Ministry of Natural Resources and Forestry

Natural. Valued. Protected.

Eastern Small-footed Myotis

Ontario Government Response Statement

Photo: Brock Fenton

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 Eastern Small-footed Myotis (*Myotis leibii*) in Ontario was completed on June 15, 2017.

Eastern Small-footed Myotis is a small, insectivorous bat, with yellow-brown fur and a prominent black face mask, and black ears and wings. At 3 to 6 grams in weight, it is the smallest bat species found in Ontario.

Ontario

Protecting and Recovering Eastern Small-footed Myotis

Eastern Small-footed Myotis is listed as an endangered species under the ESA, which protects both the bat 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 Ministry be met.

Globally, Eastern Small-footed Myotis is found in eastern North America, from southeastern Oklahoma, Arkansas, northern Alabama and Georgia, and northwestern South Carolina to New England and southern portions of Canada. In the U.S., the species is largely concentrated in the Appalachian Mountains and in Canada, the species occurs in portions of Ontario and Québec. The majority of confirmed individuals are known from surveys at just two hibernation sites in New York state.

The species has always been considered rare and it is sparsely distributed throughout its range. Reliable population estimates have been very difficult to establish across the species' range. In Canada, the species has been found in areas of southern and central Ontario, and southwestern Québec. In Ontario, Eastern Small-footed Myotis has been observed in the general area south of a line extending between the northeast shore of Lake Superior and the Ontario-Québec border.

Eastern Small-footed Myotis is the smallest and rarest of Ontario's bats. Very few observations of the species have been made, and it has been the least studied bat species in the province. As a result, less is known about its biology and distribution than other bat species. In the absence of species-specific information, knowledge of other *Myotis* species is often used to infer information, including potential trends and threats, related to Eastern Small-footed Myotis.

During the winter, Eastern Small-footed Myotis hibernates in caves and abandoned mines, individually or with other bats, and they are often found in narrow cracks in cave walls and ceilings. The species is able to tolerate colder, drier conditions than other hibernating bat species, and may return to the same hibernaculum (hibernation site) over multiple years. There are approximately 10 currently known hibernacula in Ontario. Locations of known hibernacula in the province generally coincide with the Niagara Escarpment and areas of eastern Ontario formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum (karst), and abandoned mines.

Upon emergence from hibernation in the spring, Eastern Small-footed Myotis is thought to travel to summer maternity roosts and foraging habitats. Like all other bat species in the province, Eastern Small-footed Myotis produces ultrasound echolocation calls to navigate and search for prey. Recent research has shed light on the summer habitat use and activities of the species in Ontario. As in other parts of its range, Eastern Small-footed Myotis use open, sunny rocky habitats for roosting, and are occasionally found in buildings. Only a handful of maternity roosts are known from Ontario, and these included both rock crevices and old, wooden buildings. It is thought that the species generally travels relatively short distances between winter and summer habitats.

There are substantial knowledge gaps related to the species' biology, including habitat usage, summer and hibernation ecology, and abundance and distribution across the province. The use of crevices for hibernation and roosting makes the species difficult to survey and find, and it is challenging to distinguish it from other *Myotis* species using acoustic surveying methods. Traditional bat surveying techniques to identify habitat use and quantify distribution and abundance of the species may be revised if knowledge gaps specific to the biology of the Eastern Small-footed Myotis are filled.

The primary threat to Eastern Small-footed Myotis is white-nose syndrome (WNS), a disease caused by the fungus *Pseudogymnoascus destructans*, which is thought to have been accidentally introduced to North America from Europe, and is a serious threat to all cave-dwelling bats. Since the winter of 2006-2007, WNS has spread widely and rapidly, and it is estimated that over 5 million bats from eastern North America have been killed by WNS. The disease was first detected in Ontario in 2010, and declines in *Myotis* species in Ontario hibernacula have ranged from 85 to 99%. All known Ontario hibernacula are infested or at a high risk of infestation of WNS and the fungus was first detected on Eastern Small-footed Myotis in Ontario in 2016. The Committee on the Status of Species at Risk in Ontario (COSSARO) identified WNS, and the subsequent risk of disappearance or severe decline of Eastern Small-footed Mytois at greater than 75% of their known locations, as the primary reason for classification of the species as endangered. Because of the general lack of data on the species, the extent to which Eastern Small-footed Myotis may currently be affected by WNS is unknown.

