



## 1. Consultation Document on Listing Eligibility and Conservation Actions

### *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern))

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern)) for inclusion on the EPBC Act threatened species list in the Endangered category; and
- 2) the necessary conservation actions for the above subspecies.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing either by email to:

[species.consultation@environment.gov.au](mailto:species.consultation@environment.gov.au)

or by mail to:

The Director  
Migratory Species Section  
Biodiversity Conservation Division  
Department of Agriculture, Water and the Environment  
PO Box 858  
Canberra ACT 2601

**Responses are required to be submitted by 18 March 2022.**

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## **General background information about listing threatened species**

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/index.html>.

Public nominations to list threatened species under the EPBC Act are received annually by the Department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <http://www.environment.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2018.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <http://www.environment.gov.au/biodiversity/threatened/nominations.html>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <http://www.environment.gov.au/biodiversity/threatened/recovery.html>.

## **Privacy notice**

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department's obligations under the *Privacy Act 1988* (Cwth) and the Department's Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on

the status of a potentially threatened species. This is also known as the '[common assessment method](#)'. As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.

The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: <http://environment.gov.au/privacy-policy>.

### **Information about this consultation process**

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.



# Consultation Document for *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern))



Hooded Robin (south-eastern) © Copyright, Ashley Whitworth

## Conservation status

*Melanodryas cucullata cucullata* (Hooded Robin (south-eastern)) is being assessed by the Threatened Species Scientific Committee to be eligible for listing under the EPBC Act. The Committee's preliminary assessment is at Attachment A. The Committee's preliminary assessment of the subspecies' eligibility against each of the listing criteria is:

- Criterion 1: A2bce: Endangered
- Criterion 2: Not eligible
- Criterion 3: Not eligible
- Criterion 4: Not eligible
- Criterion 5: Insufficient data

The main factor that appear to make the subspecies eligible for listing in the Endangered category is that the population has declined by >50% over the last ten years (one generation 3.0

years) (Ford et al. 2021). Across the range from 2000–2018, reporting rates from 2 ha 20 min surveys and 500 m radius area searches declined by 65% and 63% respectively (1999–2008: 14% and 55%; 2009–2018: 51% and 49%) (Ford et al. 2021). Reporting rate trends also indicate a continuing rapid decline in the population with local experiences of declines, particularly in the south and east, now evident (Ford et al. 2021).

There are currently estimated to be 68,000 (range 36,000–113,000; low reliability) mature individuals in the wild (S Garnett pers. comms. 9 Nov 2021) with a declining trend (high reliability); occurring within approximately 100 subpopulations (low reliability) (Ford et al. 2021). The subspecies' extent of occurrence (EOO) and area of occupancy (AOO) are estimated at 1,200,000 km<sup>2</sup> (range 1,100,000–1,400,000 km<sup>2</sup>) and 30,000 km<sup>2</sup> (16,000–50,000 km<sup>2</sup>), respectively (Ford et al. 2021). Both the EOO and AOO estimates for the subspecies have contracting trends (Ford et al. 2021). The minimum AOO is the number of 2x2 km squares within which the subspecies has been recorded since 1990; however, given the remoteness of much of the distribution, the real AOO is assumed to be at least twice that and probably substantially greater (Ford et al. 2021).

Decline of Hooded Robins (south-eastern) is partially attributed to ongoing threats such as: increased predation from introduced mammals (cats and foxes), invasive weeds, and competition with Noisy Miners (*Manorina melanocephala*) (Maron & Lill 2005). Grazing by domestic stock, introduced rabbits (*Oryctolagus cuniculus*), and overabundant kangaroos (*Macropus* spp.) can also negatively affect the subspecies by preventing regeneration of native vegetation (Willson & Bignall 2009). The effect of these threats, combined with habitat loss and fragmentation for large-scale agriculture, climate change, inappropriate fire regimes, and inappropriate firewood collection and tidying of farmland, have not ceased and may not be reversible.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

## Species information

### Taxonomy

Conventionally accepted as *Melanodryas cucullata cucullata* (Latham, 1801).

Three other subspecies of Hooded Robin are recognised: *M. c. melvillensis* (Tiwi Islands, NT); *M. c. westralensis* (south-western arid zone); and *M. c. picata* (northern inland) (Schodde & Mason 1999).

### Description

Hooded Robin is a large Australian robin reaching 17 cm in length. The male is strikingly marked in black and white, with a bold black hood extending down a white breast. The back is black with distinct white shoulder and wing-bar. The tail is black, with prominent white side-panels. Females and immatures are duller, with light brownish-grey upperparts, but the same striking black and white wings. Flight is short and swiftly undulating. The call is a series of descending, fading, mellow notes. The adult male is unmistakable, but the female and young males may be confused with other species. Hooded Robins (south-eastern) are distinguished by their larger size, distinctive white wing bar and different shaped tail markings ('hourglass' shaped).

