

**Ontario Species at Risk Evaluation Report**  
**for**  
**Loggerhead Shrike (*Lanius ludovicianus*)**

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

**Assessed by COSSARO as ENDANGERED**

**December 2014**

**Final**

## **Pie-grièche migratrice (*Lanius ludovicianus*)**

La pie-grièche migratrice (*Lanius ludovicianus*) est un oiseau chanteur migrateur de taille moyenne qui niche dans des habitats ouverts peuplés d'arbres isolés où elle trouve des perchoirs élevés depuis lesquels elle chasse ses proies, notamment des insectes et de petits rongeurs, des serpents, des amphibiens et des oiseaux. En Ontario, elle a fait l'objet d'observations dans une variété d'habitats, dont des alvars, les pâturages actifs et incultes, et des prairies cultivées et indigènes. La pie-grièche empale parfois (et cache temporairement) sa proie sur les arbres ou les arbustes épineux ou les clôtures barbelées, si possible. Elle occupe régulièrement une étroite bande de l'Ontario qui s'étend de la péninsule Bruce, à l'ouest, jusqu'à Smith's Falls, à l'est; elle est périodiquement observée dans le nord-ouest de l'Ontario. La pie-grièche migratrice est largement répandue en Amérique du Nord, et ses 11 sous-espèces sont nommées. De récentes analyses génétiques indiquent que les oiseaux qui nichent dans le sud de l'Ontario et le Québec voisin présenteraient, sur le plan génétique, des différences suffisantes pour les désigner en tant que sous-espèce distincte (*Lanius ludovicianus ssp.*) qui n'a pas encore été nommée. L'Atlas des oiseaux nicheurs de l'Ontario signale une baisse de 63 % de la probabilité d'occurrence entre les deux périodes de publication des atlas (1981-1985 et 2001-2005). Des relevés ciblés effectués en Ontario montrent un déclin de 26 % du nombre d'adultes à maturité de 1992 à 2013, et de 13 % de 2003 à 2013. Le taux de déclin des couples nicheurs pourrait avoir perdu de la vitesse à la suite des efforts de rétablissement en cours depuis 1997, mais la population d'oiseaux nicheurs est en ce moment dangereusement petite. Leur nombre total serait, selon les estimations, de 50 à 100 adultes en Ontario et de 10 oiseaux ou moins au Québec. Un relevé des pies-grièches réalisé en 2014 a révélé la présence de 16 couples et de 11 oiseaux seuls, pour un total de 43 oiseaux en Ontario.

Une analyse de la viabilité de la population menée par Environnement Canada évoque que le plus important facteur limitatif du rétablissement de la pie-grièche serait la survie à l'hivernation des adultes et des oisillons, qui influe directement sur le recrutement possible dans la population nicheuse. On croit que les oiseaux provenant de l'Ontario hivernent dans le sud-est des États-Unis. Il faudrait plus de renseignements sur les principaux facteurs qui touchent l'espèce dans son aire d'hivernage.

La pie-grièche migratrice (*Lanius ludovicianus*) est classée dans la catégorie des espèces en voie de disparition en Ontario en raison du très petit nombre d'adultes, des menaces permanentes dont elle fait l'objet et du déclin continu de sa population (CDSEPO, critères satisfaits : C2a[i], D1]).

