

NSW Threatened Species Scientific Committee

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Notice of and reasons for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the pilotbird *Pycnoptilus floccosus* Gould, 1851 as a VULNERABLE species in Part 3 of Schedule 1 of the Act. Listing of Vulnerable species is provided for by Part 4 of the Act.

The NSW Threatened Species Scientific Committee is satisfied that the pilotbird *Pycnoptilus floccosus* Gould, 1851 has been duly assessed by the Commonwealth Threatened Species Scientific Committee under the Common Assessment Method, as provided by Section 4.14 of the Act. After due consideration of Commonwealth DCCEEW (2022), the NSW Threatened Species Scientific Committee has made a decision to list the species as Vulnerable.

Summary of Conservation Assessment

The pilotbird *Pycnoptilus floccosus* Gould, 1851 was found to be Vulnerable in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.2 (1)(c)(2)(b)(c) because: i) a population reduction of 30-50% is suspected to have occurred over the past three-generation period of 11 years; and ii) this reduction was caused by adverse fire regimes reducing the numbers of mature individuals and increased severity and frequency of drought reducing the extent and quality of habitat, and these causes have not ceased.

The NSW Threatened Species Scientific Committee has found that:

1. The pilotbird *Pycnoptilus floccosus* Gould, 1851 (Acanthizidae) is a small, plump, ground-dwelling bird, about 18 cm long with a wingspan and weight of around 23 cm and 27 g respectively (Higgins and Peter 2002). Sexes are similar and do not display seasonal variation (Higgins and Peter 2002). Adults are large headed with cinnamon frons, amber eyes and slender, pointed, dusky bills. Their upperparts are a deep rufous-brown, while their tails are long, broad, and wedge-tipped. The species' throat, breast and underbelly are cinnamon, scalloped brown. Their lower underparts are dull white, and they have brown flanks and rufous tail coverts (Higgins and Peter 2002). Pilotbirds have characteristically large, strong feet. Juveniles are similar to adults but have darker foreheads, darker and richer russet-brown underparts, and a prominent pale gape (Higgins and Peter 2002).
2. There are two recognised subspecies of pilotbird. The upland pilotbird, *Pycnoptilus floccosus floccosus* occurs above 600 m in the Brindabella Ranges in the Australian Capital Territory, and in the Snowy Mountains in New South Wales and north-east Victoria (Higgins and Peter 2002; Loyn *et al.* 2021). The lowland pilotbird, *P. f. sandlandi* occurs in forests from the Blue Mountains, around the wetter forests of eastern Australia, to the Dandenong Ranges near Melbourne (Higgins and Peter 2002; Loyn *et al.* 2021).
3. The pilotbird has a widespread geographic distribution. The Area of Occupancy (AOO) of the pilotbird was estimated to be 3,700-34,500 km² (Loyn *et al.* 2021). The minimum AOO is based on 2 x 2 km squares encompassing records since

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1990 in areas where birds are expected to have survived the 2019-20 fires, and the maximum AOO is an alpha hull encompassing all records since 1990 (Loyn *et al.* 2021). The Extent of Occurrence (EOO) was estimated to be 205,000-217,000 km² and is based on a minimum convex polygon encompassing all records since 1990 (Loyn *et al.* 2021).

4. The total population of the pilotbird is now generally accepted to be 88,000 mature individuals, consisting of 11,000 upland pilotbirds (range 1,000–18,000, low reliability) and 77,000 lowland pilotbirds (range 9,000–125,000, low reliability) (Loyn *et al.* 2021). The population estimates of the two pilotbird subspecies are based on average densities recorded in 2 ha 20 min counts (*P. f. floccosus* 1.5±0.6 birds/ha, *P. f. sandlandi* 1.3±0.6 birds/ha; BirdLife Australia 2020); the areas likely to have been occupied from 1990–2019 based on Birddata (BirdLife Australia 2020) and eBird (Cornell Lab 2020); a habitat occupancy of 5–10%; maps of fire severity in 2019-2020 within the pre-fire range; and, initial assumptions about mortality at different severity classes (severity low: 20%; medium: 50%; high: 80%; very high: 100%).
5. Pilotbirds are terrestrial, living on the ground in dense forests with heavy undergrowth (Higgins and Peter 2002). Largely sedentary, they are typically seen hopping briskly over the forest floor and foraging on damp ground or among leaf litter. Flight is described as fairly weak, though, if disturbed, birds can sometimes ascend into shrubs (Higgins and Peter 2002). They are typically seen in pairs or occasionally in family parties, occupying small territories all year round.
6. Birds forage mostly in pairs for insects, and occasionally eat seeds and fruits (Higgins and Peter 2002). They use their bills and feet to turn and scratch leaf litter for food. Males are often seen feeding females (Higgins and Peter 2002). Pilotbirds have been associated with Superb Lyrebirds (*Menura novaehollandiae*), foraging in their wake as they scratch the forest floor (Higgins and Peter 2002).
7. Breeding takes place between August and March (Zwart 1973; Farley 2022). Adults build a domed nest on or near the ground in which they usually lay two eggs (Zwart 1973). Eggs vary in colour from grey-green to purple-brown and are incubated by the female for 20–22 days. Upon hatching, young are fed insects by both parents and can continue to be fed by their parents for up to two months after fledging (Higgins and Peter 2002). Young pilotbirds will forage together in groups with adults until the young males leave to stake their own territories. The generation length is 3.7 years (Bird *et al.* 2020).
8. The main threats to the pilotbird are adverse fire regimes, increases in the frequency and duration of drought due to climate change. 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', and 'Anthropogenic Climate Change' are listed as Key Threatening Processes under the Act.
9. Increases in frequency, extent or severity of wildfire is the main threat faced by pilotbirds across its range, as it causes direct loss of habitat and individuals (Loyn *et al.* 2021). Between July 2019 and February 2020, bushfires burned over 104,000 km² across southern and eastern Australia (Legge *et al.* 2021). It is

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estimated that 33% (range 19–37%) of upland and 30% (range 17–34%) of lowland pilotbird populations perished in the fires. These estimates depend on the fire-related mortality assumed under different scenarios (Loyn *et al.* 2021). In a separate analysis based on expert elicitation, populations of the upland and lowland pilotbirds were estimated to decline by 30% and 25% respectively, and possibly by as much as 45% and 42%, respectively, one year after fire (based on the lower 80% confidence bound) (Legge *et al.* 2021). There has also been an estimated 52.5% and 50.9% decline in upland and lowland pilotbird habitat respectively due to the fires. This includes important pilotbird nesting and feeding habitat (Loyn *et al.* 2021). While the extent of occurrence (EOO) for the species is regarded as stable, the area of occupancy (AOO) for the species is also inferred to have contracted due to the fires (Loyn *et al.* 2021). Climate change further increases the potential for extreme wildfires (Di Virgilio *et al.* 2019). Fire risk will therefore continue to escalate in the future without sustained and substantial efforts to tackle climate change (Climate Council 2019).

10. Since the mid-1990s, southeast Australia has experienced a 15% decline in late autumn and early winter rainfall, and a 2% decline in average rainfall in April and May (Climate Council 2018). This has resulted in more time in drought, yet more intense, short duration heavy rainfall events (BOM and CSIRO 2020). The retreat of pilotbirds up an altitudinal gradient may be an ecological response to the drying effect of drought at lower altitudes (Loyn and Menkhorst 2011). Pilotbirds were quite common and habituated to people in wet forest in lower altitude areas of Victoria in the 1970s, but declined subsequently and are now rare (E. McNabb pers. comm. in Loyn and Menkhorst 2011). Similar declines have been observed in other areas of the pilotbird's range, though the species remains common in wet forest at higher elevation. Additionally, drought makes vegetation more flammable, and therefore more likely to support extreme fire behaviour (Climate Council 2019). It also makes vegetation more susceptible to spot fires ahead of the main fires when weather conditions deteriorate (high temperatures, low relative humidity, strong winds) (Climate Council 2019).
11. The pilotbird is estimated to have undergone a substantial reduction in the number of mature individuals and in habitat area over three generations (11 years), which is equivalent to at least >30% to 50% and the cause has not ceased. This is because the risk of frequent, large extent, high intensity wildfires, and episodes of drought are projected to increase.
12. *Pycnoptilus floccosus* Gould, 1851 is not eligible to be listed as an Endangered or Critically endangered species.
13. *Pycnoptilus floccosus* Gould, 1851 is eligible to be listed as a Vulnerable species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a high risk of extinction in Australia in the medium-term future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome: Vulnerable under Clause 4.2 (1)(c)(2)(b)(c)

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Clause 4.2 – Reduction in population size of species

(Equivalent to IUCN criterion A)

Assessment Outcome: Vulnerable under Clause 4.2 (1)(c)(2)(b)(c)

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 – Restricted geographic distribution of species and other conditions

(Equivalent to IUCN criterion B)

Assessment Outcome: Not met

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted.
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,
		(iv)	the number of locations in which the species occurs or of populations of the species.
	(f)	extreme fluctuations occur in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 – Low numbers of mature individuals of species and other conditions

(Equivalent to IUCN criterion Clause C)

Assessment Outcome: Not met

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The estimated total number of mature individuals of the species is:			
	(a)	for critically endangered species	very low, or
	(b)	for endangered species	low, or
	(c)	for vulnerable species	moderately low.
and either of the following 2 conditions apply:			
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):	
		(i)	for critically endangered species very large, or
		(ii)	for endangered species large, or
		(iii)	for vulnerable species moderate,
	(e)	both of the following apply:	
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and
		(ii)	at least one of the following applies:
		(A)	the number of individuals in each population of the species is:
			(I) for critically endangered species extremely low, or
			(II) for endangered species very low, or
			(III) for vulnerable species low,
		(B)	all or nearly all mature individuals of the species occur within one population,
		(C)	extreme fluctuations occur in an index of abundance appropriate to the species.

**Clause 4.5 – Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Not met**

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

**Clause 4.6 – Quantitative analysis of extinction probability
(Equivalent to IUCN criterion E)
Assessment Outcome: Data Deficient.**

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

**Clause 4.7 – Very highly restricted geographic distribution of species–
vulnerable species
(Equivalent to IUCN criterion D2)
Assessment Outcome: Not met**

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the
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species is prone to the effects of human activities or stochastic events within a very short time period.

Senior Professor Kristine French
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Commonwealth DCCEEW (Department of Climate Change, Energy, the Environment and Water) (2022) Conservation Advice for *Pycnoptilus floccosus* (pilotbird). Australian Government, Canberra, ACT.

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