

**Ontario Species at Risk Evaluation Report for  
Transverse Lady Beetle (*Coccinella transversoguttata*)**

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

Assessed by COSSARO as Endangered

May 2017

Final

## Coccinelle à bandes transverses (*Coccinella transversoguttata*)

La coccinelle à bandes transverses (*Coccinella transversoguttata*) est une espèce indigène de coccinelle plutôt facile à reconnaître par ses élytres aux couleurs et marques distinctes (chaque élytre comporte une bande qui s'étend de part et d'autre de la suture, et des marques médianes atypiques). Autrefois très répandue en Ontario, l'espèce semble avoir disparu de la faune de la province, n'ayant pas été observée depuis 1990. Ce déclin rapide serait attribuable à l'arrivée de plusieurs espèces de coccinelles invasives et d'un certain nombre de pathogènes. De récentes observations au Manitoba et au Québec portent à croire que de petites populations isolées pourraient toujours être présentes en Ontario.

Compte tenu de son déclin à la fin des années 1980, possiblement dû à plusieurs facteurs comme la présence d'espèces envahissantes et l'exposition aux pesticides, la coccinelle à bandes transverses est considérée par le CDSEPO comme une espèce en voie de disparition en Ontario. Par contre, comme sa présence est toujours relativement importante dans l'Ouest du Canada, le Comité sur la situation des espèces en péril au Canada (COSEPAC) lui attribue le statut d'espèce préoccupante.

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## Executive summary

The Transverse Lady Beetle (*Coccinella transversoguttata*) is a native species of lady beetle that is relatively easy to recognize by the distinct colouration and markings on the elytra (each elytron has a basal transverse spot, which extends medially to the elytral suture, along with an apical and medial spot). Once widespread and commonly encountered in Ontario, this species appears to have disappeared from the Ontario fauna, with no verified records since 1990. This decline is associated with the introduction of several invasive lady beetle species and a number of pathogenetic organisms that are thought to have contributed to the Transverse Lady Beetle's precipitous population decline. Recent records in Manitoba and Quebec suggest that small, but remote, populations may still be present in Ontario.

The Transverse Lady Beetle is assessed as Endangered by COSSARO based on the decrease in abundance during the late 1980's due to several possible factors including invasive species and pesticide exposure. The species is classified as Endangered by COSSARO in Ontario but as it is still relatively commonly encountered in western parts of Canada it is classified as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

# 1. Eligibility for Ontario status assessment

## 1.1. Eligibility conditions

### 1.1.1. Taxonomic distinctness

The Transverse Lady Beetle is taxonomically distinct.

### 1.1.2. Designatable units

There is a single designatable unit known to occur in Ontario (*Coccinella transversoguttata richardsoni*). This is the only subspecies of *Coccinella transversoguttata* that occurs in Canada and the United States.

### 1.1.3. Native status

The Transverse Lady Beetle is native to Ontario with specimen records dating back to 1889.

### 1.1.4. Occurrence

The Transverse Lady Beetle is known to have naturally occurred throughout most of Ontario.

## 1.2. Eligibility results

The Transverse Lady Beetle (*Coccinella transversoguttata richardsoni*) is eligible for status assessment in Ontario.

# 2. Background information

## 2.1. Current designations

- GRANK: GNR (NatureServe 2017)
- NRANK Canada: NNR
- COSEWIC: Special Concern (November 2016)
- SARA: No Status
- ESA 2007: Not Listed
- SRANK: SH (ranked in 2000)

## 2.2. Distribution in Ontario

The Transverse Lady Beetle is recorded throughout the Deciduous, Great Lakes-St-Lawrence Forest and parts of the Boreal Forest (Figure 1), but all available records (P. Grant, pers. comm; University of Guelph Insect Collection and Canadian National Collection of Insects) are considered historical, with the most recent record in Ontario

from 1990 (North Point). Directed efforts in 2014 to find modern records of the Transverse Lady Beetle in parts of its previous provincial range (see COSEWIC 2016; Fig. 5) were not able to locate any individuals. Table 1 provides EOO and IAO data for Ontario, based on data from accessed museum specimens, for each decade since 1940, and all historical specimens (1889-1990). Due to the variability of collection effort both historically and geographically, general trends in these values are not further evaluated.

