The Eastern population of nesting Sandhill Crane has significantly increased both since 1990 and over the past five years. In 2023, there were 8.92 (3.74-14.1) thousand Sandhill Crane breeding pairs in this region (Figure 9.3c). This represents a 26% increase from the 10-year average of 7.07 thousand breeding pairs.



*Figure 9.3: Sandhill Crane populations. A) Spring population indices for Mid-continent Sandhill Cranes in their spring staging areas (i.e., Central Platte River Valley, Nebraska, and adjacent areas) (Source: Dubovsky 2019). B) Fall population indices for Eastern Sandhill Cranes in their fall staging areas (Source: Seamans 2023). C) Breeding pairs in Québec based on the EWS (Estimates based on helicopter plot survey only; Source: C. Lepage, CWS-Quebec Region, unpubl. Data). In figures A and B, black lines represent population indices. In figure C, black line represents breeding pair estimate, and shaded area represents the 95% confidence interval.*

### 9.2.9 Band-tailed Pigeon

Band-tailed Pigeon are monitored through the BBS (Figure 9.5). In Canada, the Band-tailed Pigeon is found only in British Columbia. Since 1970, populations indices in British Columbia have remained stable. From 2016-2021, populations indices in British Columbia have also remained stable.

### 9.2.10 Sora

In Ontario, the GLMMP indicates that there were 0.062 (0.039-0.10) Soras per monitoring station in 2022. This represents a 41% decrease from the 10-year average of 0.10 birds per station. Since 1995, the population of Sora has significantly decreased, but over the past five years, this population has shown no significant trend (Figure 9.4).

### 9.2.11 Virginia Rail

In Ontario, the GLMMP indicates that there were 0.31 (0.26-0.37) Virginia Rails per monitoring station in 2022. This represents a 19% increase from the 10-year average of 0.26 birds per station. Since 1995, the population of Virginia Rail has significantly decreased, but over the past five years, this population has shown no significant trend (Figure 9.4).

Virginia Rail are also monitored through the BBS (Figure 9.5). Across the Canadian range, Virginia Rail population indices has shown no significant trend in the short term (2011 - 2021) and long-term (1970 - 2021). Since 1970, populations indices in Alberta, British Columbia, Manitoba, Ontario, Québec, and Saskatchewan have remained stable. In the short term, populations indices in Alberta, British Columbia, Manitoba, Ontario, Québec, and Saskatchewan have also remained stable.

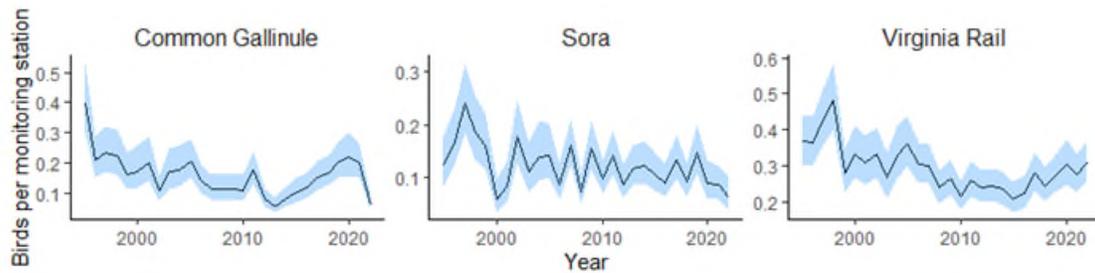


Figure 9.4: Population indices for Common Gallinule, Sora, and Virginia Rail based on the Great Lakes Marsh Monitoring Program in Ontario. Black lines represent population estimates, and shaded areas represent 95% confidence intervals.

