

Action Statement

Flora and Fauna Guarantee Act 1988

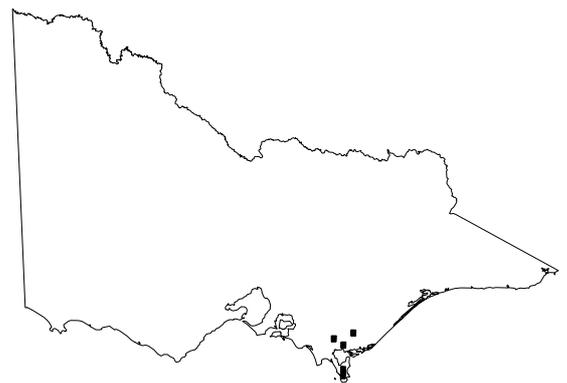
No. 176

South Gippsland Spiny Crayfish *Euastacus neodiversus*

Description and distribution

The South Gippsland Spiny Crayfish *Euastacus neodiversus* Riek 1969 is a small freshwater crayfish. Members of the genus *Euastacus* are distinguished by heavy claws or chelae and a spiny appearance (Zeidler 1982). The South Gippsland Spiny Crayfish is distinguished from other *Euastacus* by the arrangement, number and location of various spines on the exoskeleton. Adults have a maximum Occipital - Carapace Length (OCL) of 45 mm and females mature at approximately 40 mm OCL. The South Gippsland Spiny Crayfish has a brown/green upper body colour which is paler along the lower sides. Underside of body is pale blue, green and cream. General tubercles are pale yellow or green. Abdominal spines are blue or blue/brown, white tipped when sharp.

The South Gippsland Spiny Crayfish occurs at Wilsons Promontory and the Strzelecki Ranges in southern Victoria at elevations of 19 to 600 m above sea level. The species range is divided in two by the low land of the Yankie Isthmus, which appears to present unsuitable habitat (Morgan 1986). The South Gippsland Spiny Crayfish appears to be restricted to the southern side of the Strzelecki Ranges and the Merriman Creek system in South Gippsland represents the most eastern extent of the species range (Morgan 1986, Raadik 2001). The species occurs in streams in sclerophyll forest where the streamside vegetation is dominated by Mountain Ash (*Eucalyptus regnans*), tree ferns (*Cyathea* spp) and Lilly Pilly *Acmena smithii* (Morgan 1986). Its distribution at Wilsons Promontory is coastal heath with ferns and vines along stream banks.



South Gippsland Spiny Crayfish *Euastacus neodiversus* Distribution in Victoria
DSE (2004)

Habitat

Streams where the South Gippsland Spiny Crayfish have been recorded are typically narrow and shallow with stream temperatures ranging between 7 and 15 °C (Koster *et al.* 1999). Dissolved oxygen is generally high. The species is more common in streams with pool habitat and with little or no aquatic vegetation cover (Koster *et al.* 1999). Other *Euastacus* species occur in coastal and inland streams of south-east South Australia, and in both lowland and mountainous regions of Victoria. In New South Wales and Queensland,

smaller *Euastacus* species tend to be confined to cool mountain streams, while larger species tend to occur at lower altitudes (Morgan 1997).

The *Atlas of Victorian Wildlife* (DSE 2004) has only 11 records of the species for the Victoria. Collation of data from surveys for the RFA process and from various other surveys found that the South Gippsland Spiny Crayfish was recorded at a relatively low number of sites. The species was recorded at 11 of 27 sites (41%) surveyed within its known range in the South Gippsland River Basin (Koster *et al.* 1999) where a total of 100 individuals were collected. A further four were found in Glenmaggie Creek within the Thomson River Drainage Basin (Raadik *et al.* 2001).

Life history and ecology

Most species of *Euastacus* are moderate burrowers, seeking refuge under rock ledges and amongst submerged, in-stream tree roots (Zeidler 1982).

The diet of spiny freshwater crayfish consists primarily of aquatic and semi-aquatic vegetation, benthic invertebrates (Goddard 1988), fungi and bacteria found in rotting detrital matter (DCE 1992).

Mating activity between mature crayfish occurs from May onwards each year, following which females carry eggs under the tail. The eggs hatch from October onwards, depending on seasonal conditions and the species. The dependent juvenile crayfish are carried beneath the tail for some weeks or months after hatching. The yolk of the egg is retained by the young hatchlings as a yolk sac supplying food during early growth. Once the yolk sac has been completely absorbed, the young disperse to fend for themselves.

Conservation status

National conservation status

South Gippsland Spiny Crayfish has not been listed under the Commonwealth **Environment Protection and Biodiversity Conservation Act 1999**.

Ballie and Groombridge (1996) undertook an assessment based on the IUCN criteria. Their assessment determined the species to be Vulnerable according to criterion B(1 + 2c); that is, having a severely fragmented population or known to exist at no more than five localities and continuing decline inferred, observed or projected in area, extent and/or quality of habitat.

