

Kentucky Coffee-tree

Ontario Government Response Statement



Photo: Jean-Pol Grandmont

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 Ministry of Natural Resources and Forestry (the Ministry) 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 Ministry 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, as appropriate, and may be adapted if new information becomes available. In implementing the actions in the response statement, the ESA allows the Ministry to determine what is feasible, taking into account social and economic factors.

The Recovery Strategy for the Kentucky Coffee-tree (*Gymnocladus dioica*) in Ontario was completed on December 13, 2017.

Kentucky Coffee-tree is a moderate-sized, deciduous tree in the legume (pea) family. It has large, doubly-compound leaves that can reach one metre in length and produces greenish-white flowers that become hard, dark, bean-like pods when fertilized. The term coffee-tree originates from historical use of the roasted seeds in a coffee-like drink.

Protecting and Recovering Kentucky Coffee-tree

Kentucky Coffee-tree 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.

Kentucky Coffee-tree is primarily found in the United States from Texas north to the southern Great Lakes. Less than 5% of the species' global range is estimated to be in Canada, where it naturally occurs only in southern Ontario in the counties of Middlesex, Essex, Kent and Lambton and on several islands in Lake Erie (i.e., Middle, Middle Sister, East Sister, and Pelee). There are approximately 25 known Kentucky Coffee-tree locations within its natural range in Ontario. Kentucky Coffee-trees are located within protected areas, on public lands managed for conservation purposes, on private lands and on Bkejwanong (Walpole Island First Nation).

Kentucky Coffee-tree can grow in a broad range of habitats, but prefers moist, nutrient-rich, sandy-clay soils and requires openings in the tree canopy for seedlings to grow and establish. In Ontario, the species is often found in woodlands along the edges of marshes and floodplains. It is thought that Indigenous peoples may have played a role in increasing the historical range of the species, as Canadian populations of Kentucky Coffee-tree are often associated with historic routes and waterways travelled by Indigenous peoples, and subsequently early European settlers. Trees may have grown in areas where the seeds were used by Indigenous peoples for game pieces and in jewelry, musical instruments, and medicine as well as roasted and made into a drink similar to coffee by many Indigenous peoples and early European settlers. The species is rare or uncommon throughout its range in Ontario, with fewer than 500 genetically unique mature trees estimated within the province. The species is limited by low rates of dispersal and germination and has likely been uncommon in the province for many decades.

Kentucky Coffee-tree is able to reproduce both sexually via cross-pollination between male and female trees, and asexually through vegetative (i.e., clonal) reproduction. In order to allow for exchange of genetic material, both female and male trees must be present in a population. Exchange of genetic material increases genetic diversity, which improves the fitness of plants and the resilience of the species to both natural and human-caused environmental changes. Very few Kentucky Coffee-tree populations in Ontario contain both male and female trees and sexual reproduction is very limited. The seeds of the species require piercing or breaking

of the seed coat (scarification) to germinate; however, seeds are heavy, hard, and unpalatable or toxic to many species of native fauna. It has been hypothesized that Kentucky Coffee-tree seeds were once eaten and dispersed by the now-extinct mastodon (*Mammot* spp.) and that germination and dispersal have become limited as native herbivores are unable to consume the seeds. The current germination rate of Kentucky Coffee-tree seeds in Ontario is not known, but is expected to be low. Although the heavy seeds often sink in water, dispersal by rivers and streams is believed to be the only remaining natural method of dispersal.

In Ontario, many Kentucky Coffee-tree populations have been lost due to extensive historic deforestation and continued conversion of land for agricultural and urban land uses. The species has experienced a significant range contraction in Ontario including the loss of several easterly occurrences in Middlesex, Norfolk, Oxford and Elgin counties. This has isolated remaining trees and reduced opportunities for exchange of genetic material between populations as well as opportunities for colonization of new habitat. Damage or removal of Kentucky Coffee-trees may occur as the result of trimming or removal for road and railway maintenance activities. As well, reductions in canopy openings in some locations may pose a threat to the species. Kentucky Coffee-tree present on Lake Erie islands may be impacted by Double-crested Cormorants (*Phalacrocorax auritus*), particularly Middle and East Sister islands. Cormorants may impact trees in their breeding locations by physically breaking branches and stripping plant leaves on nesting trees (including Kentucky Coffee-tree) as well as through deposition of guano (feces) which damages saplings. Other potential threats to Kentucky Coffee-tree include alteration of natural water and fire regimes, and terrestrial invasive plants such as Dog-Strangling Vine (*Cynanchum rossicum* and *C. louiseae*) and Garlic Mustard (*Alliaria petiolata*).

