

Ontario Species at Risk Evaluation Report for
Barn Swallow
Hirondelle rustique
(*Hirundo rustica*)

Committee on the Status of Species at Risk in Ontario
(COSSARO)

Assessed by COSSARO as Special Concern

September 2021

Hirondelle rustique (*Hirundo rustica*)

L'hirondelle rustique (*Hirundo rustica*) est classée dans la catégorie des espèces préoccupantes en Ontario par le CDSEPO.

L'hirondelle rustique est (*Hirundo rustica*) un passereau de taille moyenne. Cette espèce d'hirondelles est la plus largement répandue au monde. Elle est présente au Canada où sa reproduction est documentée dans chaque province et dans chaque territoire, principalement au sud de la limite forestière. Dans les Amériques, cette espèce se reproduit également aux États-Unis, au Mexique et en Argentine. L'hirondelle rustique migre sur de longues distances et hiverne dans le sud des États-Unis et dans certaines parties du Mexique, de l'Amérique centrale et de l'Amérique du Sud. L'hirondelle rustique se trouve dans tout le sud de l'Ontario et sa répartition peut se prolonger vers le nord jusqu'à la baie d'Hudson.

L'hirondelle rustique niche principalement dans des structures artificielles, notamment les granges et d'autres dépendances, les garages, les maisons, les ponts et les ponceaux de route. Elle préfère les habitats ouverts pour s'alimenter et, plus particulièrement, les champs et les terres agricoles. C'est un insectivore aérien dont le régime alimentaire se compose de tous les types de mouches, ainsi que de coléoptères, d'abeilles, de guêpes, de fourmis, de papillons, de papillons nocturnes et d'autres insectes volants.

Les menaces directes sont notamment les modifications du système naturel qui réduisent la quantité et la qualité des proies (insectes volants), l'utilisation accrue des pesticides, les changements en agriculture, l'aménagement résidentiel et commercial, l'infrastructure, les changements climatiques et la pollution. Ces menaces réduisent le taux de reproduction et augmentent la mortalité. D'autres facteurs limitatifs comprennent sa dépendance à l'égard des insectes proies et sa faible survie post-envol.

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Executive summary

Barn swallow (*Hirundo rustica*) is a medium sized passerine. It is the globally the most common species of swallow. Barn Swallow occurs across Canada and has been documented breeding in every Province and Territory, primarily south of the treeline. This species also breeds in the United States, Mexico and Argentina. Barn Swallow is a long-distance migrant which overwinters in the southern United States, parts of Mexico as well as Central and South America. Barn Swallow is found throughout southern Ontario and can range as far north as Hudson Bay.

Barn Swallow largely nest in artificial structures including barns and other outbuildings, garages, houses, bridges, and road culverts. They prefer open habitats for foraging especially fields and agricultural lands. It is an aerial insectivore, and the diet consists of flies of all types, as well as beetles, bees, wasps, ants, butterflies, moths, and other flying insects.

Direct threats include changes to the natural system resulting in reduced quantity and quality of prey (flying insects), increased use of pesticides, changes in agriculture, residential and commercial development, infrastructure, climate change and pollution. These threats result in lower reproductive success and increased mortality. Other limiting factors are dependence on insect prey and low post-fledgling survival rates.

Barn Swallow is classified by COSSARO as Special Concern

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Barn Swallow is considered a valid species based on current taxonomic treatments. It is the only species in the genus *Hirundo* in North America. A single subspecies has been documented to occur in North America, *Hirundo rustica erythrogaster*. However, there are three records of the Eurasian subspecies *H. r. rustica* from the Yukon Arctic coast.

1.1.2. Designatable units

Barn Swallow is found breeding across most of southern Canada and there are no distinct range separations. Genetic differences are not known and therefore there is thought to be only one designatable unit (COSEWIC, 2021).

1.1.3. Native status

The species is confirmed as native in Ontario (SARO, 2021).

1.1.4. Occurrence

The Barn Swallow is found throughout southern Ontario and can range as far north as Hudson Bay (SARO, 2021).

