

Photo: Denis Doucet



Pygmy Snaketail (*Ophiogomphus howei*) in Ontario

Ontario Recovery Strategy Series

Recovery strategy prepared under the *Endangered Species Act, 2007*

Natural. Valued. Protected.

About the Ontario Recovery Strategy Series

This series presents the collection of recovery strategies that are prepared or adopted as advice to the Province of Ontario on the recommended approach to recover species at risk. The Province ensures the preparation of recovery strategies to meet its commitments to recover species at risk under the Endangered Species Act (ESA) and the Accord for the Protection of Species at Risk in Canada.

What is recovery?

Recovery of species at risk is the process by which the decline of an endangered, threatened, or extirpated species is arrested or reversed, and threats are removed or reduced to improve the likelihood of a species' persistence in the wild.

What is a recovery strategy?

Under the ESA a recovery strategy provides the best available scientific knowledge on what is required to achieve recovery of a species. A recovery strategy outlines the habitat needs and the threats to the survival and recovery of the species. It also makes recommendations on the objectives for protection and recovery, the approaches to achieve those objectives, and the area that should be considered in the development of a habitat regulation. Sections 11 to 15 of the ESA outline the required content and timelines for developing recovery strategies published in this series.

Recovery strategies are required to be prepared for endangered and threatened species within one or two years respectively of the species being added to the Species at Risk in Ontario list. There is a transition period of five years (until June 30, 2013) to develop recovery strategies for those species listed as endangered or threatened in the schedules of the ESA. Recovery strategies are required to be prepared for extirpated species only if reintroduction is considered feasible.

What's next?

Nine months after the completion of a recovery strategy a government response statement will be published which summarizes the actions that the Government of Ontario intends to take in response to the strategy. The implementation of recovery strategies depends on the continued cooperation and actions of government agencies, individuals, communities, land users, and conservationists.

For more information

To learn more about species at risk recovery in Ontario, please visit the Ministry of Natural Resources Species at Risk webpage at: www.ontario.ca/speciesatrisk

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Cette publication hautement spécialisée Recovery strategies prepared under the Endangered Species Act, 2007, n'est disponible qu'en Anglais en vertu du Règlement 411/97 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez communiquer avec Cathy Darevic au ministère des Richesses naturelles au 705-755-5580.

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DECLARATION

The recovery strategy for the Pygmy Snaketail was developed in accordance with the requirements of the *Endangered Species Act, 2007* (ESA). This recovery strategy has been prepared as advice to the Government of Ontario, other responsible jurisdictions and the many different constituencies that may be involved in recovering the species.

The recovery strategy does not necessarily represent the views of all of the individuals who provided advice or contributed to its preparation, or the official positions of the organizations with which the individuals are associated.

The goals, objectives and recovery approaches identified in the strategy are based on the best available knowledge and are subject to revision as new information becomes available. Implementation of this strategy is subject to appropriations, priorities and budgetary constraints of the participating jurisdictions and organizations.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy.

RESPONSIBLE JURISDICTIONS

Ontario Ministry of Natural Resources
Environment Canada, Canadian Wildlife Service - Ontario

EXECUTIVE SUMMARY

The Pygmy Snaketail (*Ophiogomphus howei*) is a small, brightly-coloured dragonfly which lives in large rivers with steady flow. Adults are thought to forage in the canopy of forests surrounding the rivers. Eggs are laid into the water where they are carried downstream and eventually sink. During the day the larvae burrow into sand or gravel sediments. At night they come to the surface and prey on other invertebrates or small fish.

This species is a globally rare dragonfly which occurs only in Eastern North America. In Canada it has been found in 11 locations in New Brunswick and at one site in Ontario. The Ontario location is on the Namakan River in the Rainy River district of northwestern Ontario. The species is listed as endangered on the Species at Risk in Ontario (SARO) List under Ontario's *Endangered Species Act, 2007 (ESA)*.

The greatest potential threat to the Pygmy Snaketail in Ontario is the impoundment of running waters, but others include forest harvesting and invasive species. Other threats common to dragonflies, such as road-kill, recreational use of waters during the emergence period, construction and pollution, may be of lower concern due to the remote northern location. Limiting factors include a need for pristine conditions and the species' short travel distance. Knowledge gaps are many, but major ones are the complete lack of information on population size and the unknown precise egg-laying location in Ontario.