Victorian conservation status

South Gippsland Spiny Crayfish has been listed as threatened under the **Flora and Fauna Guarantee Act 1988** (SAC 2001).

Decline and threats

The South Gippsland Spiny Crayfish has a restricted distribution and has been found to occur in relatively low abundance (Raadik *et al.* 2001). The biology of this species is poorly known, and the environmental parameters under which it exists are not well understood. The effects of various land uses such as forestry and agriculture on crayfish populations are unknown. The slow growth rate and low fecundity of many *Euastacus* renders them less resilient to reduction in population numbers through habitat destruction and catastrophic events.

Invertebrate species which have a limited distribution are vulnerable to localised environmental perturbations (Williams 1990). Localised catastrophic events, such as an extended drought or large sediment pulse could drastically effect populations of the South Gippsland Spiny Crayfish. Roads across or along-side streams are the most likely potential source of a sediment pulse. Roading can cause an increase in sedimentation immediately downstream of the road works, resulting in a decline in the quality of both the water and the substrate (Koehn and O'Connor 1990).

The adverse effects of habitat modification upon freshwater crayfish have been demonstrated in Europe and North America (Westman 1985). Geddes (1990) attributes the decline of the Murray River Crayfish *E. armatus* to changes in flow regime, stream morphology, productivity, water quality and sediment characteristics, with deoxygenation suspected as a major factor.

The extent of the distribution of the South Gippsland Spiny crayfish within land used for timber harvesting is unknown. The species occurs in streams surrounded by wet sclerophyll forest at Tarra Bulga National Park in the Strzelecki Ranges. This habitat occurs extensively in the Strzelecki Ranges and it is most likely the species occurs in suitable habitat within this area. A substantial amount of land within the potential range of the species distribution is used for plantations.

Little is known about the impacts of forestry practices on crayfish. However, many studies have shown direct effects of timber harvesting on the macro-invertebrates of streams due to decreased water quality and quantity (Campbell and Doeg 1989). Forestry activities may pose direct and indirect threats to the South Gippsland Spiny crayfish by altering the run-off and flow characteristics of the stream, the amounts and type of organic debris entering the stream, temperature regimes, and the amount and rate of in-stream sediment. The Code of Forest Practices for Timber Harvesting (NRE 1996) includes prescriptions to address these issues.

Sediment deposition in streams is thought to be detrimental to young crayfish as it coats the substrata and fills interstitial spaces. These areas may be of value in protecting juvenile crayfish from predators. In a recent survey of Gippsland Spiny Crayfish habitat, Koster et al. (1999) found that a negative relationship between the presence of South Gippsland Spiny Crayfish and levels of in-stream silt.

Any activity which damages stream bank integrity and alters water tables or drainage lines could be harmful to the species survival locally (Horwitz 1990a). Therefore, the location and design of roads, drains, culverts and bridges is important to the protection of habitat.

Removal of the riparian vegetation alters the light and temperature of streams, and affects the type and amount of debris accumulation in streams, changes which generally reduce the suitability of streams as habitat for *Euastacus* species. The coarse, woody debris provides an important crayfish habitat and the finer debris would provide an important food source for the species.

The long-term changes in catchment hydrology following the harvesting of older multi-aged forest and regeneration with even-aged regrowth forest have been little studied. 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 forest. In situations where a high proportion of a catchment has been converted to regrowth, streams may temporarily become less suitable as habitat for some aquatic species, especially during drought. Such hydrological changes may result in a temporary reduction in the area of suitable habitat available to the South Gippsland Spiny Crayfish.

The introduction of exotic biota could also be a threat due to predation, competition, or the spread of disease (Horwitz 1990b). Introduced fish, including Brown Trout *Salmo trutta*, occur throughout many of the river systems within the range of *E. neodiversus* and predation may have a detrimental impact on populations of the crayfish.

Existing conservation measures

A number of surveys have been carried out in the waterways within the range of the South Gippsland Spiny Crayfish between 1986 and 2000 (Horwitz 1990, Morgan 1986, Raadik 1992, Raadik *et al.* 2001). In 1999, a survey of spiny crayfish as part of the Gippsland RFA process was conducted which included observations on distribution, habitat requirements and biology of the South Gippsland Spiny Crayfish (Koster *et al.* 1999). A variety of sampling methods were employed, with

electro-fishing and the use of baited fish traps being the most common techniques. As a result of this work, the distribution of the South Gippsland Spiny Crayfish is relatively well known.

