

Round-leaved Greenbrier

Ontario Government Response Statement



Photo: Michael Oldham

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 Round-leaved Greenbrier (*Smilax rotundifolia*) in Ontario was completed on December 7, 2018.

Round-leaved Greenbrier is a perennial vine that may grow as a long tangle of branched stems on the ground, or may climb over shrubs and trees up to a height of five metres or more. The vines produce clusters of small, greenish flowers in the spring that turn into round, blue-black berries.

Protecting and Recovering Round-leaved Greenbrier

Round-leaved Greenbrier is listed as a threatened species under the ESA, which protects both the plant and its 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.

Globally, Round-leaved Greenbrier is found across south-central and eastern North America. The species' range extends from southwestern Ontario west to Kansas, south to the Gulf of Mexico, east to the Atlantic Ocean, and north to southern Nova Scotia. The species is generally common throughout its range in the United States, although it is considered vulnerable in Illinois.

In Canada, Round-leaved Greenbrier occurs in both southwestern Ontario and southwestern Nova Scotia. In Ontario it is restricted to three regions: Essex County, Norfolk County, and the Niagara Region. There are 14 extant populations that occur in Ontario within the Carolinian zone, 13 of which have been reconfirmed since 2017. The remaining population was last documented in 2013. There are an additional three populations classified as historical but presumed to be extant as suitable habitat still exists at the locations, and surveys have not been completed recently to confirm presence or absence. A population at Point Pelee documented from one specimen collected in the 1800s is believed to be extirpated.

Round-leaved Greenbrier is a perennial vine that generally grows in forest understories and openings where soil is moist and seasonally flooded. It has been documented in a small assortment of swamp and fresh to moist forest ecosystem types, and is always associated with a canopy dominated by deciduous tree species. The species is able to tolerate high levels of shade, but appears to grow best in forests with areas of edge or openings in the canopy created by minor disturbance (moderate timber harvest, small fires, etc.). Although the species has been observed in dry and upland habitats in the U.S., it appears to be restricted by soil moisture content at the northern extent of its range.

Round-leaved Greenbrier is capable of reproducing both sexually, through the production of fertile seeds, and vegetatively through the production of shoots from underground stems. Plants are dioecious, meaning that each plant produces only male or female flowers. Therefore, to reproduce sexually it must be pollinated by another plant of the opposite sex. The sex of the plants within each community has been documented for 8 of the 14 extant Ontario populations. Three populations were determined to contain only male plants, one contained only females, and the remaining four had both sexes. A historical population was also found to contain both sexes in 1989 but, if extant, this may have changed. The sex ratios of the Round-

leaved Greenbrier populations where both sexes are present are unknown. These sex ratios may be influenced by a variety of environmental or genetic factors. Where only a single sex is present the available evidence suggests this is most likely the result of site being colonized by a single individual reproducing asexually, but this has not been studied in Ontario populations. There is little information available to indicate which of these factors, if any, may influence Round-leaved Greenbrier in Ontario.

Round-leaved Greenbrier relies on pollination by an assortment of insects, including mosquitos, other small flies, and bees. Recent studies have suggested a lack of successful natural pollination due to limited observation of pollinator visitation to both male and female flowers. Studies of select populations have suggested that the species produces less fruit than similar plants, and that it is consumed less by wildlife over the winter, which may result in decreased seed dispersal.

Round-leaved Greenbrier appears to be tolerant of moderate disturbances of the overstory where it grows or, in the case of seedlings, of the ground layer. Plants have demonstrated the ability to weather some damage to the above ground growth provided the root system remains intact and conditions remain suitable for growth.

The most significant threat to Round-leaved Greenbrier in Ontario is land development that results in the removal of woodlots and swamps that the species relies on for habitat. Historically, much of the forest in the species' provincial range was removed for agriculture, and the remaining woodland habitat is highly fragmented, reducing opportunities for populations to cross-pollinate or disperse seeds to suitable growing conditions. The most significant limitation resulting from the fragmentation of its habitat is the reduced genetic diversity in single-sex populations which is expected to reduce their long-term viability.

