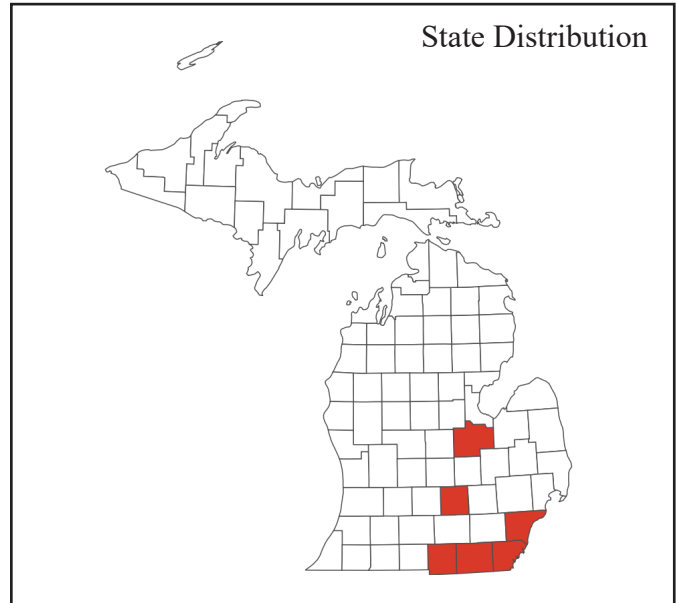
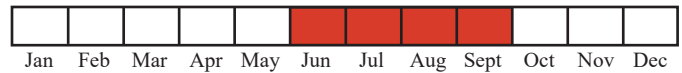




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Best Survey Period



State Status: Endangered

Global and State Rank: G5 (globally secure) / S1 (critically imperiled in Michigan)

Family: Gomphidae (clubtail dragonflies)

Synonyms: *Gomphus plagiatus* (Selys, 1854)

Total Range: The russet-tipped clubtail is a North American dragonfly with a wide range centered on Nebraska and Kansas (Corser 2010). The species ranges north to Minnesota and Wisconsin and as far south as Florida, Texas, and northern Mexico in Chihuahua (iNaturalist 2025, NatureServe 2025). The easternmost known populations occur along the Hudson River in New York and populations have been observed as far west as California (Corser 2010, iNaturalist 2025, NatureServe 2025). The status of many of these populations is unknown, in 15 of the 34 US states where this species occurs no population status assessments have been completed (NatureServe 2025). This species was also known to historically occur in southern Ontario, though it is now thought to be extirpated from Canada (CESCC 2020).

State Distribution: The russet-tipped clubtail is currently only known from a small number of populations in Michigan. The most recent documented occurrences are in the southeastern portion of the state in Monroe, Lenawee, Hillsdale, and Wayne Counties, though there have been observations further north in Ingham and Saginaw Counties (MNFI 2025). It may be present in other parts of the state, but dedicated survey effort is needed to determine its full distribution.

Recognition: Adult russet-tipped clubtail are a medium sized dragonfly roughly **5.6-6.6 cm (2.2-2.6 in) in length** (Lam 2024, NYNHP 2025). This dragonfly has a **slender abdomen, with enlarged segments near the terminal end (sections 7-10) forming the distinct clubtail appearance**, though this effect is **reduced in female** adult russet-tipped clubtails which may appear nearly clubless (Lam 2004). Other structures that can be used to distinguish this species from other dragonfly genera include **widely separated eyes, a relatively flat face, and short legs** (Dunkle 2000, Lam 2024). If observed under a microscope the small appendages at the end of the abdomen on males and the sub-genital plates on females may also be used to



separate this species from other members of its genus (NYNHP 2025).



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Adult russet-tipped clubtails have three color variants depending on where they are found in their range. The eastern form occurs in Michigan and can be identified by the **red-orange rusty coloration on the club and nearby segments** at the end of the abdomen. Both sexes of this form also have green eyes, pale brownish-black legs, and a pale gray-green thorax with dark stripes; from a side view these dark stripes are complete (**connected to the dark pattern on back**) and separated by **light-colored bands** (Lam 2024, NYNHP 2025). Other characters that are common in the eastern form, though not indicative, include **pale streaks on the side of the abdomen in no distinct pattern** and **pale frontal strips with a thin dark band separating** the color from other pale markings if viewed dorsally (Lam 2024).

