

Action Statement

Flora and Fauna Guarantee Act 1988

No. 127

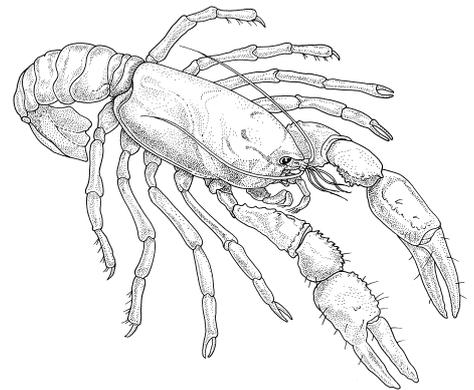
Narracan Burrowing Crayfish *Engaeus phyllocercus*

Description and distribution

The Narracan Burrowing Crayfish *Engaeus phyllocercus* Smith and Schuster is a member of the Parastacidae (Decapoda) family. The genus *Engaeus* is restricted to south-eastern Australia. In common with most other burrowing crayfish, it is cryptic and relatively small with adults having a carapace length of approximately 20 to 34.5mm (Horwitz, 1990a, Van Praagh and Hinkley 1999). Individuals appear red and purple in colour. A full taxonomic description is given in Horwitz (1990a) and further description can be found in Van Praagh and Hinkley (1999).

The Narracan Burrowing Crayfish is predominantly a burrower, spending most of its life underground. It has burrows, consisting of two or more openings which are typically found in the flood bed region of fern tree gullies in wet sclerophyll forest. Each opening carries a conical chimney of pelleted soil of varying height or a wider rim shaped chimney of 1 - 2 cm height. Burrows are sometimes found in groups in which chimney height decreases the further distance they are away from the creek bed (Van Praagh & Hinkley 1999). The burrows descend to lateral ramifications (10-30cm below the surface) below which there may be one or two further descending tunnels (Horwitz 1990a). The lateral ramifications may be situated directly below the root mats of Tree-ferns *Dicksonia antarctica* and *Cyathea* spp. (Horwitz 1990). Soils in the flood beds are often high in organic matter, dark and have a high silt component.

The species may sometimes be found in the banks of flowing creeks where the burrows have several openings ultimately descending to the deepest



Narracan Burrowing Crayfish
Engaeus phyllocercus
(Approximately life size - © Illustration by Savina Hopkins)



Distribution in Victoria
+ before 1970, ■ since 1970
(source: Atlas of Victorian Wildlife, DSE 2004)

level of the water table. These are described as 'type 2' burrows by Horwitz and Richardson (1986) which refers to burrows that are connected to the water table and the water is derived from ground water and surface runoff. The Crayfish appears to be confined primarily to blue-grey clay soils, however, a site at Darlimurla State Forest had a brown to light grey soil with relatively high coarse sand component (Van Praagh & Hinkley 1999).

The Narracan Burrowing Crayfish is sympatric with *E. hemicirratulus*, a larger common and widespread species of burrowing crayfish. Both species typically exhibit a distinct microhabitat separation. Burrows of *E. hemicirratulus* are restricted to yellow-orange clay dominated soils of hill top slopes above the level of the flood-bed where the soil is less saturated (Horwitz 1990b) however, sometimes habitat demarcation may not be very clear as *E. hemicirratulus* has been found within 10cm of *E. phyllocercus* (Van Praagh and Hinkley 1999). The burrow system of the *E. hemicirratulus* is termed a 'type 3' burrow system by Horwitz and Richardson (1986) which describe burrows that do not connect to the water table. These burrows have fan-shaped chimneys and tunnels descending obliquely to large water filled chambers 10-15 cm in diameter (Horwitz and Richardson 1986). The water is derived from surface runoff or from the downward movement of water through the soil (Horwitz 1990b). The Narracan Burrowing Crayfish has also been found in sympatry with *Euastacus kershawi* whose burrows open into the creek (type 1b burrow system) (Van Praagh and Hinkley 1999).

Horwitz (1990b) notes that the species appears to breed in mid to late spring and carries larvae during summer probably releasing juveniles in late summer. The species life history and ecological requirements is poorly known.

The Narracan Burrowing Crayfish has been recorded over a 30km section of the highland region to the north and west of the western Strzelecki Ranges in South Gippsland, Victoria, at locations above 120m (Horwitz 1990a). The species was first collected near Narracan around the turn of the century (Horwitz 1990a). Extensive collecting has failed to record the species to the north, south or east of this range, although Horwitz (1990b) suggests the species distribution may extend further to the west if further surveys were undertaken. The species range occurs in the upper reaches of the Lang Lang and Tarwin Rivers the Mt. Worth State Park and to the south of the Moe River and west of Narracan Creek. Other locations include Korumburra, Loch, Thorpdale, Trafalgar, Warragul, Wooreen and Yarragon. The species has also been recorded from Wilsons

Promontory National Park, however, this is likely to be a misidentification (Van Praagh & Hinkley 1999).

Current conservation status in Victoria

Horwitz (1990a).....rare

The Narracan Burrowing Crayfish has been listed as a threatened taxon under the **Flora and Fauna Guarantee Act 1988** (SAC 1993). The Narracan Burrowing Crayfish, although relatively common within its range, has a very restricted distribution. The area where the species has been recorded was previously tall wet sclerophyll forest (Wet Forest Ecological Vegetation Class (EVC 30) dominated by Mountain Ash *Eucalyptus regnans* (Horwitz 1990a). Much of the area has been significantly modified since European settlement, primarily being cleared for dairy farming and crops such as potatoes. Many of the gullies in which the species occur retain some native vegetation (Horwitz 1990a). Van Praagh and Hinkley (1999) found that many of the sites they surveyed had a dense understorey or dominance of tree-ferns such as Soft tree-fern (*Dicksonia antarctica*) and Rough tree-fern *Cyathea australis* as well as the 'wet ferns' Mother Shield-fern *Polystichum proliferum* and Hard Water-fern *Blechnum watsii*. Buttercup *Ranunculus* spp. and native nettle *Urtica incisa* often made up, a sometimes quite sparse, ground cover.

The species life history, population dynamics and ecological requirements is poorly known, although it is thought that alteration in drainage patterns, water table levels and removal of riparian vegetation may adversely affect the species. Yen and Butcher (1997) note that clearing of native riparian vegetation affects the hydrology of a catchment and can lead to soil erosion, salinisation and increased sedimentation within streams. In its final recommendation the Scientific Advisory Committee (SAC 1993) has determined that the Narracan Burrowing crayfish is:

- significantly prone to future threats which are likely to result in extinction; and
- very rare in terms of abundance or distribution.

Major Conservation Objectives

To guarantee that the Narracan Burrowing crayfish can survive, flourish and retain its potential for evolutionary development in the wild. To protect the species from threatening processes and to ensure the long-term viability of existing populations.

Management Issues

Ecological issues specific to the taxon

The species has a restricted distribution and occurs on private land, roadside reserve, State Park, State forest and in a Natural Features Reserve. The extent of the species distribution within these areas is not known.

At present the distribution of the species on cleared land and the extent of stock grazing within the known range of the crayfish is unclear. Generally creek frontage on private land in the area is unfenced, allowing stock access. Due to the clayey nature of the soil, this riparian habitat is particularly sensitive to pugging and compaction by stock. Removal of riparian vegetation and grazing contribute to soil erosion, stream bank damage, siltation of streams and possible damage to the crayfish burrows. Although the role of native vegetation in the survival of the species is not known, the species occurs predominantly in areas where remnant riparian vegetation remains (Horwitz 1990a). This suggests that native vegetation may be important for the species conservation.

The effects of fertilisers, herbicides and pesticides resulting from agricultural activities on the burrowing crayfish are not known.

Forest Harvesting

The distribution of the Narracan Burrowing crayfish encompasses land used for timber production by Hancock Victorian Plantations Pty. Ltd. and AMCOR. Little is known about the impacts of forestry practices on the crayfish, however it is thought that forestry activities may pose direct and indirect threats to the crayfish through habitat destruction from creation or use of logging roads and removal of vegetation (Horwitz 1990a). Any activity which may lead to an alteration in the nature of the streamside water table or drainage patterns could seriously impact on the species survival. Variation in stream flows and water table levels occur when forest vegetation is cleared and when regrowth forest is planted. This is due to decreased transpiration rates after tree felling followed by increased transpiration rates in regrowth. Any activity which damages stream bank integrity and alters water tables or drainage lines could be potentially harmful. The surrounding streamside vegetation within the plantation area is currently protected by Regional prescriptions and the *Code of Forest Practices for Timber Production* (NRE 1996), which excludes timber extraction operations from streamside buffers and steep zones. A requirement of this 'code' is the production of Forest Management Plans (FMPs) which include detailed prescriptions for the conservation of native forest fauna.

Private Land

Privately owned land in this region is primarily used for agriculture including cattle grazing and dairy production. Creek frontages are generally unfenced, allowing stock access. Due to the clayey nature of the soil and the nature of the floodplains in which the species' burrow, this riparian habitat is particularly sensitive to pugging and compaction by cattle. Indigenous vegetation has been removed from some private land, although scattered remnants are present along stream banks. The species is most likely to occur where remnant vegetation remains. Removal of riparian vegetation combined with the impacts of stock grazing contribute to soil erosion, stream bank damage, siltation of streams and possible damage to the crayfish burrows.

Wider conservation issues

Protection of riparian habitat and associated in-stream habitat has broad benefits for other native species which occur within range of the Narracan Burrowing Crayfish.

There are five species of native burrowing crayfish and several species of native fish that occur within the range of the Narracan Burrowing Crayfish. Few fish surveys have been undertaken in streams within the range of the Narracan Burrowing Crayfish.

Protection of the stream bank habitat would benefit many native species as well as assisting landowners in control of soil erosion and increased water quality.

