



Photo: David Preston; *Megalagrion pacificum*

Terrestrial Invertebrates

Damselflies and Dragonflies

Order Odonata

ORDER INCLUDES:

3 Native Families

4 Native Genera

33 Native Species

31 Endemic Species

GENERAL INFORMATION: Dragonflies are an ancient insect group that coexisted with dinosaurs, and are part of an easily recognized and well-known insect order (Odonata). All members of the order are predaceous, have large compound eyes, two pairs of large membranous wings, and a long, thin abdomen. No dragonfly or damselfly stings and all have an aquatic larval form (i.e., nymph). The order consists of two suborders, one contains the damselflies and the other the dragonflies. Damselflies are weak fliers, and at rest most hold their wings close to the body. Dragonflies are strong fliers, and at rest hold their wings away from the body. Because of the diversity and extensive adaptive radiation, the native damselfly genus *Megalagrion* is particularly well-studied. Many *Megalagrion* species are endemic to single islands or ridges, and at least ten of the 23 species in the genus are considered at risk. *M. oahuenses* is one of the few truly terrestrial damselflies in the world. Also notable is the endemic dragonfly, *Anax strenuous*. It is the largest Hawaiian native insect with a wingspan of 15 centimeters (6 inches).

DISTRIBUTION: Dragonflies and damselflies are known from all the MHI except for Kaho'olawe.

ABUNDANCE: Unknown. A lack of systematic surveys prevents any population estimate. However, the loss of native habitats likely means that species within the order are declining.

LOCATION AND CONDITION OF KEY HABITAT: Larvae and adult odonates occur in or near a wide range of aquatic habitats (e.g., streams, plunge pools, reservoirs, anchialine pools, lowland swamps and marshes), montane forests and bogs, and lowland habitats, many of which are threatened by habitat change and loss. The following areas are key habitats for four species of *Megalagrion*, all of which are candidates for federal listing: East Wailua Iki Stream on Maui (*M. nesiotes*), Tripler Army Medical Center on O'ahu (*M. xanthomelas*), Waiawa, North Hālawā, Kahana and Ma'akua Streams on O'ahu (*M. leptodemas*), and headwaters and upper mid-reaches of all drainages in the windward Ko'olau Mountains from Kaluanui to Kahawainui (*M. oceanicum*).

THREATS:

- Loss or degradation of habitat such as from water diversions or disturbance caused by feral ungulates.
- Non-native invasive invertebrates, fish and frogs prey on nymphs.

CONSERVATION ACTIONS: The goals of conservation actions are not only to protect current populations and key breeding habitats, but also to establish additional populations, thereby reducing the risk of extinction. In addition to common statewide and island conservation actions, specific management directed toward dragonflies and damselflies should include:

- Identify and protect streams currently free of non-native species and human alterations, particularly in lowland areas.
- Conduct surveys to determine distribution and abundance of known dragonfly and damselfly populations and to document and identify new species.
- Enhanced protection of key watersheds.
- Support captive breeding and relocation/translocation of *Megalagrion xanthomelas* on O'ahu.
- Preserve, maintain, and restore habitats supporting existing populations.

MONITORING:

- Continue monitoring of known populations to assess population trends.
- Survey for additional, new populations.
- Conduct surveys for species believed to be extinct.

RESEARCH PRIORITIES:

- Conduct studies to determine the cause(s) of decline of stream-breeding species, particularly on O'ahu.
- Assess potential haplotype differences among island populations of widespread species to determine the importance of protecting populations on individual islands.

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