

Ontario Species at Risk Evaluation Report for
Rapids Clubtail
Gomphe des rapides
(*Phanogomphus quadricolor*)

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

Assessed by COSSARO as Threatened

Final

Gomphe des rapides (*Gomphus quadricolor*)

Le gomphe des rapides (*Gomphus quadricolor*) est classé dans la catégorie des espèces menacées en Ontario par le CDSEPO.

Le gomphe des rapides est une libellule relativement petite et à la coloration vive. Ses yeux sont vert bleuté, sa face est vert jaunâtre clair et porte deux lignes transversales foncées, son thorax est orné d'une alternance de bandes noir brunâtre et vert jaunâtre et ses ailes sont transparentes. Comme toutes les libellules, le gomphe des rapides naît sous la forme d'une larve aquatique, puis se transforme en insecte ailé durant l'été.

Le gomphe des rapides vit généralement dans les lits de gravier et les fosses bourbeuses des rivières moyennes à grandes dont l'eau est claire et limpide. Les larves habitent les fosses bourbeuses calmes. Les mâles adultes se posent sur les pierres exposées au milieu des rapides. Les mâles ont un comportement plutôt territorial; ils font de courts vols au-dessus du cours d'eau, puis retournent au même endroit. Les femelles adultes occupent les forêts riveraines et fréquentent seulement les eaux peu profondes et les fosses lorsqu'elles sont prêtes à s'accoupler et à pondre leurs œufs.

À l'échelle mondiale, le gomphe des rapides est une espèce rare à peu commune, dont l'aire de répartition englobe tout l'est de l'Amérique du Nord. Dans cette aire, l'espèce et son habitat sont répartis localement, et on trouve de vastes secteurs où l'espèce n'est pas présente. La plupart des populations de gomphes des rapides se trouvent dans le Midwest des États-Unis, mais l'aire de répartition s'étend depuis le nord de l'Alabama et de la Géorgie jusqu'au sud de l'Ontario et depuis le Maine jusqu'à l'est du Minnesota. Sa population semble stable à l'échelle mondiale. Le gomphe des rapides figure sur la liste des espèces en voie de disparition à l'échelle nationale, et a été évalué en Ontario et classé dans la catégorie des espèces en voie de disparition, en 2009. Un programme fédéral de rétablissement du gomphe des rapides a été rendu public en 2019.

Aucune estimation de l'abondance ou des tendances de cette population en Ontario n'est disponible. Cette espèce, dont on attribuait traditionnellement l'origine à la rivière Thames, est considérée comme étant disparue dans la rivière Credit. La présence du gomphe des rapides a été constatée dans les rivières Ausable, Grand et Nith depuis la dernière évaluation de cette espèce en Ontario.

La menace la plus importante pour le gomphe des rapides est la dégradation des habitats riverains. Les activités qui ont des répercussions sur la quantité et la qualité de l'eau dans les rivières, comme les barrages et la pollution, constituent également des menaces. C'est ce type de dégradation qui a conduit apparemment à sa disparition dans la rivière Credit et au déclin de sa population dans la rivière Humber.

Le gomphe des rapides répond aux critères B2ab(iii) de définition d'une espèce en voie de disparition en Ontario, mais son aire de répartition plus vaste pertinente sur le plan biologique a été appliquée, comme cette espèce n'est pas en péril dans le Wisconsin, elle demeure abondante dans le Minnesota et la population semble stable à l'échelle mondiale.

Ce statut diffère du statut attribué par le COSEPAC, en raison de l'application d'une aire de répartition plus vaste pertinente sur le plan biologique. Cette espèce n'est pas en péril dans le Wisconsin, semble abondante dans le Minnesota et a été trouvée dans les rivières Ausable, Grand et Nith en Ontario, depuis sa dernière évaluation.

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

The Rapids Clubtail is a relatively small and brightly coloured dragonfly. Its eyes are bluish-green, with a light yellowish-green face that is striped with two dark lines, a brownish-black and yellowish-green striped body and transparent wings. Like all dragonflies, the Rapids Clubtail begins its life as an aquatic larva and transforms into a winged adult during the summer.

