

COSEWIC Assessment and Status Report

on the

Short-billed Dowitcher *Limnodromus griseus*

caurinus subspecies – *Limnodromus griseus caurinus*
hendersoni/griseus – *Limnodromus griseus hendersoni/griseus*

in Canada



***caurinus* subspecies – *Limnodromus griseus caurinus* - ENDANGERED**
***hendersoni/griseus* – *Limnodromus griseus hendersoni/griseus* - THREATENED**
2024

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

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Production note:

COSEWIC would like to acknowledge Carl Savignac for writing the status report on Short-billed Dowitcher (*Limnodromus griseus*), *caurinus* subspecies (*Limnodromus griseus caurinus*) and *hendersoni/griseus* (*Limnodromus griseus hendersoni/griseus*) in Canada, prepared under contract with Environment and Climate Change Canada. This report was overseen by Marcel Gahbauer and Louise Blight, Co-chairs of the COSEWIC Birds Specialist Subcommittee.

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Short-billed Dowitcher — Photo credit: Samuel Denault.

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COSEWIC Assessment Summary

Assessment Summary –November 2024

Common name

Short-billed Dowitcher - *caurinus* subspecies

Scientific name

Limnodromus griseus caurinus

Status

Endangered

Reason for designation

In Canada, this medium-sized shorebird breeds only in southern Yukon and the northwestern corner of British Columbia. There it nests almost exclusively in calcareous string fens, and migrates south to winter along the Pacific coast from California to South America. This species faces a number of threats, including increasing loss of wintering habitat from several causes; disturbance by dogs and recreational activities at migratory stopover sites and on the wintering grounds; impacts of pollution on birds and their prey; and effects of climate change and increased forest fires on the breeding grounds. The Canadian population estimate is 1,000 to 3,000 mature individuals, or fewer, and monitoring suggests steep population declines exceeding 50% over the past three generations.

Occurrence

British Columbia, Yukon

Status history

Designated Endangered in November 2024.

Assessment Summary –November 2024

Common name

Short-billed Dowitcher - *hendersoni/griseus*

Scientific name

Limnodromus griseus hendersoni/griseus

Status

Threatened

Reason for designation

This medium-sized shorebird is endemic to Canada, where it breeds from Northwest Territories and Alberta to northwestern Quebec and Labrador. Individuals migrate through eastern and central North America, and winter along the Atlantic and Gulf coasts of the United States and the Caribbean coast of Central and South America. The greatest threat is sport and subsistence hunting in the southern portion of the wintering range; other threats include increasing loss of non-breeding habitat; disturbance by dogs and recreational activities at migratory stopover sites and on non-breeding grounds; impacts of pollution on birds and their prey; and effects of increased forest fires and climate change on the breeding grounds. The population is estimated at about 78,000 mature individuals, although this estimate is at least 25 years out of date. Data from the International Shorebird Survey suggest 3-generation declines approaching 60%, although these surveys only partially cover the centre of the continent where trends may differ. Because the species does not meet the definition of Endangered (i.e., at immediate risk of extinction), it is designated as Threatened.

Occurrence

Alberta, Saskatchewan, Manitoba, Ontario, Northwest Territories, Quebec, Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island

Status history

Designated Threatened in November 2024.



COSEWIC Executive Summary

Short-billed Dowitcher *Limnodromus griseus*

caurinus subspecies – *Limnodromus griseus caurinus*
hendersoni/griseus – *Limnodromus griseus hendersoni/griseus*

Wildlife Species Description and Significance

Short-billed Dowitcher is a chunky, medium-sized shorebird, with generally brown-mottled upperparts speckled with cream, and an orangey-rufous breast in the breeding season. Its bill, almost twice as long as the head, is straight and dark grey, and its stout yellowish legs are relatively short. Short-billed Dowitcher is a long-distance migrant, travelling as far as 15,000 km in a round trip between its breeding and non-breeding grounds. It is harvested as a game bird in the Caribbean and in northern South America.

Spatial segregation in the breeding, migrating, and non-breeding ranges of known populations provides evidence for the subdivision of Short-billed Dowitcher into two designatable units (DUs), the *caurinus* and *hendersoni/griseus* populations, following the subspecies or subspecies complexes of *L. g. caurinus* and *L. g. hendersoni/griseus*, respectively. There is strong inference that each of the *caurinus* and *hendersoni/griseus* populations have distinctly heritable traits, in the form of highly differentiated migration routes and separate breeding and non-breeding grounds. Therefore, the two populations of Short-billed Dowitcher that occur in Canada are considered to be discrete and evolutionarily significant, and they are assessed as two separate DUs.

Distribution

Short-billed Dowitcher breeds primarily in the boreal forest of Canada and Alaska. In Canada, it occurs from British Columbia and the Northwest Territories eastward to Newfoundland and Labrador. The *caurinus* DU breeds in southwestern Yukon and northwestern British Columbia; this population is associated with wintering (non-breeding) sites located along the Pacific Coast from California to southern Peru. The breeding range of the *hendersoni/griseus* DU extends east from the south-central Northwest Territories as far south as Edmonton, Alberta and central Saskatchewan and possibly as far southeast as the northern end of Lake Winnipeg in Manitoba. It also occurs north across the Hudson Bay Lowlands, from Manitoba east to James Bay in Ontario. This DU also breeds in the islands in James Bay (Nunavut), and along Hudson Bay and James Bay in northwestern Quebec east into Labrador. Individuals described as *L. g. hendersoni* migrate through eastern and

central North America, east of the Rocky Mountains, and winter primarily along the Atlantic and Gulf coasts of the United States, and southward as far as the Caribbean coast of Central America. Birds considered to be *L. g. griseus* migrate along the Atlantic Coast, and winter in the Caribbean and along the northern coast of South America, where their range overlaps with that of *L. g. hendersoni*.

Habitat

Short-billed Dowitcher nests principally in fens in the boreal forest, particularly in large peatlands of this type with expanses of emergent aquatic vegetation (e.g., sedges) and numerous shallow ponds and pools interspersed with shrubs and small conifers. In winter, it prefers coastal wetlands such as estuaries, lagoons, mudflats, and the edges of mangrove forests.

Biology

Short-billed Dowitcher is socially monogamous and defends only a small area around the nest and, once the young have left the nest, around the brood. Adults arrive on their breeding grounds in mid-May and incubation begins in early June. The nest is a simple depression on dry ground. Four eggs are usually laid, with a three-week incubation period beginning between mid-May and mid-June. The precocial young leave the nest shortly after hatching and the male is responsible for brood rearing, which generally lasts 14 days. Short-billed Dowitcher produces only one brood a year. Age at first breeding is one year, and generation length is estimated to be four years. On the breeding and non-breeding grounds and during migration, the species feeds primarily on aquatic invertebrates such as molluscs, worms, and crustaceans.

Population Sizes and Trends

The published population size in Canada is 78,000 mature individuals for the *hendersoni/griseus* DU, the entirety of which breeds in Canada. Published estimates for the *caurinus* DU report a population of 15,000 mature individuals in Canada. However, both of these estimates are based on surveys conducted in the 1980s and 1990s. On the basis of recent unpublished surveys from the 2020s, the Canadian population of *caurinus* is thought to be much smaller and is now estimated to consist of from 1,000 to 3,000 mature individuals, or fewer. More recent information is not available on *hendersoni/griseus*.

Only one site surveyed under the International Shorebird Survey (ISS), on the northern coast of Washington State near the Canadian border, provides trend data for the *caurinus* DU. From 2007 to 2019, this DU showed a decline exceeding 7% per year, or a three-generation decline of at least 59%. This is consistent with other studies conducted on the *caurinus* DU, e.g., a decline of over 90% was recorded in Alaskan birds between 1990 and 2010, and numbers of migrating dowitchers (Long-billed and Short-billed combined) along the Pacific Coast declined by 4% annually from 2013 to 2023, equivalent to a three-generation decline of 39%.

A long-term trend analysis (1980–2019) of ISS data showed a decline of 85.24% (95% CI: -93.14, -66.89) for the *hendersoni/griseus* DU. The short-term ISS trend (2007–2019), equivalent to three generations, was -7.19% (-13.21, -1.32) per year, corresponding to an overall three-generation decline of 58.94% (-81.93, -14.74).

Threats and Limiting Factors

Multiple, interacting threats and limiting factors are likely responsible for the decline in the Short-billed Dowitcher's population. With a maximum clutch size of four eggs and a single brood, the species has a limited annual reproductive output. For the *hendersoni/griseus* DU specifically, the greatest threat is sport and subsistence hunting in the Caribbean and South America. For both DUs, important threats are considered to be the loss and degradation of wetlands and other habitats at migratory stopover sites, on the non-breeding grounds, and, increasingly, on the breeding grounds; and climate change and severe weather, which affect the species on its breeding and non-breeding grounds, as well as during migration.

Protection, Status and Ranks

In 2024, the IUCN uplisted Short-billed Dowitcher from Least Concern to Vulnerable. In Canada, NatureServe considers the Short-billed Dowitcher to be Vulnerable as a breeder and Apparently Secure as a migrant (N3N4B, N4N5M). Its status as a breeder in Yukon and British Columbia (S1 and S1S2, respectively) is Critically Imperilled, and it is considered Vulnerable (S3) in most other provinces where it is ranked. In Alaska, *caurinus* is assessed as "II Red" under the Alaska Species Ranking System. Short-billed Dowitcher and its nests and eggs are protected under Canada's *Migratory Birds Convention Act, 1994* and the species is also safeguarded under similar laws in a number of provinces. A small portion (~3%) of suitable breeding habitat (i.e., boreal wetlands and coastal mudflats) in Canada is protected by national or provincial parks, migratory bird sanctuaries, or national wildlife areas. Outside the species' breeding range, a network of important stopover sites in the Americas deemed to be of national or international significance for shorebirds including Short-billed Dowitcher are identified through various conservation designations such as the Western Hemisphere Shorebird Reserve Network (WHSRN) and BirdLife International's Important Bird and Biodiversity Areas (IBA) programme.

TECHNICAL SUMMARY – Short-billed Dowitcher *caurinus* subspecies

Limnodromus griseus caurinus

Short-billed Dowitcher *caurinus* subspecies

Bécassin roux de la sous-espèce *caurinus*

Range of Occurrence in Canada: British Columbia, Yukon

Demographic Information

Generation time (average age of parents in the population)	4 years (Bird <i>et al.</i> 2020)
Is there an [observed, estimated, inferred, or projected] continuing decline in number of mature individuals?	Yes, estimated and inferred
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Inferred and suspected cumulative decline of at least 59% over 3 generations (12 years) based on International Shorebird Survey (ISS) data for a single site in northern Washington near the Canadian border. Although <i>L. g. caurinus</i> is poorly covered by ISS, other field surveys and trends from migration monitoring support the inference of steep declines over this period.
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown, but ongoing decline is suspected given an overall threat impact of Medium and the steep nature of the declines to date.
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Inferred and suspected decline, given the overall threat impact of Medium and the steep nature of the declines to date. Extent of decline likely similar to the one described in box 4.
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a) No b) Partially c) No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	Approximately 76,175 km ² within the Canadian breeding range
Index of area of occupancy (IAO)	Details of breeding distribution are insufficiently known to calculate IAO, but it is expected to be > 500 km ² given population size estimate and the non-coloniality of the species.

Is the population “severely fragmented” i.e., is >50% of its total area of occupancy in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	A. No b. No
Number of “locations”	Unknown, but likely at least dozens based on widely distributed threats affecting migratory stopover and non-breeding areas
Is there an [observed, inferred, or projected] decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	Inferred, given the steep 3-generation population decline
Is there an [observed, inferred, or projected] decline in number of subpopulations?	Not applicable. No subpopulations.
Is there an [observed, inferred, or projected] decline in number of “locations”?	Unknown
Is there an [observed, inferred, or projected] decline in [area, extent and/or quality] of habitat?	Yes, observed and inferred declines in area, extent, and quality of breeding, migration, and non-breeding habitats
Are there extreme fluctuations in number of subpopulations?	No
Are there extreme fluctuations in number of “locations”?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each subpopulation)

Subpopulations	N Mature Individuals
Total	Surveys from the 1980s to the 1990s and an estimate of the proportion of the total population breeding in Canada produced an estimate of ~15,000 mature individuals in Canada (Jehl <i>et al.</i> 2001; Andres <i>et al.</i> 2012); however, recent unpublished surveys suggest the proportion of the population breeding in Canada is much lower than originally estimated, and the total population has also declined. Thus, there are estimated to be only 1,000–3,000 mature individuals or fewer in Canada, with the population size most likely at or below the lower end of that range (Sinclair pers. comm. 2024). A 2014 Yukon Conservation Data Centre workshop estimated 50–1,000 birds, but most likely < 300 (Bennett pers. comm. 2024)

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations, or 10% within 100 years]?	Unknown; analysis not conducted.
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Threats

Was a threats calculator completed for this species?	Yes (See Appendix 1)	Overall assigned threat impact: Medium
Key threats were identified as: i. Housing & Urban Areas (IUCN 1.1) – Low threat impact ii. Tourism & Recreation Areas (IUCN 1.3) – Low threat impact iii. Annual & Perennial Non-Timber Crops (IUCN 2.1) – Low threat impact iv. Marine & Freshwater Aquaculture (IUCN 2.4) – Low threat impact v. Recreational Activities (IUCN 6.1) – Low threat impact vi. Fire & Fire Suppression (IUCN 7.1) – Low threat impact vii. Other Ecosystem Modifications (IUCN 7.3) – Low threat impact viii. Invasive Non-Native/Alien Species/Diseases (IUCN 8.1) – Low threat impact ix. Problematic Native Species/ Diseases (IUCN 8.2) – Low threat impact x. Domestic & Urban Waste Water (IUCN 9.1) – Low threat impact xi. Industrial & Military Effluents (IUCN 9.2) – Low threat impact xii. Agricultural & Forestry Effluents (IUCN 9.3) – Low threat impact xiii. Habitat Shifting & Alteration (IUCN 11.1) – Low threat impact xiv. Temperature Extremes (IUCN 11.3) – Low threat impact		
What limiting factors are relevant? With a maximum clutch size of four eggs and a single brood annually, the species has a limited annual reproductive output. Outside of the processes that pose a threat to its foraging habitat, Short-billed Dowitcher may also be limited by the natural availability of suitable foraging habitat during migration and on the non-breeding grounds.		

Rescue Effect (from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	<i>Caurinus</i> is undergoing steep declines on its breeding grounds in Alaska.
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Yes
Are conditions deteriorating in Canada?	Yes
Are conditions for the source population deteriorating?	Likely
Is the Canadian population considered to be a sink?	No
Is rescue from outside populations likely?	Unlikely, given substantial declines in the overall population

Data Sensitive Species

Is this a data sensitive species?	No
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Status History

COSEWIC: Designated Endangered in November 2024.

Status and Reasons for Designation:

Status: Endangered	Alpha-numeric codes: A2b+4b; C2a(ii)
Reasons for designation: In Canada, this medium-sized shorebird breeds only in southern Yukon and the northwestern corner of British Columbia. There it nests almost exclusively in calcareous string fens, and migrates south to winter along the Pacific coast from California to South America. This species faces a number of threats, including increasing loss of wintering habitat from several causes; disturbance by dogs and recreational activities at migratory stopover sites and on the wintering grounds; impacts of pollution on birds and their prey; and effects of climate change and increased forest fires on the breeding grounds. The Canadian population estimate is 1,000 to 3,000 mature individuals, or fewer, and monitoring suggests steep population declines exceeding 50% over the past three generations.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Endangered A2b+4b. Suspected and inferred 3-generation decline of at least 59% based on ISS data is supported by other studies of birds in Alaska, on migration, and on the non-breeding grounds. As threats have not abated, declines are presumed to be continuing.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable. EOO and IAO exceed the thresholds for Threatened.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered C2a(ii). Recent estimates suggest a Canadian population of 1,000 to 3,000 mature individuals, or fewer; there is an estimated and inferred continuing decline; and all individuals are in a single subpopulation.
Criterion D (Very Small or Restricted Population): Not applicable. Estimate of 1,000 to 3,000 mature individuals is above thresholds for D1.
Criterion E (Quantitative Analysis): Not applicable. Analysis not conducted.

TECHNICAL SUMMARY – Short-billed Dowitcher *hendersoni/griseus*

Limnodromus griseus hendersoni/griseus

Short-billed Dowitcher *hendersoni/griseus*

Bécassin roux *hendersoni/griseus*

Range of Occurrence in Canada: Alberta, Saskatchewan, Manitoba, Ontario, Northwest Territories, Quebec, Newfoundland and Labrador, Nova Scotia, New Brunswick, Prince Edward Island

Demographic Information

Generation time (average age of parents in the population)	4 years (Bird <i>et al.</i> 2020)
Is there an [observed, estimated, inferred, or projected] continuing decline in number of mature individuals?	Yes, estimated
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Estimated decline of 58.94% (95% CI: - 81.93, -14.74) (12 years, 3 generations) based on ISS data
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown, but future reduction is suspected given magnitude of decline over last 3 generations, and an overall threat impact of High for <i>L.g. griseus</i> and Medium for <i>L.g. hendersoni</i> .
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Inferred and suspected reduction given magnitude of decline over last 3 generations and an overall threat impact of High for <i>L.g. griseus</i> and Medium for <i>L.g. hendersoni</i> . Decline likely similar to that described in box 4.
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a) No b) Yes c) No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	Approximately 4,110,000 km ²
Index of area of occupancy (IAO)	Details of breeding distribution are insufficiently known to calculate IAO, but will be >> 2,000 km ² .
Is the population “severely fragmented” i.e., is >50% of its total area of occupancy in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. No b. No

Number of “locations”	Unknown, but likely at least dozens based on threats affecting migratory stopover and non-breeding areas, which are widely distributed
Is there an [observed, inferred, or projected] decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	Inferred, given the steep 3-generation population decline
Is there an [observed, inferred, or projected] decline in number of subpopulations?	Not applicable
Is there an [observed, inferred, or projected] decline in number of “locations”?	Unknown
Is there an [observed, inferred, or projected] decline in [area, extent and/or quality] of habitat?	Yes, observed and inferred declines in area, extent, and quality of migration and non-breeding habitat
Are there extreme fluctuations in number of subpopulations?	No
Are there extreme fluctuations in number of “locations”?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each subpopulation)

Subpopulations	N Mature Individuals
Total	78,000, although this population estimate is more than 25 years out of date and the population has been declining since the 1980s

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations, or 10% within 100 years]?	Unknown; analysis not conducted
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Threats:

Was a threats calculator completed for this species?	Yes (See Appendices 2 and 3)	Overall assigned threat impact: High (<i>L. g. griseus</i>) and Medium (<i>L. g. hendersoni</i>),
Key threats were identified as: i. Housing & Urban Areas (IUCN 1.1) – Low threat impact ii. Tourism & Recreation Areas (IUCN 1.3) – Low threat impact iii. Annual & Perennial Non-Timber Crops (IUCN 2.1) – Low threat impact iv. Marine & Freshwater Aquaculture (IUCN 2.4) – Low threat impact v. Mining & Quarrying (IUCN 3.2) – Negligible to Low threat impact vi. Renewable Energy (IUCN 3.3) – Unknown to Low threat impact vii. Hunting & Collecting Terrestrial Animals (IUCN 5.1) – Medium to Low threat impact viii. Recreational Activities (IUCN 6.1) – Low threat impact ix. Fire & Fire Suppression (IUCN 7.1) – Low threat impact x. Dams & Water Management/Use (IUCN 7.2) – Unranked to Low threat impact xi. Other Ecosystem Modifications (IUCN 7.3) – Low threat impact xii. Invasive Non-Native/Alien Species/Diseases (IUCN 8.1) – Low threat impact xiii. Problematic Native Species/Diseases (IUCN 8.2) – Low threat impact xiv. Domestic & Urban Waste Water (IUCN 9.1) – Unknown to Low threat impact xv. Industrial & Military Effluents (IUCN 9.2) – Low threat impact xvi. Habitat Shifting & Alteration (IUCN 11.1) – Low threat impact xvii. Droughts (IUCN 11.2) – Unranked to Low threat impact - xviii. Temperature Extremes (IUCN 11.3) – Low threat impact xix. Storms & Flooding (IUCN 11.4) – Low threat impact		
What limiting factors are relevant? With a maximum clutch size of four eggs and a single brood annually, the species has a limited annual reproductive output. Outside of the processes that pose a threat to foraging habitat, Short-billed Dowitcher may also be limited by the natural availability of suitable foraging habitat during migration and on the non-breeding grounds.		

