American Ginseng

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 American Ginseng (Panax quinquefolius) in Ontario was completed on July 22, 2019.

American Ginseng is a long-lived perennial plant that grows 20 to 70 cm tall. It has a long tap-root and a single stem which ends in a whorl of one to four or occasionally five leaves. Each leaf typically has five leaflets radiating from a central point at the end of the leaf stem. Mature plants have a cluster of 6 to 20 inconspicuous greenish-white flowers that develop into bright-red berries. The root of American Ginseng has medicinal value, and wild American Ginseng is especially valued and highly sought after.

Protecting and Recovering American Ginseng

American Ginseng is listed as an endangered 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.

In Canada, the federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed American Ginseng as Endangered in 1999, and the species is listed under the federal *Species at Risk Act*. In Quebec, American Ginseng is listed as Threatened under the *Act Respecting Threatened or Vulnerable Species*. The species is not listed under the U.S. *Endangered Species Act;* however, it is considered vulnerable in some U.S. states where it may receive protection with laws varying state to state.

Globally, American Ginseng is native to North America where it occurs over a large portion of eastern United States, from New England and Minnesota south to Louisiana and Georgia. In Canada, the species occurs in southern Ontario, mainly along the Niagara Escarpment and eastern edge of the Precambrian Shield, and southwestern Quebec. While it is widely distributed across its North American range, its occurrence is infrequent and fragmented, and the species is considered to be rare or uncommon throughout most of its range. Although there have been over 200 occurrences of American Ginseng in Ontario to date, a 2014 study estimated that less than 10 populations are currently considered viable (i.e., able to persist long-term based on requirements for a minimum viable population size). Overall, Ontario populations are estimated to have declined almost 50 percent between 1980 and 2010, mainly due to illegal harvest. Thirty-eight Ontario populations are considered extirpated, including nine since 1980. Another 90 occurrences have not been re-confirmed in the last 20 years, and it is uncertain whether these populations still exist.

American Ginseng is a long-lived species (can live for more than 50 years) with slow population growth. Individual plants take several years to reach maturity and begin flowering, after which they typically flower annually. There are two known pollinators for the American Ginseng, halictid (sweat) bees and syrphid (hover) flies, both of which are generalists. American Ginseng reproduce mainly through seed, and seed production is closely linked to plant size, with larger, older three- and four- leaved plants producing the most seeds. Once seeds are produced their dispersal depends on gravity and movement by animals. Animal seed dispersers include birds, in particular thrushes. Seeds require at least an 18 to 22 month dormancy period before germinating. Seedling mortality is high, mainly due to drought and predation, and can reach 70 to 90 percent in

populations at the northern limit of the species' North American range. Minimum viable population size estimates have varied among locations. A study in Quebec found that viable populations contain at least 172 individuals whereas in central Appalachia (United States) viable populations were estimated to have 780 to 820 plants or more.

American Ginseng is a shade-tolerant species that typically requires large and relatively undisturbed mature forests for optimal growing conditions. American Ginseng is particularly sensitive to changes in light levels (and associated soil temperatures) and is typically found under a forest canopy providing approximately 75 percent shade. The forest canopy of occupied sites is usually dominated by Sugar Maple (*Acer saccharum*), White Ash (*Fraxinus americana*), Yellow Birch (*Betula alleghaniensis)*, and Basswood (*Tilia americana*). Soil is generally rich in nutrients with a pH of moderately acid to neutral, with a texture that is almost always a sandy loam. American Ginseng sites are usually well-drained but moderately moist.

The two primary threats to American Ginseng in Ontario are the illegal harvest of wild plants and habitat loss and degradation. Other threats include browsing, predation and diseases, introduced and invasive species and unregulated commercial cultivation on forested land, especially if it occurs on sites near wild populations. Limiting factors such as long period before plants reach maturity and seedling mortality, namely through drought and predation, also influence the species survival and reproduction.

Wild American Ginseng is highly sought after for the medicinal value of its root and commonly poached. Illegal harvest of American Ginseng harms the species by reducing abundance, reproductive potential, genetic diversity and viability. Surveys in 2011 found 50 percent of Ontario's populations showed signs of illegal harvest. American Ginseng is highly susceptible to harvesting pressure due to the plant's slow growth and small population size.