Although the species can tolerate and even benefit from moderate disturbances, high intensity timber harvest, off-path use of All-Terrain Vehicles (ATVs), and excessive deer browse all have the potential to damage individual plants, and negatively alter growing conditions around established populations. Excessive opening of the canopy or abrupt change in environmental conditions may directly affect the sex ratios, or render the soil moisture unsuitable. Alternatively, suppression of natural disturbance processes and a lack of forest management practices to simulate them resulting in full canopy closure and excessive shading may inhibit seedling establishment. Soil moisture may also be influenced by human alterations to land drainage through ditching, watercourse alteration, berm construction, and irrigation practices, which may leave plants more susceptible to damage during the freeze-thaw cycle in the spring. Other potential threats to Round-leaved Greenbrier include development and land clearing

overlapping the edges of occupied habitat and incidental damage from hydro corridor maintenance and crop management. Invasive plants such as Garlic Mustard (*Alliaria petiolata*), Glossy Buckthorn (*Frangula alnus*), European Buckthorn (*Rhamnus cathartica*), Multiflora Rose (*Rosa multiflora*) and Tartarian Honeysuckle (*Lonicera tatarica*) may also pose a threat due to competition for resources, and native insects and small herbivores may also feed on the plant.

Further research is required to gain a better understanding of the current status of each population and population dynamics over the long-term, to identify the factors limiting fertilization, germination, and establishment of seedlings, and to identify the optimal methods for addressing the limiting factors to sexual reproduction. Research would include identifying suitable propagation methods for use in single-sex populations and evaluation of artificial pollination methods for all occupied locations where appropriate.

The number of populations of Round-leaved Greenbrier in Ontario appear to be persisting over time, with a single exception. As a result, recovery efforts for Round-leaved Greenbrier will focus on preserving the existing populations and supporting their natural and sustainable reproduction through management of direct threats and biological limitations. The government supports recovery actions for Round-leaved Greenbrier that increase knowledge of the species, manage the habitat, limitations, and threats to the species, and promote the education and participation of landowners and members of the public that may use, own, or manage lands containing the species.

Government's Recovery Goal

The government's goal for the recovery of Round-leaved Greenbrier is to maintain the species' distribution in Ontario, and to support the viability of natural populations by addressing threats and limitations. The government supports augmenting single-sex populations where feasible and investigating the necessity and feasibility of augmenting mixed-sex populations.

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 cooperation 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 Round-leaved Greenbrier, the government will directly undertake the following actions:

- Continue to implement the *Ontario Invasive Species Strategic Plan* (2012) to address the invasive species (e.g., Garlic Mustard) that threaten Round-leaved Greenbrier.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Round-leaved Greenbrier data to the Ontario's central repository through the citizen science project that they receive data from (i.e., iNaturalist.ca) and directly through the Natural Heritage Information Centre.
- Undertake communications and outreach to increase public awareness of species at risk in Ontario.
- Continue to protect Round-leaved Greenbrier and its habitat through the ESA.
- Support conservation, agency, municipal and industry partners, and Indigenous communities and organizations to undertake activities to protect and recover Round-leaved Greenbrier. Support will be provided where appropriate through funding, agreements, permits (including conditions) and/or advisory services.
- 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 Round-leaved Greenbrier. 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: Research and Monitoring

Objective: Increase knowledge of the distribution, abundance, population composition, and habitat conditions of Round-leaved Greenbrier in Ontario.

Recent surveys of existing Round-leaved Greenbrier populations have provided valuable information as to the abundance at many known locations and what sexes of plants are found there. This information can be used to prioritize populations for recovery efforts, particularly those that contain

only a single-sex, those showing no evidence of seedling establishment, and/or those that are separated by a significant distance from other local populations. Populations lacking in sexual reproduction may be less able to adapt to changing site conditions, and less genetically diverse. Continued and expanded collection of monitoring information is warranted to document any demographic changes that may impact the populations' ability to persist. In addition, regular inventory of growing conditions at each site may provide valuable information regarding environmental factors influencing sex ratios and reproductive success that may be addressed or managed. Examination of the sites classified as historical but presumed to be extant (Cedar Creek, White Oak Woods, and McCleod Road) should also occur to determine if populations exist at these locations, and to ensure they are represented in research and monitoring programs.