The recovery goal is to ensure the long-term survival of Pygmy Snaketail in Ontario by protecting the existing population.

The protection and recovery objectives are to:

- protect and maintain the quality and quantity of habitat on the Namakan River in Ontario where Pygmy Snaketail occurs;
- implement a monitoring program at the location where Pygmy Snaketail is known to exist;
- conduct additional inventories for Pygmy Snaketail in suitable habitat.

When adult Pygmy Snaketails and/or breeding sites are found, it is recommended that the protection provided by a habitat regulation should be applied to those areas, including the river and 200 metres of forested habitat on either side.

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1.0 BACKGROUND INFORMATION

1.1 Species Assessment and Classification

COMMON NAME: Pygmy Snaketail

SCIENTIFIC NAME: *Ophiogomphus howei*

SARO List Classification: Endangered

SARO List History: Endangered (2012)

COSEWIC Assessment History: Special Concern (2008)

SARA Schedule 1: Special Concern

CONSERVATION STATUS RANKINGS:

GRANK: G3

NRANK: N1

SRANK: S1

The glossary provides definitions for technical terms, including the abbreviations above.

1.2 Species Description and Biology

Species Description

The Pygmy Snaketail (*Ophiogomphus howei*) is the smallest (31-37 mm long) member of the Snaketails, a group of North American medium-sized dragonflies (Bromley 1924). Colouration of the adult is distinctive: bright green thorax, vivid yellow markings on the dorsal abdomen and each wing marked basally with a large, transparent yellow-orange patch (P. Brunelle, pers. comm. 2012, as described in COSEWIC 2008). The larva is small and cryptic, but can easily be identified from other members of the genus *Ophiogomphus* by its small size (19-22.5 mm) and by its lack of dorsal abdominal spines (Kennedy and White 1979).

Species Biology

The Snaketails are characteristically found in areas with fast moving water: the Pygmy Snaketail lives in large rivers with steady flow. Eggs are laid into the water where they are carried downstream and eventually sink. Larval development and hatching occur on or under the substrate (COSEWIC 2008). During the day the larvae burrow into sand or gravel sediments. At night they come to the surface and prey on other invertebrates or small fish. After at least two years, the adults emerge and move to surrounding forests where they are thought to live and forage in the canopy (Kennedy and White 1979).

Emergence probably occurs at the same time (about mid-June) as co-existing species of Snaketails, such as Boreal Snaketail (*Ophiogomphus colubrinus*) in Ontario (I. Milne

pers. comm. 2012), and Brook Snaketail (*O. aspersus*), Riffle Snaketail (*O. carolus*), and Extra-striped Snaketail (*O. anomalus*) in New Brunswick (Catling 2002).

Adults live for about six to eight weeks and probably spend most of that time in the forest near the river (COSEWIC 2008), up to 300 m from water (NatureServe 2011). As with other dragonflies, most are eventually taken by predators, predominantly insectivorous birds, but also wasps and larger dragonflies (COSEWIC 2008). Little is known about the food preferences of adults or about the reproduction period, although they are thought to defend territories (P. Brunelle in COSEWIC 2008).

1.3 Distribution, Abundance and Population Trends

The Pygmy Snaketail occurs only in Eastern North America, in two distinct areas separated by at least 700 km: the eastern populations occupy the Appalachian region extending from Tennessee to New Brunswick, and the western populations are in Michigan, Wisconsin, and Minnesota (Donnelly 2004, Tennesen 1993), and northwestern Ontario (I. Milne pers. comm. 2012). It is possible that these populations were formerly connected across northern Ontario (as suggested by P. Brunelle in COSEWIC 2008), but recent inventories in suitable habitat there have not found the species (C. Jones, pers. comm. 2012). Much of northwestern Ontario is without suitable habitat (large, clear, fast-moving rivers with fine gravel substrate) for this species. Few other populations are likely to be discovered in Ontario based on search effort and lack of suitable rivers (COSEWIC 2008).



Figure 1. Global range of the Pygmy Snaketail (map by P. Brunelle in COSEWIC 2008)

In Canada, the Pygmy Snaketail is known from just 12 sites: 11 in New Brunswick and 1 in Ontario. This species was first reported in Canada in 2002 on the banks of the Saint John River in northern New Brunswick (Catling 2002).