American Ginseng occurs in areas where industrial, urban, agricultural and forestry activities have resulted in high levels of habitat loss and continue to put pressure on the species and its habitat. Direct loss of habitat and forest modifications that cause changes in light or hydrology can have strong negative impacts on the survival of American Ginseng. Recreational or commercial facilities and infrastructure (e.g., trails) can also lead to habitat degradation and can increase the likelihood of illegal harvest.

Browsing by White-tailed Deer (*Odocoileus virginianus*) can result in changes to forest understory, direct loss of leaves, flowers and fruit, and reduced seed production and has been documented to cause major impacts on American Ginseng populations in Canada and the United States. These effects can be especially prevalent in areas

where deer populations are abundant. American Ginseng seeds are also eaten by small rodents and the impact can be severe, significantly reducing recruitment potential in some populations.

Invasive plant species (e.g., Multiflora Rose (*Rosa multiflora)*, Japanese Barberry (*Berberis thunbergii*), Garlic Mustard (*Alliaria petiolata*), European Buckthorn (*Rhamnus cathartica*), and Dog-strangling Vine (*Cynanchum rossicum*)) are problematic to the species because they compete for resources, alter the surrounding environment and reduce habitat suitability for American Ginseng. Emerald Ash Borer (*Agrilus planipennis*), an invasive insect, and Butternut Canker (*Ophiognomonia clavigignenti-juglandacearum*), an introduced fungus, can also impact the habitat suitability for American Ginseng by killing the canopy trees which maintain the shade and low light levels required by the species. In addition, invasive slugs (e.g., *Arion rufus, A. fasciatus, A. fuscus*) can impact the species by feeding on individual plants as the emerge in early spring.

As there is a high interest in American Ginseng for its medicinal value, it is important to note, that American Ginseng found in North America can originate from four general methods of growth or production: wild, wild-simulated, woods-grown, and field cultivated. Wild American Ginseng is naturally occurring and native to deciduous or mixed forests (and sometimes treed swamps) of eastern North America; harvest of roots from wild populations is unsustainable in Canada and is prohibited under the ESA. Wild-simulated American Ginseng is grown in forests which provide natural shade and growing conditions. In wild-simulated production, seed is cast without any cultivation or other intervention, and roots can be very difficult to tell apart from wild American Ginseng. Woods-grown American Ginseng is commercially grown in forests but typically with agricultural practices applied such as mechanical or other forms of tillage, soil amendments and pest control measures. Field-cultivated American Ginseng is grown in agricultural fields under structures built to produce shade; generally, roots from field-cultivated plants can be differentiated from wild harvested roots. As it is deemed to not pose a risk to the province's wild American Ginseng, the sale of field-cultivated American Ginseng is permitted under the ESA. Other methods of commercial cultivation of American Ginseng are currently not permitted in Ontario.

Ontario has an important agricultural sector that is engaged in growing American Ginseng for domestic and export markets. About 150 producers grow American Ginseng in Southern Ontario on about 10,500 acres and produce crops valued at approximately $220 million per year (2015-2018). Hong Kong is the largest importer of Ontario Ginseng, followed by mainland China and the United States. The Ontario

Ginseng Growers Association (OGGA) is an organization representing producers of American Ginseng who grow, harvest and sell the root.

The ESA protects American Ginseng in Ontario by prohibiting the harvest, sale and distributions of wild American Ginseng. The habitat of wild American Ginseng is also protected under the ESA. Since the roots of field-cultivated American Ginseng look different than the roots of wild American Ginseng, the sale of field-cultivated roots does not threaten wild American Ginseng populations, and an exemption under the ESA (O.Reg. 242/08 s.2.) has been in place since 2008 to allow this activity. Provided a number of conditions are met, field cultivation of the species in Ontario is exempt from the species protection provisions of the Act, and field-cultivated ginseng can thus be grown, harvested and traded.

