



## Natural Heritage & Endangered Species Program

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Massachusetts Division of Fisheries & Wildlife

## Rapids Clubtail *Phanogomphus quadricolor*

State Status: **Endangered**

Federal Status: **None**

**DESCRIPTION:** The Rapids Clubtail (*Phanogomphus quadricolor*) is a large, slender insect belonging to the order Odonata, suborder Anisoptera (the dragonflies). The Rapids Clubtail is a member of the Gomphidae family (the clubtails), one of the most diverse families of dragonflies in North America with nearly 100 species. Clubtails are unique among the dragonflies in having eyes that are separated from each other. These insects, as their name implies, have a lateral swelling near the end of the abdomen, giving the abdomen a “club-like” appearance. The Rapids Clubtail belongs to the genus *Phanogomphus*. These clubtails are characterized by their dull coloring of grays, greens, browns and blacks, and by their small “club.” Rapids Clubtails have blue-green eyes. The legs are black. The sides of the thorax (section behind the head) are marked with yellow to gray-green dorsal and lateral stripes. The abdomen (section behind the thorax) is black. Segments 1 through 7 (dragonflies and damselflies have 10 abdominal segments) have thin yellowish dorsal stripes that grow shorter towards the tip of the abdomen. Recently emerged individuals are more brightly colored than mature individuals and can initially cause identification

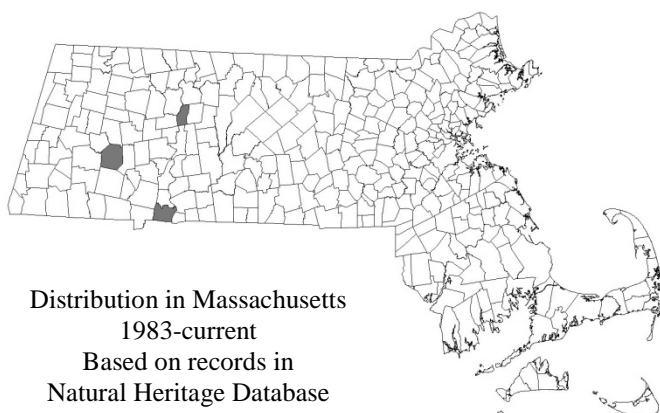


Photo © Blair Nikula

problems. Although the pattern is the same, the pale coloration, instead of the dull gray-green, can be bright yellow. Examination of the terminal abdominal appendages of the male and the vulvar lamina of the female (as shown in Needham et al. (2000) and Walker (1958)) under a microscope or magnifying lens is the most reliable method for identifying this species.

Adult Rapids Clubtails range from about 1.6 to 1.8 inches (42 to 45 mm) in length. Although the female is similar in coloration, she has more yellow on the abdomen. She is stouter overall with the exception of the club, which is smaller than that of the male.

**SIMILAR SPECIES:** Although one can fairly quickly recognize a clubtail as belonging to the genus *Phanogomphus* by a combination of factors, including its coloration and small club, members of this genus can be very difficult to identify to the species level. Examination of certain anatomical features under a microscope is the most reliable way to identify the Rapids Clubtail. Male Rapids Clubtails are best identified by examination of the terminal abdominal



Distribution in Massachusetts  
1983-current  
Based on records in  
Natural Heritage Database

**A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan**

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appendages and hamules (organs located on the underside of segment two) (as shown in Walker (1958)). Females may be identified to species by the shape of their vulvar laminae (located underneath segments eight and nine) (as shown in Walker (1958)).

The nymphs can be distinguished by characteristics of the labium as per the keys by Walker (1958) and Soltész (1996).

**HABITAT:** The Rapids Clubtail inhabits clear, cold streams and rivers with intermittent sections of rocks and rapids.

**LIFE-HISTORY/BEHAVIOR:** Rapids Clubtails fly from late spring through early summer. Adults have been observed in Massachusetts during the months of June and early July.

There has been very little published on the life cycle and behavior of the Rapids Clubtail. Information published on similar species can be used to supplement our knowledge of the Rapids Clubtail. The nymph or larvae is the first major life stage of the dragonfly following hatching from the egg. This stage of the life cycle is entirely aquatic. When the nymph is fully developed, the adult emerges from this form. The adult dragonfly is a free-flying insect that often wanders far from the water, but must return in order to breed.

