



**FLORA & FAUNA  
GUARANTEE**

**FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE**  
**FINAL RECOMMENDATION ON A NOMINATION FOR LISTING**

**Threats to native flora and fauna arising from the use by the feral honeybee  
*Apis mellifera* of nesting hollows and floral resources**  
(Potentially Threatening Process)

**Date of receipt of the nomination:** 29 June 2001  
**Date of preliminary recommendation:** 13 November 2001  
**Date of final recommendation:** 5 February 2002

**File No.:** FF/54/0145

**Validity:** The nomination is for a valid item

**Prescribed Information:** The prescribed information was provided.

**Name of the Nominator** is adequately provided.

**Name and Description of the process:**

In the opinion of the SAC the process is adequately defined and described.

The nominated process is 'Threats to native flora and fauna arising from the use by the feral honeybee *Apis mellifera* of nesting hollows and floral resources'. There is evidence that honeybees have an impact on indigenous species in two broad ways, firstly via their use of tree hollows, and secondly via their use of floral resources.

First successfully introduced to Australia from Europe in 1822, the honeybee has become an established feral bee competing with Australian native bee species and many native mammals and birds for habitat and food resources, as well as altering the seed set of various native flora.

Australia is populated by representatives of three immense plant families - the Myrtaceae (eucalypts), the Proteaceae (proteas), and the more familiar Leguminosae ('wattles' or acacias) - along with an over-abundance of the euglossine colletids, the so-called membrane bees. Further, Australian plants and their pollinators have evolved for millions of years not only in isolation but largely in the absence of highly competitive social bees such as camp-following honeybees (Buchmann and Nabhan 1995). Australia is also unusual in having a large number of specialist birds, such as honeyeaters and certain parrots, that depend on bird-adapted flowers for much of their energy budget.

Breeding colonies of honeybees occupy hollows in trees for 20-50 years. These hollows are completely taken over by honeybees, and are removed from the pool of hollows available to native species. It has been demonstrated that there is some overlap in hollow use between native fauna and feral honeybees (Paton 1996, Soderquist *et al.* 1996, Wood and Wallis 1998).

Honeybees, both feral and managed, are frequent visitors at flowers, and often remove 80% or more of the floral resources produced (Paton 1996, 2000). An average colony may collect and consume 180kg of nectar during the course of a year. Pollen is also collected in large amounts (up to 30kg annually) (Sugden *et al.* 1996). This can result in competitive displacement of native fauna that use the floral resources, including honeyeaters (Paton 1993) and native bees (Sugden and Pyke 1991, Paton 1996, Sugden *et al.* 1996).

**The range of flora or fauna affected or potentially affected** was adequately stated in the nomination.

**Significance of the threat which the potentially threatening process poses or has the potential to pose** was adequately stated in the nomination.

**Eligibility for listing as a potentially threatening process under the Flora and Fauna Guarantee**

The nominated item satisfies at least one criterion of the set of criteria prepared and maintained under Section 11 of the **Flora and Fauna Guarantee Act 1988**, and stated in Schedule 1 of the Flora and Fauna Guarantee Regulations 1991.

**Evidence that criteria are satisfied:**

**Criterion 5.1** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the survival of a range of flora or fauna.*

**Evidence:**

Honeybees (*Apis mellifera*) compete for resources with nectarivorous birds (honeyeaters eg. Regent Honeyeater and Helmeted Honeyeater), specialised parrots (lorikeets and the endangered Swift Parrot), some native mammals (Pygmy-possum and Sugar Glider) and endemic bees, thus reducing the reproductive output of these native flower-loving fauna.

Foraging of honeybees could also lead to a reduction in seed set of some native plants through nectar competition with their specialised pollinators (eg. rare eucalypts and grevilles).

**Sub-criterion 5.1.1** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the survival of two or more taxa.*

*Evidence:*

The Regent Honeyeater (Critically Endangered), Helmeted Honeyeater (Endangered), Black-eared Miner (Endangered), Swift Parrot (Endangered), Brush-tailed Phascogale (Vulnerable) and Squirrel Glider (Endangered) are FFG-listed species which are likely to be affected by honeybee foraging and nesting through competition for nectar, pollen or nest hollows. In Victoria, there are 14 bird and eight mammal species that utilise tree hollows and are listed under the Act and potentially threatened by feral bees via competition for hollows and/or floral resources.

#### **Additional Information**

Paton (1996) concluded that

- Feral honeybees do use hollows that broadly overlap with those used by several species of birds and mammals.
- Honeybees appear to use a small proportion of available hollows.
- Few studies have adequately assessed the availability of suitable hollows, and competition between honeybees and native vertebrates may occur when hollows are rare.
- Of the species dependent on hollow-bearing trees, over 20 are already listed under the FFG Act (Table 1).