Allowing the harvest and sale of American Ginseng that is commercially cultivated through other production methods (e.g., woods-grown or wild-simulated) is considered to pose a conservation risk to the species in Ontario, primarily due to difficulty in distinguishing wild American Ginseng roots from American Ginseng cultivated through these other production methods. Additionally, if it occurs too near to wild populations, woods-grown cultivation of American Ginseng can affect wild American Ginseng populations through disturbances associated with site preparation (e.g., understory clearing) and maintenance (e.g., fertilizers), an increase in levels of exposure to native pathogens and introduction of non-native pests (e.g., the invasive slugs mentioned above in hay, soil or compost) or foreign genes that potentially diminish local adaptations. For these reasons, woods-grown and wild-simulated commercial cultivation of American Ginseng are not currently permitted in Ontario.

American Ginseng is also listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES is an agreement between 183 governments to ensure that international trade in wild animals and plants does not threaten their global survival. It subjects trade in these species to certain controls including authorizing all shipments through a licensing system. The CITES list is established based on criteria set and followed by CITES, not on the status of a species in any member jurisdiction (i.e., CITES listing is independent of the status and protections provided to the species under Ontario's ESA). Canada is a party to CITES and as such exporting American Ginseng generally requires a federally-issued CITES export permit provided by Environment and Climate Change Canada (ECCC).

While many threats to wild American Ginseng (e.g., habitat disturbance, plant and seed mortality, changes to habitat suitability) may be mitigated through stewardship efforts and best management practices, mitigating the impact of illegal harvest is likely to

continue to remain a substantial challenge and may limit the recovery potential for this species in Ontario. Active threat management and continued surveillance and enforcement measures where necessary will remain a priority in order to reduce illegal harvest of wild roots.

In some instances, further research is needed to determine when and where population management techniques (e.g., reintroduction or augmentation) may be necessary and feasible to support the recovery of the species. In other cases, given that many populations in Ontario are very small, not considered to be viable, and face continued threats, population management approaches that improve recruitment, including head-starting (i.e., facilitated seed propagation) or augmentation, are warranted to support the long-term recovery of the species in Ontario. Augmentation of naturally occurring populations has occurred in Ontario in the past, and successful techniques to increase seed germination rates and propagate the species currently exist, demonstrating that augmentation is technically feasible. Research may be necessary to further refine these restoration techniques. In determining whether recovery actions, including reintroduction or augmentation, 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.

Additional approaches to recovery will include continued inventory and monitoring, reducing threats to American Ginseng and its habitat, filling knowledge gaps and promoting protection through increased awareness. As further information is gathered about the species, including current locations and population viability in Ontario, the need for additional actions to maintain the persistence of the species in Ontario will be re-evaluated.

Government's Recovery Goal

The government's goal for the recovery of American Ginseng is to support the long-term viability of existing wild populations and where technically and biologically feasible increase the abundance of and area occupied by wild American Ginseng in Ontario by mitigating threats.

The government supports augmenting existing populations where feasible, and investigating the necessity and feasibility of reintroduction.

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 American Ginseng, the government will directly undertake the following actions:

- Continue to monitor populations, mitigate threats, and propagate and plant wild American Ginseng where appropriate and feasible in provincially protected areas.
- Through provincial direction for Crown forestry practices, continue to mitigate or avoid harm to American Ginseng and its habitat in areas occupied by the species.
- Continue to implement the *Ontario Invasive Species Strategic Plan* (2012) to address the invasive species (e.g., Garlic Mustard) that threaten American Ginseng.
- Continue to implement Ontario's *Invasive Species Act* to control the spread of invasive species (i.e., Dog-strangling Vine) that threaten American Ginseng by restricting the importation, deposition, release, breeding/growing, buying, selling, leasing or trading of invasive species.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of American Ginseng data to the Ontario's central repository through the citizen science projects 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 American Ginseng and its habitat through the ESA.

- Support conservation, agency, municipal and industry partners such as the Ontario Ginseng Growers Association, and Indigenous communities and organizations to undertake activities to protect and recover American Ginseng. 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.

