Ontario Species at Risk Evaluation Report for

Chimney Swift

Martinet ramoneur

(*Chaetura pelagica*)

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

Assessed by COSSARO as Threatened

September 2020

Martinet ramoneur *(Chaetura pelagica)*

Le martinet ramoneur est le seul martinet présent en Ontario. L'espèce a une très vaste aire de répartition mondiale : la population nicheuse se répartit dans tous les États-Unis et le Canada, et les martinets migrent vers le sud à l'automne pour hiverner en Amérique du Sud. Les martinets ramoneurs sont répandus et largement répartis dans le sud de l'Ontario. Ils se sont facilement adaptés à des habitats artificiels comme les cheminées pour remplacer les perchoirs naturels disparus en raison de la déforestation. L'Ontario abrite environ 10 % de la population nicheuse canadienne, et moins de 1 % de la population reproductrice mondiale.

Le Relevé des oiseaux nicheurs de l'Amérique du Nord renferme un ensemble de données exhaustif sur les tendances à long terme de la population de martinets ramoneurs. Ces données montrent un déclin s'échelonnant sur une longue période dans l'aire de reproduction de l'espèce depuis le début des relevés, en 1970. À l'aide des plus récentes données disponibles, il est possible d'estimer le déclin des trois dernières générations de martinet ramoneur en Ontario, qui serait de l'ordre de 57 % (2005 à 2018). L'Union Internationale pour la Conservation de la Nature (UICN) considère le martinet ramoneur comme une espèce en péril à l'échelle mondiale et le COSEPAC, comme une espèce menacée depuis son évaluation de 2018.

Le martinet ramoneur répond aux critères des espèces en voie de disparition en Ontario, en raison de la diminution du nombre de ses individus matures, associée à une moins grande disponibilité de ses insectes proies et à la perte de son aire de repos. Son statut a toutefois été modifié pour celui d'espèce menacée en raison de sa situation dans l'aire de répartition plus vaste pertinente sur le plan biologique (ARVPPB). Le statut de cette espèce concorde avec l'évaluation du COSEPAC en tant qu'espèce menacée (2018).

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Remarque :
L'acronyme ARVPPB correspond à « aire de répartition plus vaste pertinente sur le plan biologique » qui se retrouve à l'alinéa 5 (4) b) de la *Loi de 2007 sur les espèces en voie de disparition*.

Executive summary

The Chimney Swift (*Chaetura pelagica*) is Ontario's only swift. The species has an extensive global range: the breeding population is distributed across the US and Canada, and swifts migrate south in the fall to overwinter in South America. Chimney Swifts are common and widely distributed across Southern Ontario, and have readily adapted to artificial habitats such as chimneys in place of natural roosts following deforestation. Ontario accounts for approximately 10% of the Canadian breeding population, and < 1% of the global breeding population.

North American Breeding Bird Survey data provide a comprehensive dataset on long-term population trends in Chimney Swifts. These data show a long-term decline across the species breeding range since surveys began in 1970. Using the most recent available data, decline over the past three generations of Chimney Swift in Ontario was estimated to be 57% (2005–2018). Chimney Swifts are considered globally vulnerable by the IUCN, and were assessed as threatened by COSWIC in 2018. They are threatened by reductions in insect prey throughout their migratory range and are potentially further at risk due to the loss of habitat, specifically the demolition or modification of chimneys. The potential impacts of pollution and climate change on the species are unknown.

Chimney Swift meets the criteria for listing as Endangered in Ontario, based on its declining number of mature individuals associated with declining availability of their insect prey, and loss of roosting habitat. However, the status has been modified to Threatened based on its condition across the broader biologically relevant range. The status of this species is consistent with the designation of Threatened by COSEWIC (2018).

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Chimney Swift (*Chaetura pelagica*) is recognized as a distinct taxon with no known sub species (COSWEIC 2019).

1.1.2. Designatable units

COSEWIC (2019) considers Chimney Swift in Canada as a single designatable unit.

1.1.3. Native status

Chimney Swift is native to Ontario, with extensive historic records and observations (COSEWIC 2018).

