

Ontario Species at Risk Evaluation Report for
Golden Eagle
Aigle Royal
Giniw (Ojibwe) & Mikisiw (Cree)
(*Aquila chrysaetos*)

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

Assessed by COSSARO as Endangered

November 2022

Final

Executive summary

Golden Eagle is a globally distributed large eagle species. It is widespread in western North America where populations are large and broadly stable. In contrast, populations in eastern North America are smaller and underwent considerable declines in the mid 20th century, primarily due to the use of the pesticide DDT, banned in 1972, although concerns over other pesticides continue. Golden Eagles are also threatened by lead poisoning, trapping, and shooting, disturbance at nest sites, habitat loss, collisions with powerlines, and climate change. The eastern population is believed to have grown in the 1970s through 1990s; however, populations have plateaued since 2000 and the number of breeding pairs remains low. Golden Eagles in Ontario include a small number of breeding pairs in the far north Hudson Bay Lowlands, and a migratory population in southern Ontario comprised of individuals migrating between overwintering sites in the United States and breeding grounds in Québec and Labrador.

The Ontario population of Golden Eagle is classified at Endangered by COSSARO due to its increased extirpation risk resulting from a very small population of fewer than 250 breeding individuals. Although the species faces numerous threats throughout its range, the small Ontario population may also reflect a low carrying capacity for this species in the province. This status differs from the current COSEWIC status of Not at Risk due to the smaller population found in Ontario and the higher decline of populations in Eastern North America.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Golden Eagle is taxonomically distinct: it is recognized as one of two eagle species in North America.

1.1.2. Designatable units

The Ontario population of Golden Eagle is considered a single Designatable Unit.

1.1.3. Native status

Golden Eagle is native to Ontario.

1.1.4. Occurrence

Both breeding and non-breeding populations of Golden Eagle are known to occur in Ontario. Possible nesting reports date back to the late 1800's, and the first documented nest was recorded in 1959 (Wyshynski & Pulfer, 2015). The most recent verified nesting observation in NHIC was recorded in 2010. iNaturalist records include 180 verified observations between 2001 and 2022, including observations as recent as October 2022, although these observations do not necessarily indicate breeding individuals.

1.2. Eligibility results

Golden Eagle (*Aquila chrysaetos*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2022)
- IUCN: Least Concern (2021)
- NRANK Canada: N4N5B, N4N5N
- COSEWIC: Not at Risk (April 1996)
- SARA: Not at Risk
- ESA 2007: Endangered (2007¹)
- SRANK: S1B, S4N (ranked in 2020)

2.2. Distribution in Ontario

Ontario's population of Golden Eagle is poorly understood, but breeding appears are limited to remote northern areas of Ontario with few, limited historic (pre-1954) nests in the south (Wyshynski & Pulfer, 2015). Increased survey effort associated with the Ontario Breeding Bird Atlases (1981–1985 and 2001–2005; Cadman et al. 1987, Sutherland 2007) identified 19 contemporary (1994–2015) nests, all within the Hudson Bay Lowlands (Figure 1). These breeding individuals are thought to be migratory: travelling south to overwinter in Wisconsin and Minnesota, although precise migratory routes within the province are unknown (Figure 2; Katzner et al. 2012, Asselin et al. 2013).

An accurate assessment of breeding pairs in Ontario is challenging due to the difficulty of conducting comprehensive surveys and inaccuracy introduced by an unknown number of non-breeding “floaters”: individuals that do not nest because all suitable territories are occupied (Wyshynski & Pulfer, 2015). Recent surveys and Breeding Bird Atlas data estimate approximately 10–20 nesting pairs (Figure 1; Sutherland 2007), and while more recent observation records exist, no confirmed nesting pairs have been added to the available data since this time. Each nesting pair is considered to be an individual location due to the territory size of the species and lack of connection between pairs.

Southern and Central Ontario are suspected to be migratory routes for Golden Eagles moving between breeding grounds in northeastern Quebec and the United States (Figure 2; Katzner et al. 2012). Seasonal observations of birds along these routes account for most records of Golden Eagle in Ontario.