The number of locations for the Transverse Lady Beetle are not currently calculated. COSEWIC (2016) notes the difficulty in assessing the locality, noting the broad geographic range, low site fidelity, and the threats are not clear.

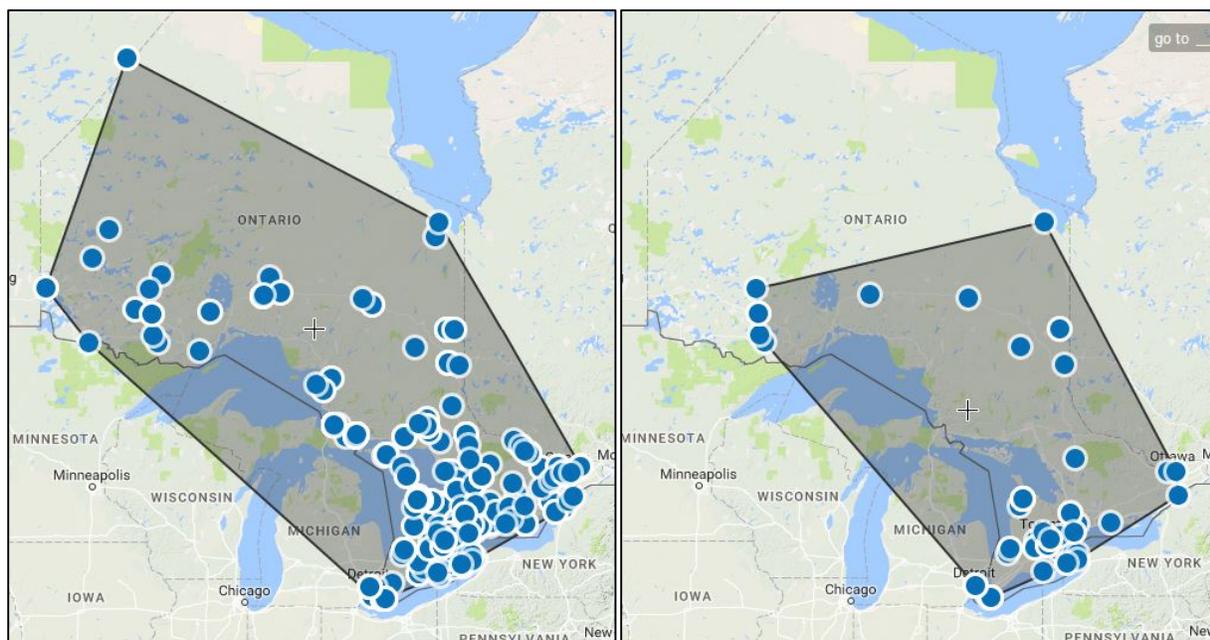


Figure 1. Transverse Lady Beetle (*Coccinella transversoguttata*) distribution in Ontario based on all historical records (left) and from 1980-1990 (right) provided by Grant (pers. comm. 2017) and newly accessed records. Created for this report using [GeoCAT \(Geospatial Conservation Assessment Tool\)](#) [website accessed April 27, 2017].