White-nose Syndrome

White-nose syndrome (WNS) affects cave-dwelling bats during their overwinter hibernation period. *Pseudogymnoascus destructans*, the fungus that causes this disease, thrives in the cool, humid environments of caves and abandoned mines, and grows on the tissues of hibernating bats. Infected bats may have white fuzzy patches on their muzzles and ears, and lesions on

their wing membranes. This leads to dehydration and electrolyte imbalances, causing bats to arouse from hibernation more frequently and/or emerge from hibernation prematurely, and depleting the bats' critical energy reserves. High levels of overwintering mortality result, and bats that do survive until spring may experience tissue damage, physiological stress or reduced reproductive success.

Some cave populations in eastern North America have experienced losses from WNS of up to 95-100%. The loss of these numbers of bats has the potential to affect ecosystem function. For example, research published in 2011 by Boyles et al. suggested that the annual agricultural losses in the U.S. due to WNS in bats could be approximately $3.7 billion (US dollars), as a result of increased insect damage and ensuing need for increased pesticide use in lieu of a primary predator.

Human disturbance (e.g., from caving, vandalism and invasive swabbing during hibernation) may also affect the species and its habitat. Recreational caving, in the absence of decontamination protocols, can spread WNS from existing locations to new locations. Additionally, bats are particularly sensitive to disturbance during the winter, and disturbance can lead to them awakening and using energy stores which reduces their overwintering survival. Alteration of habitat in hibernacula, including changes to microclimates, airflow or hydrology, is also a potential threat to the species, and may result from commercial caving and industrial activities that occur near caves or abandoned mines (e.g., quarrying, mining, and forestry). Wind turbine mortality may also be a threat to the species, though very few fatalities of Eastern Small-footed Myotis have been reported from wind energy projects in Ontario or more broadly, in North America. However, given the rarity of the species and uncertainties associated with its identification, potential population-level effects of turbine mortality on Eastern Small-footed Myotis are currently unknown.

Currently, the impacts of WNS are being observed as a significant reduction in population numbers of bat species that overwinter in Ontario. The feasibility of addressing this threat remains unknown and research is ongoing. Given the significant knowledge gaps that exist with regard to Eastern Small-footed Myotis, the uncertainty associated with the extent of impacts of WNS to the species, and the difficulties in estimating population sizes and identifying both current and historical site locations, it is difficult to determine the feasibility of achieving specific targets for populations in Ontario. At this time, general habitat protection will continue to apply for the species. Once knowledge gaps are sufficiently filled, an evaluation will be undertaken to determine whether an additional habitat tool under the ESA is needed and appropriate.

Efforts to collaborate effectively amongst all relevant partners, organizations and jurisdictions are integral to supporting the stewardship of the species and reducing duplication of activities. Actions to support the protection and recovery of Eastern Small-footed Myotis will focus on filling knowledge gaps related to the species' biology and habitat requirements and the effects of WNS and other threats, mitigating identified threats, conducting inventory and monitoring to increase knowledge of provincial populations, and working collectively to protect habitat and increase awareness of the public. Ontario will continue to work collaboratively with other jurisdictions to respond to the threat of WNS and support the protection and recovery of the species in the province.

Government's Recovery Goal

The government's short-term goal for the recovery of Eastern Small-footed Myotis is to maintain the persistence of the species at existing locations in Ontario while filling knowledge gaps related to the species' biology, habitat requirements, and the presence and severity of threats. The long-term goal is to support a self-sustaining Eastern Small-footed Myotis provincial population throughout its current range.

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 Ministry 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

Ontario's White-nose Syndrome Response Plan

Ontario's White-nose Syndrome Response Plan (2015) establishes a coordinated provincial approach to white-nose syndrome (WNS) disease response, and is intended to promote the conservation of Ontario's native hibernating bat species and the recovery of bat species at risk, including the Eastern Small-footed Myotis. The Plan was collectively prepared by the Ministry of Natural Resources and Forestry (MNRF), the Canadian Wildlife Health Cooperative (CWHC), and the Ministry of Northern Development and Mines (MNDM); these agencies have responsibility for implementing the Plan.

The Plan identifies the risks to Ontario bat populations associated with WNS, and provides for multi-agency coordination in three key areas: prevention, surveillance and research. Ontario's goals are: to prevent the spread of WNS by limiting human-assisted transmission; to monitor the spread of WNS and assess the impacts of infection; to conduct research to identify the risk of extirpation for affected species; and to promote awareness of WNS and public reporting of bat observations.

