

**Ontario Species at Risk Evaluation Report for
Kirtland's Warbler
Paruline de Kirtland
(*Setophaga kirtlandii*)**

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

Assessed by COSSARO as *Endangered*

October 2024

Final

Executive summary

Kirtland's Warbler (*Setophaga kirtlandii*) is a small songbird of the family Parulidae (North American wood-warblers). Adult males in breeding plumage have bluish-grey upperparts, a lemon-yellow throat and belly, and black streaks on the flanks and sides. Females are similar to males but their plumage is duller, with grey or brown upperparts, a pale yellow belly, and less distinct breast streaks.

In Ontario, this wood-warbler nests only in Simcoe and Renfrew Counties, in larger regenerating stands of even-aged Jack Pine and Red Pine, similar to the core of its global range in Michigan, and adjacent states and provinces, with one recent breeding observation at French River Provincial Park. There are additional breeding season observations in southwestern Ontario and Quebec's Pontiac region. The species primarily overwinters in the Bahamas.

The global population is estimated at fewer than 5,000 birds, with only about 40-50 mature individuals currently occurring in Ontario. Birds are limited by the availability of suitable nesting habitat, and threats include wildfire suppression resulting in loss of early-successional habitats; conversion of nesting and wintering habitat for agriculture, forestry, and human development; and impacts of climate change and increasingly severe weather throughout the annual cycle. In the absence of management initiatives forest succession may lead to loss of suitable breeding habitat in Canada, as is the case elsewhere.

Kirtland's Warbler was classified as Endangered under the *Endangered Species Act, 2007* when it came into effect in 2008. The species has been reassessed and maintains its classification as Endangered in Ontario based on meeting criterion D1 (fewer than 250 mature individuals).

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Kirtland's Warbler was classified in the genus *Setophaga* in 2011 along with the other former *Dendroica* warblers, based on the most recent phylogeny of the family Parulidae (Lovette et al. 2010; Chesser et al. 2011). Widespread hybridization is not documented for the species, although one possible hybrid with Blackburnian Warbler (*S. fusca*) was reported in the Dominican Republic in 1997 (Latta and Parkes 2001).

1.1.2. Designatable units

There is one designatable unit for this species.

1.1.3. Native status

The species is native to Ontario.

1.1.4. Occurrence

The species occurs in Ontario.

1.2. Eligibility results

Kirtland's Warbler (*Setophaga kirtlandii*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G3 (NatureServe 2024)
- IUCN: NT (2020)
- NRANK Canada: N1B (NatureServe 2024)
- COSEWIC: Endangered (2024)
- SARA: Endangered (Schedule 1 in June 5, 2003)
- ESA 2007: Endangered (2008)
- SRANK: S1B (ranked in NHIC 2008)

2.2. Distribution in Ontario

In Ontario, 1–4 males have been detected most years since 2014 in the eastern Georgian Bay area of Parry Sound District (COSEWIC 2024). This includes observations at Henvey Inlet First Nation (2015 to 2019), including a mated pair in 2015, and at French River Provincial Park in 2023 (Burke pers. comm. 2024). Also, a singing male was detected on one ARU recording from 6 June 2012 near Elliot Lake in Algoma

District, out of 38 ARUs deployed in the region from 2012 to 2015 (COSEWIC 2024). There are two sites with Ontario Breeding Bird Atlas records, both in Simcoe County: one singing male was detected in the county in 1985, and at a Red Pine-Oak restoration site, Packard Tract, near Barrie, 5–6 males were detected in 2022 and one male was detected in 2023 (further habitat restoration is underway elsewhere in the county; Birds Canada 2022).