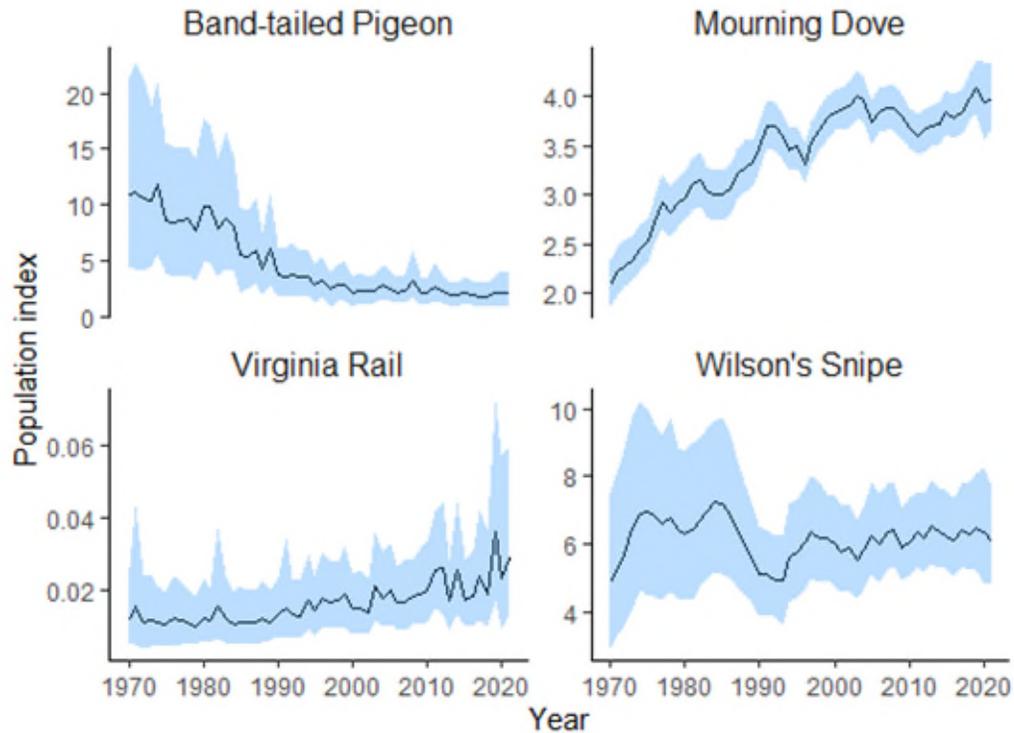


Figure 9.5: Canada-wide population indices for Band-tailed Pigeon, Wilson's Snipe, Virginia Rail, and Mourning Dove based on the Breeding Bird Survey. Black lines represent population indices, and shaded areas represent 95% credible intervals.

### 9.3 Harvest of Other Harvested Species

Annual harvest of American Coot, American Woodcock, Band-tailed Pigeon, and Wilson's Snipe has significantly decreased since the 1970s (Figure 9.6). Harvest of Sandhill Crane has significantly increased over the long term. Harvest of American Woodcock and Wilson's Snipe has significantly decreased over the past five years. Harvest of American Coot, Band-tailed Pigeon, and Sandhill Crane (Midcontinent population) remained stable over this period. In 2022, there were 2.99 (2.4-3.69) thousand American Coot, 13.5 (10.9-16.5) thousand Sandhill Crane, 144 (58-258) Band-tailed Pigeon, 2.5 (1.94-3.08) thousand Wilson's Snipe, and 20.1 (17.6-22.7) thousand American Woodcock harvested in Canada.

Mourning Dove harvest significantly increased in the 2010s, following the establishment of open seasons in Ontario in 2013 and Québec in 2016; previously only British Columbia had an open season. Over the past five years, Mourning Dove harvest has shown no significant trend. In 2022, there were 17.1 (13.8-21.1) thousand Mourning Dove harvested in Canada, primarily in Ontario.

There are no data for murre harvest prior to 2013, although harvest restrictions implemented in the mid-1990s appear to have reduced annual harvest from approximately 750 thousand murrelets to approximately 250 thousand by the early 2000s (Chardine et

al. 1999). In 2022, there were 6.16 (4.01-8.59) thousand Common Murre and 15.8 (10.9-21.3) thousand Thick-billed Murre harvested in Canada.

