Template last updated: Oct 14, 2020.

Ontario Species at Risk Evaluation Report for

Pygmy Snaketail

Ophiogomphe de Howe (*Ophiogomphus howei*)

Committee on the Status of Species at Risk in Ontario (COSSARO)

Assessed by COSSARO as Endangered

Template last updated: Oct 14, 2020.

Ophiogomphe de Howe (Ophiogomphus howei)

L’ophiogomphe de Howe (*Ophiogomphus howei)* est classé dans la catégorie des espèces menacées en Ontario par le CDSEPO.

L’ophiogomphe de Howe est le plus petit ophiogomphe, à la longueur totale comprise entre 31 et 34 mm et à la longueur de l’aile postérieure comprise entre 19 et 21 mm. Les ailes sont teintées de jaune dans la moitié basale chez les deux sexes, mais la superficie et l’opacité de cette pigmentation sont plus élevées chez la femelle. Cette coloration est rare parmi les Odonates d’Amérique du Nord. Le corps de l’ophiogomphe de Howe est brun-noir et noir, avec de grandes marques jaune vif sur le dessus de l’abdomen et vert brillant sur le thorax (COSEPAC, 2018).

Les mentions de l’ophiogomphe de Howe indiquent que l’espèce est généralement limitée à des milieux à eaux courantes relativement non polluées et qu’elle atteint la limite nord de son aire de répartition au Canada. La largeur habituelle des rivières où vivent les populations connues est de 80 à 100 m. On indique généralement que les larves de l’ophiogomphe de Howe ont besoin de cours d’eau de grande taille, relativement non pollués et qui comportent de vastes zones de sable ou de gravier et on présume que cette espèce est intolérante à l’eutrophisation (COSEPAC, 2018). On a cependant découvert récemment une population dans Grand River, un cours d’eau détérioré dans un bassin hydrographique principalement urbain au sud du Michigan (Craves *et al.* 2020).

L’ophiogomphe de Howe (*Ophiogomphus howei*) est classé dans la catégorie des espèces en voie de disparition, conformément au critère D1.

Cette publication hautement spécialisée n'est disponible qu'en anglais conformément au Règlement 671/92, selon lequel il n’est pas obligatoire de la traduire en vertu de la Loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère l’Environnement, de la Protection de la nature et des Parcs au cossarosecretariat@ontario.ca

Executive summary

Pygmy Snaketail is the smallest of the snaketails with a total length of 31-34mm and hindwing length of 19-21mm. The wings of both sexes are tinged yellow in the basal half with extent and opacity of pigmentation greater in females. This wing colour pattern is rare among North American odonates. The background body colouring is dark brown and black, with extensive yellow markings on the dorsal abdomen and bright green on the thorax (COSEWIC, 2018).

Pygmy Snaketail is reported as a species limited to relatively pristine running water and is in its northern extreme in Canada. Typical river widths of known populations are 80-100m. It is generally recorded that Pygmy Snaketail nymphs require larger, relatively pristine rivers with significant areas of sand or gravel substrates and is assumed to be intolerant of eutrophication (COSEWIC, 2018). However, a new population has been recently discovered along the Grand River, an impaired river in a largely urban watershed in southern Michigan (Craves *et al.*, 2020).

Pygmy Snaketail (*Ophiogomphus howei*) is classified as Endangered based on meeting criteria D1.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Pygmy Snaketail is taxonomically distinct with no proposed subspecies or species forms (COSEWIC, 2018).

1.1.2. Designatable units

Pygmy Snaketail is considered to have one designatable unit in Canada, with two discrete subpopulations; one in Ontario and one in New Brunswick. The subpopulation in Ontario is limited (COSEWIC, 2018).

1.1.3. Native status

Pygmy Snaketail is considered native to Ontario (NatureServe, 2021).

1.1.4. Occurrence

Pygmy Snaketail is limited to the Namakan River in northwestern Ontario.

1.2. Eligibility results

Pygmy Snaketail (*Ophiogomphus howei*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G3 (NatureServe 2021)
- IUCN: Least Concern
- NRANK Canada: N2
- COSEWIC: Special Concern (November, 2018)
- SARA: Special Concern
- ESA 2007: Endangered
- SRANK: S1

2.2. Distribution in Ontario

Known from a single record on the Namakan River, east of Rainy Lake in northwestern Ontario.