1.2. Eligibility results

Barn Swallow (*Hirundo rustica*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe, 2021)
- IUCN: Least Concern (November 5, 2018)
- NRANK Canada: N3N4B, N3N4M
- COSEWIC: Special Concern (April 2021)
- SARA: Threatened (Schedule 1)
- ESA 2007: Threatened (January 2012)
- SRANK: S4B (NHIC, 2021)

2.2. Distribution in Ontario

Barn Swallow is found throughout southern Ontario, rare to absent in parts of central and northern Ontario (Cadman *et al.*, 2007; SARO, 2021).

There are 446 reported NHIC Element Occurrences (EOs) in Ontario. According to the Ontario Breeding Bird Atlas relative abundance in southern Ontario ranges from 5.5 to 12 birds per point count in the southern portion to 1 to 2.5 birds per point count in the northern portion of Southern Ontario (Cadman *et al.*, 2007, COSEWIC, 2021).

The number of locations is unknown but is larger than 10.

IAO based on a 2x2 km grid cannot be calculated, but is more than 2000 km², given the extensive range of the species and its large population size.

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

Barn Swallow occurs across Canada and has been documented breeding in every Province and Territory primarily south of the treeline. This species also breeds in the United States, Mexico and Argentina. Barn Swallow is a long-distance migrant which overwinters in the southern United States, parts of Mexico as well as Central and South America (COSEWIC, 2021).

COSEWIC considers the Canadian population stable within the past 10 years: breeding bird survey data suggests there has been a large increase in numbers in Saskatchewan, offsetting substantial ongoing declines in Ontario and Quebec (COSEWIC, 2021).

The BBRGR is difficult to define for this species but is likely to extend beyond the boundary of Ontario. Although birds likely return to Ontario following winter migration, there is little delineation between the province's population and those of neighbouring jurisdictions.

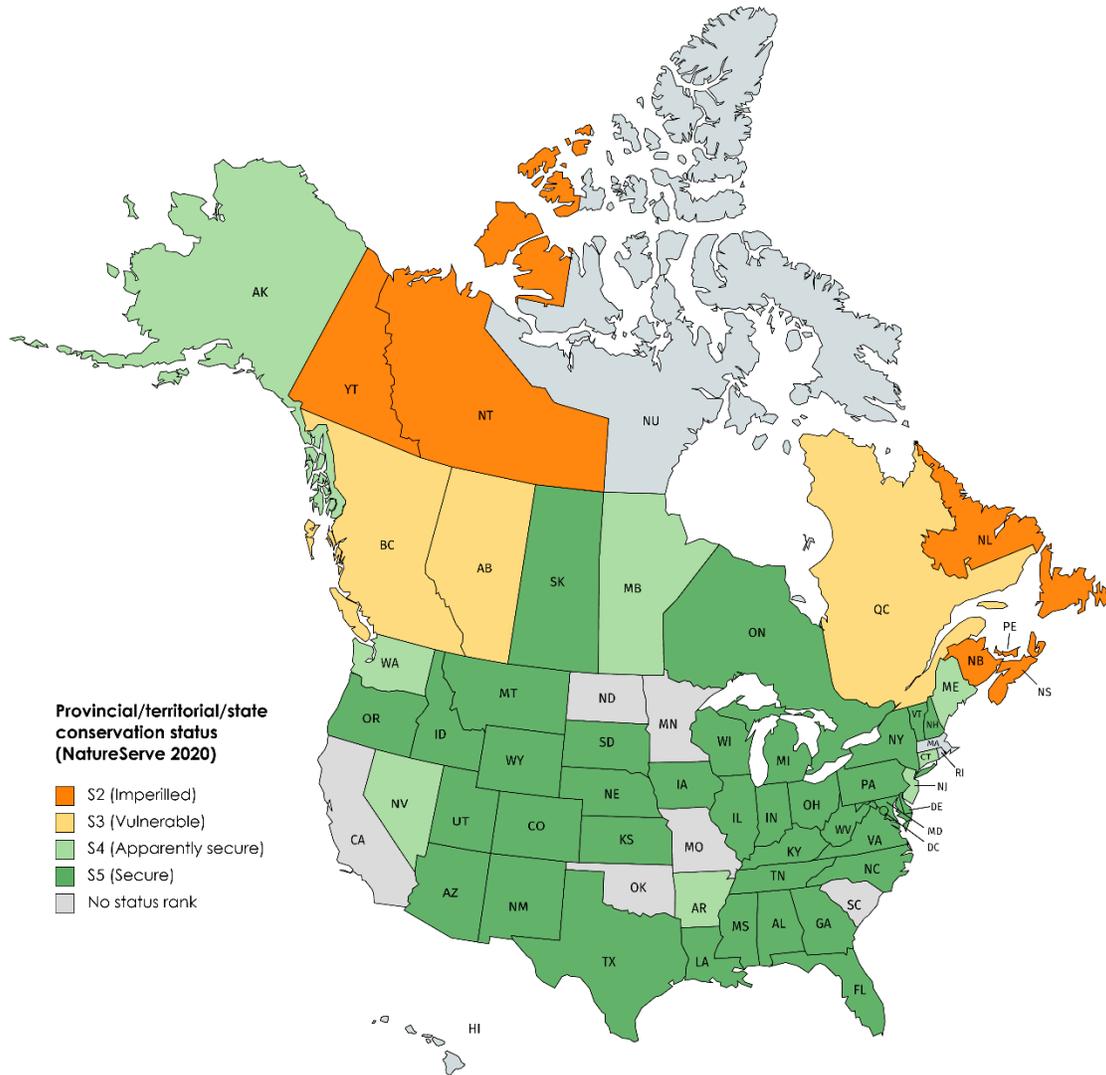
The species is not of conservation concern in US jurisdictions, populations are secure in the BBRGR, and vulnerable and in decline in Quebec.

