Beddomeia hermansi

Hydrobiid Snail (Viking Creek)

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Beddomeia hermansi © Karen Richards

Common name: Hydrobiid Snail (Viking Creek)

Scientific name: ***Beddomeia hermansi*** (Ponder & Clark)

Group: Invertebrate, Mollusca, Gastropoda, Sorbeoconcha, Hydrobiidae *s.l.*

Status: *Threatened Species Protection Act 1995*: **endangered**
Environment Protection and Biodiversity Conservation Act 1999: **Not listed**
IUCN Red List: **Vulnerable**

Distribution: Endemic status: **Endemic**
Tasmanian NRM Regions: **Cradle Coast**

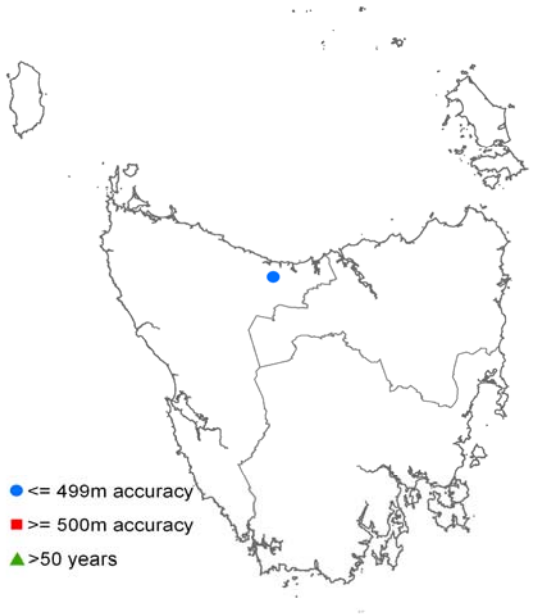

Figure 1. The distribution of *Beddomeia hermansi,* showing NRM regions

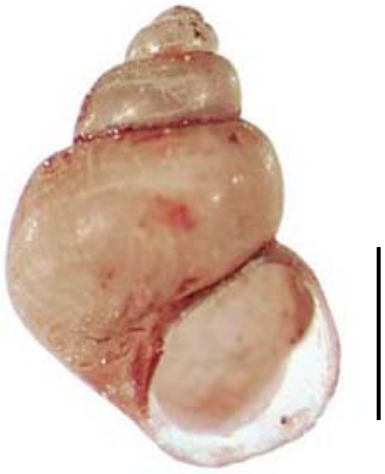

Plate 1. Specimen of *Beddomeia hermansi* (image by Stephanie Clark for Winston Ponder). Scale = 1 mm

SUMMARY

Beddomeia hermansi is a freshwater snail known from a single location, at the upper end of Viking Creek, a tributary of the Wilmot River, near Sprent, in central northern Tasmania. The species has an extremely narrow range, known only from one stream, in which the known location comprises only a 20 m length of suitable habitat. No other populations are currently recorded, and the known site is restricted by inhospitable environments.

The principal threats to *B. hermansi* are associated with agricultural practices, resulting in habitat modification or degradation. *B. hermansi* may also be vulnerable to competition with the exotic species *Potamopyrgus antipodarum* (New Zealand hydrobiid).

The principal management objectives for *B. hermansi* include preventing the loss or degradation of habitat supporting known populations, identification of new subpopulations, increasing public awareness of the species, improving the reservation status of the species, and potential translocation and monitoring of a subpopulation.

IDENTIFICATION AND ECOLOGY

Beddomeia hermansi is a member of the Hydrobiidae *s.l.*, a family of freshwater snails with cosmopolitan distribution (*sensu lato* (*s.l.*) = in the broad sense; placement of *Beddomeia* with this family is currently under review). *B. hermansi* is one of 37 *Beddomeia* species listed as threatened on the Tasmanian *Threatened Species Protection Act 1995*.

Hydrobiid snails are small (1.0-7.0 mm), often cryptic species that are difficult to identify to species level in the field, being distinguished by a number of shell and anatomical characters. They possess conical to compressed trochiform shells of between 4 and 8 whorls (Plates 1 & 2). Their shells can be opaque to dark brown in colour. The shells are most often smooth, but may possess faint sculpturing. Like a number of other *Beddomeia* species, *B. hermansi* has a broadly conic shape. This species is 2.79-3.40 mm long; 2.08-2.50 mm wide, with a protoconch of about 1.5 whorl. The microsculpture is smooth. The umbilicus is small, 0.19-0.33 mm wide (Plates 1 & 2).

The principal characters used to separate species of *Beddomeia* are the male and female reproductive systems, which require microscopic dissection of specimens.