In the Strzelecki Ranges, South Gippsland Spiny Crayfish lives in waterways flowing through Crown land leased for timber and pulp production purposes to Grand Ridge Plantations, a subsidiary of Hancock Victorian Plantations Pty Ltd. The 'Code of Forest Practice for Timber Production' (NRE 1996) includes guidelines for the protection of streams and streamside vegetation within privately-managed plantations. The Code requires the establishment of buffer and filter strips of between 20 and 40 m (depending on stream size and slope classes) of vegetation adjacent to streams within which native vegetation must be protected and harvesting of plantation trees must be conducted with care. Soil disturbance within these strips must be minimised. Minimum standards are also applied to the construction of forest roads.

The South Gippsland Spiny Crayfish also occurs in waterways which flow through National Parks and Reserves. These include Tarra River, Macks Creek and Middle Creek within Tarra Bulga National Park and Growlers Creek, Sealers Creek and Lilly Pilly Gully within Wilsons Promontory National Park. The species has been recorded in Agnes River and Turtons Creek and its habitat may therefore be protected within Agnes Falls and Turtons Creek Scenic Reserves.

Conservation Objectives

Long-term objective

To ensure that the South Gippsland Spiny Crayfish survives, flourishes and retains its potential for evolutionary development in the wild.

Objectives of this Action Statement

1. Determine the distribution and abundance of the South Gippsland Spiny Crayfish
2. Protect the in-stream and riparian habitat of the known populations of South Gippsland Spiny Crayfish
3. Determine key habitat parameters for the South Gippsland Spiny Crayfish as a basis for future management

Intended management actions

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation database. Detailed information about the actions and locations, including priorities, is held in this system and will be

provided annually to land managers and other authorities.

Systematic Survey

1. Survey the streams in those catchments most likely to contain populations of South Gippsland Spiny Crayfish in order to improve knowledge of the distribution and abundance of the species. Surveys will concentrate on waterways within the Strzelecki Ranges including, Morwell, and Tarra Rivers as well as, Traralgon and Middle Creeks. Surveys within Wilsons Promontory National Park will be conducted. Information collected will include in-stream and riparian habitat data.

Responsibility: DSE (Biodiversity & Natural Resources Division), Parks Victoria

Monitoring

2. Monitor two of the known populations of South Gippsland Spiny Crayfish at Wilsons Promontory and Strzelecki Ranges regularly, in order to gather information about its ecology.

Responsibility: DSE (Biodiversity & Natural Resources Division), Parks Victoria

Habitat protection

3. Incorporate actions to protect, enhance and restore South Gippsland Spiny Crayfish habitat into relevant Regional Catchment Strategies or their subordinate strategies via Biodiversity Action Plans. Implement these actions, according to priority, as resources become available, in conjunction with other agencies, community groups and landholders.

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

4. Provide information and advice, including maps of habitat, to local government authorities for inclusion in environmental significance overlays as part of the local planning schemes.

Responsibility: DPI (Gippsland Region)

5. Protect South Gippsland Spiny Crayfish habitat within the Tarra-Bulga and Wilsons Promontory National Park by minimising or eliminating the impacts of recreation and park management activities which might pose a threat to this species or its habitat, including construction or upgrading of roads, tracks and visitor facilities, and fire prevention or suppression activities.

Responsibility: Parks Victoria

6. Liaise with private plantation managers to protect habitat of South Gippsland Spiny Crayfish within plantations, including zoning

such habitat and appropriate buffer zones to exclude timber harvesting, roading and other activities or to minimise their impact.

Responsibility: DPI (Gippsland Region)

7. If previously undiscovered populations of the South Gippsland Spiny Crayfish are located, ensure that its habitat is protected using measures which are appropriate to the land tenure and land use in each case, including zoning, prescriptions, planning controls or fencing.

Responsibility: DPI (Gippsland Region)

8. If populations are discovered on or adjacent to private land, provide landholders with information and advice regarding measures to protect South Gippsland Spiny Crayfish.

Responsibility: DPI (Gippsland Region)

9. Pursue funding under the Natural Heritage Trust (or similar programs) and/or provide incentives to support fencing of riparian habitat on private land to exclude stock.

Responsibility: DPI (Gippsland Region), West Gippsland Catchment Management Authority, local government authorities

Staff awareness

10. Ensure that all relevant Parks Victoria and Department of Primary Industries staff working in the known range of the South Gippsland Spiny Crayfish are aware of its existence and report suspected records of the species (Gippsland Region) to the Atlas of Victorian Wildlife.

Responsibility: DPI (Gippsland Region), Parks Victoria

Research

11. Encourage research into the biology and ecology of the South Gippsland Spiny Crayfish to identify the effects of agricultural and forest management practices on crayfish populations. Priorities for research include:

- The biology and ecological requirements for the species;
- Identification of critical habitat including, tolerances, hydrological parameters and catchment-based characteristics;
- Determining the impact of various disturbances upon aspects of the South Gippsland Spiny crayfish ecology, habitat use and population size, in particular the impact of silt;
- 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)

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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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