

Massasauga (Carolinian and Great Lakes – St. Lawrence populations)

Ontario Government Response Statement



Protecting and Recovering Species at Risk in Ontario

Species at risk recovery is a key part of protecting Ontario's biodiversity. *The Endangered Species Act, 2007* (ESA) is the Government of Ontario's legislative commitment to protecting and recovering species at risk and their habitats.

Under the ESA, the Government of Ontario must ensure that a recovery strategy is prepared for each species that is listed as endangered or threatened. A recovery strategy provides science-based advice to government on what is required to achieve recovery of a species.

Within nine months after a recovery strategy is prepared, the ESA requires the government to publish a statement summarizing the government's intended actions and priorities in response to the recovery strategy. The response statement is the government's policy response to the scientific advice provided in the recovery strategy. In addition to the strategy, the government response statement considered (where available) input from Indigenous communities and organizations, stakeholders, other jurisdictions, and members of the public. It reflects the best available local and scientific knowledge, including Traditional Ecological Knowledge where it has been shared by communities and Knowledge Holders, as appropriate and may be adapted if new information becomes available. In implementing the actions in the response statement, the ESA allows the government to determine what is feasible, taking into account social, cultural and economic factors.

The Recovery Strategy for the Massasauga (*Sistrurus catenatus*) (Carolinian and Great Lakes – St. Lawrence populations) in Ontario was completed on June 2, 2016.

The Massasauga is a stout-bodied, relatively small rattlesnake with adults typically 50 to 70 cm long. The Massasauga is eastern Canada's only venomous snake and is distinguished by its diamond-shaped head, grey to dark brown colouring, darker butterfly or saddle-shaped blotches down the center with rows of smaller spots, and a well-developed rattle.

Protecting and Recovering Massasauga

Massasauga (Carolinian population) is listed as an endangered species and Massasauga (Great Lakes – St. Lawrence population) is listed as a threatened species under the ESA, which protects both the snakes and their habitat. The ESA prohibits harm or harassment of the species and damage or destruction of its habitat without authorization. Such authorization would require that conditions established by the Ontario government be met. In addition to protection under the ESA, Massasauga is listed under Schedule 9 of the *Fish and Wildlife Conservation Act, 1997* (FWCA) as a Specially Protected Reptile.

Massasauga (Carolinian population) and Massasauga (Great Lakes – St. Lawrence population) are both populations of Eastern Massasauga (*Sistrurus catenatus*). The global distribution of Eastern Massasauga is limited to portions of Ontario and ten U.S. states in the Great Lakes Region, extending from New York and western Pennsylvania west to southeastern Minnesota, eastern Iowa and northeastern Missouri. A significant portion of the global population occurs in Ontario, and the species is listed on the SARO List as two distinct populations: the Carolinian population and the Great Lakes – St. Lawrence population. Each of these two populations is made up of two distinct regional subpopulations. The Carolinian population is comprised of the Ojibway Prairie Complex subpopulation in the City of Windsor and the Town of LaSalle; and the Wainfleet Bog subpopulation near Port Colborne. The Great Lakes – St. Lawrence population is comprised of the Bruce Peninsula subpopulation, including Manitoulin, Vidal and Fitzwilliam Islands; and the eastern Georgian Bay subpopulation.

Based on the 2012 Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status report, abundance of the Great Lakes – St. Lawrence population is roughly estimated to be 16,000 (between 9,100 – 22,200) mature individuals, though information on trends and population abundance is lacking. Given the cryptic and reclusive nature of the species, it can be challenging to reliably estimate the population numbers of Massasauga across its range. The Great Lakes – St. Lawrence population is considered to be the largest and most secure population of Massasauga across its global range. This population has remained secure, likely due to the presence of large amounts of intact habitat, but declines have resulted from increased human presence in the area and associated effects (e.g., habitat degradation, road mortality, increased persecution).