Rapids Clubtail nymphs spend much of their time burrowing in the bottom sediment. The habit of burrowing not only provides them with protection from predators, but may also provide them with camouflage or a hiding spot from which they can capture prey. Dragonfly nymphs are voracious predators and feed on a variety of aquatic life from insects to small fish and tadpoles.

It is not known how long it takes for the nymph of the Rapids Clubtail to fully develop. However, it takes about one year in similarly sized dragonflies. The final step before becoming a flying adult is eclosion (or emergence). This is the process by which the adults emerge from the nymphal skin (exuviae). The nymph of the Rapids Clubtail crawls up directly onto the bank or onto exposed rocks or logs to emerge. Upon finding a secure perch, usually less than a few feet above the water's surface, the adult pushes out of the exoskeleton and stretches its wings. The new adult is very soft and

vulnerable at this time (called "teneral"). In the first few hours following emergence, adults can be damaged by rain showers, falling debris, and predators. As a result, the adult makes its maiden flight into the woods that surround the breeding habitat as soon as possible. Away from the water, the dragonfly can find relatively safe shelter among the leaves and branches of trees. During this time of wandering and maturation, Rapids Clubtails can be found in fields and forest clearings, sometimes far away from the breeding site, perched horizontally on sunlit vegetation or the ground. From such perches, Rapids Clubtails make periodic feeding forays during which they consume small aerial insects such as flies and mosquitoes. Spines on the legs of adult dragonflies aid in the capture of aerial prey. When the maturation process is complete, the adults return to the stream to breed.

In Massachusetts, the Rapids Clubtail breeds through the month of June. Although the nymphs are found in the quiet pools below areas of rapids, the adults prefer the swifter sections of the rivers. Upon returning to the stream, male Rapids Clubtails can be found perching on rocks in these areas or on shoreline vegetation. From exposed perches they make patrols out over the water, often returning to the same or a nearby perch. During these patrols, the males are primarily searching for mates and driving off any potential competitors. Females spend little time around the breeding habitat, except during the brief time when they are ready to mate and lay eggs.

When mating is completed, the female returns to the water in order to deposit her eggs. Female Rapids Clubtails oviposit alone by tapping the tip of their abdomen to the surface of the water. This is usually done in the faster sections of the stream where there are rapids. The female flies rapidly back and forth over the water touching the surface of the water with the tip of her abdomen every few feet to release eggs. Upon being laid, it is likely that the eggs are carried downstream from the rapids and deposited in the pools where they hatch and the nymphs develop.

**RANGE:** The Rapids Clubtail is found from southern Ontario south to Alabama and Georgia, west to Illinois and Wisconsin and north to Maine. The Rapids Clubtail has been recorded in each New England state.

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**POPULATION STATUS IN MASSACHUSETTS:**

The Rapids Clubtail is listed as an Endangered species in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc...) and sale under the Massachusetts Endangered Species Act. As with many species of clubtails, population densities appear to be fairly low. However, this may be due to the elusiveness of the adults. Surveys focusing on the nymphs of the Rapids Clubtail, which are easier to find than the adults, should give a more accurate representation of the species status in Massachusetts.

**MANAGEMENT RECOMMENDATIONS:** As for many rare species, the exact management needs of the Rapids Clubtail are not known. Alteration of water quality is certainly a threat to the maintenance of their populations in Massachusetts. Threats to water quality include industrial and agricultural pollution, sewage overflow, and salts and other run-offs from roadways. Also, as an inhabitant of lotic habitats, this species may also be particularly vulnerable to alterations in water flow by damming or water diversion projects. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged and preservation of the remaining undeveloped upland bordering the river should be a top priority.

**RAPIDS CLUBTAIL FLIGHT PERIOD**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

**REFERENCES:**

Dunkle, S.W. 2000. *Dragonflies through Binoculars*. Oxford University Press.

Needham, J.G., M.J. Westfall, Jr., and M.L. May. 2000. *Dragonflies of North America*. Scientific Publishers.

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Walker, E.M. 1958. *The Odonata of Canada and Alaska, Vol. II*. University of Toronto Press.

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