This dragonfly is typically found in clear, cool medium-to-large rivers with gravel shallows and muddy pools. Larvae occupy quiet muddy pools. Adult males perch on exposed rocks in the rapids. Males are quite territorial and make short flights over the water, repeatedly returning to the same perch. Adult females typically inhabit forests along riverbanks, and only visit shallows and pools when they are ready to mate and lay eggs.

The Rapids Clubtail is a globally rare to uncommon species found throughout eastern North America. Within this range it is locally distributed and there are large areas of habitat where it does not occur. Most populations of the Rapids Clubtail are located in the US Midwest, but its range extends from northern Alabama and Georgia to southern Ontario, and from Maine to eastern Minnesota. Its global population appears to be stable. Rapids Clubtail is listed as Endangered nationally was assessed as Endangered in Ontario in 2009. A federal recovery strategy for the Rapids Clubtail was released in 2019.

Population estimates of abundance or trends in Ontario are not available. This species is considered extirpated from the Credit River and was historically known from the Thames River. The Rapids Clubtail has been found in the Ausable, Grand and Nith Rivers since this species was last assessed in Ontario.

The primary threat to the Rapids Clubtail is the degradation of river habitats. Activities which impede or alter the quantity and quality of water in the rivers, such as dams and pollution pose threats. Such degradation has led to the apparent demise of this species on the Credit River and the decline of the population on the Humber River.

Rapids Clubtail is meets the criteria for Endangered in Ontario based on meeting criterion B2ab(iii), however the broader biologically relevant geographic range was applied as it is secure in Wisconsin, remains widespread in Minnesota and the global population appears to be stable. This status differs than the COSEWIC status because broader biologically relevant geographic range was applied.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Rapids Clubtail is an accepted species (COSEWIC, 2019).

1.1.2. Designatable units

The Rapids Clubtail is assessed as a single designatable unit, within which there are no known biological or behavioural differences (COSEWIC, 2019).

1.1.3. Native status

Rapids Clubtail is native to Ontario and was first recorded by western science in 1926 from the Credit River (NHIC data).

1.1.4. Occurrence

Rapids Clubtail currently occurs in Ontario. The most recent observations are from 2020 in iNaturalist (NHIC data).

1.2. Eligibility results

Rapids Clubtail (*Phanogomphus quadricolor*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G3G4 (NatureServe 2021)
- IUCN: Least Concern (2014)
- NRANK Canada: N1
- COSEWIC: Endangered (November 2018)
- SARA: Endangered (Schedule 1)
- ESA 2007: Endangered (2009)
- SRANK: S1

2.2. Distribution in Ontario

Rapids Clubtail has a scattered distribution in southern Ontario. It has recently been recorded from the Mississippi, Humber, Grand, Nith and Ausable rivers. Each of these sites is subject to different threats and considered distinct locations. The Ausable River location was discovered in 2020 and is not included in the most recent COSEWIC report (COSEWIC, 2019).

It is extirpated from the Credit River and known historically from the Thames River (last recorded over 30 years ago).

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

The global range of the Rapids Clubtail extends south of Ontario through Minnesota and Maine and as far south as Alabama and northern Georgia. The western extent of the range occurs from Minnesota south to Arkansas and the eastern limit of the range extends from North Carolina to the New England States. It is generally considered rare where it occurs. However, while the rounded NatureServe global rank is G3, it was assessed as Least Concern by the IUCN. Although it is considered of local conservation concern in Canada and the United States, there is no indication of major population decline or significant threats over large parts of the species' range (Paulson, 2018).

The broader biologically relevant geographic range for this species is defined as the state jurisdictions around southern Ontario. While the species has a much larger range there is no evidence of dispersal (COSEWIC, 2019). Although northern Great Lakes states are not adjacent to the Ontario range, there are occurrences in Minnesota that are very close to the Ontario border. Minnesota and Wisconsin are the only two states that are included in the broader biologically relevant geographic range where Rapids Clubtail is secure (Table 1).