<b>Mammals</b>	<b>Extent of use</b>	<b>Conservation status (NRE 2000)</b>	<b>Hollow size</b>
<i>Cercartetus nanus</i> Eastern Pigmy-Possum	F	S	S
<i>Dasyurus geoffroii</i> Western Quoll	F	X	M
<i>Dasyurus maculatus</i> Tiger Quoll	F	V	L
<i>Dasyurus viverrinus</i> Eastern Quoll	F	E	M
<i>Gymnobelideus leadbeateri</i> Leadbeater's Possum	O	E	L
<i>Nyctophilus timoriensis</i> Greater Long-eared Bat	O	R	M
<i>Petaurus norfolcensis</i> Squirrel Glider	O	R	M
<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	O	R	M
<b>Birds</b>			
<i>Cacatua leadbeateri</i> Major Mitchell's Cockatoo	O	R	L
<i>Calyptorhynchus banksii</i> Red-tailed Black-Cockatoo	O	E	L
<i>Calyptorhynchus lathamii</i> Glossy Black-Cockatoo	O	V	L
<i>Climacteris affinis</i> White-browed Treecreeper	O	V	M
<i>Corombates leucophaea</i> White-throated Treecreeper	O(r)	S	M
<i>Melanodryas cucullata</i> Hooded Robin	F(i)	S	S
<i>Neophema pulchella</i> Turquoise Parrot	O	R	S
<i>Ninox connivens connivens</i> Barking Owl	O	R	L
<i>Ninox strenua</i> Powerful Owl	O	R	L
<i>Oreoica gutturalis</i> Crested Bellbird	F(i)	S	S
<i>Polytelis anthopeplus</i> Regent Parrot	O	R	M
<i>Polytelis swainsonii</i> Superb Parrot	O	V	M
<i>Tyto novaehollandiae novaehollandiae</i> Masked Owl	O	R	L
<i>Tyto tenebricosa tenebricosa</i> Sooty Owl	O(r)	R	L

**Table 1:** FFG-Listed vertebrates recorded using tree hollows in Victoria.

**Extent of use:** O=Obligatory, F=Facultative, (i)=infrequent, (r)=both roosts and breeds (birds only);

**Conservation status in Victoria:** X=Extinct, E=Endangered, V=Vulnerable, R=Rare, K=Insufficiently Known, S=Secure;

**Hollow size:** S=Small, M=Medium, L=Large

#### **Advertisement for public comment**

In accordance with the requirements of Section 14 of the **Flora and Fauna Guarantee Act 1988**, the preliminary recommendation was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

'The Age' - on 26 December 2001

'The Weekly Times' - on 26 December 2001

The *Government Gazette* - on 27 December 2001

Submissions closed on 30 January 2002.

**Further evidence provided:**

Two submissions were received, although no evidence was provided to warrant a review of the Scientific Advisory Committee's preliminary recommendation that the potentially threatening process is eligible for listing.

**Documentation**

The published information and research data provided to the SAC have been assessed. Based on the available information, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

**Final Recommendation of the Scientific Advisory Committee**

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing in accordance with Section 11 of the Act because primary criterion 5.1 has been satisfied. The SAC also concludes that sub-criterion 5.1.1 has been satisfied and that no evidence exists to suggest that primary criterion 5.1 cannot be satisfied as a consequence of sub-criterion 5.1.1 being satisfied.

The Scientific Advisory Committee recommends that the nominated item be supported for listing on Schedule 3 of the **Flora and Fauna Guarantee Act 1988**.