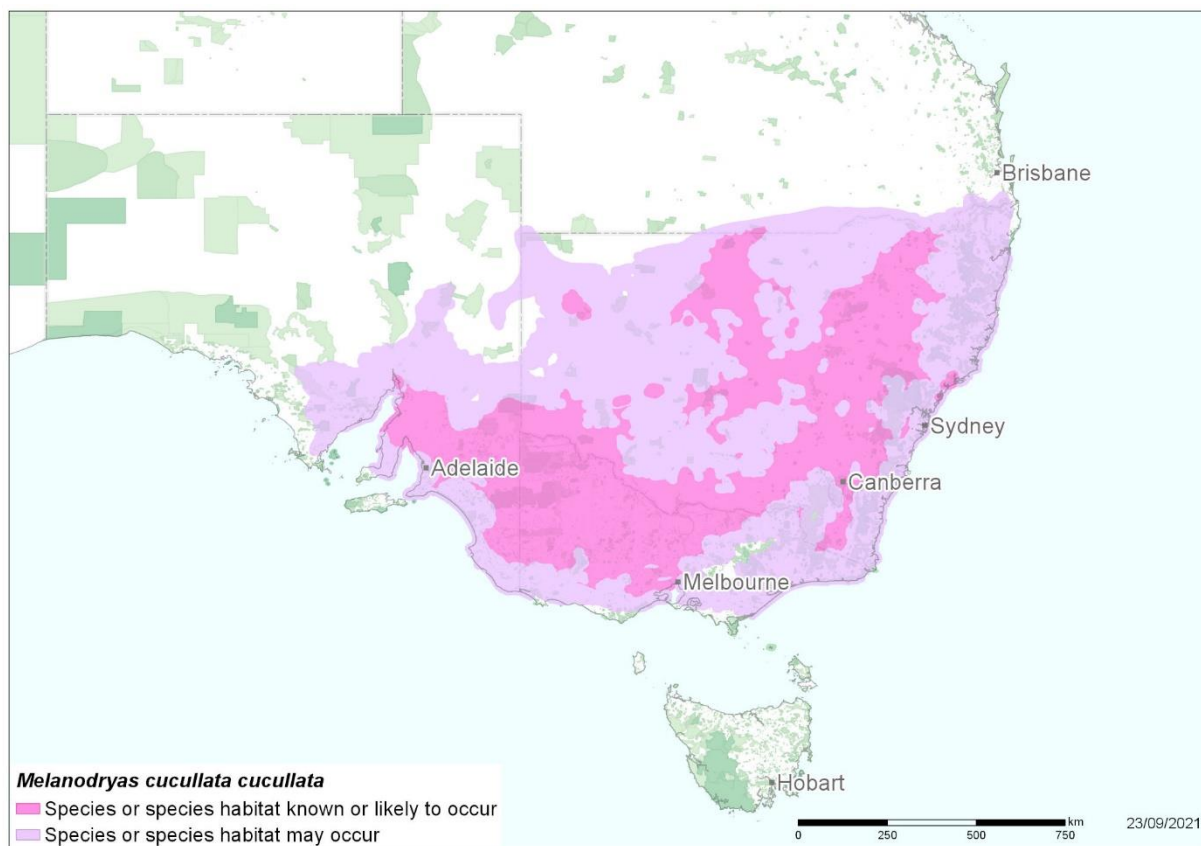


## Distribution

Hooded Robins (south-eastern) occur in south-eastern Australia from far south-east Queensland to Yorke Peninsula, South Australia, intergrading with *M. c. picata* in the southern Murray-Darling basin (Schodde & Mason 1999). The subspecies is now absent from many formerly occupied sites, particularly in the wetter areas of the south and east (Barrett et al. 1994; Paton et al. 1994; Ford et al. 2009).

There are estimated to be 100 Hooded Robin (south-eastern) subpopulations, though the reliability of this estimate is low (Ford et al. 2021). The population is not severely fragmented, and the number of locations is greater than 10. However, fragmented populations are assumed to be genetically isolated (Ford et al. 2021).

### Map 1 Modelled distribution of Hooded Robin (south-eastern)



Source: Base map Geoscience Australia; species distribution data [Species of National Environmental Significance](#) database.

## Cultural and community significance

Hooded Robins (south-eastern) are known to occur on the lands of at least the following Indigenous Peoples: Adnyamathanha, Barkandji, Bigambul, Bindjali, Boandik, Bundjalung, Eastern Maar, Euahlayi, First Peoples of the River Murray & Mallee Region (Jarijari), Gamilaraay, Gomeroi, Gunaikurnai, Gunditjmara, Iman, Jagera, Kurna, Mandandanji, Millewa-Mallee, Narungga, Ngadjuri, Ngargad, Ngarrindjeri, Ngemba, Ngiyampaa, Nukunu, Quandamooka, Ugarapul, Wangaaypuwan, Warrabinga, Wayilwan, Wilyakali, Wiradjuri, Wonnarua, Yagera and Yorta Yorta (Ford et al. 2021). The cultural and community significance of the subspecies is not known. Further research into the subject area may benefit the conservation of the subspecies by providing insights about traditional land management.

## **Relevant biology and ecology**

Hooded Robins (south-eastern) are described as shy and largely sedentary, and are mostly seen in pairs or small groups. They prefer dry eucalypt and acacia woodlands and shrublands with an open understorey, some grassy areas and a complex ground layer. They avoid woodlands with tall trees or dense tree cover but sometimes occur in tall, dense heaths with scattered open areas. While they can occur in patches as small as 2.9 ha (Montague-Drake et al. 2009), in agricultural landscapes they prefer larger patches greater than 10 ha (Watson et al. 2000) with moderately deep to deep soils (Priday 2010).

Birds tend to forage on insects and small lizards taken from the ground (Antos et al. 2008). They hunt for invertebrates by 'perch and pounce' in grassy clearings where rocks and fallen timber litter the ground (Sullivan 1993). Birds are often quiet during the day, especially in the afternoon, but are one of the first birds to call in the morning, when they vigorously add their far-carrying song to the dawn chorus (Birdlife Australia 2018). The call is a series of descending, fading, mellow notes.

Hooded Robins (south-eastern) generally form monogamous pairs and occupy territories during the breeding season (between July and November) and non-breeding season. Birds usually return to the same breeding site where they typically rear several broods each season. Nests comprise small, neat cups of bark and grasses bound with webs (Fitri & Ford 2003a, 2003b; Higgins & Peter 2002), and are situated in a tree fork or crevice, from less than 1 m to 5 m above the ground. A clutch size of two is typical. The incubation period is 14 days and only the female broods the eggs. Both sexes defend the nests with displays of injury-feigning, tumbling across the ground. Generation length is estimated at 3.0 years (Bird et al. 2020).

## **Habitat critical to the survival**

Habitat critical to the survival or important habitats of a species or ecological community refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal;
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators);
- to maintain genetic diversity and long-term evolutionary development; or
- for the reintroduction of populations or recovery of the species or ecological community.

Habitat critical to the survival of the Hooded Robin (south-eastern) include areas of:

- dry eucalypt and acacia woodlands and shrublands remnants with an open understorey, some grassy areas and a complex ground layer, often in or near clearings or open areas;
- structurally diverse habitats featuring: mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses;
- standing dead or live trees and tree stumps are also essential for nesting, roosting and foraging;
- moderately deep to deep soils, rocks and fallen timber which provides essential foraging habitat.