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

¹ Golden Eagle was listed as endangered in previous provincial endangered species legislation in Ontario including Endangered Species Act, R.S.O. 1990.

Golden Eagle has the widest distribution of all large eagle species and is found throughout North America and across the northern hemisphere. It is considered “Least Concern” globally, and “Not at Risk” nationally in Canada. Contemporarily, it is predominantly present in the west of the continent with much smaller populations in the east (Kochert et al. 2002). However, the species was historically more widespread in eastern United States and Canada (Bednarz et al. 1990). Limited data from Ontario and eastern United States suggest a stable and at times increasing trend in recent decades, since the ban of DDT in 1972 (Hussell and Brown 1992; Titus and Fuller 1990). A 1996 estimate (Kirk) suggested a few hundred pairs were present in eastern North America, while a more recent estimate by the Eastern Golden Eagle Working Group estimated a total population of 5,000 individuals (EGEWG 2015).

The BBRGR for Golden Eagle in Ontario can be most broadly defined by the eastern North American population of the species. This incorporates both the Wisconsin and Minnesota overwintering grounds of the Ontario breeding population, and breeding and overwintering grounds of Golden Eagles migrating through southern and central Ontario, in Quebec and eastern Canada and the United States respectively. As outlined above, the population in this wider region is believed to be small, but stable. In 2013, 187 Golden Eagle pairs were documented in eastern Canada, with Québec and Labrador accounting for more than 90% of these (Morneau et al 2013).

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	Y	S3B	Natureserve 2022
Manitoba	Y	S1B,S2N	Natureserve 2022
Michigan	Y	NA	Natureserve 2022
Minnesota	Y	NA	Natureserve 2022
Nunavut	N		
New York	Y	SHB,S1N	Natureserve 2022
Ohio	N		
Pennsylvania	N		
Wisconsin	Y	S2N	Natureserve 2022
<i>Other Relevant Jurisdiction</i>	NL	SB2,SUM	Natureserve 2022

2.4. Ontario conservation responsibility

The Ontario population of Golden Eagle accounts for less than 25% of the global range and population.

2.5. Direct threats

Golden Eagles in Ontario are threatened by the following (from Wyshynski & Pulfer, 2015):

Lead poisoning (threat level unknown in Ontario but considered high threat throughout range): Golden Eagles are vulnerable to poisoning from lead shot ingested when carcasses of game birds and mammals are consumed. While the use of lead shot for hunting most migratory game birds was banned in Canada in 1999, it remains legal for upland game birds and is present in ammunitions for larger mammals.

Trapping and shooting (threat level unknown in Ontario but considered high and medium, respectively, throughout range): Golden Eagle are regularly captured in leg hold traps and snares set for furbearing mammals and are also known to be shot where livestock depredation is suspected.

Disturbance at nest sites (threat level considered to be medium in Ontario and throughout range): studies suggest 85% of nest losses in western United States resulted from human disturbance through activities including rock climbing, hiking, boating, and ATVs. Other possible sources of nest disturbance include noise from nearby developments.

Habitat loss (threat level low in Ontario, medium throughout range): Golden Eagle is seriously threatened by habitat loss, primarily resulting from fire suppression and forestry, throughout its range. However, these threats are lower for the Ontario population due to their location in the far north where forestry does not occur, although the population may still be threatened by other resource extraction activity.

Collisions and electrocutions (threat level low in Ontario and medium throughout range): collisions and electrocution by power lines are leading threats in western United States. The remote location of Ontario's breeding population limits exposure to these threats.

Environmental contamination (threat level low in Ontario and throughout range): pesticides such as DDT likely contributed to previous declines of Golden Eagle but have since been banned. Concern is building regarding alternate pesticides and other contamination such as mercury accumulation.

Climate change (threat level unknown in Ontario and throughout range): resulting changes in weather patterns may affect breeding success and migratory patterns, however the likely extent of these impacts is not known.

