Lake Huron Grasshopper

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 Lake Huron Grasshopper (*Trimerotropis huroniana*) in Ontario was completed on December 7, 2018.

Lake Huron Grasshopper is a mottled silver-grey to brownish insect with speckles and banding on its front wings that help it to blend in with its sandy habitat. Like all grasshoppers, the Lake Huron Grasshopper has large back legs which are used for jumping. In Canada, the Lake Huron Grasshopper occurs only in Ontario on dunes along the shorelines of the northern Great Lakes.

Protecting and Recovering Lake Huron Grasshopper

Lake Huron Grasshopper is listed as a threatened species under the ESA, which protects both the insect 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, Lake Huron Grasshopper is restricted to the Great Lakes region of Ontario, Wisconsin, and Michigan. In Canada, it occurs only in Ontario at a total of 13 locations on the shores of Lake Superior and Lake Huron. The species formerly occurred at Wasaga Beach in Georgian Bay and Southampton along Lake Huron but has been declared extirpated from these sites. All known extant Canadian subpopulations, except for Giant's Tomb Island, were discovered since 2002. Although approximately 76 percent of dune complexes within the range of the species in Ontario have been surveyed, there are still a number of un-surveyed dune sites where the species may occur. The 13 extant subpopulations in Ontario occur on municipally-owned shorelines, conservation lands, provincial parks and privately-owned land.

Suitable habitat for the Lake Huron Grasshopper consists of open sand sparsely vegetated with native dune plants. Dunes are dynamic habitats that change due to wind, wave-wash, ice-scour, changes in lake levels, and other factors, and the Lake Huron Grasshopper has likely adapted to survive a great range of conditions. Preferred habitat for the Lake Huron Grasshopper is the foredune, a low ridge closest to the lake with open bare sand and scattered grasses. The species likely feeds primarily on native dune plants of which American Beachgrass (*Ammophila breiligulata*), Long-leaved Reed Grass (*Sporobolus rigidus*) and Field Wormwood (*Artemisia campestris*) appear to be the preferred food sources of both nymphs and adults.

Mating occurs in late summer, following which the females lay clusters of eggs which overwinter in the sand. Each female produces several egg clusters. The nymphs hatch in late spring and develop through five stages (instars) before maturing into adults. Adults may be found by mid-July and may survive until hard frosts in the fall.

Knowledge gaps include whether Lake Huron Grasshopper is present at un-surveyed dune sites; the abundance (size) of the populations at extant sites; additional information on the species' biology such as the egg-laying process and effects of predators; and habitat requirements, including the conditions that may favour competing species over the Lake Huron Grasshopper.

It is possible the distribution of Lake Huron Grasshopper is influenced by other native grasshoppers such as the Seaside Grasshopper (*Trimerotropis maritima*) and Mottled Sand Grasshopper (*Spharagemon collare*). Seaside Grasshopper and Lake Huron Grasshopper occupy similar habitat but rarely occur together, suggesting that the two species may compete for food or other limiting resources. Mottled Sand Grasshoppers seem to increase when dunes are disturbed by recreational activities. These disturbances may cause changes in dune vegetation allowing Mottled Sand Grasshopper to invade and displace the Lake Huron Grasshopper.

Threats to the species and its habitat include shoreline development, heavy recreational usage including all-terrain vehicle (ATV) use, invasive species, intentional removal of vegetation and potentially climate change. Historically, residential and commercial development and intensive recreational use destroyed or damaged much of the available dune habitat. These factors are likely what led to the extirpation of the species at Wasaga Beach and Southhampton. Recreational use of dunes by pedestrians and off-road vehicle continues to threaten some areas by damaging vegetation, causing erosion and introducing invasive species. Invasive plants, especially Phragmites (European Common Reed) (*Phragmites australis ssp. australis*) and Spotted Knapweed (*Centaurea stoebe* ssp. *Micranthos)* can replace preferred food plants and alter dune processes. Changes in lake levels related to climate change, natural cycles, or lake level management have the potential to alter the amount of dune habitat.

The abundance of Lake Huron Grasshopper populations is not known and has not been tracked, so it is unknown whether populations are currently stable, increasing or declining, and if so at what rates. In addition, there is uncertainty regarding the distribution and number of populations of the species in Ontario as some potential areas have not been surveyed. As such, one of the first steps towards achieving the recovery goal will be to perform surveys and confirm the species' presence to determine a better understanding of baseline information to track abundance and distribution over time. Focusing survey efforts on under-sampled areas with suitable habitat and implementing an ongoing monitoring program at confirmed sites will help determine whether progress is being made towards recovery. Heavy recreational use, intentional removal of native vegetation and invasive species continue to threaten Lake Huron Grasshopper, and therefore priority recovery actions will focus on reducing these threats and further loss or degradation of habitat. Increasing levels of engagement and awareness will help reduce unintended damage or destruction of habitat and will be a primary strategy to help protect and recover the Lake Huron Grasshopper.

Government's Recovery Goal

The government's goal for the recovery of Lake Huron Grasshopper is to maintain populations within the species' distribution in Ontario, and where feasible, enable natural increases in abundance by improving habitat and reducing threats.

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 Lake Huron Grasshopper, 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. Phragmites) that threaten Lake Huron Grasshopper.
- Continue to implement Ontario's *Invasive Species Act* to control the spread of invasive species (i.e., Phragmites) that threaten Lake Huron Grasshopper by restricting the importation, deposition, release, breeding/growing, buying, selling, leasing or trading of Phragmites.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Lake Huron Grasshopper 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 Lake Huron Grasshopper 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 Lake Huron Grasshopper. 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 Lake Huron Grasshopper. 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 Lake Huron Grasshopper distribution, abundance, habitat, and threats in Ontario.

