

**Ontario Species at Risk Evaluation Report for
Timber Rattlesnake
Crotale des Bois
(*Crotalus horridus*)**

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

Assessed by COSSARO as Extirpated

November 2023
Final

Executive summary

Timber Rattlesnakes (*Crotalus horridus*) is a large pit viper that can grow to 1-2m in length. These snakes are typically yellow or brown in colour with dark brown or black v-shaped markings across their back. As is typical with pit vipers, the Timber Rattlesnake head is triangular. Timber Rattlesnakes were formerly found across the Niagara Peninsula in southern Ontario. Available records indicate that this species was found in Essex, Kent, Elgin, Halton, Manitoulin, and Peel counties in Ontario (COSSARO 2019). Timber Rattlesnake is assessed as extirpated as the last recorded observation of Timber Rattlesnakes was in the Niagara Gorge in 1941 and despite considerable efforts in the past 15-20 years, no observations of this species have been made in Ontario.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Studies completed in the 1970s comparing morphological variation in Timber Rattlesnakes concluded that there was no need to identify subspecies of this snake (Zammit and Oldham 2000). More recently, Clark et al. (2003) found no evidence of subspeciation based on mtDNA variation.

1.1.2. Designatable units

No information is available to indicate that more than one designable unit is warranted for this species in Ontario.

1.1.3. Native status

Timber Rattlesnakes are native to Ontario.

1.1.4. Occurrence

Historically, Timber Rattlesnakes were found along the Niagara Escarpment.

1.2. Eligibility results

Timber Rattlesnake (*Crotalus horridus*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G4 (NatureServe 2014)
- IUCN: LC (March 2007)
- NRANK Canada: NX
- COSEWIC: Extirpated (May 2023)
- SARA: Extirpated (Schedule 1)
- ESA 2007: Extirpated (month and year of last assessment)
- SRANK: SX (ranked in 2011)

2.2. Distribution in Ontario

The last record from Canada was in 1941 in Niagara Gorge (COSSARO 2023). Since this time, many researchers have conducted searches, but no Timber Rattlesnakes have been found (COSEWIC 2023).

Historically, the Timber Rattlesnake was found in Essex, Kent, Elgin, Halton, Manitoulin, and Peel counties (COSSARO 2023).

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

Timber Rattlesnakes are found across most of the eastern United States ranging from Texas north to Minnesota in the west and from Florida and to Maine in the east. The closest observational records of Timber Rattlesnakes to Ontario are located in New York State approximately 80 km east of the Niagara boarder (COSEWIC 2023). Given the barrier to movement posed by the Niagara gorge, movement between the New York population and Ontario is exceptionally unlikely. As Timber Rattlesnakes have been absent from Ontario for over 80 years, there is no broader biologically relevant range for this species.

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
Minnesota	No	S2	NatureServe 2023
New York	No	S3	NatureServe 2023
Ohio	No	S1	NatureServe 2023
Pennsylvania	No	S3	NatureServe 2023
Wisconsin	No	S2	NatureServe 2023

2.4. Ontario conservation responsibility

Timber Rattlesnakes have not been documented in Ontario since 1941. Ontario's conservation responsibility for this species is low.

2.5. Direct threats

Human exploitation, through bounty hunting, commercial collecting and sport hunting, is the leading cause of Timber Rattlesnake decline throughout the species' range (Galligan and Dunson, 1979; Brown, 1993). Historically in Ontario, mortality rates were unsustainably high until the species was completely eradicated as a result of direct human persecution and habitat loss. Other than anecdotal information, information about threats in Ontario is lacking. Since 1719, timber rattlesnakes have been the object of "rattlesnake roundups" and bounty hunting, whereby fees were paid for killing undesirable species (Casper and Hay 1998 as cited in COSSARO 2011).

2.6. Specialized life history or habitat use characteristics

Timber Rattlesnakes is a large pit viper that can grow to 1-2m in length. These snakes are typically yellow or brown in colour with dark brown or black v-shaped markings across their back. As is typical with pit vipers, the Timber Rattlesnake head is triangular.

Timber Rattlesnakes are typically found in areas not frequented by people (Ditmars, 1907; Anderson, 1965). These snakes are typically found in forested areas with rocky outcroppings. Similar to other pit vipers, Timber Rattlesnakes are known to use basking rocks year after year, and these habitat features often attract many snakes at one time (Harwig, 1966).