'Degradation of native riparian vegetation along Victorian rivers and streams' (SAC 1996) is listed as a potentially threatening process under the **Flora and Fauna Guarantee Act 1988**.

Previous Management Action

Horwitz (*pers. comm.*) has surveyed extensively throughout Victoria for all *Engaeus* species and Van Praagh and Hinkley (1999) conducted surveys as part of the development of the Gippsland Regional Forest Agreement (NRE 1998) targeting unsurveyed areas within the known range of *E. phyllocercus*.

Intended Management Action

Surveys and Monitoring

1. Conduct extensive surveys to accurately map the distribution of the species within the western Strzelecki Ranges. Map the distribution of the species in relation to streams and drainage channels to develop appropriate sizes of buffer zones. Record all locality data on the *Atlas of Victorian Wildlife*.

Responsibility: NRE (Parks, Flora and Fauna Division, Forests Service, Gippsland Region)

Research

2. Encourage research into the biology and ecology of the Narracan Burrowing Crayfish to identify the effects of agricultural and forest management practices on crayfish populations. Priorities for research include:
 - Determining the number, size and geographic distribution of the Narracan Burrowing Crayfish populations;
 - The long term life history, biology and ecological requirements for the species;
 - Identification of critical habitat including soil types, vegetation requirements, hydrological parameters and catchment-based characteristics;
 - Determining the impact of various disturbances upon aspects of the Narracan burrowing crayfish ecology, habitat use and population size;
 - Determine and monitor the effects of agricultural and forestry activities including altered hydrology, prescription burns and timber harvesting;
 - Monitoring the effectiveness of buffer strips in protecting the crayfish.

Responsibility: DSE (Biodiversity & Natural Resources Division, Forests Service)

Habitat protection and restoration

General:

3. Establish a buffer zone around selected localities (the number to be determined when extent of population distribution is known). Where the species occurs in State forest, these buffers would be incorporated into the harvesting plans.

Responsibility: DSE (Forests Service, Gippsland Region), Parks Victoria, landholders

4. Avoid locating roads or tracks within buffer zones. Soil compaction may occur from snig tracks and may interfere with subsoil and surface drainage, thereby affecting water regimes in soils where the crayfish occurs, particularly in seepage zones at the foot of slopes.

Responsibility: DSE (Gippsland Region), Parks Victoria, landholders, local Shires,

5. Prescription burning must be used with caution in areas that contain soils rich in organic matter. Gullies, seepage zones and floodplain regions and should not be burnt during the driest time of the year. Soil moisture should be measured before any prescription burns take place within crayfish habitat. Burns within crayfish habitat

should be avoided during late spring and early summer when the species is close to or above the soil surface.

Responsibility: DSE (Biodiversity & Natural Resources Division, Forests Service, Gippsland Region), Parks Victoria, landholders, Country Fire Authority

State forest:

6. Establish streamside buffers consistent with the minimum standards within the *Code of Forest Practices for Timber Production* (NRE 1996). The *Code of Forest Practices for Timber Production* (NRE 1996) require that a streamside buffer with a minimum width of 20m either side of permanent streams (Class 1) and a streamside buffer or filter of 10m either side of temporary streams and drainage lines (Class 2), be protected from harvesting to preserve water quality and other environmental assets. A 20m buffer is required around wetlands which includes permanent spring, and swampy ground (floodplains).

Responsibility: DSE (Gippsland Region, Forests Service)

7. The construction of new roads or stream crossings will be avoided within the streamside buffers for at least 1km up-stream from the Narracan burrowing crayfish site.

Responsibility: DSE (Gippsland Region, Forests Service)

8. Where the Narracan Burrowing Crayfish occurs in seepage or flood plain zones, snig tracks need to be designed to minimise alteration to the site's normal drainage patterns.

Responsibility: DSE (Gippsland Region, Forests Service)

Education

9. Encourage landholders to fence off direct access to creeks in sensitive areas and encourage removal of stock from floodplain areas where the species occurs, particularly in the spring when the ground is very wet. These land holders should be advised of the *Land for Wildlife* Program and grants that are available to assist with fencing materials and seedling production.

Responsibility: DSE (Biodiversity & Natural Resources Division, Gippsland Region), West Gippsland Catchment Management Authority

10. Educate and involve local *Landcare* groups and other community groups such as field naturalists in the conservation of the species. Educate landholders and land managers about the crayfish through this Action Statement and the production of a colour brochure. Produce

and distribute a *Land for Wildlife* Note for the species.

Responsibility: DSE (Biodiversity & Natural Resources Division, Gippsland Region), West Gippsland Catchment Management Authority

Habitat restoration

11. Pursue the rehabilitation of degraded environments where the species is known to occur. Advise landowners within the catchment of the *Land for Wildlife* Program and grants that are available to assist landowners in protected and enhancing riparian habitat. Encourage whole farm planning principles and practices through extension activities.

Responsibility: DSE (Gippsland Region), West Gippsland Catchment Management Authority

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: <http://www.dse.vic.gov.au>

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