

Ontario Species at Risk Evaluation Report for

Short-eared Owl

(*Asio flammeus*)

Hibou des marais

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

Assessed by COSSARO as Threatened

September 2021

Hibou des marais (*Asio flammeus*)

Le hibou des marais (*Asio flammeus*) est classé dans la catégorie des espèces menacées en Ontario par le CDSEPO.

La répartition du hibou des marais à l'échelle mondiale est la plus vaste de celles de tous les hiboux, car elle englobe la majeure partie de l'Amérique du Nord et de l'Eurasie, certaines parties de l'Amérique du Sud, de l'Afrique du Nord et de diverses îles océaniques.

Les hiboux des marais nichent en petit nombre dans des localités très dispersées en Ontario, dont la majorité se concentre dans les basses terres de la baie d'Hudson. Leur répartition hivernale et leur abondance varient chaque année en Ontario, selon les conditions météorologiques et l'abondance des proies, et leur présence est habituellement confinée à la zone carolinienne et à la région de Kingston. La population de l'Ontario représente < 0,5 % de la population mondiale et < 2 % de la population canadienne.

Malgré l'importance de sa répartition et de sa population mondiale, les données du Recensement des oiseaux de Noël et du Relevé des oiseaux nicheurs du Canada et des États-Unis indiquent son déclin généralisé. Les données du Recensement des oiseaux de Noël disponibles pour l'Ontario permettent d'estimer un déclin annuel de 2,56 % des individus matures entre 1970 et 2019. Le hibou des marais est classé dans la catégorie « Préoccupation mineure » à l'échelle mondiale par l'UICN et a été évalué en tant qu'espèce menacée par le COSEPAC en 2021. Les menaces réelles pour les individus en Ontario sont notamment l'évolution et la modification de l'habitat, la perte d'habitats de reproduction et d'hivernage au profit de l'expansion urbaine, les modifications et l'intensification des cultures agricoles, les collisions avec les véhicules et les avions et les répercussions potentiellement négatives de l'accumulation des toxines utilisées pour le contrôle des rongeurs.

Le hibou des marais est classé dans la catégorie des espèces menacées en Ontario, conformément au critère A2b+4b; C1. Aucun facteur de modification de la situation n'a été appliqué. Un déclin > 30 % du nombre d'individus matures est déduit au cours de trois générations (2007-2019) et ce déclin estimé se poursuivra probablement à l'avenir. De plus, selon les estimations, le nombre d'individus matures se situe en Ontario entre 4 200 et 5 200 et leur nombre devrait diminuer de >20 % au cours de 2 générations.

Cette publication hautement spécialisée n'est disponible qu'en anglais conformément au Règlement 671/92, selon lequel il n'est pas obligatoire de la traduire en vertu de la Loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère l'Environnement, de la Protection de la nature et des Parcs au cossarosecretariat@ontario.ca

Executive summary

Short-eared Owl has the most extensive global distribution of any owl, extending across most of North America and Eurasia, parts of South America, northern Africa, and various oceanic islands. A small number of Short-eared Owl's breed in scattered locations across Ontario, with most breeding in Ontario occurring in the Hudson Bay Lowlands. Wintering distribution and abundance in Ontario vary annually in relation to weather conditions and prey abundance, and occurrences are typically limited to the Carolinian zone and the Kingston region. The Ontario population represents < 0.5% of the global population and < 2% of the Canadian population.

Despite a large global distribution and population, Christmas Bird Count and Breeding Bird Survey data from Canada and the United States indicates that Short-eared Owl is in widespread decline. Christmas Bird Count data available for Ontario estimates an annual decline of 2.56% in mature individuals between 1970 and 2019. Short-eared Owl is considered Least Concern globally by the IUCN, and was assessed as threatened by COSEWIC in 2021. Threats relevant to individuals in Ontario include habitat shifting and alteration, loss of nesting and wintering habitat to urban expansion, changes in agricultural crops and intensification, collisions with vehicles and airplanes and potential negative impacts related to accumulation of toxins used for rodent control.

Short-eared Owl (*Asio flammeus*) is classified as Threatened in Ontario based on meeting criterion A2b+4b; C1. No status modifiers were applied. There is an inferred decline of >30% in mature individuals over three generations (2007-2019) and this estimated decline is likely to continue in the future. The number of mature individuals in Ontario was also estimated to be 4,200-5,200, and it is estimated that the number of mature individuals will decrease by >20% over 2 generations.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Short-eared Owl (*Asio flammeus*) is recognized as a distinct taxon. Eleven Short-eared Owl subspecies are recognized globally, however only *Asio flammeus flammeus* occurs in Canada (COSEWIC 2021).

