

Recovery Strategy for the Rapids Clubtail (*Gomphus quadricolor*) in Canada

Rapids Clubtail



2019



Government
of Canada

Gouvernement
du Canada

Canada

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For copies of the recovery strategy, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the [Species at Risk \(SAR\) Public Registry](#)¹.

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¹ <http://sararegistry.gc.ca/default.asp?lang=En&n=24F7211B-1>

RECOVERY STRATEGY FOR THE RAPIDS CLUBTAIL (*Gomphus quadricolor*) IN CANADA

2019

Under the Accord for the Protection of Species at Risk (1996), the federal, provincial, and territorial governments agreed to work together on legislation, programs, and policies to protect wildlife species at risk throughout Canada.

In the spirit of cooperation of the Accord, the Government of Ontario has given permission to the Government of Canada to adopt the *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario* (Part 2) and the *Rapids Clubtail – Ontario Government Response Statement*² (Part 3) under Section 44 of the *Species at Risk Act* (SARA). Environment and Climate Change Canada has included a federal addition (Part 1) which completes the SARA requirements for this recovery strategy.

The federal recovery strategy for the Rapids Clubtail in Canada consists of three parts:

Part 1 – Federal Addition to the *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario*, prepared by Environment and Climate Change Canada.

Part 2 – *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario*, prepared by Stewart E. Hamill for the Ontario Ministry of Natural Resources³.

Part 3 – *Rapids Clubtail – Ontario Government Response Statement*, prepared by the Ontario Ministry of Natural Resources.

² The Government Response Statement is the Ontario Government's policy response to the recovery strategy and summarizes the prioritized actions that the Ontario Government intends to take and support.

³ On June 26, 2014, the Ontario Ministry of Natural Resources became the Ontario Ministry of Natural Resources and Forestry.

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Part 2 – *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario* prepared by Stewart E. Hamill for the Ontario Ministry of Natural Resources.

Part 3 – *Rapids Clubtail – Ontario Government Response Statement*, prepared by the Ontario Ministry of Natural Resources.

Part 1 – Federal Addition to the *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario*, prepared by Environment and Climate Change Canada

Preface

The federal, provincial, and territorial government signatories under the [Accord for the Protection of Species at Risk \(1996\)](#)⁴ agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years after the publication of the final document on the SAR Public Registry.

The Minister of Environment and Climate Change is the competent minister under SARA for the Rapids Clubtail and has prepared the federal component of this recovery strategy (Part 1), as per section 37 of SARA. SARA section 44 allows the Minister to adopt all or part of an existing plan for the species if it meets the requirements under SARA for content (sub-sections 41(1) or (2)). The Ontario Ministry of Natural Resources (now the Ontario Ministry of Natural Resources and Forestry) led the development of the attached recovery strategy for the Rapids Clubtail (Part 2) in cooperation with Environment and Climate Change Canada. The Province of Ontario also led the development of the attached Government response statement (Part 3), which is the Ontario Government's policy response to its provincial recovery strategy and summarizes the prioritized actions that the Ontario government intends to take and support.

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 and will not be achieved by Environment and Climate Change Canada, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this strategy for the benefit of the Rapids Clubtail and Canadian society as a whole.

This recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment and Climate Change Canada and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this strategy is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

The recovery strategy sets the strategic direction to arrest or reverse the decline of the species, including identification of critical habitat to the extent possible. It provides all Canadians with information to help take action on species conservation. When critical habitat is identified, either in a recovery strategy or an action plan, SARA requires that critical habitat then be protected.

⁴ <http://registrelep-sararegistry.gc.ca/default.asp?lang=en&n=6B319869-1#2>

In the case of critical habitat identified for terrestrial species including migratory birds SARA requires that critical habitat identified in a federally protected area⁵ be described in the *Canada Gazette* within 90 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry. A prohibition against destruction of critical habitat under ss. 58(1) will apply 90 days after the description of the critical habitat is published in the *Canada Gazette*.

For critical habitat located on other federal lands, the competent minister must either make a statement on existing legal protection or make an order so that the prohibition against destruction of critical habitat applies.

If the critical habitat for a migratory bird is not within a federal protected area and is not on federal land, within the exclusive economic zone or on the continental shelf of Canada, the prohibition against destruction can only apply to those portions of the critical habitat that are habitat to which the *Migratory Birds Convention Act, 1994* applies as per SARA ss. 58(5.1) and ss. 58(5.2).

For any part of critical habitat located on non-federal lands, if the competent minister forms the opinion that any portion of critical habitat is not protected by provisions in or measures under SARA or other Acts of Parliament, or the laws of the province or territory, SARA requires that the Minister recommend that the Governor in Council make an order to prohibit destruction of critical habitat. The discretion to protect critical habitat on non-federal lands that is not otherwise protected rests with the Governor in Council.

Acknowledgements

The initial draft of the federal addition was prepared by Holly Bickerton (Consulting Ecologist, Ottawa). Allan Harris (Northern Bioscience) and Jennie Pearce (J. L Pearce and Associates) provided information and advice. Ken Tuininga, Krista Holmes and Marie-Claude Archambault (Environment and Climate Change Canada, Canadian Wildlife Service - Ontario) and Lauren Strybos and Marsha Smith (formerly Environment and Climate Change Canada, Canadian Wildlife Service – Ontario) and Aileen Wheeldon (Ontario Ministry of Natural Resources and Forestry) reviewed and provided comments and advice during the development of this document.

Acknowledgement and thanks is given to all other parties that provided advice and input used to help inform the development of this recovery strategy including various Indigenous organizations and individuals, landowners, citizens and stakeholders who provided input and/or participated in consultation meetings.

⁵ These federally protected areas are: a national park of Canada named and described in Schedule 1 to the *Canada National Parks Act*, The Rouge National Park established by the *Rouge National Urban Park Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act* see ss. 58(2) of SARA.

Additions and Modifications to the Adopted Document

The following sections have been included to address specific requirements of the federal *Species at Risk Act* (SARA) that are not addressed in the *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario* (Part 2 of this document, referred to henceforth as “the provincial recovery strategy”) and/or to provide updated and additional information.

Environment and Climate Change Canada is adopting the provincial recovery strategy (Part 2) with the exception of section 2, Recovery. In place of section 2, Environment and Climate Change Canada has established a population and distribution objective and performance indicators, and is adopting the government-led and government-supported actions of the *Rapids Clubtail Ontario Government Response Statement* (Part 3) as the broad strategies and general approaches to meet the population and distribution objective.

Under SARA, there are specific requirements and processes set out regarding the protection of critical habitat. Therefore, statements in the provincial recovery strategy referring to protection of the species’ habitat may not directly correspond to federal requirements with respect to critical habitat. Recovery measures dealing with the protection of habitat are adopted; however, whether these measures will result in protection of critical habitat under SARA will be assessed following publication of the federal recovery strategy.

1. Species Status Information

The Rapids Clubtail (*Gomphus quadricolor*) is a dragonfly that occurs across eastern North America. In Canada, the Rapids Clubtail is listed as Endangered on Schedule 1 of SARA. In Ontario, it is listed as Endangered under the *Endangered Species Act, 2007* (ESA 2007). The Rapids Clubtail has a global conservation rank of G3G4, meaning that it is considered Vulnerable⁶. It is also considered vulnerable nationally (N3N4) in the United States, and Critically Imperiled to Secure at a state level across its range in the United States (Appendix A). In Canada, the species is ranked as Critically Imperilled⁷ both nationally (N1) and in Ontario (S1; NatureServe 2014). Less than 10 percent of the species’ global range occurs in Canada.

⁶ Vulnerable: At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats or other factors. Note that a range rank (e.g. G3G4) is assigned when the available information does not allow assignment of a more precise rank; the rank is conservatively treated to be the lower of the two (i.e., G3G4 is treated as G3, or vulnerable) (NatureServe 2014).

⁷ Critically Imperilled: At a very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats or other factors.

2. Recovery Feasibility Summary

Based on the following four criteria that Environment and Climate Change Canada uses to establish recovery feasibility, there are unknowns regarding the feasibility of recovery of the Rapids Clubtail. In keeping with the precautionary principle, this recovery strategy has been prepared as per section 41(1) of SARA, as would be done when recovery is determined to be technologically and biologically feasible. This recovery strategy addresses the unknowns surrounding the feasibility of recovery.

1. Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.

Yes. The Rapids Clubtail has been documented at six locations in southern Ontario. It has been observed at three Ontario rivers since 1989 (two since 2005) (Catling and Brownell 2002; Harris and Foster 2006; Hamill 2010) and has likely been extirpated from a fourth location. Additionally, since 2013 the species has been confirmed on two watercourses where it was previously unknown: the Grand River and the Nith River (P. Burke pers. comm. 2014; C. Jones pers. comm. 2015). COSEWIC (2008) estimated the Canadian population in 2005 to be a minimum of 318 individuals, including 106 adults that were presumed to be reproductive. The species is widespread throughout the northeastern United States and is perhaps most common in the American Midwest (COSEWIC 2008). Although unsuccessful searches have been undertaken by various experts across a large part of southern Ontario, particularly at historical locations, the Rapids Clubtail may still occupy areas of Ontario where it has not yet been discovered.

2. Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.

Yes. The distribution of the Rapids Clubtail is very localized, and yet suitable habitat (medium to large rivers with nearby deciduous or mixed forest or mixed treed swamp areas) is not thought to be limiting. Many other rivers in southern Ontario have characteristics similar to occupied habitat, and have been identified as potentially suitable habitat for this species (Harris and Foster 2006). Despite searches in many of these areas over many years, the species has only recently been confirmed on only two additional rivers. The reasons for this distribution pattern are unclear and are identified as a knowledge gap (Hamill 2010).

