Threatened Species Assessment

Austroaeschna flavomaculata
Alpine Darner Dragonfly

Taxonomy

Austroaeschna flavomaculata Tillyard, 1916

In 2012 this species was placed in the subgenus *Glaciaeschna*, which is monotypic (Theischinger 2012); however the Atlas of Living Australia still has this species as *Austroaeshna (Austroaeshna) flavomaculata*.

There is also dispute at the family level. Hawking and Theischinger adopt the use of Telephlebiidae after Bechly (1996). However the Australian National Insect Collection dispute this, arguing that Aeshnidae traditionally is divided into several subfamilies, but there does not seem any good reason to separate out the two Australian genera Austroaeschna and Telephlebia as a separate family, and they most likely are not each other's sister taxa. The family-level characters given by Bechly (1996-2008) for his family Telephlebiidae are "median space crossed", but it is not crossed in Austroaeschna, and "hypertriangles crossed" but that also applies to other genera of Aeshnidae. Telephlebiidae appears to be the most widely accepted.

Current conservation status

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

Proposed conservation status

Vulnerable in Victoria

Criteria B1ab(iii)+2ab(iii); D2

Species Information

Description and Life History

The specific details regarding the life history of *Austroaeschna flavomaculata* are not available. In general, dragonflies have three life stages: the egg hatches into the nymph, which moults up to 15 times before emerging as an adult. Unlike most other insects, there is no pupal stage and the transition from nymph to adult is known as incomplete metamorphosis.

Both adults and nymphs are predaceous with adult darners able to catch insects in flight. The Aeshnidae are more tolerant of a range of temperatures and therefore able to occupy alpine environments.

Generation Length

The generation length of *Austroaeschna flavomaculata* is inferred to be 12 to 24 months. This is based on other similar taxa within the genus that can have life spans up to 2 years, as there are no specific data available for this taxon.

Distribution

The dragonfly has been recorded from alpine areas, including Mount Buffalo and Bogong High Plains (Crowther et al. 2008). It is considered to be range restricted by Hawking and Theischinger (2004), being found in the snow areas of the southern alps. There are limited data due to a lack of targeted sampling effort for this species. Data that has been recorded has been collected by dragonfly enthusiasts or taxonomists.

Habitat

Larvae have been found in alpine trickles and run-off waters, occurring in sphagnum and under rocks (Theischinger and Hawking 2006). Adults have been observed to perch overnight on large boulders in stream beds, the only species in the genus known to display this behaviour (G. Theischinger, pers. comm. cited in Dow 2017).

Threats

No specific threats were identified in the IUCN assessment (Dow 2017), however climate change impacts and wildfire are likely to pose threats to the habitat and consequently to the taxon. Post-fire impacts on aquatic biota can result from direct loss of physical habitat, and also reduced water quality (Crowther et al. 2008).

The habitat is particularly threatened by increased fire and drought due to climate change along with grazing. Other threats include the impacts of Sambar deer (*Rusa unicolor*), feral horses and pigs (potentially), and weed invasion.

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%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

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.

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*]

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.

based on any of the following:

(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.

The bushfires of 2019/2020 are believed to have impacted a few locations where the taxon has been recorded, including Mount Buffalo and Bogong High Plains**.** Therefore, the taxon may be impacted by water quality issues.

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 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
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 Vulnerable

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 11,315 km², based on accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is inferred to have six locations, corresponding to the subpopulations. Being restricted to alpine environments makes this species susceptible stochastic events across all its populations. The likely threats of concern are climate change related, in particular drought and increased temperatures.

It is inferred to have a continuing decline in area, extent and/or quality of habitat, based on impacts of bushfires, including those on Mount Buffalo and Bogong High Plains. Therefore, the taxon may be impacted by water quality issues.

Eligible under Criterion B2 as Vulnerable

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, the taxon has six locations and has a continuing decline in (iii) 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.

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 km2 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

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