The Pygmy Snaketail is known from Ontario by the collection of one exuvia (the cast-off exoskeleton of a larva) by Ilka Milne from the Namakan River in the Rainy River district of northwestern Ontario in 2007 (I. Milne, pers. comm. 2012). Subsequent surveys failed to produce any adults or more exuviae, but the habitat was confirmed as suitable (J. Van den Broeck, pers. comm. 2012). Since this single record is based on an exuvia, it is considered to represent an established reproducing population. There is insufficient information to speculate on population size or fluctuation, but several hundred individuals are likely necessary to ensure survival of a population of the species (P. Brunelle in COSEWIC 2008).

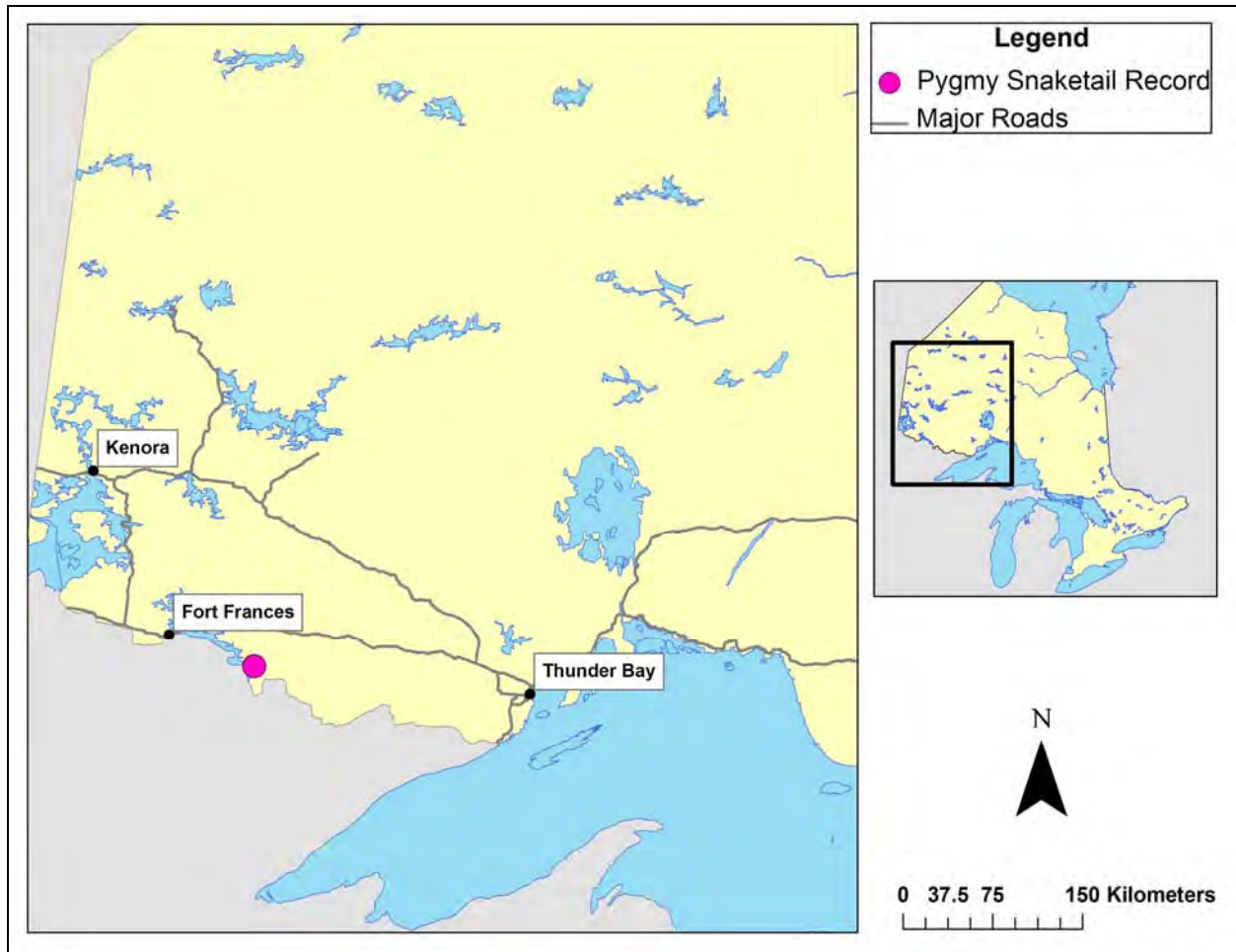


Figure 2. Current distribution of Pygmy Snaketail in Ontario

1.4 Habitat Needs

Larvae of the Pygmy Snaketail occur in large moderate-gradient rivers with clear, swift-flowing, and unpolluted running waters and substrates of fine sand or pea gravel (deMaynadier 2006). They are not found in smaller rivers (less than 10 m wide) or in high-gradient streams unless there are substantial sections of low-gradient stream bed which can retain fine substrates (Dunkle 2000).