1.1.2. Designatable units

COSEWIC (2021) considers Short-eared Owl in Canada as a single designatable unit.

1.1.3. Native status

Short-eared Owl is native to Ontario, with extensive historic records and observations (COSEWIC 2021).

1.1.4. Occurrence

Short-eared Owl breed throughout Ontario in summer. Individuals of this species are also known to winter in southern Ontario.

1.2. Eligibility results

Short-eared Owl (*Asio flammeus*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2021)
- IUCN: Least Concern (October 2016)
- NRANK Canada: N4B-N3N-N4M
- COSEWIC: Threatened (May 2021)
- SARA: Special Concern (Schedule 1)
- ESA 2007: Special Concern (2008?)
- SRANK: S4?B, S2S3N (last update November 2020)

2.2. Distribution in Ontario

While the Short-eared Owl is widely distributed across Ontario during the breeding season, occurrences in both the Ontario Breeding Bird Atlas and at migration banding stations at Long Point Bird Observatory and Thunder Cape Bird Observatory are very rare. This species has become an increasingly rare and irregular breeder in southern Ontario, primarily associated with remnant habitat near Kingston, the lower Ottawa River, the Niagara Peninsula, and Sault Ste. Marie (COSEWIC 2021). Observations during the breeding season are rare within the boreal forest zone, aside from grassland habitat near Rainy River (Gahbauer 2007). The majority of Ontario observations during the breeding season occur in the James Bay and Hudson Bay Lowlands, where the probability of observation during Ontario's second breeding bird atlas (2001-2005) was over seven times higher than the average for the rest of the province (COSEWIC 2021).

Wintering distribution and abundance vary annually in relation to weather conditions and prey abundance, and occurrences are typically limited to the Carolinian zone and the Kingston region; Long Point, Haldimand County, Amherst Island, and Wolfe Island are of particular importance (COSEWIC 2021). Breeding territories are often established in wintering areas if food is plentiful (Clark 1975).

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

Short-eared Owl has the most extensive global distribution of any owl, extending across most of North America and Eurasia, parts of South America, northern Africa, and various oceanic islands (COSEWIC 2021). In Canada, Short-eared Owl breeds in all provinces and territories, with the core breeding range located primarily in the tundra, northern Quebec and Ontario, and the prairies (COSEWIC 2021). The winter range of Short-eared Owl in North America extends across the lower 48 US states and northern Mexico, with some birds frequently wintering in southern parts of British Columbia, the prairie provinces, Ontario, Quebec, and Nova Scotia (COSEWIC 2021).

Short-eared Owl is considered a partial migrant (Wiggins et al. 2020). Individuals breeding in the northern extent of the range in Canada are highly migratory, whereas some individuals breeding in the south may be resident (COSEWIC 2021). Gahbauer

et al. (2021) reported that Short-eared Owls wintering in New York State were tracked to northern Quebec and Labrador for summer. In contrast, limited data from wintering sites in southern Ontario and New York state suggest more consistent use of both winter and summer ranges (Gahbauer et al. 2021).

The Short-eared Owl is considered to be highly nomadic, moving in response to the abundance of small mammal prey (Wiggins et al. 2020). Nomadism in search of food, migration, and juvenile dispersal may be confused, particularly in areas where habitat use is year-round (Wiggins et al. 2020). Despite large north-south movements being reported, relatively little east-west exchange occurs within Canada (Gahbauer et al. 2021).

Despite a large global distribution and population, Christmas Bird Count and Breeding Bird Survey data from Canada and the United States indicates that Short-eared Owl is in widespread decline (COSEWIC 2021). Accordingly, there may be little potential for rescue from other jurisdictions.

2.4. Ontario conservation responsibility

COSEWIC (2021) estimated an Ontario population of 4,200 Short-eared Owls, using data from the Ontario Breeding Bird Atlas (2001-2005). Using data from Partners in Flight (PIF), COSEWIC also estimated that approximately 5,200 mature individuals occur in Ontario. The Ontario population represents < 0.5% of the global population and < 2% of the Canadian population. Therefore, Ontario does not have a significant conservation responsibility for this species.

