

Pteropus poliocephalus (Grey-headed Flying-fox)

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

Date: September 2001

1. Scientific name, common name (where appropriate), major taxon group

Pteropus poliocephalus (Grey-headed Flying-fox)

2. National Context

This species is endemic to Australia, with a distribution ranging from Bundaberg in Queensland to Melbourne in Victoria. The species range extends from the coast inland to the western slopes of New South Wales. There have also been recent reports of *P. poliocephalus* present in South Australia.

3. How judged by TSSC in relation to the EPBC Act criteria

The Grey-headed Flying-fox has been nominated as vulnerable and was identified as vulnerable in the 1999 Bat Action Plan. The issue of threat classification and management for Grey-headed Flying-foxes has been controversial, due both to the perceived extent and contraction of the population and the interactions Grey-headed Flying-foxes continue to have with the orchard industry and other human activities.

The robustness of data presented to support listing has been challenged by some scientists. A thorough investigation of survey methodologies, data and expert discussion has been undertaken in order to verify data and estimates of population decline.

TSSC judges the species to be eligible for listing as vulnerable under the EPBC Act. The justification against the criteria is as follows:

Criterion 1 - Decline in numbers

Population size data obtained by fly-out count surveys contain a degree of error that is difficult to quantify. Two key sources of error have been considered in relation to assessing the robustness of the available data. Firstly, the survey methodology and secondly the comparability of the survey results for the purpose of calculating trends in population size or species abundance.

Fly-out counts are acknowledged by the scientific community to be the best method currently available of obtaining reliable and reproducible estimates of abundance (if not actual population counts) for flying-foxes. The available data for 1989 and 1998-2001 has been obtained using the same survey techniques that are widely acknowledged to be appropriate for estimating the abundance of this species. The data available from the fly-out counts conducted should be regarded as estimates of abundance, rather than precise population counts.

The 1989 estimate of abundance is notably incomplete in the survey coverage, lacking data from Qld, where the species is known to occur throughout the year in significant numbers, and several sites in NSW that were known to be occupied at the time. The 1989 estimate of abundance is therefore likely to be a significant underestimate of abundance of the species at that time. Use of the 1989 estimate of abundance provides a minimum indication of population decline when related to maximum estimates of populations sizes obtained during the 1998-2001 surveys.

The surveys of 1998-2001 have been much more comprehensive than the 1989 survey in terms of the number of roosts and extent of geographical range included. Despite the significantly increased knowledge of the species roost sites and survey effort, the estimates of abundance obtained indicate a decline in the abundance of the species. Using the maximum estimate from the 1998-2001 surveys (400,000) and the minimum estimate of abundance in 1989 (566,000), the rate of decline since 1989 has been in the order of 30%.

A number of experts commented that the projected habitat clearance in northern NSW is the primary ongoing threat to Grey-headed Flying-foxes. One expert stated that annually reliable winter resources are limited in distribution to a narrow coastal strip in northern NSW and Queensland. These coastal areas are targeted for intensive residential development to cater for a projected 25% increase in the human population over the next decade. It was this argument that convinced the Editorial Panel of the Bat Action Plan to identify Grey-headed Flying-foxes as vulnerable, although the Editorial Panel was not unanimous in its decision.

Therefore, the species is **eligible** for listing as **vulnerable** under this criterion.

Criterion 2 -Geographic distribution

The distribution of the species is not precarious for the survival of the species nor limited, the range of the species extending from Bundaberg in Queensland to Melbourne in Victoria and from the coast inland to the western slopes of New South Wales. There have also been recent reports of *P. poliocephalus* present in South Australia.

The threat to the species of a projected loss of habitat and associated winter food resources from northern NSW has been discussed under criterion 1.

The northern geographic range of Grey-headed Flying-foxes appears to be contracting. In the late 1800's and early 1900's, specimens were recorded from far north Queensland. In 1929 there were camp-sites occupied permanently or regularly around Rockhampton. Grey-headed Flying-foxes are no longer found in the Rockhampton area and known sites have experienced a northern contraction of about 300 kilometres.

However, Grey-headed Flying-foxes have expanded in the south of their range as evidenced by the permanent colonies in Melbourne and their recent detection in South Australia. It has been hypothesised that the northern contraction and the southern expansion relates to temperature changes over the last 30 years, as the average temperature has increased by approximately 2-3 degrees Celsius across the range of the species. However, the adaptability of Grey-headed Flying-foxes to exploit a wide range of food resources could also be a causative factor in their southerly range expansion.