Actions:

1. **(High)** Develop and implement a monitoring program for Round-leaved Greenbrier. The program should be designed and implemented in such a manner that it may contribute to research actions and include the following:
 - evaluate detectability of Round-leaved Greenbrier and survey locations where the population is considered to be historical;
 - investigate population dynamics including:
 - genetics, including the effects of in-breeding;
 - reproductive biology (e.g., pollination, seed production, germination);
 - recruitment (e.g., effects of site disturbance, sex representation); and,
 - factors inhibiting growth, including invasive species and native insect pests.
2. **(High)** Conduct research to determine optimal methods for managing Round-leaved Greenbrier populations including augmentation (e.g., propagation) in single-sex populations, and practices that increase pollination rates (e.g., artificial pollination), seed production, dispersal, germination, and seedling establishment in mixed-sex populations.
3. Investigate the necessity and feasibility of augmenting mixed-sex populations to address sex ratio bias if present.

Focus Area: Management and Habitat Protection

Objective: Maintain or improve the quality of habitat available for Round-leaved Greenbrier, and where feasible and appropriate, enhance the ability of existing plants to reproduce.

Round-leaved Greenbrier populations and habitat occur primarily on private lands, but are also found on properties belonging to municipalities and conservation organizations. Many of the habitat areas in which it is found consist of fragmented woodlots separated by roads, agricultural areas, and development. As a result, a collaborative approach to population and habitat management and protection is needed to support the recovery of the species. Encouraging the use of best management practices across multiple sectors and land users will also support better long-term recovery.

Actions:

4. **(High)** In collaboration with landowners and local agencies implement, monitor and adapt actions identified as necessary and feasible to promote sexual reproduction in the species including:
 - augmenting single-sex populations (e.g., propagation, artificial pollination); and,
 - enhancing pollination, seed production, dispersal, germination, and seedling establishment in mixed-sex populations (e.g. artificial pollination, head-starting seeds).
5. Work collaboratively with land owners, land managers, and researchers to develop, implement and evaluate management plans and best management practices to maintain or improve the quality of Round-leaved Greenbrier habitat and viability of populations at existing sites. Plans may include:
 - encouraging the use of silvicultural practices that allow for sustainable harvest while maintaining or improving habitat conditions **(High)**;
 - steps to minimize impacts of land use and water management on natural drainage regimes **(High)**;
 - strategies to remove and/or monitor the presence and impacts of invasive plants (e.g., Glossy Buckthorn and Garlic Mustard) or harmful native insect pests in areas with or adjacent to populations; and,
 - habitat and land management approaches that encourage the establishment and maintenance of natural vegetated corridors, that support the survival and movement of pollinators necessary for Round-leaved Greenbrier sexual reproduction.
6. As opportunities arise, work with local land owners and community partners to support the securement of habitat of Round-leaved Greenbrier through existing land securement and stewardship programs.

7. Implement approaches to avoid or reduce impacts of recreational activities on Round-leaved Greenbrier and its habitat including:
 - redirecting recreational activities away from the species;
 - erecting physical barriers, if appropriate; and,
 - installing signage to alert land users to the presence of the species.

Focus Area: Outreach and Awareness

Objective: Increase public awareness of and participation in efforts to minimize threats to Round-leaved Greenbrier.

Round-leaved Greenbrier is found on lands utilized for recreational, commercial, agricultural, and residential uses. Therefore, the education and involvement of the public is a key factor in supporting recovery of the species, particularly to help manage the threats of inappropriate recreational vehicle use, and damage occurring incidentally to the species from activities such as road corridor maintenance and brush clearing. Ensuring landowners are aware of the presence of the species and potential threats will require collaboration between agencies with an emphasis on sharing the best available information.

Actions:

8. Promote awareness about Round-leaved Greenbrier among land owners, land managers and land users by sharing information on:
 - how to identify the species;
 - the species' habitat requirements;
 - protection afforded to the species and its habitat under the ESA; and,
 - actions that can be taken to reduce threats to the species and its habitat (e.g., distributing best management practices for recreational activities to land users).

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 the 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 coordinated across government response statements.

Reviewing Progress

The ESA requires the Ontario government to conduct a review of progress towards protecting and recovering a species no later than the time specified in the species' government response statement, or not later than five years after the government response statement is published if no time is specified. The review will help identify if adjustments are needed to achieve the protection and recovery of Round-leaved Greenbrier.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Round-leaved Greenbrier (*Smilax rotundifolia*) 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 the Ministry of the Environment, Conservation and Parks
1-800-565-4923
TTY 1-855-515-2759
www.ontario.ca/environment