Since the arrival of European settlers, the species has been introduced widely as an ornamental plant. In the past, it was thought that introduced populations and ornamental trees might have a different genetic make-up than trees naturally occurring in Ontario. There was uncertainty as to whether planting trees with different genetic material and the subsequent spread of that genetic material into the Ontario population posed a threat to the species. Although further research on this topic is warranted, recent research indicates that planted and naturally occurring trees have similar genetic makeup and that the introduction of non-native genetic material is not likely to pose a significant threat.

As Kentucky Coffee-tree is limited by short-distance dispersal and low rates of sexual reproduction and seed germination, recovery efforts are required to address reproductive barriers. These efforts may include applying management techniques to increase seed germination and seedling establishment, and where feasible, increasing the number of populations that are capable of sexual reproduction through augmentation efforts. 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, suggesting that augmentation is technically feasible.

In determining whether augmentation is 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. Augmentation of single-sex population has been assessed and determined to be necessary and feasible to support the species' recovery at the provincial scale. Assessment of feasibility in implementing augmentation of single-sex populations must still be considered at the local scale. For mixed-sex populations, further research is needed to determine whether these actions are necessary and feasible to support the recovery of Kentucky Coffee-tree.

It is anticipated that implementing management techniques to increase germination and seedling establishment rates as well as augmentation of single-sex populations will result in increased reproductive success and result in natural population increases. In addition to increasing the number of sexually reproducing populations, Ontario protection and recovery approaches will focus on: research and monitoring actions to help increase understanding of the species, its threats, where it is present, and the status of populations; habitat management and protection actions to ensure that suitable conditions are available for the species; and, outreach and awareness actions to improve understanding of the species and measures that can be taken to reduce threats. Recovery efforts will be focused on naturally occurring populations or those populations previously established for restoration or recovery purposes within the species' natural range.

Government's Recovery Goal

The government's goal for the recovery of Kentucky Coffee-tree is to maintain the provincial distribution of the species within its natural range in Ontario and to enable increases in abundance by addressing barriers to reproduction. 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 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 Kentucky Coffee-tree, the government will directly undertake the following actions:

- Continue to monitor and manage East Sister Island Provincial Park in a manner consistent with the park management plan; including monitoring of Kentucky Coffee-tree populations and potential threats (e.g., impact of Double-crested Cormorants) and determining whether specific management actions are necessary.
- Explore taking appropriate management actions in accordance with provincial policy direction on cormorants to support protection and recovery for Kentucky Coffee-tree.
- Collaborate with federal partners, such as Parks Canada, Environment and Climate Change Canada and Canadian Wildlife Service to implement protection and recovery actions for Kentucky Coffee-tree on federal lands, including Middle Island.
- For populations that occur on Pelee Island, explore opportunities to work collaboratively with the Township of Pelee, including the Pelee Island Environmental Advisory Committee, the federal government and local partners to integrate approaches to stewardship, implement recovery actions and explore integrated approaches to managing species at risk.
- Continue to implement the *Ontario Invasive Species Strategic Plan (2012)* to address the invasive species (e.g., Dog Strangling Vine, Garlic Mustard) that threaten Kentucky Coffee-tree.

- Continue to implement Ontario's *Invasive Species Act* to control the spread of invasive species (i.e., Dog Strangling Vine) that threaten Kentucky Coffee-tree by restricting the importation, deposition, release, breeding/growing, buying, selling, leasing or trading of Dog Strangling Vine.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Kentucky Coffee-tree data to Ontario's central repository through the citizen science projects that they receive data from (i.e., iNaturalist) 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 Kentucky Coffee-tree 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 Kentucky Coffee-tree. 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 Kentucky Coffee-tree. Actions identified as "high" may be given priority consideration for funding under the ESA. 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 Kentucky Coffee-tree distribution, abundance, habitat, and threats in Ontario, further refine recovery techniques and evaluate population management techniques.

Understanding where Kentucky Coffee-tree is present, the status of existing populations and their long-term viability (ability to persist), are critical to the protection of the species, its habitat and effective recovery efforts. Implementation of a standardized monitoring program will aid in

understanding the status of the species, the effectiveness of recovery efforts, and will help to determine whether additional management actions may be required. Although recent genetic research on the species has indicated that naturally occurring and planted trees have a similar genetic makeup, further research is warranted in order to determine whether the genetic makeup of Ontario populations is unique and therefore warrants additional efforts to preserve it.