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

The full range of Pygmy Snaketail is limited to Ontario, New Brunswick and the northeastern to eastern United States (NatureServe, 2021). It is considered globally vulnerable (G3) and is a species of Least Concern according to the IUCN redlist.

Populations of Pygmy Snaketail occupy moderate gradient rivers with fine sand or pea gravel substrates with adults residing in forest canopies nearby (COSEWIC, 2018). This type of habitat is found throughout its known range.

Pygmy Snaketail is not a migratory species and its dispersal capabilities have not been studied. It is estimated that adults can disperse 1-13km (COSEWIC, 2018).

Table 1. Condition of Pygmy Snaketail in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	**Biologically Relevant to Ontario (n/a, yes, no)**	**Condition**	**Notes & Sources**
Quebec	n/a	n/a	n/a
Manitoba	n/a	n/a	n/a
Michigan	Yes	S1	NatureServe
Minnesota	Yes	S3	NatureServe
Nunavut	No	n/a	n/a
New York	Yes	S1	NatureServe
Ohio	n/a	n/a	n/a
Pennsylvania	Yes	SH (possibly extirpated)	NatureServe
Wisconsin	Yes	S4	NatureServe
Other Relevant Jurisdiction			
New Hampshire	Yes	S2	NatureServe
Maine	Yes	S2	NatureServe
New Brunswick	Yes	S2	NatureServe
Kentucky	Yes	S1	NatureServe
Virginia	Yes	S1	NatureServe
Tennessee	Yes	S3?	NatureServe
North Carolina	Yes	S1	NatureServe

2.4. Ontario conservation responsibility

Approximately 30% of the species' global range is in Canada with a total of six subpopulations; five in New Brunswick and one in Ontario. For the Ontario subpopulation, a single exuvia was observed along Namakan River. Other similar rivers have not been extensively surveyed (COSEWIC, 2018).

2.5. Direct threats

Overall threats to the Pygmy Snaketail are considered low. The potential for dam construction could be considered a threat along Namakan River. Water pollution due to excessive nutrient input from sewage, or sedimentation due to agricultural or forestry run-off are believed to have a negligible impact on the species (COSEWIC, 2018).

A threats calculation was completed for Pygmy Snaketail as part of the COSEWIC (2018) report as follows:

i) Dam & water management/use: Low Impact
ii) Housing and urban areas: Negligible impact
iii) Agricultural and forestry effluents: Negligible impact
iv) Garbage and solid waste: Negligible impact
v) Invasive non-native/alien species/diseases: Unknown impact

2.6. Specialized life history or habitat use characteristics

Pygmy Snaketail is the smallest of the snaketails with a total length of 31-34mm and hindwing length of 19-21mm. The wings of both sexes are tinged yellow in the basal half with extent and opacity of pigmentation greater in females. This wing colour pattern is rare among North American odonates. The background body colouring is dark brown and black, with extensive yellow markings on the dorsal abdomen and bright green on the thorax (COSEWIC, 2018).

Pygmy Snaketail is reported as a species limited to relatively pristine running water and is in its northern extreme in Canada. Typical river widths of known populations are 80-100m. It is generally recorded that Pygmy Snaketail nymphs require larger, relatively pristine rivers with significant areas of sand or gravel substrates and is assumed to be intolerant of eutrophication (COSEWIC, 2018). However, a new population has been recently discovered along the Grand River, an impaired river in a largely urban watershed in southern Michigan (Craves *et al.*, 2020). Exuviae were found on the riverbank adjacent to a trail in spots that were either downstream of a canoe landing or a tree that projected into the river. Depth of the river ranged from 0.76 to 1.8m with substrate recorded as cobble with margins of sand and silt. Also the area where exuviae were found is less forested and contains more agriculture with associated increased levels of synthetic nitrogen and pesticide usage than all other known sites (Craves *et al.*, 2020). These findings suggest a wider habitat range for this species than

previously known.