1.1.4. Occurrence

Chimney Swifts breed in Ontario in summer. The species migrates to Ontario in spring and departs in fall. It is absent from Ontario in winter.

1.2. Eligibility results

Chimney Swift (*Chaetura pelagica*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G4 (NatureServe 2020)
- IUCN: Vulnerable (August 2018)
- NRANK Canada: N4B,N3M
- COSEWIC: Threatened (April 2018)
- SARA: Threatened (Schedule 1)
- ESA 2007: Threatened (month and year of last assessment)
- SRANK: S4B,S4N (ranked in 2009)

2.2. Distribution in Ontario

Chimney Swift is widely distributed and relatively common across Southern Ontario, with a sparser distribution extending northward into Central Ontario (Cadman *et al* 2007; COSEWIC 2018). Swifts are commonly associated with developed areas, where artificial vertical cavities, specifically chimneys, are used as a substitute for the species' natural roosting and nesting of large hollow trees (Graves 2004). Despite the shift to anthropogenic habitats, Chimney Swifts still breed in natural tree cavities where they are available (Tozer 2012; Zanchetta *et al*. 2014).

Breeding Bird Surveys (BBS) provide extensive data on population trends of Chimney Swift in Ontario. The species has shown long-term decline since surveys began in 1970, with a decline of more than 90% between 1970 and 2017 in the province. Since the publication of the most recent COSWIC assessment of Chimney Swift (2018), the Canadian Wildlife Service (CWS) has developed improved statistical models and population indices for BBS data (Smith and Edwards 2020). Moving forward CWS plans to use the new General Additive Model Year Effects, described by Smith and Edwards (2020) to general annual population indices. Using these data, the 14-year (three generation) decline for Chimney Swift was 61% between 2005 and 2018 (95% CI: 57–69%). However, due to annual data fluctuations such trends may vary considerably from year to year with the result that species can fluctuate across criterion threshold from year to year. To combat this issue, CWS recommends that long-term trends are calculated using a smoothed General Additive Model (Smith and Edward 2020; A. C. Smith pers. comm 2020). Using this model for Ontario data from 2005 to 2018 results in an estimated decline of 57% (95% CI: 36–72%). The model further predicts the probability that the population declined by at least 30% and at least 50% as 0.94 and 0.77 respectively.

Additional evidence of the species' decline in Ontario comes from the change in probability of observation of Chimney Swift between the first (1981–1985) and second (2001–2005) Breeding Bird Atlases, with a decline of 46% (Cadman *et al.* 2007). During these surveys, Chimney Swift was recorded in 61% fewer survey squares in the second atlas, despite a 25% increase in survey effort (Cadman *et al.* 2007). Targeted monitoring of specific roosts in Ontario indicate statistically significant increases in

spring populations, while trends in fall are non-significant; these data are limited and additional surveys and analyses are required (COSEWIC 2018).

The number of locations in Canada was assumed by COSEWIC (2018) to greatly exceed 10, and the same logic can be applied to Ontario. The Estimated Area of Occurrence and Index of Area of Occupancy for Chimney Swift in Ontario is assumed to exceed the relevant thresholds of 20 000 km^2 and 2 000 km^2 respectively, and therefore was not calculated here (Cadman *et* al. 2007; COSEWIC 2017).

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

Chimney Swift has an extensive global range, distributed across North America, Central America and South America. The species is a long-distance migrant, with the breeding population distributed between Saskatchewan and Nova Scotia and extending as far south as Florida and Texas (Steves *et al*. 2014). Swifts migrate southward in fall, traveling through Central America in large flocks to reach wintering areas in South America (COSEWIC 2018). Due to the species' ecology as a long-distance migrant, the entirety of this intercontinental range can be considered as biologically relevant to the species.

Despite a large global population and wide distribution, Breeding Bird Survey data from most US states and other Canadian provinces suggests that Chimney Swift is in widespread decline. Accordingly, there is little potential for rescue from other jurisdictions while such declines continue (COSWEIC 2018).