As the species has a history of use by Indigenous peoples and is present on Bkejwanong (Walpole Island First Nation), understanding of the species may be further improved by working with Indigenous communities and Knowledge Holders to understand Traditional Ecological Knowledge of the species, and encourage its integration into collaborative management actions.

Actions:

1. **(High)** Conduct an inventory to determine population status and viability at extant and historic locations. Develop and implement a standardized monitoring program for extant populations to track:
 - population dynamics and reproductive success;
 - existence and severity of threats; and,
 - habitat conditions.
2. **(High)** Continue research to evaluate the genetic variation and structure of North American Kentucky Coffee-trees and determine whether Ontario populations contain unique genetic material that should be preserved.
3. Investigate the necessity and feasibility of augmenting mixed-sex populations.
4. As appropriate, encourage the recording, sharing and transfer of Traditional Ecological Knowledge on Kentucky Coffee-tree, where it has been shared by communities, to increase knowledge of the species and support future recovery efforts.

Focus Area: Management and Habitat Protection

Objective: Maintain or improve the quality of Kentucky Coffee-tree habitat and as appropriate and feasible, improve the species' ability to reproduce sexually.

Kentucky Coffee-tree is rare in Ontario and is limited by low rates of dispersal, germination and sexual reproduction. As a result, some populations may require additional recovery efforts in order to reduce the risk of population loss. Actions that improve reproductive success and the number of populations with both sexes of trees are expected to result in increased abundance. The species' habitat may also require habitat

management actions (through creation of canopy openings and control of invasive species) to ensure it remains suitable and populations are able to persist. Although techniques to increase germination rates and seedling establishment, and for the propagation and transplanting of Kentucky Coffee-tree currently exist, consolidation of this information will help to inform those undertaking recovery efforts. Kentucky Coffee-trees and their habitat may also be impacted by water management and flood control and by road and railway maintenance activities. Development of best management practices will provide guidance as to how to undertake these activities where the species is present. Kentucky Coffee-tree occurs on municipal land, in protected areas, on private land, and on First Nations' land. A collaborative management approach to implement recovery efforts will share responsibilities, reduce threats, ensure suitable habitat is maintained and encourage communication about lessons learned.

Actions:

5. **(High)** Consolidate and distribute available information about techniques to propagate and transplant Kentucky Coffee-tree as well as methods to increase germination rates and seedling establishment.
6. **(High)** Where appropriate, implement and monitor the effectiveness of management techniques to increase seed germination and seedling establishment rates (e.g., creating canopy openings, scarification, seed coat treatment, controlling invasive species posing a direct threat, as appropriate)
7. **(High)** In collaboration with landowners, land managers, municipalities and interested Indigenous communities and organizations, assess single-sex populations to evaluate the feasibility of augmentation at the local scale and determine whether additional management techniques are necessary (see Action 6 above). Where feasible, undertake and monitor the success of augmentation actions.
8. Develop and implement best management practices in collaboration with landowners, land managers, municipalities and interested Indigenous communities and organizations to:
 - conduct road and railway maintenance activities where Kentucky Coffee-tree is present; and,
 - manage water regimes and flood control in a manner that benefits the species (e.g., replicating natural flood cycles).

9. If further research indicates Ontario populations contain unique genetic material that should be preserved (see Action 2), undertake additional efforts to assist in its preservation. Actions may include preservation in situ (where the material currently occurs) and/or ex situ (off site) through archiving of material and/or incorporating material into existing populations.
10. As opportunities arise, support the securement of Kentucky Coffee-tree habitat that exists on privately owned lands through existing land securement and stewardship programs.

Focus Area: Outreach and Awareness

Objective: Increase awareness of the species, its habitat requirements and ways to minimize threats.

Kentucky Coffee-tree is found on lands used for recreational, agricultural and urban uses. As a result, the involvement of a number of groups and organizations will be necessary to implement recovery actions and promote awareness of the species and its threats. Collaboration between organizations will support coordinated implementation of actions, improve efficiency and prevent duplication of efforts.

Actions:

11. Promote local awareness about Kentucky Coffee-tree among land users, owners, and managers as well as interested Indigenous communities and organizations and promote community involvement 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.

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 Kentucky Coffee-tree.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Kentucky Coffee-tree (*Gymnocladus dioicus*) 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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