Due to the international scope of WNS and the necessity for cooperation, Ontario is working in collaboration with provincial, national and international partners to better our understanding of WNS and monitor its spread and impact across North America. Ontario supports the principles and strategies of the U.S. and Canadian WNS plans, and will endeavor to integrate Ontario's WNS response actions with the national plan when possible.

To help protect and recover Eastern Small-footed Myotis, the government will directly undertake the following actions:

- Continue to implement *Ontario's White-nose Syndrome Response Plan* to address the threat of *Pseudogymnoascus destructans* on Eastern Small-footed Myotis, and coordinate WNS prevention, surveillance and monitoring efforts with other provincial, national and international plans including CWHC National Wildlife Disease Database, North American Bat Monitoring Program, and national WNS Working Groups.
- Coordinate Ontario-based Eastern Small-footed Myotis research and monitoring, including government-supported efforts undertaken by partners, and integrate with national and international efforts (e.g., North American Bat Monitoring Program).
- Evaluate the effectiveness of existing bat survey protocols for Eastern Small-footed Myotis. Based on this evaluation and if necessary, develop a protocol to be used by proponents and partners to survey for the presence or absence of Eastern Small-footed Myotis.
- Continue to conduct research and population monitoring for Eastern Small-footed Myotis at known hibernacula, identify potential roost sites and swarming sites, monitor maternity roosts, and increase understanding of habitat use for different life stages.
- Apply multiple methods (including genetics, mark-recapture surveys and trend analysis) to estimate Eastern Small-footed Myotis population size, trends over time, and response to WNS.
- Continue to contribute to Bird Studies Canada's Wind Energy Bird and Bat Monitoring Database to improve understanding of negative effects of wind power on bats.

- Continue to undertake outreach and collaborate with stakeholders in the mining industry and groups using caves to increase awareness and reduce impacts of activities on Eastern Small-footed Myotis, and prevent the spread of WNS.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Eastern Small-footed Myotis data to the Ministry's central repository at the Natural Heritage Information Centre.
- Undertake communications and outreach to increase public awareness of species at risk in Ontario.
- Continue to protect Eastern Small-footed Myotis 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 Eastern Small-footed Myotis. 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 Eastern Small-footed Myotis. Actions identified as "high" will 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. The government will focus its support on these high-priority actions over the next five years.

Focus Area: **Research and Threat Management**
Objective: Reduce threats to Eastern Small-footed Myotis by increasing knowledge of the species' biology, habitat requirements, and the presence and severity of threats.

White-nose syndrome is the most substantial threat to Eastern Small-footed Myotis. Mitigating this threat requires collective effort across jurisdictions and is of critical importance to the species' persistence in Ontario. While our knowledge of WNS continues to grow, the rareness and cryptic nature of this species has resulted in less available information specific to Eastern

Small-footed Myotis. Further species-specific information on the degree of impact of this threat is necessary to inform future recovery efforts. Additionally, because bats are long-lived, have naturally low reproductive rates, and the number of remaining Eastern Small-footed Myotis individuals is presumed to be small, the significance of other potential threats, and any resulting mortalities, may be heightened. Investigating, implementing, and evaluating methods to mitigate WNS and other potential threats will contribute to comprehensive recovery efforts. Conducting research to increase the success of inventory and monitoring efforts will also support greater understanding of population trends and assist in monitoring the effects of WNS on the species.

Eastern Small-footed Myotis occupies a slightly different habitat type than other Myotis species in Ontario. Because of the rarity and cryptic nature of the species, knowledge gaps exist related to the species' habitat usage, both temporally and spatially, and the species' biology. Filling these knowledge gaps will support effective threat mitigation and increase our understanding of the threats affecting the species during different life stages.

Actions:

1. **(High)** Conduct research to increase knowledge of Eastern Small-footed Myotis, including studies of:
   - the species' habitat (e.g., overwintering habitat characteristics, summer roosting/foraging habitat characteristics and range, spatial distribution of habitat types); and,
   - the species' biology and ecology (e.g., population structure, site fidelity, usage of habitat throughout different life stages, hibernation ecology, summer roosting ecology including maternity period, trends in diet composition).
2. **(High)** Develop, implement and evaluate methods to differentiate Eastern Small-footed Myotis from other bat species during surveying and increase detectability during wind turbine mortality monitoring.
3. **(High)** Undertake research into the effects of WNS and incorporate results in developing and implementing emerging tools and mechanisms to reduce impacts and mitigate effects of WNS, as appropriate and feasible.
4. Investigate the effects of WNS on Eastern Small-footed Myotis survival, reproductive success and population-level impacts.