3. The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.

Unknown. The primary threat to the Rapids Clubtail in Canada is habitat degradation, caused by the construction of dams and other water control structures, and an overall reduction in water quality through pollution and sedimentation (COSEWIC 2008; Hamill 2010). These activities are widespread, and are generally irreversible in highly developed southern Ontario. Loss of natural shoreline habitat is also a threat, and although it can be reduced to some degree through the use of shoreline buffers, it may not be sufficient to maintain the habitat quality required by the Rapids Clubtail. However, it is expected that with further investigation into direct and indirect threats to Rapids Clubtail habitat posed by future development and the relative severity of threats, effective mitigation approaches can be identified for populations and threats from new development activities can be reduced through land management and stewardship.

4. Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.

Unknown. The population and distribution objective calls for maintaining existing populations. Research is required to develop guidelines for the rehabilitation of streams specifically for this species and to understand the microhabitat attributes favoured by the Rapids Clubtail (Hamill 2010). As indicated in (3) above, land management and stewardship techniques to address the primary threats do exist (e.g., land use planning, creation of shoreline buffers, techniques to restore and rehabilitate streams and rivers through riparian plantings, channel naturalization, etc.) and have the potential to prevent future habitat destruction, however, in situations where dams and water control structures already exist the habitat alterations may be irreversible.

3. Species Population and Distribution

Since the publication of the provincial *Recovery Strategy for the Rapids Clubtail* (*Gomphus quadricolor*) in Ontario and the development of the provincial habitat regulation, two additional populations of Rapids Clubtail have been discovered. One of these populations is on the Grand River near Brantford, Ontario, in Brant County and the second on the Nith River, just west of Paris, Ontario, Oxford County (P. Burke pers. comm. 2014; C. Jones pers. comm. 2015). In total, Rapids Clubtail is now believed to exist at five locations: the Humber River, Mississippi River, Thames River, and the two new locations described above (Figure 1). Rapids Clubtail is believed to be extirpated from the Credit River where it was last observed in 1939. The most up-to-date statuses for the four populations known before 2013 are provided in the provincial recovery strategy (Part 2).

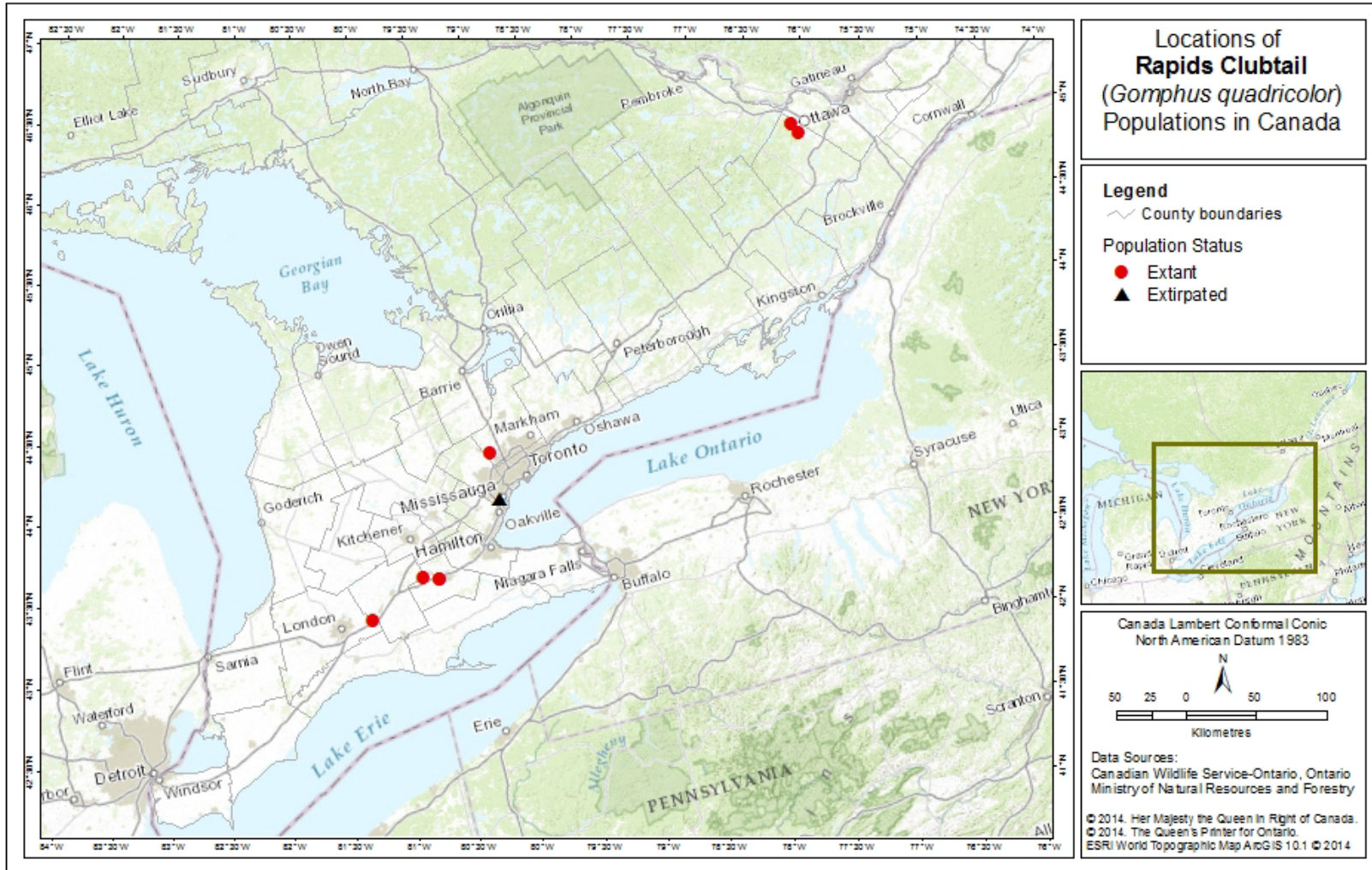


Figure 1. Locations of Rapids Clubtail Populations in Canada. There are a total of 5 extant⁸ populations (the Mississippi River locations are considered one population due to their close proximity).

⁸ A population which is still in existence.

4. Population and Distribution Objectives

Under SARA, a population and distribution objective for the species must be established. Consistent with the goal set out in the Government of Ontario's Government Response Statement, Environment and Climate Change Canada's population and distribution objective for the Rapids Clubtail in Canada is to: :

- Maintain existing populations and, where biologically and technically feasible, rehabilitate degraded habitat at previously known locations.

This objective is consistent with the province of Ontario's Government Response Statement developed under the provincial *Endangered Species Act, 2007*, which outlines the provincial government's goal for the recovery of the species and summarizes the prioritized actions the government intends to take (see Part 3 for more information). The *Rapids Clubtail - Government Response Statement* for the Province of Ontario lists the following goal for the recovery of the Rapids Clubtail in Ontario:

The government's goal for the recovery of Rapids Clubtail is to ensure its long-term survival by protecting existing populations and, where feasible, by rehabilitating degraded habitat at known sites.

Maintaining the five existing populations of the Rapids Clubtail will require controlling and mitigating some of the many threats to this species, especially habitat degradation and loss. The impacts of certain potential threats to this species (e.g. invasive aquatic species, road collisions, and inbreeding depression) are not well understood. Although these threats may affect the species, activities that can be undertaken to reduce their impacts are much less clear.

Very little is known about restoring extirpated dragonfly populations, therefore rehabilitating degraded habitat through activities such as shoreline protection and erosion prevention, and promoting landowner stewardship programs at all known locations where required is considered to be the most feasible approach to recovery, particularly at the Credit River and Thames River sites where the Rapids Clubtail has not been observed for many years.

Provided that other threats to Rapids Clubtail individuals (e.g., new dam construction, shoreline alteration, pollution, new road development) are managed and mitigated, viable populations would be expected to persist over long time frames where sufficient suitable habitat exists, and expansion of populations may be encouraged through maintaining currently unoccupied adjacent suitable habitat.

5. Broad Strategies and General Approaches to Meet Objectives

The government-led and government-supported actions tables from the *Rapids Clubtail – Ontario Government Response Statement* (Part 3) are adopted as the broad strategies and general approaches to meet the population and distribution objective. Environment and Climate Change Canada is not adopting the approaches identified in section 2.3 of the *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario* (Part 2).

6. Critical Habitat

6.1 Identification of the Species' Critical Habitat

Section 41(1)(c) of SARA requires that recovery strategies include an identification of the species' critical habitat, to the extent possible, as well as examples of activities that are likely to result in its destruction. Under SARA, critical habitat is "the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species".

Identification of critical habitat is not a component of provincial recovery strategies under the Province of Ontario's ESA 2007. Following the completion of the provincial recovery strategy for this species, a provincial habitat regulation was developed for the Rapids Clubtail, effective July 1, 2012. A habitat regulation is a legal instrument that prescribes an area that will be protected⁹ as the habitat of the species by the Province of Ontario. The habitat regulation identifies the geographic area within which the habitat regulation may apply and explains how the boundaries of regulated habitat are determined (based on biophysical and other attributes). The regulation is dynamic and automatically in effect wherever and whenever the description(s) of the regulation are met.

Environment and Climate Change Canada is adopting the description of Rapids Clubtail habitat under section 29.0.1 of Ontario Regulation 242/08¹⁰ made under the provincial ESA 2007 as the critical habitat in this federal recovery strategy. The area defined under Ontario's habitat regulation contains the biophysical attributes required by the Rapids Clubtail to carry out its life processes (Figure 2). Two additional locations of critical habitat currently not included in the provincial habitat regulation are also identified as critical habitat based on the description of habitat found in the provincial habitat regulation. To meet specific requirements of SARA, the biophysical attributes of critical habitat are provided below, following the Ontario Regulation.

⁹ Under the federal *Species at Risk Act* (SARA), there are specific requirements and processes set out regarding the protection of critical habitat. Protection of critical habitat under SARA will be assessed following publication of the final federal recovery strategy.