2.5. Direct threats

Short-eared Owls are thought to be vulnerable to the effects of various threats in breeding and wintering areas, as well as along migration routes. However, very little quantitative data is available on threats affecting populations of Short-eared Owls, and most identified threats are based on published hypotheses. Likely threats relevant to individuals in Ontario include habitat shifting and alteration, loss of nesting and wintering habitat to urban expansion, changes in agricultural crops and intensification, collisions with vehicles and airplanes and potential negative impacts related to accumulation of toxins used for rodent control (Environment Canada 2016; COSEWIC 2021). Research is needed to better understand the threats and population-level effects on this rare and elusive species.

2.6. Specialized life history or habitat use characteristics

Short-eared Owl nesting typically occurs in large open habitat types, consisting of grasslands, tundra and wetlands (Wiggins et al. 2020), with nesting also occurring in agricultural areas in southern Ontario (COSEWIC 2021). Breeding territory size varies greatly throughout the range of Short-eared Owls, however Clark (1975) reported a mean territory size of 82ha (range 23-121ha) in Manitoba. This species is considered to be sensitive to habitat fragmentation (Wiggins 2004).

Winter habitat use by Short-eared Owls is similar to breeding habitat, however large open areas within woodlots, stubble fields, marshes, weedy fields, dumps, gravel pits, rock quarries and shrub thickets may also be utilized (Clark 1975). Short-eared Owls also appear to demonstrate a greater preference for areas adjacent to trees for roosting and shelter during the winter (Clark 1975).

Habitat use during migration is similar to that in the breeding range, however smaller open areas are also utilized if prey is available (Wiggins et al. 2020).

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

Threatened. Meets criterion A2b and 4b. Inferred decline of >30% in mature individuals over three generations (2007-2019). The estimated decline is likely to continue in the future.

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

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

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

Threatened. Meets criterion C1. Number of mature individuals in Ontario estimated to be 4,200-5,200, and it is estimated that the number of mature individuals will decrease by >20% over 2 generations, inferred from CBC data (decline of 2.56-4.66%/year over 8 years).

3.1.4. Criterion D – Very small or restricted total population

Does not apply. 4,200-5,200 mature individuals estimated to be in Ontario.

3.1.5. Criterion E – Quantitative analysis

Does not apply. Analysis not conducted for Canadian population.

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 population represents <0.5% of the global population and <2% of the Canadian population (COSEWIC 2021).

3.3.2. Status modification based on rescue effect

Does not apply. Population is in global decline (IUCN status: Least Concern) and is declining in most bordering states and provinces. Rescue effect is not expected (COSEWIC 2021).

Modification due to BBRGR does not apply. Species considered to be Threatened in Canada by COSEWIC and is ranked from S1 to S3 in adjacent United States jurisdictions that would form the 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

Short-eared Owl (*Asio flammeus*) is classified as Threatened, Ontario based on meeting criterion A2b+4b; C1.

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

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, Ontario. xxii + 706 pp.

Clark, R. J. (1975). A field study of the Short-eared Owl (*Asio flammeus*) Pontoppidan in North America. Wildlife Monographs 47:1-67.

Environment Canada. 2016. Management Plan for the Short-eared Owl (*Asio flammeus*) in Canada [Proposed]. Species at Risk Act Management Plan Series. Environment Canada, Ottawa. v + 35 pp.

Gahbauer, M.A. 2007. Short-eared Owl. pp. 302-303 in Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier (eds.). 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.

Gahbauer, M.A., T.L. Booms, P.G. Novak, M.D. Schlesinger, L. Takats-Priestley, and K.L. Keyes. 2021. Movements and habitat selection of Short-eared Owls (*Asio flammeus*) in North America. Airo 29:83-102.

Johnson, J.A., T.L. Booms, L.H. DeCicco, and D.C. Douglas. 2017. Seasonal movement of the Short-eared Owl (*Asio flammeus*) in Western North America as revealed by satellite telemetry. Journal of Raptor Research 51:115-128.

PIF (Partners in Flight). 2021. Population Estimates Database, version 3.0. Website: <http://pif.birdconservancy.org/population-estimate-database-scores/> [accessed September 2021].

Wiggins, D.A. 2004. Short-eared Owl (*Asio flammeus*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Website: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5182042.pdf [accessed September 2021].