2.6. Specialized life history or habitat use characteristics

Golden Eagles in eastern North America typically breed at the boundary of tundra, boreal forest, and wet meadows (Katzner et al. 2012). They are particularly limited by the availability of suitable nesting sites, which usually are built on cliffs but are occasionally built in tall trees or on artificial structures (Wyshynski & Pulfer, 2015). Golden Eagles frequently refurbish and reuse existing eagle nests, and pairs may prepare several nests as alternatives (Pagel et al. 2010). Home range size in eastern Canada can range from 845 to 1,585 km².

2.7. Existing Conservation and Recovery Actions

- DDT banned in 1972
- Lead shot banned for most game birds in 1999
- Habitat management guidelines developed in 1987
- Species and general habitat protection under ESA 2007
- Targeted surveys as part of Breeding Bird Atlases
- Ongoing sporadic aerial surveys targeting known and potential nest sites throughout known breeding range
- Observations collected through eBird
- Data on fatalities collected from the Wind Energy Bird and Bat Monitoring Database
- Telemetry studies in surrounding jurisdictions
- Many documented nesting sites are within Polar Bear Provincial Park

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.

No clear evidence of declines in the adult population within the last 10 years or three generations.

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

Does not apply.

Thresholds met for Endangered (IAO) and threatened (EOO) but sub-criteria are not met: no clear evidence for continuing decline, and more than 10 locations are known.

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

Does not apply.

Although the Ontario population is thought to contain far fewer than 2,500 Golden Eagle there is no clear evidence of decline or vulnerable sub-populations.

3.1.4. Criterion D – Very small or restricted total population

Meets Endangered D1.

Best estimates suggest 10–20 breeding pairs; this number is almost certainly an underestimate but is significantly below the threshold of 250. While migratory populations in the south may exceed the threshold, no clear estimate is available and these are considered separately to the breeding population in the north.

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

Does not apply.

Species is not globally threatened.

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

Does not apply.

Population and trend data for Golden Eagle is lacking throughout its range in eastern North America. However, the population has undergone significant declines in the past century from which is only recently beginning to recover. Available trend data in the BBRGR suggests population growth from the 1970s through 1990s, which have subsequently stabilised with no indication of further growth (EGEWG, 2015). The total eastern population is believed to be approximately 5,000 individuals in total, plus or minus 2,000 (EGEWG, 2015). This figure includes breeding individuals and floaters (non-breeding individuals awaiting an open breeding territory).

3.3.3. Rescue Effect

Does not apply.

There is no clear evidence for Rescue Effect assisting Golden Eagle populations in Ontario. The species may be habitat restricted with a mixture of nesting pairs and “floaters” that are limited by lack of available breeding habitat but act to fill gaps when they become available (Wyshynski & Pulfer, 2015).

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

Golden Eagle (*Aquila chrysaetos*) is classified as Endangered in Ontario based on meeting criterion D1. This classification differs from the current COSEWIC status of Not at Risk (1996), reflecting the smaller population and higher risk of extirpation in Ontario.

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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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: Golden Eagle (*Aquila chrysaetos*)

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.	16 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Unknown
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. Partially b. Partially c. Partially
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).	>7,800 km ² (calculated for breeding records only)
Index of area of occupancy (IAO).	84 km ² (calculated for breeding records only)
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. <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>	10–20
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	11
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?	Unknown
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
NA	

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

Lead poisoning: threat level unknown in Ontario but considered high threat throughout range.

Trapping and shooting: threat level unknown in Ontario but considered high and medium respectively throughout range.

Disturbance at nest sites: threat level considered to be medium in Ontario and throughout range.

Habitat loss: threat level low in Ontario and medium throughout range.

Collisions and electrocutions: threat level low in Ontario and medium throughout range.

Environmental contamination: threat level low in Ontario and throughout range.

Climate change: threat level unknown in Ontario and throughout range.

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	S2N / Not Ranked (Wisconsin / Minnesota) & S3B (Quebec)
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possibly
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Unknown
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?	No
Is rescue from outside populations likely?	Possibly

Sensitive species

Golden Eagle is not a sensitive species in Ontario.

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