Any known or likely habitat (Map 1) should be considered as habitat critical to the survival of the subspecies. Additionally, areas that are not currently occupied by the species due to recent disturbance (e.g. fire, grazing or human activity), but should become suitable again in the future, should also be considered habitat critical to the survival of the species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Hooded Robin (south-eastern) habitat occurs across a wide range of land ownership arrangements, including on private land, travelling stock routes and reserves, state forests and state reserves, and National Parks. It is essential that the highest level of protection is provided to these areas and that enhancement and protection measures target these productive sites.

Habitat critical to the survival should not be cleared, fragmented or degraded. If removal of habitat critical to the survival cannot be avoided or mitigated, then an offset should be provided. Actions identified in this document may form suitable offsets.

## Threats

Hooded Robins are one of several arid-adapted species declining in the wetter portions of their distribution. Historical habitat clearance that destroyed much habitat has left a legacy of fragmentation and degradation (Ford 2011) where nest predation is too high to compensate for adult mortality (Ford et al. 2009), and they have to compete with Noisy Miners (*Manorina melanocephala*) (Maron & Lill 2005).

Other possible threats are likely to be by-products of fragmentation. They include altered fire regimes that promote greater density in understorey shrubs or weeds, firewood collection and tidying of farmland, grazing by stock, rabbits (*Oryctolagus cuniculus*) and overabundant kangaroos (*Macropus* spp.), increased predation cats (*Felis catus*) and foxes (*Vulpes vulpes*), and invasive weeds (Willson & Bignall 2009). Even though Hooded Robins are widespread in the arid zone, local extirpation in some areas has followed drought (Ellis & Taylor 2014). Droughts are likely to increase in intensity (Evans et al. 2017). The likelihood of local extinction due to drought is probably increased for habitat patches already under pressure, and which cannot be recolonised naturally when fragmented in an inhospitable agricultural matrix.

**Table 1 Threats impacting Hooded Robin (south-eastern)**

Threat	Status and severity <sup>a</sup>	Evidence
Habitat loss, degradation and fragmentation		
Ongoing impacts of habitat fragmentation and land clearing for agriculture	<ul style="list-style-type: none"> <li>• Status: historical, current &amp; future</li> <li>• Confidence: inferred</li> <li>• Consequence: moderate</li> <li>• Trend: static</li> <li>• Extent: across part of its range</li> </ul>	<p>The main threats to bird survival in agricultural areas is habitat loss caused by over-clearing of native vegetation, and subsequent degradation of remnant vegetation (Stevens 2001). Since European settlement, over 80% of woodlands in south-east Australia have been cleared (Bradshaw 2012). Remaining remnants are generally isolated and small, and often below the critical size needed to sustain healthy populations of many bird species (Olsen et al. 2005).</p> <p>Additionally, as habitats become increasingly fragmented due to</p>



		clearing, native birds become more vulnerable to other threats, such as predation and destructive fires, and may lose the ability to recolonise once-suitable habitat (Olsen et al. 2005). Also, as the richer soils tend to have been cleared for agriculture, the remaining areas may not produce prey of sufficient quantity or quality (Watson 2011; Razeng & Watson 2015).
Habitat degradation caused by domestic livestock grazing	<ul style="list-style-type: none"> <li>• Status: historical, current &amp; future</li> <li>• Confidence: inferred</li> <li>• Consequence: moderate</li> <li>• Trend: increasing</li> <li>• Extent: across part of its range</li> </ul>	<p>Native tree and shrub seedlings and grassy woodland groundcover species are highly susceptible to domestic stock grazing. Many woodland remnants in poor condition lack native plant diversity and therefore have low habitat value for woodland birds (Seddon et al. 2003).</p> <p>Unlike native herbivores, most domestic stock are hard-hoofed and cause significantly more damage to soil structure from compaction, and damage to native plants by trampling (Willson &amp; Bignall 2009). A reduction or removal of understorey habitat (e.g., native shrubs, herbs and grasses) can reduce foraging and nesting sites, reduce shelter, and subsequently increase the risk of predation (Olsen et al. 2005).</p> <p>The other major influence of livestock grazing is its interaction with weed invasion (Martine &amp; Alan 2005). Livestock grazing can exacerbate weed spread through seed dispersal, soil and vegetation disturbance, and nutrient enrichment (Martine &amp; Alan 2005).</p>
Invasive weeds	<ul style="list-style-type: none"> <li>• Status: current</li> <li>• Confidence: suspected</li> <li>• Consequence: moderate</li> <li>• Trend: static</li> <li>• Extent: across part of its range</li> </ul>	<p>Invasive weeds have the ability to change the floristic and structural characteristics of habitat, thereby changing resource availability (French &amp; Zubovic 1997). Some weeds may also increase the flammability of habitat, amplifying bushfire risk (Salvo Aires 2014).</p> <p>More research is required to assess the specific species which may impact Hooded Robin (south-eastern) feeding and breeding habitats, and the extent of this threat.</p>
Unintentional effects of firewood collection	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: suspected</li> <li>• Consequence: moderate</li> <li>• Trend: unknown</li> <li>• Extent: across part of its range</li> </ul>	<p>Legal and illegal harvesting of timber for firewood reduces the availability of habitat for birds, and the invertebrates on which they feed, and can alter micro-habitat conditions for native flora (Wilson &amp; Bignall 2009).</p>

		<p>The level of impact of this threat within Hooded Robin (south-eastern) range is unclear. Management guidelines for firewood collection exist (ANZECC 2001; DEH 2002; DEC 2003) and should be encouraged to maintain and improve essential habitat for the subspecies.</p>
Climate change		
<p>Increased likelihood of extreme events (i.e., wildfire, heatwave, and drought)</p>	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: known</li> <li>• Consequence: high</li> <li>• Trend: increasing</li> <li>• Extent: across the entire range</li> </ul>	<p>Since 1950, the number of record hot days (above 35°C) across Australia has more than doubled and the mean temperature has increased by about 1.4°C since 1910 (BOM &amp; CSIRO 2020; IPCC 2021). Heatwaves are also lasting longer, reaching more extreme maximum temperatures, and occurring more frequently over many regions of Australia, including south-eastern Australia (Perkins-Kirkpatrick et al. 2016; Evans et al. 2017; Herold et al. 2018; (BOM &amp; CSIRO 2020). Heatwaves also exacerbate drought, which in turn can also increase bushfire risk (Climate Council 2014) and adversely impact resource availability (BOM &amp; CSIRO 2020)</p> <p>Birds are also vulnerable to extreme heatwaves that overwhelm their physiological limits (McKechnie et al 2012). Detailed information on temperature threshold at which reproduction and survival are affected are available for the closely related <i>Microeca fascians</i> (Jacky Winter) (Sharpe et al. 2019; Sharpe et al. 2021). At this study site Hooded Robin (south-eastern) co-exist with Jacky Winter and appear susceptible to the same temperatures. For example, Jacky Winter hatching success starts to decline when air temperatures reach 35°C with 100% egg mortality at 42.5°C; early arrival of heatwaves can reduce annual reproductive success by 50%; adult mortality during heatwaves can increase almost three-fold; and single days of extreme heat can cause major mortalities (30% of the adult population died within 24h of a single extreme day of 49°C) (Sharpe et al. 2019; Sharpe 2021).</p>
Competition	•	

Noisy Miner territorial competition	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: inferred</li> <li>• Consequence: moderate</li> <li>• Trend: static</li> <li>• Extent: across the entire range</li> </ul>	<p>The Noisy Miner is a native species that often aggressively excludes other small woodland birds from remnants they occupy (Willson &amp; Bignall 2009). Noisy Miners have benefited from landscape-scale clearing and fragmentation. They typically dominate open Eucalypt woodland remnants on farms, in tree corridors and clumps of paddock trees, especially those lacking a shrubby understorey (Crates et al. 2018). Local scale control programs at a critical breeding sites may benefit the subspecies where Noisy Miners are a known threat.</p>
Fire		
Inappropriate fire regimes	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: suspected</li> <li>• Consequence: low</li> <li>• Trend: increasing</li> <li>• Extent: across the entire range</li> </ul>	<p>Too frequent fire may contribute to Hooded Robin (south-eastern) decline through: changes in composition and/or structure of vegetation; increased weed invasion following fire; loss of woody debris; reduction in leaf litter; and decline in invertebrate abundance (Spencer &amp; Baxter 2006). Several fires in close succession can also prevent plants and animals from returning to an area (particularly in fragmented landscapes), and prevent soil seed set (Wilson &amp; Bignall 2009).</p> <p>Fire suppression can be as detrimental as too frequent fires (Wilson &amp; Bignall 2009). Fire plays an important role in environmental ecology, and is needed to trigger natural processes, such as stimulating seed germination (Olsen et al. 2005). Infrequent fire results in wood thickening and loss of grassy woodlands, granivorous species and general biodiversity (Olsen et al. 2005). Fires can also free plants from competition with invasive weeds and eliminate disease or droves of insects that may have been causing damage to old growth.</p> <p>Since little is known about the appropriate fire regime for the subspecies, particularly in fragmented landscapes, the potential for negative outcomes from management actions is high. A greater level of understanding is required to achieve effective management.</p>

Invasive species		
Cat and fox predation	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: suspected</li> <li>• Consequence: low</li> <li>• Trend: static</li> <li>• Extent: across the entire range</li> </ul>	Woodland bird species that nest or forage on the ground are particularly vulnerable to predation by cats and foxes, including Hooded Robins (south-eastern) (Olsen et al. 2005; Commonwealth of Australia 2008a, 2008b, 2015a, 2015b; Woinarski et al. 2017). The threat of cats is also amplified by bushfires as they take advantage of recently burnt areas (McGregor et al. 2016), as they prefer to hunt in open habitats (McGregor et al. 2015).
Habitat degradation caused by rabbit and deer grazing and browsing pressure	<ul style="list-style-type: none"> <li>• Status: current &amp; future</li> <li>• Confidence: suspected</li> <li>• Consequence: low</li> <li>• Trend: static</li> <li>• Extent: across the entire range</li> </ul>	<p>There is evidence that European rabbits and feral deer impact negatively on native species via competition for resources, alteration of the structure and composition of vegetation, land degradation, and supporting elevated densities of introduced predators (cats, foxes) (Commonwealth of Australia 2011; Commonwealth of Australia 2016a, 2016b; NSW OEH 2017). Feral deer also destroy native vegetation by trampling and ringbarking young trees, and cause soil erosion due to impacts of hard hooves (NSW OEH 2017).</p> <p>Grazing and browsing pressure by rabbits and deer has reduced the capacity of woodlands to regenerate, consequently reducing Hooded Robin (south-eastern) nesting, feeding and foraging sites.</p>

Status—identify the temporal nature of the threat;

Confidence—identify the extent to which we have confidence about the impact of the threat on the species;

Consequence—identify the severity of the threat;

Trend—identify the extent to which it will continue to operate on the species;

Extent—identify its spatial content in terms of the range of the species.

Each threat has been described in Table 1 in terms of the extent that it is operating on the subspecies. The risk matrix (Table 3) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately (Table 2). The risk matrix (Table 3) and ranking of threats has been developed in consultation with experts, community consultation and by using available literature.

**Table 2 Risk prioritisation**

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain	Low risk	Moderate risk	Very high risk	Very high risk	Very high risk

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
<b>Likely</b>	Low risk	Moderate risk	High risk	Very high risk	Very high risk
<b>Possible</b>	Low risk	Moderate risk	High risk	Very high risk	Very high risk
<b>Unlikely</b>	Low risk	Low risk	Moderate risk	High risk	Very high risk
<b>Unknown</b>	Low risk	Low risk	Moderate risk	High risk	Very high risk

**Categories for likelihood are defined as follows:**

Almost certain – expected to occur every year

Likely – expected to occur at least once every five years

Possible – might occur at some time

Unlikely – such events are known to have occurred on a worldwide basis but only a few times

Rare or Unknown – may occur only in exceptional circumstances; OR it is currently unknown how often the incident will occur

**Categories for consequences are defined as follows:**

Not significant – no long-term effect on individuals or populations

Minor – individuals are adversely affected but no effect at population level

Moderate – population recovery stalls or reduces

Major – population decreases

Catastrophic – population extinction

**Table 3 Hooded Robin (south-eastern) risk matrix**

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
<b>Almost certain</b>			<ul style="list-style-type: none"> <li>Noisy Miner territorial competition</li> </ul>	<ul style="list-style-type: none"> <li>Ongoing impacts of habitat fragmentation caused land clearing for large scale agriculture</li> <li>Increased likelihood of extreme events (i.e., wildfire, heatwave, and drought)</li> </ul>	
<b>Likely</b>		<ul style="list-style-type: none"> <li>Cat and fox predation</li> <li>Rabbit and deer grazing and browsing pressure</li> </ul>	<ul style="list-style-type: none"> <li>Invasive weeds</li> </ul>	<ul style="list-style-type: none"> <li>Habitat degradation caused by domestic livestock grazing</li> </ul>	
<b>Possible</b>			<ul style="list-style-type: none"> <li>Unintentional effects of firewood collection</li> <li>Altered fire regimes</li> </ul>		
<b>Unlikely</b>					
<b>Unknown</b>					

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be 'very high' or 'high'. For those threats with an unknown or low risk outcome it may be more appropriate to identify further research or maintain a watching brief.