The status of Chimney Swift varies considerable across Ontario's neighboring jurisdictions (Table 1), which may in some part reflect differences in the timing and approach's taken to assessment. However, the most recent BBS data (A. C. Smith pers. comm 2020) provides a comparable assessment of populations across both the US and Canada, and assessment of the species condition was primarily based on these data. Chimney Swift shows widespread declines across most jurisdictions in northeastern North America, however in most cases the declines were lower than those in Ontario, falling between 30 and 50% over the past three generations. We considered the wider area of northeastern North America to be the broader biologically relevant range for Chimney Swift due to this species migratory ecology and ability to move throughout this range.

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)	Status & Trends	Condition	Notes & Sources
Quebec	Yes	S2B	Observed in 16% fewer squares between second and first breeding bird atlas	Québec BBA

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Status & Trends	Condition	Notes & Sources
			Annual trend of -3.83% from 1970-2017	Smith *et al*. 2017
Manitoba	Yes	S2B	Annual trend of 0.721% from 1970-2017	Smith *et al*. 2017
Michigan	Yes	S5	Annual trend of -1.61% from 1970-2017	https://www.mbr-pwrc.usgs.gov
Minnesota	Yes	SNRB	Annual trend of -2.17% from 1970-2017	https://www.mbr-pwrc.usgs.gov/
Nunavut	No			
New York	Yes	S5B	Annual trend of -1.65% from 1970-2017	https://www.mbr-pwrc.usgs.gov
Ohio	Yes	S5	Annual trend of -1.87% from 1970-2017	https://www.mbr-pwrc.usgs.gov
Pennsylvania	Yes	S5B	Annual trend of -1.34% from 1970-2017	https://www.mbr-pwrc.usgs.gov
Wisconsin	Yes	S4B	Annual trend of -1.07% from 1970-2017	https://www.mbr-pwrc.usgs.gov

2.4. Ontario conservation responsibility

Blancher and Couturier (2007) estimated an Ontario population of 8,000 Chimney Swifts, using data from the Ontario Breeding Bird Atlas (2001-2005). Similar methods (Blancher *et al*. 2013) produced an estimate that the Canadian population represented 1% of the global population. Limitations of the data mean these figures may be overestimations (COSWEIC 2018). The Ontario population likely represents < 1% of the global population and, thus, Ontario does not have a significant conservation responsibility for this species.

2.5. Direct threats

Chimney Swifts are thought to be threatened by a combination of factors occurring throughout their migratory range. Reduced availability of aerial insect prey due to pesticide usage (Scott-Dupree *et al.* 2009) and mosquito control actions such as filling

or drainage of wetlands (COSEWIC 2018) is considered a high to medium threat (COSEWIC 2018).

The availability of suitable chimneys for nesting and roosting is believed to have declined since the 1950s due to conversion to electrical and natural gas heating of houses (Fitzgerald *et al*. 2014). In addition, new safety and environmental requirements in many municipalities require modifications, such as lining or capping, that prevent the use of chimneys by swifts (Lamoureux 2012). This loss of roosting habitat is currently considered a medium threat to the species (COSEWIC 2018). A 2014 study from Ontario suggested that swifts were only occupying 25% of available chimneys, and that habitat availability is not currently a limiting factor (Fitzgerald et al. 2014). However, assessing the suitability of structures can be difficult to determine, and figures for the number of suitable chimneys available to swifts may be overestimates (LeRoux *et al.* 2019; Wake 2020, personal communication). Surveys in London, Ontario found that 29% of chimneys that were occupied between 2004 to 2013 had been demolished or capped by the time of follow-up surveys conducted in 2015, making them unavailable to swifts (Wake 2016). Even if the loss of suitable chimneys is not currently a significant threat to Chimney Swifts, it is expected to become increasingly limiting in coming years (COSEWIC 2018; Wake 2020, personal communication). Moreover, the creation of artificial nesting structures has had little success in attracting breeding Chimney Swifts in Canada.

The loss of mature forest and chimney cleaning activities are both considered of low threat to Chimney Swifts, while the impact of pollution and climate change are currently unknown (COSEWIC 2018).

