

Stephan's riffle beetle
Heterelmis stephani

STATUS: Candidate (67 FR 40657, June 13, 2002).

SPECIES DESCRIPTION: The Stephan's riffle beetle is a member of the family Elmidae (phylum Arthropoda; class Insecta; order Coleoptera). It is a small beetle; length 2.3-2.6 mm (.09 - .10 inches), breadth 1.05-1.2 mm (.041 - .047 inches). The body is elongate ovoid, sides subparallel, elytra slightly wider than prothorax, and moderately strongly convex. The head is without distinct impressions, except slightly along coronal and frontal sutures.

HABITAT: Beetles of the family Elmidae gain their common name "riffle beetle" from their propensity to live in shallow streams, rapids, or other comparable lotic situations. Firm substrates such as cobble, gravel, woody debris, and aquatic vegetation are essential. The most common habitat is a rheocrene - a spring emerging from the ground as a free flowing stream.

LIFE HISTORY: Elmid larvae are strictly aquatic and respiration occurs through retractile cloacal tracheal gills. Adults attach their eggs to the underside of submerged rocks, woody debris, or aquatic plants. Life histories of elmids are quite variable with a short incubation period and a larval stage. Upon reaching maturity, riffle beetle larvae crawl out of the aquatic environment to pupate under cover of sand, rock, bark, or other debris. In temperate zones, pupation typically requires 1-2 weeks and occurs from late spring through summer. After emergence, adults commonly fly and may be attracted to lights during their sole dispersal flight. Upon reentering the aquatic environment, most elmid adults never again leave the water. Respiration for adults occurs through the use of a plastron. Riffle beetle diet consists of microorganisms and debris, such as diatoms and detritus, scraped from substrate surfaces.

RANGE: *Heterelmis stephani* is endemic to spring environments within the Santa Rita Mountains, Santa Cruz County. Stephan's riffle beetle was described from specimens collected from Bog Spring in Madera Canyon. The beetle is also known from Sylvester Spring in Madera Canyon, and based on relatively intensive surveys of the surrounding area, the entire range of this species is believed to be confined to this canyon. The species no longer occurs at the type locality.

REASON FOR DECLINE/ VULNERABILITY: Threats and vulnerability include the historic alteration of springs from boxing, capping, and piping; susceptibility of springs to recreational impacts; and the lack of State and/or local government programs structured to address the conservation of rare and imperiled insects.

LAND OWNERSHIP: All lands encompassing the known range of the species are under the management authority of the Coconino National Forest.

NOTES: As a candidate, the Stephan's riffle beetle receives no legal protection under the Endangered Species Act.