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	Yes	S3B	Population is in decline. Population vulnerable.
Manitoba	Yes	S4B	Increasing population, apparently secure.
Illinois	Yes	S5	Population is secure.
Indiana	Yes	S5	Population is secure.
Michigan	Yes	S5	Population is secure.
Minnesota	Yes	SNRB	No status rank.
Nunavut	n/a	Not available	
New York	Yes	S5B	Population is secure.
Ohio	Yes	S5	Population is secure.
Pennsylvania	Yes	S4B, S5M	Population is secure or apparently secure.
Wisconsin	Yes	S5B	Population is secure.
<i>Other Relevant Jurisdiction</i>			

Source: Nature Serve, 2021/COSEWIC, 2021

BBRGR: Adjacent jurisdictions and States on the Great Lakes.



Created with mapchart.net

Figure 2: Map showing the conservation status of Barn Swallow in each province, territory, and state within its range in Canada and the United States (COSEWIC 2021).

2.4. Ontario conservation responsibility

The Barn Swallow population in Canada is currently estimated to be at least 6.4 million mature individuals which represents approximately 3.4% of the global Barn Swallow population and 13.6% of the population in the United States and Canada. Over 60% of the Canadian population currently breeds in the Prairie provinces (COSEWIC, 2021). The population in Ontario consists of approximately 860,000 individuals, 13.4% of the Canadian population (PIF, 2019).

Less than 1% of the species' global range occurred in Ontario.

2.5. Direct threats

Direct threats include changes to the natural system resulting in reduced quantity and quality of prey (flying insects), increased use of pesticides, changes in agriculture, residential and commercial development, infrastructure, climate change and pollution. These threats result in lower reproductive success and increased mortality. Other limiting factors are dependence on insect prey and low post-fledgling survival rates (COSEWIC, 2021).

The overall impact of threats on Barn Swallow over the next decade is considered to be medium (COSEWIC, 2021).