The western form is not known to occur in Michigan but is a yellow-green color with blue eyes. Further, it has yellow spots on the side of the club at the end of the abdomen, a reduced rusty appearance on the terminal abdominal segments, and distinct pale markings on the abdomen (Lam 2024). The intermediate form is also not known to occur in Michigan. It has blue eyes and is closer in overall color to the western form yet has a more pronounced rusty color on the club and nearby abdominal segments similar to the eastern form (Lam 2024).

Larvae of the russet-tipped clubtail are similar to other dragonfly larvae of the family Gomphidae in

that they have **stocky, developed legs** for burrowing into substrate, **four antennal segments**, and a **flat or nearly flat mouthpart** (labium) against the bottom of their head (Schoodic Institute 2014, Tennesen 2020). Larvae can further be identified as *Stylurus* largely based on body shape and color. Generally, *Stylurus* are **more elongate and more slender** than other Gomphid larvae. They are **slightly flattened** (but not as flat as larvae of dragonhunter [*Hagenius brevistylus*]), **are typically light brown or tan in color**, have **dark markings on the top side of the abdomen**, and have **wing cases that are parallel along the back** (Bright 2020, Tennesen 2020). To identify a russet-tipped clubtail larva to species is often difficult and requires magnification of small structures; diagnostic structures vary across the species range and they may easily be confused with larval Laura's clubtail and elusive clubtail (*S. laurae* and *S. notatus* respectively) (Tennesen 2020).

Biology: Upon hatching from eggs, larval russet-tipped clubtail almost immediately move to the bottom of the water and bury into sandy or gravel substrates (Corser 2010). Like other Gomphid larvae, the russet-tipped clubtail spends most of this life stage buried in these substrates (Tennesen 2020). Based on the biology of other *Stylurus* species, russet-tipped clubtail are thought to spend roughly two years as larvae (Cannings 2003, Corser 2010). During this period, they act as voracious generalist predators on smaller invertebrates. The larvae develop through several instars and upon reaching a sufficient size emerge into an adult. In the northern portion of their range, this generally occurs in late June to early July but varies based on climate conditions (Corser 2010, NYNHP 2025). After emergence adults will quickly move to suitable habitats to perch, gather energy, and begin hunting other invertebrate species (Dunkle 2000, Corbet 2006). When not in flight adult russet-tipped clubtails prefer to be perched high up on leaves or branches near the water's edge. They will most often land horizontally but may appear to be perched vertically from their weight dragging down leaves. Adults are active at any time during the day



when the sun is out (Dunkle 2000, Paulson 2011, NYNHP 2025). Males tend to be more active than females and are more frequently observed; during the active season they may be making foraging flights or patrolling flights over the water to attempt to locate mates (White 2024). The active flight season in New York runs from emergence through September with the highest abundance of dragonflies in August (Paulson 2011, White 2024). Adults mate throughout the active season. Once a female produces eggs, she lays them in flight at the surface of the water (NYNHP 2025).

Habitat: Across its range, russet-tipped clubtails are found in a wide range of aquatic habitats including rivers, lakes, and streams, appearing to favor riverine habitats with slower moving water and sandy bottoms (Dunkle 2000, Nikula et al. 2003). In the northern part of its range in New York, russet-tipped clubtail shows a large degree of habitat selection and is almost exclusively found in tidal mudflats along the Hudson River (Corser 2010, White 2024). As a perching dragonfly, russet-tipped clubtail also require tall trees or shrubs near their aquatic foraging habitat where they can perch and thermoregulate to obtain the energy to forage (Dunkle 2000, Corbet 2006). Larval russet-tipped clubtail require substrates that they can burrow into and select for areas with sandy or gravel substrates (Corbet 1999, Corser 2010). Dragonfly larvae generally require relatively good water quality to successfully develop but the range of conditions that russet-tipped clubtail larvae can tolerate have not been fully studied.

Survey Methodology: As adult russet-tipped clubtail are cryptic, spending most of a day perched high up in branches of trees or shrubs, visual observations even with binoculars can be difficult. Aerial net surveys may be used during the active flight season to capture adults. However, when in flight russet-tipped clubtails often take long flights over the water's surface and then quickly return to trees to eat any captured prey making them difficult to capture in flight (Lam 2024, NYNHP 2025). During the active flight season the leftover exoskeleton

from the molting process (exuvia) may be searched for. Many key identifiers of larval russet-tipped clubtail should be present on exuviae (O'Brien 1999). Exuviae for russet-tipped clubtail can be found on emergent vegetation, tree roots, rocks, and embankments near the edge of the water (Corser 2010). Finally, dipnet surveys using D-frame nets may be used to detect larval russet-tipped clubtail at any time of year in suitable habitat, but as this species burrows into sediment, it may be harder to detect than other larval dragonflies (Tennessee 2020). Any collected exuviae or larval dragonflies should be preserved in at least 80% ethanol as soon as possible to ensure they remain intact for identification (Cezário et al. 2021).

Conservation/Management: As little is known about the status of russet-tipped clubtail populations in Michigan, conservation strategies for the species may be inferred from other similar dragonfly species. Anything that alters natural hydrology may make habitats unsuitable for larval and adult russet-tipped clubtail (NYNHP 2025). Dragonfly larvae are known to be vulnerable to a wide range of contaminants that may wash into a site from across the watershed (Dixon et al. 2022). These may cause direct mortality to larval dragonflies or sub-lethal effects that reduce overall survivability of individuals in a population. Increasing turbidity of waters where this species occurs may also cause a loss of larval dragonflies. As larval *Stylurus* burrow into substrates they are also particularly at risk if the habitat they occur in is dredged or channelized. Because adult russet-tipped clubtails require perching locations such as trees or tall shrubs, any such native plants on the shorelines of habitats where they occur should be maintained in a natural state (Cannings 2003). This also makes any action that would cause bank destabilization a significant threat to this species as this would alter what plant species are able to persist on the riverbanks. Use of insecticides, such as mosquito treatments, would reduce the amount of prey available to adult dragonflies, cause direct mortality to adult and larval dragonflies if improperly applied, or accumulate in adults and reduce overall fitness.



Known sites for russet-tipped clubtail in Michigan should have populations of the dragonfly monitored at regular intervals to document any possible declines early. Currently in Michigan there are only eight known occurrences of russet-tipped clubtail; and of these four are based on few (less than five) individuals observed in a single site visit (MNFI 2025). Thus, population sizes, population viability, and habitat status of these sites are largely unknown. Only one of these occurrences is wholly on private property, with the other known occurrences on land owned by local governments, US Fish and Wildlife Service, and The Nature Conservancy. These sites should incorporate the conservation of this dragonfly into their management plans if any exist to ensure that any actions taken do not cause harm to these sensitive populations.

Research Needs: Systematic surveys for this species and other riverine dragonflies are warranted in Michigan to document new populations and evaluate the status of populations at known sites. Furthermore, as Michigan is near the northern and eastern edges of this species' range, research into habitat needs of larval and adult russet-tipped clubtail is warranted to determine which areas in the state may be suitable to target for future surveys. As this species is difficult to detect as both a larva and an adult, multiple surveys in a potential site may be required to successfully detect this species or confirm absence. Research on the life history of russet-tipped clubtail in Michigan should be conducted, including factors that influence the timing of larval dragonfly emergence and development into adults. This research should also include work into the behavior of adults such as mating phenology and preferred perching habitat. Studying the life history of russet-tipped clubtail may help in making future surveys for the species more successful and increase the probability of documenting new populations.

Related Abstracts: *Stylurus amnicola* (Riverine clubtail)

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