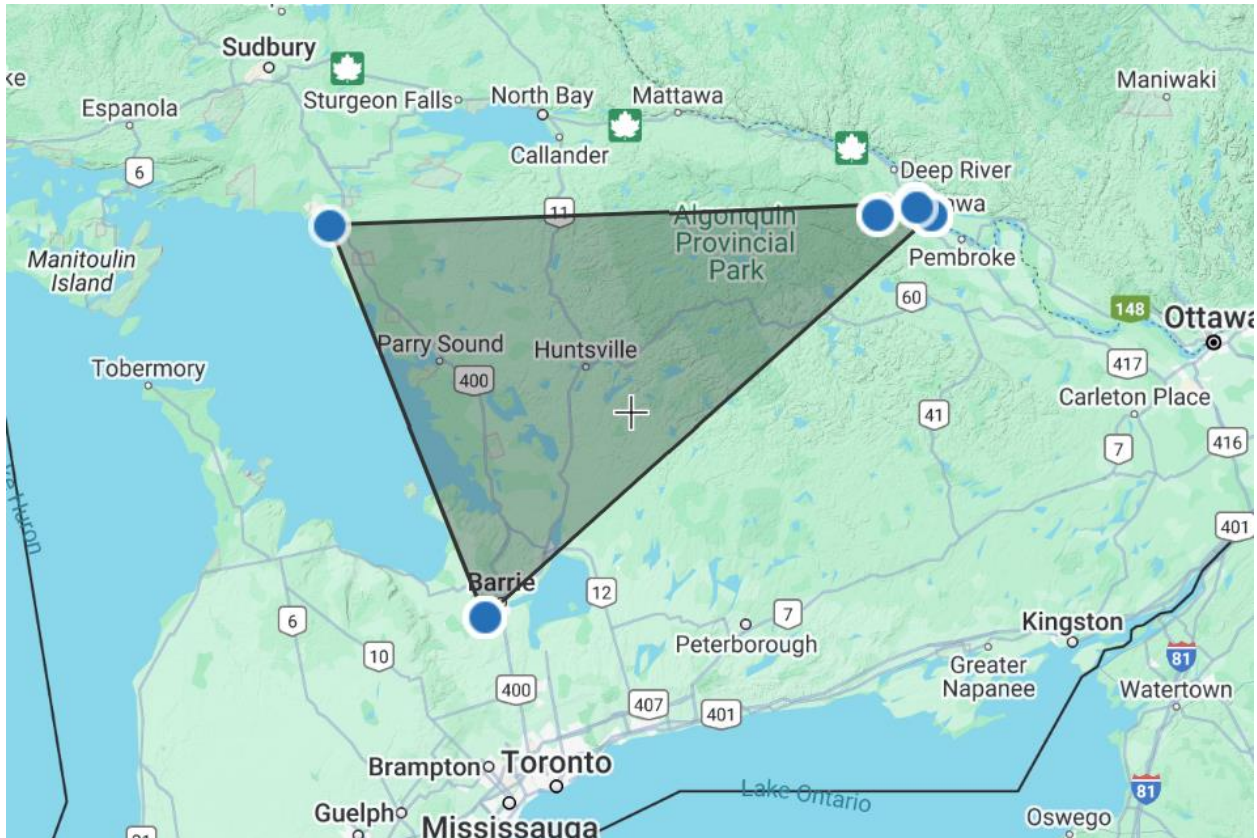


Figure 1. All Ontario Kirtland's Warbler element occurrence records (confirmed or candidate). Created for this report using [GeoCAT](#) [website accessed October 10, 2024].

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

In Ontario, the species is currently known to breed in Simcoe County and Renfrew County, Ontario. Further breeding season observations have been reported from near Kenora, Ontario, in the west, to the Pontiac region of Quebec. There are also low but regular numbers of spring migration stopover records (max. 5-10 individuals per year) in southwestern Ontario. One recent occurrence suggests that the species may have started to expand its range northward into the Canadian Shield (Burke pers. comm. 2024).

Kirtland's Warbler overwinters primarily in The Bahamas, with additional records from the Turks and Caicos and at least one record from Cuba. Globally, over 95% of the global Kirtland's Warbler population breeds in Michigan, U.S.A., with the majority of

these birds (>98%) found in the northern portion of the Lower Peninsula of Michigan and lower numbers found in Michigan’s Upper Peninsula and Wisconsin.

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	Few records, not assessed	COSEWIC 2024
Manitoba	No	-	-
Michigan	Yes	S3, majority of records	NatureServe 2024, COSEWIC 2024
Minnesota	No	-	-
Nunavut	No	-	-
New York	No	-	-
Ohio	Yes	S1N	NatureServe 2024
Pennsylvania	Yes	SNA	NatureServe 2024
Wisconsin	Yes	S1B	NatureServe 2024

2.4. Ontario conservation responsibility

Ontario’s conservation responsibility is low, with less than 5% of breeding individuals outside of Michigan, and less than 1% of the Warbler’s global population and range in Canada. Breeding records outside of Michigan include Ontario, Quebec, Indiana, Ohio, Pennsylvania, Virginia, North Carolina, South Carolina, Georgia, and Florida, each with very low numbers of breeding records.

2.5. Direct threats

The primary threat to Kirtland’s Warbler is reduced breeding habitat quality owing to fire suppression and maturation of current pine plantation habitat. Further threats include breeding, migrating, and wintering habitat loss and fragmentation, and potential brood parasitism by Brown-headed Cowbird (COSEWIC 2024).

