



Thaumatoperla flaveola Mount Stirling stonefly

Taxonomy

Thaumatoperla flaveola Burns and Neboiss 1957

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 1991).

Categorised as Vulnerable in the 2009 Advisory list of threatened invertebrate fauna in Victoria (DSE 2009).

Proposed conservation status

Critically Endangered in Victoria

Criterion B1ab(i,iii,v)

Species Information

Description and Life History

There is little life history information available for this taxon. However, Hynes and Hynes (1975) concluded that its rate of larval development was similar to that of *Eusthenia venosa*, another species from the family *Eustheniidae*. This latter species spent three to four years as a larva before emerging as an adult. The adult emergence periods are during March - May across the Mount Buller, Mount Stirling and Mount Winstanley areas. The adult's life stage is short, ranging from 2 - 4 weeks and are known to be poor dispersers due to the inability to fly. Dispersal is accomplished by "walking" of the adult *Thaumatoperla flaveola* through the terrestrial environment.

Generation Length

The generation length of *T. flaveola* is inferred to be 3 to 4 years. There is insufficient field observation to support an estimate of generation length with any confidence, consequently the generation length is inferred on the basis of the similar species *Eusthenia venosa*.

Distribution

The taxon is only known from streams above 1000m on Mt Buller, Mt Stirling and Mt Winstanley (Doeg 1999). The species is only known to occur in the three major catchments: Howqua, Delatite and King.

Habitat

The taxon's main habitats are permanent rivers, streams and creeks, however the animals can also be found in seasonal water streams above 1000m.

Threats

Alpine species are prone to range contraction due to climate change, of which the impacts are likely to be seen first in marginal, lower-elevation sub-populations. Large fires are becoming more frequent and two fires at a short interval will be particularly detrimental. Increasing impacts of feral horses and deer might be countered in some areas by recovery from cattle grazing.

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IUCN Criteria

Criterion A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>based on any of the following:</p> <ul style="list-style-type: none"> (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites 			

Evidence:

Ineligible under Criterion A

There is insufficient evidence to determine whether there has been or will be a reduction in population sufficient to meet any threshold for Criterion A.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

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Evidence:

Eligible under Criterion B1 as Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 60 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas. The EoO has been made equal to the AoO to ensure consistency with the definition of the AoO as an area within the EoO.

The taxon is estimated to be severely fragmented. Populations are relatively small and isolated and at risk from on-going climate change, fire and grazing, such that there is increased extinction risk and little or no probability of recolonisation should subpopulations become extinct.

It is inferred to have a continuing decline in (i), (iii) and (v) above as a result of climate change, the taxon's extremely restricted distribution, its highly specialised ecological requirements, proximity of its habitat to potential sources of disturbance and natural system modifications.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 60 km², based 2 x 2 km grids derived from accepted, post-1970 records from the VBA. As above, is severely fragmented and has a continuing decline in (i), (iii) and (v) above.

Criterion C. Small Population size and decline		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b)	Extreme fluctuations in the number of mature individuals			

Evidence:

Ineligible under Criterion C as Data Deficient

No reliable estimate of the total population size for the taxon is available.

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Criterion D - Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	<50	<250	<1,000
D2 - Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.	-	-	D2 - Typically: AoO < 20 km ² or number of locations ≤ 5

Evidence:

Ineligible under Criterion D as Data Deficient

There is insufficient evidence to determine the number of mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

- Crowther, D., Lyon, S. and Papas, P. (2008). The response of threatened aquatic invertebrates to the 2006 fire in north-eastern Victoria. *Arthur Rylah Institute for Environmental Research Technical Series 179*
- Doeg, T.J. (1999) Distribution and conservation status of the stonefly *Thaumatoperla flaveola* in the Mt Buller-Stirling area. *Proceedings of the Royal Society of Victoria* 111, 87-92.
- Hynes, H.B.N. and Hynes, M.E. (1975). The life histories of many of the stoneflies (Plecoptera) of south-eastern mainland Australia. *Australian Journal of Marine and Freshwater Research* 26, 113-53.
- Mynott, J.H. (2016). Surveying the threatened species *Thaumatoperla alpina* across the Bogong High Plains. Final Report prepared for the Department of Land, Water and Planning by The Murray-Darling Freshwater Research Centre, *MDFRC Publication 117 /2016*.
- Pettigrove, V. (1991) An investigation of the distribution and ecological requirements of the stonefly *Thaumatoperla flaveola*. Rural Water Commission of Victoria, Report No. 104.
- SAC (1991). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 226 *Thaumatoperla flaveola*.