Massasaugas are shy, docile snakes that avoid confrontation with humans whenever possible, often relying on their excellent camouflage and cryptic behaviour to remain unseen. Although Massasaugas are venomous, there are only two historical records of human fatalities resulting from Massasauga bites in Ontario, and both of these incidents occurred more than 60 years ago. Given the small size of Massasaugas (and thus low venom yield), as well as our current knowledge of snake bite prevention and treatment in Ontario, Massasaugas present a relatively low risk to public safety.

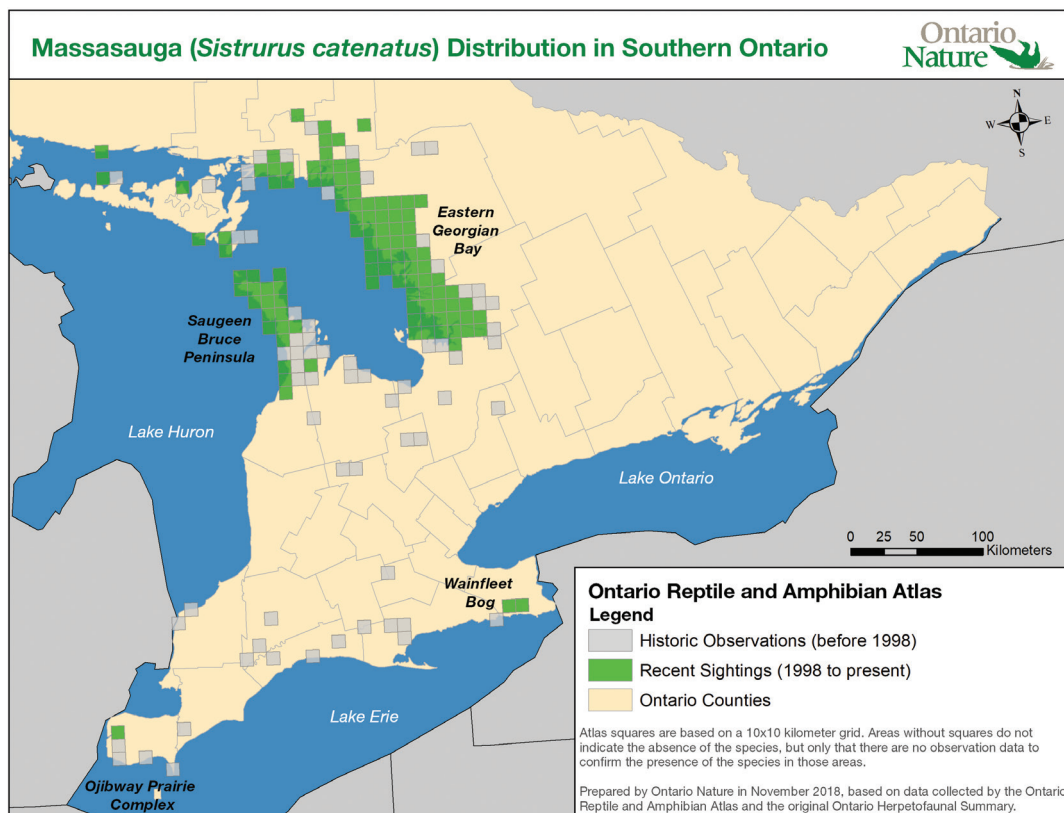


Figure 1. Massasauga Range and Distribution in Ontario by Regional Population in Ontario (courtesy of the Ontario Reptile and Amphibian Atlas Project).

Based on the 2012 COSEWIC status report, abundance of the Massasauga (Carolinian population) was estimated at 80 (± 30) mature individuals. Extinction of the Ojibway Prairie subpopulation is considered imminent with current abundance based on mark-recapture survey efforts from 2013-2016 estimated to be less than 10 mature individuals. The long-term persistence of this population is of particular significance since it represents an ecological and genetically distinct population that is local adapted to the prairie ecosystem. The Wainfleet Bog subpopulation is estimated to be between 40 and 70 mature individuals.