Adults, particularly females, need forest surrounding the river to provide the habitat needed for foraging and mating (Paulson 2007). The specific type of forest required has not been described in publications, but along the Namakan River the forest is mixed deciduous and coniferous (I. Milne, pers. comm. 2012). In New Brunswick the Pygmy Snaketail uses Acadian Forest habitat, which is also mixed (P. Catling, pers. comm. 2012).

Precise distances and areas required by Pygmy Snaketail are not known. When not in the forest, males patrol low and fast over the water surface with other similar dragonflies (Kennedy and White 1979). Females likely spend most of their time in the forest but move to the river for ovipositing. The distance travelled between reproductive and roosting and foraging sites by dragonflies is generally less than 200m (Corbet 1999). Studies of other similar species (Briggs 1994 for *Enallagma laterale*, Corbet 1999 for *Nesiothemis nigeriensis* and *Calopteryx haemorrhoidalis*) indicate that forested habitat used may extend up to 300 m on either side of the river but at breeding sites (the locations where eggs are laid) the area of forest used may be as big as a circle with a radius of 500 m (NatureServe 2011).

The Pygmy Snaketail does not migrate to meet its habitat requirements, but it can travel a few kilometres per day along the waterway, using suitable habitat of the river and surrounding forests (NatureServe 2011).

1.5 Limiting Factors

Based on river conditions where the Pygmy Snaketail has been found throughout its range (clear, swift-flowing and unpolluted running waters), the species is likely intolerant of eutrophication and of interference with the flow of the river (Tennessee 1993). This is a localized, non-migratory species which does not travel more than a few kilometres along the river from the larval habitat (NatureServe 2011). With these ecological limitations and the need for pristine conditions, it is unlikely that the Pygmy Snaketail is capable of making the adjustments which would be needed to survive substantial habitat alteration. The species' limited travel distance suggests that re-colonization after an Ontario extirpation is unlikely (COSEWIC 2008).

1.6 Threats to Survival and Recovery

Threats common to other dragonflies, such as road mortality, construction activities or recreational use of waters during the emergence period are unlikely along the remote and pristine Namakan River. Pollution from road salt, forestry pesticides, or chemical spills is also not a large threat at the known site due to the northern forested location and the fact that the only nearby road crossing is a logging road.

Significant potential threats to Pygmy Snaketail in Ontario are listed below:

Habitat Alteration

The greatest potential threat to the Pygmy Snaketail in Ontario is the impoundment of running waters. Tennessen (1993) reported that in the Appalachian Mountain range it was found only in “undammed and relatively undisturbed rivers”. Any dam on the Namakan River could therefore affect the Ontario population if it eliminated the swift-flowing waters and the constant supply of fine sediment which the species needs. A dam can stop the downstream flow and deposition of fine sediment, “armouring” or coarsening the river bottom with coarse gravel or pebbles (Donnelly 1993).

Healthy forest habitat surrounding a clean flowing river is critical for a species such as the Pygmy Snaketail, whose adults likely spend much of their time in the forest canopy. Forest harvest activities near the river could negatively impact these conditions if they fragmented or eliminated the canopy, or caused erosion, siltation and lowered water quality.

Invasive Species

Invasive aquatic plants can grow to a density which affects water quality, and the ensuing die-offs can create lethal conditions for aquatic organisms such as dragonfly larvae (COSEWIC 2008). This occurs mostly in still waters and would not be an issue for the Pygmy Snaketail unless dams are constructed on the Namakan River.

Crayfish and fish species, such as Chain Pickerel (*Esox niger*), Smallmouth Bass (*Micropterus dolomieu*) and Muskellunge (*Esox masquinongy*), have been widely introduced by recreational fishing activities. These predators can have significant negative impacts on dragonfly populations by feeding on their larvae (COSEWIC 2008). Only one of these, the Rusty Crayfish (*Orconectes rusticus*), is a potential threat to the Pygmy Snaketail in Ontario, as it has been discovered in lake systems bordering the Namakan River (J. Van den Broeck, pers. comm. 2012). The Spiny Water Flea (*Bythotrephes longimanus*) has been identified as a potential future concern due to its predatory impact on zooplankton and other dragonfly larva foods (Environment Canada 2012).