Rescue Effect (from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	The <i>hendersoni/griseus</i> DU does not breed outside Canada.
Is immigration known or possible?	No
Would immigrants be adapted to survive in Canada?	N/A
Is there sufficient habitat for immigrants in Canada?	N/A
Are conditions deteriorating in Canada?	Yes
Are conditions for the source population deteriorating?	N/A (no outside source population for rescue)
Is the Canadian population considered to be a sink?	No
Is rescue from outside populations likely?	No

Data Sensitive Species

Is this a data sensitive species?	No
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Status History

COSEWIC: Designated Threatened in November 2024

Status and Reasons for Designation:

Status: Threatened	Alpha-numeric codes: Met criteria for Endangered, A2bd+4bd, but designated Threatened, A2b+4bd, because the wildlife species is not at imminent risk of extinction
Reasons for designation: This medium-sized shorebird is endemic to Canada, where it breeds from Northwest Territories and Alberta to northwestern Quebec and Labrador. Individuals migrate through eastern and central North America, and winter along the Atlantic and Gulf coasts of the United States and the Caribbean coast of Central and South America. The greatest threat is sport and subsistence hunting in the southern portion of the wintering range; other threats include increasing loss of non-breeding habitat; disturbance by dogs and recreational activities at migratory stopover sites and on non-breeding grounds; impacts of pollution on birds and their prey; and effects of increased forest fires and climate change on the breeding grounds. The population is estimated at about 78,000 mature individuals, although this estimate is at least 25 years out of date. Data from the International Shorebird Survey suggest 3-generation declines approaching 60%, although these surveys only partially cover the centre of the continent where trends may differ. Because the species does not meet the definition of Endangered (i.e., at immediate risk of extinction), it is designated as Threatened.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Endangered A2bd+4bd. Estimated 3-generation decline of 58.94% (95% CI: -81.93, -14.74) based on ISS trend analysis. Hunting on the non-breeding grounds is the greatest threat to this species. As threats have not abated, declines are presumed to be continuing.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable. Does not meet thresholds for EOO and IAO.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Number of mature individuals is unknown. The population estimate of 78,000 mature individuals is at least 25 years out of date and the population has been declining since the 1980s, but it is believed to be above thresholds.
Criterion D (Very Small or Restricted Population): Not applicable. Estimate of 78,000 mature individuals is above thresholds for D1, and the population is not vulnerable to rapid and substantial decline.
Criterion E (Quantitative Analysis): Not applicable. Analysis not conducted.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2024)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species is likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



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The Canadian Wildlife Service, Environment and Climate Change Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

Short-billed Dowitcher

Limnodromus griseus

caurinus subspecies – *Limnodromus griseus caurinus*
hendersoni/griseus – *Limnodromus griseus hendersoni/griseus*

in Canada

2024

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WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

Name and Classification

Scientific name: *Limnodromus griseus*

English name: Short-billed Dowitcher

French name: Bécassin roux

Spanish names: Costurero Pico Corto, Agujeta de Pico Corto, Agujeta Piquicorta, Agujeta Común, Agujeta Gris

Classification:

Class: Aves

Order: Charadriiformes

Family: Scolopacidae

Short-billed Dowitcher is one of three species in the shorebird genus *Limnodromus* (Paulson 1995; American Ornithologists' Union 1998).

Morphological Description

Short-billed Dowitcher is a chunky, medium-large shorebird, approximately 25–29 cm long and weighing 90–120 g (Jehl *et al.* 2020). It has a long neck and a slightly down-curved bill that is around twice the length of its head. Its stout legs are relatively short and greenish. In adult breeding plumage, the upperparts are generally mottled with buffy to whitish feather edges and the flanks, belly, and breast are spotted with pale salmon. On the basis of mainly plumage, morphological differences, and breeding ranges, three subspecies of Short-billed Dowitcher are recognized in North America (*L. g. griseus*, *L. g. hendersoni*, and *L. g. caurinus*; Jehl *et al.* 2020). The neck, breast, and belly are generally rufous with black barring, particularly in subspecies *hendersoni*; in subspecies *griseus*, this coloration is limited to the neck and breast, and the belly is grey to white. Non-breeding adults have a brownish-grey back and a breast scattered with dark spots; the belly is generally whitish and the sides are barred grey (Paulson 2005). Juveniles have similar but paler plumage, and can also be distinguished by the paler base to the bill, darker crown, and buff-striped mantle (Paulson 2005).

Short-billed Dowitcher can be confused with Long-billed Dowitcher (*Limnodromus scolopaceus*), especially where they overlap during migration. The two species are most easily distinguished by their flight calls, but details of plumage and behaviour can also be used to differentiate them (Paulson 2005), at least by experienced observers. Red Knot (*Calidris canutus*) is also somewhat similar in both breeding and non-breeding plumages,

but is larger and has proportionally shorter legs and a much shorter bill than Short-billed Dowitcher (Paulson 2005).

Population Spatial Structure and Variability

The extent of the Short-billed Dowitcher's breeding range in Canada is not well studied. Jehl *et al.* (2020) show distinct breeding ranges for the three described subspecies, with a zone of overlap between *L. g. hendersoni* and *L. g. griseus* along the James Bay coast. Breeding bird atlases conducted in Canada also suggest, based mainly on morphological aspects, an overlap in the breeding ranges of *L. g. hendersoni* and *L. g. griseus*, especially around James Bay and in the adjacent Hudson Bay Lowlands (Burke and Sutherland 2007) and on several islands in the Nunavut portion of James Bay (eBird 2022; Figures 1, 2).

L. g. caurinus breeds west of the Rocky Mountains, primarily in southwestern and south-central Alaska, southwestern Yukon, and northwestern British Columbia (Sinclair *et al.* 2003; Paulson 2005; Fraser 2015; eBird 2022; Figure 2). *L. g. hendersoni* breeds from the southern Northwest Territories through northern Alberta (FAN 2007), northern Saskatchewan (Saskatchewan Breeding Bird Atlas 2020), and northwestern Manitoba (Artuso 2018); and along the Hudson Bay coast in Manitoba and Ontario (Burke and Sutherland 2007). *L. g. griseus* breeds mainly in northern Quebec, generally north of the 50th parallel (Consortium Gauthier et Guillemette – G.R.E.B.E 1991, 1993; Québec Breeding Bird Atlas 2020), but ranges from the eastern part of Ontario's Hudson Bay Lowlands (Burke and Sutherland 2007) to central Labrador (eBird 2022; Figures 1 and 2; see also **Canadian Range**).

Banding and telemetry data have been used to elucidate the migration patterns and non-breeding grounds of the named subspecies (Dunn *et al.* 2010; Jehl *et al.* 2020). Generally, *L. g. caurinus* is known to migrate and overwinter along the Pacific Coast, from northern California southward, with large concentrations found in Mexico's Baja California region (Jehl *et al.* 2020). According to a telemetry study conducted on 25 *L. g. caurinus* individuals captured at two breeding sites in Alaska in 2021 and 2022 and equipped with 3.7-g GPS PinPoint transmitters, all individuals tracked to their non-breeding sites spent the winter along the Pacific Coast, primarily in southern California (San Francisco Bay, San Diego Bay, and the Colorado River Delta), along the coast of mainland Mexico (Sonora, Sinaloa), and in the Guerrero Negro area of Baja California (USFWS, Migratory Bird Division, unpubl. data; Figure 3).

L. g. hendersoni migrates through central and eastern North America (including the Prairies and Mississippi Valley) and overwinters along the Atlantic and Gulf coasts of the United States southward to the east coast of Central America and the West Indies (Jehl *et al.* 2020; Figure 1). *L. g. griseus* is an Atlantic migrant, overwintering in the Caribbean—where it overlaps at least partially with *hendersoni*; see **Designatable Units**—and along the northern coast of South America (Dunn *et al.* 2010; Reed *et al.* 2018; Jehl *et al.* 2020; Figure 1). According to Hayman *et al.* (1986) and Birds Canada (2022), these birds likely adopt one of two migration strategies in fall: either a non-stop flight over the Atlantic Ocean

to the Lesser Antilles or the Guianas or, when fat reserves are insufficient for a transoceanic flight, a coastal route along the U.S. Eastern Seaboard (Burton and McNeil 1975).

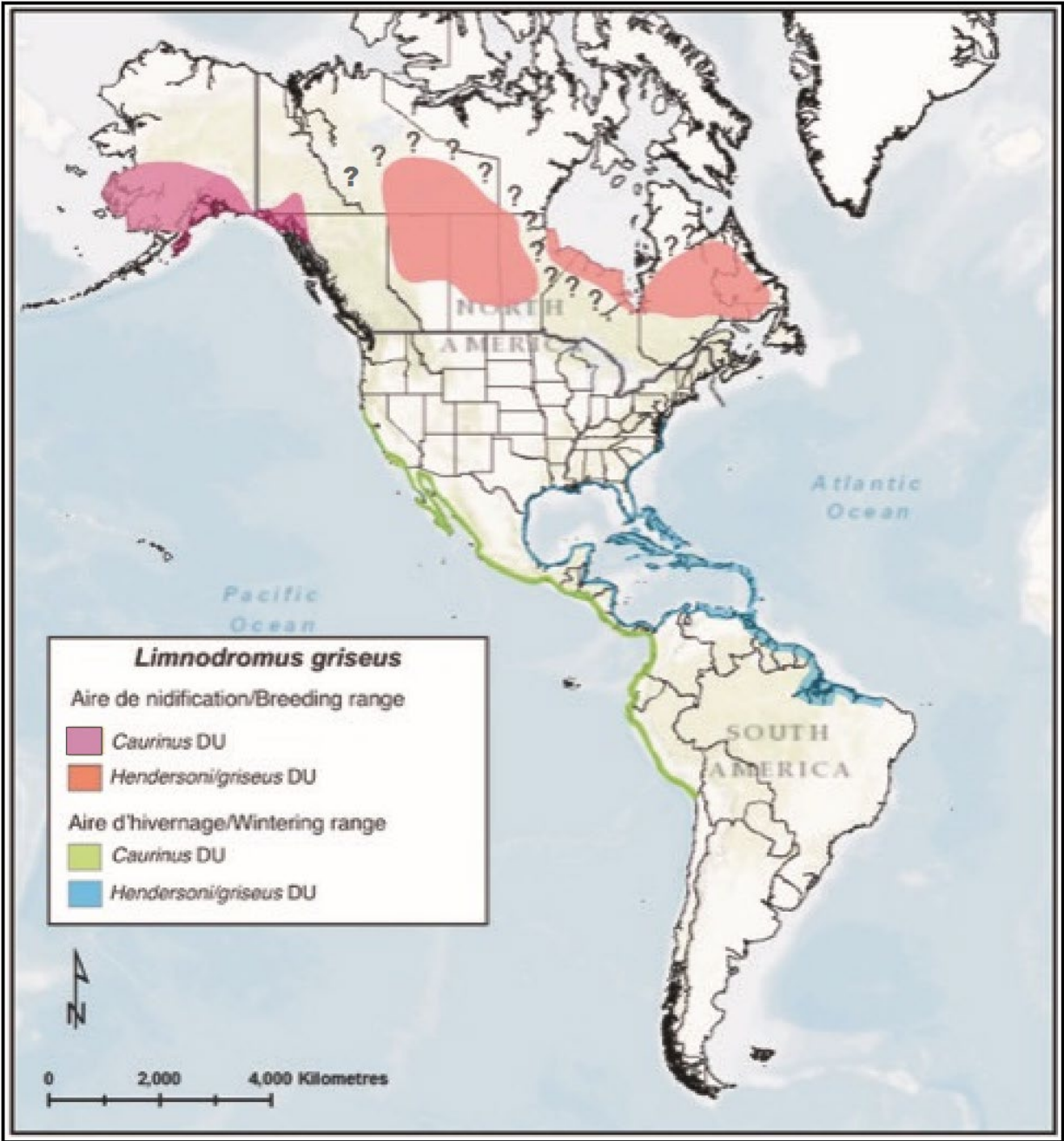


Figure 1. Distribution of Short-billed Dowitcher, including its North American breeding and wintering ranges (based on Consortium Gauthier et Guillemette – G.R.E.B.E. 1991; Sinclair *et al.* 2003; Burke and Sutherland 2007; FAN 2007; Fraser 2015; Artuso 2018; Robert 2019; Saskatchewan Breeding Bird Atlas 2020; Jehl *et al.* 2020; Fink *et al.* 2023; Lyons *et al.* 2024; eBird 2024; Hache unpubl. data). Question marks indicate that the limits of the breeding range in the boreal forest is uncertain due to poor survey coverage.

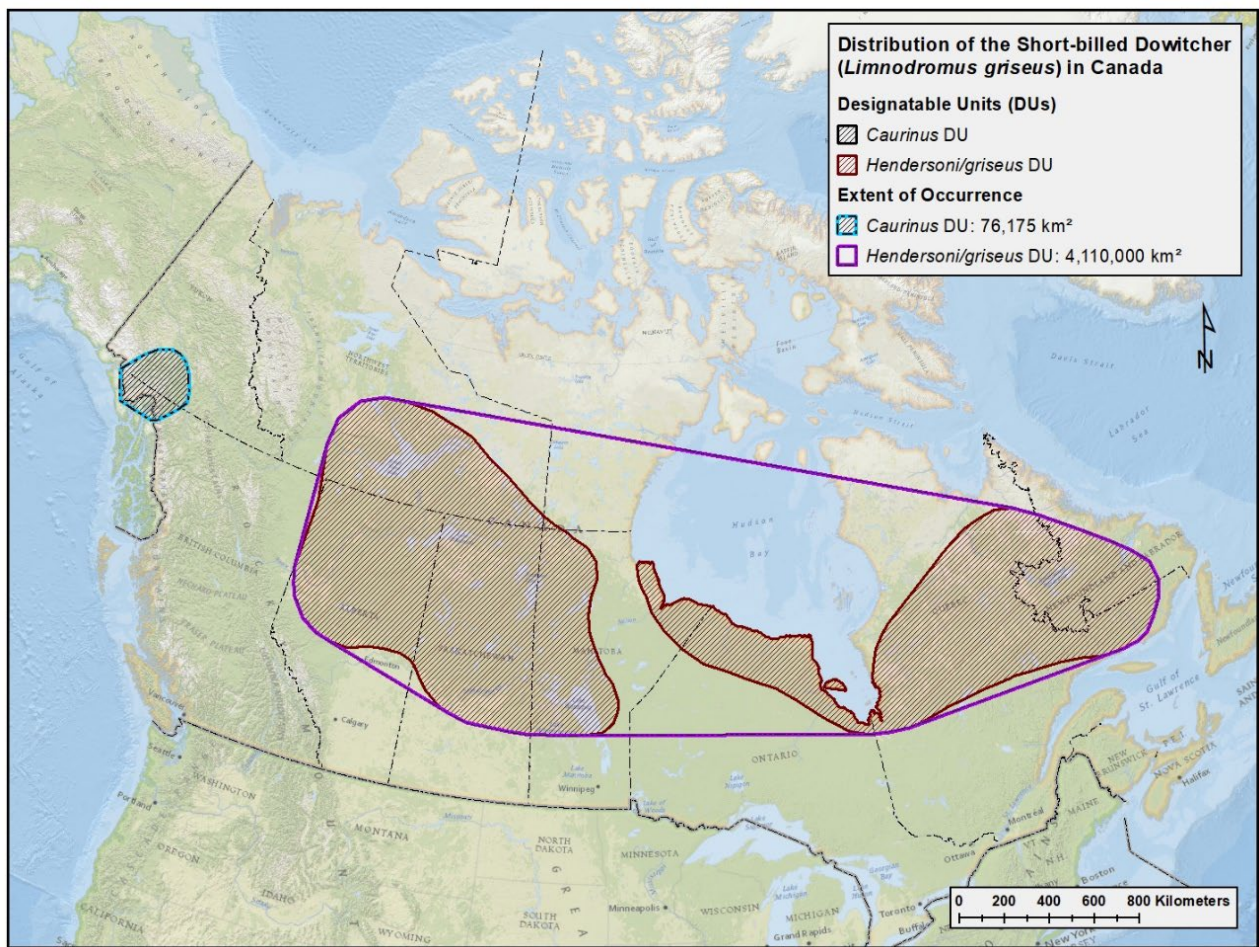


Figure 2. Map of the breeding range of Short-billed Dowitcher in Canada, used for the calculation of extent of occurrence (EOO) for each DU in Canada (see legend; estimated distribution based on Consortium Gauthier et Guillemette – G.R.E.B.E. 1991; Smith 1996; Sinclair *et al.* 2003; Burke and Sutherland 2007; FAN 2007; Fraser 2015; Artuso 2018; Québec Breeding Bird Atlas 2020; Saskatchewan Breeding Bird Atlas 2020; Fink *et al.* 2023; eBird 2024; Hache unpubl. data). The breeding range in the northern part of the boreal forest in most provinces and territories is putative due to the limited information available.

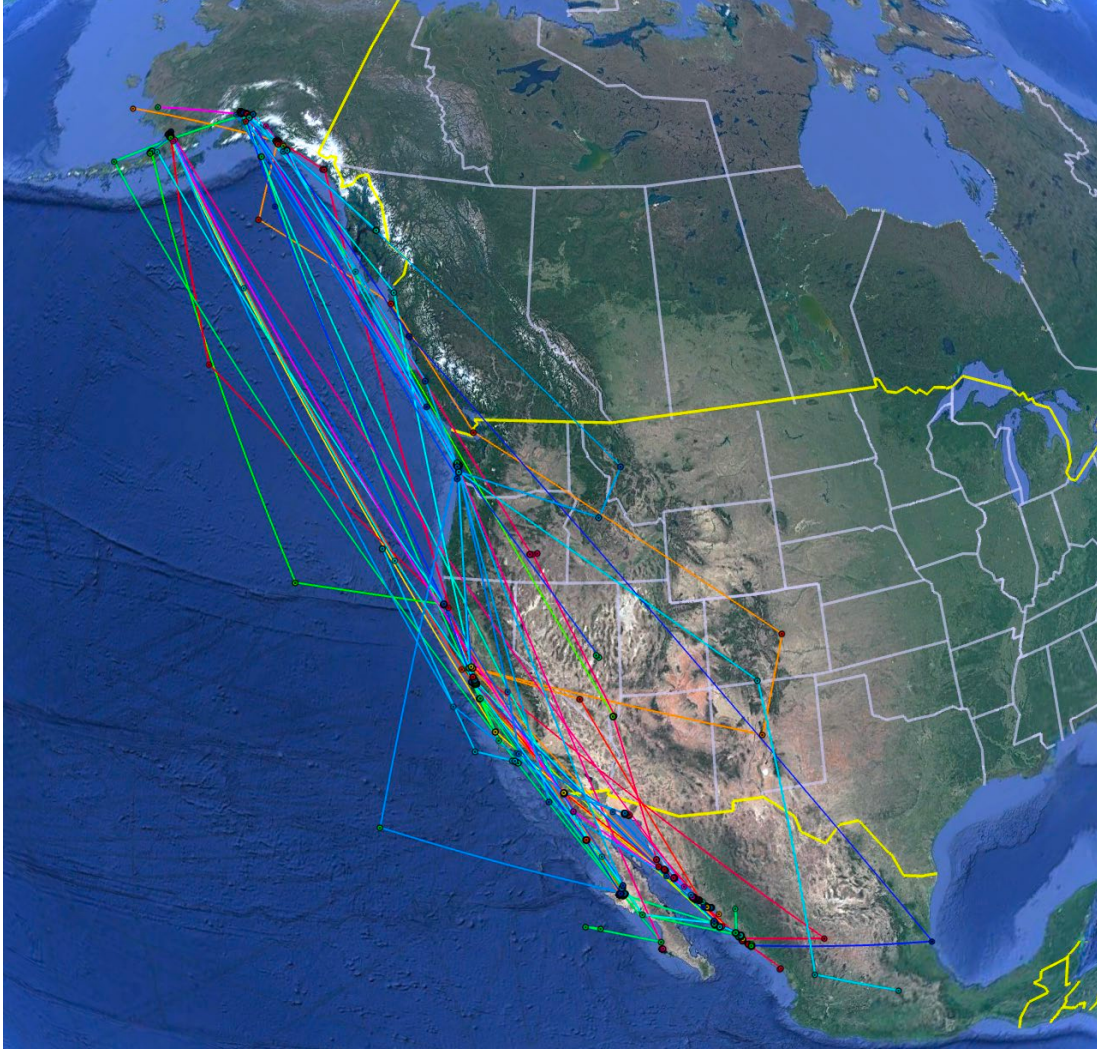


Figure 3. Fall migration routes of 25 breeding birds of *L. g. caurinus* tracked from Alaska Peninsula and the Cook Inlet, Alaska, in 2021 and 2022 (U.S. Fish and Wildlife Service, Migratory Bird Division, unpubl. data; Bathrick pers. comm. 2024).

According to stable isotope analysis of juvenile Short-billed Dowitchers harvested on the non-breeding grounds in Barbados, the origin of sampled individuals was centred on the zone of overlap between *L. g. griseus* and *L. g. hendersoni* around James Bay and the Hudson Bay Lowlands, indicating that both subspecies overwinter at this site; Watts *et al.* 2015; Reed *et al.* 2018; Figure 1). Reed *et al.* (2018) used probabilistic models to assign sampled individuals to origin, and could not rule out the possibility that some individuals originated in western Alaska (i.e., range of *L. g. caurinus*). However, these authors also noted that similarities in the precipitation $\delta^2\text{H}$ isoscapes for eastern North America and Alaska impeded their ability to determine birds' origins; Reed *et al.* (2018) provide insufficient evidence to assume the non-breeding ground overlap of *caurinus* (see **Designatable Units**).

Designatable Units

Current COSEWIC guidelines stipulate that, to be recognized as a designatable unit (DU), populations must meet at least one line of evidence for both discreteness and evolutionary significance (COSEWIC 2021). Those that do not first meet at least one criterion for discreteness are not further considered for significance.

Discreteness

A putative DU may be considered discrete based on one or both of the following criteria, each of which indicate little or no transmission of heritable information between it and other DUs (COSEWIC 2021):

D1. Evidence of heritable traits or markers that clearly distinguish the putative DU from other DUs (e.g., evidence from genetic markers or heritable morphology, behaviour, life history, phenology, migration routes, vocal dialects, etc.), indicating limited transmission of this heritable information with other DUs.