Massasauga is eastern Canada's only venomous snake, though the species poses a low threat to public safety. Historically, only two people have ever died in Ontario due to a Massasauga bite, and both of those incidents were over 60 years ago. The Massasauga is shy and cryptic by nature, and its first response to an encounter with a human is to lie motionless to try and avoid detection. However, if the snake feels threatened, it may warn you of its presence by rattling its tail. Massasauga is not aggressive and if given room and time, the snake will move away into nearby cover.

Adult Massasaugas use a diversity of habitats across their Ontario range, including tallgrass prairie-savannah habitat (Ojibway Prairie subpopulation), peat land-swamp/forest-bog complexes (Wainfleet Bog subpopulation), as well as alvars, rock barrens, wetlands, shoreline habitats and forest clearings (Great Lakes – St. Lawrence population). The Ojibway Prairie subpopulation is locally adapted to prairie ecosystems, making it ecologically and genetically distinct from other Canadian subpopulations. Massasaugas use a variety of habitat types during different life stages, with specific requirements for hibernation and gestation sites and more generalized habitat requirements during the active season. At this time, general habitat protection, informed by the general habitat description for Massasauga, will continue to apply. The need for and appropriateness of additional habitat tools under the ESA will be evaluated over the next five years.

Massasaugas are valuable components of the ecosystems they inhabit, both as a predator of small mammals and as prey for hawks, owls, cranes and mammals. Massasaugas, like many snakes, play an important role in controlling rodent populations and thus rodent-borne diseases (e.g., Lyme disease). Ensuring that snakes such as Massasaugas continue to be present on the landscape is beneficial for overall ecosystem health and thus, human health.

The greatest threats to the species, across both the Carolinian and Great Lakes – St. Lawrence populations, are road mortality and habitat loss, degradation and fragmentation. Human population growth in southern and central Ontario continues to result in the rapid expansion of Ontario's road network and urban/cottage development, further amplifying these threats. Persecution by humans is also a significant threat to Massasauga across its range. Additional threats to Massasauga include illegal collection for the pet trade, climate change, and specific forest management activities (e.g., large-scale clear cutting and road usage), as well as potential effects of snake fungal disease. Climate change can impact Massasauga through the increased occurrence of severe weather events which can affect a variety of life stages (including mass winter mortality events) and habitat suitability. Working together to reduce negative perceptions of snakes is an important component of conserving biodiversity and addressing these threats for all snake species. Approaches to recovery will focus on managing and protecting habitat for the species, filling knowledge gaps and monitoring population trends, and increasing awareness of Massasauga amongst local landowners and partners and collaboratively mitigating threats.

Government's Recovery Goal for Massasauga (Great Lakes – St. Lawrence population)

The government's goal for the recovery of Massasauga (Great Lakes – St. Lawrence population) is to maintain self-sustaining populations across the current distribution of the species through strategic habitat management (including connectivity) and threat mitigation.

Additional Recovery Approaches for Massasauga (Carolinian population)

Since 2013, the Ojibway Prairie Reptile Recovery program has taken a lead role in mitigating threats, conducting outreach and filling knowledge gaps with regard to the Ojibway Prairie subpopulation of the Carolinian population with the support of Ontario's Species at Risk Stewardship Program. A report entitled *Ecological and Socioeconomic Feasibility of Recovering the Ojibway Prairie Population of Eastern Massasauga* was finalized in 2014 and provides an analysis of multiple factors related to future population management activities (e.g., population augmentation, head-starting).

Given the small population size, ongoing decline, and local threats, the Carolinian population of Massasauga (Ojibway Prairie and Wainfleet Bog subpopulations) is unlikely to persist in the long-term without the collective implementation of substantial recovery actions. The Ojibway Prairie subpopulation is not viable and is likely to become extirpated in the short-term without population management actions, including augmentation.

In determining whether population management actions are necessary and feasible, social and economic factors, the likelihood of success, long-term contribution to species recovery, and the resources required may be considered, at the appropriate scale, in addition to biological and technical feasibility. Recognizing the recovery efforts to date, including the completion of a feasibility report for the Ojibway Prairie Nature Complex, the government supports the implementation of population management activities (e.g., captive-breeding and release) as necessary and feasible for the Ojibway Prairie subpopulation. Further research is needed to investigate the necessity and feasibility of population management actions for the Wainfleet Bog subpopulation. These efforts to manage increased population stability will need to be accompanied by continued habitat management and direct threat mitigation.