- Conduct a review of progress toward the protection and recovery of American Ginseng within ten years of the publication of this document. Additional time is necessary to complete the review of progress for this species given its slow rate of reproduction and the length of time expected to complete and measure progress towards implementing recovery actions.

Government-supported Actions

The government endorses the following actions as being necessary for the protection and recovery of American Ginseng. 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 American Ginseng distribution, biology, habitat requirements and threats and further refine recovery techniques.

Many known occurrences of American Ginseng are now considered extirpated or historical in Ontario. Knowledge gaps also exist around the species’ biology, ecology and genetics including population viability, dispersal patterns and tolerance to various stressors. Confirming whether American Ginseng is present or absent at sites and filling knowledge gaps will provide information to determine the species’ ability to maintain self-sustaining populations and will help determine where recovery efforts are best focused. Implementation of a standardized long-term monitoring program will aid in understanding the status of the species, the effectiveness of recovery efforts, and determine whether management actions may be required. Collaborative efforts that address both research and monitoring priorities are encouraged where possible. When storing or sharing information on American Ginseng for research and monitoring

purposes, caution should be taken to ensure it is done so in a manner that does not place the species at risk of illegal harvest. Illegal harvest is one of the main threats to the species. Studying factors that increase vulnerability to this activity may help mitigate this threat. Evaluating propagation techniques (e.g., stratification of seeds to simulate natural conditions that the seeds must experience before germination can occur) and site suitability for augmentation and/or reintroduction will assist in determining under what circumstances these recovery efforts may have the most benefit. Finally, investigating the potential impacts of American Ginseng cultivation on wild American Ginseng will help to inform whether these threats to the species can be mitigated.

Actions:

1. **(High)** Develop and utilize a standardized survey and monitoring protocol that includes confirmation of presence, assessment of the extent of areas occupied by the species, demographics, habitat quality, disturbances and site-specific threats. The program should be designed and implemented in such a manner that it may contribute to research actions. Monitoring activities could include assessment of:
    - population viability, recruitment and distribution;
    - site-specific threats; and,
    - trends in habitat condition and use.
2. **(High)** Investigate factors that increase susceptibility to illegal harvest and test the effectiveness of mitigation approaches to reduce illegal harvest of roots. Actions may include:
    - evaluating marking and detection techniques (e.g., canine detection) to increase traceability or reduce marketability within illegal trade networks;
    - identification of indicators of risk of illegal harvesting; and,
    - monitoring the impact of having deterrents (e.g., cameras) to intercept or obstruct illegal activity.
3. **(High)** Investigate the necessity, feasibility, and potential risks of augmenting wild American Ginseng at confirmed locations or reintroducing the species in areas with suitable habitat.

4. **(High)** Conduct research on species biology, ecology, habitat use and genetics such as:
    - studying population viability in Ontario taking into account all relevant threats, ecological factors and conditions (e.g., canopy disturbance, edge effects, silvicultural systems and harvest methods, illegal harvest, demographic structure) to assess extirpation risk and minimum viable population size;
    - conducting demographic and genetic studies to assess how American Ginseng populations respond to various threats (e.g., sensitivity to edge effects, effect of different types and degree of canopy disturbance, impact of artificial selection through illegal harvest);
    - investigating the genetics of American Ginseng to develop and test methods of identifying the local origin of plants used in cultivation, the degree of local adaptation found in the species and the capacity for genetic exchange between wild and cultivated populations; and,
    - studying aspects related to the propagation of individuals (e.g., pollinators, seed ecology, short and long-distance dispersal pathways).
5. Conduct research, develop, validate and improve detection probability models and implement a standardized presence/absence survey protocol. This may include developing and incorporating predictive habitat modeling to identify focus areas for surveys.
6. Implement, evaluate, adapt and improve propagation best practices and techniques (including seed stratification and planting techniques used in Ontario) to support populations of wild American Ginseng and identify site characteristics that maximize the success of propagation and planting.
7. Investigate potential conservation benefits and risks associated with cultivating American Ginseng in forest settings for reasons other than species recovery (e.g., woods-grown or wild-simulated).

8. As appropriate, encourage the recording, sharing and transfer of Traditional Ecological Knowledge on American Ginseng, where it has been shared by communities, to increase knowledge of the species and support future recovery efforts.

