



Bathurst Copper Butterfly

Paralucia spinifera

(Edwards and Common, 1978)

Other common name(s): Purple Copper Butterfly

The following information is provided to assist authors of Species Impact Statements, development and activity proponents, and determining and consent authorities, who are required to prepare or review assessments of likely impacts on threatened species pursuant to the provisions of the *Environmental Planning and Assessment Act 1979*. These guidelines should be read in conjunction with the NPWS *Information Circular No. 2: Threatened Species Assessment under the EP&A Act: The '8 Part Test' of Significance* (November 1996).

Identification of habitat

Current knowledge suggests that *P. spinifera* occurs only at altitudes in excess of 900 metres and requires the presence of the larval food plant *Bursaria spinosa* subsp. *lasiophylla*. Aspect, geology, vegetation overstorey species are sufficiently variable at known locations of *P. spinifera* to preclude their use as factors in identifying potential *P. spinifera* habitat. Similarly, the cryptic nature of the attendant ant, *Anonychomyra itinerans*, and its apparent absence from at least one *P. spinifera* location precludes its use as an indicator of the presence or absence of *P. spinifera*.

It is recommended that potential habitat for *P. spinifera* be identified by the presence of *Bursaria spinosa* subsp. *lasiophylla* at locations above approximately 900 metres in altitude. *Bursaria spinosa* subsp. *lasiophylla* is described in Cayser et al (in prep).

Survey

P. spinifera has been described by adult (butterfly) morphological features (Edwards and Common 1978), hence an

adult must be examined to confirm identification.

The adult phase of a *P. spinifera* may only last two weeks, however, adults may be expected to be active at a site for a number of weeks as emergence of adults is affected by intra-site microclimate variation.

Survey of potential habitat for *P. spinifera* should be designed in cognisance of; records of adult emergence occurring between August and November, the factors affecting activity (eg. weather), the emergence of adults at nearest known sites, the sensitivity of the species to disturbance and handling, the need to ensure that the habitat is adequately sampled.

Life cycle of the species

The ecology of *P. spinifera* is described in the referenced literature and the Recovery Plan.

P. spinifera's lifecycle includes egg, larval, pupal, and adult stages. These stages encompass a number of key elements; oviposition, larvae emergence and survival, acquisition of nutrition through grazing of host plant by larvae, diurnal and nocturnal migration between host plant and *A. itinerans* nest, pupation in *A. itinerans* nest, emergence of adults, courtship and mating, dispersal, and so on. The continuity of *P. spinifera*'s lifecycle may be interrupted if any one of these elements is directly or indirectly affected.

As the lifecycle of *P. spinifera* relies on a mutualistic relationship with the ant species, *A. itinerans*, and on the presence of the larval food plant *B. spinosa* subsp. *lasiophylla* the lifecycles of these species must be considered in assessing potential impact on *P. spinifera*.

For example, the spacial distribution of *B. spinosa* subsp. *lasiophylla* affects its availability to larvae, which are not known to cross open ground to graze - only reaching additional plants by traversing interconnecting branchlets. Accordingly, changes to the actual or effective density of *B. spinosa* subsp. *lasiophylla* through wildfire fuel reduction or by the invasion of weeds may cause early pupation due to starvation, reduced adult size and reduced fecundity. Reduced fecundity may lead to population decline and local extinction.

Viable local population of the species

Given that the combined population of *P. spinifera* is small and occurs as discrete populations within a restricted range, activities which result in the destruction of individuals have the potential to significantly affect the viability of a population of *P. spinifera*.

Threatening processes

The *Threatened Species Conservation Act* 1995 (TSC Act) lists high frequency fire and clearing of native vegetation as key threatening process. Additionally, processes that are generally considered by the scientific community as being detrimental to a species or its habitat (habitat degradation, introduction of weeds, vermin or feral species, etc.) should be considered.

The Recovery Plan identifies clearing of habitat (associated with grazing by stock or feral animals, development or land use activities), isolation of habitat, weed invasion, inappropriate fire regimes, collection of specimens, disturbance to soils and vegetation by feral animals, loss of attendant ant, and dust generated by traffic as threats.

A significant area of habitat

The restricted distribution of *P. spinifera* may be partially explained through the apparent reliance on a combination of restrictive habitat requirements, mainly its mutualistic association with *A. itinerans* and requirement for the larval food plant *B. spinosa* subsp. *lasiophylla*. However,

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both these species are more widespread than *P. spinifera*.

There is insufficient information on which to estimate any reduction in the natural extent or distribution of this species or its habitat, except where isolated populations may have become extinct. Recent genetic studies allow for a recent reduction in the extent of habitat. Dexter and Kitching (unpub.) consider the population sites as refugia from past climate changes.

- Any assessment of the effect of a proposal on habitat should consider all direct and indirect effects on the habitat of *P. spinifera* and on the habitat of *A. itinerans* and *B. spinosa* subsp. *lasiophylla*.

Isolation/fragmentation

P. spinifera occurs at twenty-nine locations. A genetic study found that the heterogeneity within populations was high and that the individual populations were closely related. This indicates either some movement of *P. spinifera* between populations, or that the time since separation and isolation of the various populations is relatively recent (E. Dexter pers. comm.).

P. spinifera has a low dispersal capability, which may present an increased risk of extinction due to the potential for fragmented populations to have inadequate levels of genetic exchange. Accordingly, isolated habitat fragments are less likely to be recolonised if local extinction does occur. In addition to habitat removal, structures or other developments may restrict movement of *P. spinifera*.

Regional distribution of the habitat

The TSC Act defines region as the regions defined in the Interim Biogeographic Regionalisation of Australia. The known distribution of *P. spinifera* is confined to the South Eastern Highlands region.

Limit of known distribution

The distributional limits of *P. spinifera* are described in the Recovery Plan. The distribution of *P. spinifera* is extremely

restricted, therefore the loss of individuals from the limit of *P. spinifera*'s distribution may result in range contraction and potential loss of genetic diversity, hence may affect the viability of *P. spinifera*.

Further survey may identify additional populations and range extensions

Four of the 29 known populations of *P. spinifera* are located within land managed for conservation purposes by the NPWS. Although a genetic study found that the heterogeneity within populations was high and that the individual populations were closely

related (Dexter and Kitching unpub.), it is not known whether *P. spinifera*'s genetic variation is adequately reserved. Similarly, in the absence of adequate population studies, it is not known whether a significant proportion of the total population is reserved. The reserved sites do not represent the full range of vegetative variability, altitudinal range or geographic range.

Critical habitat

There is currently no critical habitat declared for *P. spinifera*.

For Further Information contact

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References

Cayser L.W., Crisp M.D. and Telford I.R.H. (Draft 1997 (in prep) *Bursaria* (Pittosporaceae): A Morphometric Analysis and Revision.

Dexter E. M. and Kitching R. L. *Nomination for the Register of the National Estate*. Australian Heritage Commission (unpublished report).

Edwards E. D. and Common I. F. B. (1978) A New Species of *Paralucia* Waterhouse and Turner from New South Wales (Lepidoptera: Lycaenidae) in *Aust Ent Mag* 5(4):65-70

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