Government's Recovery Goal for Massasauga (Carolinian population)

The government's goal for the recovery of Massasauga (Carolinian population) is to increase the likelihood of securing and maintaining the current regional distribution of the species in southern Ontario. The government supports the implementation of population management actions (e.g., augmentation through captive-breeding and release), and associated evaluation and adaptation, at the Ojibway Prairie Complex. The government supports continued investigation, evaluation and if appropriate, implementation of population management actions (e.g., head-starting) at the Wainfleet Bog subpopulation.

Actions

Protecting and recovering species at risk is a shared responsibility. No single agency or organization has the knowledge, authority or financial resources to protect and recover all of Ontario's species at risk. Successful recovery requires inter-governmental co-operation and the involvement of many individuals, organizations and communities. In developing the government response statement, the government considered what actions are feasible for the government to lead directly and what actions are feasible for the government to support its conservation partners to undertake.

Government-led Actions

To help protect and recover Massasauga (Carolinian and Great Lake – St. Lawrence populations), the government will directly undertake the following actions:

- Continue to manage the habitat of Massasauga in provincially protected areas and monitor populations, where feasible.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Massasauga (Carolinian and Great Lakes – St. Lawrence populations) data to Ontario's central repository through the citizen science projects that they receive data from (e.g., Ontario Reptile and Amphibian Atlas, iNaturalist) and directly through the Natural Heritage Information Centre.
- Undertake communications and outreach activities to increase public awareness of species at risk in Ontario.
- Continue to protect Massasauga (Carolinian and Great Lakes – St. Lawrence populations) and its habitat through the ESA. Continue to implement, promote compliance with and enforce habitat protections using the species-specific habitat description for Massasauga.

- Support conservation, agency, municipal and industry partners, and Indigenous communities and organizations to undertake activities to protect and recover Massasauga (Carolinian and Great Lakes – St. Lawrence populations). Support will be provided where appropriate through funding, agreements, permits (including conditions) and/or advisory services.
- Continue investigation and enforcement efforts related to illegal collection and trafficking of Massasauga, and explore creative strategies to counter these activities (e.g., use of pit tagging to identify snakes from wild Ontario populations).
- Encourage collaboration, and establish and communicate annual priority actions for government support in order to reduce duplication of efforts.

Government-supported Actions

The government endorses the following actions as being necessary for the protection and recovery of Massasauga (Carolinian and Great Lakes – St. Lawrence populations). Actions identified as “high” may be given priority consideration for funding under the Species at Risk Stewardship Program. Where reasonable, the government will also consider the priority assigned to these actions when reviewing and issuing authorizations under the ESA. Other organizations are encouraged to consider these priorities when developing projects or mitigation plans related to species at risk.

Focus Area: Habitat Management and Protection

Objective: Protect and improve the quality of existing habitat and increase habitat connectivity (Carolinian population)
Maintain suitable habitat and where possible, increase habitat connectivity (Great Lakes – St. Lawrence population)

Because Massasauga uses a variety of habitat types for different life processes, both habitat suitability and connectivity are important contributors to its long-term survival and recovery. With increasing development of roads and infrastructure across the species’ distribution, habitat connectivity (including reduction of further fragmentation) is a key component of landscape-level, habitat-focussed recovery actions. This is true across the species’ range but of particular importance for the Carolinian population given that habitat quality and quantity have been severely degraded and reduced. At the site level, Massasauga require areas with low canopy cover and high ground cover (rocks and vegetation), where physical and vegetative structures support populations of small rodents. When fire regimes are altered through suppression and succession occurs, prey is reduced and the quality of habitat available for the species is degraded (e.g., decrease in the presence of open patches). Site-level habitat management actions,

particularly for the Carolinian population where habitat is limiting, will support improved habitat suitability for the species. Because the Carolinian population occurs in urban areas, a collaborative approach to habitat management and protection for conservation purposes is critical.