1.7 Knowledge Gaps

Extensive dragonfly inventories across Ontario have produced no observations of adults of the Pygmy Snaketail. The only record from the province is one exuvia. Even on the Namakan River, where the exuvia was found, the precise egg-laying location is unknown due to drift of both eggs and larvae. The species has in general not been extensively studied. The resulting knowledge gaps are many, including the following:

- reproductive activities and timing;
- population size and distribution across Ontario;
- effects of invasive species;
- size and range of the population along the Namakan River;
- location of breeding and egg-laying sites on the Namakan River;
- food preferences and forest habitat needs of adults;
- recolonization abilities of the species after extirpation;
- potential for and feasibility of reintroduction after extirpation.

1.8 Recovery Actions Completed or Underway

Odonatists across the province make regular outings and provide records to the Atlas of Ontario Odonata database maintained by the Natural Heritage Information Centre (NHIC), OMNR, Peterborough. The existence of the Pygmy Snaketail in Ontario became known through the contribution of information from one such individual. The development and implementation of protection and recovery activities is highly dependant on these individuals and their continued input.

2.0 RECOVERY

2.1 Recovery Goal

Ensure the long-term survival of Pygmy Snaketail in Ontario by protecting the existing population.

2.2 Protection and Recovery Objectives

Table 1. Protection and recovery objectives

No.	Protection or Recovery Objective
1	Protect and maintain the quality and quantity of habitat on the Namakan River in Ontario where Pygmy Snaketail occurs
2	Implement a monitoring program at the location where Pygmy Snaketail is known to exist
3	Conduct additional inventories for Pygmy Snaketail in suitable habitat

2.3 Approaches to Recovery

Table 2. Approaches to recovery of the Pygmy Snaketail in Ontario

Relative Priority	Relative Timeframe	Recovery Theme	Approach to Recovery	Threats or Knowledge Gaps Addressed
1. Protect and maintain the quality and quantity of habitat on the Namakan River in Ontario where Pygmy Snaketail occurs.				
Necessary	Long-term	Protection	1.1 Develop a habitat regulation to define the area protected as habitat for Pygmy Snaketail habitat in Ontario, to be applied once adults and/or breeding sites are found.	<ul style="list-style-type: none"> Habitat loss and degradation at the known site
Necessary	Short-term	Assessment, Stewardship, Education and Outreach, Communications	1.2 Protect the lands surrounding the known site <ul style="list-style-type: none"> Determine land ownership and review current management plans and practices. Review development proposals for adjacent and nearby lands to ensure measures are in place to protect Pygmy Snaketail and its habitat. Develop and implement supportive education, awareness and stewardship programs. 	<ul style="list-style-type: none"> Habitat loss and degradation at the known site

Recovery Strategy for the Pygmy Snaketail in Ontario

Relative Priority	Relative Timeframe	Recovery Theme	Approach to Recovery	Threats or Knowledge Gaps Addressed
Necessary	Ongoing	Protection	<p>1.3 Mitigate negative impacts at the known location.</p> <ul style="list-style-type: none"> – Work with the appropriate agencies to mitigate the affects of any change in river flow which would threaten Pygmy Snaketail habitat. – Work with municipalities to mitigate impacts from land use change. – Work with landowners and forestry companies to reduce or mitigate impacts from forestry activities, salting, road construction, sedimentation mitigation and similar activities. 	<ul style="list-style-type: none"> • Habitat loss and degradation at the known site
2. Implement a monitoring program for the location where Pygmy Snaketail is known to exist.				
Critical	Ongoing	Monitoring and Assessment	<p>2.1 Develop and implement a monitoring program to be conducted by qualified personnel at the known location.</p>	<ul style="list-style-type: none"> • All threats
3. Conduct additional inventories for Pygmy Snaketail in suitable habitat.				
Necessary	Ongoing	Inventory	<p>3.1 Conduct inventory programs for the known river and other suitable rivers.</p>	<ul style="list-style-type: none"> • Unknown current distribution and population size
Necessary	Ongoing	Inventory	<p>3.2 Include information on Pygmy Snaketail in ongoing benthic inventory programs in rivers across the province.</p>	<ul style="list-style-type: none"> • Unknown current distribution and population size
Necessary	Ongoing	Inventory	<p>3.3 Engage dragonfly volunteers (e.g., field naturalist clubs) to undertake surveys for Pygmy Snaketail.</p>	<ul style="list-style-type: none"> • Unknown current distribution and population size

