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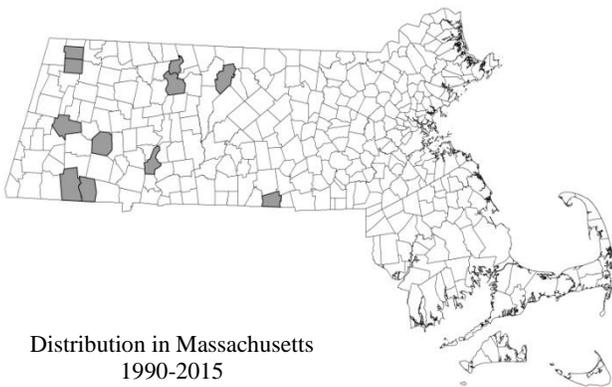
Massachusetts Division of Fisheries & Wildlife

Tule Bluet *Enallagma carunculatum*

State Status: **Special Concern**
Federal Status: **None**

DESCRIPTION OF ADULT: The Tule Bluet is a small, semiaquatic insect of the order Odonata, suborder Zygoptera (the damselflies) and family Coenagrionidae (pond damselflies). Like most adult damselflies, the Tule Bluet has a very long, slender abdomen, large eyes on the sides of the head, short antennae, and four heavily veined wings that are held folded together over the back. On males, the thorax (winged and legged section behind the head) is blue with black stripes on the “shoulders” and top. The abdomen, which is composed of ten segments, is blue with varying black markings on each segment, the black most extensive on the 5th through 8th segments. Females have thicker abdomens than the males, and are generally brown where the males are blue, though older females may become quite blueish. The black abdominal markings are more extensive on females than males.

Adult Tule Bluets range from 1 to 1.4 inches (26 mm to 37 mm) in length. Fully developed nymphs are about 0.75 to 0.9 inch (19 mm to 23 mm) in length.



Distribution in Massachusetts
1990-2015
Based on records in
Natural Heritage Database



Photo © Blair Nikula

SIMILAR SPECIES: The bluets (genus *Enallagma*) comprise a large group of damselflies, with no fewer than 20 species in Massachusetts. Identification of the various species can be very difficult and often requires close examination of the terminal appendages on the males (Nikula *et al.* 2007) or the mesostigmal plates (located behind the head) on the females (Westfall & May 1996). The Tule Bluet is most similar in appearance to the common, widespread Familiar Bluet (*E. civile*). The two species are most safely distinguished by the shape of the terminal appendages on the male and the mesostigmal plates of the females. The black abdominal markings on Tule Bluets are generally more extensive, particularly on the 4th through 6th segments, giving them a darker overall appearance than Familiar Bluets. However, there is some variation in this feature and it is not entirely reliable for identification.

HABITAT: Tule Bluets inhabit a variety of wetlands, but seem to be most numerous on large lakes. In addition to lentic, freshwater habitats, they have also been found on sluggish rivers and apparently are fairly tolerant of brackish and saline conditions. They occur in well-

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Massachusetts Division of Fisheries & Wildlife

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vegetated wetlands as well as at sites where emergent vegetation is sparse.

The nymphs are aquatic and live among aquatic vegetation and debris. The adults inhabit emergent vegetation along the shore and nearby uplands.

LIFE HISTORY/BEHAVIOR: Although little has been published specifically on the life history of the Tule Bluet, it is likely similar to other, better-studied species in the genus. All odonates have three life stages: egg, aquatic nymph, and flying adult. The nymphs are slender with three leaf-like appendages extending from the end of the body which serve as breathing gills. They have a large, hinged lower jaw which they are able to extend forward with lightning speed. This feature is used to catch prey, the nymph typically lying in wait until potential prey passes within striking range. They feed on a wide variety of aquatic life, including insects and worms. They spend most of their time clinging to submerged vegetation or other objects, moving infrequently. They transport themselves primarily by walking, but are also capable of swimming with a sinuous, snake-like motion.

Tule Bluets have a one-year life cycle. The eggs are laid in late summer and probably hatch in the fall. The nymphs develop over the winter and spring, undergoing several molts. In early to mid-summer the nymphs crawl up on emergent vegetation and begin their transformation into adults. This process, known as emergence, typically takes a couple of hours or less, after which the newly developed adults (teneral) fly weakly off to upland areas where they spend several days or more feeding and maturing. The young adults are very susceptible to predators, particularly birds, ants, and spiders; mortality is high during this stage of the life cycle. The adults feed on a wide variety of smaller insects which they typically catch in flight.

When mature, the males return to the wetlands where they spend most of their time searching for females. When a male locates a female, the male attempts to grasp her behind the head with the terminal appendages at the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the end of her abdomen up to the base of the male's abdomen where his secondary sexual organs ("hamules") are located. This coupling results in the heart-shaped tandem formation characteristic of all odonates. This coupling

lasts for a few minutes to an hour or more. The pair generally remains stationary during this mating but, amazingly, can fly, albeit weakly, while coupled.

Once mating is complete, the female begins laying eggs (ovipositing) in emergent grasses and rushes, using the ovipositor located on the underside of her abdomen to slice into the vegetation and deposit eggs. Although the female occasionally lays eggs alone, in most cases the male remains attached to the back of the females head. This form of mate-guarding is thought to prevent other males from mating with the female before she completes egg-laying. The adult's activities are almost exclusively limited to feeding and reproduction, and their life is short, probably averaging only three to four weeks for small damselflies like the Tule Bluet.

RANGE: The Tule Bluet has a wide distribution across Canada and northern and western United States, with records from Nova Scotia and New Brunswick west to British Columbia and south to Maryland, Kansas, and California. It is most common in the western portions of its range.

POPULATION STATUS IN MASSACHUSETTS: The Tule Bluet is listed as a Species of Special Concern in Massachusetts. Most Massachusetts sites are sparsely vegetated lakes or reservoirs, though the species also occurs on the Connecticut River. At some sites, particularly in Berkshire County, large populations have been found. There is only one historical record for Tule Bluet in the Massachusetts, with all other occurrences post-1970; whether this indicates a population increase and range expansion in the state or simply reflects increased observer effort is unclear.

MANAGEMENT RECOMMENDATIONS: Threats to Tule Bluet populations in Massachusetts are similar to those facing other odonates and, indeed, most wetland fauna. These threats include disturbance from human recreational activities, destruction of habitat for residential and other uses, contamination from herbicides, insecticides, and highway run-off, and alteration of water levels through water pumping or other activities. Management should focus on maintaining water quality, protecting wetlands and adjoining upland buffers (crucial to maturing adults), controlling road run-off, limiting the application of herbicides and insecticides, and maintaining sufficient water levels. Fortunately, Tule Bluets appear to be

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habitat generalists and their populations locally seem to be at least stable, if not increasing.

TULE BLUET FLIGHT PERIOD

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

REFERENCES:

Nikula, B., J.L. Ryan, and M.R. Burne. 2007. *A Field Guide to the Dragonflies and Damselflies of Massachusetts*. Massachusetts Natural Heritage and Endangered Species Program.

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Westfall, M.J., Jr., and M. May. 1996. *Damselflies of North America*. Scientific Publishers.

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