D2. Natural (i.e., not the product of human disturbance) geographic disjunction between putative DUs such that transmission of information (e.g., individuals, seeds, gametes) between these “range portions” has been severely limited for an extended time and is not likely in the foreseeable future. “Extended time” is intended to mean that sufficient time has passed such that either natural selection or genetic drift are likely to have produced discrete units, given the specific biology of the taxon.

D1: Genetic differences between the three named subspecies of Short-billed Dowitcher have not been assessed. There are subtle morphological and plumage differences between all three subspecies (Paulson 2005; Jehl *et al.* 2020). *L. g. caurinus* tends to have narrower, darker feather edges on the upperparts, as well as an overall concentration of barring on the breast, with the russet wash mainly on the neck and breast and the belly whitish. *L. g. hendersoni* tends to have broad cinnamon feather edges on its upperparts, as well as less heavily marked, evenly reddish underparts with scattered small dark spots and fairly extensive bars (Paulson 2005). *L. g. griseus* tends to be the smallest of the three subspecies, with a smaller bill and a more heavily marked breast (barring and speckling), but a mostly white belly with no russet tones. Paulson (2005) notes, however, that each subspecies is variable in its plumage and the identification of single birds outside of their normal range is problematic. Jaramillo *et al.* (1991) used museum skins to identify features specific to *hendersoni* and *griseus*, but these authors also noted that intermediate forms between these two subspecies do exist (see also Burke and Sutherland 2007). Thus, criterion D1 may be supported on the basis of morphological differences for *L. g. caurinus*, but is not supported for *L. g. hendersoni/griseus*.

According to the *Birds of the World* species account (Jehl *et al.* 2020), the three subspecies are believed to have distinct breeding grounds and migration routes. (It should be noted that Jehl *et al.* 2020 is a republished version of the 2001 species account, and is unchanged from that earlier version.) A study tracking the southbound migration of 25 *L. g. caurinus* individuals during 2021 and 2022 indicates that Alaskan birds use the greater Pacific Flyway and primarily winter on the west coast of mainland Mexico (i.e., high migratory connectivity; U.S. Fish and Wildlife Services, Migratory Bird Division, unpubl. data; Figure 3; see also **Dispersal and Migration**). In contrast, a study farther east following tagged birds for three years under various Motus projects showed overlap between the migratory routes taken by *L. g. hendersoni* and *L. g. griseus* (e.g., along the Atlantic coast, in the Delaware area; Birds Canada 2022). A stable isotope analysis of juvenile Short-billed Dowitchers overwintering in Barbados broadly supports these patterns of the absence of separation between the wintering grounds of *hendersoni* and *griseus*; Reed *et al.* (2018) applied a feather isoscape based on Lesser Scaup (*Aythya affinis*) values and identified southeastern Manitoba, northeastern Ontario around James Bay, and central Quebec (i.e., centring on the area of breeding overlap for the *L. g. hendersoni* and *L. g. griseus* subspecies) as the likely area of origin of most sampled individuals. They could not rule out a western Alaskan origin in a small number of birds, i.e., the range of *caurinus* (Reed *et al.* 2018); however, given similarities in isoscapes of $\delta^2\text{H}$ (the stable isotope value used to assign individuals' origins) between eastern North America and Alaska, authors could not precisely determine birds' origins. Based on migration routes, criterion D1 is supported for *caurinus*, and is not supported for *L. g. hendersoni* and *L. g. griseus*.

D2: There appears to be a clear and substantial geographic disjunction between *L. g. caurinus* and the *L. g. hendersoni* and *L. g. griseus* subspecies complex during the breeding season (Figures 1 and 2) and on the non-breeding grounds. In contrast, there is some overlap between the breeding ranges of *L. g. griseus* and *L. g. hendersoni*, notably along the west coast of James Bay, where breeding individuals are known to have the plumage characteristics of both subspecies, making them difficult to distinguish in the field (Burke and Sutherland 2007). Thus, criterion D2 is supported for *L. g. caurinus* but not for *L. g. hendersoni* and *L. g. griseus*.

Significance

If a putative DU is found to be discrete, its significance can be assessed. A DU is considered significant based on one or more of the following criteria, which capture two types of significance that can operate together or separately: (i) an evolutionarily significant period of isolation that is expected to generate an evolutionary history that cannot be reasonably expected to be practically reconstituted (criterion 1); and/or (ii) the presence of specific adaptive, heritable traits (phenotype) that may develop in a shorter time frame but that nevertheless cannot be reasonably expected to be reconstituted (criterion 2; COSEWIC 2021).

S1. Direct evidence or strong inference that the putative DU has been on an independent evolutionary trajectory for an evolutionarily significant period, usually intraspecific phylogenetic divergence indicating origins in separate Pleistocene refugia.

S2. Direct evidence or strong inference that can be used to infer that the putative DU possesses adaptive, heritable traits, that cannot be practically reconstituted if lost. For example, the persistence of the discrete, putative DU in an ecological setting where a selective regime is likely to have given rise to DU-wide local adaptations that could not be reconstituted.

Given the lack of genetic analyses of Short-billed Dowitcher subspecies, there are no data to support criterion S1.

There is strong inference that the *L. g. hendersoni/griseus* subspecies complex and *L. g. caurinus* subspecies each have distinctly heritable traits, in the form of differentiated breeding and non-breeding grounds and migration routes; in addition, migratory connectivity of *caurinus* in the Pacific Flyway is high (U.S. Fish and Wildlife Services, Migratory Bird Division, unpubl. data; Figure 3).

The distinct migration patterns for *L. g. caurinus* are common among other species breeding in Alaska and adjacent Yukon, where individuals do not tend to cross the Western Cordillera and instead fly over water or along the coast to a western breeding range. This has been studied most thoroughly in Dunlin (*Calidris alpina*) in North America, which has disjunct breeding ranges and distinct migration routes analogous to those observed in Short-billed Dowitcher, but in which strong and significant differences have been found according to genetic analyses (dating to the Pleistocene; Wenick *et al.* 1993; Wenick *et al.* 1996; Wenick and Baker 1996). In 2024, Short-billed Dowitchers exhibiting alarm-calling behaviour were observed at three sites in Yukon's Mackenzie Mountains, within about 500 km of the known western edge of the range of the *hendersoni/griseus* DU (Sinclair pers. comm. 2024). However, the eastern foothills of the Cordillera are a contact zone for many other North American avian taxa (Swenson and Howard 2005), and the geographic disjunction between *hendersoni/griseus* and *caurinus* is likely a significant dispersal barrier. Combined with morphological differences, this suggests that the *hendersoni/griseus* subspecies complex has distinctly heritable traits from *caurinus*, supporting the criterion.

Overall, there appears to be sufficient evidence for criteria D1, D2, and S2, as well as indirect support (based on comparison with other species with a similar biogeography) of S1. Overall, there is evidence to support evaluating the three recognized subspecies as two separate DUs. As most studies on Short-billed Dowitcher have been carried out at the species or subspecies scale, information at the DU level is presented below only when available, or can be inferred.

Special Significance

Short-billed Dowitcher was among the shorebirds hunted heavily by European settlers during migration and on the non-breeding grounds, which caused numbers to plummet on both coasts in the 1800s (NatureServe 2024). Although game hunting of this species on the U.S. Atlantic Coast ceased with the implementation of the Migratory Birds Convention in the early twentieth century, harvesting continues in the Caribbean and in northern South America, both for sport and subsistence (Wege *et al.* 2014; Jehl *et al.* 2020).

The *hendersoni/griseus* DU breeds exclusively in Canada (Jehl *et al.* 2020). Although no publicly available Aboriginal Traditional Knowledge was identified for Short-billed Dowitcher, it is part of Canadian ecosystems that are important to Indigenous peoples, who recognize the interconnectedness of all species.

DISTRIBUTION

Global Range

Short-billed Dowitcher breeds exclusively in the boreal forest of North America, generally north of the 52nd parallel, in Canadian provinces and territories from Labrador west, as well as in southern Alaska (Burke and Sutherland 2007; Robert 2019; Jehl *et al.* 2020; Figure 1). The *hendersoni/griseus* DU overwinters along the Atlantic Coast from southern New Jersey to northern Brazil and throughout the Caribbean (Reed *et al.* 2018; Jehl *et al.* 2020). Non-breeding sites with the greatest density of records for the *hendersoni/griseus* DU are the Atlantic Coast from New Jersey to Florida, the Gulf of Mexico, the Greater Antilles, and the northern coast of Brazil (eBird 2020; Jehl *et al.* 2020). The *caurinus* DU overwinters along the Pacific Coast from California south to Peru (Jehl *et al.* 2020; U.S. Fish and Wildlife Service Migratory Bird Division, unpubl. data). Baja California (Mexico) seems to be the main non-breeding range for *caurinus* DU. See **Population Spatial Structure and Variability** for details by DU.

Canadian Range

In Canada, Short-billed Dowitcher breeds primarily in muskeg and open forests in the boreal ecozone, roughly corresponding to the discontinuous permafrost zone extending through northern Canada (Rouse *et al.* 1997; Figure 1).

The *hendersoni/griseus* DU breeds exclusively in Canada, with a range extending east from the southern Northwest Territories (Hache unpubl. data) as far south as Edmonton in Alberta (FAN 2007; but may no longer nest this far south; see below, this section) and central Saskatchewan (Saskatchewan Breeding Bird Atlas 2020), and possibly as far southeast as the northern end of Lake Winnipeg in Manitoba (Artuso 2018); it also breeds along a 100 km wide strip of the Hudson Bay Lowlands, from Manitoba to the Ontario side of James Bay (Burke and Sutherland 2007; Figure 1). This DU also

breeds on Akimiski and Twin Islands in James Bay, in Nunavut (Burke and Sutherland 2007), and from the coast of Hudson Bay and James Bay in northwestern Quebec east to Lake Melville in Labrador, from Rivière à la Baleine in the north to Petit Lac Manicouagan in the south (eBird 2020; Québec Breeding Bird Atlas 2020). As indicated in Figure 1, the northern limit of the breeding range, on the edge of the boreal forest, is poorly known in most provinces and territories.

Data from several studies have suggested that the breeding range for *hendersoni/griseus* DU may have contracted northward by a few hundred kilometres in Alberta and Saskatchewan in recent years (Salt and Salt 1976; Smith 1996; Saskatchewan Breeding Bird Atlas 2020; Sinclair pers. comm. 2024). Smith (1996) provides evidence of confirmed and probable breeding as well as possible breeding in the northern three fifths of Saskatchewan. However, the recent Saskatchewan Breeding Bird Atlas (2020) had only one possible breeding record. In Alberta, Salt and Salt (1976) reported individuals nesting from the Edmonton area northward, including within Edmonton's city limits, but even at that time noted that Short-billed Dowitcher had disappeared from altered or fragmented wetlands and that the species did not use small pockets of remaining wetland like some others do (e.g., Wilson's Snipe *Gallinago delicata*). The first Alberta Breeding Bird Atlas (FAN 1992) had seven confirmed and probable breeding records, while the second atlas (FAN 2007) had zero confirmed and three probable breeding records.

In Canada, the *caurinus* DU breeds in southwestern Yukon and northwestern British Columbia. In Yukon, it has been confirmed to breed in the Southern Lakes area (Swan Lake, Lake Laberge, Nares Lake, and near Tagish Lake) and is suspected to breed at Marsh Lake (Sinclair *et al.* 2003, Yukon Conservation Data Centre 2020; eBird 2024). In British Columbia, it has nested in the Chilkat Pass area and in the St. Elias Mountains, and formerly (until 1994) bred in the northern part of Haida Gwaii (Fraser 2015; Figure 1). However, more recent observations suggest that occurrences in northwestern British Columbia, which were once common (1980s and earlier; see Weeden 1960), have become very scarce (Sinclair pers. comm. 2024; see **Population Sizes and Trends**).

Extent of Occurrence and Area of Occupancy

Overall extent of occurrence (EOO) for the *caurinus* DU is estimated at 76,175 km². The estimated EOO for the *hendersoni/griseus* DU is 4,110,000 km² (Figure 2). Data on breeding distribution are insufficiently precise to calculate the index of area of occupancy (IAO), but based on the relatively broad distribution and abundance of each DU and the non-colonial nature of the species, it is unlikely that the IAO for *caurinus* is less than 500 km² (threshold for Endangered under the B criterion) and the IAO for *hendersoni/griseus* is certainly over the threshold of 2,000 km² for Threatened. It is inferred that the IAO is declining, given the population declines observed.

Search Effort

Early search effort, described by Bent (1962), Salt and Salt (1976), and others, was somewhat confounded by the fact that Short-billed and Long-billed Dowitchers were considered conspecific in the first half of the twentieth century. In Canada and elsewhere in North America, Short-billed Dowitcher and other shorebirds have been counted at a number of major migration stopover sites since the 1970s by both professional and amateur field ornithologists as part of the International Shorebird Survey (ISS; Morrison and Ross 1989; Donaldson *et al.* 2000; Morrison *et al.* 2001; Bart *et al.* 2007).

Information on the current and past distribution of Short-billed Dowitcher in Canada during the breeding season comes mainly from recent breeding bird atlas projects in various provinces, although coverage tends to be less extensive in the northern regions where Short-billed Dowitcher is most common (Sinclair *et al.* 2003; Burke and Sutherland 2007; FAN 2007; Fraser 2015; Artuso 2018; Québec Breeding Bird Atlas 2020; Saskatchewan Breeding Bird Atlas 2020). Additional data on the distribution of this species have been obtained from eBird (2024) and Sinclair (unpubl. data). It should be noted that, in Quebec, the search effort above 50.50° north latitude was much greater during the second breeding bird atlas project than the first breeding bird atlas project in the 1990s (Robert pers. comm. 2020). Thousands of amateur birdwatchers also submit their Short-billed Dowitcher records through eBird (eBird 2024), although observer reliability may be low in areas the species co-occurs with Long-billed Dowitcher during migration, including Canada's Pacific Coast, the Prairies, the Great Lakes region, and along the Gulf of Mexico (Paulson 2005). Some individual Short-billed Dowitchers are identified to subspecies based on range or plumage characteristics, but subspecies identification may be unreliable (see **Morphological Description**), particularly in areas of possible overlap. Automated Recording Units used in breeding bird studies broadly covering the Northwest Territories have documented the presence of Short-billed Dowitcher in the southern half of that region (Hache, unpubl data).

HABITAT

Habitat Requirements

Breeding habitat

Short-billed Dowitcher generally breeds in fens in the boreal forest, especially in the transition zone between forest and tundra (Jehl *et al.* 2020). Typical breeding habitat consists of a mosaic of extensive string fens dominated by wet sedge areas (e.g., *Carex* sedges), interspersed with shrubs and small Black Spruce (*Picea mariana*) and Tamarack (*Larix laricina*), as well as numerous ponds and pools (Sinclair *et al.* 2003; Aubry and Cotter 2007; Burke and Sutherland 2007; Artuso 2018; Robert 2019; Jehl *et al.* 2020). In Ontario, the species is also found in sedge marshes between relict beach ridges near the treeline (Burke and Sutherland 2007). On the coast of Hudson Bay near Churchill, Manitoba, Short-billed Dowitcher mainly occurs in swamps scattered with sedge hummocks (Johnsgard 1981).

In the eastern James Bay area of northern Quebec, large peatlands seem to be an important factor in nest site selection by Short-billed Dowitcher (Consortium Gauthier et Guillemette – G.R.E.B.E. 1993), with a reported minimum patch size of at least 13 ha, with most patches larger than 36 ha (Consortium Gauthier et Guillemette – G.R.E.B.E. 1993). Within these habitats, the species seeks shallow pools with abundant low aquatic vegetation.

Migration and non-breeding habitat

During migration and in the non-breeding season, Short-billed Dowitcher prefers intertidal habitats such as flats and estuaries associated with mangroves, brackish coastal lagoons, and mudflats (Aubry and Cotter 2007; Jehl *et al.* 2020). On migration through the Great Plains, the species uses shallow salt ponds and lakes (Alexander and Gratto-Trevor 1997) and flooded farm fields (Jehl *et al.* 2020).

Habitat Trends

Breeding habitat

The area of shallow lakes and ponds in the boreal, subarctic, and Arctic zones is estimated to have decreased by 6,700 km² between 2000 and 2009 (Carroll *et al.* 2011). Loss and degradation of breeding habitat is expected to increase due to rising temperatures associated with climate change, causing drying and degradation of wetlands through increased evapotranspiration, lowering of the water table, and increasing shrub growth (i.e., shrubification), linked to thawing permafrost (Woo 1992; Riordan *et al.* 2006; Carroll *et al.* 2011; see **Threats**).

It is expected that these losses will increase in the future due to removal and degradation of wetlands for industrial development, particularly oil sands and natural gas extraction in western Canada. For example, the oil sands region (OSR) of Alberta currently encompasses 142,000 km², with wetlands representing 45% of this area (64,000 km²; Rooney *et al.* 2012; Ficken *et al.* 2019). A total of 40% of all the wetlands (or 26,000 km²) potentially at risk from development in the OSR correspond to Short-billed Dowitcher breeding habitat (mostly fens). Surface mining, which occurs in 3% of the OSR wetlands, could therefore affect an estimated 800 km² of potential breeding habitat (see **Threats**). Peat mining and critical mineral mining are both expected to increase in the near future, generally in places where the *hendersoni/griseus* DU breeds. Similar to oil sands development, peat mining and critical mineral mining will have severe local impacts, causing habitat loss and degradation (Ng pers. comm. 2024).

Non-breeding habitat

Agricultural intensification in North America has resulted in substantial losses of wetlands. For the *hendersoni/griseus* DU, this is of particular concern during migration in the Great Plains, where the conversion of wetlands to agriculture remains ongoing, although at a slower rate than in the past (Badiou 2013). The majority of agricultural conversion has already occurred, although some wetland drainage and intensification of usage is ongoing, with the former accelerating in some areas in response to recent droughts. For example, in Manitoba, many lakes encroached on croplands during the last wet cycle, but now with the waters receding, these lands have been reconverted to crops (Poole pers. comm. 2024). Some types of large-scale agriculture, such as rice production in California, may benefit migrating dowitchers (Golet *et al.* 2017), although the negative impact of such production (such as pesticide use and conversion to agricultural uses not favourable to migrants) on shorebirds has not been fully assessed.

The extent of suitable habitat at coastal migratory stopover sites and non-breeding sites is declining for both DUs as a result of residential and tourism-related development, the diking of coastal marshes on the U.S. Atlantic Coast to control mosquitoes, and the conversion of mangrove forests on the non-breeding grounds in Mexico and northern Brazil for shrimp farming (Dahl 1990; Rey *et al.* 1991; Shepherd *et al.* 2003; FAO 2007; Dahl 2009; Navedo *et al.* 2015; Jehl *et al.* 2020; see **Threats**).

BIOLOGY

Owing to the remote areas where Short-billed Dowitcher nests, its ecology remains largely unknown. The species account for Short-billed Dowitcher in *Birds of the World* (Jehl *et al.* 2020) is a republished but non-updated version of the 2001 *Birds of North America* account. Although it provides a comprehensive overview of the biology of the species and is the primary reference for this section, it has been supplemented here with citations of more recent research where possible.

Life Cycle and Reproduction

The longevity record for Short-billed Dowitcher based on banding data is 13 years and 3 months (Klimkiewicz and Fitcher 1989); Bird *et al.* (2020) report a maximum of 13.9 years. According to Jehl *et al.* (2020), the maximum lifespan of the species is likely similar to that of Bristle-thighed Curlew (*Numenius tahitiensis*), i.e., 20 years (Marks *et al.* 1990). There is no detailed information on the survival of the Short-billed Dowitcher on its breeding or non-breeding grounds (Jehl *et al.* 2020). Bird *et al.* (2020) have estimated a generation length of four years, taking into consideration age at first breeding, maximum known longevity, and available data on annual adult survival.

Short-billed Dowitcher is socially monogamous (Jehl *et al.* 2020), and typically begins breeding in its first or second spring (Watts *et al.* 2015). Males generally arrive on the breeding grounds on the shores of Hudson Bay and in northern Quebec from mid- to late May, followed by the females a few days later (Jehl *et al.* 2020), at which point courtship begins, involving aerial pursuits and vocalizations from the tops of trees (Burke and Sutherland 2007; Jehl *et al.* 2020).

Nests are on the ground, generally along the edges of sedge (*Carex* spp.) fens or other wetlands, and often among clumps of conifers (Jehl *et al.* 2020). Although no detailed studies have been conducted on nest site fidelity in the species (Jehl *et al.* 2020), breeding philopatry is likely, based on data from adult breeders banded at a study site in Anchorage, Alaska in 2019 and recaptured in 2020, only 20 m from where they were banded (McDuffie pers. comm. 2019).

Short-billed Dowitcher produces a single brood annually, although a second brood may be initiated if the first is lost (Jehl *et al.* 2020). Rousseu and Drolet (2017) estimate that, on average, the first egg is laid at the end of May, although clutch initiation has been reported as occurring in the first week of June in Churchill, Manitoba (Harris 1989) and Schefferville, Quebec (Jehl *et al.* 2020). Clutch size is typically four eggs and the clutch is completed in 4–5 days; incubation takes 21 days on average (Jehl and Hussell 1966). In Yukon, nests with four eggs have been noted from 24 May to 18 June, and newly fledged young from 1 July (Sinclair *et al.* 2003; eBird 2024). Both sexes share incubation duties (Harris 1989). The young are precocial and leave the nest as soon as their plumage is dry. Shortly after the eggs hatch, between the third week of June and the third week of July ($n = 19$ nests; Rousseu and Drolet 2017), the females begin migration, leaving nearly all parental care to the males (Harris 1989). Males remain until the young are able to fly for short distances, at approximately 12–14 days of age (Jehl and Smith 1970).