¹⁰ www.ontario.ca/laws/regulation/080242#BK75

The areas prescribed under **Ontario Regulation 242/08 – Rapids Clubtail habitat** are presented in this recovery strategy, as follows:

29.0.1 (1) For the purpose of clause (a) of the definition of “habitat” in subsection 2 (1) of the Act, the areas described in subsection (2) that are located in the following parts of geographic areas are prescribed as the habitat of rapids clubtail:

- 1. The part of the geographic area of Lanark composed of the lower-tier municipality of Mississippi Mills.*
- 2. The part of the geographic area of Middlesex composed of the lower-tier municipality of Thames Centre.*
- 3. The parts of the geographic area of Oxford composed of the lower-tier municipalities of South-West Oxford and Zorra.*
- 4. The part of the geographic area of Peel composed of the lower-tier municipality of Caledon.*
- 5. The parts of the geographic area of York composed of the lower-tier municipalities of King and Vaughan. O. Reg. 122/12, s. 4.*

(2) Subsection (1) applies to the following areas:

- 1. Any part of a river, stream or other body of water, up to the high water mark, that is being used by a rapids clubtail or on which a rapids clubtail directly depends in order to carry on its life processes.*
- 2. Any part of a river, stream or other body of water, up to the high water mark, that was used by a rapids clubtail at any time during the previous 5 years and that provides suitable conditions for a rapids clubtail to carry on its life processes.*
- 3. An area of deciduous or mixed forest or of deciduous or mixed treed swamp that is adjacent to an area identified in paragraph 1 or 2 and within 200 metres of the relevant high water mark. O. Reg. 122/12, s. 4.*

The habitat for the Rapids Clubtail is protected under the ESA 2007 until five consecutive years of documented non-use by a Rapid's Clubtail, as long as the habitat remains suitable for the species. The five-year term represents approximately two-times the life span of a Rapids Clubtail. The 200 metre distance represents the average distance traveled by most dragonflies, as they will move between waterbodies and forests or swamps to access reproduction and resting/foraging sites.

The biophysical attributes of critical habitat include the characteristics described below.

- Unpolluted and relatively unaltered, medium to large swift-flowing rivers and streams (river channels 20-50 m wide) characterized by the following:
 - clear, cool water;
 - gravel and cobble bottom with riffles;
 - boulders, rocks and other projections (for perching);
 - rapids which continue downstream to quiet pools that have muddy bottoms in which nymphs¹¹ can bury themselves;
 - presence of aquatic prey items such as small aquatic invertebrates, small fish or tadpoles and terrestrial prey items such as aerial insects.
- Deciduous or mixed forest or mixed treed swamp, particularly shorelines directly adjacent and up to 200 m away from a river or stream containing the above characteristics, and where there are trees, shrubs and grassy clearings and bare sandy spots adjacent to the river for the species to bask in.

The part of a river, stream or other body of water being used by the Rapids Clubtail are described in the provincial recovery strategy (Part 2) for three populations, as follows:

1. *Thames River*: on the 17th Line north of Putnam, from the bridge 800 metres in either direction
2. *Humber River*: between Nashville Road at Kleinburg and King Road West at Bolton
3. *Mississippi River*: from the ball diamond at the south end of town of Pakenham north to include two sets of rapids and quiet water north of the Pakenham Bridge on Kinburn Sideroad; AND from Blakeney Road at the bridge, north to include the rapids plus quiet water below the rapids; AND in Almonte from Main Street West at the bridge¹², downstream including the rapids and the quiet water below the rapids.

For the two populations (Grand River and Nith River) not described in the provincial recovery strategy, the part of a river, stream or other body of water being used by the Rapids Clubtail will include the upstream set of rapids downstream to the end of the first downstream pool.

The boundaries of critical habitat for Rapids Clubtail will include the areas above, and the deciduous or mixed forest or swamp adjacent to and within 200 m of the high water mark of the river or stream in any direction, within which a Rapids Clubtail has been observed in the past 25 years. The average distance travelled between reproductive and roosting and foraging sites is generally less than 200 m for dragonflies (Corbet

¹¹ An immature dragonfly.

¹² Refers to the more southerly of the two Main Street West bridges, which may also be known as the Almonte Street bridge. For more information contact the local MNRF district office

1999, cited in COSEWIC 2008). A 25 year time period is precautionary given the small and inconspicuous nature of the species, and the limited number of people in Ontario with the knowledge required in finding and identifying it.

Through this recovery strategy, the areas prescribed as habitat for the Rapids Clubtail under section 29.0.1 of Ontario Regulation 242/08 become critical habitat under SARA at those locations. Since the regulation is dynamic and automatically in effect whenever the conditions described in the regulation are met, if any new locations of Rapids Clubtail are confirmed within the geographic areas listed under subsection (1) of the regulation (see Figure 1), the habitat regulation under the ESA 2007 applies. Refer to the *Habitat Protection Summary for Rapids Clubtail* (OMNR 2012) for further details on the provincial habitat regulation and its application. Should new occurrences of the Rapids Clubtail be identified that meet the criteria above, the additional critical habitat will be identified in an updated recovery strategy or a subsequent action plan.

Based on the best available information for the Rapids Clubtail, the provincial habitat regulation currently includes habitat required by three of the five currently known extant local populations in Canada. Two additional populations (newly discovered, Grand River and Nith River) currently fall outside the geographic scope of the habitat regulation¹³. For these populations, critical habitat is identified using the the description of the Rapid's Clubtail habitat under section 29.0.1 of Ontario Regulation 242/08, subsection (2).

Application of the critical habitat criteria to the best available data (as of December 2014), identifies critical habitat for the five known extant populations of the Rapids Clubtail in Canada (Figure 3, See also Table 1). The critical habitat identified is considered sufficient to meet the population and distribution objective for the Rapids Clubtail; therefore a schedule of studies is not required.

Critical habitat for the Rapids Clubtail is presented using 1 x 1 km UTM grid squares. The UTM grid squares presented in Figure 3 are part of a standardized grid system that indicates the general geographic areas containing critical habitat, which can be used for land use planning and/or environmental assessment purposes. In addition to providing these benefits, the 1 x 1 km UTM grid respects provincial data-sharing agreements in Ontario. The areas of critical habitat within each grid square occur where the description of habitat (section 29.0.1) in the *Ontario Regulation 242/08 – Rapids Clubtail habitat* and the characteristics of biophysical attributes, as described above, are met. More detailed information on regulated habitat may be requested on a need-to-know basis from the Ontario Ministry of Natural Resources and Forestry. More detailed information on the location of critical habitat to support protection of the species and its habitat may be requested on a need-to-know basis by contacting Environment and Climate Change Canada – Canadian Wildlife Service at ec.planificationduretablissement-recoveryplanning.ec@canada.ca.

¹³ Any new locations outside the specified geographic areas, would require an amendment of the regulation or a habitat protection order in order to protect habitat under the ESA.

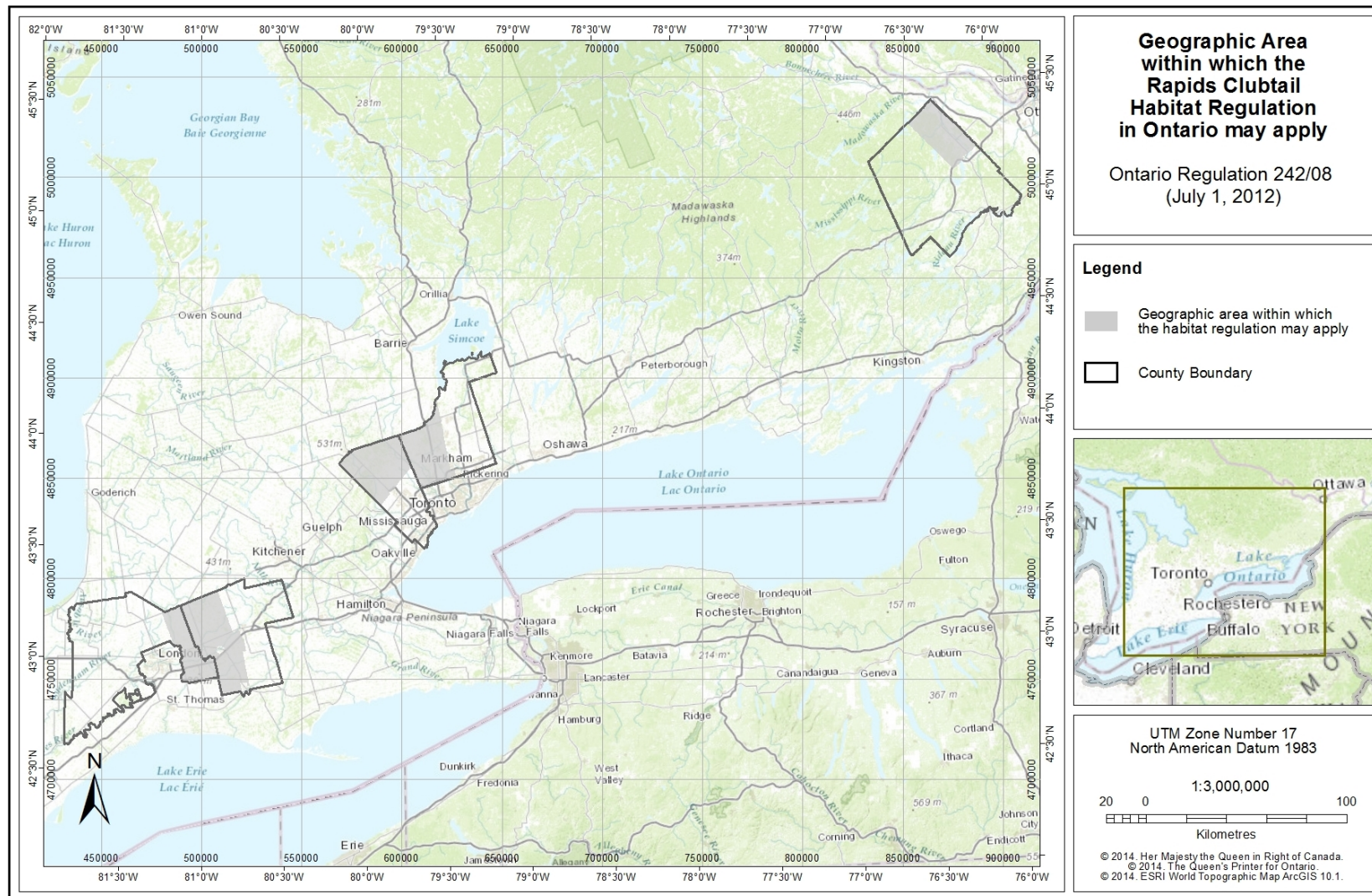


Figure 2. The geographic area within which the habitat regulation for Rapids Clubtail may apply, if the habitat meets the criteria described in section 29.0.1 of Ontario Regulation 242/08 under the provincial ESA 2007.

