

**Advice to the Minister for the Environment, Heritage and the Arts  
from the Threatened Species Scientific Committee (the Committee)  
on Amendment to the list of Threatened Species under the  
*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

**1. Scientific name (common name)**

*Pteropus melanotus natalis* (Christmas Island Flying-fox)

**2. Reason for Conservation Assessment by the Committee**

This advice follows assessment of information provided by a public nomination to list the Christmas Island Flying-fox as **vulnerable**.

This is the Committee's first consideration of the subspecies under the EPBC Act.

**3. Summary of Conclusion**

The Committee judges that the subspecies is **not eligible** for listing in any category under the EPBC Act at this time.

**4. Taxonomy**

The subspecies is conventionally accepted as *Pteropus melanotus natalis* (Christmas Island Flying-fox).

Since Chasen's (1940) taxonomy, it has been generally accepted as a subspecies of *Pteropus melanotus*. However, a full modern taxonomic study of the Christmas Island Flying-fox and related taxa has not yet been undertaken to determine its taxonomic status.

**5. Description**

The Christmas Island Flying-fox is a small flying-fox with blackish or dark brown fur, occasionally with a slightly paler wash on the back of the neck. The fur is peppered with greyish-white hairs, particularly on the belly. Weight varies from 220–500 grams, with a mean weight of 350 grams. Males and females are the same size.

**6. National Context**

The Christmas Island Flying-fox is located only on Christmas Island. The broader *P. melanotus* species is made up of the Christmas Island Flying-fox and five other subspecies, each restricted to a single island across a chain from the Andaman and Nicobar Islands, Nias, and Enggano through to Christmas Island. There is no evidence to suggest that these subspecies travel between the islands (Tidemann, 1985, 1989). The Christmas Island subspecies is the only one within the Australian jurisdiction.

The bats primarily occupy rainforest, secondary regrowth, weed thickets and fruit orchards, but forage throughout the island, the area of which is 135 km<sup>2</sup>. Much of the island (63%) is now contained within the Christmas Island National Park.

## 7. Relevant Biology/Ecology

Christmas Island flying-foxes roost mainly in regular camps ranging from several hundred to two thousand individuals at particular points in time, but many also roost singly and in small groups scattered throughout the island. While some camps are used continuously, particularly maternity camps, others are seasonal, particularly those used by juveniles. Individuals move regularly between camps, suggesting this is a single population (Tidemann, 1985).

Christmas Island flying-foxes breed once a year, bearing single young after a five-month gestation. September is the primary mating season and most births occur around February, but some births occur a month or two before or after this. Females are sexually mature at six months, while males mature at about 18 months. A 1984 study suggested there was a significantly skewed sex ratio, with many more mature females than mature males. This is likely to be a natural phenomenon, but the reasons are poorly understood (Tidemann, 1985). The longevity and generation length of the bats is unknown.

Tidemann (1985) found that the bats are diurnal, with some activity at most times and peaking for several hours before sunset and briefly again at dawn. This permits them to feed on flowers opening during the day and access daily wind patterns to disperse from camp to foraging areas. The bats forage for a wide variety of fruits and blossoms from 35 species of plants, particularly the fruits of *Muntingia calabura* (Japanese cherry), *Syzygium nervosum*, *Terminalia*, *Planchonella* and *Mangifera* spp. and the flowers of the *Cocos* and *Barringtonia* spp. (Parks Australia, 2007a). Foraging occurs both at short distances from camp and at longer range, over 5 kilometres away (Tidemann, 1985, 1987).

The bats act as a primary seed dispersal and pollination vector for a variety of rain-forest trees and other plants, and is considered an important component of the Christmas Island rainforest ecosystem (Tidemann, 1985; Parks Australia, 2007a).

## 8. Description of Threats

Threats to the Christmas Island Flying-fox are poorly understood. A number of plausible threats have been suggested, but none has been clearly demonstrated to have a significant impact on the bats. There may also be as yet unknown threats.

Disturbance and/or predation by Yellow Crazy Ants (*Anoplolepis gracilipes*) is likely to be the main potential threat, through direct predation and/or disturbance to their roosting and foraging patterns. Recent studies have demonstrated the significant impact of Yellow Crazy Ants on other important tropical rainforest species, such as birds, both on Christmas Island and elsewhere. These include impacts on population size, ecologies and behaviour. Of particular concern is the likely interference to feeding patterns, such as reducing fruit handling in areas infested with Yellow Crazy Ants (Davis et al., 2007a, 2007b).

The ants also induce scale and sooty mould that may reduce fruit and pollen production or even kill trees that flying-foxes use as food sources (Thomas, 1998; Parks Australia, 2007a). At present there is little evidence of predation by Yellow Crazy Ants, but research is limited.

Yellow Crazy Ants currently occur across about 75% of Christmas Island and continue to spread, but of particular concern are areas infested with supercolonies, where ant densities are enormously high and have a very destructive impact on the island's ecosystem. Supercolonies currently occupy between 700 and 1000 hectares on the island. Some of the supercolonies are located directly below or near flying-fox camps and these are being treated directly as a priority (Parks Australia, 2007b, 2008, pers. comm.). The ants are the focus of an active control programme by Parks Australia. The Threat Abatement Plan to reduce the impact of tramp ants on biodiversity in Australia and its territories identifies the Christmas Island Flying-fox as one of several species that are adversely affected by Yellow Crazy Ants and

could become eligible for listing as vulnerable (Commonwealth of Australia, 2006). However, there is not yet any direct evidence that Yellow Crazy Ants are having a significant adverse impact on the Christmas Island Flying-fox.

Feral cats (*Felis catus*) have been known to prey upon the bats when they are feeding on low lying shrubs, but there is no firm evidence to suggest that this is a common or substantial threat. A 1988 study of cat gut contents on Christmas Island found that the bats occurred in around 10% of cat stomachs and made up 21% of their diet by volume. It found no evidence that cats are having an adverse impact on native species (Tidemann, 1988; Tidemann et al., 1994). More recent studies have found little or no evidence of flying-fox predation by cats (EWL Sciences for CI Phosphates, 2003; Algar and Brazell, 2005).

Cyclones and storms are a suspected threat to the bats, which tend to roost close to the shore. Other *Pteropus* species have been significantly affected by storms on islands elsewhere, and there is some anecdotal evidence of destruction of bat colonies and food sources on Christmas Island during a cyclone in 1988. There is, however, no direct evidence of a reduction in Christmas Island Flying-fox numbers associated with the cyclone (Parks Australia, 2007a).

Hunting by humans was identified as a threat by Tidemann (1985), but the bats are no longer hunted at significant levels on the island (Parks Australia, 2007a).

Tidemann found no evidence of parasites in the population, but there have been no assessments since then, nor any assessment of diseases in the population (Tidemann, 1985, no date [c. 1993]; Parks Australia, 2007a).

Around 25% of Christmas Island was deforested between 1895 and 1987, but since then there has been little new clearing. Several recent development proposals on the island have not proceeded, suggesting that land clearing is not a major threat at present, but there remains the potential for future developments to impact on the habitat of the Christmas Island Flying-fox, including affecting their feeding patterns.

## **9. Public Consultation**

The nomination was made available for public exhibition and comment for 30 business days from 2 October 2007 to 13 November 2007. No public comments were received.

## 10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations

The Committee judges that the subspecies is **not eligible** for listing in any category under the EPBC Act at this time. The assessment against the criteria is as follows:

### **Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers**

Tidemann (1985) found that there were approximately 4000–6000 flying-foxes on Christmas Island in September 1984 (3500–4000 individual bats counted in and emerging from camps and an estimated 2000–2500 further bats roosting individually or in small groups throughout the island).

The only substantial study of numbers since then is the monitoring carried out by Parks Australia since December 2005 and currently ongoing as at December 2007. This study is more extensive than Tidemann's, involving several simultaneous ground and exit counts from known camps per month. Unpublished data from this study (Parks Australia, 2007a) indicate the highest count of bats in or exiting camps was around 1400 in September 2006. Subsequent unpublished data from Parks Australia indicate that around 2300 bats were counted in September 2007 (Parks Australia, 2007b, pers. comm.). This did not include a ground count from an as yet unidentified camp site suspected to exist near Murray Hill. Parks Australia has also made no firm estimate of the number of bats outside known camps, but estimates the total number including dispersed individuals could now be around 4000 (Parks Australia, 2007b, pers. comm.). Counts have been carried out at all known bat camps simultaneously, suggesting that there would be fewer potential double counting issues than in Tidemann's study, in which counts at different camps were carried out on different days.

Not accounting for the dispersed bats, whose numbers are speculative, this suggests a possible reduction in numbers of 35–43% (3500–4000 down to around 2300) over a period of 23 years from 1984–2007. It is not yet clear whether this decline is continuing, and the causes for the suspected decline are unknown. The generation length of the bats is unknown.