Adults are rarely encountered, and it is assumed that they spend most of their adult lives in forest canopy. Specific habitat requirements are unknown. Eggs are laid by adult females by dipping the end of the abdomen into water. Presumably eggs sink to the bottom and development of the larvae is on or inside the substrate. Larvae burrow during the day reaching depths of 20cm and drift downstream at night. Exuviae have been collected as early as May 25 and are usually collected on erosional banks where the current is strong. Water mites (Arachnida), mayflies (Ephemeroptera), and midge larvae (Diptera) have been recorded in the foregut of larvae. Food preferences for adult Pygmy Snaketail is unknown and is presumably flying insects (COSEWIC, 2018).

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

3.1.1. Criterion A – Decline in total number of mature individuals

Not applicable. Insufficient information to determine population estimates.

3.1.2. Criterion B – Small distribution range and decline or fluctuation

Not applicable. Insufficient information to determine distribution range, its decline or fluctuation.

3.1.3. Criterion C – Small and declining number of mature individuals

Not applicable. Number of mature individuals unknown.

3.1.4. Criterion D – Very small or restricted total population

Meets Endangered D1. Likely very small and restricted population. Only one single exuvia observed along Namakan River in northwestern Ontario.

3.1.5. Criterion E – Quantitative analysis

A quantitative analysis has not been completed.

3.2. Application of Special Concern in Ontario

Not applicable.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Pygmy Snaketail is a globally at risk (G3, NatureServe) and 30 percent of the global range is in Canada (COSEWIC, 2018). However, it is unknown what percent of the global range is in Ontario as only one exuvia has been observed along one river.

3.3.2. Status modification based on rescue effect or level of risk in broader biologically relevant geographic range

Rescue effect is unlikely as adult snaketail species are generally closely associated with larval sites. The nearest known site in Minnesota is approximately 165km from the Ontario site, further than adults are likely to wander which is 1-13km (COSEWIC, 2018).

Broader biologically relevant geographic range not applicable due to species' similar rankings other jurisdictions (NatureServe, 2021). Pygmy Snaketail is considered critically imperiled in most jurisdictions (NatureServe, 2021).

3.4. Other status categories

3.4.1. Data deficient

Not applicable.

3.4.2. Extinct or extirpated

Not applicable.

3.4.3. Not at risk

Not applicable.

4. Summary of Ontario status

Pygmy Snaketail (*Ophiogomphus howei*) is classified as Endangered based on meeting criteria D1.

5. Information sources

COSEWIC. 2018. COSEWIC assessment and status report on the Pygmy Snaketail *Ophiogomphus howei* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 46pp. http://www.registrelep-sararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1 .

Craves, J.A., O'Brien D.S., Marvin, D.A. 2020. New Population of the Rare Dragonfly *Ophiogomphus howei* (Odonata: Gomphidae) in Southern Michigan, United States. Journal of Insect Science, 20(5): 33;1-9

NatureServe. 2021. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Website: http://explorer.natureserve.org [accessed January 2021].

Natural Heritage Information Centre. 2021: An online database of species observations for Ontario

Appendix 1: Technical summary for Ontario

Species: Pygmy Snaketail (*Ophiogomphus howei)*

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	2-4 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. unknown b. partially understood c. No
Are there extreme fluctuations in number of mature individuals?	No

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence (EOO). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	unknown
Index of area of occupancy (IAO). *If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.*	unknown
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy is in habitat patches that are: (a) smaller than would be required to support a viable population, and	a. No b. No

Extent and occupancy attributes	Value
(b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	
Number of locations. *See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.*	1 location
Number of NHIC Element Occurrences *Request data from MNRF.*	not available
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Yes
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Yes
Is there an observed, inferred, or projected continuing decline in number of locations?	No
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Possible
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

Number of mature individuals unknown.

Quantitative analysis (population viability analysis conducted)

No population viability analysis has been conducted.

Threats

A threats calculation was completed for Pygmy Snaketail as part of the COSEWIC (2018) report as follows:

i) Dam & water management/use: Low Impact
ii) Housing and urban areas: Negligible impact
iii) Agricultural and forestry effluents: Negligible impact

iv) Garbage and solid waste: Negligible impact
v) Invasive non-native/alien species/diseases: Unknown impact

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	Michigan S1; New York S1
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Dispersal capability unknown
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Yes
Are conditions deteriorating in Ontario?	Possibly
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	Possible but unlikely

Sensitive species

Not a data sensitive species group.

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
ESA: Endangered Species Act
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario