



Spathula tryssa Planarian

Taxonomy

Spathula tryssa Ball, 1977

Current conservation status

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

Proposed conservation status

Endangered in Australia

Criteria B1ab(ii,iv,v)+2ab(ii,iv,v)

Species Information

Description and Life History

Spathula tryssa is a freshwater planarian up to 8.5 mm long, lacking both eyes and pigment, and appearing creamy-white in colour. The head is rounded with two pairs of ciliated pits, one pair on the frontal margin and one pair behind it. *S. tryssa* is a stenothermal planarian species found in the Victorian Alps. It is one of a suite of species associated with groundwater on mountains in Victoria (St Clair et al. 1999). The places where the groundwater reaches the land surface varies with amount of water, so actual collecting localities can move and many fewer localities are found in drier periods.

Planarians are both male and female so both animals produce a cocoon after mating. The cocoons each contain a few eggs that develop inside, and the young planarians emerge from them. Mating occurs in larger animals and usually in the warmer months.

Generation Length

The generation length of *Spathula tryssa* is estimated to be 6 to 36 (midpoint 12) months. This is estimated from similar planarian taxa, as there is insufficient observation to support an estimate of generation length with any confidence.

Distribution

The taxon is endemic to Victoria. It is known from many localities in the Mt Buller general area and the Howitt Plains area (St Clair et al. 1999). Extensive collecting in suitable habitats in other areas of the Victorian Alps found more species of flatworms but no *S. tryssa* (St Clair et al. 1999).

Habitat

The taxon is known from many shallow runnels and soaks where ground water emerges to the surface over Mt Buller and surrounding areas, also Mt Howitt and surrounding areas above 1470 m altitude (St Clair et al. 1999). In summer, these water bodies almost dry up and the planarians were found just inside the hill where water remained. Because its habitat is supplied by underground springs and at least some individuals can retreat underground when the water dried up, it never experiences temperatures above 9 degrees C (Hay and Ball 1979). In summer, the habitat supports a dense population of small gammarids, on which the planarians feed readily without having to move far (Hay and Ball 1979). St Clair et al. (1999) found a specimen in much warmer water but this was in water no longer connected to the groundwater.

Threats

Pollution, increased nutrients and reduced groundwater discharge that affect the extent of groundwater above 1470 m altitude, could have severe consequences to both *S. tryssa* and the gammarid amphipods on which it feeds. Global warming is a significant threat, as the taxon requires water below 10 degrees and above 1470 m altitude. Appropriated habitat will be reduced with global warming. Hay and Ball (1979) suggest that *S. tryssa* is a stenotherm and cannot tolerate small temperature rises, which makes this taxon quite susceptible to climate change impacts. Other climate change impacts would include extreme events and drought.

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:

Eligible under Criterion A2 as Vulnerable

The population reduction over the past 10 years is suspected to be 0 to 30%, based on (c) above.

The decline is based on lack of exact numbers as an unknown part of the population is present in the groundwater at any one time and lack of recent surveys.

Eligible under Criterion A3 as Vulnerable

The population reduction over the next 10 years is suspected to be 0 to 30%, based on (c) above.

Future population is estimated based on that no cause of change seen from original sampling but based on the listed threats, it may will occur.

Eligible under Criterion A4 as Vulnerable

The population reduction over any 10 year period, including both past and future, is suspected to be 0 to 30%, based on (c) above.

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			

Evidence:

Eligible under Criterion B1 as Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 462 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA).

It is inferred to have four locations, as each subpopulation may be variably affected by bushfire or stochastic events.

It has a continuing decline in (ii), (iv) and (v) above. It is affected by temperatures above 10 degrees (Hay & Ball 1979). St Clair et al. (1999) found a lower level of 1470 metres altitude for the populations. These two facts combined suggest that climate change may reduce the area, extent and quality of habitat, and therefore numbers.

Eligible under Criterion B2 as Endangered

The Area of Occupancy (AoO) across the taxon's range is estimated to be 44 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has 4 locations and has a continuing decline in (ii), (iv) 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

It is suspected that there are 10,000 to 30,000 mature individuals, which exceeds the thresholds for criterion C.

Criterion D. Very small or restricted populations		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:

Eligible under criterion D2 as Vulnerable

The taxon is inferred to be very restricted.

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

References

Ball I.R. (1977) A monograph of the genus *Spathula* (Platyhelminthes: Turbellaria: Tricladida). *Aust. J. Zool., Supple. Ser.* 47: 1-43

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https://www.environment.vic.gov.au/__data/assets/pdf_file/0016/50452/Advisory_List_of_Threatened_Invertebrate_Fauna_2009_FINAL_Sept_2009.pdf

Hay S.A. and Ball I.R. (1979) Contributions to the biology of freshwater Planarians (Turbellaria) from the Victorian Alps, Australia. *Hydrobiologia* 62(2): 137-164

St Clair, R., Doeg T. and Winsor, L. (1999). A survey for *Spathula tryssa* Ball and other freshwater flatworms in the Victorian Alps with an evaluation of the conservation status of each species. *Proceedings of the Royal Society of Victoria*. 111:43-49.