While many of the dune complexes within or adjacent to known occurrences of Lake Huron Grasshopper have been surveyed, there remains additional work to confirm the full distribution of the species in Ontario. Surveying for the presence/absence of Lake Huron Grasshopper at extant locations, as well as under and un-surveyed areas with suitable habitat, will help determine where recovery efforts are best focused. 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. Knowledge gaps also exist around the species’ ecology and biology including specific habitat requirements, interactions with other species and egg-laying and feeding behaviours. Information on these biological and ecological requirements are needed to support continued protection and management of the species and its habitat. Increasing our understanding of potential emerging threats, such as climate change will support effective mitigation if needed in the future. Potential changes such as late spring frosts, unusually cool and wet growing seasons, increased dune vegetation succession, drought or increased temperature (leading to lower lake levels) may all have effects on the species.

Actions:

1. **(High)** Develop and implement a standardized survey protocol (i.e., presence/absence) prioritizing surveys at historical sites and under or un-surveyed areas with suitable habitat.
2. **(High)** Develop a standardized long-term monitoring protocol and monitoring schedule to be implemented at subpopulations throughout the species' range. Monitoring activities could include assessment of:
    - species presence/absence;
    - relative abundance, viability and population trends;
    - site-specific threats;
    - trends in habitat condition and use; and,
    - changes in proportional abundance of Lake Huron Grasshopper and other competing native grasshoppers such as the Seaside or Mottled Sand Grasshoppers.
3. Investigate the severity and extent of known and suspected threats to the species and its habitat and where necessary and feasible investigate the effectiveness of mitigation measures to address these threats.
4. Investigate the biology and ecology of the Lake Huron Grasshopper, such as:
    - interactions with other species, especially other grasshopper species such as the Seaside Grasshopper. For example, types of habitat conditions which favour other competing grasshoppers over the Lake Huron Grasshopper;
    - microhabitat requirements;
    - affects of changing lake levels on Lake Huron Grasshopper; and,
    - behaviours such as egg-laying and feeding.

Focus Area:	**Habitat and Threat Management**
Objective:	Maintain or improve habitat and reduce threats to Lake Huron Grasshopper and its dune habitat in Ontario.

Habitat alteration poses a significant threat to the Lake Huron Grasshopper. This includes shoreline development, heavy recreational usage and intentional removal of vegetation. Exposure to wind and wave is essential to maintain erosion and deposition of sand and to prevent forest succession. Activities which restrict these natural processes from happening threaten the habitat and thus the survival of Lake Huron Grasshopper. Collectively working to implement best management practices and effective mitigation options will support habitat management and restoration for this species. Invasive plant species can displace preferred food plants for the Lake Huron Grasshopper or alter dune processes, and dunes with the greatest risk of this threat tend to be those with a high degree of public access. Cooperative efforts to prevent the introduction of invasive species and manage habitat for suitability over the long-term will greatly assist in reducing this threat.

Actions:

5. **(High)** Collaborate with local organizations and initiatives to minimize threats to the species and its habitat, including trampling and dune vegetation removal, such as:
    - reducing off-trail ATV use and trampling from foot traffic by designating trails, installing signage or placing barriers; and,
    - providing positive information and suggested alternatives to landowners and beach users to reduce or eliminate the removal of native dune vegetation.
6. Remove or control invasive species in the habitat of Lake Huron Grasshopper. Actions may include:
    - developing and implementing best management practices for invasive species control;
    - supporting landowners and municipalities with on-the-ground invasive species control actions; and,
    - encouraging the use of invasive species prevention protocols such as the Clean Equipment Protocol.
7. Collaborate with local groups and land managers to identify candidate areas for habitat enhancement and/or restoration, prioritizing currently occupied habitat. This may involve identifying site-specific restoration needs and goals, developing

restoration plans, and evaluating the species' response to habitat restoration practices and techniques.

Focus Area:	**Outreach and Awareness**
Objective:	Increase public awareness of the species, its habitat requirements and ways to minimize threats.

Lake Huron Grasshopper is found on both private and public lands used for a number of recreational and urban uses. As a result, the involvement of multiple groups and organizations will be necessary to implement recovery actions and promote awareness of the species and its threats. Raising awareness amongst the public, municipalities, local land owners and organizations of Lake Huron Grasshopper, 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. By increasing local awareness, individuals will become more knowledgeable about the types of activities that may inadvertently impact the species.

Actions:

8. **(High)** Promote local stewardship and awareness of the Lake Huron Grasshopper and its habitat which may include:
    - developing social marketing strategies to help influence public perceptions and behaviours. For example, increasing awareness of how landowners can benefit from protecting and restoring dune habitat;
    - producing stewardship publications to highlight success stories and engage the public in dune conservation and provide these materials to nature centres, tourist operations, libraries, and other public sites;
    - hosting events where the public can assist with stewardship and habitat improvement;
    - supporting landowners to steward their dunes;
    - providing educational materials about dunes for municipal and public use during the planning process; and,
    - partnering with schools to conduct outreach.

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 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 Lake Huron Grasshopper.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Lake Huron Grasshopper (*Trimerotropis huronia*) 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 Natural Resources Information and Support Centre
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