5. Work collaboratively with the Canadian Wildlife Health Cooperative in maintaining and updating WNS decontamination protocols, coordinating national-level WNS monitoring, and identifying related data gaps and data management needs.
6. Investigate non-WNS threats to Eastern Small-footed Mytois and potential methods to reduce identified threats, and as appropriate, implement methods to reduce those threats, including:
   - working collectively with industry sectors (e.g., mining, aggregates, problem/nuisance wildlife removal, wind power) to develop, implement and evaluate best management practices to minimize the impacts of industry activities and operations on Eastern Small-footed Myotis and its habitat.

Focus Area: **Inventory and Monitoring**
Objective: Inventory and monitor populations of Eastern Small-footed Myotis in Ontario to increase knowledge of population trends and the effects of white-nose syndrome.

Populations of Eastern Small-footed Myotis are difficult to locate and differentiate from other *Myotis* species using acoustic surveys, and knowledge gaps (e.g., provincial distribution, habitat characteristics and use during different life cycle stages, location of maternity habitats), continue to persist. As a result, it has been difficult to establish reliable population estimates throughout the species' range which poses a challenge to monitoring the effects of WNS. Continued efforts are needed to increase our knowledge of the species and to identify and monitor populations in Ontario. Collaboration between partners and government agencies, including reporting of banded bats, is critical to effective monitoring. The species may be under-detected by current survey techniques that target other bat species and as a result, novel or alternative methods may need to be used to increase detection rates. Additionally, human disturbance or inadvertent alteration of habitat may occur during surveying and monitoring unless standardized methods are developed and employed. Working collaboratively with conservation organizations, researchers, and other involved groups will ensure that survey and monitoring efforts for broader bat initiatives are also able to support increased knowledge of Eastern Small-footed Myotis.

Actions:

7. **(High)** Coordinate and conduct standard inventory and monitoring of Eastern Small-footed Myotis populations in historic, current, and potentially-inhabited locations, in collaboration with organizations currently involved in bat surveillance and monitoring, where possible, including:
   - implementing standardized survey and monitoring protocols and tools that specifically target Eastern Small-footed Myotis;
   - reporting banded/PIT tagged bats and any associated banding information to MNRF;
   - identifying potential suitable summer and winter habitat;
   - conducting inventories of potential Eastern Small-footed Myotis hibernacula and roost sites; and,
   - monitoring species' population trends, distribution, threats, habitat preferences and prevalence of use.
8. Collaborate with other organizations to evaluate and where appropriate implement monitoring to assess the potential impacts of WNS at hibernacula, and determine the feasibility of implementing monitoring to assess impacts of the disease at summer roost sites for Eastern Small-footed Myotis.

Focus Area: **Awareness and Habitat Protection**
Objective: Increase public awareness of the species, its habitat and threats and protect suitable habitat available for Eastern Small-footed Myotis.

Bats play a critical role in the health of ecosystems and their continued presence through Ontario is of great benefit to all Ontarians. Given the severity of the threat of WNS to bats that overwinter in the province, including Eastern Small-footed Myotis, public awareness and collective efforts to address threats, report occurrences, and protect habitat are vital. Working together to reduce the spread of WNS, accurately report species occurrence information, and protect habitat through conservation programs will contribute to collective benefits for Eastern Small-footed Myotis.

Actions:

9. Increase awareness amongst land managers, land owners, the recreational caving community, problem/nuisance wildlife removal companies, and the general public of Eastern Small-footed Myotis, its biology, habitat and threats to the species, including:

- the importance of maternity colonies and methods to reduce threats during this life stage;
- methods to reduce the spread of WNS (e.g., promotion of cave decontamination protocols, development and installation of signage, and as appropriate, access management);
- the species' habitat requirements;
- protections afforded to the species and its habitat under the ESA, including appropriate management of human-bat encounters; and,
- how to participate in citizen science bat initiatives and report occurrence information.

10. As opportunities arise, work with local land owners and community partners to support the securement of Eastern Small-footed Myotis habitat through existing land securement and stewardship programs.

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 Ministry. The Ministry 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 Ministry 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 Eastern Small-footed Myotis.

Acknowledgement

We would like to thank all those who participated in the development of the Recovery Strategy for the Eastern Small-footed Myotis (*Myotis leibii*) 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
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