Beddomeia wiseae

Hydrobiid Snail (Blizzards Creek)

TASMANIAN THREATENED SPECIES LISTING STATEMENT

Image © Karen Richards

Common name: Hydrobiid Snail (Blizzards Creek)

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

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

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

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

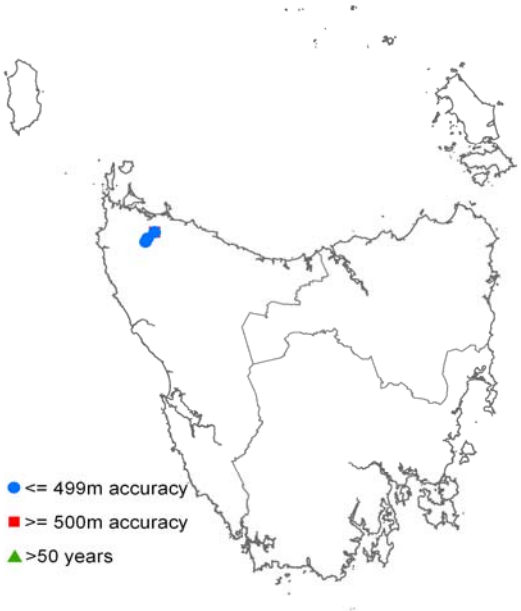

Figure 1. The distribution of *Beddomeia wiseae* showing NRM regions

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

SUMMARY

Beddomeia wiseae is a freshwater snail occurring in Blizzards Creek Irishtown, Allens Creek Irishtown, tributary of Duck River just south of Roger River township, and Birthday Ck, tributary of Duck River. The species has a narrow range, known only from four streams, with a maximum 4 km separation between the known sites, occurring in separated catchments. The threats to *B. wiseae* are associated with agricultural practices, resulting in habitat modification or degradation. *B. wiseae* may also be impacted by competition with and displacement by the exotic species *Potamopyrgus antipodarum* (New Zealand hydrobiid).
The principal management objectives for *B. wiseae* 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. wiseae 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. wiseae* 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. Like a number of other *Beddomeia* species, *B. wiseae* has a conical shape. This shell is 2.71-3.05 mm long, 1.76-1.98 mm wide, and has a protoconch of about 1.75 whorls with no microsculpture. The umbilicus is small, 0.10-0.20 mm wide. The species is not in asexually 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. wiseae*, as for most *Beddomeia* spp., 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. wiseae* are typical of *Beddomeia* and are 0.90-1.03 mm in maximum length. Egg capsules of *Beddomeia* spp. 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 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. wiseae is known from small streams near Irishtown, where they are located on submerged allochthonous material (leaves, wood) and stones, where it feeds actively, grazing on periphyton. Field observations indicate *Beddomeia* spp. have a preference for the underside and lower margins of rocks and stream debris.

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

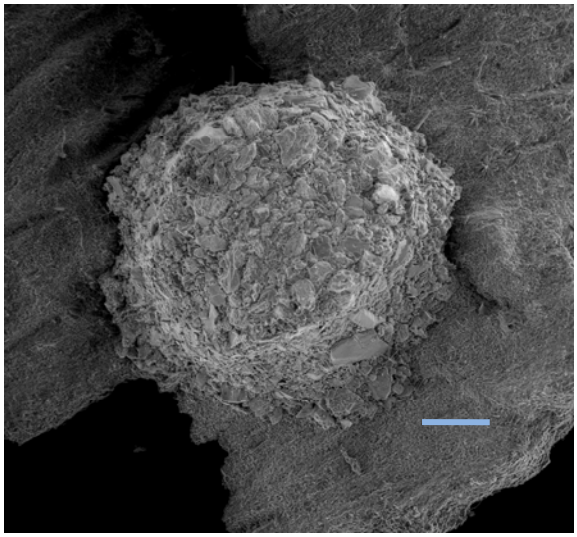

Plate 2. Egg capsule of *Beddomeia sp.*, scale 200 µm (image © Karen Richards)

Survey techniques

B. wiseae is a small, cryptic species which can be difficult to tell apart from other species of *Beddomeia,* and identification to species 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. wiseae co-occurs with at least two species of *Beddomeia* (*B. topsiae* and an undescribed species) and up to five species of *Austropyrgus* (K. Richards, unpublished data); however, it can be readily distinguished from *Austropyrgus* in its markedly broader, larger shell and lack of operculum peg, a feature not possessed by any *Beddomeia* species. 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. Shells of *B. wiseae* may be confused with other species of *Beddomeia* of similar external appearance (*B. zeehanensis, B. capensis, B. bowryensis, B. hullii*), however the known geographic range of these species do not overlap with *B. wiseae.* 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. Confusion between the more conical of *Beddomeia* species and the exotic species *Potamopyrgus antipodarum* may also occur where these species co-occur.