## Conservation and recovery actions

### Primary conservation outcome

- Stable or increasing populations across the range.

### Conservation and management priorities

#### Ongoing impacts of habitat fragmentation caused by land clearing for agriculture

- Cease all land clearing of habitat critical for the survival of Hooded Robin (south-eastern).
- Retain and restore all remnant woodland patches in areas of habitat critical for the survival of Hooded Robin (south-eastern).
- Undertake revegetation, using a diverse mix of locally appropriate native species, focussing on expanding and connecting areas of existing habitat or widening wildlife corridors wherever possible. Where appropriate:
  - Replace cohorts of trees where they have been removed from the landscape, particularly in areas adjacent to and connecting woodland remnants.
  - Establish new habitat patches in areas where native vegetation cover is lacking.
  - Target the productive lower parts of the landscape, especially areas adjacent to streams (which may provide important drought refuges). To maximise these benefits, riparian plantings should be at least 50 m wide.
  - Consider the characteristics of thermal refuges used during extreme heat events e.g., ground based thermal refuges.
- Ensure populations remain connected by avoiding gaps greater than 100 m between habitat patches and along linear remnants. Eliminate gaps through revegetation (either corridors or stepping stone plantings), focusing on important movement pathways.
- Promote ecological management and connectivity of woodland remnants on public and private land.

#### Increased likelihood of extreme events (i.e., wildfire, heatwave, and drought)

- Develop a site-based fire management strategies with local authorities which considers the ecological needs of the subspecies.
- Characterise the nature and use of thermal refuges used by the subspecies during heatwaves.

#### Habitat degradation caused by domestic livestock grazing

- Prevent intensive grazing in high value habitats.
- Modify grazing management practices that will maintain or improve habitat values and still allow some grazing to occur at strategic times of the year.



### **Invasive weeds**

- Target removal of weeds significantly compromising habitat values (e.g. invasive perennial grasses) and restore native vegetation. Care should be taken to avoid widespread removal of beneficial exotic woody vegetation without replacement and avoid non-target impacts of herbicides.

### **Noisy Miner territorial competition**

- Measure the abundance and impact of noisy miners on subspecies populations and habitat, and implement appropriate management actions with demonstrated effectiveness to reduce the impacts of Noisy Miners if/where required. The preferred method for managing Noisy Minor impacts is through habitat modification (e.g. reduce the amount of edge and establish a structurally complex understorey).

### **Altered fire regimes**

- Develop site-based fire management strategies with local authorities which consider the ecological needs of the subspecies.
- Monitor bushfire-affected areas to assess the impact of wildfire on the subspecies and its habitats, and the capacity of the subspecies to recover from such events.
- Actively manage the landscape to minimise the risk of very large, high-intensity wildfires.

### **Unintentional effects of firewood collection**

- Control firewood collection including limiting the removal of live and dead timber.

### **Stakeholder engagement/community engagement**

- Target in-perpetuity covenants or stewardship agreements to landholders with high quality remnant woodland habitat.
- Raise awareness among landholders in areas known to have important habitat for the species, to engage them in proactive management and monitoring of the subspecies' population on their land.
- Support community education programs to achieve regional conservation outcomes.
- Encourage the retention of a floristically and structurally diverse and spatially variable understorey in patches of woodland. Raise public awareness of the damage caused to native wildlife habitat by firewood collection, cleaning up, over-grazing, and frequent fuel reduction burns.
- Encourage the retention of woody ground debris:
  - Raise public awareness of the impact of firewood collection, cleaning up, and fuel reduction burns on this critical resource.
  - Promote the retention of large old trees that have the potential to contribute woody ground debris via the shedding of limbs.
- Encourage responsible pet ownership, e.g., keeping cats indoors.

### **Survey and monitoring priorities**

- Monitor long term trends and status of the subspecies.

- Monitor the effectiveness of management actions and trends in local populations regularly. Any site-based management will be adapted, added or removed over time in response to monitoring results.

### Information and research priorities

- Determine population densities and trends in arid, less fragmented parts of the range.
- Identify fire regimes suitable to the habitat requirements of the species.
- Establish criteria for sites where management investment to recover robin populations is warranted.
- Use modelling techniques to investigate the potential impact of climate change on the subspecies and their habitat critical for survival.
- Identify different practical methods for restoring the structure and function of the ground layer in degraded habitat, including soil biota and its functionality.
- Develop appropriate management interventions for isolated subpopulations including predator and competitor control, fire regime and ground cover manipulation.
- Undertake experimental reintroductions within closely managed environments.
- Investigate genetic impacts of fragmentation and their potential to be driving local losses.

### Recovery plan decision

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

### Links to relevant implementation documents

- [Threat abatement plan for predation by European red fox](#) (Commonwealth of Australia 2008b).
- [Threat abatement plan for predation by feral cats](#) (Commonwealth of Australia 2015b).
- [Threat abatement plan for competition and land degradation by rabbits](#) (Commonwealth of Australia 2016b).
- [Listing assessment for aggressive exclusion of birds from potential woodland and forest habitat by over-abundant noisy miners \(\*Manorina melanocephala\*\) \(TSSC 2013\).](#)
- [Removal of dead wood as a key threatening process](#) (NSW National Parks and Wildlife Service 2003).

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# THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee draft listing assessment

## Attachment A: Listing Assessment for *Melanodryas cucullata cucullata*

### Reason for assessment

Prioritisation of a nomination from the TSSC.