The Committee judges that the subspecies is suspected to have undergone a reduction in numbers. However, considering the lack of information about the bats' lifecycle, the unknown quantity of bats dispersed throughout the island, and the unknown causes of the decline, there are insufficient data available to judge whether the reduction would be very severe, severe or substantial. Therefore, the subspecies has not been demonstrated to have met each of the required elements of Criterion 1, and is **not eligible** for listing in any category under this criterion.

**Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited**

The Christmas Island Flying-fox continues to move and forage throughout the whole island, its full natural range (Parks Australia, 2007a). The extent of occurrence is thus 135 km<sup>2</sup>.

There is little evidence that the area of occupancy has changed significantly. Bats continue to be found roosting individually in many places throughout the island, though there is no standard measurement available to reliably determine changes in distribution or density. The bats are highly mobile throughout the year, moving from camp to camp or dispersing into smaller groups. Occupancy of camps varies widely throughout the year, with many camps unoccupied at certain times but containing many individuals at other times. For instance, some camps appear to be used as maternity camps, where large numbers of bats congregate during mating and birthing seasons. Over time, camps may also be abandoned or reoccupied, and new camps formed. Tidemann (1985) counted bats roosting at five main camps in 1984. Parks Australia identified four main camps regularly in use in 2007, and a further camp was suspected to exist (Parks Australia, 2007b, pers. comm.). Three of the camps identified in 1984 were still in use in 2007 (Hosnie's Spring, Greta Beach and Ethel Beach). Tidemann (1985) reported that an additional camp may exist, which he had not found (Dolly Beach/McMicken Point). This camp was the largest camp in September 2007.

Yellow Crazy Ants pose the primary potential threat to Christmas Flying-foxes. Yellow Crazy Ant supercolonies continue to spread throughout the island (Parks Australia, 2007b, 2008, pers. comm.). However, there is no direct evidence that the Yellow Crazy Ants are having a significant impact on the bats at this time and the Committee notes that the ants are subject to an active control programme by Parks Australia. The Committee considers that the subspecies' geographic distribution is limited, but that it is not yet precarious for the survival of the subspecies.

Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 2, it is **not eligible** for listing in any category under this criterion.

**Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**

**(a) evidence suggests that the number will continue to decline at a particular rate; or**

**(b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

The estimated total number of individuals is likely to be somewhat over 2300 (including dispersed individuals), possibly around 4000 (Parks Australia, 2007b, pers. comm.). It is not clear how many of these individuals are mature. Taking its unknown lifespan into account, the Committee considers this to be limited for the purposes of this criterion. Numbers are suspected to have declined since 1984, but there are no data available to suggest whether the number will continue to decline. The subspecies' geographic distribution is not considered to be precarious for its survival. Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 3, it is **not eligible** for listing in any category under this criterion.

**Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

The estimated total number of individuals is likely to be somewhat over 2300 (including dispersed individuals), possibly around 4000 (Parks Australia, 2007b, pers. comm.). It is not clear how many of these individuals are mature. The Committee does not consider that the estimated total number of mature individuals of the subspecies is extremely low, very low or low. Therefore, as the subspecies has not been demonstrated to have met this required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

**Criterion 5: Probability of extinction in the wild that is at least:**

- (a) **50% in the immediate future; or**
- (b) **20% in the near future; or**
- (c) **10% in the medium-term future.**

There are no data available to estimate a probability of extinction of the subspecies in the wild over a relevant timeframe. Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

## **11. CONCLUSION**

### **Conservation Status**

*Pteropus melanotus natalis* (Christmas Island Flying-fox) was nominated for inclusion in the list of threatened subspecies referred to in section 178 of the EPBC Act. The nominator suggested listing in the **vulnerable** category of the list.

The Committee considers that there are insufficient data to confidently identify past declines in population size. The Committee accepts that there are a number of potential threats to the subspecies, particularly the continuing expansion of Yellow Crazy Ants, but that there is no direct evidence that any of these potential threats has a significant impact on the subspecies. However the Committee notes that if the expansion of Yellow Crazy Ants is not actively and aggressively controlled it is likely that the Christmas Island Flying-fox and other Christmas Island fauna may become threatened in the future.

The subspecies has not been demonstrated to have met any of the criteria and is therefore **not eligible** for listing in any category of the EPBC Act at this time.

## **12. Recommendations**

The Committee recommends that the *Pteropus melanotus natalis* (**Christmas Island Flying-fox**) is **not eligible** for inclusion in the list referred to in section 178 of the EPBC Act.

Associate Professor Robert J.S. Beeton

Chair

Threatened Species Scientific Committee

### 13. References cited in the advice

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