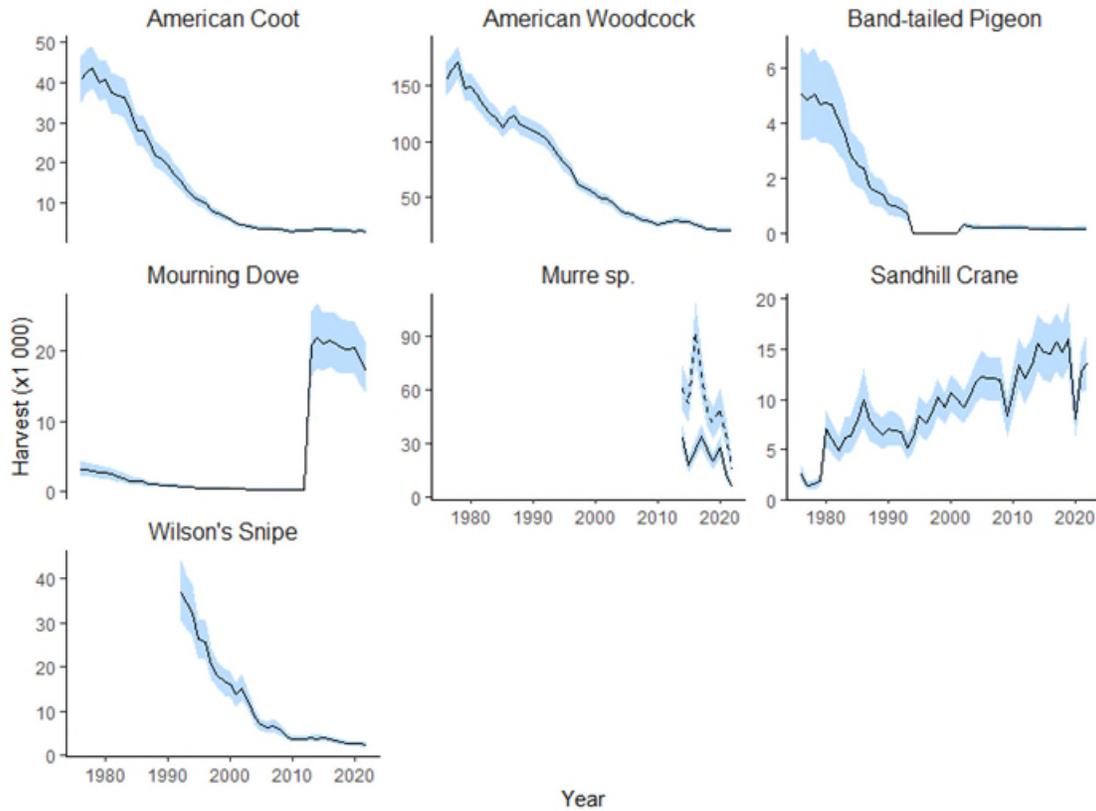


Figure 9.6: Estimated harvest of other hunted species in Canada. Black lines represent harvest estimates, and shaded areas represent 95% confidence intervals. Canadian harvest data were obtained from the National Harvest Survey (Smith, Villeneuve, and Gendron 2021). For murre species, the solid line represents harvest of Thick-billed Murre, and the dashed line represents harvest of Common Murre.

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## 11 Appendix A

### 11.1 Breeding Population Estimates and Trends of Ducks from the EWS

Table 11.1: Breeding population estimates (in thousands), with 95% credible intervals (CI) and trend estimates, for the core survey area of the Eastern Waterfowl Survey. Estimates are based on combined results of helicopter and fixed-wing aircraft surveys, except for those species monitored only by the helicopter survey (+). Trends are expressed as an annual percent change. Significant trends ( $p < 0.05$ ) are indicated with an asterisk [\*].

Species	2023 Breeding Population Estimate	5-yr Trend	1990 to 2023 Trend
American Black Duck	544 (484-617)	1.39 (-0.27 - 3.2)	0.23 (-0.18 - 0.6)
American Wigeon	9.77 (0-19.8)	1.22 (-4.06 - 7.3)	0.88 (-1.02 - 2.8)
Black Scoter (+)	19.7 (0-41.7)	-7.12 (-21.87 - 10.2)	9.04 (4.33 - 13.9)*
Bufflehead	53.5 (23.8-83.2)	10.7 (0.55 - 22.01)*	1.09 (-0.8 - 3)
Common Goldeneye	285 (218-351)	-0.03 (-2.5 - 2.3)	0.18 (-0.66 - 0.9)
Common Merganser (+)	331 (258-404)	7.46 (3.53 - 11.92)*	1.87 (0.97 - 2.77)*
Goldeneye sp.	626 (466-877)	1.77 (-1.2 - 6)	0.25 (-0.61 - 1.2)
Green-winged Teal	231 (180-306)	-0.25 (-2.35 - 1.7)	-0.08 (-0.76 - 0.5)
Hooded Merganser (+)	707 (521-894)	12.7 (8.66 - 17.03)*	5.62 (4.7 - 6.6)*
Mallard	548 (381-824)	1.44 (-0.91 - 4.3)	1.28 (0.28 - 2.34)*
Red-breasted Merganser (+)	33.3 (10.1-56.5)	3.9 (-3.64 - 12.2)	3.47 (1.28 - 5.69)*
Ring-necked Duck	503 (410-637)	0.14 (-1.69 - 1.8)	0.29 (-0.29 - 0.8)
Scaup sp.	32.9 (0-67.6)	20 (1.78 - 41.82)*	1.11 (-2.13 - 4.5)
Surf Scoter (+)	73.7 (28.9-119)	-3.5 (-10.7 - 3.1)	1.07 (-1.3 - 3.3)
White-winged Scoter (+)	8.17 (0-18.4)	1.95 (-14.77 - 21.4)	4.09 (-4.03 - 13.2)

## 11.2 Breeding Population Estimate and Trends of Game Birds from the WBPBS

Table 11.2: Breeding population estimates (in thousands), with 95% confidence intervals (CI) and trend estimates, for the Traditional Survey Area of the Waterfowl Breeding Population and Habitat Survey of Western Canada and the Northwestern US. Trends are expressed as an annual percent change. Significant trends ( $p < 0.05$ ) are indicated with an asterisk [\*].

Species	Population size 2023	5-yr trend	1970 to present trend
American Coot	964 (687-1240)	-6.51 (-16.35 - 20.7)	0.23 (-0.57 - 2.8)
American Wigeon	1850 (1510-2190)	-6.31 (-9.2 - -3.31)*	-0.83 (-1.08 - -0.58)*
Blue-winged Teal	5250 (4670-5830)	-1.28 (-4.71 - 2.3)	0.35 (0.1 - 0.59)*
Bufflehead	985 (840-1130)	-1.53 (-3.97 - 0.7)	1.06 (0.77 - 1.32)*
Canvasback	608 (483-733)	-0.9 (-4.67 - 3)	0.27 (-0.26 - 0.6)
Common Goldeneye	596 (454-737)	0.52 (-4.66 - 5.8)	0.65 (0.11 - 1.12)*
Gadwall	2560 (2280-2840)	-4.65 (-7.48 - -1.79)*	1.02 (0.78 - 1.28)*
Green-winged Teal	2490 (1940-3050)	-5.62 (-9.45 - -1.26)*	0.3 (-0.03 - 0.6)
Mallard	6100 (5690-6500)	-8.83 (-10.38 - -7.24)*	-0.64 (-0.79 - -0.48)*
Merganser sp.	757 (540-975)	2.27 (-3.89 - 8.9)	1.62 (1.12 - 2.13)*
Northern Pintail	2210 (1920-2500)	-1.71 (-4.84 - 1.5)	-1.92 (-2.16 - -1.68)*
Northern Shoveler	2850 (2530-3180)	-5.89 (-8.79 - -2.9)*	0.56 (0.32 - 0.79)*
Redhead	923 (765-1080)	3.53 (-0.85 - 8.2)	0.9 (0.58 - 1.22)*
Ring-necked Duck	1520 (1280-1760)	-0.85 (-5.01 - 3.5)	1.49 (0.66 - 1.94)*
Ruddy Duck	618 (444-791)	5.91 (-1.1 - 13.4)	1.48 (0.82 - 2.1)*