Focus Area:	**Population and Threat Management**
Objective:	Maintain or improve the quality of habitat, reduce threats and augment existing populations of American Ginseng where feasible and appropriate at locations where it is known to occur in Ontario.

Habitat loss and degradation and illegal harvest are considered the greatest threats to American Ginseng in Ontario. Developing and implementing practical actions that land owners, land managers, Indigenous communities and organizations and conservation partners can undertake to address high priority threats will help support the protection and recovery of this species. Promoting beneficial actions that land owners, land managers and Indigenous communities and organizations can take proactively to enhance and restore habitat and improve habitat suitability are also encouraged. A collaborative management approach to implement best management practices will share responsibilities, share lessons learned, reduce threats and ensure suitable habitat is maintained.

Actions:

9. **(High)** In collaboration with landowners, land managers, Indigenous communities and organizations develop, implement and evaluate the effectiveness of best management practices (BMP) at the local and landscape levels in order to improve habitat, increase reproductive success, minimize threats and increase population size beyond extirpation and viability thresholds. Actions may include:
    - reducing the visibility of American Ginseng populations to reduce the risk of illegal harvest (e.g., re-directing trails and related recreational activities, planting vegetation to create a visual screen, facilitating natural dispersal of ripe fruit, removing dead stems in the autumn, relocation if other options are not feasible);
    - mitigating the effects of canopy disturbance and/or other forest management activities on American Ginseng and its habitat;

- implementing a marking program to make plants less valuable to illegal harvesters, a surveillance program to detect illegal activity and other measures to facilitate enforcement;
- where appropriate, dispersing or collecting and stratifying of seed, and the planting of seeds or seedlings appropriately sourced to maintain or improve genetic health, and
- managing vegetation to improve habitat quality (e.g., controlling invasive species posing a direct threat).

10. Collaborate with local groups and land managers to assess current, historic and presently unoccupied areas with suitable habitat and identify candidate areas for habitat enhancement and restoration, prioritizing currently occupied habitat. This may involve identifying site-specific restoration needs and goals, developing restoration plans and monitoring the species' and habitat response to habitat management to inform adaptive implementation of management approaches.
11. As opportunities arise, work with local land owners and community partners to support the strategic securement of American Ginseng habitat through existing land securement and stewardship programs.

Focus Area:	**Stewardship and Awareness**
Objective:	Increase awareness and promote the protection and stewardship of wild American Ginseng and its habitat in Ontario with appropriate audiences and in a manner that does not increase risk to the species.

Wild American Ginseng is found on both public and private lands, in areas which continue to experience a variety of development pressures. As a result, the involvement of several groups and organizations will be necessary to implement recovery actions and promote awareness of the species and its threats. Raising awareness and promoting local stewardship of wild American Ginseng amongst land owners, land managers, Indigenous communities and organizations, conservation organizations, forest industry and commercial cultivators, as well as how to reduce threats to the species and how to enhance its habitat will help promote and encourage protection of the species and its habitat in Ontario. Collaboration between organizations will support coordinated implementation of actions, improve efficiency and prevent duplication of

efforts. Due to the risk of illegal harvest, data on American Ginseng is classified as sensitive by the Ontario government. As such information protection protocols are in place to ensure information about the species, including locational information, is not misused. When storing or sharing information on American Ginseng to increase awareness and/or promote protection and stewardship of the species, caution should be taken to ensure it is done so in a manner that does not place the species at risk of illegal harvest.

Actions:

12. Promote the development of networks of land owners, land managers, Indigenous communities and organizations, conservation organizations, and the commercial ginseng industry (e.g., OGGA) to exchange knowledge, promote awareness of American Ginseng and encourage local collaborative land stewardship. Actions may include:
    - implementing training and outreach;
    - promoting and implementing American Ginseng conservation techniques;
    - addressing priority recovery actions; and
    - implementing a communication strategy aimed at reducing threats to the species.

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 Ministry of the Environment, Conservation and Parks 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 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 American Ginseng.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the American Ginseng (*Panax quinquefolius*) 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