2.4 Area for Consideration in Developing a Habitat Regulation

Under the ESA, a recovery strategy must include a recommendation to the Minister of Natural Resources on the area that should be considered in developing a habitat regulation. A habitat regulation is a legal instrument that prescribes an area that will be protected as the habitat of the species. The recommendation provided below by the author will be one of many sources considered by the Minister when developing the habitat regulation for this species.

Existing information indicates that an established population of Pygmy Snaketail lives on the Namakan River upstream from (east of) the logging road bridge where the exuvia was found. This section of river extends over 20 km between the bridge and Lac la Croix. As both eggs and larvae drift downstream, the area appropriate for consideration in a habitat regulation at this site would consist of an as-of-yet undetermined stretch of river extending from the egg-laying site (precise location unknown) to the adult emergence site, including up to 200 m of forest on either side of the river.

The lack of information about the Pygmy Snaketail population size and adult range on the Namakan River means that it would be premature to apply a habitat regulation at this site until more data are available. When adults and/or breeding sites are found, it is recommended that the protection provided by a habitat regulation be applied to the portion of the river extending from the site of the furthest upstream adult observation, to the site of the furthest downstream exuvia observation.

Because adults are thought to spend most of their time in the forest canopy adjoining the river, the forest on both sides of the river should also be protected. In addition to the aquatic area, the regulation should include 200 metres of forested habitat on either side of the river, which is the average distance travelled between reproductive and roosting and foraging sites by dragonflies (Corbet 1999). This corresponds to the habitat regulated in Ontario for the Rapids Clubtail (*Gomphus quadricolor*) (Ontario Regulation 242/08 <http://www.e-laws.gov.on.ca/index.html>) and to the habitat regulation recommendation for Laura's Clubtail (*Stylurus laurae*) in Ontario (Pulfer et al. 2011). For comparison, the State of Maine, where the Pygmy Snaketail is listed as Special Concern, recommends the maintenance of forested buffers up to 600 feet (180 m) along rivers where the species occurs (Maine Department of Inland Fisheries and Wildlife 2003).

GLOSSARY

Committee on the Status of Endangered Wildlife in Canada (COSEWIC): The committee responsible for assessing and classifying species at risk in Canada.

Committee on the Status of Species at Risk in Ontario (COSSARO): The committee established under section 3 of the *Endangered Species Act, 2007* that is responsible for assessing and classifying species at risk in Ontario.

Conservation status rank: A rank assigned to a species or ecological community that primarily conveys the degree of rarity of the species or community at the global (G), national (N) or subnational (S) level. These ranks, termed G-rank, N-rank and S-rank, are not legal designations. The conservation status of a species or ecosystem is designated by a number from 1 to 5, preceded by the letter G, N or S reflecting the appropriate geographic scale of the assessment. The numbers mean the following:

- 1 = critically imperilled
- 2 = imperilled
- 3 = vulnerable
- 4 = apparently secure
- 5 = secure

Endangered Species Act, 2007 (ESA): The provincial legislation that provides protection to species at risk in Ontario.

Exuvia (plural exuviae): The cast-off exoskeleton of an odonate larva.

Forest: A community with tree cover greater than 60 percent.

Odonate: A member of the Order Odonata (Dragonflies and Damselflies).

Odonatist: An expert or enthusiast of odonates.

Ovipositing: The laying and placement of eggs.

Species at Risk Act (SARA): The federal legislation that provides protection to species at risk in Canada. This act establishes Schedule 1 as the legal list of wildlife species at risk to which the SARA provisions apply. Schedules 2 and 3 contain lists of species that at the time the Act came into force needed to be reassessed. After species on Schedule 2 and 3 are reassessed and found to be at risk, they undergo the SARA listing process to be included in Schedule 1.

Species at Risk in Ontario (SARO) List: The regulation made under section 7 of the *Endangered Species Act, 2007* that provides the official status classification of species at risk in Ontario. This list was first published in 2004 as a policy and became a regulation in 2008.

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