

Municipal councils have played a key role in conserving the Eltham copper butterfly.

Issues of **rarity** cloud plans for **action**

Australian butterfly enthusiasts are eagerly awaiting the endorsement by Environment Australia of a national strategy for conserving Australia's butterflies.

The Butterfly Action Plan, prepared by Dr Don Sands and Dr Geoff Clarke from CSIRO Entomology and Dr Tim New from LaTrobe University, looks at trends in the persistence, abundance and distribution of 218 butterfly species and sub-species of conservation concern in Australia.

'We're very keen to see that the plan is refereed critically and constructively,' New says. 'If it's accepted as authoritative, it will essentially help dictate national and regional priorities in regard to butterfly conservation.'

For threatened species, the plan defines the urgency of the conservation need, the history of conservation interest, threats to the species, recovery actions needed and how these might be undertaken.

A key recommendation of the plan is the need to re-evaluate the way butterfly taxa (species and sub-species) are earmarked for conservation. At present, their conservation status is determined by guidelines developed by the International Union for the Conservation of Nature (IUCN).

These guidelines were developed for vertebrates, but according to Sands, New and Clarke, are inappropriate for invertebrates. This is because four of the five criteria used to determine if a taxon is threatened, rely on counting adult populations and their trends over time.

Insect populations, however, have a natural tendency to fluctuate widely and quickly, as they respond to weather conditions, the availability of food plants and interactions with natural enemies.

Most insects also have a high 'intrinsic rate of increase'. This means they can rapidly build up population numbers under favourable conditions, making population measurements irrelevant.

'During a drought most insect populations are low, but when we get rain they come up again,' Sands says.

In the past, conservation assessment has also tended to focus on the 'rarity' of a species. But in butterfly terms, rarity does not necessarily mean the species is threatened in the long term.

'Species considered rare may simply be cryptic, enabling them to avoid detection,' Sands says. 'They might be hard to find because they fly high above the ground or their numbers might be driven down because of natural processes such as parasitism. That makes the species rare, but not threatened.'

'So misconceptions relating to conservation arise from confusion between species that are intrinsically rare and those that are threatened by human-induced processes such as habitat destruction.'

These misconceptions and inappropriate assessment methods have resulted in some butterfly species being listed as 'threatened' (critically endangered, endangered or vulnerable) under state legislation, when in fact they're not.

Sands says that of the seven endangered and 11 vulnerable butterflies listed in Queensland, he considers that only about four are actually threatened.

Funding for conservation projects is assessed on the level of threat to a species, so it is essential that species in need of help are identified over those that aren't. Accurate lists are also essential for assessing the threat new developments pose to a species and have been used in court to resolve disputes.

Alternative assessments

To solve these problems, Sands suggests other assessment methods should replace IUCN guidelines. Principal among these is the identification of human-induced threats to a species and the ecological communities to which it belongs.

These threats include weed invasion, inappropriate land management practices and, by far the biggest threat to butterflies, habitat loss.

'Butterfly conservation is really about protecting habitat,' Sands says. 'You can't separate butterflies from the ecological communities in which they live.'

As well as addressing the shortcomings of the IUCN criteria in relation to insects, the Butterfly Action Plan emphasises the importance of community participation in species recovery plans and the involvement of municipal councils.

'Working with the Caloundra Council on the Richmond Birdwing project, I realised there was a level of conservation concern



Above: The Richmond Birdwing lays its eggs underneath the Richmond birdwing vine leaf. The eggs hatch in 8–13 days, and the larvae consume their egg shell. The first meal for a first instar larvae is critical. New shoot tips are toxic to first instars, while older leaves are too tough for their mandibles. As only relatively young leaves are edible, smaller vines can only support one caterpillar at a time.

Inset above: A leaf penetrometer is used to measure the toughness of birdwing vine leaves. Leaves exceeding a toughness (force) of 0.23 newtons/mm² are too tough for the first instar larvae of the Richmond birdwing and account for 85% of starvation.

that could be addressed most effectively at the municipal level,' Sands says.

'Practical conservation happens in the community and municipal councils are the closest you can get to the community and still have Government teeth.'

For both the Richmond birdwing and Victoria's vulnerable Eltham copper, municipal councils played a key role in conserving each species.

The Caloundra Council in Queensland bought land specifically for birdwing conservation, and keeps the needs of threatened insects in mind when conducting environmental assessments.

In Victoria, the Nillumbick and Banyule Councils provided funding for community activities and in-kind support for weed control programs and land management.

Abstract: A Butterfly Action Plan has drawn attention to the issue of butterfly conservation. The plan, which is under review by Environment Australia, considers the problems involved in evaluating the conservation status of butterflies, in particular, guidelines that rely on measuring population size and trends over time. The plan also highlights the need to address 'threatening processes' such as habitat destruction and the importance of community participation in species recovery actions. A conservation project to save the Richmond birdwing butterfly illustrates the successful application of these concepts.

Keywords: butterflies, wildlife conservation, Richmond birdwing butterfly, Richmond birdwing vine, Richmond Birdwing Project, endangered species, Butterfly Action Plan, Eltham copper butterfly.

Key roles for flagship species

WHEN wetlands, heathlands, rainforests and mangroves are cleared for development, numerous species of insects and other invertebrates lose a vital part of their habitat. For butterflies, habitat loss can mean the loss of valuable food plants and local extinctions of butterfly populations.

Butterflies are thought to exist as 'metapopulations': localised patches of butterflies, some of which may die out but are balanced by new patches that establish elsewhere.

While some localised extinctions are natural, it is the rate at which extinctions occur under habitat loss that is of concern. If local extinctions increase and new patches do not establish, the population becomes restricted. Restricted populations become inbred, rendering individuals infertile and contributing to further population decline.

CSIRO entomologist Dr Don Sands says one of the best ways to address habitat loss is through species-oriented conservation. This involves picking flagship species such as the Richmond birdwing or Eltham copper, which are indicators for a particular habitat. If efforts are then focussed on preserving that habitat, the indicator species and other organisms that use it will be conserved.

Butterflies are also threatened by inappropriate fire regimes, particularly winter burning of bushland to reduce fuel loads. Winter burning catches butterflies at their most vulnerable time, when they are usually immobile as pupae or eggs.

Simple strategies such as mosaic burning, which leaves patches of land unburnt, can prevent this, especially if prime butterfly habitats such as creek beds and hilltops are undisturbed.

Farming practices such as grazing and pesticide use can also take their toll on butterflies. The cultivation of exotic grasses and the use of fertilisers to improve pastures are detrimental to native grasses, which support many butterflies, moths and other insects.

Butterflies also fall victim to pesticides sprayed on roadside plants, as these plants are easily accessible to butterflies and an attractive place to lay eggs.

On a brighter note, the designation of World Heritage areas, national parks and flora and fauna reserves affords protection to many butterfly species.

Public education about growing food plants in backyards, or protecting habitats on private land, can help conserve butterflies whose habitats may not be represented in these protected areas.