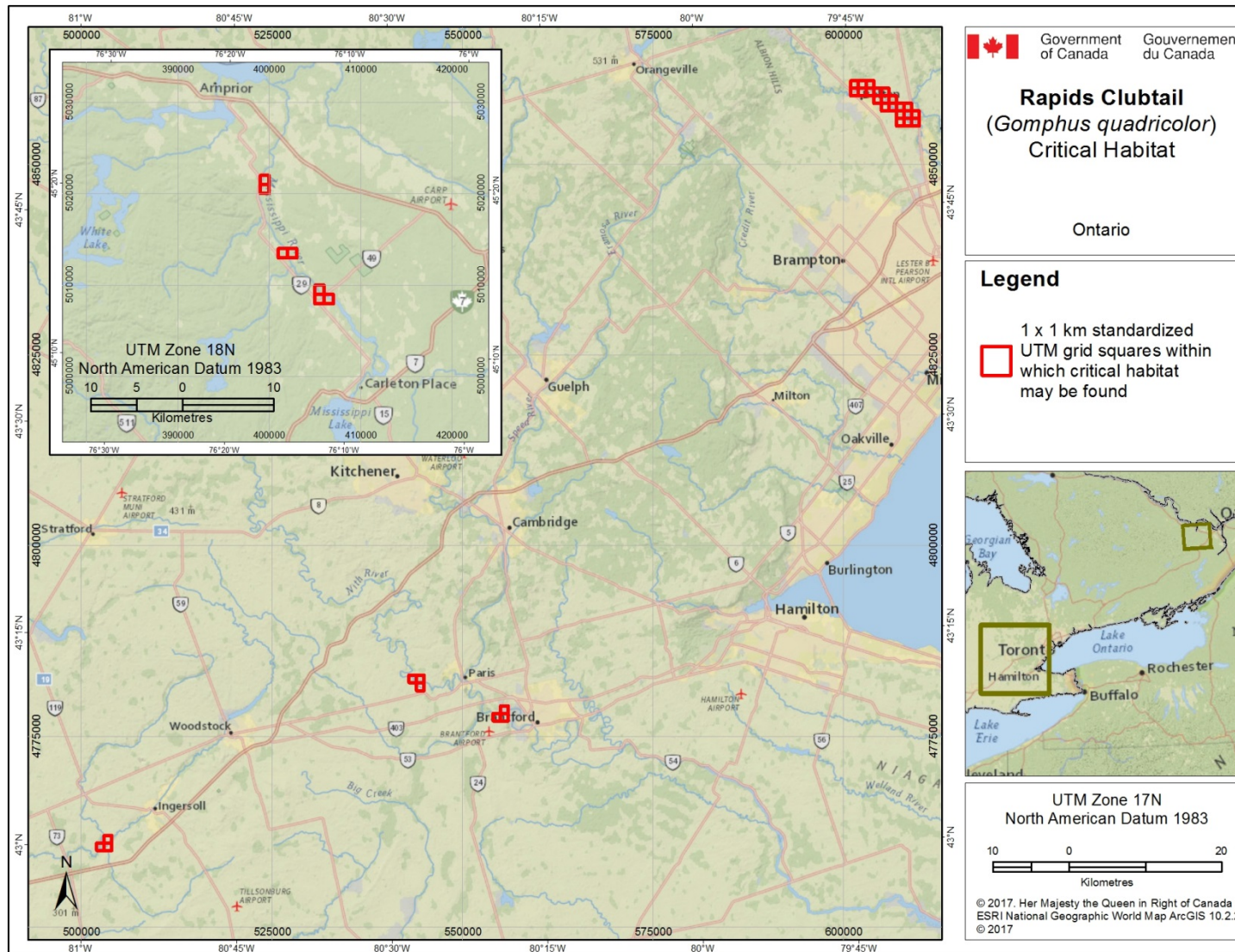


Figure 3. Grid squares that contain critical habitat for Rapids Clubtail in Canada. Critical habitat for the Rapids Clubtail occurs within these 1 x 1 km standardized UTM grid squares (red squares), where the description of critical habitat is met.

Table 1. Grid squares that contain critical habitat for Rapids Clubtail in Canada. Critical habitat for the Rapids Clubtail occurs within these 1 x 1 km Standardized UTM grid squares where the description of critical habitat is met.

Population	Critical Habitat Units	1 x 1 km Standardized UTM grid square ID ¹	Province/Territory	UTM Grid Square Coordinates ²		Land tenure ⁵
				Easting	Northing	
Thames River	Thames River	17TNH0620	Ontario	502000	4760000	Non-federal Land
		17TNH0630	Ontario	503000	4760000	Non-federal Land
		17TNH0631	Ontario	503000	4761000	Non-federal Land
Nith River	Nith River	17TNH4832	Ontario	543000	4782000	Non-federal Land
		17TNH4841	Ontario	544000	4781000	Non-federal Land
		17TNH4842	Ontario	544000	4782000	Non-federal Land
Grand River	Grand River	17TNH5747	Ontario	554000	4777000	Non-federal Land
		17TNH5757	Ontario	555000	4777000	Non-federal Land
		17TNH5758	Ontario	555000	4780000	Non-federal Land
Humber River	Humber River	17TPJ0519	Ontario	601000	4859000	Non-federal Land
		17TPJ0529	Ontario	602000	4859000	Non-federal Land
		17TPJ0539	Ontario	603000	4859000	Non-federal Land
		17TPJ0548	Ontario	604000	4858000	Non-federal Land
		17TPJ0549	Ontario	604000	4859000	Non-federal Land
		17TPJ0557	Ontario	605000	4857000	Non-federal Land
		17TPJ0558	Ontario	605000	4858000	Non-federal Land
		17TPJ0559	Ontario	605000	4859000	Non-federal Land
		17TPJ0567	Ontario	606000	4857000	Non-federal Land
		17TPJ0568	Ontario	606000	4858000	Non-federal Land
		17TPJ0575	Ontario	607000	4855000	Non-federal Land
		17TPJ0576	Ontario	607000	4856000	Non-federal Land
		17TPJ0577	Ontario	607000	4857000	Non-federal Land
		17TPJ0585	Ontario	608000	4855000	Non-federal Land
		17TPJ0586	Ontario	608000	4856000	Non-federal Land
		17TPJ0587	Ontario	608000	4857000	Non-federal Land
		17TPJ0595	Ontario	609000	4855000	Non-federal Land
		17TPJ0596	Ontario	609000	4856000	Non-federal Land
		17TPJ0610	Ontario	601000	4860000	Non-federal Land
17TPJ0620	Ontario	602000	4860000	Non-federal Land		
17TPJ0630	Ontario	603000	4860000	Non-federal Land		
Mississippi River	Mississippi River - Pakenham	18TUR9290	Ontario	399000	5020000	Non-federal Land
		18TUR9291	Ontario	399000	5021000	Non-federal Land

	Mississippi River - Almonte	18TVR0058	Ontario	405000	5008000	Non-federal Land
		18TVR0059	Ontario	405000	5009000	Non-federal Land
		18TVR0068	Ontario	406000	5008000	Non-federal Land
	Mississippi River - Blakeney	18TVR0113	Ontario	401000	5013000	Non-federal Land
		18TVR0123	Ontario	402000	5013000	Non-federal Land

¹ Based on the standard UTM Military Grid Reference System (see <http://www.nrcan.gc.ca/earth-sciences/geography/topographic-information/maps/9789>), where the first 2 digits and letter represent the UTM Zone, the following 2 letters indicate the 100 x 100 km standardized UTM grid followed by 2 digits to represent the 10 x 10 km standardized UTM grid. The last 2 digits represent the 1 x 1 km standardized UTM grid containing all or a portion of the critical habitat unit. This unique alphanumeric code is based on the methodology produced from the Breeding Bird Atlases of Canada (See www.bsc-eoc.org/ for more information on breeding bird atlases).

² The listed coordinates are a cartographic representation of where critical habitat can be found, presented as the southwest corner of the 1 x 1 km Standardized UTM grid square that is the critical habitat unit. The coordinates are provided as a general location only.

³ Land tenure is provided as an approximation of the types of land ownership that exist where critical habitat has been identified and should be used for guidance purposes only. Accurate land tenure will require cross referencing critical habitat boundaries with surveyed land parcel information.

6.2 Activities Likely to Result in the Destruction of Critical Habitat

Understanding what constitutes destruction of critical habitat is necessary for the protection and management of critical habitat. Destruction is determined on a case by case basis. Destruction would result if part of the critical habitat was degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. Destruction may result from a single activity or multiple activities at one point in time or from the cumulative effects of one or more activities over time. It should be noted that not all activities that occur in or near critical habitat are likely to cause its destruction. Activities described in Table 2 are examples of those likely to cause destruction of critical habitat for the species; however, destructive activities are not necessarily limited to those listed.