2.6. Specialized life history or habitat use characteristics

Barn Swallows build mud nests on horizontal and vertical structures that include natural cliffs, caves and trees (about 1% of nest sites), as well as man-made structures, such as barns, bridges and culverts (Brown and Brown 2020). They reuse existing nests where possible to save time on construction and increase the chances of having a second brood in the season. Post-fledging survival in Barn Swallows was found to be 42% over eight weeks in Ontario (Evans *et al.* 2019).

Changes in the use of building materials such as metal and vinyl siding limit available nesting opportunities as nest cannot be attached to those materials. Barn Swallow prefer wood and rougher materials to affix their mud nests to.

Barn Swallow feed on the wing and rarely feed on the ground. Dependency on flying insects makes Barn Swallow vulnerable as abundance of insects has declined following changes in agricultural practices and resulting losses of foraging habitat.

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Does not apply. Reduction of total numbers of mature individuals is not greater or equal to 50%.

According to the Breeding Bird Survey (Smith *et al.*, 2020) the long-term trend (years 1970 to 2019) shows a population decrease of 64.7% (-70.9% lower limit/-57.3% upper limit). This represents an annual trend of -2.1% (-2.49 lower limit/-1.72 upper limit) with an overall high reliability. The probability of a population change of >50% is 1.

The short-term trend (years 2009 to 2019) shows a population decrease of 25.9% (-

35.9% lower limit/-14.6% upper limit). The annual trend for this time period was -2.95% (-4.35% lower limit/-1.57% upper limit). The probability of a population change of 25 to 50% is 0.567 and 0 to 25% is 0.433.

The Ontario Breeding Bird Atlas estimates an annual rate of change of -2.95% (CI: -4.35 to -1.2). Numbers of Barn Swallow in Ontario declined between 1981-1985 and 2001-2005 by 35% (Cadman *et al.* 2007; COSEWIC 2011). Breeding records of Barn Swallow became more sporadic in the Algonquin Highlands as well as the Southern Shield region of Ontario (Cadman *et al.* 2007). It should be noted that the period over which this decline was recorded is over 15 years ago.

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Does not apply. EOO and AIO are below thresholds, and Barn Swallow occurrences are not severely fragmented nor do they fluctuate.

3.1.3. Criterion C – Small and declining number of mature individuals

Does not apply. Population exceeds thresholds.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. Population exceeds thresholds.

3.1.5. Criterion E – Quantitative analysis

Does not apply. No analysis has been conducted.

3.2. Application of Special Concern in Ontario

Applicable.

The species qualifies for Special Concern because it is near to qualifying under Criterion A (given an observed decline of 26% in the past three generations). Further, the species has experienced large historic declines, the causes of which are not fully ceased or addressed and could become threatened in the future if these threats continue.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply. Barn Swallow is not globally at risk and less than 25% of the Global Range is found in Ontario.

3.3.2. Status modification based on rescue effect or level of risk in broader biologically relevant geographic range

Barn Swallow breeds in all US states along the Canadian border and is considered common in most of them (PIF, 2019). Although the US population is considered to be common and secure, 10-year declines have been recorded in most states that border Canada. Of the 12 states, only Ohio and New Hampshire show small increases (1% and 0.07%, respectively). Although Barn Swallow is highly mobile and immigration into Canada from the US very likely occurs, it is probable that any drastic future decline in the Canadian population would also be reflected in the US population, and rescue therefore would be improbable (COSEWIC, 2021).

Modification due to BBRGR could apply. The wider Canadian population is considered to be Species Concern by COSEWIC, and therefore no modification would apply. However, incorporating more southern populations in the USA may give cause to apply this modification.

3.4. Other status categories

3.4.1. Data deficient

Does not apply.

3.4.2. Extinct or extirpated

Does not apply.

3.4.3. Not at risk

May apply given the BBRGR.

4. Summary of Ontario status

Barn Swallow (*Hirundo rustica*) is classified as Special Concern in Ontario based on being near meeting criterion A.

COSEWIC recently listed Barn Swallow as Special Concern (COSEWIC 2021). The species was previously assessed by COSEWIC as Threatened.