Information on the breeding habits of *B. hermansi* is limited. *Beddomeia* reproduce sexually, laying single eggs, contained within a capsule formed of sand grains secreted together (Plate 3). The egg capsules of *B. hermansi* are undescribed; however, *Beddomeia* spp. egg capsules are approximately 30% of adult body size. Individual egg capsules have broad attachment bases and are attached to the underside of submerged stable rocks or allochthonous material. The period of egg incubation is unknown; however, eggs develop into fully formed juvenile snails prior to emergence from their capsules. There is currently no available information on the fecundity of these species, although it is thought to be low, based on the proportions of egg capsules to snail abundance recorded at many sites (K. Richards, unpubl. data).

B. hermansi is known from a tributary of Viking Creek, Wilmot River, where they are located on submerged allochthonous material (leaves, small wood pieces) and rocks, where they feed actively, grazing on periphyton. Field observations indicate these snails have a preference for the underside and lower margins of rocks and stream debris (Plate 4).

While no specific life history information is available for *B. hermansi*, it is presumed to be similar to other headwater stream-inhabiting *Beddomeia* species. Species of *Beddomeia* are capable of breeding throughout the year, with no evidence of a seasonal reproductive peak observed (Richards 2010). Some *Beddomeia* species are known to live for over 5 years and develop slowly, reaching sexual maturity only after 2-3 years (K. Richards unpubl. data).

Due to the method of reproduction, limited fecundity and specific habitat requirements species of *Beddomeia* are unable to disperse widely, unlike other aquatic molluscs with a

free-swimming larval stage (Bryant & Jackson 1999). This apparent inability to disperse into new habitat renders these species vulnerable to several threatening processes.

Plate 2. Images of live *Beddomeia hermansi* (images © Karen Richards)

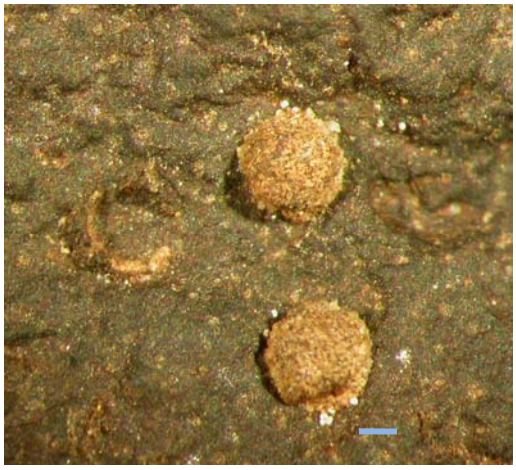

Plate 3. Egg capsule of *Beddomeia hermansi.* Scale 200 µm (image © Karen Richards)

Survey techniques

B. hermansi is a small cryptic species that can be difficult to tell apart from other species of *Beddomeia,* and dentification to species-level normally requires a specialist. A survey protocol guiding collection methods has been developed by DPIPWE and is available to ecological consultants via the DPIPWE website; however, only suitably qualified people capable of field identification of hydrobiids to genus-level should undertake surveys for *Beddomeia.*

Confusing species

B. hermansi co-occurs with two species of *Austropyrgus*; however, it can be readily distinguished from *Austropyrgus* by its markedly broader, larger shell and lack of operculum peg, a feature not possessed by any *Beddomeia* species. *B. hermansi* may be confused with other species of *Beddomeia* of similar external appearance (*B. averni*, *B. waterhouseae, B. turnerae, B. hallae, B. fallax, B. lodderae, B. camensis, B. forthensis*), however, there is no known overlap in the ranges of these species. The 'plasticity' of shell shape within some individual species may also lead to incorrect identification. The colour of uncleaned individual shells is not a taxonomically useful character. Reproductive characteristics are used to separate species (Ponder et al. 1993), but this requires microscopic dissection. Confusion between the more conical of *Beddomeia* species and the exotic species *Potamopyrgus antipodarum* which is known to co-occur with *B. hermansi.*

DISTRIBUTION AND HABITAT

B. hermansi is known from a single location, at the upper end of Viking Creek, a tributary of the Wilmot River, near Sprent, in central northern Tasmania (Figure 1, Table 1). The species has an extremely narrow range, recorded only from one stream, in which the known location comprises only a 20 m length of suitable habitat (Plate 4). No other subpopulations have been identified, and the known site is restricted by inhospitable environments (immediate upstream, cleared for agricultural use and downstream, an impoundment which is populated by the exotic species *Potamopyrgus antipodarum*).

Plate 4. Habitat of *Beddomeia hermansi* (image by Karen Richards)

Table 1. Population summary for *Beddomeia hermansi*

	Location	Tenure	NRM region*	1:25 000 mapsheet	Year last (first) seen	Extent of subpopulation (ha)	Abundance
1	Viking Creek, tributary of Wilmot River, Sprent	Private Property	Cradle Coast	Kindred	(1989) 2005, 2009, 2011	unknown	Low

*NRM region = Natural Resource Management region

POPULATION PARAMETERS

Population estimates are not available. No comprehensive surveys have as yet been undertaken to estimate the population size at the known localities; however, a monitoring and translocation project is being developed (K. Richards unpubl. data).

RESERVATION STATUS

The known record for *B. hermansi* occurs on private property, outside of the formal reserve system.

CONSERVATION STATUS

B. hermansi was listed in 1995 as rare on the Tasmanian *Threatened Species Protection Act 1995*. The species was uplisted to endangered in 2009, following a review of available information, meeting the criteria for listing criterion B, specifically B1 (severely fragmented or known to exist at no more than 5 locations) and B2 (continuing decline inferred, observed or projected, in extent of occurrence (estimated to be less than 0.1 km^2) and quality of habitat).

THREATS, LIMITING FACTORS & MANAGEMENT ISSUES

The principal identified threats to freshwater molluscs are agricultural clearing, forestry, mining and impoundment construction (Ponder & Colgan 2002, Ponder & Walker 2003, Strong et al. 2008). For *B. hermansi* the limiting factors are associated with agricultural practices, including stock access, resulting in habitat modification or degradation. This species is confined to a small section of a headwater stream subject to agricultural land use and consequently is at higher risk of being impacted by habitat degradation and modification (Richards 2010). The known site occurs in disturbed *Acacia dealbata* regrowth on cleared agricultural land.

Habitat modification and destruction: *B. hermansi* is known to occur at a single site in an area previously subjected to anthropogenic disturbance brought about by agricultural land practices including cattle trampling and sedimentation; consequently it is extremely vulnerable to habitat destruction and modification. Permanent removal of riparian vegetation increases stream temperatures and siltation, thus reducing habitat suitability for *B. hermansi*.

Interspecific competition from introduced hydrobiids: Owing to the restricted population of *B. hermansi*, it is considered vulnerable to interspecific competition and displacement from the exotic species *Potamopyrgus antipodarum* (New Zealand hydrobiid), particularly as they occur in areas already subjected to water quality degradation which is favoured by the exotic species (Schreiber et al. 2003).

Climate change: The trend towards a warmer climate and fluctuations in precipitation may impact on the habitat availability for *B. hermansi* by reducing stream flow and modification of riparian vegetation communities.

Stochastic risk: The known distribution of *B. hermansi* is denied any opportunity for extension into other suitable habitat, thus exposing the species to likely risk of extinction.

MANAGEMENT STRATEGY

Management objectives

The main objective for the management of the *B. hermansi* is to decrease the risk of extinction by maintaining or improving the integrity of habitat at the known site through appropriate

land management and proposed translocation to an additional site.

- Prevent the loss or degradation of habitat supporting known populations;
- Identify new subpopulations of the species;
- Increase the level of information and data available on the location, size and condition of known subpopulations;
- Improve the understanding of the ecological requirements of the species.
- Improve reservation status and/or develop management agreements with land managers to minimise the degradation of subpopulations;
- Increase likelihood of species survival through translocation and monitoring of a subpopulation.

What has been done?

Targeted surveys & monitoring: The type locality was re-surveyed in 2005, when specimens were obtained for DNA analysis (Richards 2010). To date no subsequent surveys for the species have been conducted. *B. hermansi* is the target of a monitoring and translocation program established by Natural Resource Management (NRM North) to be initiated in 2013.

Forestry management: *B. hermansi* is included in the *Threatened Fauna Adviser*, a decision-support system used by forest industry to take account of threatened fauna in wood production forests managed under the Tasmanian *Forest Practices Code* (FPB 2000, 2001).

What is needed?

- To improve protection of the species - raise awareness of *B. hermansi* with local communities and investigate reservation and protection of the known site through fencing options to exclude stock from the stream and the riparian zone and formal agreement with land holders.
- To improve management of the species – provide information and support to the landholder and land manager.
- To improve protection of the species - raise awareness of *B. hermansi* within local communities and promote good hygiene practices for equipment used in and around waterways to reduce translocation of exotic snail species.
- To improve protection of the species - undertake extension surveys outside the known range in potential habitat to locate any additional subpopulations.
- To improve protection of the species - provide information and extension support to relevant Natural Resource Management committees, local councils, government agencies, the local community and development proponents on the locality, significance and management of hydrobiid species and potential habitat;
- To increase understanding of the ecology of the species – conduct more precise assessment of population size, distribution, ecological requirements and the relative impacts of threatening processes.

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View:

http://www.dpipwe.tas.gov.au/threatenedspecieslists

Contact details: Threatened Species & Marine Section, Department of Primary Industries, Parks, Water and Environment, GPO Box 44, Hobart, Tasmania, Australia, 7001.

Ph. (03) 6165 4340; fax (03) 6233 3477; threatenedspecies.enquiries@dpipwe.tas.gov.au

Permit: A permit is required under the *Tasmanian Threatened Species Protection Act 1995* to knowingly "take" (which includes kill, injure, catch, damage, destroy and collect), keep, trade in or process any specimen of a listed species.