

CANDIDATE ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Heterelmis stephani

COMMON NAME: Stephan=s riffle beetle

LEAD REGION: Region 2

INFORMATION CURRENT AS OF: Feb. 2003

STATUS/ACTION (Check all that apply):

New candidate

Continuing candidate

Non-petitioned

Petitioned - Date petition received: ____

90-day positive - FR date: ____

12-month warranted but precluded - FR date: ____

Is the petition requesting a reclassification of a listed species?

Listing priority change

 Former LP: ____

 New LP: ____

Latest date species first became a Candidate: _____

Candidate removal: Former LP: ____ (Check only one reason)

A - Taxon more abundant or widespread than previously believed or not subject to a degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

F - Range is no longer a U.S. territory.

M - Taxon mistakenly included in past notice of review.

N - Taxon may not meet the Act=s definition of A species.@

X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: *Coleoptera, Elmidae*

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Arizona

LEAD REGION CONTACT (Name, phone number): Susan Jacobsen (505-248-6641)

LEAD FIELD OFFICE CONTACT: Arizona ES Field Office, Phoenix, Mike Martinez, (602-242-0210 ext. 224)

BIOLOGICAL INFORMATION:

Heterelmis stephani is an endemic riffle beetle found in limited spring environments within the Santa Rita Mountains, Pima County, Arizona. Stephan=s riffle beetle was fully described in 1972 from 71 specimens collected in 1969 from Bog Spring in Madera Canyon (Brown, 1972a). 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. (Barr, 1991; Barr and Shepard, 1993). To summarize, historically only three populations, including Bog and Sylvester Springs and an area where water was being diverted from Bog Springs (see factor A. below), have been documented. The population being maintained by seepage from a water tank is no longer extant since water ceased flowing from the tank in 1976.

Beetles of the family Elmidae gain their common name Ariffle beetle@from their propensity to be found living in shallow streams, rapids, or other comparable lotic situations. Del Rio springs can be described as a typical isolated, mid-elevation, permanently saturated, spring-fed aquatic climax community that is commonly referred to as a ciénega (Hendrickson and Minckley, 1985). Elmid larvae are strictly aquatic and respiration occurs through retractile cloacal tracheal gills (Brown, 1983). Riffle beetles attach their eggs to the underside of submerged rocks, woody debris, or aquatic plants (Brown, 1987). Life histories of elmids are quite variable with a short incubation period and a larval stage lasting from 6 to 36 months (Tavares and Williams, 1990).

Upon reaching maturity, riffle beetle larvae crawl out of the aquatic environment to pupate under cover of sand, rock, bark, or other debris (Brown, 1972b; Brown, 1983). In temperate zones, pupation typically requires 1-2 weeks and occurs from late spring through summer (Brown, 1987). After emergence, adults commonly fly and may be attracted to lights during their sole dispersal flight (Brown, 1983, 1987). Adults are small, typically less than 3 mm in total length (Brown, 1983). Upon reentering the aquatic environment, most elmid adults never again leave the water (Brown, 1987). Respiration for adults occurs through the use of a plastron (a semipermanent bubble of air through which respiratory gases are exchanged in some aquatic invertebrates) (Brown, 1972). Riffle beetle diet consists of microorganisms and debris, such as diatoms and detritus, scraped from substrate surfaces (Brown, 1987; Tavares and Williams, 1990).

An interesting and important note about riffle biology is that these organisms are suspected of possessing some sort of chemical defense that readily repels diverse types of predators (Brown, 1987). There are also accounts of indigenous peoples of Lima, Peru, who utilize beetles of the elmid family as a food seasoning (Brown, 1987). Unfortunately, the potential medicinal value of elmids has not been explored.

THREATS (Describe threats in terms of the five factors in section 4 of the ESA providing specific, substantive information. If this is a removal of a species from candidate status or a change in listing priority, explain reasons for change):

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

The springs where Stephan=s riffle beetle is known to occur no longer exist within their natural condition. All have been boxed, capped, or channeled into pipes (Barr, 1991). Concrete boxes were constructed around the spring heads in the 1930s by the Civilian Conservation Corps (Barr and Shepard, 1993). The most significant habitat losses occurred after the species was originally described.

The type locality, where the species was originally collected, no longer exists as habitat for the species (Barr and Shepard, 1993). After conferring with the original collector, Barr and Shepard (1993) determined that the type locality was not Bog Spring but actually a site 1.5 miles away near a Forest Service campground. Apparently the original population was maintained by seepage from a pipe which was believed to be overflow seepage from a nearby tank which stored water diverted from Bog Spring. Seepage from the tank ceased in 1976 and the tank was removed entirely in 1992 (Barr and Shepard, 1993).

During the surveys conducted by Barr and Shepard (1993) only one adult riffle beetle was collected from Sylvester Spring. They were unable to find the beetle in Bog Spring proper. Based on the 71 beetle specimens originally collected in 1969, Barr and Shepard (1993) believe the species was very common. The subsequent loss of habitat at the type locality has eliminated what was likely a significant population of Stephan=s riffle beetle.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Not a known threat.