### Assessment of eligibility for listing

This assessment uses the criteria set out in the [EPBC Regulations](#). The thresholds used correspond with those in the [IUCN Red List criteria](#) except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

### Key assessment parameters

Table 4 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria.

**Table 4 Key assessment parameters**

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	68,000	36,000	113,000	<p>The population estimate of Hooded Robin (south-eastern) is the product of the three measures of AOO and the average density of birds in 2 ha 20 min surveys in which counts were undertaken (1.8 birds/2 ha; SD 1.1, 1327 plots) (Ford et al. 2021).</p> <p>Studies by Ford and others have shown that Hooded Robins tend to persist only in substantial areas of remnant habitat, so it is assumed that, if they are present at all, there must have been at least 20 ha of suitable habitat within the patch where they were observed (S Garnett pers. comms. 9 Nov 2021). Therefore, each 2x2 km square contributing to the AOO is assumed to indicate 20 ha of suitable habitat (S Garnett pers. comm. 9 Nov 2021).</p> <p>The reliability of this population estimate is low (Ford et al. 2021).</p>
Trend	Declining			<p>Numbers of this subspecies have been declining in agricultural landscapes for many decades (Robinson 1993; Robinson &amp; Traill 1996; Reid 1999; Olsen et al. 2005; Ford et al. 2021). The reliability of this estimate is high (Ford et al. 2021).</p>
Generation time (years)	3.0	2.7	3.3	<p>Bird et al. (2020). The reliability of this estimate is medium (Ford et al. 2021).</p>



<b>Metric</b>	<b>Estimate used in the assessment</b>	<b>Minimum plausible value</b>	<b>Maximum plausible value</b>	<b>Justification</b>
<b>Extent of occurrence</b>	1,200,000 km <sup>2</sup>	1,100,000 km <sup>2</sup>	1,400,000 km <sup>2</sup>	Ford et al. (2021). The reliability of this estimate is high.
<b>Trend</b>	Contracting			Ford et al. (2021). The reliability of this estimate is high.
<b>Area of Occupancy</b>	30,000 km <sup>2</sup>	16,000 km <sup>2</sup>	50,000 km <sup>2</sup>	The minimum AOO is the number of 2x2 km squares within the subspecies have been recorded since 1990 (Ford et al. 2021). But, given the remoteness of much of the distribution, the real AOO is assumed to be at least twice that and probably substantially greater (Ford et al. 2021).  The reliability of this estimate is low (Ford et al. 2021; S Garnett pers. comm. 9 Nov 2021).
<b>Trend</b>	Contracting			Ford et al. (2021). The reliability of this estimate is high.
<b>Number of subpopulations</b>	100			Due to widespread distribution of the subspecies, fragmentation of woodland habitat, and low dispersal distances there are likely to be many subpopulations of Hooded Robin (south-eastern). For the purpose of this assessment there are estimated to be 100 subpopulations (Ford et al. 2021). However, the reliability of this estimate is low (Ford et al. 2021).
<b>Trend</b>	Declining			Ford et al. (2021). The reliability of this estimate is high.
<b>Basis of assessment of subpopulation number</b>	Fragmented populations are assumed to be genetically isolated, and there are many fragments (Ford et al. 2021).			
<b>No. locations</b>	>10			Ford et al. (2021)
<b>Trend</b>	Not calculated			Ford et al. (2021)
<b>Basis of assessment of location number</b>	Fragmented populations are assumed to be genetically isolated, and there are many fragments (Ford et al. 2021).			
<b>Fragmentation</b>	Not severely fragmented (Ford et al. 2021).			
<b>Fluctuations</b>	Not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals (Ford et al. 2021).			

## Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p><b>A1</b> Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p><b>A2</b> Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p><b>A3</b> Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) <i>cannot be used for A3</i>]</p> <p><b>A4</b> An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>Based on any of the following</p> <ul style="list-style-type: none"> <li>(a) direct observation [except A3]</li> <li>(b) an index of abundance appropriate to the taxon</li> <li>(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat</li> <li>(d) actual or potential levels of exploitation</li> <li>(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites</li> </ul>			

## Criterion 1 evidence

### Eligible under Criterion 1 A2bce for listing as Endangered

Hooded Robins (south-eastern) occur in south-eastern Australia from far south-east Queensland to Yorke Peninsula, South Australia, intergrading with *M. c. picata* in the southern Murray-Darling basin (Schodde & Mason 1999). The subspecies has been recognised as a declining member of the woodland avifauna (Ford et al. 2021), and are now absent from many formerly occupied sites, particularly in the wetter areas of the south and east (Barrett et al. 1994; Paton et al. 1994; Ford et al. 2009).

Reporting rate data can be used to determine bird species abundance. Data used in trend analyses are limited to standardised bird surveys drawn from discrete (spatially separated) sites which have multiple repeat observations over time. Based on reporting rate data, it appears that the Hooded Robin (south-eastern) population has undergone a significant reduction in size (>50%) over ten years (one generation 3.0 years) (Ford et al. 2021). While there is no dedicated range-wide monitoring, but the subspecies is still sufficiently common that reporting rate trends are likely to reflect changes in abundance (Ford et al. 2021). Across the range from 2000–2018, reporting rates from 2 ha 20 min surveys and 500 m radius area searches declined by 65% and 63% respectively (1999–2008: declines of 14% and 55%; 2009–2018: declines of 51% and 49%). At a local level, the reporting rate in the Australian Capital Territory declined by 93.3% from 1987–2017 with a 94% decline in the final decade (Canberra Ornithologists Group 2020); while a 20 year trend analysis between 1998–2019 found (Bounds et al. 2021). In southern New South Wales, abundance declined by 66% from 2002–2015 (Lindenmayer et al. 2018) and in

north-east New South Wales reporting rates at 41 sites declined from 52% in 1977–1980 to 13% in 2004–2006 (Gosper & Gosper 2016) and zero in 2020 (DG and CR Gosper pers comm cited in Ford et al. 2021).

Additionally, numbers of this subspecies have been declining in agricultural landscapes for many decades (Robinson 1993; Robinson & Traill 1996; Reid 1999; Olsen et al. 2005); the reporting rate declined by 41% in NSW between the 1977–1981 and 1998–2002 BirdLife Australia Atlases, with no variation between bioregions (Barrett et al. 2007). The declining trend has been continuing (Ford et al. 2021).