**Selected references:**

- Buchmann, S. L. & Nabhan, G. P. (1995) *The Forgotten Pollinators*. Eco Books.
- Gibbs, P. & Muirhead, I. F. (1998) The economic value and environmental impact of the Australian Beekeeping Industry. Report to the Australian Beekeeping Industry.
- Gross, C. L. (2001) The effect of introduced honeybees on native bee visitation and fruit-set in *Dillwynia juniperina* (Fabaceae) in a fragmented ecosystem. *Biological Conservation* **102**: 89-95.
- Gross, C.L. & Mackay, D. (1998) Honeybees reduce fitness in the pioneer shrub *Melastoma affine* (Melastomataceae). *Biological Conservation* **86**: 169-178.
- Horskins, K. & V. B. Turner (1999) Resource use and foraging patterns of honeybees, *Apis mellifera*, and insects on flowers of *Eucalyptus costata*. *Australian Journal of Ecology* **24**: 221-227.
- Manning, r. (1997) The Honeybee debate: a critique of scientific studies of honeybees *Apis mellifera* and their alleged impact on Australian wildlife. *Vic. Naturalist* **114** (1): 13-22.
- New, T. R. (1997) Significance of Honey Bees in the Australian Environment: Setting the Scene. *Vic. Nat.* **114** (1): 4-7.
- NRE (in prep.) *Loss of tree hollows in Victorian native forests* (Potentially threatening process). Flora and Fauna Guarantee Action Statement. Department of Natural Resources and Environment: Melbourne.
- NRE (2000) *Threatened Vertebrate Fauna in Victoria 2000: A systematic list of vertebrate fauna considered extinct, at risk of extinction or in major decline in Victoria*. Department of Natural Resources and Environment: Victoria.
- NSW Scientific Committee (2001) Preliminary Determination: Competition from feral honeybees *Apis mellifera* Linnaeus (Key Threatening Process). NSW Scientific Committee. NSW NP&WS: Hurstville.
- Oldroyd, B. P., Lawler, S. H. & Crozier, R. H. (1994) Do feral honeybees (*Apis mellifera*) and regent parrots (*Polytelis anthopeplus*) compete for nest sites? *Australian Journal of Ecology* **19**: 444-450.
- Paton, D. C. (1993) Honeybees in the Australian environment: does *Apis mellifera* disrupt or benefit the native biota? *BioScience* **43**: 95-103.
- (1996) *Overview of the impacts of feral and managed honeybees in Australia*. Australian Nature Conservation Agency: Canberra.
- (1997) Honeybees *Apis mellifera* and the disruption of plant-pollinator systems in Australia. *Victorian Naturalist* **114**: 23-29.
- (2000) Disruption of Bird-Plant Pollination Systems in Southern Australia. *Cons. Biology* **14** (5): 1232-1234.
- Pyke, G. H. & Blazer, L. (1985) The effects of the introduced honey bee *Apis mellifera* on Australian native bees. NSW NP&WS *Occasional Paper No. 7*.
- Pyke, G. H. (1999) The introduced honeybee *Apis mellifera* and the Precautionary Principle: reducing the conflict. *Australian Zoologist* **31**: 181-186.
- SAC (1991) Final Recommendation on a nomination for listing: *Loss of hollow-bearing trees from Victorian native forests* (Nomination no. 100). Scientific Advisory Committee, Flora and Fauna Guarantee. Department of Conservation and Environment: Melbourne.
- (2001) Preliminary Recommendation on a nomination for listing: *Metallic Green Carpenter Bee *Xylocopa aeratus** (Nomination no. 529). Scientific Advisory Committee, Flora and Fauna Guarantee. Department of Natural Resources and Environment: Melbourne.
- Schwarz, M. P. & Hurst, P. S. (1997) Effects of Introduced Honey Bees on Australia's Native Bee Fauna. *Vic. Nat.* **114** (1): 7-12.
- Simpson, K. (2001) Birds that nest in tree-hollows. *Bird Observer* **811**: 15-18.

- Soderquist, T. R., Traill, B. J., Faris, F. and Beasley, K. (1996). Using nest boxes to survey for Brush-tailed Phascogales *Phascogale tapoatafa*. *Victorian Naturalist* 113: 256-261.
- Sugden, E.A. & Pyke, G.H. (1991) Effects of honeybees on colonies of *Exoneura asimillima*, an Australian native bee. *Australian Journal of Ecology* 16: 171-181.
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- Trainor, R. (1995) Sweet danger: How feral bees compete with hollow-using birds and mammals. *Bird Observer* April 1995: 7-9.
- Vaughton, G. (1996) Pollination disruption by European honeybees in the Australian bird-pollinated shrub *Grevillea barklyana* (Proteaceae). *Plant Systematics and Evolution* 200: 89-100.
- Whelan, R.J., Ayre, D. J., England, P. R., Llorens, T. & Beynon, F. (2000) Ecology and genetics of *Grevillea* (Proteaceae): implications for conservation of fragmented populations. in Young, A. [ed] *Genetics of Fragmented Populations*. Cambridge University Press: Cambridge.
- Wood, M.S. & Wallis, R.L. (1998) Potential competition for nest sites between feral European Honeybees (*Apis mellifera*) and Common Brushtail Possums (*Trichosurus vulpecula*). *Australian Mammalogy* 20: 377-381.

**Relevant websites:**

Exotic honeybees in the Australian bush, Ockham's Razor - <http://www.abc.net.au/rn/science/ockham/stories/s224473.htm>

Significance of Honey Bees in the Australian Environment: Setting the Scene (see New 1997 above) - <http://calcite.apana.org.au/fncv/vicnat/trnew.html>

Honeybees as a nestbox pest - [http://www.powerup.com.au/~ozbox/bees\\_honey.htm](http://www.powerup.com.au/~ozbox/bees_honey.htm)

*An introduction to understanding honeybees, their origins, evolution and diversity.* From the web pages of the *Bee Improvement and bee breeders Association* (Milner, A. 1996). <http://www.angus.co.uk/bibba/bibborig.html>

**Endorsement by the Convenor of the Scientific Advisory Committee**

**Date**



**Professor Virginia Studdert**  
Convenor

**11 FEB 2002**