DISTRIBUTION AND HABITAT

B. wiseae occurs in Blizzards Creek Irishtown, Allens Creek Irishtown, tributary of Duck River just south of Roger River township, and Birthday Ck, tributary of Duck River (Figure 1, Table 1). The species has a narrow range, known only from four streams, with a maximum 4 km separation between the known sites, occurring in separated catchments (Plate 3). The total length of stream in which the species occurs is unknown. Subpopulations occurring in the streams are separated by topography and inhospitable environments (large stream and cleared agricultural land).

Plate 3. Habitat of *Beddomeia wiseae* (image by Karen Richards)

POPULATION PARAMETERS

Population estimates are not available. No comprehensive surveys have as yet been undertaken to estimate the population size at the known localities, although snail densities are known to differ between streams.

RESERVATION STATUS

Each of the known populations of *B. wiseae* occur in streams occur on private property.

Table 1. Population summary for *Beddomeia wiseae*

	Location	Tenure	NRM region*	1:25 000 mapsheet	Year last (first) recorded	Extent of subpopulation (ha)	Abundance
1	Blizzards Ck, Irishtown	Private Property	Cradle Coast	Lileah	(1989) 2004	Unknown	Low to Moderate
2	Allens Ck, Irishtown	Private Property	Cradle Coast	Lileah	2004	Unknown	Low
3	Birthday Ck, Scotchtown Rd	Private Property	Cradle Coast	Lileah	1989	Unknown	Low
4	Tributary of Duck River, Roger River township	Private Property	Cradle Coast	Lileah	1995	Unknown	Moderate

*NRM region = Natural Resource Management region

CONSERVATION STATUS

B. wiseae was listed in 1995 as rare on the Tasmanian *Threatened Species Protection Act 1995*. The species was uplisted to vulnerable 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 10 locations) and B2 (continuing decline inferred, observed or projected, in extent of occurrence (area of occupancy, quality of habitat and number of locations or subpopulations).

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. wiseae* the limiting factors are associated with agricultural practices, resulting in habitat modification or degradation. This species is confined to small order streams subject to agricultural practices and consequently are at higher risk of being impacted by habitat degradation and modification (Richards 2010). The known sites occur in remnant native riparian vegetation in cleared agricultural land.

Habitat modification and destruction: *B. wiseae* occurs in areas subject to ongoing anthropogenic disturbance brought about by agricultural practices; 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. wiseae*.

Interspecific competition from introduced hydrobiids: An additional threat is interspecific competition and displacement from the exotic New Zealand species, *Potamopyrgus antipodarum* in degraded waterways on the margins of forested areas (K. Richards unpubl. data). *P. antipodarum* is known to co-occur with *B. wiseae* at some sites (K. Richards, unpubl. data). Owing to the restricted subpopulations of *B. wiseae*, they are considered vulnerable to competition and displacement from *P. antipodarum*, 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. wiseae* by reducing stream flow and modification of riparian vegetation communities.

Stochastic risk: The fragmented distribution of the subpopulations of *B. wiseae* offer no opportunity for genetic exchange between subpopulations, thus exposing the species to a risk of extinction.

MANAGEMENT STRATEGY

Management objectives

The main objective for the management of the *B. wiseae* 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: One targeted survey was undertaken for this species in 2004 (K. Richards unpubl. data) for the Private Land Reserve Program. To date no subsequent targeted surveys for the species have been conducted.

Forestry management: *B. wiseae* 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?

Recent studies have improved knowledge of the ecology of several headwater stream-inhabiting *Beddomeia* species (Richards 2010), however, a complete understanding of the life-history of *Beddomeia* spp. remains limited. The following additional actions are recommended:

- To improve protection of the species – work with existing landholders to ensure promotion of good hygiene practices for equipment used in and around waterways known to contain the species to improve water quality and 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

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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.