Decline of Hooded Robins (south-eastern) is partially attributed to such ongoing threats as: grazing by domestic stock, introduced rabbits (*Oryctolagus cuniculus*), and overabundant kangaroos (*Macropus* spp.) (all of which prevent regeneration of native vegetation (Willson & Bignall 2009); increased predation from introduced mammals (cats and foxes), invasive weeds, and competition with Noisy Miners (*Manorina melanocephala*) (Maron & Lill 2005). The effect of these threats, combined with habitat loss and fragmentation for large-scale agriculture, climate change, inappropriate fire regimes, and inappropriate firewood collection and tidying of farmland, have not ceased and may not be reversible.

The data presented above appear to demonstrate that the subspecies is **eligible for listing as Endangered** under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

## Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
<b>B1.</b> Extent of occurrence (EOO)	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
<b>B2.</b> Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
<b>AND at least 2 of the following 3 conditions:</b>			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

## Criterion 2 evidence

Not eligible

Hooded Robin (south-eastern) EOO is estimated at 1,200,000 km<sup>2</sup> (range 1,100,000–1,400,000 km<sup>2</sup>) and AOO is estimated to be 30,000 km<sup>2</sup> (16,000–50,000 km<sup>2</sup>) (Ford et al. 2021). The minimum AOO is the number of 2x2 km squares within they have been recorded since 1990 but, given the remoteness of much of the distribution, the real AOO is assumed to be at least twice that and probably substantially greater (Ford et al. 2021). Both the EOO and AOO for the subspecies are contracting (Ford et al. 2021). There are estimated to be 100 subpopulations (Ford et al. 2021) and 68,000 (36,000–113,000) mature individuals in the wild (S Garnett pers. comms. 9 Nov 2021). The population is not severely fragmented, and the number of locations is greater than 10. However, fragmented populations are assumed to be genetically isolated, and there are many fragments (Ford et al. 2021). The number of subpopulations is likely declining. The subspecies is not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals (Ford et al. 2021).

The data presented above appear to demonstrate that the subspecies is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

### Criterion 3 Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generations (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

### Criterion 3 evidence Not eligible

The total number of mature individuals is estimated to be 68,000 (36,000–113,000), however the reliability of this estimate is low (S Garnett pers. comms. 9 Nov 2021). There are estimated to be approximately 100 subpopulations (low reliability) with a declining trend (high reliability) (Ford et al. 2021). The number of mature individuals in the largest subpopulation is estimated to be 50,000 (30,000–100,000). The subspecies' distribution is not precarious for its survival. The subspecies is not subject to extreme fluctuations in the number of mature individuals (Ford et al. 2021).

The data presented above appear to demonstrate that the subspecies is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

#### Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
<b>D. Number of mature individuals</b>	< 50	< 250	< 1,000
<b>D2.<sup>1</sup> Only applies to the Vulnerable category</b> Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km <sup>2</sup> or number of locations ≤ 5

<sup>1</sup> The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the [common assessment method](#).

#### Criterion 4 evidence

##### Not eligible

The estimated total number of mature individuals is 68,000 (36,000–113,000) (S Garnett pers. comms. 9 Nov 2021). The population of Hooded Robins (south-eastern) is the product of the three measures of AOO and the average density of birds in 2 ha 20 min surveys in which counts were undertaken (1.8 birds/2 ha; SD 1.1, 1327 plots) assuming, given that Hooded Robins tend to persist in larger habitat patches, that each 2x2 km of AOO is associated with 20 ha of habitat.

The data presented above appear to demonstrate that the subspecies is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

## Criterion 5 Quantitative analysis

	<b>Critically Endangered Immediate future</b>	<b>Endangered Near future</b>	<b>Vulnerable Medium-term future</b>
<b>Indicating the probability of extinction in the wild to be:</b>	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

## Criterion 5 evidence

### Insufficient data to determine eligibility

Population viability analysis appears not to have been undertaken, and therefore there is insufficient data to demonstrate if the subspecies is eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the subspecies' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

### Adequacy of survey

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.



## **CONSULTATION QUESTIONS FOR *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern))**

### **SECTION A - GENERAL**

1. Is the information used to assess the nationally threatened status of the species/subspecies robust? Have all the underlying assumptions been made explicit? Please provide justification for your response.
2. Can you provide additional data or information relevant to this assessment?
3. Have you been involved in previous state, territory or national assessments of this species/subspecies? If so, in what capacity?

## **PART 1 – INFORMATION TO ASSIST LISTING ASSESSMENT**

### **SECTION B DO YOU HAVE ADDITIONAL INFORMATION ON THE ECOLOGY OR BIOLOGY OF THE SPECIES/SUBSPECIES? (If no, skip to section C)**

#### **Biological information**

4. Can you provide any additional or alternative references, information or estimates on longevity, average life span and generation length?
5. Do you have any additional information on the ecology or biology of the species/subspecies not in the current advice?

### **SECTION C ARE YOU AWARE OF THE STATUS OF THE TOTAL NATIONAL POPULATION OF THE SPECIES/SUBSPECIES? (If no, skip to section D)**

#### **Population size**

6. Has the survey effort for this taxon been adequate to determine its national adult population size? If not, please provide justification for your response.
7. Do you consider the way the population size has been derived to be appropriate? Are there any assumptions and unquantified biases in the estimates? Did the estimates measure relative or absolute abundance? Do you accept the estimate of the total population size of the species/subspecies? If not, please provide justification for your response.
8. If not, can you provide a further estimate of the current population size of mature adults of the species/subspecies (national extent)? Please provide supporting justification or other information.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species/subspecies numbers, and also choose the level of confidence you have in this estimate:

Number of mature individuals is estimated to be in the range of:

☐ >25,000 ☐ 25,001-50,000 ☐ 50,001-75,000 ☐ 75,001-100,000

☐ 100,001-125,000 ☐ 125,001-150,000 ☐ >150,000

Level of your confidence in this estimate:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, information suggests this range
- ☐ 95–100% - high level of certainty, information indicates quantity within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

**SECTION D ARE YOU AWARE OF TRENDS IN THE OVERALL POPULATION OF THE SPECIES/SUBSPECIES? (If no, skip to section E)**

9. Does the current and predicted rate of decline used in the assessment seem reasonable? Do you consider that the way this estimate has been derived is appropriate? If not, please provide justification of your response.