Table 2. Activities Likely to Destroy Critical Habitat of Rapids Clubtail

Description of Activity	Description of Effect in Relation to Function Loss	Details of Effect
Building of water control structures such as dams; any activity that results in changes to water flows and levels.	Results in the removal of areas of rapids and changes to sedimentation patterns, such that the river or creek required by this species for breeding becomes unsuitable for activities including egg laying and larval development.	This activity is likely to result in the destruction of critical habitat, whether it occurs within the bounds of critical habitat or in upstream areas such that water regimes in critical habitat are altered and breeding habitat required by Rapids Clubtail is removed.
Development and conversion of lands (e.g., shoreline alteration, creation and operation of quarries, conversion of land to residential or commercial properties or agriculture such as intensive cropping or pasture).	Results in direct loss or covering of native vegetation, which females and young adult males of the species use for foraging. Conversion of land use may also result in a deterioration of water quality as a result of sedimentation, pollution, pesticides and nutrient loading, such that larval habitat becomes unsuitable (COSEWIC 2008).	This activity, when conducted within, or near to, the bounds of critical habitat, is likely to result in its destruction by removing foraging habitat for a significant proportion of individuals in a population.
Removal of native vegetation, including significant clearance of forests and treed swamps.	Results in direct loss or covering of native vegetation, which females and young adult males of the species use for foraging. This may also increase the risk of predation of dispersing adults and juveniles by birds and other dragonflies. Loss of shoreline vegetation may alter bank stability, and increase both water temperature and sedimentation rates, making habitat unsuitable for larvae. The result of combined changes may be lead to the loss of part or all of a population.	When significant clearing occurs within critical habitat, at any time of year, it is likely to result in destruction by removing foraging habitat for a significant proportion of individuals in a population.

7. Measuring Progress

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives. Every five years, success of recovery strategy implementation will be measured against the following performance indicators:

- Abundance and distribution of existing populations in Ontario have been maintained.
- Rehabilitation of degraded habitat at previously known locations in Ontario has been encouraged and, where feasible, undertaken.

8. Statement on Action Plans

One or more action plans for the Rapids Clubtail will be completed and posted on the Species at Risk Public Registry by December 31, 2026.

9. Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the [Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals](#)¹⁴. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the [Federal Sustainable Development Strategy](#)'s¹⁵ (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below in this statement.

This federal recovery strategy directly contributes to the goals and targets of the Federal Sustainability Development Strategy for Canada (FSDS). Specifically, it will help to restore populations of wildlife to healthy levels and maintain productive and resilient ecosystems with the capacity to recover and adapt (Goals 5 and 6 of the FSDS). In general, its suitable habitat in relatively pristine waterways is relatively rare within its southern Ontario range. Conserving this habitat may assist in the protection of other provincially or regionally significant odonate¹⁶ species as well as the other species at risk found there.

The potential for this recovery strategy to inadvertently lead to adverse effects on other species was considered. Because this species is very localized with no known co-occurring species at risk, and recovery activities will focus on the improvement of water quality and protection of riparian habitat at known sites, the SEA concluded that this strategy will clearly benefit the environment and will not entail significant adverse effects.

¹⁴ www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1

¹⁵ www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1

¹⁶ Belonging to the order Odonata, encompassing dragonflies and damselflies.

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Appendix A: Subnational Conservation Ranks of the Rapids Clubtail (*Gomphus quadricolor*) in Canada and the United States

Table A-1 Ranks of Rapid's Clubtail in Canada and the United States (NatureServe 2017)

Rapids Clubtail (<i>Gomphus quadricolor</i>)	
S-rank	State/Province
S1 (Critically Imperiled)	Ontario, Alabama, Connecticut, Georgia, Iowa, Maine, Massachusetts, North Carolina (?)
S1S2 (Critically Imperiled-Imperiled)	Pennsylvania
S2 (Imperiled)	Indiana, Maryland, Vermont
S2S3 (Imperiled-Vulnerable)	Kentucky, Michigan, Virginia, West Virginia
S3 (Vulnerable)	New Hampshire, New Jersey, New York, Ohio
S3S4 (Vulnerable-Apparently Secure)	Tennessee
S4 (Apparently Secure)	Indiana, Kentucky, New York, Virginia
S5 (Secure)	Wisconsin
SNR (Unranked)	Arkansas, Minnesota, Missouri

Rank Definitions (NatureServe 2014)

S1: Critically Imperiled - At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

S2: Imperiled - At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3: Vulnerable - At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4: Apparently Secure - At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5: Secure - Common; widespread and abundant.

SNR: Unranked - National or subnational conservation status not yet assessed.

Question mark (?) - Denotes an inexact numeric rank.

Part 2 – *Recovery Strategy for the Rapids Clubtail (Gomphus quadricolor) in Ontario*, prepared by Stewart E. Hamill for the Ontario Ministry of Natural Resources



Photo: Glenn Carbiere

Rapids Clubtail (*Gomphus quadricolor*) in Ontario

Ontario Recovery Strategy Series

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

September 2010

Natural. Valued. Protected.

Ministry of Natural Resources

 Ontario

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, 2007 (ESA, 2007) 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, 2007, 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, 2007 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, 2007. 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

RECOMMENDED CITATION

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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 Pamela Wesley au ministère des Richesses naturelles au 705-755-1661.

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- Thilaka Krishnaraj, Entomologist, Toronto Region Conservation Authority
- Chris Lewis, Fisheries Biologist, Niblett Environmental Associates, Lindsay
- Heather Lynn, Natural Heritage Ecologist, Credit Valley Conservation
- Paul Pratt, Head Naturalist, Ojibway Nature Centre
- Don Sutherland, Zoologist, Natural Heritage Information Centre, OMNR
- Melinda Thompson-Black, Species at Risk Biologist, Aurora District, OMNR
- Jeff Ward, Stewardship Coordinator, Community Stewardship Council of Lanark County
- Kelly Wilson, Aquatic Biologist, Mississippi Valley Conservation

DECLARATION

The Ontario Ministry of Natural Resources has led the development of this recovery strategy for the Rapids Clubtail in accordance with the requirements of the *Endangered Species Act, 2007* (ESA 2007). 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
Fisheries and Oceans Canada
Environment Canada, Canadian Wildlife Service - Ontario

EXECUTIVE SUMMARY

The Rapids Clubtail is a small, brightly coloured dragonfly which lives in clear, cool, medium to large rivers with wooded shorelines, gravel shallows, and muddy pools. Adult males perch on exposed rocks in the rapids. Adult females inhabit shoreline forests, moving to the rapids when ready to mate. Eggs are laid over the rapids and the nymphs live in quiet, muddy, downstream pools.

This species is a globally rare to uncommon dragonfly found throughout Eastern North America, in a range extending from Maine to Minnesota, including southern Ontario. In Ontario it has been found in only four rivers: the Credit, the Thames, the Humber and the Mississippi. The population in the Credit River may be extirpated. The species is listed as endangered on the Species at Risk in Ontario (SARO) List under the *Endangered Species Act, 2007*.

Threats to survival and recovery include dam construction, shoreline alteration, pollution, removal of shoreline forests, exotic predatory species, roadkill and climate change. Limiting factors include low population numbers, limited distribution and apparent sensitivity to specific habitat features. Knowledge gaps include a lack of understanding of the reasons for its limited distribution and for its habitat sensitivity.

The recovery goal is to ensure the long-term survival of Rapids Clubtail in the province by protecting existing populations and by restoring populations in appropriate habitat where feasible.

The recovery objectives are to:

1. protect, maintain and improve habitat in the four rivers in Ontario where Rapids Clubtail has been found;
2. implement a monitoring program for the locations where Rapids Clubtail is known to exist;
3. conduct additional inventory for Rapids Clubtail in suitable habitat; and,
4. initiate research to address knowledge gaps for Rapids Clubtail.

It is important to ensure adequate protection of habitat and water quality for the species' survival and recovery.

The locations where the species has been found in the Credit, Thames, Humber and Mississippi Rivers should all be prescribed as habitat in a habitat regulation. At each location, the area prescribed as habitat should include the section of the river containing the rapids and the pools below the rapids, plus the wooded shores on either side extending inland to include any forest which is within 800 metres of the shoreline.

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Recovery strategy for the Rapids Clubtail in Ontario

1.0 BACKGROUND INFORMATION

1.1 Species Assessment and Classification

COMMON NAME: Rapids Clubtail

SCIENTIFIC NAME: *Gomphus quadricolor*

SARO List Classification: Endangered

SARO List History: Endangered (2009)

COSEWIC Assessment History: Endangered (2008)

SARA Schedule 1: N/A

CONSERVATION STATUS RANKINGS:

GRANK: G3G4

NRANK: N1

SRANK: S1

The glossary provides definitions for the abbreviations above.

1.2 Species Description and Biology

Species Description

The Rapids Clubtail is a small (42 to 45 mm long), brightly coloured dragonfly in the family Gomphidae. The widely separated eyes are bluish-green on a light yellowish-green face that is striped with two dark lines. The legs are entirely black. The thorax has a contrasting pattern of dark and light coloured stripes. The wings span 25 to 27 millimetres and are transparent. The abdomen is slender, but in males is slightly expanded at the tip (Dunkle 2000, Needham et al. 2000).

Species Biology

The Rapids Clubtail lives in clear, cool, medium to large rivers with wooded shorelines, gravel shallows and muddy pools. Adult males perch on exposed rocks in the rapids, from which they make territorial flights to drive away competitors, mating flights to find females and predatory flights to catch aerial insects. Adult females inhabit shoreline forests, moving to the rapids when ready to mate. Eggs are laid in the water over the rapids and are carried downstream where they are deposited in pools (Walker 1958).

The nymphs live in these quiet, muddy, downstream pools where they spend most of their time buried just below the surface of the sediment in the bottom of the pool, breathing through the tip of the abdomen raised above the sediment. They ambush prey (invertebrates, small fish and tadpoles) from the sediment using the prehensile labium (Walker 1958).