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## EXECUTIVE SUMMARY

The Loggerhead Shrike (*Lanius ludovicianus*) is a medium-sized, migratory songbird that inhabits open habitat containing isolated trees for nesting and elevated perches from which it hunts for prey such as insects and small rodents, snakes, amphibians, and birds. In Ontario, it has been observed using a variety of habitats including alvars, active and idle pastures, cultivated and native grasslands. The Shrike may impale (and temporarily cache) its prey on thorny trees or shrubs or barbed wire fences where available. It regularly occupies a narrow band of Ontario extending from the Bruce Peninsula in the west to Smith's Falls in the east, and has been recorded periodically in northwestern Ontario. The Loggerhead Shrike is widely distributed in North America, and 11 subspecies have been named. Recent genetic analysis suggests the birds nesting in southern Ontario and adjacent Quebec may be genetically distinct enough to qualify as a separate subspecies (*Lanius ludovicianus* ssp.) that has not been named yet. The Ontario Breeding Bird Atlas suggests a decline of 63% in the probability of occurrence between the two atlas periods (1981-85 and 2001-05). Targeted surveys in Ontario suggest a decline in the number of mature adults of 26% from 1992-2013 and 13% from 2003-2013. The rate of decline in nesting pairs may have slowed as a result of recovery efforts underway since 1997, but the population of breeding birds is now critically low. The total number of breeding pairs is estimated to be 50-100 adults in Ontario and 10 or fewer birds in Quebec. A 2014 survey for the shrike revealed 16 pairs and 11 single birds for a total of 43 birds in Ontario.

A population viability analysis conducted by Environment Canada suggests the most important factor limiting recovery of the Loggerhead Shrike is overwinter survival of adults and juveniles, which directly influences potential recruitment into the breeding population. Birds from Ontario are thought to overwinter in the southeastern US. More information is needed on key factors that may affect the species on its wintering range.

The Loggerhead Shrike (*Lanius ludovicianas*) is classified as Endangered in Ontario on the basis of a very small number of adults, ongoing threats and continued population decline (COSSARO criteria met: C2a(i), D1).

## **1. BACKGROUND INFORMATION**

### **1.1 CURRENT DESIGNATIONS**

**GRANK: G4T3Q** (NatureServe, accessed Nov. 25, 2014)

**NRANK Canada: N2B**

**COSEWIC: ENDANGERED** (2014)

**SARA: ENDANGERED** (Schedule 1)

**ESA 2007: ENDANGERED** (last assessment was *November 2000*)

**SRANK: S2B**

### **1.2 DISTRIBUTION IN ONTARIO**

In Ontario, the Loggerhead Shrike is a migratory bird that inhabits sparsely treed grasslands, alvars, and pasture lands during the nesting season. It occupies a narrow band of Ontario extending from the Bruce Peninsula in the west to Smith's Falls in the east (Figure 1), and there are also periodic records of occurrence in northwestern Ontario (Table 1). The Ontario Breeding Bird Atlas (OBBA) indicates that the area occupied was much broader during the first OBBA (1981-85) than during the second (2001-2005; Cadman et al. 2007). Atlas data suggest the range has retreated southward since 1981-85, such that the species is no longer found on Manitoulin Island or the north shore of Lake Huron, or in a broad band of area between the northern tip of Lake Simcoe and Pembroke (Cadman et al. 2007).

