

Rhodope rousei Marine opisthobranch

Taxonomy

Rhodope rousei B. Brenzinger, N.G. Wilson & M. Schrödl, 2011

Rhodope taxonomy has proven to be problematic, in that characteristic anatomical features (shell, head, tentacles, foot, gill, heart and radula) are lacking compared to other gastropods, such that they more closely resemble a turbellarian worm. However, following over a century of attempts by systematic biologists to describe the genus in terms of its phylogeny, its taxonomic placement is now considered resolved (Brenzinger, Wilson and Schrödl, 2011; Wilson et al., 2017).

The *Rhodope* species assessed here (Burn 1990), and collected from Western Port (Burn 1990, 1998, 2006) was only identified to genus level at the time of listing under the FFG Act. Following a recent taxonomic and morphological analysis of another Rhodopemorpha, *Rhodope rousei*, collected from Edithburgh in South Australia, it was concluded that the two species can be considered conspecific. This judgment was based on the unique three-banded orange pattern and their southern distribution (Brenzinger et al., 2011; Hazprunner and Heß, 2005).

The World Register of Marine Species (WoRMS) currently contains seven taxa registered under the genus *Rhodope*, including *Rhodope rousei* (MolluscaBase, 2019).

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Rhodope* spp.

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(iii,v)+2ab(iii,v)

Species Information

Description and Life History

The taxa belonging to the genus *Rhodope* are marine opisthobranchs, commonly referred to as 'sea slugs,' which are benthic gastropods lacking a shell. They have been described to be epifaunal intertidal and/or subtidal interstitial species found to occur within sub-tropical and temperate environments on all continents (Brenzinger et al., 2011; Salvini-Plawen, 1991; Haszprunar and Heß, 2005; Cuervo-González, 2017). Little is known about their ecological significance, however recent studies have found that they are typically interstitial, living between the sand grains in their habitat and have been found to prey on placozoans (Cuervo-González, 2017).

There is no specific information on the life history and reproductive capacity of *Rhodope rousei*. However, data available from another closely related species, *R. veranii*, suggests that it may produce between 6 and 30 eggs, have direct development and crawl-away larvae, indicating low dispersal capabilities and suggesting strong tendencies to be localised with high endemism (Rudman, 2005b; Brenzinger et al., 2011; Cuervo-González, 2017). *R. rousei* has been observed to have an affinity with algae, and long-range dispersal events on floating algae are considered possible (Brenzinger et al., 2011; Burn 1990). *R. rousei*, like all other opisthobranchs, are hermaphroditic, in that they possess both male and female reproductive organs (Brenzinger et al., 2011). Self-fertilisation in other closely related species *R. placocephalus* has been found to produce progeny with a



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consistent generation length of between 18-20 days (Cuervo-González, 2017) which could also be true of *R. rousei*. However, considering the different type localities of each of the closely related species discussed above, the life history of *R. rousei* can only be estimated with uncertainty, as it may be subject to environmental pressures which are specific to its type locality which may have induced adaptive changes in its reproductive strategy.

Generation Length

The generation length of *R. rousei* is inferred to be 18 to 20 days, based on a similar species, *R. placozophagus* (Cuervo-González, 2017).

Distribution

The taxon is known to occur in San Remo, Western Port, in Victoria. It also occurs in Edithburgh and Port Hughes, York Peninsula, South Australia (Burn, 1990; Brenzinger et al., 2011; NCMND, 2016).

Habitat

The taxon is found to occur in reef flats, crawling atop of the seagrass *Zostera* at 0m depth (Haszprunar and Heb, 2005; Burn 1998) and interstitially in subtidal sandy substrate between 4 to 8m depth (Brenzinger et al., 2011). The type locality in which it was originally recorded (Burn, 1990) exhibits a combination of unique physical attributes that have not been documented anywhere else in Victoria. The San Remo Marine Community has a northerly orientation and experiences low wave energy. A fast-flowing channel is adjacent to the community, which facilitates nutrient availability (O'Hara 1995).

Threats

Threats encountered by this taxon are based on those listed in O'Hara (2002) as being specific to vulnerable marine habitats in which this species is found, namely embayments and the intertidal/subtidal shallow zone. The San Remo Marine Community was listed under the FFG Act as it is highly prone to future threats which are likely to result in extinctions (O'Hara, 1995). The community was listed in response to the proposal to build a marina at the site. Threats specific to the San Remo Marine community include impacts associated with development, damage from boating, recreational activities, changing currents, inflows, and nutrient sedimentation loads, pollution and dredging.

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 style="text-align: center;"><i>based on any of the following:</i></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.

No recent surveys have specifically targeted this taxon, so there is no evidence to indicate whether the taxon has suffered a significant past or future decline in population size or any other demographic parameter. However, it is possible that ongoing habitat decline may be occurring due to the operating threats. It should be noted that the marine invertebrates of the San Remo Reef Flat have been extensively surveyed since 1981 (O'Hara 1995) so it is considered likely that this taxon is in fact quite rare.

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| 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 Critically Endangered

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 4 km², based on accepted, post-1970 records from the Victorian Biodiversity Atlas (VBA). The EoO has been made equal to the Area of Occupancy (AoO) to ensure consistency with the definition of AoO as an area within EoO.

It is suspected to have one location, as all key identified threats apply across its range and can rapidly affect all individuals of the taxon present.

It is inferred to have a continuing decline in (iii) and (v) above. Due to operating threats, it is likely that the population will continue to decline due to reduced quality of habitat. It is not considered likely that there is a continuing decline in extent or area. Note that there have been no recent targeted surveys to confirm this.

Eligible under Criterion B2 as Critically Endangered

The AoO across the taxon's range is estimated to be 4 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the VBA. As above, it has one location and a continuing decline in (iii) and (v) above.

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| 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 recent surveys have specifically targeted this taxon, so there is no accurate way of estimating the past, current or future population size. It should be noted that the marine invertebrates of the San Remo Reef Flat have been extensively surveyed since 1981 (O'Hara 1995) so it is considered likely that it is in fact quite rare.

| 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.

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