Table 1. Condition of the Species 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	
Manitoba	n/a	n/a	
Michigan	Yes	S3	
Minnesota	Yes	SNR	Scattered occurrences in central and northeast counties (Odonate Central)
Nunavut	n/a	n/a	
New York	Yes	S3	
Ohio	Yes	S3	
Pennsylvania	Yes	S2S3	Species of “immediate concern” in the State Wildlife Action Plan
Wisconsin	Yes	S5	Wisconsin is the only jurisdiction where Rapids Clubtail is ranked as secure

2.4. Ontario conservation responsibility

Approximately 10% of the global range (based on extent of occurrence) of Rapids Clubtail occurs in Ontario.

2.5. Direct threats

The overall threat ranking calculated for Rapids Clubtail is between medium to high. The highest ranking threats are recreational activities and water pollution as the result of runoff from urban development, agriculture and urban waterwater discharge (COSEWIC, 2019). The Humber River occurrence may be impacted by the proposed GTA West highway construction.

Surface water quality varies between the locations (Table 2). Surface water quality is based on phosphorus, E. coli and benthic index. This information is from watershed report cards and is available for the Grand River watershed.

Table 2: Watershed report card results (surface water quality) for Rapids Clubtail locations

Watershed/ Location	Year	Results
Lower Ausable	2018	C (Fair) Few changes between 2012-2017. Approximately 66% of the watershed is agricultural.
Lower Mississippi	2018	B (Good)
Thames (Dorchester Corridor)	2017	D (Poor) From 1996-2015, phosphorus levels have improved, other indicators have been steady.
North Humber	2018	B (Good)

2.6. Specialized life history or habitat use characteristics

Two factors that increase the vulnerability of Rapids Clubtail to extinction:

As with most dragonflies, Rapids Clubtail is typically found in relatively unpolluted environments. The apparent loss of this species at the Credit River (and possibly the

Thames River) sites, where water quality has been significantly degraded, could indicate that this species is sensitive to decreased water quality.

The Rapids Clubtail does not appear to disperse over long distances. Subpopulations typically remain resident for the duration of their life. They are known to disperse only between 200–800 m into forest habitat before returning to the river to breed. The habit of foraging close to the surface of the water rather than above the forest canopy as in some other dragonfly species means that they are likely less susceptible to wind directed dispersal than other species. Passive dispersal likely occurs predominantly following oviposition of eggs or nymphs within the water column, which may drift for considerable distances before settling on the river bottom. (COSEWIC, 2019)

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. Decline unknown

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

Meets criterion for Endangered, B2ab(iii), as IAO is less than 500 km² (80 km²) and it is severely fragmented and there is an inferred continuing decline in quality of habitat.

It is severely fragmented because it is found in small and isolated subpopulations. Most locations are separated by distances much further than this species is known to disperse.

Evidence for the inference for declining habitat is somewhat mixed based on watershed report cards. There have been significant improvements in municipal wastewater treatment, but agricultural runoff is probably increasing due to more intensive land use and extreme weather events. However, the Humber River location may now be under greater risk because of proposed highway construction.

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

Not applicable, total number of mature individuals unknown.

3.1.4. Criterion D – Very small or restricted total population

Not applicable, total number of mature individuals unknown.

3.1.5. Criterion E – Quantitative analysis

Does not apply.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply. Rounded global rank is G3, but less than 25% (10%, estimated) of the global range is found in Ontario.

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

Applied.

Although Rapids Clubtail is generally rare to uncommon throughout most its range including the regions adjacent to southern Ontario and rescue is unlikely, broader biologically relevant geographic range was applied to this species. It is secure in Wisconsin and appears widespread in Minnesota.

3.4. Other status categories

3.4.1. Data deficient

Does not apply.

3.4.2. Extinct or extirpated

Does not apply.

3.4.3. Not at risk

Does not apply.

4. Summary of Ontario status

Rapids Clubtail (*Phanogomphus quadricolor*) meets the criteria for Endangered in Ontario based on meeting criterion B2ab(iii), however the broader biologically relevant geographic range was applied as it is secure in Wisconsin and appears widespread in Minnesota and the global population appears to be stable. This status differs than the COSEWIC status because broader biologically relevant geographic range was applied.