It has been purported that habitat degradation in the north of its range is responsible for its disappearance from this area. However, it should be noted that the Black Flying-fox, *Pteropus alecto*, exploits similar niches as Grey-headed Flying-foxes in terms of camp-sites and food resources, and yet it is still abundant in areas of southern Queensland formerly occupied by Grey-headed Flying-foxes.

It is important to note that Grey-headed Flying-foxes are highly mobile and appear to be a highly adaptable species in response to changes in their habitat and surrounding environment. A number of 'urban' roost sites that are occupied year-round (Sydney suburbs, Botanic Gardens in Sydney and Melbourne) have become established due to consistently available food resources and suitable roosting habitat. At other 'non-permanent' roost sites, Grey-headed Flying-foxes have shown themselves to be able to respond rapidly to the presence/absence of food availability.

Given the current extent of the species range, and clear evidence of its capacity to expand its range, the geographic distribution is not considered precarious for the survival of the species.

Therefore, the species is **not eligible** for listing under this criterion.

Criterion 3 - Population size and decline in numbers or distribution

The estimated abundance of this species is not limited, survey figures obtained during the period 1998-2001 indicating abundance to be in excess of 320,000 - 400,000 individuals. Discussion of historic or potential declines and geographic distribution is provided respectively under criterion 1 and 2 above.

Therefore the species is **not eligible** for listing under this criterion.

Criterion 4 - Population size

The estimated abundance of this species is not low, survey figures obtained during the period 1998-2001 indicating abundance to be in excess of 320,000 - 400,000 individuals.

Therefore, the species is **not eligible** for listing under this criterion.

Criterion 5 - Probability of extinction in the wild

There is no quantitative evidence available against this criterion. However, two experts have recently modeled the vulnerability of both the Grey-headed Flying-fox and the Spectacled Flying-fox, *Pteropus conspicillatus*, to decline and extinction using basic parameters of reproduction obtained from captive breeding data. This analysis shows that flying-fox populations have a low capacity for increase and depend on low levels of natural mortality and high survival of adults to maintain stable population levels. These experts conclude that current death rates of the Grey-headed Flying-fox imposed by fruit orchardists and other management approaches place populations at risk.

One expert challenged the validity of the inputs to the model, in particular, the fecundity of two year old animals, and the assumed sex ratio of 1:1. The model essentially assumes that flying-foxes do not breed until three years of age, based on observations of captive animals, but field based data is available for the closely related Black Flying-fox that indicates this is not the case. The sex ratio of flying-foxes in most camps is also closer to 70:30 (females:males). Changes to these and other inputs to the model should be made to further explore the impacts of these influences on the population survival.

However, whilst the modelling is imperfect, it provides clear messages about the likely impact of increased mortality to adults. Sustained high levels of mortality additional to natural mortality would undoubtedly increase the probability of extinction in the medium-term in virtually most scenarios. However, the current level of mortality at the hands of orchardists is unquantified, but has been substantially reduced through NSW government subsidised netting of orchards. This, combined with the equivocal nature of the data on population size, renders it difficult to be confident that current levels of non-natural mortality are likely to lead to negative population growth.

Based upon the population modelling, likely recruitment rates, and other characteristics such as its adaptability and mobility, there is not a 10% probability that the Grey-headed Flying-fox will become extinct in the wild in the medium-term future.

Therefore, the species is **not eligible** for listing under this criterion.

4. Conclusion

The estimates of abundance derived from surveys conducted in 1989 and during the period 1998-2001 indicate a rate of decline in abundance of the species in the order of 30%.

Given the limitations of the available data, research into both accurate estimates of abundance and mortality associated with human activities (eg orchard control) should be encouraged. For this reason, the decision on this species conservation status should be reviewed in three years time.

5. Recommendation

The Committee is of the view that priority should be given to the generation of more data and that this matter be revisited in 2004 or when significant new data becomes available. However, this review should only be initiated if substantial work is undertaken which significantly clarifies the conservation status of the species. In particular:

- count techniques need to be standardised and conducted annually across the range of this species;
- population modelling should be refined to incorporate field-derived data if possible; and
- quantification of the level of mortality currently occurring through the protection of fruit crops.

TSSC recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **vulnerable** category:

***Pteropus poliocephalus* (Grey-headed Flying-fox)**