### 11.3 Breeding Population Estimate and Trends in Ducks from the BCCPWBS

Table 11.3: Number of breeding pairs (in thousands), with 95% credible intervals (CI) and trend estimates, for the Central Plateau of British Columbia from the Waterfowl Breeding Population Survey of the Central Interior Plateau of British Columbia. Trends are expressed as an annual percent change. Significant trends ( $p < 0.05$ ) are indicated with an asterisk [\*].

Species	2023 Breeding Population Estimate	5-yr Trend	2006 to 2023 Trend
American Wigeon	18.3 (13.1-23.5)	1.35 (-7.28 - 8.7)	1.03 (-1.16 - 3)
Blue-winged Teal	6.22 (4.07-8.36)	1.16 (-13.25 - 17)	2.72 (-0.07 - 5.7)
Bufflehead	53.3 (43.4-63.2)	1.15 (-2.49 - 4.9)	0.92 (-0.08 - 1.9)
Canada Goose	20.7 (16.4-25)	-7.93 (-13.64 - -2.33)*	-2.07 (-3.37 - -0.78)*
Gadwall	3.65 (0-7.37)	-3.85 (-18.21 - 7.9)	-1.99 (-6.14 - 1.9)
Mallard	70.8 (58.9-82.6)	-0.78 (-4.01 - 2.5)	-1.05 (-2.02 - -0.15)*
Merganser sp.	9.81 (6.4-13.2)	-3.32 (-9.8 - 1.9)	-1.8 (-3.42 - -0.16)*
Northern Pintail	2.65 (0.765-4.54)	-2.7 (-19.68 - 17.1)	-2.71 (-7.74 - 2.5)
Ring-necked Duck	80 (62.1-97.9)	1.45 (-5.28 - 7.9)	0.88 (-0.53 - 2.2)
Ruddy Duck	5.88 (2.26-9.5)	5.4 (-7.23 - 26.5)	-0.93 (-5.28 - 3.8)
Scaup sp.	58.2 (31.8-84.6)	0.72 (-6.3 - 9.6)	0.25 (-2.09 - 2.7)
Scoter sp.	8.57 (3.04-14.1)	-3.49 (-18.4 - 10.9)	5.9 (1.85 - 10.38)*

#### 11.4 Breeding Population Estimate and Trends in Geese and Ducks from Lincoln Estimates

Table 11.4: Estimated population (in thousands), with 95% credible intervals (CI) and trend estimates, based on Lincoln estimates. Trends are expressed as an annual percent change. Significant trends ( $p < 0.05$ ) are indicated with an asterisk [\*].

Species	Region	Breeding Population Estimate	5-yr Trend	1970 to 2022 Trend
Atlantic Brant		38.8 (22.5-55.1)	-28 (-36.55 - -18.73)*	-3.09 (-7.71 - 2.1)
Cackling Goose		1,600 (1190-2010)	-6.62 (-13.98 - 0.7)	2.49 (1.72 - 3.26)*
Greater White-fronted Goose	Arctic	1,370 (1010-1740)	-11.7 (-18.82 - -4.37)*	3.07 (2.36 - 3.78)*
Lesser Snow Goose	Mid-Continent	3,110 (2440-3770)	-15.2 (-20.81 - -9.18)*	1.38 (0.7 - 2.09)*
Lesser Snow Goose	Western Arctic	1,070 (751-1380)	-11 (-19.54 - -1.84)*	3.05 (1.94 - 4.16)*
Ross's Goose		532 (363-700)	-22.6 (-30.64 - -13.83)*	8.38 (5.51 - 11.12)*
Wood Duck	Eastern	3,200 (2850-3560)	-5.67 (-9.15 - -2.12)*	2.5 (2.14 - 2.85)*
Wood Duck	Western	68.5 (34.3-103)	0.85 (-11.5 - 14.2)	3.13 (2.08 - 4.22)*