Table 1. Extent of Occurrence (EOO) and Index of Area of Occupancy (IAO, based on 2x2km grid) of the Transverse Lady Beetle in Ontario, based on museum specimens included in the COSEWIC (2016) report and newly accessed material. EOO and IAO values were calculated using [GeoCAT \(Geospatial Conservation Assessment Tool\)](#).

| Decade | EOO (km <sup>2</sup> ) | IAO (km <sup>2</sup> ) |
|--------|------------------------|------------------------|
| 1940's | 905,654                | 80                     |
| 1950's | 302,530                | 204                    |
| 1960's | 539,870                | 184                    |

| Decade      | EOO (km <sup>2</sup> ) | IAO (km <sup>2</sup> ) |
|-------------|------------------------|------------------------|
| 1970's      | 543,235                | 380                    |
| 1980's      | 729,442                | 156                    |
| Post 1990   | 0?                     | 0?                     |
| All Records | 1,151,941              | 892                    |

### 2.3. Distribution and status outside Ontario

The Transverse Lady Beetle (*Coccinella transversoguttata*) occurs throughout the Holarctic region and includes five subspecies, four of which occur in the Nearctic. All the subspecies are morphologically distinct and found in distinct geographical areas. Only one subspecies, *C. transversoguttata richardsoni*, occurs in Canada and the United States (Gordon 1985). Over the past two decades, the Transverse Lady Beetle has apparently disappeared from most of its eastern range.

### 2.4. Ontario conservation responsibility

Ontario has minimal conservation responsibility for both the species and subspecies, as less than 10% of the global distribution occurs in Ontario.

### 2.5. Direct threats

The cause(s) behind the decline of the Transverse Lady Beetle are unclear but the introduction of several invasive lady beetle species and pathogenetic organisms are considered the greatest threats to the Transverse Lady Beetle. The disappearance of the Transverse Lady Beetle coincides with the establishment of a number of invasive lady beetle species (including *Harmonia axyridis* and *Coccinella septumpunctata*) and it is thought that these species may be competing for prey, or may be preying upon Transverse Lady Beetles, but there is little direct evidence to support this argument. It may also be possible that various parasites, parasitoids, pathogens and fungi may have been introduced along with the invasive lady beetles. As with the threat posed by invasive lady beetles, the effects of these various pathogenic organisms on the Transverse Lady Beetle are also unclear. They may be a contributing factor to the decline of Transverse Lady Beetle throughout its range. A lower impact threat to Transverse Lady Beetle is insecticide use both in urban and agricultural settings. Other possible, lesser threats include decline in habitat quality, and habitat loss (e.g. urbanization).

### 2.6. Specialized life history or habitat use characteristics

The Transverse Lady Beetle, like many other lady beetles, is a generalist and is recorded from a number of different habitat types, both including natural, agricultural and urban environments. Adults are capable of flight and likely can travel more than

15km in a single effort.

### 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 under Criterion A2abce. Verified records of the Transverse Lady Beetle in Ontario have declined by more than 50% over the 10 period between 1985-1995 in anecdotal observations, photographs, and specimen vouchers (subcriteria a and b), with no records since 1990. The major decline occurred during the late 1980's, and there are no records of this species in Ontario since 1990 despite active efforts to document its occurrence through directed survey efforts and citizen science initiatives. Due to the rapid and severe decline in verifiable records, both IAO and EOO have substantially declined, and the effects of the various introduced lady beetle species and pathogens still persist (subcriteria c and e). While this decline occurred outside the last 10 years and there are no recent records from Ontario, recent records in nearby Quebec and Manitoba (COSEWIC 2016) suggest that a small population of Transverse Lady Beetle likely still persists in parts of Ontario. Although Criterion A2 specifies a period over the past 10 years, its application here meets the spirit of the criteria. Furthermore, as survey efforts to confirm its extirpation in Ontario are questionable at the provincial scale, any remaining population(s) that may still occur in Ontario likely remain under threat from the cause(s) of the original decline nearly 30 years ago.

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

Not Applicable. The Transverse Lady Beetle historically had a widespread distribution in Ontario, but the current EOO and IAO are in question. If a recent record of the Transverse Lady Beetle were to be verified, then Criterion B1 and B2 could be applicable.

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

Insufficient information. Criterion C does not apply as no population data is available for the Transverse Lady Beetle. If it is present in Ontario, the population threshold is very likely under the threshold required for Endangered, and the population decline can be inferred to be continuing.

##### 3.1.4. Criterion D – Very small or restricted total population

Insufficient information. No datum exists to indicate the current population number. If a recent record/population were verified from Ontario, then Criterion D1 may be applicable.

### 3.1.5. Criterion E – Quantitative analysis

Not Applicable.

## 3.2. Application of Special Concern in Ontario

Not Applicable.

## 3.3. Status category modifiers

### 3.3.1. Ontario's conservation responsibility

Not Applicable. Ontario has less than 25% of the historical range of this species.

### 3.3.2. Rescue effect

There is the possibility that populations in adjacent states and provinces may provide the opportunity for a rescue effect on Ontario's population, and that individuals from these populations would be capable of surviving in Ontario. However, the general decline of the Transverse Lady Beetle in these regions suggests that neighbouring populations will not provide any significant rescue effect.

## 3.4. Other status categories

### 3.4.1. Data deficient

Not Applicable. There is sufficient evidence to demonstrate its historical presence and the decline in the population.

### 3.4.2. Extinct or extirpated

Not applicable as specimens have been found within the last 50 years and insufficient effort has been made to survey for the Transverse Lady Beetle throughout its historical range in Ontario. While once widespread and commonly encountered, the absence of any verified records in the past 27 years despite a variety of efforts in the past 15 years to document it in Ontario suggests that the Transverse Lady Beetle may be extirpated in Ontario. While this evidence may be compelling, efforts to survey for it throughout the historical range in Ontario is considered here to be insufficient to exclude the possibility that small discrete population(s) of the Transverse Lady beetle still occur in remote parts of the province.

### 3.4.3. Not at risk

Not Applicable.

## 4. Summary of Ontario status

Transverse Lady Beetle (*Coccinella transversoguttata*) is classified as Endangered in Ontario based on meeting criterion A2abce. As this species is still common in the western parts of its range in Canada, COSEWIC has classified the species as Special Concern in Canada.

## 5. Information sources

COSEWIC. 2016. [COSEWIC assessment and status report on the Transverse Lady Beetle \*Coccinella transversoguttata\* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 57 pp. ([Species at Risk Public Registry website](#)).

Gordon, R.D. 1985. The Coccinellidae (Coleoptera) of America north of Mexico. *Journal of New York Entomological Society* 95:1-912.

Grant, P. pers. comm. 2017. Inquiry to access Ontario data from data used in the COSEWIC assessment of Transverse Lady Beetle (COSEWIC 2016).

NatureServe. 2017. [NatureServe Explorer: An online encyclopedia of life](#) [web application]. Version 7.0. NatureServe, Arlington, VA. U.S.A. [website accessed April 30 2017]

## Appendix 1: Technical summary for Ontario

Species: Transverse Lady Beetle (*Coccinella transversoguttata*)

### Demographic information

| Demographic attribute                                                                                                                                                                                           | Value                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Generation time.<br>Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.                                                                                        | 2 generations per year                                                                                                                   |
| Is there an observed, inferred, or projected continuing decline in number of mature individuals?                                                                                                                | Yes, based on the continued presence of the various pathogens and invasive species which are thought to have contributed to its decline. |
| 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<br>(a) clearly reversible, and<br>(b) understood, and<br>(c) ceased?                                                                                                              | a. No<br>b. No<br>c. No                                                                                                                  |
| Are there extreme fluctuations in number of mature individuals?                                                                                                                                                 | Unknown                                                                                                                                  |

### Extent and occupancy information in Ontario

| Extent and occupancy attributes                                                                                                                                                   | Value                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Estimated extent of occurrence (EOO).<br><br><i>Based on specimen data and calculated using <a href="#">GeoCAT</a> (<a href="#">Geospatial Conservation Assessment Tool</a>).</i> | 1,115,1941 km <sup>2</sup> (all records)<br>729,442 km <sup>2</sup> (1980-1990)<br>0? km <sup>2</sup> (post 1990) |
| Index of area of occupancy (IAO).                                                                                                                                                 | 892 km <sup>2</sup> (all records)<br>156 km <sup>2</sup> (1980-1990)<br>0? km <sup>2</sup> (post 1990)            |

| <b>Extent and occupancy attributes</b>                                                                                                                                                                                                                                                                          | <b>Value</b>              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <i>Based on specimen data and calculated using <a href="#">GeoCAT (Geospatial Conservation Assessment Tool)</a>.</i>                                                                                                                                                                                            |                           |
| Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are:<br>(a) smaller than would be required to support a viable population, and<br>(b) separated from other habitat patches by a distance larger than the species can be expected to disperse? | a. No<br>b. No            |
| Number of locations.                                                                                                                                                                                                                                                                                            | Unknown.                  |
| Number of NHIC Element Occurrences.                                                                                                                                                                                                                                                                             | None currently available. |
| Is there an observed, inferred, or projected continuing decline in extent of occurrence?                                                                                                                                                                                                                        | Yes                       |
| Is there an observed, inferred, or projected continuing decline in index of area of occupancy?                                                                                                                                                                                                                  | Yes                       |
| Is there an observed, inferred, or projected continuing decline in number of populations?                                                                                                                                                                                                                       | Yes                       |
| Is there an observed, inferred, or projected continuing decline in number of locations?                                                                                                                                                                                                                         | Yes                       |
| 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).

Current number of mature individuals is currently unknown. There are no verified records of this species in Ontario in the past 27 years but it is plausible that one or more small populations still occur in parts of the province.

Quantitative analysis (population viability analysis conducted)

No population viability analysis has been conducted.

## Threats

An International Union for the Conservation of Nature – Conservation Measures Partnership threats calculator was performed by COSEWIC (2016). The following threats were noted: Invasive & Other Problematic Species and Genes (High-Medium),

Pollution (Low), and Natural System Modifications (Low).

## Rescue effect

| <b>Rescue effect attribute</b>                                                                             | <b>Value</b>         |
|------------------------------------------------------------------------------------------------------------|----------------------|
| Status of outside population(s) most likely to provide immigrants to Ontario                               | In decline.          |
| 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?                                            | Yes                  |
| Are conditions deteriorating in Ontario?                                                                   | Unknown but unlikely |
| Is the species of conservation concern in bordering jurisdictions?                                         | No                   |
| Is the Ontario population considered to be a sink?                                                         | Unknown              |
| Is rescue from outside populations likely?                                                                 | Unknown but unlikely |

## Sensitive species

Transverse Lady Beetle is not considered a data sensitive species.

## Appendix 2: Adjoining jurisdiction status rank and decline

Information regarding rank and decline for Transverse Lady Beetle (*Coccinella transversoguttata*)

| Jurisdiction | Subnational rank | Population trend                    | Sources            |
|--------------|------------------|-------------------------------------|--------------------|
| Ontario      | S1               | Declining?                          | COSEWIC (2016)     |
| Quebec       | S4               | Declining                           | COSEWIC (2016)     |
| Manitoba     | S4S5             | Declining                           | COSEWIC (2016)     |
| Michigan     | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |
| Minnesota    | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |
| Nunavut      | Not Present      | Not applicable.                     | Not applicable.    |
| New York     | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |
| Ohio         | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |
| Pennsylvania | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |
| Wisconsin    | SNR              | Unknown. Presumed to be in decline. | NatureServe (2017) |

### Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada

COSSARO: Committee on the Status of Species at Risk in Ontario

EOO: extent of occurrence

ESA: Endangered Species Act

GRANK: global conservation status assessments

IAO: index of area of occupancy

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

S3: Vulnerable

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