C. Disease or predation.

Not a known threat

D. The inadequacy of existing regulatory mechanisms.

The documented loss of habitat and a population of Stephan=s riffle beetle demonstrates the need to develop a conservation program in coordination with the Forest Service. No such program exists and it is unlikely that one would be initiated absent the assignment of candidate status to the species. We know of no State or local government programs structured to address the conservation of rare and imperiled insects. The Arizona Department of Fish and Game does not have any jurisdiction over invertebrates. The authority for invertebrates is with the Arizona State Department of Agriculture; however, they do not have an invertebrate conservation program. Thus, there is currently no potential for State protection.

E. Other natural or manmade factors affecting its continued existence.

Bog Spring and Sylvester Spring are located immediately off of a Forest Service maintained recreational trail. Due to the relatively obscure nature of the beetle=s existence, it is unlikely that recreationists are entirely aware of the sensitive nature of those spring ecosystems. In the absence of public education, recreationists may unwittingly degrade habitat by introducing

chemicals or allowing pets into the springs. The unintentional killing of larvae may also occur as a result of trampling.

Endemic spring-dependent organisms whose populations exhibit a high degree of geographic isolation are extremely susceptible to stochastic extinction resulting from catastrophic natural disasters such as fires, floods, or changes in spring water chemistry.

BRIEF SUMMARY OF REASONS FOR REMOVAL OR LISTING PRIORITY CHANGE:

N/A

FOR RECYCLED PETITIONS: N/A

- a. Is listing still warranted? ___
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? ___
- c. Is a proposal to list the species as threatened or endangered in preparation? ___
- d. If the answer to c. above is no, provide an explanation of why the action is still precluded.

LAND OWNERSHIP:

The entire range of this species is believed to be confined to Madera Canyon which is located in the Coronado National Forest.

PRELISTING:

No conservation activities have been initiated.

REFERENCES:

- Barr, C.B. 1991. Personal letter to Robert A. Johnson regarding the distribution and status of *Heterelmis stephani*, dated December 19, 1991.
- Barr, C.B. and W.D. Shepard. 1993. Survey for *Heterelmis stephani* Brown (*Insecta: Coleoptera: Elmidae*) in Madera Canyon and other localities in the Santa Rita Mountains, Arizona. Final Report prepared for U.S. Forest Service. 48 p. August 14, 1993.
- Brown, H.P. 1972a. Synopsis of the genus *Heterelmis* Sharp in the United States, with a description of a new species from Arizona (*Coleoptera, Dryopoidea, Elmidae*). Entomological News. 83: 229-238.
- Brown, H.P. 1972b. Biota of freshwater ecosystems. Identification Manual No. 6. Aquatic Dryopoid beetles (*Coleoptera*) of the United States. Prepared by H.P. Brown, University of Oklahoma for the Environmental Protection Agency. April 1972.

- Brown, H.P. 1983. A catalog of the Coleoptera of America north of Mexico. United States Department of Agriculture. Agriculture Handbook Number 529-50. Prepared by Agricultural Research Service. November 1983. 21 p.
- Brown, H.P. 1987. Biology of riffle beetles. *Ann. Rev. Entomol.* 32: 253-73.
- Hendrickson, D.A. and W.L. Minckley. 1985. Ciénegas - Vanishing climax communities of the American southwest. *Desert Plants* 6(3). The University of Arizona. 175 pp.
- Shepard, W.D. 1992. Riffle beetles (Coleoptera: Elmidae) of Death Valley National Monument, California. *Great Basin Naturalist.* 52(4), pp. 378-381.
- Shepard, W.D. 1993. Desert springs - both rare and endangered. *Aquatic Conservation: Marine and Freshwater Ecosystems.* Vol. 3, 351-359.
- Tavares, A.F. and D.D. Williams. 1990. Life histories, diet, and niche overlap of three sympatric species of Elmidae (Coleoptera) in a temperate stream. *Can. Ent.* 122: 563-577.

LISTING PRIORITY

THREAT

Magnitude	Immediacy	Taxonomy	Priority	
High	Imminent	Monotypic genus	1	
		Species	2	
		Subspecies/population	3	
	Non-imminent	Non-imminent	Monotypic genus	4
			Species	5*
			Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7	
		Species	8	
		Subspecies/population	9	
	Non-imminent	Non-imminent	Monotypic genus	10
			Species	11
			Subspecies/population	12

Rationale for listing priority number:

Magnitude: All springs that the species is known from have been modified in some manner. One site has been entirely dewatered, resulting in localized extirpation. The springs are currently maintained in modified conditions.

Imminence: Because the most recent surveys for the species are nearly a decade old, it is difficult to ascertain the current status of the species populations. Therefore, we cannot conclude that extinction is imminent.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all additions of species to the candidate list, annual retentions of candidates, removal of candidates, and listing priority changes.

Approve: Tom Bauer March 14, 2003
Acting Regional Director, Fish and Wildlife Service Date

Concur: _____
Director, Fish and Wildlife Service Date

Do not concur: _____

Director, Fish and Wildlife Service Date

Director's Remarks:

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Date of annual review: Feb. 2003
Conducted by: Mike Martinez

Comments:

(rev. 7/02)