5. Information sources

Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.). 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto, xxii + 706 pp

COSEWIC. 2021. IN PRESS. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 60 pp. <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow *Hirundo rustica* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp. <https://wildlife-species.canada.ca/bird-status/oiseau-bird-eng.aspx?sY=2014&sL=e&sB=BARS&sM=p1>

Government of Ontario 2018. O.Reg. 230/08. Species at Risk in Ontario list. <https://www.ontario.ca/laws/regulation/080230>

Nature Serve. 2021. Barn Swallow. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.104225/Hirundo_rustica

PIF. 2019. Population Estimates Database, version 3.0. Partners in Flight <http://pif.birdconservancy.org/PopEstimates>

Smith, A.C., Hudson, M-A.R. Aponte, V.I., and Francis, C.M. 2020. North American Breeding Bird Survey - Canadian Trends Website, Data-version 2019. Trend Results for Barn Swallow. Environment and Climate Change Canada, Gatineau, Quebec, K1A 0H3. <https://wildlife-species.canada.ca/breeding-bird-survey-results/P004/A001/?lang=e&m=s&r=BARS&p=L>

¹ A change in the classification of a species during reassessment by COSSARO may be for genuine or non-genuine reasons. Genuine reasons may include a reduction in threats to a species such that status of the species has improved, or the continuation of threats to the species such that the status of the species has further deteriorated. Non-genuine reasons may include new information on population size or threats that was not available during a previous assessment, the use of previous COSSARO criteria that may have yielded a different result or, taxonomic revisions that result in changes in range, population sizes or designatable units.

Appendix 1: Technical summary for Ontario

Species: Barn Swallow (*Hirundo rustica*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	3 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Yes, but likely very slight overall, and varying somewhat among regions.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown. However, the annual trend over the last 10 years showed a decline of 2.95%
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	BBS suggests a 25.9% decline in number of mature individuals over the last 10 years.
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown.
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown.
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 in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	?
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	IAO based on a 2x2 km grid cannot be calculated, but is more than 2000 km ² , given the extensive range

Extent and occupancy attributes	Value
	of the species and its large population size.
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy is 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. Not applicable b. Not applicable
Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	Unknown, but far greater than the threshold of 10 locations
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	446 EOs reported by NHIC.
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No.
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes; observed decline in occupancy of 10x10 km squares based on results from the second Ontario (as well as Maritimes and Quebec) breeding bird atlas, likely not entirely offset by the increasing population in Saskatchewan and Manitoba.
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	There are no subpopulations of Barn Swallow in Ontario.
Is there an observed, inferred, or projected continuing decline in number of locations?	Unknown.
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes, inferred decline in anthropogenic nest site quality and foraging habitat quality.
Are there extreme fluctuations in number of populations?	No.
Are there extreme fluctuations in number of locations?	No.
Are there extreme fluctuations in extent of occurrence?	No.

Extent and occupancy attributes	Value
Are there extreme fluctuations in index of area of occupancy?	No.

Number of mature individuals in each sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals
Ontario (Ontario's population cannot be divided into sub-populations).	860,000

Quantitative analysis (population viability analysis conducted)

Unknown; analysis not conducted.

Threats

A threats calculator was completed for this species in May 2021 by COSEWIC.

Identified threats include:

Low to medium threat impacts:

- Natural system modifications
- Climate change

Low threat impacts:

- Residential and commercial development
- Agriculture and aquaculture
- Transportation and service corridors

Other relevant limiting factors:

- Dependence on insect prey
- Low post-fledging survival rates

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes.
Status of outside population(s) most likely to provide immigrants to Ontario	S5

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes.
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Yes.
Would immigrants be adapted to survive in Ontario?	Yes.
Is there sufficient suitable habitat for immigrants in Ontario?	Yes.
Are conditions deteriorating in Ontario?	Unknown, but likely.
Is the species of conservation concern in bordering jurisdictions?	Yes.
Is the Ontario population considered to be a sink?	No.
Is rescue from outside populations likely?	No.

Sensitive species

Not a data sensitive species.

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
ESA: Endangered Species Act
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario