# *Beddomeia petterdi*

## Hydrobiid Snail (Blythe River)

TASMANIAN THREATENED SPECIES LISTING STATEMENT

*Beddomeia* sp. © Karen Richards

**Common name:** Hydrobiid Snail (Blythe River)

**Scientific name:** ***Beddomeia petterdi*** (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**

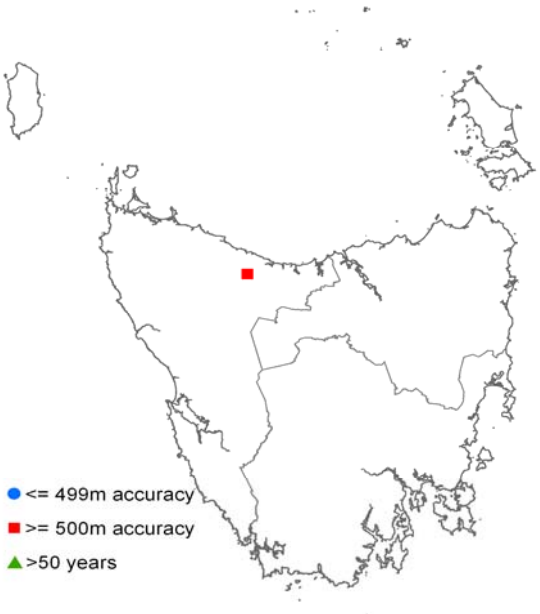


**Figure 1.** The distribution of *Beddomeia petterdi,* showing NRM regions

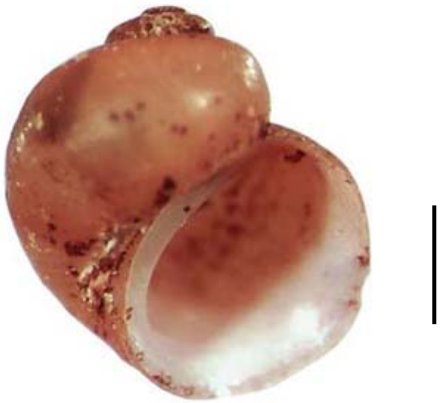

**Plate 1.** Specimen of *Beddomeia petterdi* (image by Stephanie Clark for Winston Ponder). Scale – 1 mm

**SUMMARY**

*Beddomeia petterdi* is a freshwater snail found in one tributary of Blythe River, near South Riana, in central northern Tasmania, while an historic record 'from Blythe River' (grid reference indicating near the mouth of the Blythe River) cannot be confirmed.

The principal identified threats to *B. petterdi* are associated with agricultural practices and altered flow dynamics in the immediate catchment from where the species is known, resulting in habitat modification or degradation. *B. petterdi* may also be vulnerable to competition with the exotic species *Potamopyrgus antipodarum* (New Zealand hydrobiid).

The principal management objectives for *B. petterdi* include preventing the loss or degradation of habitat supporting known populations, identification of new subpopulations, increasing public awareness of the species, and improving its reservation status.

## IDENTIFICATION AND ECOLOGY

*B. petterdi* 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. petterdi* 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 (Plate 1). Their shells can be opaque to dark brown in colour, often depending on the age of the individual. The shells are most often smooth, but may possess faint sculpturing. *B. petterdi* has a trochiform shape, 2.77-3.59 mm long; 3.04-3.61 mm wide, with a protoconch of about 1.5-1.7 whorls; its microsculpture is uniform, displaying weak axial wrinkles. The umbilicus is closed and represented by chink 0.14-0.34 mm wide. The species is not sexually dimorphic in length, width or shape (Ponder et al. 1993).

The principal characters used to separate species of *Beddomeia* are the male and female reproductive systems.

Information on the breeding habits of *B. petterdi* is limited. *Beddomeia* reproduce sexually, laying single eggs, contained within a capsule formed of sand grains secreted together (Plate 2). The egg capsules of *B. petterdi* 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 develops into fully formed juvenile snails prior to emergence from the 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).

While no specific life history information is available for *B. petterdi*, 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.

### Survey techniques

*B. petterdi* is a small cryptic species that can be difficult to tell apart from other species of *Beddomeia,* and identification 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*.

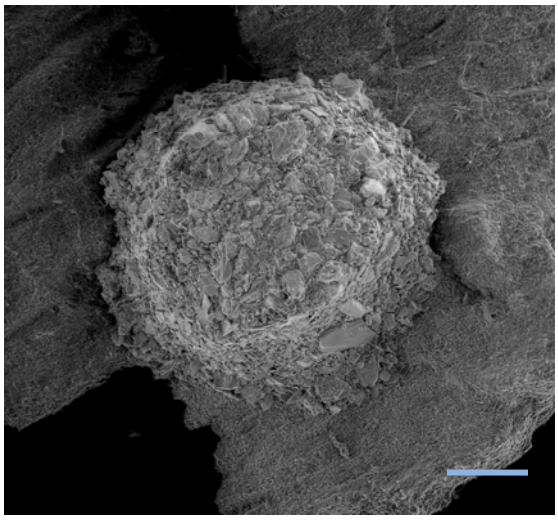

**Plate 2.** Egg capsule of *Beddomeia sp.*, scale 200 µm (image © Karen Richards)

## Confusing species

*B. petterdi* co-occurs with at least one species of *Austropyrgus* and a species similar to *Beddomeia lodderae*; however, it can be readily distinguished from these species in its markedly broader shell size. Due to their diminutive size and distinguishing characters, *Beddomeia* and *Phrantela* species cannot easily be identified in the field; however, they are readily distinguishable from most of the native freshwater genera. *B. petterdi* may be confused with other species of *Beddomeia* of similar external appearance (*B. paludinella paludinella, B. paludinella levenensis, Ampullaria tasmanica*). The 'plasticity' of shell shape within some individual species may also lead to incorrect identification. The colour of individual shells is not a taxonomically useful character. Reproductive characteristics are used to separate species (Ponder et al. 1993), but this requires microscopic dissection.

### DISTRIBUTION AND HABITAT

*B. petterdi* is known to occur in one tributary of Blythe River, near South Riana, in central northern Tasmania (Figure 1, Table 1), while an historic record 'from Blythe River' (grid reference indicating near the mouth of the Blythe River) cannot be confirmed. *B. petterdi* is known a small tributary of Blythe River, South Riana Rd, north central Tasmania, where they are located under stones, where it feeds actively, grazing on periphyton. Field observations indicate these snails have a preference for the underside and lower margins of rocks in quieter pools, co-occurring with other *Beddomeia* spp. (Ponder et al. 1993).

The species has an extremely narrow range, known only from one stream (Plate 3). The total length of stream in which the species occurs is unknown.

**Plate 3.** *Beddomeia petterdi* locality (image by Chris Spencer)

### POPULATION PARAMETERS

Population estimates are not available. Surveys have been undertaken at the known locality, however, repeat visits to the site to date have failed to relocate the species (K. Richards unpubl. data).

### RESERVATION STATUS

The known record for *B. petterdi* occurs within the Blythe River reserve, on private property.

### CONSERVATION STATUS

*B. petterdi* 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

**Table 1.** Population summary for *Beddomeia petterdi*

| | Location | Tenure | NRM region* | 1:25 000 mapsheet | Year last (first) recorded | Extent of subpopulation (ha) | Abundance |
|---|---|---|---|---|---|---|---|
| 1 | Tributary of Blythe River, South Riana | Private Property | Cradle Coast | Riana | 1982 | Unknown | Unknown |

*NRM region = Natural Resource Management region

(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. petterdi* the limiting factors are associated with agricultural practices, and altered flow dynamics in the immediate catchment from where the species is known, resulting in habitat modification or degradation. This species is confined to a small order stream subject to agricultural practices and irrigation scheme development; consequently it is highly vulnerable to habitat destruction and modification (Richards 2010). The known sites occur in remnant native riparian vegetation in a highly modified environment cleared for agricultural purposes. In 2011, a dam site for the Forth Irrigation scheme was proposed and approved immediately upstream of the only known locality of *B. petterdi*.

**Habitat modification and destruction**: *B. petterdi* occurs in areas subjected to ongoing anthropogenic disturbance brought about by agricultural land use; consequently it is highly vulnerable to habitat destruction and modification. Permanent removal of riparian vegetation increases stream temperatures and siltation, thus reducing habitat suitability for *B. petterdi*.

**Interspecific competition from introduced hydrobiids:** Owing to the restricted population of *B. petterdi*, 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. petterdi* by reducing stream flow and modification of riparian vegetation communities.

**Stochastic risk:** The known distribution of *B. petterdi* 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. petterdi* is to decrease the risk of extinction by maintaining the integrity of habitat at known sites through appropriate land management. To achieve this, specific management objectives include:

- 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.

**What has been done?**

**Targeted surveys & monitoring:** The type locality was re-surveyed in 2003 and 2010; however, no specimens of *B. petterdi* were obtained. An additional survey of the proposed dam footprint upstream of the site was conducted in 2012, but failed to locate further specimens of *B. petterdi*.

**Forestry management:** *B. petterdi* 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 - conduct more precise assessment of population size, distribution, ecological requirements and the relative impacts of threatening processes.
- 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 improve protection of the species - raise awareness of *Beddomeia* spp. within local communities and promote good hygiene practices for equipment used in and around waterways to reduce translocation of exotic snail species.

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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. Phone (03) 6233 6566; fax (03) 6233 3477.

**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.