Recovery strategy for the Rapids Clubtail in Ontario

Adults live about three to four weeks, emerging and flying from mid-May to mid-July, while larvae may live two or more years (Walker 1958).

1.3 Distribution, Abundance and Population Trends

The Rapids Clubtail is a globally rare to uncommon dragonfly found throughout eastern North America, with large areas of unsuitable habitat within this range where it does not occur. Most populations are located in the U.S. Midwest, with the range extending from Maine to Minnesota, including southern Ontario (Donnelly 2004).

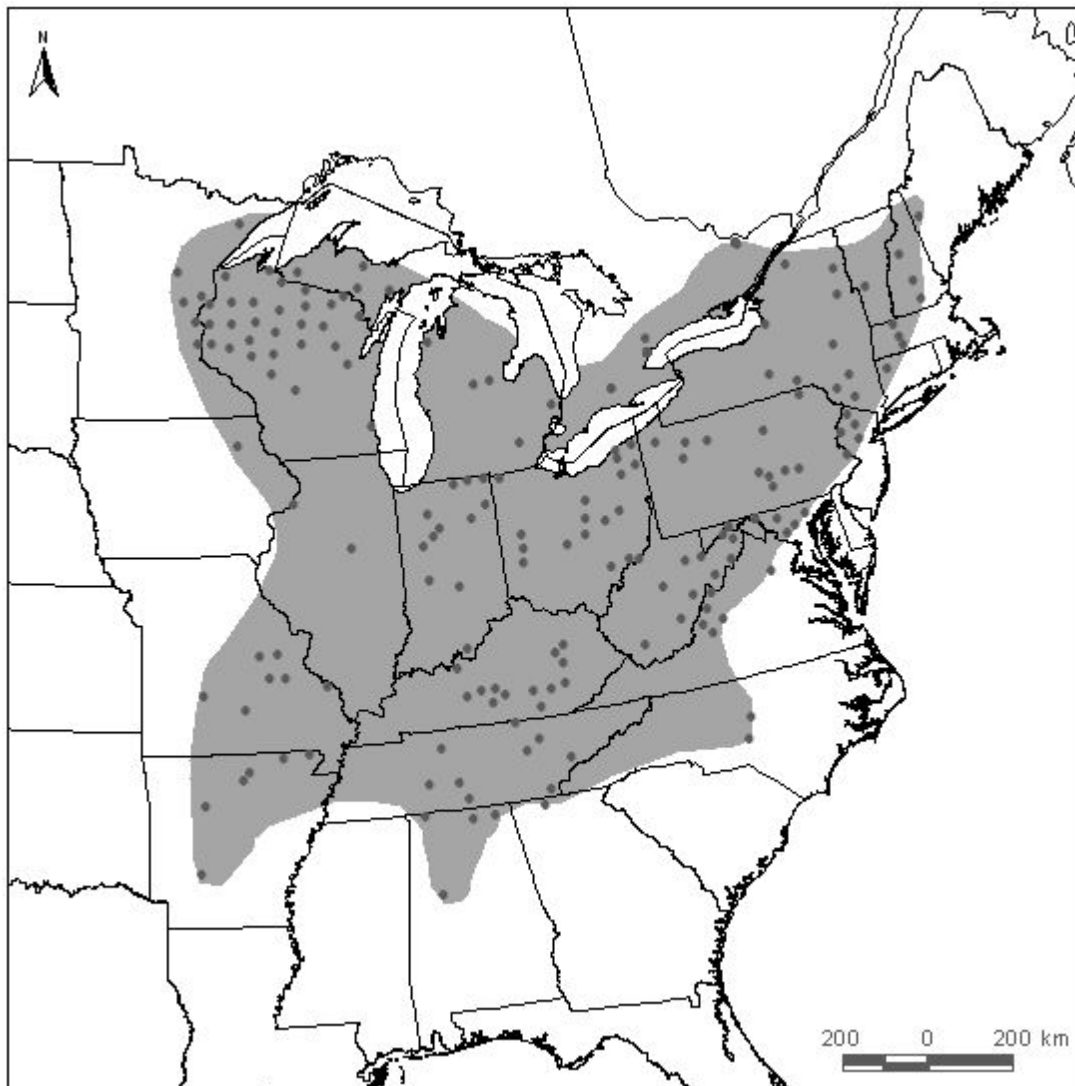


Figure 1. Distribution of Rapids Clubtail in North America (COSEWIC 2008, from Donnelly 2004)

Recovery strategy for the Rapids Clubtail in Ontario

In Ontario the species has been found in only four rivers:

- the Credit River near Erindale, not seen since 1939 (Walker 1958);
- the Thames River near Putnam, not seen since 1989 (P. Pratt pers. comm. 2009);
- the Humber River near Kleinburg, found in 1939 (Walker 1958) and again in 2005 (Harris and Foster 2006); and,
- the Mississippi River at Pakenham and at Blakeney, seen from 2001 to 2005 (P. Catling pers. comm. 2009, Catling and Brownell 2002) and at Almonte in 2010 (C. Lewis, pers. comm. 2010).

The population at the Credit River site may be extirpated (Harris and Foster 2006) due to shoreline alteration and water pollution (D. Sutherland pers. comm. 2009). The Thames River population may persist, undetected since 1989 (P. Pratt pers. comm. 2009).

No studies have been done to estimate population size or general abundance at the Ontario sites. Although work has been done to search for the species across a large part of Ontario by various experts (as listed in Harris and Foster 2006 and COSEWIC 2008), it is possible that the species exists in other rivers in Ontario where it has not yet been discovered.

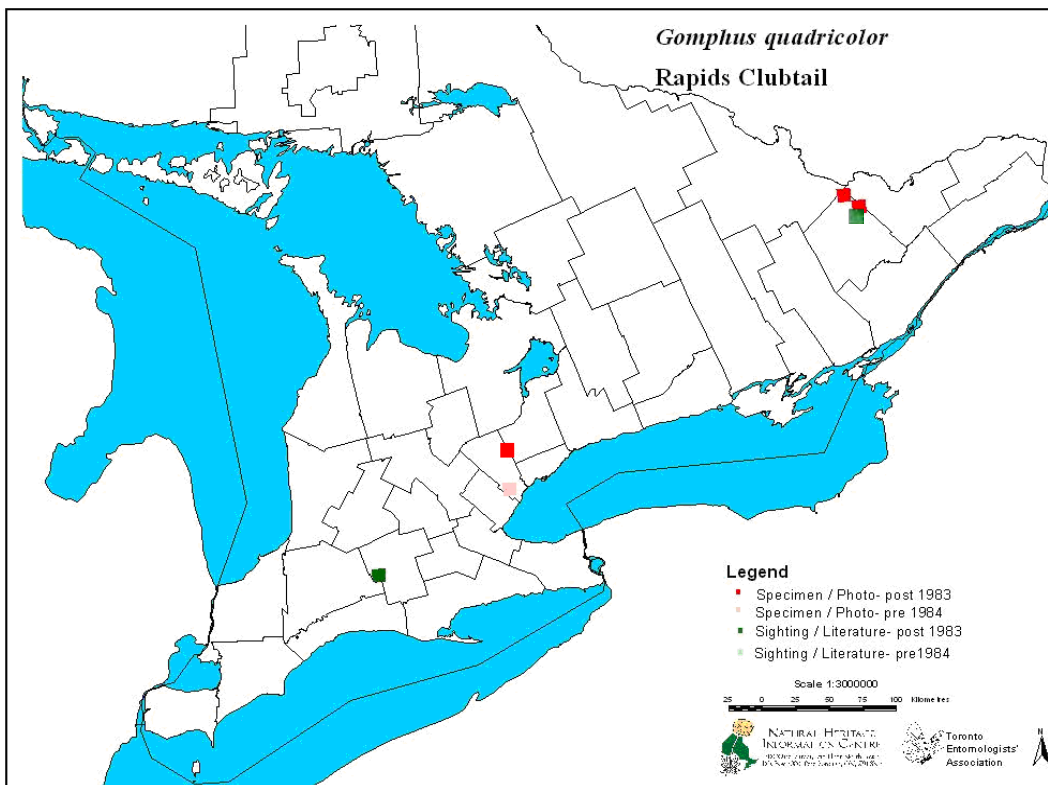


Figure 2. Historical and current distribution of Rapids Clubtail in Ontario (modified from OMNR, NHIC website)

1.4 Habitat Needs

The Rapids Clubtail requires the natural, unpolluted, unaltered habitat of a medium to large, swift-flowing river: clear cool water, wooded shorelines, gravel and cobble riffles and projecting boulders interspersed with muddy pools (Cuthrell 2000). Each of these components is critical to the survival of the species, as follows:

- Adult males use rocks and other projections in the rapids as perches from which they make short territorial, mating and foraging flights over the riffle.
- Adult females live in shoreline forests (deciduous or mixed mature stands; P. Catling pers. comm. 2010), sheltering among leaves and branches, up to 800 metres inland from the river (Walker 1958).
- Eggs are laid in the water over the rapids where they drift downstream to quiet pools.
- Nymphs spend most of their time buried in the muddy bottom.
- Newly-emerged adults disperse inland to the safety of the forest to avoid predation until the exoskeleton has hardened and they can fly strongly (Massachusetts Division of Fisheries and Wildlife 2008).

A suitable river with rapids and good water quality is not sufficient for the species if the shoreline forest is not protected. Evidence suggests that long-term assured shoreline protection is necessary to ensure the continued existence of the shoreline forest needed by the Rapids Clubtail.

1.5 Limiting Factors

Characteristics of the species make natural recovery by dispersal unlikely. Although capable of strong flight, the Rapids Clubtail lives in relatively stable habitats where the requirement for dispersal is low. Their flight behaviour of remaining close to the river surface or in forest cover makes them less capable of passive dispersal by wind compared to some other odonates which habitually swarm above the canopy (COSEWIC 2008).

The restricted distribution of the species in Ontario and its apparent small population sizes, mean that it is vulnerable to local extirpation due to the potential for one weather-related event or one human-caused incident to eliminate an entire population. These factors could also mean limited genetic variability in Ontario, leading to less resilient populations.

Although the riffle/rapid habitat preferred by the Rapids Clubtail may be locally distributed on river systems, odonate surveys indicate that a number of other rivers in southern Ontario appear to provide suitable habitat. Examples include the Ausable, Bayfield, Beaver, Bighead, Black, Boyne, Clyde, Crowe, Eramosa, Fall, Gananoque, Ganaraska, Grand, Indian, Mad, Madawaska, Maitland, Moira, Napanee, Nith, North Saugeen, Nottawasaga, Ottawa, Petawawa, Rideau, Rocky Saugeen, Salmon, Skootamatta, Speed, Sydenham, Tay, Trent and Indian Creek (as reported by Harris

Recovery strategy for the Rapids Clubtail in Ontario

and Foster in COSEWIC 2008, from various sources). However, as the species has so far not been found in these rivers, there is an apparent but unknown sensitivity to specific habitat features.

The lack of understanding of the reasons for the limited distribution, small populations and habitat sensitivity of the Rapids Clubtail is a serious limiting factor to protection and management.

1.6 Threats to Survival and Recovery

Human activities which are altering the natural river and forest habitat required by this species are a threat to its survival. Such activities include: dam construction, which eliminates rapids; shoreline alteration; pollution from industrial, residential, agricultural or road-salting activities; removal of shoreline forests for agriculture or urban development; introduction of exotic species such as predatory fish; road development or more and faster traffic, which increases roadkill; and climate change, which produces warmer or altered levels of river waters (Massachusetts Division of Fisheries and Wildlife 2008). All of these threats are imminent or ongoing in the species' southern Ontario range, where development is ubiquitous and where shoreline management is largely conducted by private landowners.

The promotion and development of hydro-electric projects which dam rivers could have major negative impacts on the habitat required by this species. Similarly, the loss of natural shoreline habitat across southern Ontario, and forests in general, is a serious impediment to the recovery of the species.

Current conditions at three of the four sites where the Rapids Clubtail was found will make survival or recovery there a challenge. Habitat degradation due to rapid urbanization including pollution, sedimentation, impoundment and loss of shoreline forest has been most serious in the Credit and Thames watersheds, where the species has not been seen recently (Harris and Foster 2006), but is also an issue in the Humber watershed (D. Sutherland pers. comm. 2009). The Credit River watershed is highly urbanized, with the majority of the forest cover removed and water quality impaired by surrounding development. The South Thames River watershed has only 11 percent forest cover remaining and the Humber River watershed has just 17 percent (COSEWIC 2008). The Mississippi River sites are surrounded by good forest cover. Lowered water quality is a probable factor in explaining the apparent disappearance of the species at the Credit River site (D. Sutherland pers. comm. 2009).

1.7 Knowledge Gaps

Over half of the rivers with potentially suitable habitat in southern Ontario have been visited at the appropriate time of year (June) by odonatists (COSEWIC, 2008). While other Gomphid dragonflies have been found, the Rapids Clubtail, which can be easily

Recovery strategy for the Rapids Clubtail in Ontario

detected by experienced surveyors, has not been observed. The complete distribution pattern of the species in Ontario, and the reasons for this pattern, are therefore obvious knowledge gaps. More inventory work might find more locations, but the species is obviously not widespread in Ontario, suggesting a habitat specialization which is not clearly understood (Cuthrell 2000).

Given the small and inconspicuous nature of the species, the knowledge required in finding and identifying it, and the relatively small (but growing) number of persons in Ontario who make a practice of recording odonates, there are major knowledge gaps in the distribution of the Rapids Clubtail in even the four rivers where it has been found.

Specific details about the biology of the species, such as main prey, length of time spent as adult and as nymph and post-emergence dispersal are lacking (Massachusetts Division of Fisheries and Wildlife 2008).

Surveying for the Rapids Clubtail by non-experts is hampered by the lack of an inventory protocol for the species.

1.8 Recovery Actions Completed or Underway

No specific recovery efforts for the Rapids Clubtail have been reported to date. However, ongoing work by conservation authorities and municipalities across the province to improve and maintain water quality/quantity will help to protect the habitat needed by this species and will be integral to any natural or assisted recovery. Such projects include water quality/quantity sampling and monitoring, shoreline protection and erosion prevention, benthos sampling and monitoring and landowner stewardship programs.

Similarly, the landscape analysis to identify areas for protection being done by municipalities and conservation groups, and the designation of significant wildlife habitat and significant woodlands under the Provincial Policy Statement by municipalities will help recovery of the Rapids Clubtail.

Legislation to restrict cosmetic pesticide use in Ontario may also improve the situation for the Rapids Clubtail and other insects.

Basic distribution patterns of the Rapids Clubtail in Ontario were deduced by various observers, including Paul Pratt on the Thames River, Paul Catling on the Mississippi River, and Allan Harris and Robert Foster in a 2005 inventory of various rivers done for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessment and status report. Other odonatists make regular outings and provide records to the Atlas of Ontario Odonata database maintained by the Natural Heritage Information Centre (NHIC), OMNR, Peterborough. Their work helps to determine the distribution of the species.

2.0 RECOVERY

2.1 Recovery Goal

The recovery goal is to ensure the long-term survival of Rapids Clubtail in the province by protecting existing populations and by restoring populations in appropriate habitat where feasible.

2.2 Protection and Recovery Objectives

Table 1. Protection and recovery objectives

No.	Protection or Recovery Objective
1	Protect, maintain and improve habitat in the four rivers in Ontario where Rapids Clubtail has been found.
2	Implement a monitoring program for the locations where Rapids Clubtail is known to exist.
3	Conduct additional inventory for Rapids Clubtail in suitable habitat.
4	Initiate research to address knowledge gaps for Rapids Clubtail.

Recovery strategy for the Rapids Clubtail in Ontario

2.3 Approaches to Recovery

Table 2. Approaches to recovery of the Rapids Clubtail in Ontario

Relative Priority	Relative Timeframe	Recovery Theme	Approach to Recovery	Threats or Knowledge Gaps Addressed
1. Protect, maintain and improve habitat in the four rivers in Ontario where Rapids Clubtail has been found.				
critical	short-term	Protection	1.1 Develop a habitat regulation to protect the habitat at the known locations of the species	<ul style="list-style-type: none"> • habitat loss and degradation at the identified locations
necessary	short-term	Assessment, Stewardship, Education and Outreach, Communications	1.2 For the lands surrounding the known sites: <ul style="list-style-type: none"> – determine land ownership and review current management plans and practices – review development proposals for adjacent and nearby lands – develop and implement supportive education, awareness and stewardship programs 	<ul style="list-style-type: none"> • habitat loss and degradation at the identified locations
necessary	ongoing	Protection	1.3 In order to mitigate negative impacts at the known locations: <ul style="list-style-type: none"> – work with municipalities to mitigate impacts from land use change – work with municipal road maintenance departments regarding salting, road construction, sedimentation mitigation, etc. 	<ul style="list-style-type: none"> • habitat loss and degradation at the identified locations
2. Implement a monitoring program for the locations where Rapids Clubtail is known to exist.				
critical	ongoing	Monitoring and Assessment	2.1 Develop and implement a Rapids Clubtail monitoring program to be conducted by qualified personnel at the known locations (see Appendix 1 for an outline of such a program)	<ul style="list-style-type: none"> • all threats

Recovery strategy for the Rapids Clubtail in Ontario

Relative Priority	Relative Timeframe	Recovery Theme	Approach to Recovery	Threats or Knowledge Gaps Addressed
3. Conduct additional inventory for Rapids Clubtail in suitable habitat.				
necessary	ongoing	Inventory	3.1 Conduct an inventory program for Rapids Clubtail prioritized by historic locations, other sites on the known rivers, and other suitable rivers	<ul style="list-style-type: none"> • Unknown current distribution
necessary	ongoing	Inventory	3.2 Include information on Rapids Clubtail in ongoing benthic inventory programs in rivers across the province	<ul style="list-style-type: none"> • Unknown current distribution
necessary	ongoing	Inventory	3.3 Engage dragonfly volunteers to undertake surveys (e.g., field naturalist clubs)	<ul style="list-style-type: none"> • Unknown current distribution
4. Initiate research to address knowledge gaps for Rapids Clubtail.				
necessary	long-term	Research	4.1 Determine why Rapids Clubtail appears to occur naturally in only a few of the many apparently suitable rivers in Ontario	<ul style="list-style-type: none"> • Lack of understanding of current distribution
critical	long-term	Research	4.2 Investigate the sensitivity of Rapids Clubtail to various habitat features to determine which are critical for survival and to prioritize threats	<ul style="list-style-type: none"> • Lack of understanding of habitat specialization and sensitivity
necessary	long-term	Research	4.3 Carry out research on basic biology, such as prey, duration of life stages and post-emergence dispersal	<ul style="list-style-type: none"> • Lack of information on basic biology
critical	short-term	Inventory, Monitoring and Assessment	4.4 Develop protocols for inventory and monitoring of Rapids Clubtail populations (see Appendix 1 for suggested protocol components)	<ul style="list-style-type: none"> • Lack of inventory and monitoring protocols

2.4 Area for Consideration in Developing a Habitat Regulation

Under the ESA 2007, 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 recovery strategy author will be one of many sources considered by the Minister when developing the habitat regulation for this species.

Due to the limited known distribution of the Rapids Clubtail in Ontario, and until such time as we can determine if, in fact, the species is restricted to just four rivers, it is recommended that the area prescribed as habitat in the habitat regulation include only the locations where the species has been found in the four rivers. Although there have been no sightings at two of these locations for several years, the Thames River population could persist undetected (P. Pratt pers. comm. 2009). The Credit River location should also be included for the future possibility that potential limiting factors such as water quality and quantity, exotic predators and riparian habitat changes in the river will improve. At such time the Rapids Clubtail population may re-establish itself or could be re-introduced to this location.