2.6. Specialized life history or habitat use characteristics

Chimney Swift is highly specialized in its habitat requirements, requiring vertical cavities for roosting and nesting (Fitzgerald et al. 2014). Prior to European settlement, the species predominantly used large hollow trees for nesting and roosting. However, the species readily adapted to the creation of artificial structures, and now primarily uses chimneys for nesting and roosting, although nests in natural cavities may still occasionally be found (Graves 2004). Chimney Swifts are specialized foragers and are highly adapted to catching insects while in flight (Sutton 1928; Macbriar 1963). As such, Chimney Swifts are vulnerable declines in populations of flying insects. The species also shows high fidelity to breeding sites, making it vulnerable to local disturbances (COSEWIC 2018).

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

Endangered. Meets criterion A2b with a decline of 57% in the BBS annual index over three generations (14 years, 2005-2018).

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

Does not apply. Population has a large distributon in Ontario, well above thresholds.

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

Threatened. Meets criterion C1: Ontario's Chimney Swift population was estimated to be 8 000 individuals in 2007 (Blancher and Coutuier), and is unlikely to have fallen below the 2 500 individual threshold for Endagered at the average annual decline of 5.47% per year.

3.1.4. Criterion D – Very small or restricted total population

Does not apply. Ontario's population was estimated at 8 000 in 2007 (Blancher and Coutuier) and is unlikely to have decreased below 1 000 individuals at the observed rates of decline.

3.1.5. Criterion E – Quantitative analysis

Doest not apply. Not conducted for Canadian populations.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply. Ontario has a little over 10% of Canada's population, which is estimated to be 1% of the global population (COSEWIC 2018).

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

Status modification due to rescue effect does not apply. Population is in global decline (IUCN status: Vulnerable) and is declining in most bordering states and provinces and rescue effect is not expected (COSEWIC 2018).

Status modification due to broader biologically relevant geographic range applies. The availability of consistent BBS data across the entire US and Canada allows us to assess the species condition with a consistent methodology, using the most recent data. These data show that Chimney Swift are facing widespread declines in the number of mature individuals. However, in the majority of jurisdictions in northeastern North America – which the committee considers to be the BBRGR for the Ontario population – population decline exceeds the 30% threshold for Threatened, but does not meet the 50% threshold for Endangered, indicating a lower level of risk to the speices. Therefore, in accordance with the requirement in Ontario's Endangered Species Act section 5 (5), COSSARO's classification must reflect the lower level of risk to the species in its BBRGR.

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

Does not apply.

4. Summary of Ontario status

Chimney Swift (*Chaetura pelagica*) is classified as Threatened in Ontario based on meeting criterion A2b for Endangered, lowered to Threatened to reflect the lower level of risk identified in the broader biologically relevant geographic range.

This status of this species is consistent with the definition of status under the Endangered Species Act, 2007.

5. Information sources

Blancher, P., and A.R. Couturier. 2007. Appendix 5: Population size estimates for Ontario birds, based on point counts. Pp. 655-657 in M.D. Cadman, D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (Eds.). Atlas of the Breeding Birds of Ontario. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, Ontario.

Blancher, P., M.D. Cadman, B.A. Pond, A.R. Couturier, E.H. Dunn, C.M. Francis, and R.S. Rempel. 2007. Changes in Bird Distributions between Atlases. Pp. 32-48 in M.D. Cadman, D.A. Sutherland, G.G. Beck, D. Lepage and A.R. Couturier (Eds.). Atlas of the Breeding Birds of Ontario. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources and Ontario Nature, Toronto, Ontario.

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, Ontario. xxii + 706 pp.

Fitzgerald, T.M., E. van Stam, J.J. Nocera, and D.S. Badzinski. 2014. Loss of nesting sites is not a primary factor limiting northern Chimney Swift populations. Population Ecology 56:507-512.

Graves, G.R. 2004. Avian commensals in Colonial America: When did *Chaetura pelagica* become the Chimney Swift? Archives of Natural History 31:300-307.

Lamoureux, S. 2012. État des connaissances sur la règlementation des municipalités en lien avec le ramonage et l'entretien des cheminées. Regroupement QuébecOiseaux, Montréal, Québec. 1-58 pp.