Data on reproductive success are limited to those obtained in Churchill, Manitoba. Jehl (1971) reported hatching success of 100% ($n = 30$ eggs) in eight nests between 1964 and 1967. For the 1992–1999 period, Jehl *et al.* (2020) reported nest success of 56% ($n = 16$ nests), with 35 of the 36 eggs in successful nests hatching. Data on fledging success is scarce and nearly impossible to measure (Jehl *et al.* 2020).

Dispersal and Migration

Short-billed Dowitcher is a medium- to long-distance migrant, travelling from its boreal breeding grounds to its southern non-breeding grounds, which range from the southern United States to the coastal areas of northern South America (Jehl *et al.* 2020, Figure 1). Fall migration occurs in three waves, with the females leaving as soon as the eggs hatch (beginning in late June), followed by the adult males when brood rearing has been completed (around the third week in July), and the juveniles migrating last (beginning in early to mid-August) (Jehl 1963). Non-breeding adults begin southward migration even sooner, as early as mid-June (Jehl *et al.* 2020). This pattern appears to be consistent across all three subspecies, or both DUs (Jehl *et al.* 2020).

In fall, Short-billed Dowitcher is mainly a coastal migrant (Jehl *et al.* 2020; Birds Canada 2022; for additional details on migration routes, see **Population Spatial Structure and Variability**, and **Designatable Units**). The *hendersoni/griseus* DU migrates along the Atlantic Coast and through Eastern North America (including the Prairies and Mississippi Valley) south to its non-breeding grounds along the Atlantic and Gulf coasts, the east coast of Central America, the northern coast of South America, and in the Caribbean (Birds Canada 2022). In the fall, concentrations of this DU are noted in southern Manitoba, Nova Scotia, and on the north shore of the St. Lawrence River in Quebec (eBird 2024). Few migrants travel through southern Alberta or Saskatchewan (eBird 2024).

The *caurinus* DU overwinters along the Pacific Coast from northern California to Peru (Jehl *et al.* 2020). Fewer *L. g. caurinus* juveniles than adults are reported in fall on the Pacific Coast (Jehl *et al.* 2020). Twenty-five individuals from three Alaska *caurinus* breeding sites were tracked during southbound migration in 2021 and 2022. Tracked birds used the Pacific Flyway, and most (16) took an exclusively coastal route, using bays and sloughs primarily on the coasts of Washington and California as stopover sites. Nine birds used interior sites during at least part of their migration, stopping at interior salt lakes, freshwater lakes, and agricultural fields (USFWS Migratory Bird Division, unpubl. data; Figure 3). Primary stopover sites used by *L. g. caurinus* during fall migration include Cordova, Alaska; the coast of British Columbia; Gray's Harbor, Washington; and Arcata Marsh, San Francisco Bay, and San Diego Bay, California (USFWS, Migratory Bird Division unpubl. data).

Some concentrations of *hendersoni/griseus* DU birds are reported in southern Ontario and Quebec each spring (eBird 2024). The *caurinus* DU migrates north along the Pacific Coast. An adult captured and fitted with a geolocator tag during fall migration in 2010 in Anchorage, Alaska travelled down the Pacific Coast and overwintered in the southern Baja California region of Mexico before returning in spring to the same site in Alaska where it had been captured (Lancot pers. comm. 2020). Large concentrations of *L. g. caurinus* are often reported near Tofino, British Columbia in spring (Drever *et al.* 2016; eBird 2024).

Diet and Foraging Behaviour

The Short-billed Dowitcher's long bill is generally used to capture prey buried in the sand, mud, or shallow water (Jehl *et al.* 2020). It often forages by immersing its entire head in water and repetitively probing deeply with its bill, a motion that has been likened to a sewing machine. During the breeding season, the species feeds on aquatic and non-aquatic invertebrates, primarily insects and their larvae (Johnsgard 1981; Jehl *et al.* 2020). At other times of the year, its diet includes insects (primarily Diptera), molluscs, marine worms, and crustaceans. It sometimes also consumes the seeds of grasses, sedges, and other aquatic plants. In spring, it is known to feed on the eggs of Horseshoe Crab (*Limulus polyphemus*) along the U.S. Atlantic Coast, particularly in Delaware Bay (Jehl *et al.* 2020). At migratory stopovers, Short-billed Dowitcher often feeds in large single-species or mixed-species flocks (Jehl *et al.* 2020).

Interspecific Interactions

In Manitoba, and very likely elsewhere in central Canada, Short-billed Dowitcher are regularly found in flocks with Long-billed Dowitcher during fall migration, as they are in Pacific Canada (Paulson 2005).

Interspecific aggression by Short-billed Dowitcher is generally rare on the breeding grounds, and it often feeds in the company of other species of shorebirds like Hudsonian Godwit (*Limosa haemastica*), Lesser Yellowlegs (*Tringa flavipes*), Dunlin (*Calidris alpina*), and Stilt Sandpiper (*C. himantopus*; Jehl *et al.* 2020). During migration on the Florida coast, McNair (1991) observed agonistic behaviour by Ruddy Turnstone (*Arenaria interpres*) towards Short-billed Dowitcher feeding on Horseshoe Crab eggs.

Research at Churchill, Manitoba identified a number of potential predators of Short-billed Dowitcher, including weasels (*Mustela* spp.), Red Fox (*Vulpes vulpes*), Arctic Fox (*V. lagopus*), Common Raven (*Corvus corax*), Herring Gull (*Larus argentatus*), Parasitic Jaeger (*Stercorarius parasiticus*), Short-eared Owl (*Asio flammeus*), Merlin (*Falco columbarius*), and Canada Jay (*Perisoreus canadensis*; Jehl *et al.* 2020). Short-billed Dowitchers have been observed chasing a Short-eared Owl and a Merlin to protect their broods (Jehl *et al.* 2020). During migration, Peregrine Falcon (*Falco peregrinus*) and other raptors may also be predators.

Home Range and Territory

Detailed data on the average size of breeding territories are scarce (Jehl *et al.* 2020). In the Churchill area, nests were estimated to be 300–400 m apart, with a breeding pair density of generally 1 pair/5 ha (Jehl *et al.* 2000). In central Alberta, the distance between four nests found in the 1920s was 50 m, equivalent to a local density of 1 pair/0.8 ha (Rowan 1932). Consequently, an average territory size for Canada may be in the range of 2–3 ha. An inventory in 2015 and 2016 of breeding shorebirds in eight physiographic strata on the Yukon-Kuskokwim Delta, Alaska, a key part of the breeding range of the *caurinus* DU, estimated 39,847 individuals (95% CI: 18,131; 61,564), equivalent to a breeding density of 0.7 individuals/km² (Lyons *et al.* 2024).

Behaviour and Adaptability

Short-billed Dowitcher primarily inhabits natural habitat, but during migration and on the non-breeding grounds, it shows a certain amount of adaptability by using human-constructed wetlands such as sewage lagoons (eBird 2024), shrimp farms, salinas (i.e., salt pans or salt lakes; Navedo *et al.* 2015, 2017), and artificial hunting ponds (Wege *et al.* 2014).

POPULATION SIZES AND TRENDS

Sampling Effort and Methods

Population size estimates

Population size estimates have been published by the Canadian Wildlife Service, which has been active in monitoring overwintering shorebirds in northern South America since the 1980s. Exhaustive aerial inventories of 28,000 km of coastline were conducted in the 1980s (Morrison and Ross 1989), and in the late 2000s (Morrison *et al.* 2012). Field surveys and targeted observations in the Canadian range of *caurinus* provided an updated estimate of population size for this DU (see also **Other trend estimates**).

Trend estimates

Trend estimates for Short-billed Dowitcher are primarily derived from data collected during migration as part of the ISS (Government of Canada 2015). The 10-year trend for the species' entire range has also recently been estimated using eBird data (Fink *et al.* 2023).

The breeding range of Short-billed Dowitcher is only sparsely covered by the Breeding Bird Survey, given the vastness of the boreal forest and bogs where it breeds and the generally poor accessibility of this range (Jehl *et al.* 2020). Range-wide BBS trend estimates are therefore not available. Data sources are detailed below.

International Shorebird Survey (ISS)

The ISS (Brown *et al.* 2001) includes the Atlantic Canada Shorebird Survey (ACSS; Donaldson *et al.* 2000) and the Ontario Shorebird Survey (OSS), as well as a network of sites elsewhere in Canada and abroad. In the mid-1970s, the Manomet Center for Conservation Sciences in the United States launched the ISS and Environment Canada launched the ACSS and OSS to gather information on shorebird numbers and the wetlands they use. Since 1974, over 100,000 surveys have been conducted by volunteers, with roughly 1,300 surveys conducted each year. Surveyors are asked to census a site three times a month during the key migration periods in spring and fall, following ISS guidelines. These surveys are used to monitor trends in the relative abundance of shorebirds during migration at the regional and continental scales. The integrated analysis of survey data provides trend data and annual indices for 37 shorebird species, including Short-billed Dowitcher. Because the surveys document migrants, counts at a site vary dramatically over time, and the timing of peak passage varies among species. In contrast to previous ISS analyses based on mean peak counts, the current analytical approach uses raw counts during the peak (i.e., central 90%) of the species-specific migration period (Brown *et al.* 2001). Smith *et al.* (2023) modelled ISS counts at each survey site using a hierarchical Bayesian model that estimated smooth nonlinear patterns of population change with additional random annual fluctuations.

Surveys of southbound migrants provide moderately reliable trend data, at least for the *hendersoni/griseus* DU (Cyr and Larivée 1995). High numbers of Short-billed Dowitchers are recorded, but counts vary markedly from year to year, in part because observers may have difficulty distinguishing between Short-billed and Long-billed Dowitchers, two similar species that may occur together at the same time and at the same survey sites in the Prairie and Great Lakes regions (Ross *et al.* 2012; Government of Canada 2015). There is some uncertainty about how representative ISS trends are for the entire DU, particularly as the survey does not cover birds migrating through the mid-continent (Government of Canada 2015; Artuso pers. comm. 2024). *L. g. caurinus* is poorly covered by ISS (Brown *et al.* 2001; Smith and Smith unpubl. data; Figures 4 and 5).

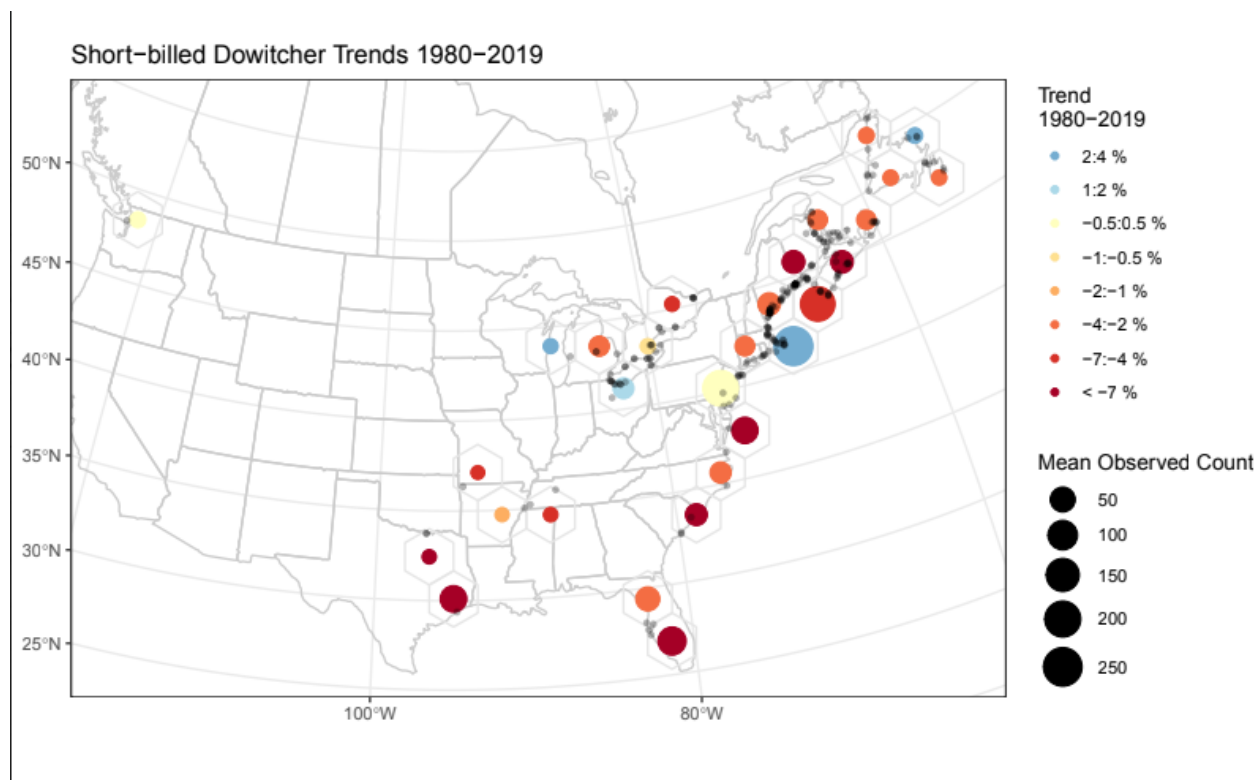


Figure 4. Long-term (1980–2019) average annual population trends for Short-billed Dowitcher at ISS fall migration survey sites in Canada and the United States (A. Smith and P. Smith unpubl. data).

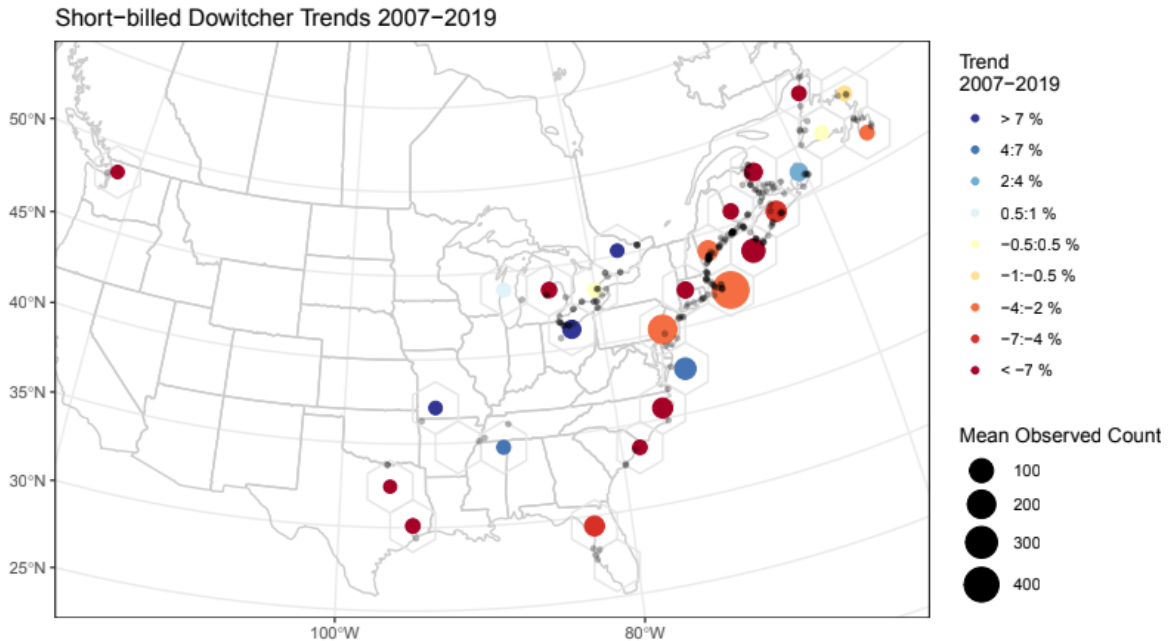


Figure 5. Short-term (2007–2019; equivalent to three generations) average annual population trends for Short-billed Dowitcher at ISS fall migration survey sites in Canada and the United States (A. Smith and P. Smith unpubl. data).

eBird

eBird data were used to estimate the cumulative change in estimated relative abundance in 27 km x 27 km cells across North and Central America during the non-breeding period (25 October–15 March, 2011–2021; Fink *et al.* 2023). For cell-level trends, each cell shows a cumulative trend that represents the average rate of change in relative abundance in this cell for this period. Cumulative change in estimated relative abundance was summarized by providing the percentage of all sites at which the species increased, decreased, or showed no trend, for sites with a relative abundance greater than or equal to 0.5 (Table 2). All sites on the west coast of North and Central America were assigned to the *caurinus* DU, and those located on the Atlantic Coast, including the Caribbean, to the *hendersonii/griseus* DU. Relative abundance is the count of individuals detected on a one-hour-long, 2-km travelling checklist at the optimal time of day; relative abundance predictions are optimized for user skill and hourly weather conditions, specific for the given region, season, and species, in order to maximize detection rates. For each species, relative abundance was estimated for all 52 weeks of the year across a regular spatial grid with a density of one site per 3 km x 3 km (Fink *et al.* 2023). Fink *et al.* (2023) also aggregated these results to generate 10-year range-wide trends (i.e., not separated to DU or subspecies) for wintering Short-billed Dowitcher (also 25 October–15 March, 2011–2021).

Other trend estimates

Recent monitoring of migration stopover sites along the Pacific Coast of the Americas from Canada to Peru—led by the Migratory Shorebird Project of Point Blue Conservation Science—has produced 10-year trends for Long-billed and Short-billed Dowitcher combined (“dowitcher spp.”; 2013–2023; Reiter unpubl. data). Although not designed to assess trends per se, field surveys (2022) and targeted observations by experienced birders and contracted professionals (since 2020) carried out in the Canadian breeding and migratory range of *L. g. caurinus* have provided information on trends in this DU in Canada and allowed for an updated estimate of population size. The Canadian breeding range of this DU is small, extending from the Alaska border into southwestern Yukon and northwestern B.C., and is almost entirely within about 200 km of Whitehorse, overlapping with most of the Yukon’s human population (Sinclair pers. comm. 2024).

An earlier study conducted in Tofino, British Columbia, compared counts of migrating *L. g. caurinus* from 2011 with historical data collected in 1988–1989 and 1995 (Drever *et al.* 2016). Inventories of *L. g. caurinus*, carried out by Matz *et al.* (2011) at four sites in Kachemak Bay, an important migration stopover site in Alaska, were compared with count data from the same sites in 1986–1994 (Matz *et al.* 2011).

Abundance

Data on breeding density is currently lacking in Canada. The abundance of Short-billed Dowitcher is best estimated when birds are concentrated at migratory stopovers and wintering sites, rather than when dispersed over the breeding grounds. The reliability of counts can be limited by the difficulty in distinguishing between Short-billed Dowitcher and Long-billed Dowitcher during migration surveys, particularly on the Pacific Coast, as well as in the Prairie and Great Lakes regions and at non-breeding sites where Long-billed Dowitchers are abundant (Morrison *et al.* 2001; Jehl *et al.* 2020).

Donaldson *et al.* (2000) provided the first estimate of the size of the Canadian population of Short-billed Dowitcher at 320,000 breeding individuals (92% of the total North American population of 348,000). Morrison *et al.* (2006) proposed a much lower estimate of 153,000 breeding individuals in North America following Jehl *et al.* (2001); this comprised 78,000 mature individuals of *L. g. hendersoni* and *L. g. griseus* combined (i.e., the *hendersoni/griseus* DU). These estimates were retained by Andres *et al.* (2012) in their updates to shorebird population sizes. As the Jehl *et al.* (2001) estimates are based on field surveys from the 1980s and 1990s, the population estimates for this species are more than 25 years out of date. Population declines have been ongoing since the 1980s (Table 1), meaning current numbers will be much reduced.

Table 1. International Shorebird Survey trends for Short-billed Dowitcher (*hendersoni/griseus* DU; P.A. Smith and A.C. Smith, Environment and Climate Change Canada, unpubl. data).

Start Yr.	End Yr.	Trend_type	Trend	lci	uci	% Change	% Change lci	% Change uci	Mean Abundance	Mean Observed	Mean No. Surveys
1980	2019	Long-term	-4.78	-6.64	-2.79	-85.24	-93.14	-66.89	9.75	34.77	837.35
1980	1995	First 15-year	-5.26	-9.94	-0.90	-55.54	-79.21	-12.67	15.38	38.47	904.06
1995	2007	Prev. 3-gen	-1.60	-5.59	2.93	-18.55	-49.87	41.43	7.63	40.88	919.92
2004	2019	15-year	-6.41	-11.48	-1.49	-62.81	-83.96	-20.17	5.10	31.55	689.31
2007	2019	Recent 3-gen	-7.19	-13.29	-1.32	-58.94	-81.93	-14.74	4.60	23.66	676.54

Table 2. eBird trends for Short-billed Dowitcher estimated by the cumulative change in estimated relative abundance within 27 km x 27 km cells from 25 October to 15 March (2011–2021). Data are summarized only for circles with relative abundance ≥ 0.5 . From Fink *et al.* (2023).

DU	Number and percent of circles with decreasing trend ($\geq 20\%$)	Number and percent of circles with increasing trend	Number and percent of circles with uncertain trend*	Total number of regions assessed
<i>hendersoni/griseus</i>	39 (50.6%)	3 (0.04%)	35 (45.5%)	77
<i>caurinus</i>	21 (29.6%)	0	50 (70.4%)	71

*Region where the trend estimate is not significantly different from zero (i.e., the 80% confidence interval contains zero).

According to Morrison *et al.* (2006), the estimated size of the global population of the *caurinus* DU is 75,000 mature individuals; again, this estimate is based on the figures in Jehl *et al.* (2001). About 80% of the *caurinus* DU is thought to breed in Alaska (Alaska Shorebird Group 2019); based on this, the number of mature individuals in Canada is approximately 15,000 mature individuals. However, it should be noted that these values for population size and percent occurrence in *L. g. caurinus* are derived from population-specific estimates using unpublished data, and reflect a high degree of uncertainty (Alaska Shorebird Group 2019). More recently, Lyons *et al.* (2024) estimated about 40,000 breeding individuals spread over a significant portion of the species' Alaska range (see **Home Range and Territory**). In addition, Sinclair (pers. comm. 2024) has suggested that less than 5% of the global population of this DU now breeds in Canada (see **Fluctuations and Trends**), resulting in an estimate of the current breeding population of Canada of

approximately 1,000 to 3,000 mature individuals, with the actual population size most likely at the lower end of that range, or fewer (Sinclair pers. comm. 2024). This is consistent with the results of a ranking workshop for bird species held by the Yukon Conservation Centre in 2014, which estimated “50–1,000 [Short-billed Dowitchers] but most likely fewer than 300” (Bennett pers. comm. 2024); evidence for continued breeding in British Columbia is equivocal (see **Other trend estimates**), so the estimate for Yukon is likely representative of the entire Canadian population.

Fluctuations and Trends

International Shorebird Survey (ISS)

Data from only one site surveyed in the ISS (located on the north coast of Washington State adjacent to the Canada–U.S. border) were used in calculating the trend for the *caurinus* DU, although a handful of other sites are monitored in the region. Over the short-term (three generations) period of 2007–2019, the trend for this DU shows a severe decline, exceeding 7% per year, or a three-generation decline of at least 59% (Figures 4 and 5; Smith and Smith unpubl. data). It should be noted, however, that due to the nature of the Bayesian model (see **International Shorebird Survey [ISS]**), regional or local sites with highly imprecise trend estimates will more closely reflect trends at neighbouring sites—in this case, sites used by *hendersoni/griseus* individuals—which is likely occurring here (P. Smith pers. comm. 2024). Although this trend should be interpreted with caution, other studies in the range of *caurinus* also indicate steep declines (see **eBird** and **Other trend estimates**).

The most recent analyses of ISS data from survey sites in eastern and central Canada and the United States were used to obtain trends for the *hendersoni/griseus* DU for the periods 1980–2019 (long-term) and 2007–2019 (short-term, equivalent to three generations; Figures 4–6; Table 1; Smith and Smith. unpubl. data; Smith *et al.* 2023). The overall long-term trend was -4.78% (95% CI: -6.64, -2.79) per year, corresponding to a decline of 85% (-93.14, -66.89) over that period (Table 1). In addition, the modelled mean annual count for North America has declined over time (Figure 6). The short-term trend (2007–2019) was -7.19% (-13.21, -1.32) per year, corresponding to an overall three-generation decline of 58.94% (-81.93, -14.74; Table 1). These long- and short-term trends are among the steepest recorded for the 28 species of shorebirds included in Smith *et al.* (2023), and the most recent three-generation trend for Short-billed Dowitcher is more negative than the one preceding it (Smith *et al.* 2023).

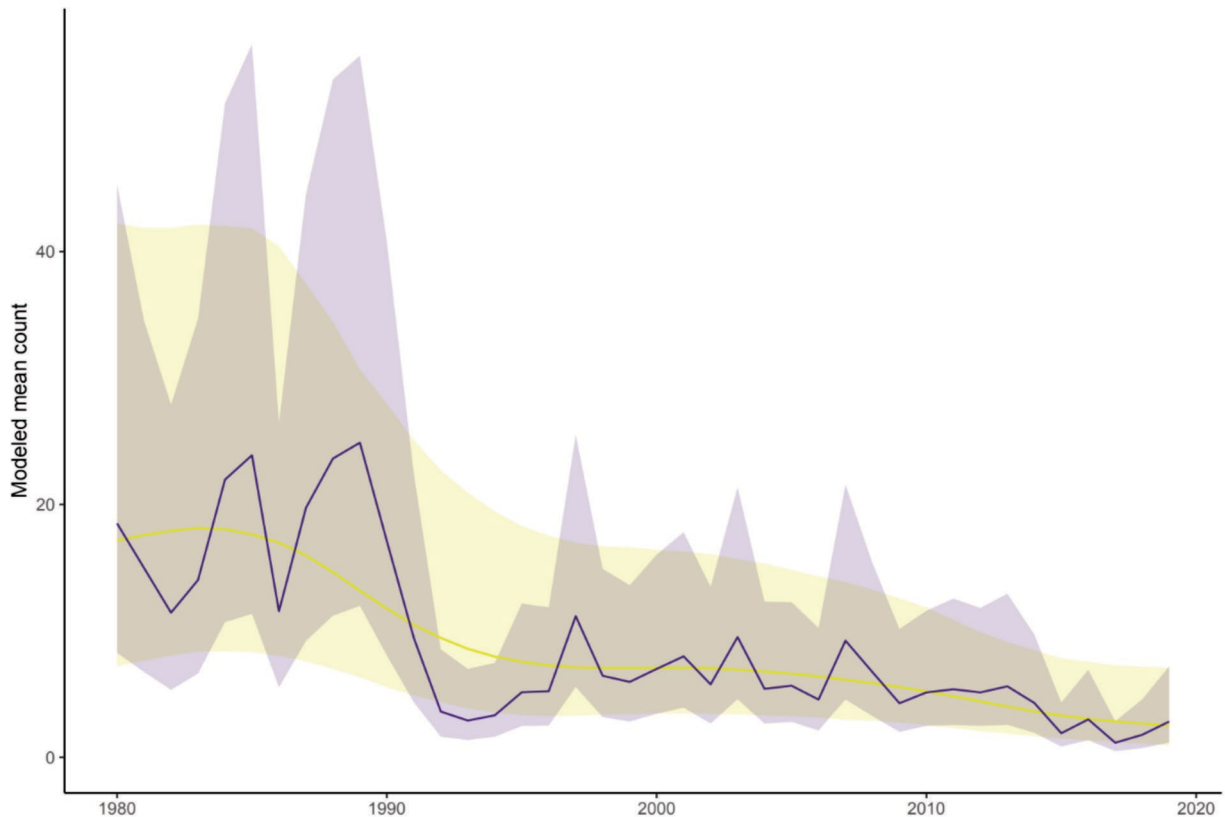


Figure 6. Modelled mean counts of Short-billed Dowitchers in the ISS in North America between 1980 and 2019 (A. Smith and P. Smith unpubl. data; Smith *et al.* 2023); this represents the trend for the *hendersoni/griseus* DU. The model estimates the overall population trajectory as an additive combination of a smooth term that tracks medium- and long-term change (shown here by the yellow line and the yellow band, which represents the uncertainty). The purple line represents the annual fluctuations around the smoothed line and tracks broad-scale variations in a given year (the purple line is the sum of the annual fluctuations and the smooth yellow line). The trends for the species are derived from the yellow line, because it provides the best estimate of medium- and long-term change. The shaded areas correspond to the 95% credible interval.

eBird

Trends from eBird data show a significant decline in estimated relative abundance across the non-breeding range of the species (both DUs combined; 25 October–15 March; -20.5%; 80% CI: -14.5, -21.4; Fink *et al.* 2023), although these trends are only calculated for 10 years (2011–2021). The cumulative trend along the Pacific Coast, where the *caurinus* DU winters, is declining (exceeding -20%) for 29.5% of all assessed cells (Fink *et al.* 2023; Table 2). There are no cells with an increasing trend and 70.4% of all cells show a non-significant trend. On the Atlantic Coast, where the *hendersoni/griseus* DU winters, the cumulative trend for 50.6% of all cells assessed (77 cells) exceeds (is more negative than) -20% while only 0.04% of the cells show an increasing trend. Non-significant trends on the Atlantic coast account for 45.5% of all cells (Table 2).

Other trend estimates

On the breeding grounds, a comparison between past and recent field surveys of *L. g. caurinus* in northwestern B.C. and Yukon provide more evidence for a decline in the abundance of this DU. Recent field studies (i.e., since 2022), using area searches and automated recording units in known nesting habitat in these two jurisdictions, found the species to be very scarce (Sinclair unpubl. data). In Chilkat Pass, B.C., Weeden (1960), Miller *et al.* (1983), and Campbell *et al.* (1990) found Short-billed Dowitcher to be a “common” nester. However, although there were a few detections on 4 of the 11 recording units deployed in northwest B.C. in 2022 (total of 8 detections between 20 May and 18 June, and 1 on 30 July), there has not been a direct observation there since 2014 (eBird 2024; Sinclair pers. comm. 2024). In Yukon, although three former breeding sites (Crag Lake, Swan Lake and Judas Creek) also had “a few” detections on recording units (and nesting was confirmed near Crag Lake and at Nares Lake), several former sites (e.g., Shallow Bay) have not had confirmed or probable breeding for decades, despite continued or increased observation coverage (Fraser 2015; Sinclair unpubl. data). The number of migrants recorded at staging areas is also very low now (max. count = 6 birds in the last decade vs. several counts of 20 or more during the 1979–2003 period; Sinclair unpubl. data).

Point Blue Conservation Science’s Migratory Shorebird Project recently provided an estimated 10-year trend of -4% annually for “dowitcher spp.” on the non-breeding grounds along the Pacific Flyway (95% CI: -0.07, -0.01) in 2013–2023 (Reiter unpubl. data); this is equivalent to a 39% decline over three generations.

Studies ending just outside the most recent three-generation period also show steep declines for the *caurinus* DU. Surveys carried out by Matz *et al.* (2011) at an important migration stopover site in Alaska (Kachemak Bay) show a decline of over 90% between 1990 and 2010 (average of intensive counts = 460 birds in 1986–1994 versus 33 birds in 2010–2011 for this period). Individuals from the *caurinus* DU migrating south through mudflats in Tofino, British Columbia, showed a significant decline of 4% annually between 1988 and 2011 (Drever *et al.* 2016).

Summary of Population Trends

At one ISS site for the *caurinus* DU, short-term trends show a three-generation (2007–2019) decline exceeding (more negative than) 7% per year (or a total of at least 59% over that time period), and recent monitoring along the Pacific Flyway shows a three-generation decline of 39% for “dowitcher spp.” (both species combined), while field surveys targeting breeding *caurinus* in British Columbia and Yukon suggest the species now only occurs in low numbers in its Canadian range. Outside the recent three-generation period, a significant decline for this DU occurred at another site (Tofino, B.C.) between 1988 and 2011, and a decline of > 90% was documented at a key migration stopover site in Alaska between 1990 and 2010.

Recent long-term trend analyses of ISS data show that the *hendersoni/griseus* DU has declined substantially over the long term, with an estimated drop of 58.94% over the past three generations. These results are broadly consistent with eBird trends for the non-breeding season over 10 years (2011–2021; 25 October to 15 March), which indicate a generalized decline across North and Central America.

These trends occur against a backdrop of earlier long-term declines resulting from widespread hunting by European settlers. An account by Smith (1874) from Maine is cited in NatureServe (2024) as being illustrative of the historical abundance of Short-billed Dowitcher in at least part of its range: “May 25, 1868 was the largest flight I ever saw. They extended from horizon to horizon, and the flight lasted over three hours six miles out at sea (at right angles with their course) . . . This body of birds must have been 12 or 15 miles wide and 100 long. They did not ‘darken the air,’ but were in bunches from a dozen to several hundred, and were visible in all directions.”

Rescue Effect

For the *caurinus* DU, exchange of individuals between breeding sites in western Canada and Alaska seems likely given the strong migratory abilities of the species. Any individuals dispersing into Canada from the Alaskan breeding grounds would be well adapted to survive and reproduce in western Canada due to the similar habitat and environmental conditions. Nevertheless, rescue is considered unlikely, as the potential source population in Alaska is declining markedly (Matz *et al.* 2011; Fink *et al.* 2023).

There is no potential for rescue of the *hendersoni/griseus* DU as the DU is endemic to Canada.

THREATS AND LIMITING FACTORS

Threats

Short-billed Dowitcher is vulnerable to the cumulative effects of various threats throughout its annual cycle. Because information on the threats to Short-billed Dowitcher is primarily available at either the subspecies or species level, threats were assessed separately for *L. g. hendersoni*, *L. g. griseus*, and *L. g. caurinus*, rather than by DU (Appendices 1–3); threats are described below by DU where information allows. Threats are categorized here following the IUCN-CMP (International Union for the Conservation of Nature – Conservation Measures Partnership) unified threat classification system (based on Salafsky *et al.* 2008). They are listed in order of decreasing severity of impact by Level 1 threat, and then in numerical order. Threats considered to have a Negligible impact are discussed only in Appendices 1–3.

The overall threat impact is considered to be Medium for *L. g. caurinus* (*caurinus* DU), Medium for *L. g. hendersoni*, and High for *L. g. griseus*. These impacts are expected to correspond to the lower or middle range of the predicted declines associated with these scores, since the majority of the identified threats have a Low impact and some threats could be mitigated by conservation actions. Nonetheless, it is plausible that the recent steep declines may continue.

IUCN 5: Biological Resource Use (Medium threat impact for *L. g. griseus*, Low for *L. g. hendersoni* and Negligible for *L. g. caurinus*)

*IUCN 5.1: Hunting & Collecting Terrestrial Animals (Medium threat impact for *L. g. griseus*, Low for *L. g. hendersoni* and Negligible for *L. g. caurinus*)*

Description of threat:

In the nineteenth century, Short-billed Dowitcher was intensively hunted along the coasts of North and South America during fall migration and on the species' non-breeding grounds (Bent 1962; Wege *et al.* 2014; AFSIHWG 2016; NatureServe 2024). This is believed to have caused a steep population decline, followed by a partial rebound in the mid-twentieth century (Jehl *et al.* 2020). However, the species continues to be hunted, primarily for sport and subsistence, in the Caribbean region and in South America (Ottema and Spaans 2008; Andres 2016, 2017; Lévesque Birding Enterprise 2016; Office national de la chasse et de la faune sauvage de Guadeloupe 2017), where it has been described as one of the most heavily harvested shorebird species in some areas (NatureServe 2024). In Barbados, Short-billed Dowitcher is considered to be one of the six most frequently hunted species of shorebirds (Wege *et al.* 2014). However, sport hunting in Barbados declined between 2000 and 2015 owing to declining interest, increased costs of maintaining hunting ponds, new restrictions on the possession of firearms, and local governments' desire to increase the number of wildlife preserves without hunting (Andres 2016). In addition, in 2008, BirdLife International, in collaboration with the Barbados Wildfowlers Association, the Canadian Wildlife Service, and the U.S. Fish and Wildlife Service, introduced conservation measures in an effort to ensure that the shorebird harvest in Barbados was sustainable and would not cause negative impacts on the populations being harvested. The purpose of the proposed measures was to educate hunters and encourage responsible hunting rather than forbidding the hunt altogether, and to regulate the take of some species. For example, hunting clubs in that country have established stricter bag limits for the Short-billed Dowitcher. In French Guiana in 2015, the government established regulations on the possession of firearms and hunting licences (Andres 2017). In Martinique and Guadeloupe, the Short-billed Dowitcher harvest was closed for the 2022–2023 hunting season, and there is now a 20 shorebird per day quota (Laliberté pers. comm. 2024). Prior to the 2022–2023 season in Martinique, Short-billed Dowitchers were among the five most hunted waterbirds of the 13 allowed species. The species could be hunted in nine hunting reserves totalling 5,000 ha over a period of 205 days (end of July to mid-February; Lévesque Birding Enterprise 2016). The impact of hunting is thought to be greatest in Suriname (AFSI Harvest Working Group 2020; NatureServe 2024). Some subsistence harvest of shorebirds occurs in Alaska, i.e., the range of the *caurinus* DU.

Scope:

A stable isotope analysis of Short-billed Dowitchers harvested in Barbados indicates that these birds come primarily from the breeding grounds along the coast of Hudson Bay and James Bay, in Ontario and Manitoba (i.e., mostly presumed to be *L. g. hendersoni*), as well as from north-central Quebec (i.e., *L. g. griseus*; Reed *et al.* 2018). The scope is estimated to be Small for *L. g. hendersoni* and Large for *L. g. griseus*, reflecting the proportion of the population likely passing through regions where hunting occurs regularly. For *L. g. caurinus*, the scope is considered Negligible, as hunting pressure has not been documented along the Pacific Coast of the United States, Mexico, and Central America, and the subsistence harvest in Alaska is thought to be small (Naves and Keating 2018).

Severity:

Bag limits for Short-billed Dowitcher range from no limit (e.g., Trinidad and Tobago and Saint-Pierre and Miquelon) to 2,500 birds/swamp in Barbados, where the Short-billed Dowitcher harvest is estimated to comprise 4–11% of the total annual shorebird harvest (i.e., roughly 700–2,400 out of 20,000 harvested birds; Wege *et al.* 2014). Before recent changes to harvest regulations, the total additional annual harvest of Short-billed Dowitchers throughout the Caribbean and northern South America was possibly around 1,400 to 4,800 birds, as the harvest in these other regions was estimated to be at least equal to the take in Barbados (Laliberté, pers. comm. 2020). Short-billed Dowitcher was not among the species found in shorebird markets in eastern Guyana (Andres *et al.* 2022). The average sustainable harvest in the Caribbean has been estimated at between 3,038 and 7,171 birds annually (Watts *et al.* 2015). Severity for *L. g. hendersoni* and *L. g. griseus* is considered to be Moderate given the number of birds hunted annually in relation to population size, but may have diminished with the new regulations. However, the effectiveness of and compliance with regulations and the intensity of compliance monitoring presumably varies by country. Severity for *L. g. caurinus* is likely Negligible, as hunting mortality is thought to be insufficient to cause population change.

IUCN 1: Residential & Commercial Development (Low threat impact for *L. g. hendersoni*, *L. g. griseus*, and *L. g. caurinus*)

*IUCN 1.1: Housing & Urban Areas (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)*

Description of threat:

Habitat loss and degradation due to urban and road development affects mainly migration stopover areas and non-breeding season sites, particularly on the Pacific and Atlantic coasts of the United States, where this threat is responsible for the loss of coastal habitats (i.e., beach stabilization, the filling and draining of intertidal wetlands and lagoons, and the diking of marshes to control mosquitoes) (Rey *et al.* 1991; Brockmeyer *et al.* 1997; Shepherd *et al.* 2003; Ducks Unlimited 2005; Dahl 2009; Jehl *et al.* 2020). Extensive

losses of coastal wetlands have occurred in the United States as a result of urban development, including nearly half of the marshes that existed in 1900 along the Atlantic and Gulf coasts (Dahl 1990, 2009), and this threat continues, although at a smaller scale. Expansion of residential development and associated shoreline stabilization in the Great Lakes region may also affect stopover sites (Environment Canada and United States Environmental Protection Agency 2007). Urban development is a significant threat on the coasts of Mexico and northeastern Brazil where mangrove forests are being converted into residential areas (Wilke and Johnston-González 2010).

Scope:

The scope is considered Small for all three subspecies, as much of the habitat loss affecting Short-billed Dowitcher is historical, but remains ongoing in various locations.

Severity:

Given the dependence of Short-billed Dowitcher on key stopover sites during migration (Gratto-Trevor *et al.* 2011), their loss or degradation could impact survival to a “Slight” extent, i.e., a population reduction from this threat of 1–10% over three generations.

IUCN 1.3: Tourism & Recreation Areas (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Ongoing development of hotel resorts and other tourism facilities at sites along coastlines and estuaries in the non-breeding range and at southern migratory stopover areas could impact Short-billed Dowitcher by altering its feeding and resting habitats.

Scope:

The scope is considered Small for all three subspecies, as much of the habitat loss affecting Short-billed Dowitcher is historical, but remains ongoing in various locations.

Severity:

Given the dependence of Short-billed Dowitcher on key stopover sites during migration (Gratto-Trevor *et al.* 2011), their loss or degradation could impact survival to a “Slight” extent, i.e., population reduction from this threat of 1–10% over three generations.

IUCN 2: Agriculture & Aquaculture (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)

*IUCN 2.1: Annual & Perennial Non-Timber Crops (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)*

Description of threat:

Short-billed Dowitchers migrating along the Central Flyway in North America are dependent on Prairie wetlands to meet their energy demands. However, agricultural intensification in North America has resulted in wetland losses, particularly in the Great Plains. Although the majority of agricultural conversion has already occurred (see Salt and Salt 1976), some draining of wetlands and intensification of usage is ongoing, with the former accelerating in some areas in response to recent droughts (Skagen *et al.* 2008).

Scope:

This threat primarily affects *L. g. hendersoni*, with a greater proportion of the subspecies likely exposed to it to some extent within the next ten years; therefore, the scope is considered Restricted. The scope is likely to be Small for both *L. g. caurinus* and *L. g. griseus*, which have minimal exposure to agricultural landscapes.

Severity:

The severity of this threat is expected to be Slight for all three subspecies, as the impact of habitat losses in the next decade will probably be only incrementally greater than that of past losses.

*IUCN 2.4: Marine & Freshwater Aquaculture (Low threat impact for *L. g. hendersoni*, *L. g. griseus*, and *L. g. caurinus*)*

The substantial expansion of shrimp farming at migration and non-breeding sites is reducing the quality and availability of mangrove forests and adjacent intertidal habitats used by Short-billed Dowitcher (Valiela *et al.* 2001; Jehl *et al.* 2020). In Central America, these habitat losses are mainly affecting natural salt flats that are key roosting sites for dowitchers and other shorebirds (Morales *et al.* 2019). However, in Latin America as a whole, nearly 800,000 ha of mangrove forests are estimated to have been destroyed between 1980 and 2005, with the greatest losses believed to be in Mexico, Colombia, and Brazil (Food and Agriculture Organization of the United Nations 2007). Shrimp farming continues to expand along the Atlantic and Pacific coasts of Latin America (Food and Agriculture Organization of the United Nations 2007), notably in estuaries used heavily by the Short-billed Dowitcher (eBird 2024). The consequences of this threat include the direct loss of habitat (i.e., destruction of salt marshes and mangrove forests), as well as the alteration of the biological and physical processes associated with tidal cycles, significant changes in nutrient cycling, and an increase in contaminated effluents (Navedo *et al.* 2015). On the northwestern coast of Mexico, although the two species of dowitcher feed at

shrimp farms with semi-intensive production (i.e., where certain natural processes are maintained), they prefer to forage in natural intertidal habitats at low tide, and avoid shrimp farms that do not maintain any natural processes (Navedo *et al.* 2015). At Banco dos Cajuais, in Northern Brazil, Short-billed Dowitchers (*hendersoni/griseus* DU), which winter in good numbers at the site, appeared to use natural and altered tidal flats (i.e., salinas and aquaculture ponds) equally (Paquet pers. comm. 2022). It is not known, however, how these altered non-breeding habitats impact birds' energy intake and northbound migration.

Scope:

The scope is deemed Restricted–Small and Large–Restricted for *L. g. hendersoni* and *L. g. griseus*, respectively, as the threat potentially affects substantial sections of coastline in North and South America used by the *hendersoni/griseus* DU during migration and in winter. The scope for the *caurinus* DU is Large, given ongoing habitat loss to aquaculture in the non-breeding range of this subspecies.

Severity:

Substantial losses have already occurred in much of the non-breeding range, but intensifying management practices could also be a concern. The severity is deemed Slight for all three subspecies.

IUCN 3: Energy Production & Mining (Low threat impact for *L. g. hendersoni* and *L. g. griseus*)

*IUCN 3.2: Mining & Quarrying (Low threat impact for *L. g. hendersoni* only)*

Description of threat:

Oil sands extraction, which involves surface mining techniques, in large wetland complexes in Alberta is known to negatively impact the breeding habitat of *L. g. hendersoni*; Rooney *et al.* 2012; see **Habitat trends**). Mining of both peat and critical minerals is expected to increase in places where the *hendersoni/griseus* DU breeds, although little information is currently available on this threat. As with oil sands development, these activities will cause localized habitat loss and degradation (Ng pers. comm. 2024).

Scope:

The scope is considered Small as this threat only affects a small part of this DU.

Severity:

Severity is considered Moderate–Slight, with the impact depending on the ability of displaced individuals to seek suitable breeding habitat elsewhere.

IUCN 3.3: Renewable Energy (Unknown threat impact for L. g. hendersoni; Low threat impact for L. g. griseus)

Description of threat:

Wind farms located across the Prairies and proposed marine wind farm projects on migration routes along the Eastern Seaboard of the U.S. and in the non-breeding range (e.g., northeastern Brazil; 4 C offshore 2021) could pose a mortality risk to migrating and non-breeding Short-billed Dowitcher in those regions (*hendersoni/griseus* DU).

Scope:

The scope is estimated to be Small for *L. g. hendersoni* and Restricted for *L. g. griseus*, given the likelihood of each population encountering renewable energy projects at some point in their annual cycle.

Severity:

The severity is undocumented and thus rated Unknown for *L. g. hendersoni*, and is considered to be Slight for *L. g. griseus* given the known potential for direct mortality.

IUCN 6: Human Intrusions & Disturbance (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

IUCN 6.1: Recreational Activities (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Short-billed Dowitcher is vulnerable to human disturbance along coastlines during migration and winter, with disturbances including ATVs, drone flights, off-leash dogs, direct human disturbance, and kite surfing (Drever *et al.* 2016; Murchison *et al.* 2016; Mobley *et al.* 2022). Repeated human disturbance of shorebirds along the coasts during migration can adversely affect feeding and resting birds by altering their behaviour and affecting their energy budget (Burger *et al.* 1995; Sitters 2001; West *et al.* 2002; Blanco *et al.* 2006).

Scope:

Scope is likely Large to Pervasive for *L. g. hendersoni*, *L. g. griseus*, and *L. g. caurinus* (i.e., *caurinus* and *hendersoni/griseus* DUs), given the likelihood of migrants encountering human disturbance from recreation at some point during migration along the Pacific, Atlantic, or Gulf coasts, or in the Caribbean.

Severity:

Frequent and intense disturbance causes displacement, with implications for energetics, but evidence does not support severity being greater than Slight for all three subspecies.

IUCN 7: Natural System Modifications (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)

*IUCN 7.1: Fire & Fire Suppression (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)*

Description of threat:

Climate change is increasing the frequency and severity of forest fires and the length of the fire season in Canada's boreal forest (Soja *et al.* 2006; Price *et al.* 2013). This includes a greater risk of high-intensity fires in boreal peatlands (Wilkinson *et al.* 2018; Helbig *et al.* 2020) where Short-billed Dowitcher nests.

Scope:

Within the next decade, the scope of the population affected by fire is likely Small for all three subspecies, i.e., for both DUs.

Severity:

Severity is assessed as ranging from Slight to Moderate for both DUs: adult Short-billed Dowitchers are likely able to flee forest fires, but there may be some impact on eggs and on juveniles not yet capable of flight, and thus cumulative effects on productivity.

*IUCN 7.2: Dams & Water Management/Use (Low threat impact for *L. g. hendersoni* only)*

Description of threat:

Future hydroelectric development projects are being considered in Ontario (Northern Ontario Business 2022); the flooding of the boreal forest, and especially peatlands, in this region would reduce the amount of breeding habitat for the *L. g. hendersoni* subspecies. Increasing agricultural drainage is addressed under Threat 2.1 (**Annual & Perennial Non-Timber Crops**).

Scope:

Given the proportion of the breeding range of *L. g. hendersoni* that this project would likely affect, the scope is considered Small.

Severity:

Severity is most likely Slight but could be as high as Moderate, depending on the availability of suitable habitat elsewhere.

IUCN 7.3: Other Ecosystem Modifications (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

A range-wide reduction of prey availability as a result of pollution and other factors (e.g., decline of the Horseshoe Crab population in Chesapeake Bay due to a food fishery and harvest for medical purposes) likely affects almost all individuals (Sitters 2001). Shoreline hardening to reduce coastal erosion in northern South America (especially Guyana) can also reduce the extent and quality of shoreline habitat available to dowitchers and other shorebirds for roosting and foraging (Seitz *et al.* 2006).

Scope:

The scope is considered Pervasive for all three subspecies (or both DUs), as nearly all individuals are likely to be exposed to reduced prey availability at some point in their life cycle.

Severity:

There are uncertainties about the severity of this threat; it is known to be problematic but there is limited specific evidence on its extent. Therefore, the severity is judged to be Slight for all three subspecies.

IUCN 8: Invasive & Other Problematic Species & Genes (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

IUCN 8.1: Invasive Non-Native/Alien Species/Diseases (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Predation or persistent disturbance of (and resulting energetic impacts to) shorebirds by feral cats and dogs on beaches on the non-breeding grounds can negatively impact Short-billed Dowitcher (Tibbitts and Moskoff 2014; Mobley *et al.* 2022; disturbance by domestic dogs accompanying their beach-using owners is addressed in 6.1). Although there is no evidence of feral cats or dogs killing dowitchers, there are records of cats killing other shorebirds on the non-breeding grounds (Tibbitts and Moskoff 2014). In northern Brazil, Mobley *et al.* (2022) reported cases of frequent disturbance of feeding shorebirds, including dowitchers, by cows roaming in coastal habitats. Along the northeastern coast of South America, an increase in disturbance and predation of shorebirds by stray dogs has also been reported, especially in urban areas (Espinosa *et al.* 2006).

Scope:

The scope is Pervasive–Large, given the ubiquity of feral dogs and cats in the non-breeding range of Short-billed Dowitcher.

Severity:

Net effect of disturbance and occasional predation is assessed as Slight.

IUCN 8.2: Problematic Native Species/Diseases (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Climate change favours the expanded distribution of generalist predators such as Red Fox and Coyote (*Canis latrans*) in boreal and Arctic regions (Blois *et al.* 2013). Increases in predator abundance may be particularly notable in areas where they are subsidized by human resources (e.g., in the Churchill, Manitoba, area). Hatching success of Hudsonian Godwit, a shorebird nesting in the same habitat as the Short-billed Dowitcher in the Churchill area, has declined due to predation by these species (COSEWIC 2019).

Predation pressure has also increased in coastal regions where Short-billed Dowitchers migrate and overwinter, especially where Peregrine Falcon numbers have recovered (Hickin and Spaans 1993; White *et al.* 2002; Morrison *et al.* 2012). The presence of avian predators not only increases the risk of direct predation but can also affect shorebirds' energy budget by forcing birds to move more (Piersma *et al.* 2003; Ydenberg *et al.* 2004; Cresswell and Whitfield 2008).

Avian botulism is one of the major diseases affecting migratory birds worldwide (Rockle and Bollinger 2007). *Clostridium botulinum* (Type C), a bacterium that occurs in some wetlands in Canada, can become highly toxic and cause mass mortality events in waterfowl and shorebirds, impacting hundreds of thousands of waterbirds annually. These impacts are typically linked to high concentrations of waterfowl feeding at a single place, as well as to water levels and temperatures (Adams *et al.* 2003). In the Canadian Prairies, the Short-billed Dowitcher is among the species potentially affected by this disease; however, in one case study, it was shown to be affected to a much lesser extent than other species of shorebirds (Adams *et al.* 2003).

Scope:

The scope is considered Small for the *caurinus* DU, with limited exposure to the increased abundance of predators, but Large for *L. g. hendersoni* and *L. g. griseus* given greater exposure to recovering populations of Peregrine Falcon and generalist mammalian predators.

Severity:

The severity of this threat is assessed as Slight for all three subspecies, and thus for both DUs.

IUCN 9: Pollution (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)

*IUCN 9.1: Domestic & Urban Waste Water (Low threat impact for *L. g. caurinus* and *L. g. hendersoni*, and Unknown for *L. g. griseus*)*

Description of threat:

Pollution from urban wastewater is likely ubiquitous in some of the coastal environments used by migrating Short-billed Dowitchers. Pollution may reduce prey availability during migration, with effects on individuals' energetic budgets (Morales *et al.* 2019). This threat is likely to have a greater effect on *L. g. griseus* given its primary migration route along the heavily developed Atlantic Coast.

Scope:

Scope is considered Large for *L. g. griseus* as nearly all individuals are likely to be exposed to domestic and urban wastewater effluent at some point in their life cycle, and is Restricted for *L. g. hendersoni* and *L. g. caurinus*.

Severity:

Although urban wastewater pollution presumably has adverse effects on Short-billed Dowitcher, more research is required to understand the extent of the impact. At present, there is no evidence to suggest that the severity is more than Slight for *L. g. hendersoni* and *L. g. caurinus*; it is assessed as Unknown for *L. g. griseus* given the subspecies' greater exposure and potential for larger (but currently undocumented) effects.

*IUCN 9.2: Industrial & Military Effluents (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)*

Description of threat:

On the breeding grounds, significant sources of contamination in the aquatic environments where the Short-billed Dowitcher forages include mercury deposition from industrial activities (DesGranges *et al.* 1998; Fitzgerald *et al.* 1998; Wiener *et al.* 2003) and the release of methylmercury from melting permafrost in the boreal forest (Edmonds *et al.* 2010). Exposure to mercury and methylmercury can reduce birds' reproductive success by altering their immune responses and can also cause behavioural and physiological problems (Scheuhammer *et al.* 2007). Although no specific data are available on the effects of mercury concentrations on the health of Short-billed Dowitchers during the

breeding season, there is evidence of substantial concentrations of mercury in the blood and feathers of other species of boreal birds and fish associated with these habitats (Matsuoka *et al.* 2008; Edmonds *et al.* 2010; Greenberg and Matsuoka 2010; Hargreaves *et al.* 2010; Perkins *et al.* 2016). Short-billed Dowitcher may also be affected by the acidification of boreal wetlands, as this reduces the availability of calcium and other minerals essential for proper bone and eggshell formation (DesGranges and Houde 1989; Greenberg and Droege 1999). Short-billed Dowitcher samples were also among the most contaminated in a study of organochlorine pesticides and PCBs in Canadian shorebirds collected across Canada (Braune and Noble 2009).

On the non-breeding grounds, small-scale gold mining near the coast of Suriname, and possibly elsewhere in northern South America, could cause mercury contamination in some estuaries where dowitchers feed (Morrison *et al.* 2012).

Short-billed Dowitcher is also exposed to the risk of coastal oil spills during migration and on the non-breeding grounds, on both the Atlantic and Pacific coasts. Many migratory stopover sites and non-breeding areas of importance to the species are vulnerable to oil spills due to the proximity of several major ports and heavy oil tanker traffic (Aubry and Cotter 2007; Alaska Shorebird Group 2019). The risk is particularly acute along the Gulf Coast, the northern coast of South America (particularly Suriname and Brazil; American Wind Wildlife Institute 2019; Morales *et al.* 2019; Loring *et al.* 2020), Delaware Bay, and, in Canada, the St. Lawrence River corridor and Fraser River Delta (Hicklin and Spaans 1993; Donaldson *et al.* 2000; Jehl *et al.* 2020).

Scope:

The scope is considered Pervasive for all three subspecies (both DUs), as nearly all individuals are likely to be exposed to industrial effluents at some point in their life cycle.

Severity:

Although the effects of industrial pollution on Short-billed Dowitcher are presumably negative, more research is required to understand the extent of the impact. At present, there is no evidence to suggest that the severity is more than Slight.

IUCN 9.3: Agricultural & Forestry Effluents and IUCN 9.4: Garbage & Solid Waste (Unknown threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Estuaries and other coastal habitats in North, Central, and South America can be degraded through the accumulation of large quantities of nutrients (e.g., nitrogen and phosphorous) and toxic substances from agricultural sources (Smithsonian Institute 2021). The extensive deposition of agricultural effluents along coastlines likely affects a large part of the non-breeding range and perhaps some stopover locations for all subspecies (both DUs) of Short-billed Dowitcher. Pollution by pre- and post-consumer plastics is similarly

ubiquitous in this range. Birds may also be potentially exposed to neonicotinoids and other pesticides leaching into wetlands and lakes, especially at inland stopover sites during migration, but the effects are unknown (Hicklin and Spaans 1993; Mineau and Palmer 2013; Ertl *et al.* 2018). Algal blooms in coastal estuaries have been attributed to upstream pollution from peanuts, sugarcane, and rice production in Central America (Morales *et al.* 2019). There is also potential for mortality from ingestion of toxic algae and other contaminants, but the severity of these multiple threats is generally Unknown.

Scope:

The scope is considered Large for all three subspecies, given the extensive nature of agricultural effluents and plastic pollution in coastally discharging rivers and along the coastlines where the two DUs migrate or overwinter.

Severity:

There is little direct evidence of the effects of agricultural or plastic pollution on Short-billed Dowitcher, but the impact is presumably negative. In the absence of more detailed knowledge, the severity is considered Unknown.

IUCN 11: Climate Change & Severe Weather (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)

*IUCN 11.1: Habitat Shifting & Alteration (Low threat impact for *L. g. caurinus*, *L. g. hendersoni*, and *L. g. griseus*)*

Description of threat:

An average temperature increase exceeding 1.5 °C has already been recorded in the boreal region where both Short-billed Dowitcher DUs breed, and temperatures are expected to continue to rise there under various Intergovernmental Panel on Climate Change (IPCC) scenarios (Gauthier *et al.* 2015). The drying and degradation of wetlands in a large part of the boreal forest, particularly in the discontinuous permafrost zone—caused mainly by the lowering of the water table linked to permafrost melting and increased evapotranspiration—have already been observed on a large scale in Canada (Riordan *et al.* 2006; Carroll *et al.* 2011), and are expected to continue, even under the most optimistic emissions scenarios (Avis *et al.* 2011). Increased temperatures in the subarctic zone could cause a decline in the area of peatlands to the south, in the boreal forest (Gignac and Vitt 1994; Nicholson and Gignac 1996; Rouse *et al.* 1997), reducing the availability of breeding habitat for Short-billed Dowitcher across its range. Rising temperatures in the taiga and Arctic are also altering the species' breeding habitat by increasing the amount of shrubs (or shrubification) in open areas such as in peatlands (Zhang *et al.* 2013).

Increasing temperatures are also expected to cause earlier snowmelt in Canada's subarctic regions, which could cause asynchrony between the peak period for invertebrate hatches and the brood-rearing period for Short-billed Dowitcher and other shorebirds, which could in turn reduce their productivity (Watkinson *et al.* 2004; Tulp and Schekkerman 2008; Galbraith *et al.* 2014; Senner *et al.* 2016).

Scope:

The scope is considered Pervasive for all three subspecies, as nearly all individuals will be exposed to some habitat alteration arising from climate change.

Severity:

Severity is expected to be similar for all three subspecies and both DUs. It is difficult to estimate the impact on breeding, and it is currently not possible to predict whether shorebirds can adjust their migration strategies to arrive on the breeding grounds earlier in response to earlier snowmelt (Gratto-Trevor *et al.* 2011). Nonetheless, severity is considered to be no more than Slight over the time frame considered by this threats assessment.

IUCN 11.2: Droughts (Low threat impact for L. g. hendersoni only)

Description of threat:

By partially or completely drying up wetlands and coastal mudflats (Fang and Pomeroy 2008), droughts can affect invertebrate communities in wetlands, which can have bottom-up effects on the condition and survival of predators such as shorebirds. The modelling of climate change impacts on wetlands predicts an increase in drought frequency, length, and severity (Carter Johnson *et al.* 2005). Anderson *et al.* (2021) showed that even short-term, moderate drought conditions on the southwestern coast of James Bay, Ontario, can negatively affect shorebird refuelling performance, which may carry over to subsequent stopover decisions. Like many other shorebirds—including Lesser Yellowlegs (COSEWIC 2020)—Short-billed Dowitcher seems to depend on a small number of migration stopover sites in the Prairies, and its reproductive success and survival are likely strongly associated with these sites. Short-billed Dowitchers migrating through the Prairies will be negatively affected if wetlands dry up in response to higher temperatures (Johnson *et al.* 2010). In Manitoba, key wetlands used as stopovers by Short-billed Dowitchers, such as the Whitewater Lake IBA, are known to dry up completely during some years of severe drought. Johnson *et al.* (2005) estimated that the most productive wetlands in the Dakotas and southern Saskatchewan would dry up in a scenario with a temperature increase of 3 °C and a 20% decrease in precipitation.

Scope:

Although all three subspecies are theoretically vulnerable to exposure to drought, this was not assessed as a current threat for *L. g. caurinus* and *L. g. griseus*. For *L. g. hendersoni*, the scope is uncertain, ranging from Pervasive to Restricted.

Severity:

It is unknown to what extent drought spanning multiple years would affect *L. g. hendersoni*, but the impact over the time frame covered by this assessment is likely not more than Slight.

IUCN 11.3: Temperature Extremes (Low threat impact for L. g. caurinus, L. g. hendersoni, and L. g. griseus)

Description of threat:

Climate change is slowing the jet stream and keeping weather systems in place for abnormally long periods, which can include prolonged cold episodes at the beginning of the breeding season for Short-billed Dowitcher (Clark 2009). This can cause delays in nesting or outright breeding failure, as has been seen in several Arctic-breeding shorebird species in Alaska, Greenland, and Siberia (Ackerman 2018). Moreover, climate models predict that the atmosphere in the Arctic—and probably also in the subarctic boreal forest, where the Short-billed Dowitcher breeds—will be increasingly saturated with moisture, which could result in late snowfalls in spring and summer, with potential implications for reduced breeding success (Ackerman 2018).

Scope:

The scope is considered Small for all three subspecies given the proportion of the population likely to be affected by this threat within three generations.

Severity:

The severity is deemed Moderate for all three subspecies: the increased risk of cold and moisture in spring and early summer could cause breeding failure, with implications for population size over time.

IUCN 11.4: Storms & Flooding (Unknown threat impact for L. g. caurinus; Low threat impact for L. g. hendersoni and L. g. griseus)

Description of threat:

The primary mechanisms by which storms and flooding may impact Short-billed Dowitcher are considered to be different for each of the two DUs over the time frame of this assessment (although over the longer term, 20–70% of the intertidal habitat currently used by Short-billed Dowitcher at U.S. stopover sites is expected to be lost to flooding or erosion at some time during the 21st century; Galbraith *et al.* 2002; Field *et al.* 2007; Stedman and Dahl 2008; Dahl 2009). For the *caurinus* DU, it is expected that sea-level rise may eliminate non-breeding habitat, particularly in areas where topography hinders the migration of habitat inland (Galbraith *et al.* 2002, 2014), while increases in severe weather are a primary threat to the *hendersoni/griseus* DU.

The frequency and intensity of hurricanes have been increasing, notably along the Atlantic Coast and in the Gulf of Mexico (Wiley and Wunderle 1993), during periods and in regions where Short-billed Dowitcher may be present in large numbers. Changes in the strength and direction of the prevailing winds can affect the survival of migrating Short-billed Dowitchers, either by forcing them to stop over in suboptimal habitats or by directly pushing them off course and preventing them from accessing foraging sites (Shamoun-Baranes *et al.* 2010; Morrison *et al.* 2012; Sutherland *et al.* 2012; Wege *et al.* 2014). Hurricanes also degrade coastal wetlands at migratory stopover sites and on the non-breeding grounds, notably by destroying or damaging mangrove ecosystems (FAO 2008) or by increasing beach erosion rates or saltmarsh sedimentation rates (Smithsonian Institute 2021).

Scope:

The scope is considered Pervasive for *hendersoni/griseus* DU birds, as almost all individuals have a potential to be exposed to hurricanes or their indirect effects. The shorter-term impacts on the *caurinus* DU are more uncertain, with the scope ranging from Restricted to Pervasive.

Severity:

The vulnerability of Short-billed Dowitcher to hurricanes is undocumented. The impact on the *hendersoni/griseus* DU may be variable, depending in part on the ability of the species to avoid severe storms. The severity of this threat is therefore currently considered Slight, but it is likely to increase over time. Similarly, it is anticipated that sea-level rise will reduce the suitability and ultimately the availability of migratory stopover and non-breeding habitats, but the degree to which this will affect Short-billed Dowitcher will at least partially be a function of the availability of alternative sites. Over the time frame covered by this assessment, the severity for the *caurinus* DU is Unknown.

Limiting Factors

With a maximum clutch size of four eggs, the species has a limited annual reproductive output. Outside of the processes that threaten foraging habitat, Short-billed Dowitcher may also be limited by the natural availability of suitable foraging habitat during migration and on the non-breeding grounds. For example, Morrison *et al.* (2012) reported that, between the 1980s and 2008–2011, large areas of coastal mudflats and mangroves, particularly along the coast of Suriname, were naturally transformed by the processes of accretion and erosion, causing sandbanks to migrate westward (cf. Augustinus 2004), which in turn changed the nearshore seabed profile, and spatially and temporally reduced shorebirds' access to foraging habitat. In contrast to the vast mudflats exposed on falling tides in the 1980s, in 2008–2011 "water levels remained close to the upper shoreline and the flats in many parts of the country . . . were not uncovered until three hours after high tide" (Morrison *et al.* 2012). This limiting factor would likely affect only the *hendersoni/griseus* DU, but its real impact still remains to be assessed.

Number of Locations

The number of locations for Short-billed Dowitcher is unknown, but considering the dispersed nature of its various threats, it is highly likely that there are more than 10 locations for each of the two DUs.

PROTECTION, STATUS AND RANKS

Legal Protection and Status

Short-billed Dowitcher and its nests and eggs are protected in Canada under the *Migratory Birds Convention Act, 1994* (Government of Canada 2017). In several provinces, the species is also generally protected under similar laws that prohibit hunting or capturing individuals or damaging their nests and eggs. An example is Quebec's *Act Respecting the Conservation and Development of Wildlife* (CQLR, c C-61.1) (Gouvernement du Québec 2023). However, this species is not currently protected under any provincial or territorial species-at-risk legislation. The species is also protected in the United States under the *Migratory Bird Treaty Act of 1918* (USFWS 2017), but not under any species-at-risk legislation in that country.

Since 2012, efforts by the U.S. Fish and Wildlife Service and Environment and Climate Change Canada have led to the adoption of policies to regulate hunting and harvests in Barbados, Guadeloupe, Saint Martin, Martinique, and French Guiana, to reduce mortality of Short-billed Dowitcher and other shorebird species from sport and subsistence hunting (Andres 2017).

Non-Legal Status and Ranks

NatureServe (2024) assigns Short-billed Dowitcher a Global Status of G3 (Vulnerable; Table 3). In 2024, Short-billed Dowitcher was reassessed and uplisted from Least Concern to Vulnerable on the IUCN Red List (BirdLife International 2024; Burfield pers. comm. 2024). In Canada, the status of Short-billed Dowitcher as a breeder is Vulnerable (N3N4B). The species is ranked Critically Imperilled as a breeder in British Columbia (S1S2B) and Yukon (S1B); Vulnerable in Newfoundland and Labrador (S3B), Ontario (S3B), and Quebec (S3S4B); and Unrankable in Alberta, Saskatchewan, Northwest Territories, and Nunavut (NatureServe 2024; Table 3).

Table 3. Conservation status ranks assigned to the Short-billed Dowitcher according to NatureServe (2024) and CESSC (2022).

Region	NatureServe Rank*	GSSC (General Status of Species in Canada) Rank
Global	G3	
United States	N3B, N3N	
Canada	N3N4B, N4N5M	SUB
Nunavut	SUB	SUB
Yukon	S1B	S1B
Northwest Territories	SU	SUB
British Columbia	S1S2B, S2S3M	S2S3B
Alberta	SUB, S4M	SUB, S4M
Saskatchewan	SUB, S4M	SUB, S4M
Manitoba	S4B	S3B
Ontario	S3B, S4M	S3S4B
Quebec	S3S4B	S3S4B
New Brunswick	S3M	S3M
Nova Scotia	S3M	S3M
Prince Edward Island	S3M	S3M
Newfoundland and Labrador	S3M S3B, SUM	S3M S3B, SUM

* G = is a global status rank; S = rank assigned to a province or state; N = is a national status rank. S1 indicates that a species is critically imperilled because of extreme rarity (often five or fewer occurrences) or because of other factor(s) such as a steep decline, making it especially vulnerable to extirpation; S2 indicates that a species is imperilled because of rarity or other factors making it very vulnerable to extirpation, usually with 6 to 20 occurrences or few individuals remaining (i.e., 1,000 to 3,000); S3 indicates that a species is vulnerable at the subnational level because it is rare or uncommon, or found only in a restricted range, or because of other factors making it vulnerable to extirpation; S4 indicates that the species is apparently secure because it is uncommon but not rare, and that there is some cause for long-term concern due to declines or other factors; S5 indicates that a species is secure, because it is common, widespread and abundant. M = migrant; B = breeding; NR = unranked; U=unrankable.

In Alaska, *L. g. caurinus* is considered of high conservation concern according to the Alaska Shorebird Conservation Plan, based on concerns over its population size and restricted breeding distribution, and potential threats (Matz *et al.* 2011; Alaska Shorebird Group 2019); *L. g. caurinus* is also assessed as II Red in the Alaska Species Ranking System (Alaska Center for Conservation Science 2023). The U.S. Shorebird Conservation Plan ranks Short-billed Dowitcher as High Concern due to serious threats and population decline (U.S. Shorebird Conservation Plan Partnership 2016).

According to a recent update of the Canadian Shorebird Conservation Plan, Short-billed Dowitcher is a species of high concern (Hope *et al.* 2019). Short-billed Dowitcher is considered a high-priority species and a species of high concern, respectively, under the boreal conservation and continental categories established by Sinclair *et al.* (2014). Bird Conservation Regions 6, 7, and 8 are considered important to the species' conservation (Sinclair *et al.* 2014). It is also a priority species for the Prairie Habitat Joint Venture (2014).

Habitat Protection and Ownership

A number of initiatives in the Americas including Canada aim to identify, restore and designate important shorebird breeding areas and migratory stopover sites (including for Short-billed Dowitcher). These include the North American Bird Conservation Initiative (NABCI), the Western Hemisphere Shorebird Reserve Network (WHSRN), the Eastern Habitat Joint Venture (EHJV), and the Important Bird and Biodiversity Areas (IBAs) program (Morrison *et al.* 1995; Aubry and Cotter 2007).

Suitable breeding habitat for Short-billed Dowitcher in Canada is found primarily on public and Indigenous lands in the boreal forest (Figures 1 and 2). The species is considered to regularly occur in 13 protected areas managed by Parks Canada (Parks Canada 2021), where it is generally transient except in Wapusk National Park, where the species is known to breed. The species is also present as a migrant or a nesting bird on many other federal lands administered by other departments and Indigenous governments, as well as in numerous provincial parks and ecological reserves and other types of nature reserves and conservation areas such as Migratory Bird Sanctuaries and National Wildlife Areas (Andrew *et al.* 2014) and areas identified as critical habitat for other SARA-listed species such as Woodland Caribou (*Rangifer tarandus caribou*; Environment Canada 2012), a species with which Short-billed Dowitcher co-occurs.

Migration habitat for Short-billed Dowitcher is mainly identified under the WHSRN, which aims to better protect important stopover sites deemed of international importance in the Americas (WHSRN 2022). WHSRN (2022) has identified five stopover sites in Canada with a maximum number of Short-billed Dowitchers of over 2,000 birds, the two most important being Eastern Cape Sable Island, Nova Scotia (maximum counts of 15,000 birds) and Lagune du Havre-aux-Basques, Quebec (7,600 birds). No legal protection is currently given to these two sites. In the Caribbean, the species was found in significant numbers at the following sites: Humedal Sur de Pinar del Rio, Cuba (14,500 birds), Humedal Sur de Sancti Spiritus, Cuba (5,000 birds), and at the Grand Turk

Salinas and Shores, Turks and Caicos (4,000 birds). In South America, an important number of overwintering Short-billed Dowitchers were reported on the shores of French Guiana (10,000 birds) and at Bahia de Tumbes, Peru (9,000 birds; WHSRN 2022). Sites with over 2,000 birds were also identified in Mexico (1 site), Costa Rica (1 site), Panama (1 site), and Trinidad and Tobago (1 site) (WHSRN 2022).

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Carl Savignac is the Project Director of Dendroica Environnement et Faune, an environmental consulting firm specializing in avian ecology, particularly studies involving the conservation of bird species at risk, wetland conservation and the assessment of the impacts of industrial development projects on birds and species at risk and their habitats. Carl has been studying birds for over 25 years and has conducted numerous field studies in several Canadian provinces and territories. He has led a number of stewardship projects in southern Quebec, particularly involving the Red-headed Woodpecker, Golden-winged Warbler, Peregrine Falcon, and a number of grassland bird species. He is the author of a number of scientific reports and publications, and writer of more than 15 COSEWIC status reports on birds of boreal and temperate forests.

APPENDIX 1. Threats Calculator for Short-billed Dowitcher, *caurinus* subspecies

Species or Ecosystem Scientific Name	Short-billed Dowitcher <i>caurinus</i> ssp.		
Element ID		Elcode	
Date (Ctrl + “;” for today’s date):	2022-03-24		
Threats call invitees:	Carl Savignac, Marcel Gahbauer, Richard Elliot, Dave Fraser, Liana Zanette, Paul-Allen Smith, Louise Blight, Gord Court, Robin Gutsell, Purnima Govindarajulu, Greg Wilson, Ray Poulin, Chris Friesen, Colin Jones, Isabelle Gauthier, Benoit Tremblay, Mary Sabine, Donna Hurlburt, Jessica Humber, Shelley Moores, Suzanne Carriere, Eve Lamontagne, Tom Jung, Shelly Pruss, Myrle Ballard, Sue Chiblow, Barrie Ford, Leah de Forest, Pippa Shepherd, Syd Cannings, Gina Schalk, Jennifer Doubt, Katriina Ilves, Christian Artuso, Mike Burrell, Pete Davidson, Danielle Ethier, Andrew Horn, Tara Imlay, Elsie Krebs, Jean-Pierre L. Savard, David Toews, Tim Polle, Pam Sinclair, Julie Paquet, Christian Friis, Scott Fleming, Michel Rober, Nathan Hentze, Cindy Bertan Cernino		
References:	gen time 4 years		
Overall Threat Impact Calculation Help:	Level 1 Threat Impact Counts		
	Threat Impact		
	A	Very High	0
	B	High	0
	C	Medium	0
	D	Low	7
Calculated Overall Threat Impact:	Medium		Medium
Assigned Overall Threat Impact:	Medium		
Impact Adjustment Reasons:			
Overall Threat Comments			

Threat	Impact (calculated)	Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
1 Residential & commercial development	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Scope likely to be somewhat smaller in most cases than for <i>hendersoni</i> , but likely still in the same range; severity similar
1.1 Housing & urban areas	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Pertaining primarily to residential development in coastal areas; small potential in the breeding range around Anchorage, Alaska, but likely pertaining primarily to wintering range and stopover sites
1.2 Commercial & industrial areas	Negligible	Negligible (<1%)	Slight (1–10%)	High (Continuing)	
1.3 Tourism & recreation areas	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Some ongoing development of hotels and other tourism facilities in coastline sites and estuaries within the wintering range and southern migratory stopover areas
2 Agriculture & aquaculture	D Low	Large (31–70%)	Slight (1–10%)	High (Continuing)	
2.1 Annual & perennial non-timber crops	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Some documented use of rice farms in California, but likely involving a small portion of the population at most. Rice farming may have both positive and negative consequences for Short-billed Dowitcher; the severity is considered to be Slight at worst.
2.2 Wood & pulp plantations					

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
2.3	Livestock farming & ranching		Negligible	Negligible (<1%)	Unknown	High (Continuing)	There may be some exposure to livestock during migration or on the wintering grounds, but the scope is almost certainly Negligible, and it is unknown whether there is any impact.
2.4	Marine & freshwater aquaculture	D	Low	Large (31–70%)	Slight (1–10%)	High (Continuing)	Substantial losses have already occurred in much of the wintering range. Most of the effect is through habitat loss to aquaculture, but intensifying management practices could also be a concern. Some further expansion is still likely, especially in Costa Rica and Guatemala, with scope varying regionally within the range of small to restricted, taking into account both wintering birds and migrants passing through. Loss of habitat due to shrimp farms in Central America is mainly affecting natural salt flats, which are key roosting sites for dowitchers and other shorebirds (Morales <i>et al.</i> 2019). However, various shorebirds including dowitchers may use shrimp farms when drained, especially where they include dikes that shorebirds can use for roosting. Although there may be occasional benefits at some sites, the overall effect is likely slightly negative.
3	Energy production & mining		Negligible	Negligible (<1%)	Unknown	High (Continuing)	
3.1	Oil & gas drilling		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Minimal overlap of oil and gas drilling with any part of the annual range
3.2	Mining & quarrying						
3.3	Renewable energy		Negligible	Negligible (<1%)	Unknown	High (Continuing)	Very little growth of wind energy anticipated within coastal areas most heavily used by Short-billed Dowitcher
4	Transportation & service corridors		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	
4.1	Roads & railroads		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	Some potential exposure during migration and on wintering grounds, likely affecting a restricted portion of the population. Species not documented as a collision risk, therefore severity likely Negligible.
4.2	Utility & service lines		Negligible	Small (1–10%)	Negligible (<1%)	High (Continuing)	Scope likely somewhat smaller than for roads; collision risk perhaps slightly greater but probably still negligible
4.3	Shipping lanes						
4.4	Flight paths						
5	Biological resource use		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	
5.1	Hunting & collecting terrestrial animals		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	No documented hunting on west coast, though occasional incidental mortality possible. Some subsistence harvest of shorebirds occurs in Alaska, though scope and severity for Short-billed Dowitcher are likely Negligible (Naves and Keating 2018).
5.2	Gathering terrestrial plants						
5.3	Logging & wood harvesting						

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
5.4	Fishing & harvesting aquatic resources						
6	Human intrusions & disturbance	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
6.1	Recreational activities	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	During migration or on wintering grounds, majority of population likely to be exposed to various recreational activities on beaches, including ATVs, drone flights, and kite surfing. Frequent and intense disturbance may cause displacement, with implications on energetics, but there is no evidence to support severity being more than Slight.
6.2	War, civil unrest & military exercises						
6.3	Work & other activities		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Research is undertaken on a negligible part of the population; given animal care standards, severity is assumed to be Negligible.
7	Natural system modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
7.1	Fire & fire suppression	D	Low	Small (1–10%)	Moderate – Slight (1–30%)	High (Continuing)	The frequency and severity of fires and length of the fire season are all increasing because of climate change. However, within the next decade the scope of the population affected by fire is likely still Small. Severity could range from Slight to Moderate, given that adults can flee from fire, but eggs and chicks would perish from fires around the peak of the breeding season, and large or repeated fire events could have a cumulative impact on recruitment.
7.2	Dams & water management/use						
7.3	Other ecosystem modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Reduction of prey availability as a result of pollution and other factors likely affects almost all individuals. Not much known about severity—presumably problematic but no specific evidence as to this extent, so Slight seems appropriate.
8	Invasive & other problematic species & genes	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
8.1	Invasive non-native/alien species/diseases	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	Feral dogs on beaches are widespread in the wintering range and can cause persistent disturbance, although the net effect is likely not more than slight.
8.2	Problematic native species/diseases	D	Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Limited exposure to increased abundance of predators
8.3	Introduced genetic material						
8.4	Problematic species/diseases of unknown origin						
8.5	Viral/prion-induced diseases						
8.6	Diseases of unknown cause						

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
9	Pollution	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
9.1	Domestic & urban waste water	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	
9.2	Industrial & military effluents	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Almost all individuals are likely exposed to some mercury contamination and/or leaching of calcium and other chemicals because of acid rain. Effect is presumably negative, but there is no evidence to suggest it is greater than slight. Potential risk of exposure to coastal oil spills during migration and on wintering grounds. Along the Pacific Coast, many important migratory stopover sites for shorebirds are vulnerable to oil spills, due to the proximity of several major ports and heavy oil tanker traffic. Port expansion projects in the next ten years (such as the Roberts Bank terminal in Vancouver, British Columbia) could increase the risk of accidental spills in stopover habitat. There can also be frequent small-scale oil spills from fishing boats near wintering sites in Central America (Morales <i>et al.</i> 2019). Although there could be serious consequences from a major oil spill, typical severity is more likely to be slight.
9.3	Agricultural & forestry effluents	D	Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive deposition of agricultural effluents along coastlines likely affects a large part of the wintering range and perhaps some stopover sites too, but effects are unknown. Algal blooms in coastal estuaries have been attributed to upstream pollution from peanut, sugarcane, and rice production in Central America (Morales <i>et al.</i> 2019). There is potential for mortality from ingestion of toxic algae and other contaminants.
9.4	Garbage & solid waste		Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive plastic pollution in mangroves, beaches, and salt flats has been documented in Central and South America (Morales <i>et al.</i> 2019). The impact on Short-billed Dowitcher remains unknown at this time.
9.5	Air-borne pollutants						
9.6	Excess energy						
10	Geological events						
10.1	Volcanoes						
10.2	Earthquakes/tsunamis						
10.3	Avalanches/landslides						
11	Climate change & severe weather	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
11.1	Habitat shifting & alteration	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Loss of permafrost and drying of wetlands may be a widespread concern in the breeding range, although the change will be gradual and short-term severity is likely to be only Slight. Change in spring and summer temperature regimes could result in asynchrony between timing of breeding and peak prey availability. Open wet areas with scattered trees are changing into shrub thickets in northeastern British Columbia and Yukon, and this could accelerate over time.
11.2	Droughts						
11.3	Temperature extremes	D	Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	Modelling suggests increased risk of cold and moisture in spring and early summer, which could cause breeding failure and have implications for population size over the course of multiple years.
11.4	Storms & flooding		Unknown	Pervasive – Restricted (11–100%)	Unknown	High (Continuing)	Sea-level rise may eliminate some wintering habitat for some to most of this population, but implications of this are unknown at this time.
11.5	Other impacts						

Classification of Threats adopted from IUCN-CMP, Salafsky *et al.* (2008)

APPENDIX 2. Threats Calculator for Short-billed Dowitcher, *hendersoni* subspecies

Species or Ecosystem Scientific Name	Short-billed Dowitcher <i>hendersoni</i> ssp.		
Element ID		Elcode	
Date (Ctrl + “;” for today’s date):	2022-03-24		
Threats call invitees:	Carl Savignac, Marcel Gahbauer, Richard Elliot, Dave Fraser, Liana Zanette, Paul-Allen Smith, Louise Blight, Gord Court, Robin Gutsell, Purnima Govindarajulu, Greg Wilson, Ray Poulin, Chris Friesen, Colin Jones, Isabelle Gauthier, Benoit Tremblay, Mary Sabine, Donna Hurlburt, Jessica Humber, Shelley Moores, Suzanne Carriere, Eve Lamontagne, Tom Jung, Shelly Pruss, Myrle Ballard, Sue Chiblow, Barrie Ford, Leah de Forest, Pippa Shepherd, Syd Cannings, Gina Schalk, Jennifer Doubt, Katriina Ilves, Christian Artuso, Mike Burrell, Pete Davidson, Danielle Ethier, Andrew Horn, Tara Imlay, Elsie Krebs, Jean-Pierre L. Savard, David Toews, Tim Polle, Pam Sinclair, Julie Paquet, Christian Friis, Scott Fleming, Michel Rober, Nathan Hentze, Cindy Bertan Cernino		
References:	gen time 4 years		
Overall Threat Impact Calculation Help:		Level 1 Threat Impact Counts	
		Threat Impact	
		A Very High	0
		B High	0
		C Medium	0
		D Low	9
Calculated Overall Threat Impact:		Medium	Medium
Assigned Overall Threat Impact:		Medium	
Impact Adjustment Reasons:			
Overall Threat Comments			

Threat	Impact (calculated)	Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
1 Residential & commercial development	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Cumulative scope could potentially exceed 10% but likely not, as both 1.1 and 1.3 are likely to be in the lower part of the Small range.
1.1 Housing & urban areas	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Some housing development along Gulf Coast, but new footprint unlikely to affect > 10% of individuals. Severity likely Slight at most, as displacement unlikely to have much impact on the population.
1.2 Commercial & industrial areas	Negligible	Negligible (<1%)	Slight (1–10%)	High (Continuing)	Some of this development may occur in association with urban expansion, but footprint likely even smaller. Severity would be similar or potentially slightly greater given the potential for larger facilities to cause greater displacement.