Each location is described below:

1. Credit River: Between Dundas Street West and Burnhamthorpe Road West in Mississauga;
2. Thames River: On the 17th Line north of Putnam, from the bridge 800 metres in either direction;
3. Humber River: Between Nashville Road at Kleinburg and King Road West at Bolton;
- 4a. Mississippi River at Pakenham: From the ball diamond at the south end of town north to include two sets of rapids and quiet water north of the Pakenham Bridge on Kinburn Sideroad;
- 4b. Mississippi River at Blakeney: From Blakeney Road at the bridge, north to include the rapids plus quiet water below the rapids.
- 4c. Mississippi River at Almonte: From Main Street West at the bridge, downstream including the rapids and the quiet waters below the rapids.

At each location, the area prescribed as habitat should include the section of the river containing the rapids, the pools below the rapids, plus the wooded shores on either side, extending inland to include any forest which is within 800 metres of the shoreline. It has been observed that Rapids Clubtail females' range extends up to 800 metres into the forest adjoining the river (Walker 1958). For the purposes of this recommendation, a forest is a deciduous or mixed, mature forest stand (P. Catling pers. comm. 2010, see Glossary for definition).

In addition, if the Rapids Clubtail is discovered at any new locations, the habitat regulation should be revised to extend protection to these sites.

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 2007): The provincial legislation that provides protection to species at risk in Ontario.

Extirpated: Eliminated from a portion of its range.

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

Gomphid: Belonging to the dragonfly Family Gomphidae.

Mature forest: A forest dominated by species which are replacing themselves and which are likely to remain an important component of the community if it remains undisturbed.

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

Odonatist: An expert or enthusiast of odonates.

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.

Recovery strategy for the Rapids Clubtail in Ontario

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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Authorities consulted:

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APPENDIX 1. COMPONENTS OF AN INVENTORY PROTOCOL FOR RAPIDS CLUBTAIL

Scope

In southern Ontario, inventories should target clear, cool, medium to large rivers with wooded shorelines, gravel shallows and muddy pools, particularly rivers where Rapids Clubtail has previously been recorded. A list of rivers and specific locations where the species might occur should be developed.

Timing

Searches should occur on warm, sunny, low-wind days between mid-May and mid-July.

Location and Method

It is recommended to search with binoculars for adults perched on rocks in the rapids. Shoreline rocks and vegetation should be searched for exuviae of nymphs (P. Catling pers. comm. 2009). Searches for Rapids Clubtail nymphs in benthic sampling programs should be included.

Protection

At sites where Rapids Clubtail is known or suspected, nymphs which are buried in the bottom of muddy pools should not be disturbed. Benthic sampling in muddy pools at these locations should not be undertaken (P. Catling pers. comm. 2009).

Identification

Clubtails are unique among the dragonflies in having eyes that are separated from each other. As the name suggests, Clubtails have an enlarged tip on the end of the abdomen, giving it a club-like appearance. Adult Rapids Clubtails may be distinguished from other similar species by the following characteristics: More prominent club, less yellow on the abdomen and completely black legs. Females have more yellow spotting on the abdomen (Massachusetts Division of Fisheries and Wildlife 2008, New York Natural Heritage Program 2009).

Confirmation of identification requires capture and in-hand examination. Adults can be identified using the keys in Walker (1958) and by the illustrations in Jones et al. (2008). Nymphs can be identified by using characteristics of the labium as per the keys in Walker (1958) and Soltesz (1996).

Contact the MNR to determine if a permit is required under the *Endangered Species Act, 2007* to conduct sampling and identification protocols.



Figure 3. Rapids Clubtail male larva (COSEWIC 2008, from Walker 1932)

**Part 3 – *Rapids Clubtail* – Ontario Government Response
Statement, prepared by the Ontario Ministry of
Natural Resources**

Rapids Clubtail

Ontario Government Response Statement



Photo: Lois Stacey

PROTECTING AND RECOVERING SPECIES AT RISK IN ONTARIO

Species at risk recovery is a key part of protecting Ontario's biodiversity. Biodiversity – the variety of life on Earth – provides us with clean air and water, food, fibre, medicine and other resources that we need to survive.

The Endangered Species Act, 2007 (ESA) is the Government of Ontario's legislative commitment to protecting and recovering species at risk and their habitats. As soon as a species is listed as extirpated, endangered or threatened under the ESA, it is automatically protected from harm or harassment. Also, immediately upon listing, the habitats of endangered and threatened species are protected from damage or destruction.

Under the ESA, the Ministry of Natural Resources (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 the government on what is required to achieve recovery of a species.

GOVERNMENT RESPONSE STATEMENTS

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 recovery strategy for Rapids Clubtail was completed on September 10, 2010 (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/STDPROD_066841.html).

The response statement is the government's policy response to the scientific advice provided in the recovery strategy. In addition to the strategy, the response statement is based on input from stakeholders, other jurisdictions, Aboriginal communities and members of the public. It reflects the best available traditional, local and scientific knowledge at this time and may be modified 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.

Rapids Clubtail is a small, brightly coloured dragonfly that lives in clear, cool, medium-sized to large rivers with gravel shallows and muddy pools. Like all dragonflies, the Rapids Clubtail begins its life as an aquatic larva and is transformed into a winged adult during the summer.

MOVING FORWARD TO PROTECT AND RECOVER RAPIDS CLUBTAIL

Rapids Clubtail is listed as an endangered species under the ESA, which protects both the animal and its habitat. The ESA prohibits harm to or harassment of the species and damage to or destruction of its habitat without authorization. Such authorization would require that conditions established by the Ministry be met.

In Ontario, Rapids Clubtail has been found in only three rivers in the past 25 years: the Thames, the Humber and the Mississippi. Historically, the species was also found in the Credit River, where it has not been observed since 1939. The primary threat to the species is the degradation of river habitats. Activities or conditions that impede or alter the quantity and quality of water in the rivers, such as dams and pollution, pose threats to Rapids Clubtail.

The government's goal for the recovery of Rapids Clubtail is to ensure its long-term survival by protecting existing populations and, where feasible, by rehabilitating degraded habitat at known sites.

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 intergovernmental 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's conservation partners to undertake with government support.

GOVERNMENT-LED ACTIONS

To help protect and recover Rapids Clubtail, the government will directly undertake the following actions:

- Develop a survey protocol to be used by proponents and partners to detect the presence or absence of Rapids Clubtail.
- Educate other agencies and authorities involved in planning and environmental assessment processes on the protection requirements under the ESA.
- Encourage the submission of Rapids Clubtail 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.
- Protect the Rapids Clubtail and its habitat through the ESA. Develop and enforce a regulation prescribing the habitat of the species.

- Support conservation, agency, municipal and industry partners in undertaking activities to protect and recover Rapids Clubtail. Support will be provided through funding, agreements, permits (including conditions) and advisory services.
- Establish and communicate annual priority actions for government support in order to encourage collaboration and reduce duplication of efforts.

GOVERNMENT-SUPPORTED ACTIONS

The government endorses the following actions for the protection and recovery of Rapids Clubtail. Actions identified as “high” will be given priority consideration for funding or for authorizations under the ESA. The government will focus its support on these high-priority actions over the next five years.

Focus Area: Protection and Management
Objective: Protect, maintain and rehabilitate habitat in the three rivers in Ontario where Rapids Clubtail has been found within the past 25 years.

Actions:

1. **(HIGH)** Develop best management practices for protecting Rapids Clubtail and its habitat and promote these practices to landowners and land managers whose land surrounds occupied locations.
2. Rehabilitate degraded habitat at occupied locations where feasible.

Focus Area: Inventory
Objective: Conduct an inventory of Rapids Clubtail in suitable habitat.

Actions:

3. **(HIGH)** Develop and conduct an inventory program for Rapids Clubtail prioritized by historic locations, other sites on the currently occupied rivers and other suitable rivers.
4. Integrate searches for Rapids Clubtail into ongoing benthic inventory programs* in rivers across the province.
5. Train volunteers, such as field naturalist clubs, on undertaking surveys to increase knowledge of the species distribution.

Focus Area: Monitoring
Objective: Implement a monitoring program for the locations where Rapids Clubtail is known to exist.

Actions:

6. Develop and implement a monitoring program to be conducted by qualified personnel at known locations.

◆ These programs involve collecting benthic macro-invertebrates, which are mostly aquatic insects or the aquatic stage of an insect, that live at the bottom of a water body. As these types of species are sensitive to changes in environmental conditions, they provide valuable information on water and habitat quality.

Focus Area: Research
Objective: Implement a monitoring program for the locations where Rapids Clubtail is known to exist.

Actions:

7. Investigate the sensitivity of Rapids Clubtail to various habitat features to determine why the species occurs in so few rivers and to prioritize threats.
8. Carry out research on basic biology, such as prey, duration of life stages and dispersal after Rapids Clubtail emerges from the water.

IMPLEMENTING ACTIONS

Financial support for the implementation of actions may be available through the Species at Risk Stewardship Fund, Species at Risk Farm Incentive Program or Community Fisheries and Wildlife Involvement 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 may be required to undertake the project.

Implementation of the actions may be subject to changes in priorities across the multitude of species at risk, availability of 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 toward protecting and recovering a species not later than five years from the publication of this response statement. The review will help determine whether adjustments are needed to achieve the protection and recovery of Rapids Clubtail.

ACKNOWLEDGEMENT

We would like to thank all those who participated in the development of the "Recovery Strategy for Rapids Clubtail in Ontario" for their dedication to protecting and recovering species at risk.

For additional information:

Visit the species at risk website at
ontario.ca/speciesatrisk
Contact your MNR district office
Contact the Natural Resources Information Centre
1-800-667-1940
TTY 1-866-686-6072
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