Actions:

1. **(High)** (Carolinian population) Work collaboratively with local landowners, land managers, organizations and municipalities to develop and implement habitat management and restoration techniques and monitor their effectiveness. This may include:
 - developing coordinated habitat management plans for both subpopulations to increase habitat connectivity and habitat suitability;
 - creating gestation, hibernation and shelter habitat in appropriate areas, recognizing the need to improve knowledge of the design and construction of these features; and,
 - maintaining open habitat using methods such as mechanical removal of woody vegetation and prescribed burns, as appropriate.
2. **(High)** (Carolinian population) As opportunities arise, work with local land owners and community partners to support the securement of Massasauga habitat through existing land securement and stewardship programs, including land that would support greater habitat connectivity.
3. (Great Lakes – St. Lawrence population) Work in partnership with local land owners, land managers, organizations and municipalities to develop, implement and promote habitat management techniques, specifically focussed on increasing connectivity between various types of habitat to increase gene flow.

Focus Area: Research and Monitoring

Objective: Increase knowledge of habitat requirements and usage, threats, and population ecology, and monitor population abundance, distribution and trends.

Although Massasauga has been the focus of several studies in Ontario, there are still many knowledge gaps that hamper progress towards recovery for the species. In particular, information related to habitat use at various life stages and emerging and landscape-level threats is needed. Continued efforts to conduct inventory and monitoring, and encourage collaboration

amongst citizen science programs and Indigenous communities and organizations will support a greater understanding of population trends and the impacts of threats.

Given the precarious state of the Carolinian population, information regarding population dynamics and demographics are necessary to establish self-sustaining population level targets and inform future recovery efforts.

Actions:

4. **(High)** (Carolinian population) Conduct research on the habitat needs of Massasauga, focusing on usage of overwintering sites, neonate and juvenile habitat usage, and habitat required to support viable subpopulations within the Carolinian population.
5. **(High)** Investigate the scale and potential effects of threats such as snake fungal disease, road mortality, climate change and specific forest management activities (e.g., large-scale clear cutting and road usage) on Massasauga populations.
6. Encourage participation in citizen science data collection programs (e.g., *Ontario Reptile and Amphibian Atlas*) and develop and implement a long-term monitoring and survey program to:
 - monitor the distribution and abundance of Massasauga at representative sites across its range in Ontario; and,
 - monitor emerging and existing threats to the species.
7. (Carolinian population) Investigate the population dynamics of the Ojibway Prairie and Wainfleet Bog subpopulations to gain information on demographics and survival rates to:
 - inform population viability analyses; and,
 - establish minimum viable population sizes.
8. As appropriate, encourage the recording, sharing and transfer of Traditional Ecological Knowledge on Massasauga, where it has been shared by communities, to increase knowledge of the species and support future recovery efforts.

Focus Area: Threat Management and Stewardship

Objective: Reduce threats to Massasauga by implementing threat mitigation techniques and promoting stewardship of the species and its habitat.

Landowners, local residents, municipalities and conservation organizations all have an important role to play in the protection and recovery of Massasauga. Increasing public awareness of Massasauga, mitigating threats and promoting local stewardship are critical to addressing key threats such as road mortality, and decreasing individual participation in harmful activities such as persecution and the pet trade. Given the broad distribution of the Great Lakes – St. Lawrence population, and the location of the Carolinian population in urbanized areas, targeted social media campaigns can effectively provide information, interactive insights and help individuals overcome misperceptions of snakes often prevalent in society. In areas where human-snake conflict is a real or perceived risk, collective action to alleviate concerns will support the recovery of Massasauga and support stewardship-focused coexistence of snakes and humans.