Additional threats may include direct mortality and reduced habitat area and quality due to climate change-related effects; spread of invasive plants on the breeding and wintering grounds; and human disturbance from military base activities. Kirtland’s Warbler is also typically single-brooded, further limiting its population growth.

2.6. Specialized life history or habitat use characteristics

Kirtland’s Warbler has special significance only in that it has a very restricted global distribution: it is the only bird species in North America to exclusively breed in 5–20-year-old Jack Pine and Red Pine forests. It is therefore an emblematic species of the pine barren ecosystem.

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.

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

Does not apply. With only three locations the species has a small distribution range in Ontario, but the range is not declining.

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

Does not apply.

3.1.4. Criterion D – Very small or restricted total population

Applies. There are less than 90 suspected records of Kirtland's Warbler in the province, with only 30 of those records recognized as element occurrences or candidate element occurrences. Endangered under criteria D.1, population estimated to have less than 250 mature individuals.

3.1.5. Criterion E – Quantitative analysis

Does not apply.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Low. Ontario shares a small number of breeding individuals outside the core of the species range in Michigan with several other jurisdictions with breeding or transient records.

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

Does not apply.

3.3.3. Rescue Effect

Rescue effect is possible, as the core of the breeding range is in the upper peninsula of Michigan, the high likelihood of survival of the species in suitable habitat in Ontario, and the availability of that habitat. If the recent breeding record in the Canadian Shield indicates a true range expansion, this effect could be even more likely. However, the U.S. population remains small and may be declining, reducing the potential for rescue.

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

Kirtland's Warbler (*Setophaga kirtlandii*) is classified as Endangered, in Ontario based on meeting criterion D1 (<250 mature individuals).

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

5. Information sources

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Appendix 1: Technical summary for Ontario

Species: Kirtland's Warbler (*Setophaga kirtlandii*)

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.	2.2 years (Bird et al 2020)
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Unlikely based on stable but few occurrences.
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.	Unknown
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. Unknown b. Unknown c. Unknown
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).	23,422 km ² (estimated using GeoCAT 2024)
Index of area of occupancy (IAO).	28 km ² (estimated using GeoCAT 2024)
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

Extent and occupancy attributes	Value
Number of locations.	3
Number of NHIC Element Occurrences	30
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No - Not estimated for previous status reports. Persistence of breeding birds at Petawawa and Borden and increased breeding season sightings in Ontario and Quebec over the past 10 years suggest that EOO has not declined over the past 10–15 years.
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	No
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	NA
Is there an observed, inferred, or projected continuing decline in number of locations?	No
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Unknown – Succession of pine barren forests is possible, which could reduce habitat quality where it exists.
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
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
Only one population in Ontario.	40-50 – COSEWIC 2024

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

A threats calculator assessment was conducted for this species by COSEWIC (2024) and determined the overall threat impact in Canada to be High-Medium.

Key threats were identified as:

- i. Agriculture & Aquaculture (IUCN 2) – Medium-Low impact: conversion of breeding and wintering habitat to crop agriculture and non-native pine plantations; habitat loss at primary Canadian breeding site in a pine plantation due to ageing trees and lack of management plan.
- ii. Natural System Modifications (IUCN 7) – Medium-Low impact: wildfire suppression resulting in loss of early-successional habitats; wildfires in breeding habitat; dominance of non-native plant species reducing food availability of native species in breeding and wintering habitat.
- iii. Human Intrusions & Disturbance (IUCN 6) – Low impact: military base training activities.
- iv. Invasive & Other Problematic Species, Genes & Diseases (IUCN 8) – Low impact: predation by feral and domestic cats; nest parasitism by Brown-headed Cowbird.
- v. Climate Change & Severe Weather (IUCN 11) – Low impact: Jack Pine habitat loss within breeding range due to warming climate; rising sea levels and severe droughts on wintering grounds; extreme weather events (e.g., hurricanes) throughout annual cycle.

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	Stable or declining.
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 – but may be limited.
Are conditions deteriorating in Ontario?	Unknown
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	Yes - Possibly
Is rescue from outside populations likely?	Unlikely, but possible.

Sensitive species

Canadian breeding season detections are suppressed for this species by NHIC (Ontario), eBird, and iNaturalist, so impact of recreational activities is currently negligible. However, there is a potential risk of breeding season disturbance and related population level impacts through observation by birders and photographers if details of nesting localities were publicized. Also, primary current nest sites have restricted access and publishing these may lead to trespass (thus providing a potential disincentive for land managers to manage habitat for this species).

Acronyms

BBRGR: Broader Biological Relevant Geographic Range
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
MNR: Ministry of Natural Resources
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