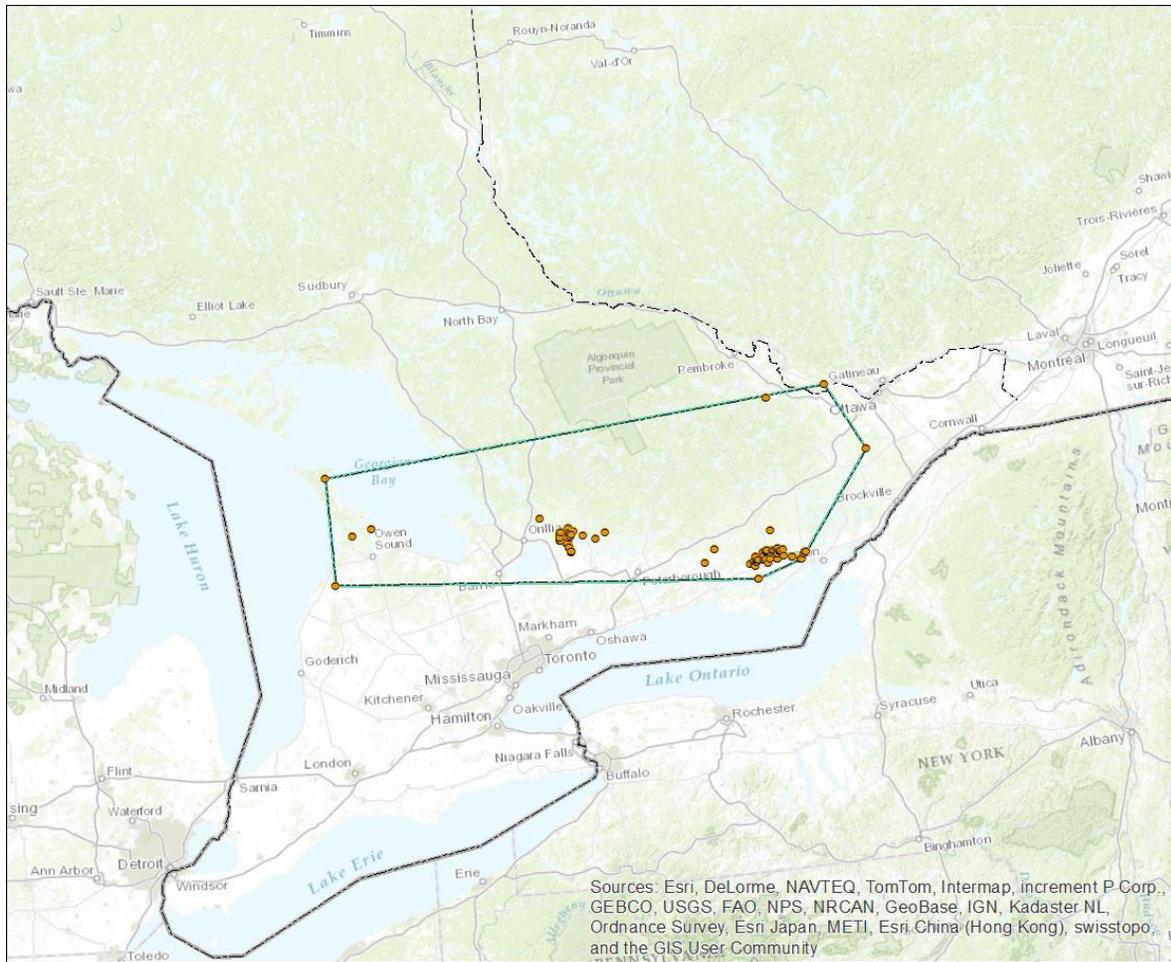


Figure 1. Breeding range of the Eastern Loggerhead Shrike in southern Ontario and Quebec, according to COSEWIC (2014). EC (2010, p. 11) reported that a pair was nesting "in Pembroke" in 2009; it is uncertain whether this is shown on the map.

Table 1. Records of occurrence of the Loggerhead Shrike in Northwestern Ontario (list compiled by C. Risley).

<b>Date (Y/M/D)</b>	<b>Location</b>	<b>Number</b>	<b>Observer</b>	<b>Comments</b>
1929	Emo	2 + young	L.L. Snyder	Observed pair with young
1964-06-14 to 1964-06-27	Hutchinson's Corners, 14 km WSW of Fort William Post Office	2 (pair)		Nest with eggs found; NHIC EO #12546
1983-04-25	Heron Bay, Thunder Bay	1	T. Hince	Ontario Birds Records Data (1983-220) from eBird (2014); James (1984)
1987-09-28	Schreiber, Thunder Bay District	1	Alan Wormington and Nicholas G. Escott	Ontario Birds Records Data (#1052) from eBird (2014)
1992-05-04	Sawmill Creek, Rainy River District	1	Don Graham and Dave Elder	Ontario Birds Records Data (#461) from eBird (2014); Bain (1993)
1992	South end of Sable Islands	2		Pair nested; John Vandebroek (pers. comm. 2014)
1994-04-30 to 1994-05-02	Silver Islet, Thunder Bay District	1	Nick Escott and Barry Atkinson	Ontario Birds Records Data (#781) from eBird (2014); Pittaway (1995)
1997-05-21	Pass Lake, Thunder Bay District	1	Annette van Niejenhuis and Brian Moore	Ontario Birds Records Data (#781) from eBird 2014
2001-05-21 to 2001-05-22	Thunder Cape Bird Observatory	1	B. J. Rodrigues, S. Nelson and D. D. Tousignant	Published Ontario Birds Records Data (#222) from eBird (2014); Roy (2002)
2001-05-27 to 2001-06-03	River Road east of McInnes Creek, Rainy River District		Dave Elder	Harris et al. (2002)
2003-05-24	Big Fork, Rainy River District	1	Chris Martin and Gordon Martin	Ontario Birds Records Data (#450) from eBird (2014); Crins (2004)
2010-05-03 to 2010-05-05	Thunder Bay – Chippewa Landfill	1	Alan Wormington and Richard P. Carr	Ontario Birds Records Data (2010-066) from eBird (2014)
2013-05-26	Rosspoint, Thunder Bay District	1	Alan Wormington	Brian Ratcliff (pers. comm., 2014)

### **1.3 DISTRIBUTION AND STATUS OUTSIDE ONTARIO**

As a species, the Loggerhead Shrike is widely distributed in North America, occurring on the prairies of Alberta, Saskatchewan, and southwestern Manitoba, to as far south as Florida and throughout most of Mexico, (COSEWIC 2014). The Loggerhead Shrike was last recorded nesting in the Maritimes in 1972 (EC 2010). Possibly only one pair, and definitely fewer than 10, may nest in Quebec (COSEWIC 2014, EC 2010). The Loggerhead Shrike has been extirpated from much of its former range in the northcentral US, occurring now only from Michigan, Wisconsin, Ohio, Indiana and further south (COSEWIC 2014). Its status in adjoining jurisdictions is provided in Appendix 2.

### **1.4 ONTARIO'S CONSERVATION RESPONSIBILITY**

Ontario accounts for much less than 25% of the species range overall. Recent genetic analysis suggests the birds in southern Ontario (and the few remaining in Quebec) may be genetically distinct enough to be candidates for a new subspecies (yet unnamed) distinct from *L. l. migrans* which occurs to the south in the United States (COSEWIC 2014).

### **1.5 DIRECT THREATS**

Recovery efforts for the Loggerhead Shrike have been underway in Ontario since at least 1994 (EC 2010, COSEWIC 2014). The program has involved habitat stewardship projects focused on collaboration with private landowners, an intensive banding program, and the release of hundreds of captive-reared juvenile shrikes, including some with radio transmitters or geolocators. Releases have continued up to 2014 (Wheeler 2014).

Environment Canada (EC 2010) concluded from a population viability analysis that the most important factor limiting recovery of the Canadian population of the Eastern Loggerhead Shrike is overwinter survival of adults and juveniles, which directly influences potential recruitment into the breeding population. Birds from Ontario are thought to overwinter in the southeastern US; more information is needed on key factors that may affect the subspecies on its wintering range (EC 2010). The recovery efforts described above will help to provide necessary information on threats.

Population decline appears to be greater than breeding habitat loss alone could explain (Henson et al. 2005, Chabot et al. 2001). For example, in an area where 31 pairs were found, EC (2010) identified over 6,800 ha of critical (suitable) habitat. This is about 219 ha per pair, much larger than the 50 ha area of occupancy identified around individual nest sites (EC 2010, p. 18). The species seems to have a fairly broad habitat tolerance. It frequently nests in active and idle pasture (grassland, possibly also qualifying as "alvars") with isolated red cedar, hawthorn, or white cedar trees (Chabot et al. 2001), but will also nest in fencerows, hedgerows, highly fragmented suburban habitat, and large expanses of rural grassland (EC 2010).

COSEWIC (2014) and EC (2010) listed other factors with the potential to cause some mortality or reduced fecundity, but none was identified as being a significant threat.

## **1.6 SPECIALIZED LIFE HISTORY OR HABITAT USE CHARACTERISTICS**

The Loggerhead Shrike is a medium-sized songbird that inhabits open habitat containing isolated trees for nesting and elevated perches from which it hunts for prey such as insects and small rodents, snakes, amphibians, and birds (Chabot et al. 2001, EC 2010, COSEWIC 2014). In Ontario, it has been observed to use alvars, pastures, cultivated and native grasslands, golf courses, schoolyards, and fencerows (COSEWIC 2014, Chabot et al. 2001, EC 2010, Peck and James 1987). Perches can be fence posts and fencing wire, utility wires, trees, and shrubs. The Shrike's strongly-hooked beak with a "tomial tooth" on each side, similar to that possessed by some birds of prey, and its large head with well-developed musculature, enable the shrike to inflict a relatively powerful bite to its prey. The Shrike may impale (and temporarily cache) its prey on thorny trees or shrubs or barbed wire fences where available. While the Shrike has a unique combination of attributes, none would seem to make it particularly vulnerable to attaining a higher risk status.

## **2. ELIGIBILITY FOR ONTARIO STATUS ASSESSMENT**

### **2.1 ELIGIBILITY CONDITIONS**

**Taxonomic Distinctness: Yes.** Two species of shrikes are found in Ontario: the Northern Shrike (*Lanius excubitor*), which nests mainly in open woodlands and muskeg in the James Bay and Hudson Bay lowlands, and the Loggerhead Shrike (*L. ludovicianus*), which nests in sparsely treed grasslands in southern Ontario. There have been consistent but infrequent observations of Loggerhead Shrikes in northwestern Ontario as well. There are 11 (possibly 12) recognized subspecies of Loggerhead Shrikes in North America. Only one subspecies of Loggerhead Shrike regularly occurs in Ontario (see below); the subspecies to which birds observed in northwestern Ontario belong has not been confirmed.

**Designatable Units:** For the purpose of this provincial assessment, the species has been evaluated at the species level. In Ontario, the Loggerhead Shrike occurs in two widely separated areas - southern Ontario (Figure 1) where it is a regular breeder, and northwestern Ontario where there have repeated reports of individual birds (Table 1). It is not conclusive that there ever was a well-established population in northwestern Ontario, however.

**Native Status: Yes.** The first record of the Loggerhead Shrike in Ontario was from 1860 (Cadman et al. 2007).

**Occurrence:** The Loggerhead Shrike is a migratory bird that occurs regularly in Ontario (Figure 1, Table 1, Table 2).

## **2.2 ELIGIBILITY RESULTS**

The Loggerhead Shrike (*Lanius ludovicianus*) is eligible for status assessment in Ontario because the taxon is valid and is native to Ontario.

## **3. ONTARIO STATUS ASSESSMENT**

### **3.1 APPLICATION OF ENDANGERED/THREATENED STATUS IN ONTARIO**

#### **Criterion A – Decline in Total Number of Mature Individuals Criterion does not apply.**

Loggerhead Shrikes continue to nest and produce young in southern Ontario (Table 2). Figure 2 summarizes the results of counts of nesting pairs in southern Ontario from 1991-2014.

Several estimates of the rate of population decline are available from COSEWIC (2014), and the Ontario Breeding Bird Atlas (Cadman et al. 2007):

- an overall decline of 63% in the probability of occurrence between Ontario Breeding Bird Atlas periods (1981-85 and 2001-05; Cadman et al. 2007),
- - 26% decline overall (or -2.9% per year; 95% confidence interval -20.8 to -3.3) during 2001-2011 based on BBS data for 18 survey routes (COSEWIC 2014), and
- a decline of 13% (from 59 to 51) in the number of adults during 2003-2013, based on targeted surveys (COSEWIC 2014).

Between 2004 - 2013 a total of 698 captive-raised birds was released in Ontario (COSEWIC 2014). The program had a positive impact on abundance (EC 2010). Perhaps as a result of those efforts, the decline in number of adults in southern Ontario during the most recent 10 year period (13% over 2003-2013) does not meet the threshold for threatened status (at least 30%) under this criterion.

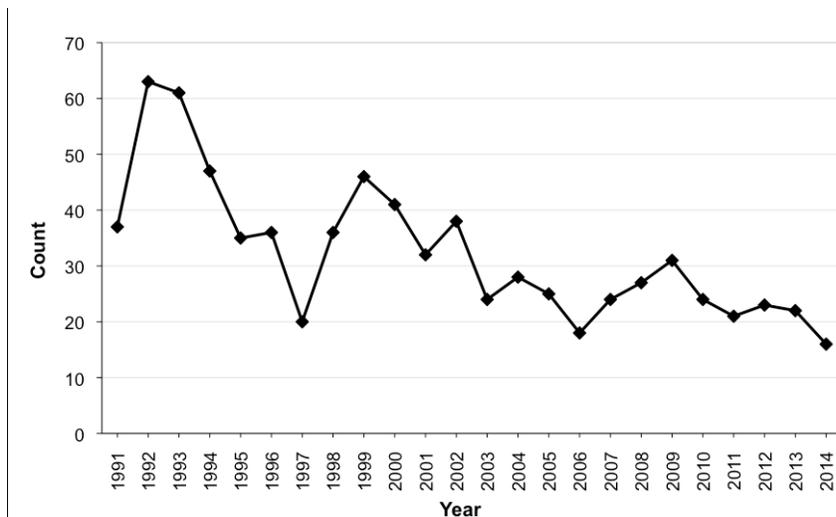


Figure 2. Total number of Loggerhead Shrike nesting pairs in southern Ontario, 1991-2014 (data from Wheeler 2014; does not include single, non-nesting adults).

Table 2. Recent counts of the number of mature Loggerhead Shrikes and young in southern Ontario.

Nesting Year	Number of Nesting Pairs	Number of Single Adults Reported	Number of Young Fledged	Source
2009	31		81	Steiner (2009)
2010	22	13-18	64+	Steiner (2010)
2011	21	22	48	Imlay (2011)
2012	22		79	Steiner (2012)
2013	24		32	Steiner (2013)
2014	16	11	35	Wheeler (2014)

**Criterion B – Small Distribution Range and Decline or Fluctuation**  
**Criterion does not apply.**

In eastern Canada, the Loggerhead Shrike occurs regularly only in southern Ontario and extreme southwestern Quebec (COSEWIC 2014). Using the minimum convex polygon method, COSEWIC (2014) estimated the extent of occurrence (EOO) of the "Eastern Loggerhead Shrike" subspecies in Ontario and Quebec to be 49,310 km<sup>2</sup> (Figure 1). Occurrences in Quebec account for a small proportion of that area, so the EOO for Ontario is probably well over the 20,000 km<sup>2</sup> minimum threshold for threatened status under this criterion (B1). Occurrences in northwestern Ontario (Table 1) have been recurring but have been too few to enable changes in range to be estimated.

Based on a 2 km by 2 km grid square method of mapping, COSEWIC estimated that the index of area of occupancy (IAO) for Ontario and Quebec combined would be < 200

km<sup>2</sup>. The IAO for Ontario alone would therefore meet the lower threshold for endangered status under this criterion (< 500 km<sup>2</sup>; criterion B2). However, to qualify as endangered or threatened under this criterion, there must also be good evidence of at least 2 of the following:

- B2a - severely fragmented or known to exist at ≤ 5 to 10 locations,
- B2b - continuing decline in the extent of occurrence, index of area of occupancy, area, extent and/or quality of habitat, number of locations or subpopulations, or number of mature individuals, or
- B2c - extreme fluctuations in the measures in the above bullet.

COSEWIC's (2014) technical summary and the map of occurrences suggest that there are currently more than 10 locations occupied by the species in Ontario, and the total population is not considered to be severely fragmented (B2a; COSEWIC 2014). COSEWIC (2014) has treated each nesting pair as one "location". COSEWIC's (2014) data (and Figure 2) suggest there is a continuing decline in the extent of occurrence, index of area of occupancy, and number of locations or subpopulations (criterion B2b). However, there are no extreme fluctuations in these measures (COSEWIC 2014; criterion B2c) and the population is not severely fragmented (B2a). Therefore, the Loggerhead Shrike does not qualify as endangered or threatened under criterion B.

**Criterion C – Small and Declining Number of Mature Individuals**  
**Endangered: Criterion C2a(i) is met.**

The total number of breeding pairs in Ontario is small with the most recent estimate from COSEWIC (2014) being 50-100 adults, and data from targeted surveys in southern Ontario suggesting 16 to 31 nesting pairs in southern Ontario between 2009 and 2014 (Figure 2, Table 2). This is much less than the minimum for endangered status under this criterion (<2,500 adults). Recovery efforts have shown some success with at least 35 released birds returning to Ontario in a subsequent year; the data presented by COSEWIC (2014, p. 32) suggest this might have helped to slow the decline. Reproduction has continued in southern Ontario (Table 2). However, at this time there is no strong evidence that the overall decline has been halted (Figure 2). The total provincial population is less than 250 mature individuals. Therefore there is sufficient evidence to classify the Loggerhead Shrike as Endangered under criterion C2a(i).

**Criterion D – Very Small or Restricted Total Population**  
**Endangered: Criterion D1 is met.**

The total number of mature individuals is < 250 (Table 2, Figure 2), qualifying the species for Endangered status under this criterion.

**Criterion E – Quantitative Analysis**  
**Threatened: Criterion E1.**

EC (2010) described a population viability analysis (PVA) for the Loggerhead Shrike performed by the Canadian Wildlife Service in 2009. COSEWIC (2014, p. x) interpreted

the results as follows:

"Extinction risk was <10% over the next 5 generations, but extinction was almost certain within the next 100 years. The model predicted an estimated time to extinction of 43 years."

On this basis, the Loggerhead Shrike qualifies for threatened status under this criterion.

### **3.2 APPLICATION OF SPECIAL CONCERN IN ONTARIO**

The Loggerhead Shrike meets more than one criterion for endangered status in Ontario. Therefore the assessment of special concern status does not apply.

### **3.3 STATUS CATEGORY MODIFIERS** **Ontario's Conservation Responsibility**

The Loggerhead Shrike qualifies for endangered status in the province based on COSSARO's standard assessment criteria (see above). Therefore Ontario's conservation responsibility (see section 1.4) was not proposed as a status modifier.

#### **Rescue Effect**

Suitable but currently unoccupied habitat exists in Ontario (COSEWIC 2014). However, genetic analysis presented by COSEWIC (2014, Figure 5) suggests that genetic similarity is high among Ontario Loggerhead Shrikes (only those in southern Ontario were assessed), and that gene flow between populations from southern Ontario and elsewhere within the species' range is low. Since the 1980s, fewer than 10 pairs are thought to have nested in Quebec, and EC (2010) suggests there was only one pair observed there in 1995 and another in 2010. Populations of Loggerhead Shrike in adjacent states are very low and declining so it is unlikely that the Ontario population would be rescued by Loggerhead Shrikes from elsewhere.

#### **Other Potential Modifiers**

Not applicable

### **3.4 OTHER STATUS CATEGORIES**

**DATA DEFICIENT - Not applicable.**

**EXTINCT OR EXTIRPATED - Not applicable.**

**NOT AT RISK - Not applicable.**

#### **4. SUMMARY OF ONTARIO STATUS**

The Loggerhead Shrike (*Lanius ludovicianus*) is classified as Endangered in Ontario. The species qualifies as endangered under the following criteria:

- C2a(i) - small number of adults (no subpopulation contains at least 250) and continued decline, and
- D1 - total number of mature individuals < 250.

The rate of decline in nesting pairs may have been slowed as a result of recovery efforts underway since 1997 (Figure 2, Table 2), but the population is critically low and there is no evidence that the decline has halted.

The Loggerhead Shrike also qualifies as Threatened in Ontario under criterion E1 (quantitative analysis - probability of extirpation greater than 10% within 100 years).

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## APPENDIX 1: TECHNICAL SUMMARY FOR ONTARIO

### Species: Loggerhead Shrike

<b>Demographic Information</b>	
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 - observed (Figure 2)
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	For southern Ontario (Table 2), decline from a minimum of 57-62 adults in 2010 to 43 adults in 2014, or from 24.6% to 30.6% decline over 5 years.
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	26% decline based on long-term results from targeted surveys in Ontario from 1992-2013 (COSEWIC 2014). A 13% decline from 59 to 51 adults between 2002 and 2013 (COSEWIC 2014)
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?	No. There is unoccupied breeding habitat in southern Ontario (COSEWIC 2014, EC 2010). Habitat loss on the wintering grounds is suspected to be the most significant threat (COSEWIC 2014, EC 2010) but more information is needed to elucidate causes of the population decline (EC 2010).
Are there extreme fluctuations in number of mature individuals?	No, not since 1998, perhaps in part owing to a release program.
<b>Extent and Occupancy Information in Ontario</b>	
Estimated extent of occurrence.	> 20,000 ha
Index of area of occupancy (IAO).	< 200 km <sup>2</sup> (COSEWIC 2014 for Ontario and Quebec)
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?)	No
Number of locations ( <i>as defined by COSEWIC</i> ).	25-50 for Ontario and Quebec
Number of NHIC Element Occurrences	Data are not up-to-date
Is there an observed, inferred, or projected continuing decline in	During the first OBBA (1981-85)

extent of occurrence?	the Loggerhead Shrike was observed on Manitoulin Island, along the north shore of Lake Huron, north of Lake Nipissing, and in the southern portion of the southern shield region, but no Shrikes were seen in these areas during the nesting season in 2001-2005 (Cadman et al. 2001).
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Unknown (but COSEWIC 2014 concludes "yes")
Is there an observed, inferred, or projected continuing decline in number of populations?	No (COSEWIC 2014)
Is there an observed, inferred, or projected continuing decline in number of locations?	No (COSEWIC 2014)
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes (COSEWIC 2014)
Are there extreme fluctuations in number of populations?	No (COSEWIC 2014)
Are there extreme fluctuations in number of locations?	Yes, based on Table 2 and Figure 2
Are there extreme fluctuations in extent of occurrence?	No. A decline in EOO has been observed (Cadman et al. 2014) but not extreme fluctuations.
Are there extreme fluctuations in index of area of occupancy?	No (COSEWIC 2014)
<b>Number of Mature Individuals In Each Sub-Population or Total Population (if known)</b>	
Sub-Population (or Total Population)	N of Mature Individuals
Ontario	50-100
<b>Quantitative Analysis (population viability analysis conducted)</b>	
Probability of extinction in the wild is >95% A Population Viability Analysis performed by Tischendorf (2009) indicated that extinction risk was <10% over the next 5 generations, but that extinction was almost certain within the next 100 years. The model predicted an estimated time to extinction of 43 years. (COSEWIC 2014)	
<b>Rescue Effect</b>	
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible but unlikely
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Yes currently
Is the species of conservation concern in bordering jurisdictions?	Yes
Is rescue from outside populations reliant upon continued intensive recovery efforts?	Possibly

**APPENDIX 2: ADJOINING JURISDICTION STATUS RANK AND DECLINE**

<b>Jurisdiction</b>	<b>Subnational Rank</b>	<b>Sources</b>	<b>Population Trend</b>	<b>Sources</b>
Ontario	S2B	NHIC	Long term decline that may be continuing, or may have slowed as a result of recovery efforts in Ontario	COSEWIC (2014), NatureServe
Manitoba	S1B	NatureServe	These birds are of a different subspecies (a different designatable unit) than the Shrikes occurring in Ontario. In general, a long term decline of this subspecies seems to be continuing.	
Michigan	S1	NatureServe		
Minnesota	S2B	NatureServe		
Nunavut	Not present	NatureServe		
New York	S1B	NatureServe		
Ohio	Species not ranked	NatureServe		
Pennsylvania	S1B	NatureServe		
Quebec	Threatened	COSEWIC (2014)	Long term decline that may be continuing	