Wiggins, D. A., D. W. Holt, and S. M. Leasure (2020). Short-eared Owl (*Asio flammeus*), version 1.0. In Birds of the World (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.sheowl.01>

Appendix 1: Technical summary for Ontario

Species: Short-eared Owl (*Asio flammeus*)

Demographic information

Demographic attribute	Value
<p>Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.</p>	4 years
<p>Is there an observed, inferred, or projected continuing decline in number of mature individuals?</p>	<p>Yes. Inferred from Christmas Bird Count (CBC) and Breeding Bird Survey (BBS) trends.</p>
<p>Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.</p>	<p>Estimated reduction of >20% over 2 generations, inferred from CBC data (decline of 2.56-4.66%/year over 8 years).</p>
<p>Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.</p>	<p>Estimated 43.6% reduction over 3 generations (2007-2019), inferred from CBC data.</p>
<p>Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.</p>	<p>Projected future reduction of about 30% over three generations, based on anticipated impact of threats, and continuing decline in IAO and habitat quality.</p>
<p>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.</p>	<p>Projected continuing reduction of at least 30% over three generations, based on recent trends, anticipated impact of threats, and continuing decline in IAO and habitat quality.</p>
<p>Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?</p>	<p>a. Partly. Some threats cannot be reversed. b. Yes, partly. Impact of habitat loss is understood, but other factors are less clear.</p>

Demographic attribute	Value
	c. No. Habitat loss and other threats are ongoing.
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>	1,386,524km ² . Includes small portion of range in United States and Quebec.
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>	4,040km ²
Is the total 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. <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>	3413
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 continuing decline in IAO in parts of southern Canada.
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Not applicable. No defined subpopulations.
Is there an observed, inferred, or projected continuing decline in number of locations?	Unknown. Insufficient data.
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes. Inferred continuing decline in extent and quality of breeding and wintering habitat in southern Ontario.
Are there extreme fluctuations in number of populations?	No

Extent and occupancy attributes	Value
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 sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals
	<i>Estimated 4,200-5,200 mature individuals in Ontario (COSEWIC 2021)</i>

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

Threats calculator results for Short-eared Owl were prepared by COSEWIC (2021)

- i. Other ecosystem modifications (IUCN 7.3) – medium to low threat
- ii. Habitat shifting and alteration (IUCN 11.1) – medium to low threat
- iii. Housing and urban areas (IUCN 1.1) – low threat
- iv. Annual and perennial non-timber crops (IUCN 2.1) – low threat
- v. Roads and railroads (IUCN 4.1) – low threat
- vi. Flight paths (IUCN 4.4) – low threat
- vii. Hunting and collecting terrestrial animals (IUCN 5.1) – 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. See Appendix 2.
Status of outside population(s) most likely to provide immigrants to Ontario	Declining. See Appendix 2.
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible, but not likely
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. See Appendix 2.

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes. See Appendix 2.
Is the Ontario population considered to be a sink?	Unknown
Is rescue from outside populations likely?	Unknown

Sensitive species

This species is not data sensitive.

Appendix 2: Broader biologically relevant geographic range

Information regarding rank and decline for Short-eared Owl (*Asio flammeus*)

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Status & Trends	Condition	Notes & Sources
Quebec	Yes	S3B	Annual rate of change -3.67% from 1970-2019	COSEWIC (2021)
Manitoba	Yes	S2B	Annual rate of change -2.61 to 4.18% from 1970-2019	COSEWIC (2021)
Michigan	Yes	S1	United States annual rate of change -2.02% from 1970-2019	COSEWIC (2021)
Minnesota	Yes	S3	Annual rate of change -2.23% from 1970-2019	COSEWIC (2021)
New York	Yes	S2	United States annual rate of change -2.02% from 1970-2019	COSEWIC (2021)
Ohio	Yes	S1	United States annual rate of change -2.02% from 1970-2019	COSEWIC (2021)
Pennsylvania	Yes	S1	United States annual rate of change -2.02% from 1970-2019	COSEWIC (2021)
Wisconsin	Yes	S1	United States annual rate of change -2.02% from 1970-2019	COSEWIC (2021)

Broader Biologically Relevant Geographic Range in Other Jurisdictions

Species does not demonstrate fidelity to nesting areas. Species capable of long-distance migrations, making adjacent jurisdictions biologically relevant to the survival of the species in Ontario.

Global Status and Trends

GRANK: G5

IUCN: LC (2016)

NRANK: N4B-N3N-N4M

COSEWIC: Threatened (2021)

SARA: Special Concern

ESA: Special Concern

SRANK: S4?B, S2S3N

Acronyms

CBC: Christmas Bird Count

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