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
1.3	Tourism & recreation areas	D	Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	A recent mid-continent shorebird review expressed concern for various species based on development of tourist facilities all along the Gulf Coast from Florida through Cancun. However, much development has already occurred, so scope over the next decade may only be Small. Severity is probably toward the lower end of Slight, as there is potential for shorebirds to continue using some of the land occupied by tourism and recreation areas.
2	Agriculture & aquaculture	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	
2.1	Annual & perennial non-timber crops	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	Majority of agricultural conversion has already occurred, but some draining and intensification of usage is ongoing, with wetland drainage accelerating in some areas in response to recent droughts. For example, in Manitoba, many lakes expanded into croplands during the last wet cycle, but now with waters receding, lands have been reconverted to crops (Poole pers. comm. 2024). Scope likely varies temporally and spatially but is probably Restricted on average. Impact on the population is unclear, probably to the lower end of Slight.
2.2	Wood & pulp plantations						
2.3	Livestock farming & ranching		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Potential for some damage to stopover habitat by livestock, but both scope and severity likely to be Negligible
2.4	Marine & freshwater aquaculture	D	Low	Restricted – Small (1–30%)	Slight (1–10%)	High (Continuing)	Substantial losses have already occurred in much of the wintering range. Most of the effect is through habitat loss to aquaculture, but intensifying management practices could also be a concern. Some further expansion is still likely, especially in Costa Rica and Guatemala, with scope varying regionally within the range of Small to Restricted, taking into account both wintering birds and migrants passing through. Loss of habitat due to shrimp farms in Central America is mainly affecting natural salt flats that are key roosting sites for dowitchers and other shorebirds (Morales <i>et al.</i> 2019). However, various shorebirds including dowitchers may use shrimp farms when drained, especially where they include dikes that shorebirds can use for roosting. Although there may be occasional benefits at some sites, the overall effect is likely slightly negative.
3	Energy production & mining	D	Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	
3.1	Oil & gas drilling		Negligible	Small (1–10%)	Negligible (<1%)	High (Continuing)	Exposure primarily related to oil drilling in the Gulf of Mexico; scope is likely small and under normal operations negligible effects are anticipated.

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
3.2	Mining & quarrying	D	Low	Small (1–10%)	Moderate – Slight (1–30%)	High (Continuing)	Some areas of suitable breeding habitat may support relatively high densities of Short-billed Dowitcher. McLelland Fen is one of these, and is at risk from proposed expansion of oil sands extraction. However, this would still only affect a small part of the population. Effects could range from slight to moderate, depending on the ability of displaced individuals to seek suitable breeding habitat elsewhere.
3.3	Renewable energy		Unknown	Small (1–10%)	Unknown	High (Continuing)	Small portion of the population likely to encounter wind farms during migration, but no documentation to date of collisions, and severity is therefore Unknown.
4	Transportation & service corridors		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	
4.1	Roads & railroads		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	Some potential exposure during migration and on wintering grounds, likely affecting a restricted portion of the population. Species not documented as a collision risk, therefore severity likely Negligible.
4.2	Utility & service lines		Negligible	Small (1–10%)	Negligible (<1%)	High (Continuing)	Scope likely somewhat smaller than for roads; collision risk perhaps slightly greater but probably still negligible
4.3	Shipping lanes						
4.4	Flight paths						
5	Biological resource use		Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	
5.1	Hunting & collecting terrestrial animals		Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	Population generally not believed to generally go through the Caribbean or South America where shorebird hunting persists, but see Fig. 3 in Reed <i>et al.</i> 2018 showing origin in zone of ssp. overlap, and Watts <i>et al.</i> (2015). There may also be some incidental mortality or subsistence hunting in North America, but scope is presumed to be no more than Small.
5.2	Gathering terrestrial plants						
5.3	Logging & wood harvesting						
5.4	Fishing & harvesting aquatic resources						
6	Human intrusions & disturbance	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
6.1	Recreational activities	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	During migration or on wintering grounds, majority of population likely to be exposed at some point to various recreational activities on beaches, including ATVs, drone flights, and kite surfing. Frequent and intense disturbance may cause displacement, with implications on energetics, but there is no evidence to support severity being more than Slight.
6.2	War, civil unrest & military exercises						

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
6.3	Work & other activities		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Research is undertaken on a negligible part of the population; given animal care standards, severity is assumed to be Negligible.
7	Natural system modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
7.1	Fire & fire suppression	D	Low	Small (1–10%)	Moderate – Slight (1–30%)	High (Continuing)	The frequency and severity of fires and length of the fire season are all increasing because of climate change. However, within the next decade, the scope of the population affected by fire is likely still Small. Severity could range from Slight to Moderate, given that adults can flee from fire, but eggs and chicks would perish from fires around the peak of the breeding season, and large or repeated fire events could have a cumulative impact on recruitment.
7.2	Dams & water management/use	D	Low	Small (1–10%)	Moderate – Slight (1–30%)	High (Continuing)	Some hydro developments being considered in Ontario (Northern Ontario Business 2022), with potential to affect a small part of the population. Severity is most likely Slight but could range to Moderate depending on the availability of suitable habitat elsewhere.
7.3	Other ecosystem modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Reduction of prey availability as a result of pollution and other factors likely affects almost all individuals through one or more parts of their life cycle. Not much known about severity - presumably problematic but no specific evidence as to extent, so Slight seems appropriate.
8	Invasive & other problematic species & genes	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
8.1	Invasive non-native/alien species/diseases	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	Feral dogs on beaches are widespread in the wintering range and can cause persistent disturbance, although the net effect is likely slight at most.
8.2	Problematic native species/diseases	D	Low	Large (31 – 70%)	Slight (1–10%)	High (Continuing)	Increase in terrestrial predators in parts of the breeding range and of Peregrine Falcon at stopover and wintering sites likely affects a large portion of the population; avian botulism may also be a concern in some areas although dowitchers appear to be less vulnerable than some other shorebirds.
8.3	Introduced genetic material						
8.4	Problematic species/diseases of unknown origin						
8.5	Viral/prion-induced diseases						
8.6	Diseases of unknown cause						
9	Pollution	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
9.1	Domestic & urban waste water	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
9.2	Industrial & military effluents	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Almost all individuals likely exposed to some mercury contamination and/or leaching of calcium and other chemicals because of acid rain. Effect is presumably negative, but there is no evidence to suggest it is greater than slight. Potential risk of exposure to coastal oil spills during migration and on wintering grounds, especially in the Gulf of Mexico, where the Deepwater Horizon oil spill occurred in 2010. There can also be frequent small-scale oil spills from fishing boats near wintering sites in Central America (Morales <i>et al.</i> 2019). Although there could be serious consequences from a major oil spill, typical severity is more likely to be slight.
9.3	Agricultural & forestry effluents		Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive deposition of agricultural effluents along coastlines likely affects a large part of the wintering range and perhaps some stopover locations too, but effects are unknown. Algal blooms in coastal estuaries have been attributed to upstream pollution from peanut, sugarcane, and rice production in Central America (Morales <i>et al.</i> 2019). There is potential for mortality from ingestion of toxic algae and other contaminants.
9.4	Garbage & solid waste		Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive plastic pollution in mangroves, beaches, and salt flats has been documented in Central and South America (Morales <i>et al.</i> 2019). The impact on Short-billed Dowitcher remains unknown at this time.
9.5	Air-borne pollutants						
9.6	Excess energy						
10	Geological events						
10.1	Volcanoes						
10.2	Earthquakes/tsunamis						
10.3	Avalanches/landslides						
11	Climate change & severe weather	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
11.1	Habitat shifting & alteration	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Loss of permafrost and drying of wetlands may be a widespread concern in the breeding range, although the change will be gradual and short-term severity is likely to be only Slight. Change in spring and summer temperature regimes could result in asynchrony between timing of breeding and peak prey availability. Open wet areas with scattered trees may transition into shrub thickets, becoming unsuitable for breeding.

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
11.2	Droughts	D	Low	Pervasive – Restricted (11–100%)	Slight (1–10%)	High (Continuing)	Drought is most likely to affect northbound migrants passing through the Great Plains in spring. If wetlands are unavailable, refuelling could be impaired, potentially reducing likelihood of reproductive success upon arrival on the breeding grounds. Exposure to this threat is likely to vary over time, but could range as high as pervasive. However, at this point enough alternatives likely exist for the severity to be slight at most, perhaps in most years even Negligible.
11.3	Temperature extremes	D	Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	Modelling suggests increased risk of cold and moisture in spring and early summer, which could cause breeding failure and have implications for population size over the course of multiple years.
11.4	Storms & flooding	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Extreme weather events can reduce body weight in advance of migration, perhaps impairing the ability of individuals to survive long-distance journeys. Increased frequency and severity of hurricanes could increase mortality of those individuals that cross the Gulf of Mexico. Presumably severity is at least slight; could increase over time.
11.5	Other impacts						
Classification of Threats adopted from IUCN-CMP, Salafsky <i>et al.</i> (2008).							

APPENDIX 3. Threats Calculator for Short-billed Dowitcher, *griseus* subspecies

Species or Ecosystem Scientific Name	Short-billed Dowitcher <i>griseus</i> ssp.		
Element ID		Elcode	
Date (Ctrl + “;” for today’s date):	2022-03-24		
Threats call invitees:	Carl Savignac, Marcel Gahbauer, Richard Elliot, Dave Fraser, Liana Zanette, Paul-Allen Smith, Louise Blight, Gord Court, Robin Gutsell, Purnima Govindarajulu, Greg Wilson, Ray Poulin, Chris Friesen, Colin Jones, Isabelle Gauthier, Benoit Tremblay, Mary Sabine, Donna Hurlburt, Jessica Humber, Shelley Moores, Suzanne Carriere, Eve Lamontagne, Tom Jung, Shelly Pruss, Myrle Ballard, Sue Chiblow, Barrie Ford, Leah de Forest, Pippa Shepherd, Syd Cannings, Gina Schalk, Jennifer Doubt, Katriina Ilves, Christian Artuso, Mike Burrell, Pete Davidson, Danielle Ethier, Andrew Horn, Tara Imlay, Elsie Krebs, Jean-Pierre L. Savard, David Toews, Tim Polle, Pam Sinclair, Julie Paquet, Christian Friis, Scott Fleming, Michel Rober, Nathan Hentze, Cindy Bertan Cernino		
References:	gen time 4 years		
Overall Threat Impact Calculation Help:		Level 1 Threat Impact Counts	
	Threat Impact		
	A	Very High	0
	B	High	0
	C	Medium	1
	D	Low	8
Calculated Overall Threat Impact:		High	High
Assigned Overall Threat Impact:		High	
Impact Adjustment Reasons:			
Overall Threat Comments			

Threat	Impact (calculated)	Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
1 Residential & commercial development	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Scope likely to be somewhat smaller in most cases than for <i>hendersoni</i> , but likely still in the same range; severity similar
1.1 Housing & urban areas	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Pertaining primarily to residential development in coastal areas, limited to wintering grounds and migratory stopover sites
1.2 Commercial & industrial areas	Negligible	Negligible (<1%)	Slight (1–10%)	High (Continuing)	
1.3 Tourism & recreation areas	D Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Some ongoing development of hotels and other tourism facilities in coastline sites and estuaries within the wintering range and southern migratory stopover areas.
2 Agriculture & aquaculture	D Low	Large – Restricted (11–70%)	Slight (1–10%)	High (Continuing)	

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
2.1	Annual & perennial non-timber crops	D	Low	Small (1–10%)	Slight (1–10%)	High (Continuing)	Limited to rice farming, most of which is ongoing, with limited expansion anticipated over the next decade, suggesting that scope is toward the low end of Small or possibly even Negligible. Dowitchers may make some limited use of rice fields at some point in the crop growth cycle. Rice farming is generally fairly shorebird-friendly, with severity Slight at most.
2.2	Wood & pulp plantations						
2.3	Livestock farming & ranching		Negligible	Negligible (<1%)	Unknown	High (Continuing)	Livestock roam freely in Brazil including on beaches, and destroy some habitat, but scope is likely Negligible and there is no evidence of any impact on shorebirds.
2.4	Marine & freshwater aquaculture	D	Low	Large – Restricted (11–70%)	Slight (1–10%)	High (Continuing)	Some ongoing expansion of aquaculture, especially in northern Brazil where laws have changed, facilitating expansion while the salt extraction industry is shrinking. Potentially a large part of the population passes through or winters in areas at risk of being affected. Loss of habitat due to shrimp farms in Central America is mainly affecting natural salt flats that are key roosting sites for dowitchers and other shorebirds (Morales <i>et al</i> 2019), and this may also apply to South America. However, various shorebirds including dowitchers may use shrimp farms when drained, especially where they include dikes that shorebirds can use for roosting. Although there may be occasional benefits at some sites, the overall effect is likely slightly negative.
3	Energy production & mining	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	
3.1	Oil & gas drilling		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Minimal overlap of oil and gas drilling with any part of the annual range. Oil spills are considered a threat to Lesser Yellowlegs (Roberge and Chapdeleine 2000; Aubry and Cotter 2007; Buidin <i>et al.</i> 2010); spills certainly could also affect Short-billed Dowitcher in migration and on the wintering grounds.
3.2	Mining & quarrying		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Salt extraction (at salinas) is a historical concern, especially along the northeast coast of Brazil, but is generally being scaled back, with some getting converted into shrimp ponds. Hypersaline environments are not preferred, but may still be used to some extent by shorebirds, especially for foraging on insects along the edges. Both scope and severity are likely Negligible.
3.3	Renewable energy	D	Low	Restricted (11–30%)	Slight (1–10%)	High (Continuing)	Limited threat to date, but quite a lot of shoreline and offshore development proposed in northeastern Brazil, as well as some offshore along the U.S. Eastern Seaboard (AWWI 2019, Loring <i>et al.</i> 2020).
4	Transportation & service corridors		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	
4.1	Roads & railroads		Negligible	Restricted (11–30%)	Negligible (<1%)	High (Continuing)	Some potential exposure during migration and on wintering grounds, likely affecting a restricted portion of the population. Species not documented as a collision risk, therefore severity likely Negligible.

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
4.2	Utility & service lines		Negligible	Small (1–10%)	Negligible (<1%)	High (Continuing)	Scope likely somewhat smaller than for roads; collision risk perhaps slightly greater but probably still negligible
4.3	Shipping lanes						
4.4	Flight paths						
5	Biological resource use	C	Medium	Large (31–70%)	Moderate (11–30%)	High (Continuing)	
5.1	Hunting & collecting terrestrial animals	C	Medium	Large (31–70%)	Moderate (11–30%)	High (Continuing)	Substantial hunting pressure remains throughout much of Caribbean and South America, with a large part of the population likely exposed at some point; cumulative severity over 12 years is very likely to exceed 10%.
5.2	Gathering terrestrial plants						
5.3	Logging & wood harvesting						
5.4	Fishing & harvesting aquatic resources						
6	Human intrusions & disturbance	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
6.1	Recreational activities	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	During migration or on wintering grounds, majority of population likely to be exposed at some point to various recreational activities on beaches, including ATVs, drone flights, and kite surfing. Some evidence of motorcycle use on tidal flats and beaches causing disturbance in northern Brazil. Frequent and intense disturbance may cause displacement, with implications on energetics, but there is no evidence to support severity being more than Slight.
6.2	War, civil unrest & military exercises						
6.3	Work & other activities		Negligible	Negligible (<1%)	Negligible (<1%)	High (Continuing)	Research is undertaken on a negligible part of the population; given animal care standards, severity is assumed to be Negligible.
7	Natural system modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
7.1	Fire & fire suppression	D	Low	Small (1–10%)	Moderate – Slight (1–30%)	High (Continuing)	The frequency and severity of fires and length of the fire season are all increasing because of climate change. However, within the next decade the scope of the population affected by fire is likely still Small. Severity could range from Slight to Moderate, given that adults can flee from fire, but eggs and chicks would perish from fires around the peak of the breeding season, and large or repeated fire events could have a cumulative impact on recruitment.
7.2	Dams & water management/use						No hydro development expected in Quebec over the next decade

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
7.3	Other ecosystem modifications	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Reduction of prey availability as a result of pollution and other factors such as Horseshoe Crab population decline likely affects almost all individuals. Not much known about severity—presumably problematic but no specific evidence as to extent, so Slight seems appropriate. Shoreline hardening to reduce coastal erosion in northern South America (especially Guyana) can reduce the extent and quality of shoreline habitat available to dowitchers and other shorebirds for roosting and foraging (Seitz <i>et al.</i> 2006).
8	Invasive & other problematic species & genes	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	
8.1	Invasive non-native/alien species/diseases	D	Low	Pervasive – Large (31–100%)	Slight (1–10%)	High (Continuing)	Feral cats and dogs on beaches are widespread in the wintering range and can cause persistent disturbance, although the net effect is likely not more than slight.
8.2	Problematic native species/diseases	D	Low	Large (31–70%)	Slight (1–10%)	High (Continuing)	Increase in terrestrial predators in parts of the breeding range and of Peregrine Falcon at stopover and wintering sites likely affects a large portion of the population; avian botulism may also be a concern in some areas although dowitchers appear to be less vulnerable than some other shorebirds.
8.3	Introduced genetic material						
8.4	Problematic species/diseases of unknown origin						
8.5	Viral/prion-induced diseases						
8.6	Diseases of unknown cause						
9	Pollution	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
9.1	Domestic & urban waste water		Unknown	Large (31–70%)	Unknown	High (Continuing)	
9.2	Industrial & military effluents	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Almost all individuals likely exposed to some mercury contamination and/or leaching of calcium and other chemicals because of acid rain. Effect is presumably negative, but there is no evidence to suggest it is greater than slight. Potential risk of exposure to coastal oil spills during migration and on wintering grounds. For example, in the St. Lawrence River corridor and in Atlantic Canada, many important migratory stopover sites for Lesser Yellowlegs are vulnerable to oil spills, due to the proximity of several major ports, heavy oil tanker traffic, and offshore oil extraction (Roberge and Chapdeleine 2000; Aubry and Cotter 2007; Buidin <i>et al.</i> 2010). A major oil spill extending along more than 2,000 km of Brazil's coastline in August 2019 affected part of the wintering range of Short-billed Dowitcher. There can also be frequent small-scale oil spills from fishing boats near wintering sites in Central America, which may similarly occur in South America (Morales <i>et al.</i> 2019). Although there could be serious consequences from a major oil spill, typical severity is more likely to be slight.

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
9.3	Agricultural & forestry effluents		Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive deposition of agricultural effluents along coastlines likely affects a large part of the wintering range and perhaps some stopover locations, too, but effects are unknown. Algal blooms in coastal estuaries have been attributed to upstream pollution from peanut, sugarcane, and rice production in Central America (Morales <i>et al.</i> 2019). There is potential for mortality from ingestion of toxic algae and other contaminants.
9.4	Garbage & solid waste		Unknown	Large (31–70%)	Unknown	High (Continuing)	Extensive plastic pollution in mangroves, beaches, and salt flats has been documented in Central and South America (Morales <i>et al.</i> 2019). The impact on Short-billed Dowitcher remains Unknown at this time.
9.5	Air-borne pollutants						
9.6	Excess energy						
10	Geological events						
10.1	Volcanoes						
10.2	Earthquakes/tsunamis						
10.3	Avalanches/landslides						
11	Climate change & severe weather	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	
11.1	Habitat shifting & alteration	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Loss of permafrost and drying of wetlands may be a widespread concern in the breeding range, although the change will be gradual and short-term severity is likely to be only Slight. Change in spring and summer temperature regimes could result in asynchrony between timing of breeding and peak prey availability. Open wet areas with scattered trees may transition into shrub thickets, becoming unsuitable for breeding.
11.2	Droughts						
11.3	Temperature extremes	D	Low	Small (1–10%)	Moderate (11–30%)	High (Continuing)	Modelling suggests increased risk of cold and moisture in spring and early summer, which could cause breeding failure and have implications for population size over the course of multiple years.
11.4	Storms & flooding	D	Low	Pervasive (71–100%)	Slight (1–10%)	High (Continuing)	Extreme weather events can reduce body weight in advance of migration, perhaps impairing the ability of individuals to survive long-distance journeys. Increased frequency and severity of hurricanes could increase mortality while crossing the Atlantic / Caribbean in fall. Presumably severity is at least slight; could increase over time.
11.5	Other impacts						

Classification of Threats adopted from IUCN-CMP, Salafsky *et al.* (2008).