LeRoux C.E., McFarlane Tranquilla LA, Nocera JJ. 2019. Ambient temperature preferences of Chimney Swifts (*Chaetura pelagica*) for nest site selection. J Thermal Biol 80:89-93.

Macbriar, W.N. 1963. Chimney Swifts gathering insects off the surface of a pond. Wilson Bulletin 75:458.

Scott-Dupree, C.D., L. Conroy, and C.R. Harris. 2009. Impact of currently used or potentially useful insecticides for canola agroecosystems on *Bombus impatiens* (Hymenoptera: Apidae), *Megachile rotundata* (Hymentoptera: Megachilidae), and *Osmia lignaria* (Hymenoptera: Megachilidae). Journal of Economic Entomology 10:177-182.

Smith, A. C., Hudson, M-A.R. Aponte, V., and Francis, C.M. 2020. North American Breeding Bird Survey - Canadian Trends Website, Data-version 2018. Environment and Climate Change Canada, Gatineau, Quebec, K1A 0H3

Smith, A. C., and Edwards, B. P. M. 2020. Improved status and trend estimates from the North American Breeding Bird Survey using a Bayesian hierarchical generalized additive model. BioRxiv, 2020.03.26.010215 **[Preprint]** https://doi.org/10/ghcfwh

Steeves, T.K., S.B. Kearney-McGee, M.A. Rubega, C.L. Cink, and C.T. Collins. 2014. Chimney Swift (*Chaetura pelagica*). In P.G. Rodewald (ed.). The Birds of North America. Cornell Lab of Ornithology, Ithaca, New York. Website: https://birdsna.org/Species-Account/bna/species/chiswi DOI: 10.2173/bna.646. [accessed October 2016].

Sutton, G.M. 1928. Notes on the flight of the Chimney Swift. Cardinal 2:85-92.

Tozer, R. 2012. Birds of Algonquin Park. The Friends of Algonquin Park, Whitby, Ontario. 474 pp.

Wake, W. 2016. Loss of Chimneys used by Chimney Swifts in London, Ontario, 2004-2013. Cardinal 243:33-38.

Zanchetta, C., D.C Tozer, T.M. Fitzgerald, K. Richardson, and D. Badzinski. 2014. Tree cavity use by Chimney Swifts: implications for forestry and population recovery. Avian Conservation and Ecology 9(2):1.

[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: Chimney Swift (*Chaetura pelagica*)

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.	4.5 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Yes based on observations.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Estimated 37% (30-48%) decline in annual index between 2010-2018 in areas covered by the Breeding Bird Survey; some local populations in towns and urban areas stable or increasing
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Estimated 57% (36-72%) decline in annual index between 2004 and 2017 in areas covered by the Breeding Bird Survey; some local populations in towns and urban areas stable or increasing
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Not estimated, but decline is expected to continue at a similar rate, based on recent long- and short-term population trends (COSEWIC 2018)
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.	Not estimated, but decline is expected to continue at a similar rate, based on recent long- and short-term population trends (COSEWIC 2018)
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. No b. Partly 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). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	Unknown, but probably exceeds 20,000 km^2 threshold for distribution-related status criteria
Index of area of occupancy (IAO). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	Unknown, but probably exceeds the 2000 km^2 threshold for distribution-related status criteria
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. No b. No
Number of locations. *See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.*	Unknown, but far greater than the threshold of 10 locations
Number of NHIC Element Occurrences *Request data from MNRF.*	Insert if available
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Unknown
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Unknown
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Unknown
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
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	Unknown
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 sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals

Estimated total population size of 8,000 individuals for Ontario (Blancher and Couturier 2007)	

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

Threats calculator results for the Chimney Swift were prepared by COSEWIC (2018)

i. Other ecosystem modifications – high to medium threat
ii. Housing and urban areas (IUCN 1.1) – low threat
iii. Commercial and industrial areas (IUCN 1.2) – low threat
iv. Logging and wood harvesting (IUCN 5.3) – low threat
v. Work and other activities (IUCN 6.3) – low threat

Rescue effect and broader biologically relevant geographic range

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	Declining
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Are conditions deteriorating in Ontario?	Yes
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

This species is not data sensitive.

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