# Threatened Species Assessment

## *Synamphisopus ambiguus*
## freshwater isopod

### Taxonomy

*Synamphisopus ambiguus* (Sheard, 1936)

There is some dispute over the family for this group of isopods. Currently the family taxonomy adopted follows that of Boyko et al. (2008).

### Current conservation status

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

### Proposed conservation status

Vulnerable in Australia

Criterion D2

Most of the Phreatoicdean isopods are likely to be small range endemics, therefore subject to considerable risk.

### Species Information

#### Description and Life History

Isopods which are sometimes referred to as aquatic sowbugs have over 950 species, rivalling the amphipods in terms of diversity, ecological importance and distribution (Wellborn et al. 2015). Isopods have among their number detritivores, carnivores, fish parasites, and scavengers. This species belongs to the Suborder Phreatoicidea, Family Phreatoicopsidae, all of which are freshwater species. Phreatoicidean species tend to be short or small range endemics, a pattern that is also seen in most genera, and in a few cases at the family-level (Wilson and Johnson 1999, Wilson, 2008). The Australian phreatoicideans have significant endemism at the generic and higher levels.

This species is one of two from the genus *Synamphisopus*, which is relatively large compared to some of the other isopod species found in the Grampians National Park (i.e. *Gariwerdeus*) (Wilson and Keable 2002, G.D.F. (Buz) Wilson, pers. comm. 2019). *S. ambiguus* is a large species and possibly long lived, and may have different reproductive dynamics to the other genera of isopods found in the Grampians National Park, *Phraetoicopsis raffae* and *Gariwerdeus* (Buz Wilson, pers. comm. 2019). Phylogeny studies indicate that the *Phraetoicopsis* and *Synamphisopus,* both of which are restricted to the Grampians National Park, are sister groups.

Specific ecological and biological information is lacking for this taxon with the following text relating to peracarid isopods in general. All three genera of Phreatoicidean found in the Grampians region support substantial numbers of *Temnocephala* spp. on their limbs and somites, as with many Australian crayfish. It's not known if the flatworms have any impact on their isopod hosts (Wilson and Keable 2002). As with all the peracarid crustaceans, isopod embryos undergo direct development within the female brood pouch (marsupium), from which they emerge as juveniles, known as manca. These are essentially small replicas of adults but lack the last pair of thoracic legs. There is no pelagic larval stage among the isopods. There is a large amount of data which indicates that peracarids are very poor overland dispersers, and is potentially limited to the crawling ability of the species, resulting in most species having highly restricted distributions and patterns of high endemism (Brusca, 1997, Wellborn, et al. 2015).

### Generation Length

The generation length of *S. ambiguus* is inferred to be 1 to 3 years. There are no data on the life history of this taxon. It is large compared to other phreatoicdean isopods and thought to be long lived, although further work is required to confirm this (Buz Wilson, pers. comm. 2019).

### Distribution

The taxon has been recorded from a range of localities in the Grampians National Park, including in the MacKenzie River catchment - MacKenzie and Fish Falls; Stony Creek around Turret Falls, and in the Roses Gap area at Beehive Falls (Wilson and Keable 2002).

### Habitat

This taxon has been recorded from a range of habitat types in the Grampians National Park. It has been found in splash zones in gravel, sand and mud under rocks both above and below waterfalls, also at the edges of creeks/rivers and falls, and in areas with seeps (Wilson and Keable 2002). It is considered a freshwater species, but likely is semi-terrestrial as it has also been found among roots of ferns near seeps and waterfalls. Some specimens have also been collected from instream habitat among aquatic macrophytes, in riffle zones, and pool habitats. It is likely that the main habitat is in the moist areas surrounding groundwater seepage zones and splash zones of waterfalls.

### Threats

Environmental degradation of rivers, streams and other water bodies via land clearing, development, sedimentation, drought and water pollution are all threats to the conservation of this taxon. These are generic threats, as specific threats have not been recorded. Based on the localities of the records for this taxon, recreational impacts (trampling, disturbance of habitat, pollution) are possible threats. Climate change is also considered a significant threat.

## 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.

There is no evidence to indicate whether the taxon has suffered significant past decline in population size or any other demographic parameter. Future decline cannot be estimated as there have been no targeted surveys since the species was first described. However due to the operating threats, it is suspected that the population is susceptible to declines in habitat.

| 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:

**Ineligible under Criterion B**

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 91 km² and the Area of Occupancy (AoO) is estimated to be 24 km², but other thresholds under this criterion have not been met.

| 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**

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

| 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<br>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:<br>AoO <·20 km2 or number of locations ≤·5 |

## Evidence:

**Eligible under Criterion D2 as Vulnerable**

The taxon is estimated to be very restricted, with an AoO of 24 km²and one location. This is restriction makes it likely that the taxon cold become Critically Endangered or Extinct within a time frame of one or two generations, in response to the identified threats, notably environmental degradation of rivers, streams and other water bodies.

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

## References

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