**Evidence of total population size change**

10. Are you able to provide an estimate of the total population size during the late 2000s (*at or soon after the start of the most recent three generation period*)? Please provide justification for your response.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species/subspecies numbers, and also choose the level of confidence you have in this estimate.

Number of mature individuals is estimated to be in the range of:

☐ >25,000 ☐ 25,001-50,000 ☐ 50,001-75,000 ☐ 75,001-100,000

☐ 100,001-125,000 ☐ 125,001-150,000 ☐ >150,000

Level of your confidence in this estimate:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, information suggests this range
- ☐ 95–100% - high level of certainty, information indicates quantity within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

11. Are you able to comment on the extent of decline in the species/subspecies' total population size over the last approximately 13 years (i.e., three generations)? Please provide justification for your response.

If, because of uncertainty, you are unable to provide an estimate of decline, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of decline, and also choose the level of confidence you have in this estimated range.

Decline estimated to be in the range of:

☐ 1–30% ☐ 31–50% ☐ 51–80% ☐ 81–100% ☐ 90–100%

Level of your confidence in this estimated decline:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, suggests this range of decline
- ☐ 95–100% - high level of certainty, information indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

12. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

**SECTION E ARE YOU AWARE OF INFORMATION ON THE TOTAL RANGE OF THE SPECIES/SUBSPECIES? (If no, skip to section F)**

**Current Distribution/range/extent of occurrence, area of occupancy**

13. Does the assessment consider the entire geographic extent and national extent of the species/subspecies? If not, please provide justification for your response.
14. Has the survey effort for this species/subspecies been adequate to determine its national distribution? If not, please provide justification for your response.
15. Is the distribution described in the assessment accurate? If not, please provide justification for your response and provide alternate information.
16. Do you agree that the way the current extent of occurrence and/or area of occupancy have been estimated is appropriate? Please provide justification for your response.
17. Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the extent of occurrence and/or area of occupancy.

If, because of uncertainty, you are unable to provide an estimate of extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of extent of occurrence, and also choose the level of confidence you have in this estimated range.

**Current extent of occurrence** is estimated to be in the range of:

- ☐ <1,00,000 km<sup>2</sup> ☐ 1,000,000-1,500,000 km<sup>2</sup> ☐ 1,500,001-2,000,000 km<sup>2</sup>
- ☐ >2,000,000 km<sup>2</sup>

Level of your confidence in this estimated extent of occurrence

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of area of occupancy, and also choose the level of confidence you have in this estimated range.

**Current area of occupancy** is estimated to be in the range of:

- ☐ <25,000 km<sup>2</sup> ☐ 25,000 – 50,000 km<sup>2</sup> ☐ 50,001 – 100,000 km<sup>2</sup> ☐ >100,000 km<sup>2</sup>

Level of your confidence in this estimated extent of occurrence:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

**SECTION F ARE YOU AWARE OF TRENDS IN THE TOTAL RANGE OF THE SPECIES/SUBSPECIES? (If no, skip to section G)**

**Past Distribution/range/extent of occurrence, area of occupancy**

18. Do you consider that the way the historic distribution has been estimated is appropriate? Please provide justification for your response.

19. Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the former extent of occurrence and/or area of occupancy.

If, because of uncertainty, you are unable to provide an estimate of past extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past extent of occurrence, and also choose the level of confidence you have in this estimated range.

**Past extent of occurrence** is estimated to be in the range of:

- ☐ <1,00,000 km<sup>2</sup> ☐ 1,000,000-1,500,000 km<sup>2</sup> ☐ 1,500,001-2,000,000 km<sup>2</sup>
- ☐ >2,000,000 km<sup>2</sup>

Level of your confidence in this estimated extent of occurrence

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of past area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past area of occupancy, and also choose the level of confidence you have in this estimated range:

**Past area of occupancy** is estimated to be in the range of:

- ☐ <25,000 km<sup>2</sup> ☐ 25,000 – 50,000 km<sup>2</sup> ☐ 50,001 – 100,000 km<sup>2</sup> ☐ >100,000 km<sup>2</sup>

Level of your confidence in this estimated extent of occurrence:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

## PART 2 – INFORMATION FOR CONSERVATION ADVICE ON THREATS AND CONSERVATION ACTIONS

### **SECTION G** DO YOU HAVE INFORMATION ON THREATS TO THE SURVIVAL OF THE SPECIES/SUBSPECIES? (If no, skip to section H)

20. Do you consider that all major threats have been identified and described adequately?
21. To what degree are the identified threats likely to impact on the species/subspecies in the future?
22. Are the threats impacting on different populations equally, or do the threats vary across different populations?
23. Can you provide additional or alternative information on past, current or potential threats that may adversely affect the species/subspecies at any stage of its life cycle?
24. Can you provide supporting data/justification or other information for your responses to these questions about threats?

**SECTION H**     **DO YOU HAVE INFORMATION ON CURRENT OR FUTURE  
MANAGEMENT FOR THE RECOVERY OF THE SPECIES/SUBSPECIES?  
(If no, skip to section I)**

25. What planning, management and recovery actions are currently in place supporting protection and recovery of the species/subspecies? To what extent have they been effective?
26. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species/subspecies?
27. Would you recommend translocation (outside of the species' historic range) as a viable option as a conservation actions for this species/subspecies?

**SECTION I**     **DO YOU HAVE INFORMATION ON STAKEHOLDERS IN THE RECOVERY  
OF THE SPECIES/SUBSPECIES?**

28. Are you aware of other knowledge (e.g., traditional ecological knowledge) or individuals/groups with knowledge that may help better understand population trends/fluctuations, or critical areas of habitat?
29. Are you aware of any cultural or social importance or use that the species/subspecies has?
30. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species/subspecies?
31. How aware of this species/subspecies are land managers where the species/subspecies is found?
32. What level of awareness is there with individuals or organisations around the issues affecting the species/subspecies?
  - a. Where there is awareness, what are these interests of these individuals/organisations?
  - b. Are there populations or areas of habitat that are particularly important to the community?

**PART 3 – ANY OTHER INFORMATION**

33. Do you have comments on any other matters relevant to the assessment of this species/subspecies?