Actions:

9. **(High)** Develop, implement and evaluate best management practices to reduce the impacts of existing (e.g., road mortality) and emerging (e.g., disease, climate change) threats to the species. This may include:
 - implementing techniques to mitigate the threat of road mortality and reduce habitat fragmentation such as:
 - installing ecopassages, fencing, and wildlife crossing signs in areas with high mortality;
 - promoting alternatives to traditional roadway construction through Massasauga habitat, such as the inclusion of “eco-passages” and fencing;
 - avoiding the construction of roads in sensitive habitats or through important migration corridors and, where feasible, implementing temporary or permanent closures of existing roads in such habitats;
 - increasing awareness of drivers about Massasauga presence on roadways, the biological importance of the species, and appropriate steps to take if encountered in a vehicle; and,
 - working collaboratively with industries to develop guidance on the identification and ecological importance of snakes and activity-specific best management practices;
10. **(High)** Develop targeted, interactive social media and social marketing campaigns (e.g., gestation cameras, if appropriate) to promote Massasauga stewardship and reduce the threat of persecution and illegal collection for the pet trade.

11. Work collaboratively with land owners, land managers, organizations and municipalities in key areas to reduce human-snake conflict, reduce snake persecution and alleviate public safety concerns. This may include:
 - developing materials and promoting public awareness of Massasauga, the biological importance of the species, and safety and first aid measures;
 - developing local strategies to minimize human-snake conflict, such as short-distance rattlesnake re-location programs or the installation of snake-proof fencing in key areas (Carolinian population); and,
 - installing permanent signage at park trailheads.

Focus Area: Population Management

Objective: (Carolinian population) Increase the likelihood of both subpopulations persisting by investigating, implementing and evaluating population management activities, as appropriate.

Because the population numbers of the two Carolinian subpopulations are so low, habitat management and threat mitigation actions alone are not likely to ensure the population's persistence in the long-term. The Ojibway Prairie subpopulation, in particular, is at risk of imminent extirpation and requires immediate intervention. There has been a long history of collaborative recovery work for this subpopulation, including feasibility studies and collective efforts by relevant municipalities, conservation organizations and local land owners and managers. The recovery of this subpopulation will require population management techniques (e.g., population augmentation), supported by the establishment of a captive population, and continued adaptive management based on evaluation of activities. Recovery will additionally be supported by further research on habitat requirements and a population viability analysis. The Wainfleet Bog subpopulation may require population management techniques but further research on the feasibility and appropriateness of these actions is needed prior to implementation.

Actions:

12. **(High)** (Carolinian population) Using research and feasibility assessments already conducted, implement population management actions for the Ojibway Prairie subpopulation at the Ojibway Prairie Complex, such as captive-breeding and release, as deemed effective and appropriate. Evaluate the effectiveness of population management activities and conduct research to inform refinement of the husbandry and release techniques used in captive-breeding and release activities.

13. (Carolinian population) Investigate the potential need for, and feasibility of, recruitment techniques to support the Wainfleet Bog subpopulation. If found to be feasible and necessary, implement, evaluate, adapt and improve recruitment techniques with consideration for Massasauga ecology. An example of a priority recruitment technique is:
 - exploring the potential benefits and need for a cost-effective head-starting protocol/program.

Implementing Actions

Financial support for the implementation of actions may be available through the Species at Risk Stewardship Program. Conservation partners are encouraged to discuss project proposals related to the actions in this response statement with program staff. The Ontario government can also advise if any authorizations under the ESA or other legislation may be required to undertake the project.

Implementation of the actions may be subject to changing priorities across the multitude of species at risk, available resources and the capacity of partners to undertake recovery activities. Where appropriate, the implementation of actions for multiple species will be co-ordinated across government response statements.

Reviewing Progress

The ESA requires the Ontario government to conduct a review of progress towards protecting and recovering a species not later than five years from the publication of this response statement. The review will help identify if adjustments are needed to achieve the protection and recovery of Massasauga (Carolinian and Great Lakes – St. Lawrence populations).

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Massasauga (*Sistrurus catenatus*) - Carolinian and Great Lakes – St. Lawrence populations in Ontario for their dedication to protecting and recovering species at risk.

For additional information:

Visit the species at risk website at ontario.ca/speciesatrisk

Contact your MNRF district office

Contact the Natural Resources Information Centre

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