Timber Rattlesnakes hibernate communally along granitic escarpments and ledges with accumulations of talus (Brown, 1991); typically, these sites are located along south facing slopes (Galligan and Dunson, 1979). Communal hibernation sites make this species especially vulnerable to habitat loss and persecution. Additionally, as an area of approximately 50 km² of suitable habitat is required to sustain a population (Brown, 1993), Timber Rattlesnakes are particularly vulnerable to the effects of habitat loss.

Several life history traits of the Timber Rattlesnake make this species susceptible to losses of adults in a population including slow maturation rates, low reproductive output, low juvenile survival, and slow population replacement rate (Harding, 1997). Female Timber Rattlesnakes do not mature until about eight years old and are known to reproduce on approximately once every three years (Martin, 1993).

2.7. Existing Conservation and Recovery Actions

None.

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

Not applicable.

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

Not applicable.

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

Not applicable.

3.1.4. Criterion D – Very small or restricted total population

Not 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.

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

Not applicable.

3.3.3. Rescue Effect

Not applicable. The closest known observation of Timber Rattlesnakes to Ontario is located approximately 80 Km east of the Niagara border (COSEWIC 2023).

3.4. Other status categories

3.4.1. Data deficient

Not applicable.

3.4.2. Extinct or extirpated

Applicable. Timber Rattlesnakes were historically found along the Niagara Escarpment and portions of southern Ontario. However, despite considerable search effort, this species has not been documented in Ontario since 1941. This species is still present throughout much of the eastern United States.

3.4.3. Not at risk

Not applicable.

4. Summary of Ontario status

Timber Rattlesnake (*Crotalus horridus*) is classified as Extirpated in Ontario based on meeting criterion for this status.

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

5. Information sources

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Brown, W.S. 1993. Biology, status and management of the Timber Rattlesnake (*Crotalus horridus*): a guide for conservation. SSAR Herpetological Circular No. 22 pp. i-iv + 1–78.

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COSSARO. 2011. Evaluation of Timber Rattlesnake (*Crotalus horridus*) in Ontario. Committee on the Status of Species at Risk in Ontario. Peterborough. (<https://www.ontario.ca/page/timber-rattlesnake-evaluation#section-7>).

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Harding, J.H. 1997. Amphibians and reptiles of the Great Lakes region. The University of Michigan Press, Ann Arbor: MI. xvi + 378 pp.

Harwig, S.H. 1966. Rattlesnakes are where and when you find them. *Proceedings of the Ninth Annual Meeting of the Ohio Herpetological Society* 5: 163.

Martin, W.H. 1983. The Timber Rattlesnake in the northeast: its range, past and present. *Herpetological Bulletin of the New York Herpetological Society* 17: 15–20.

Pisani, G.R., J.T. Collins and S.R. Edwards. 1972. A re-evaluation of the subspecies of *Crotalus horridus*. *Transactions of the Kansas Academy of Science* 75(3): 255-263.

Zammit, A.E. and M.J. Oldham. 2000. COSSARO candidate V,T,E species evaluation form for Timber Rattlesnake (*Crotalus horridus*). Natural Heritage Information Centre, Peterborough ON. 12 pp.

Appendix 1: Technical summary for Ontario

Species: Timber Rattlesnake (*Crotalus horridus*)

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.	~13 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	N/A
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	N/A
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	N/A
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	N/A
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.	N/A
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	N/A
Are there extreme fluctuations in number of mature individuals?	N/A

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	N/A
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	N/A
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	N/A

Extent and occupancy attributes	Value
(b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	
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>	25
Number of NHIC Element Occurrences <i>Request data from MNR.</i>	1
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	N/A
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	N/A
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	N/A
Is there an observed, inferred, or projected continuing decline in number of locations?	N/A
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	N/A
Are there extreme fluctuations in number of populations?	N/A
Are there extreme fluctuations in number of locations?	N/A
Are there extreme fluctuations in extent of occurrence?	N/A
Are there extreme fluctuations in index of area of occupancy?	N/A

Number of mature individuals in each sub-population or total population (if known)

Sub-population (or total population)	Number of mature individuals
<i>Insert additional rows as necessary. If total population, do not use table format.</i>	0

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is [not applicable].

Threats

Not applicable.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	N/A
Status of outside population(s) most likely to provide immigrants to Ontario	N/A
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No
Would immigrants be adapted to survive in Ontario?	Unknown
Is there sufficient suitable habitat for immigrants in Ontario?	No
Are conditions deteriorating in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	N/A
Is rescue from outside populations likely?	No

Sensitive species

Not applicable.

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