This status of this species is consistent with the definition of Threatened under the Endangered Species Act, 2007.

5. Information sources

COSEWIC. 2019. *COSEWIC assessment and status report on the Rapids Clubtail (Phanogomphus quadricolor) in Canada*. Ottawa. p. xii + 48.

Paulson, DR. (2018). *Phanogomphus quadricolor* (amended version of 2017 assessment). The IUCN Red List of Threatened Species 2018: e.T51179112A125537394. Available from <https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T51179112A125537394.en>

Appendix 1: Technical summary for Ontario

Species: Rapids Clubtail (*Phanogomphus quadricolor*)

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 (larvae live 2–4 years, adults live approximately 1–2 months)
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. Unknown c. Unknown No known decline
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). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	19,677 km ² Calculated using NHIC data in Geocat (with corrections)
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	80 km ² Calculated using NHIC data in Geocat.
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are: (a) smaller than would be required to support a viable population, and	a. No b. Yes

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. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	5-6 locations
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	5-6
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	No
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	No
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	No
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?	Yes – inferred decline of some locations in watersheds dominated by agriculture
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)

Sub-population (or total population)	Number of mature individuals
Thames River	<i>Historic</i> The first and only record from the South Thames River occurred in 1989; however, survey coverage within this portion of the Thames River has been limited, particularly in comparison to other known sites in Ontario, and hence, this subpopulation should be considered historical rather than extirpated. T
Credit River	<i>Extirpated</i> The subpopulation on the Credit River is considered extirpated, with no new observations in recent history despite several surveys undertaken in 2005 and 2006 when a

	2.6 km stretch of river near Erindale was searched (COSEWIC 2008). The Credit River has been surveyed fairly extensively, while no records have been identified since 1939, when E.M. Walker noted the species to be common near Erindale.
Humber River	<i>Extant</i> The species was first identified on the Humber River from exuviae collected by E. Walker in 1939 and is now known from a stretch of the river from southwest of Kleinburg, Ontario to the Nashville Conservation Reserve to the north.
Nith River	<i>Extant</i> In 2014, the species was documented for the first time on the Nith River, west of Paris, Ontario, with an additional site being found approximately 10 km further north in 2016.
Grand River	<i>Extant</i> Search effort on the Grand and Nith Rivers resulted in the discovery of two new subpopulations within the past 10 years. In 2009, the species was identified on the Grand River northwest of Brantford, Ontario (Figure 7). In 2014, the species was documented for the first time on the Nith River, west of Paris, Ontario, with an additional site being found approximately 10 km further north in 2016
Mississippi River	<i>Extant</i> The Mississippi River subpopulation was discovered in 2001 at two sites approximately 8 km apart, and in 2010, additional sites on the Mississippi were identified near Almonte, Ontario, stretching the known occurrences across approximately 15 km of river
Ausable River	Recently discovered in 2020 at Rock Glen Conservation Area.

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

The overall threat ranking calculated for Rapids Clubtail is between medium to high. The highest ranking threats are recreational activities and water pollution as the result of runoff from urban development, agriculture and urban waterwater discharge.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	No. The Rapids Clubtail is not considered to be a long distance dispersing species, and has never been identified a great distance from water in Ontario (Ontario Odonata Atlas Database 2017). The distance the Rapids Clubtail disperses during its adult life stage and aquatic nymphal stage is unknown.
Status of outside population(s) most likely to provide immigrants to Ontario	Insert status
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	No. Unlikely due to large gaps separating subpopulations and barriers to movement such as the Great Lakes and large impassable rivers.
Would immigrants be adapted to survive in Ontario?	Yes. Apparently suitable riverine habitat is found throughout eastern Ontario and at several locations in southwestern Ontario, and northwestern Ontario where this species has not been recorded.
Is there sufficient suitable habitat for immigrants in Ontario?	Yes
Are conditions deteriorating in Ontario?	Yes/No/Unknown/Probably/Possibly
Is the species of conservation concern in bordering jurisdictions?	Yes. In all except Wisconsin and Minnesota.
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	No

Sensitive species

No. Collection of this species is thought to be uncommon.

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