Australian Capital Territory

Nature Conservation (Gang-gang Cockatoo) Conservation Advice 2023

Notifiable instrument NI2023–219

made under the

Nature Conservation Act 2014, s 90C (Conservation advice)

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1 Name of instrument

This instrument is the *Nature Conservation (Gang-gang Cockatoo) Conservation Advice 2023*.

2 Commencement

This instrument commences on the day after its notification day.

3 Conservation advice for Gang-gang Cockatoo

Schedule 1 sets out the conservation advice for Gang-gang Cockatoo (*Callocephalon fimbriatum*).

Arthur Georges
Chair, Scientific Committee
14 April 2023

Schedule 1

(see s 3)

CONSERVATION ADVICE

GANG-GANG COCKATOO – *Callocephalon fimbriatum*

CONSERVATION STATUS

The Gang-gang Cockatoo *Callocephalon fimbriatum* (Grant, 1803) is recognised as threatened in the following jurisdictions:

National	**Endangered**, Environment Protection and Biodiversity Conservation Act
ACT	**Endangered**, *Nature Conservation Act 2014*
NSW	**Vulnerable**, *Biodiversity Conservation Act 2016* (species)
	Endangered, *Biodiversity Conservation Act 2016* (Hornsby/Ku-Ring-Gai Chase population)

ELIGIBILITY

The Gang-gang Cockatoo is listed as Endangered in the ACT Threatened Native Species List under IUCN Criterion A—A2bc due to a severe reduction in abundance at the national level (Attachment A). The Gang-gang Cockatoo population has declined by approximately 69% (50–80%) in the last three generations (1999-2019). The species suffered further substantial declines and habitat loss following the 2019–2020 bushfires (Department Agriculture, Water and the Environment (DAWE) 2022).

DESCRIPTION AND ECOLOGY

The Gang-gang Cockatoo is approximately 32–36 cm in length with an average wingspan of 70 cm and a short tail. The male has a distinctive scarlet head with a wispy crest and general plumage that is slate-grey with dull-white edging. Females have a small wispy grey crest and chest feathers that are edged in dusky orange and banded yellow.

Gang-gang Cockatoos commonly feed in small groups but larger groups of up to 25 individuals have been recorded (M. Mulvaney pers comm. in DAWE 2020). Gang-gang Cockatoos have a diverse diet that includes over 200 food items (Mulvaney 2022, unpublished data). This includes the seeds, pods, flowers and fruits from a range of native and introduced species, and insect larvae. Within the ACT urban landscape, Gang-gang Cockatoos feed primarily on species of *Eucalyptus* and *Acacia* and on introduced species such as Liquidambar (*Liquidambar styraciflua),* Pistachio (*Pistacia chinensis*), Hawthorn (*Crataegus monogyna*) and several coniferous species (Mulvaney 2022, unpublished data).

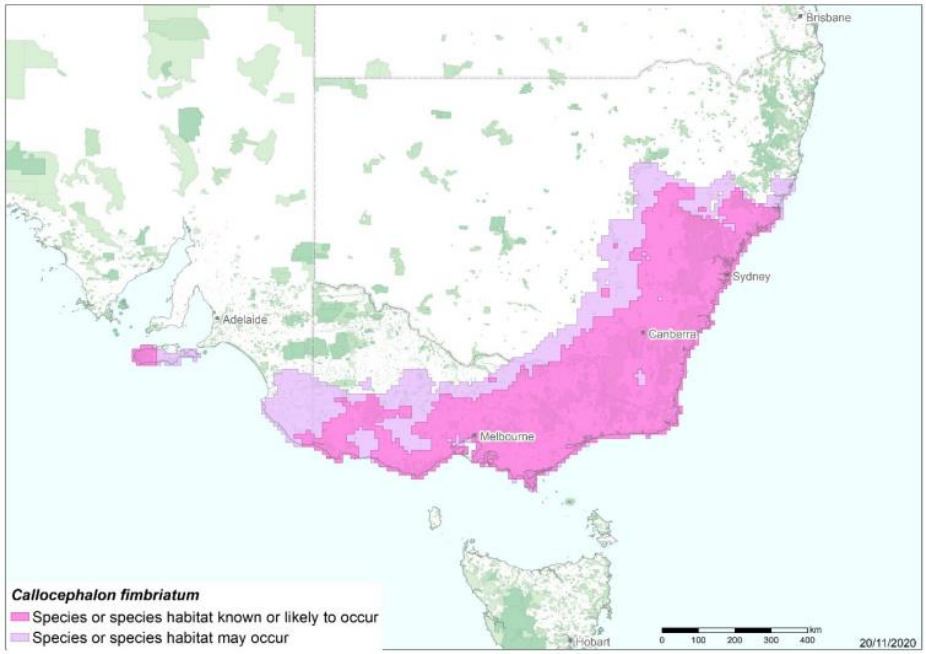
Male Gang-gang Cockatoo
(Tobias Hayashi – Canberra Birds)

The Gang-gang Cockatoo breeding season varies across its distribution but is generally between October and January (Higgins 1999). Both the male and female line their nest hollow with fine wood or bark chewings sourced directly from the nest chamber (Davey et al. 2019). Eggs are generally laid in October in the ACT (Davey et al. 2019) and both parents incubate the eggs and care for the young (Birdlife Australia 2022). In the wild, clutch size is typically two, though nests with up to three young have been recorded (Higgins 1999, Davey et al. 2019). Fledging generally occurs between January and February in the ACT (Davey et al. 2019). Adults actively encourage the fledging of young, and chicks can be heard calling in the hollow at this time. It takes about seven (range 3–11) days for juveniles to fledge after they are first observed at the hollow entrance (Davey et al. 2019). Parents feed their young for at least four weeks after fledging (Endersby & Endersby 2001). Generation length is estimated at 6.9 years (Bird et al. 2020).

DISTRIBUTION AND HABITAT

The Gang-gang Cockatoo is endemic to south-eastern Australia (Figure 1), from the NSW mid-north coast to southern Victoria (Higgins 1999). It was once widespread and numerous in the greater Sydney Metropolitan Area but the last known breeding population there contains less than 40 pairs (Smith and Smith 2019, NSW Scientific Committee 2019). In Victoria, the Gang-gang Cockatoo is widespread through the north-eastern and southern regions, with some records in east Melbourne, Mornington Peninsula, and south-western Gippsland (Higgins 1999, Menkhorst et al. 2017). The Gang-gang Cockatoo was introduced to Kangaroo Island in South Australia (Higgins 1999).

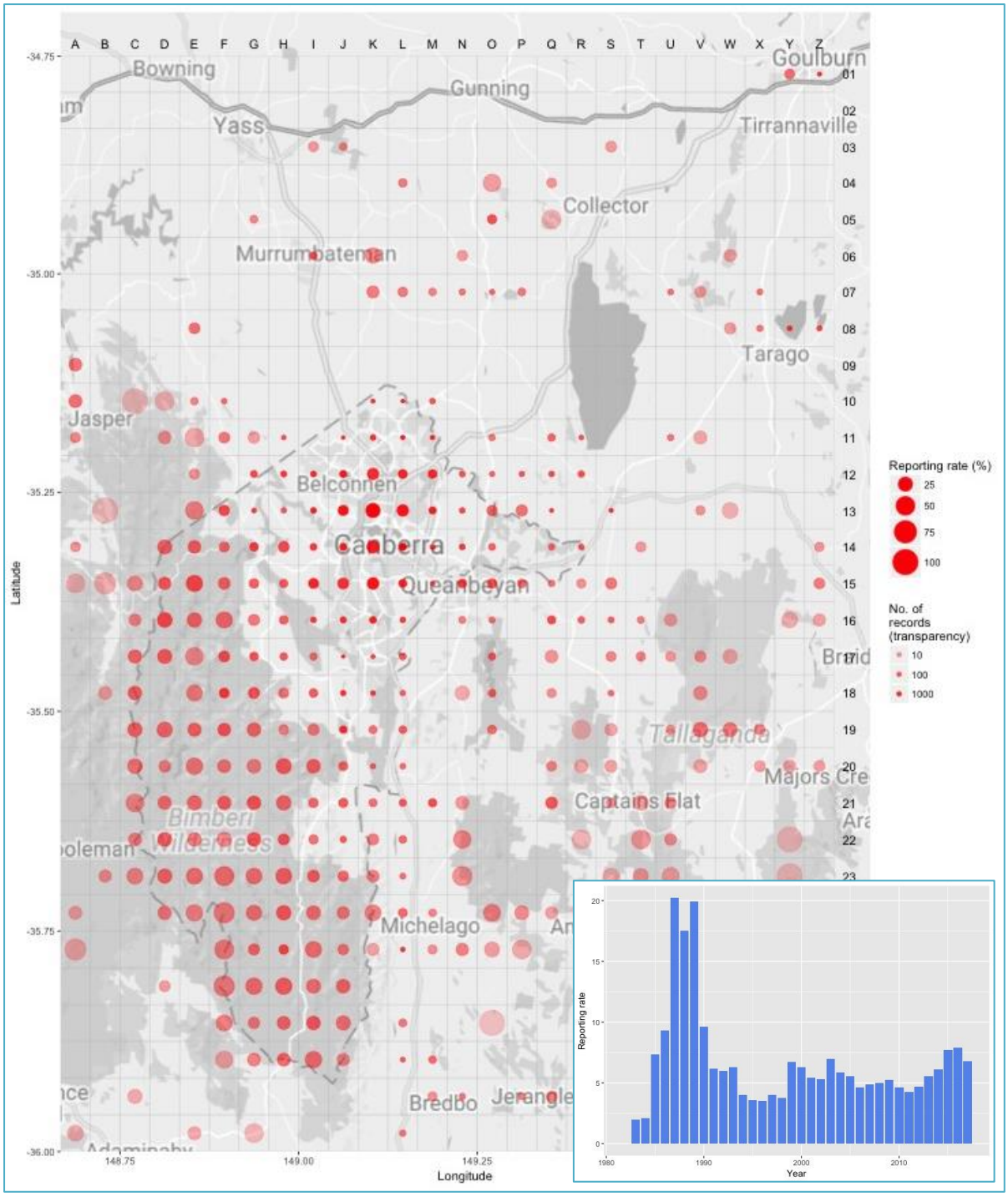
Figure 1: Modeled distribution of the Gang-gang Cockatoo (Source DAWE 2022)



Source: Base map Geoscience Australia; species distribution data Species of National Environmental Significance database.

The Gang-gang Cockatoo has been recorded widely across the ACT region and reporting rates over the last 40 years are shown in Figure 2. Higher reporting rates in the late 1980s and 2015 coincides with intense survey effort during 1986–1989 and 2014-2015 (Davey et al. 2019). The Gang-gang Cockatoo showed a weak, but consistent, increase in ACT peri-urban grassy woodlands from 1998–2021 (Bounds et al. 2021). However, results from surveys undertaken in 2021 across urban and peri-urban Canberra, indicate there may be far fewer individuals than expected from reporting rates alone (Taylor 2022 unpublished data). Within urban Canberra, Gang-gang Cockatoos are most frequently recorded in suburbs bordering Canberra Nature Park nature reserves including: Mount Majura, Mount Ainslie, Gossan Hill, Bruce Ridge, O'Connor Ridge, Black Mountain, Aranda Bushland, Red Hill and Mount Taylor (Davey and Eyles 2015). Gang-gang Cockatoos have been observed to successfully nest within 50 m of urban development in Canberra.

Figure 2: Distribution of Gang-gang Cockatoo records in the ACT region – 1982–2017



Source: Canberrabirds.org.au (2022). Note: Reporting rate (%) is the proportion of all surveys in which the species was present. These data were collected by volunteer birdwatchers using various survey methods and, on some occasions, more than one person may have recorded bird sightings on the same day, which may skew the data.

The Gang-gang Cockatoo occurs within forests and woodlands and requires stands of trees with hollows for nesting (Davey et al. 2019, Davey and Mulvaney 2020). Historically, Gang-gang Cockatoo nesting habitat includes tall, mature forest with dense shrubby understorey (Higgins 1999). In urban Canberra, hollow-bearing trees that have proven suitable for nesting occur in remnant patches of woodland or as individual trees within otherwise cleared sites (DAWE 2022).

Very little is known about the distribution of the Gang-gang Cockatoo in lowland and mountain forest habitat in Namadgi National Park and further research is required to establish the importance and status of this habitat.

Habitat critical to the survival of the Gang-gang Cockatoo includes foraging habitat and hollow-bearing trees with known or potential nest hollows. Suitable nest hollows are generally around: 20 cm in floor diameter, 50 cm deep (range 22–90 cm) and occur 7.5 m (range 5–9.4 m) above the ground (Davey & Mulvaney 2020, Davey et al. 2021). Davey et al. (2019 pers. comm.) has recorded successful nest sites in Blakely's Red Gum (*Eucalyptus blakleyi*), Brittle Gum (*E. mannifera*), Scribbly Gum (*E. rossii*), Yellow Box (*E. melliodora*), River Peppermint (*E. elata*), Southern Blue Gum (*E. globulus subsp. bicostata*) and Red Box (*E. polyanthemos*). Nest hollows typically occur within the main trunk, at the junction of a main branch and the tree trunk, or in a short spout attached to the main trunk. Stands of trees within or adjacent to known breeding areas, that are likely to become hollow-bearing in future years, are also key components of the habitat of the Gang-gang Cockatoo (DAWE 2022).

In 2017, a citizen scientist project commenced to locate and monitor Gang-gang Cockatoo nesting sites in peri-urban Canberra. This project identified 43 nesting hollows located on Mount Ainslie, Black Mountain, Red Hill, Mugga Mugga and The Pinnacle nature reserves, as well as at Bass Gardens and the Australian National University. These sites are being monitored annually and several of these hollows were used during more than one breeding season since monitoring commenced (Davey et al. 2021).

THREATS

The Gang-gang Cockatoo is the least studied species in its family and reasons for their steady and widespread decline are not well understood. However, Gang-gang Cockatoos are likely to be adversely impacted by a range of threats identified in the Commonwealth Conservation Advice (DAWE 2022), including: habitat loss, wildfire, climate change and competition for suitable nesting hollows.

Approximately 28–36% of all known Gang-gang Cockatoo habitat burnt during the 2019–2020 bushfires (Ward et al. 2020, Legge et al. 2021). This is likely to have reduced key breeding, foraging and roosting habitat for the Gang-gang Cockatoo. The 2020 Orroral Valley fire burnt 80% of Namadgi National Park (82,700 hectares), 22% of Tidbinbilla Nature Reserve (1,444 hectares) and 3,350 hectares of rural lands (ACT Government 2022). The 2003 wildfires burnt 70% (164,914 hectares) of the ACT including 90% of Namadgi National Park and Tidbinbilla Nature Reserve (Carey et al. 2003). Fire frequency and severity have strong implications for tree hollow abundance in montane and subalpine eucalypt forests. Stand-level hollow abundance (a key habitat value of mature trees and habitat requirement of the Gang-gang Cockatoo) decreases with more frequent fires (Salmona et al. 2018), as the capacity of eucalypts to recover may be diminished. In the ACT, Botha (2021) mapped mature tree loss between 2015 and 2020 and found losses in reserves (1,731), urban areas (14,455) and rural areas (4,846). Further research is required to determine if the loss of hollows is causing Gang-gang Cockatoo populations to decline in the ACT.

Further loss of key breeding resources may also occur through the removal of hollow-bearing trees that are considered a hazard in planned burning activities, or unsightly/dangerous within urban areas (DAWE 2022). The replacement of lost hollow-bearing trees is impractical for

immediate solutions as suitable tree hollows may not form until a tree is 120–200 years old (Gibbons and Lindenmayer 2002).

Climate change may impact Gang-gang Cockatoos directly through increased heat stress on individuals (particularly nestlings), and indirectly through increased wildfire risk, projected changes to vegetation composition and reduced or impeded hollow availability. As the Gang-gang Cockatoo is a cool temperate species it may be particularly vulnerable to increased temperatures (DAWE 2022). During the end of the 2019–2020 season, Canberra experienced record day temperatures and experienced high levels of smoke haze. During this period, unusual Gang-gang Cockatoo chick behaviour and mortality occurred that had not previously been observed. Davey and Mulvaney (2020) describe the death of chicks in nests from heat exhaustion during heat waves and chicks leaving or attempting to leave their hollows prematurely. Altered rainfall patterns that indicate a seasonal shift to more intense summer storms across the range of the Gang-gang Cockatoo may result in increased flooding of nests and a reduced number of hollows available for nesting (Davey et al. 2019, 2021).

The loss and degradation of habitat due to fires, forestry management practices, and rural and urban development is likely to increase competition for nest hollows with other species (DAWE 2022). Davey et al. (2021) observed and documented nest-site competition with several parrot species (e.g. the Sulphur-crested Cockatoo (*Cacatua (Cacatua) galerita*), Crimson Rosella (*Platycercus (Platycercus) elegans*), Eastern Rosella (*Platycercus (Violania) eximius*), Long-billed Corella (*Cacatua (Licmetis) tenuirostris*), and Rainbow Lorikeet (*Trichoglossus haematodus*)), mammals (e.g. the Common Brushtail Possum (*Trichosurus vulpecula*), Common Ringtail Possum (*Pseudocheirus peregrinus*) and Sugar Glider (*Petaurus breviceps*)) and other introduced and native bird species (e.g. the Australian Wood Duck (*Chenonetta jubata*) and Common Myna (*Acridotheres tristis*)).

Nest predation by the Common Brushtail Possum may impact the recruitment of Gang-gang Cockatoos in some areas. This pressure is likely to be elevated when habitat becomes fragmented following fires and land clearance (Hradsky et al. 2017). The reproductive success of the Gang-gang Cockatoo may be enhanced with the protection of eggs and young from possums (Garnett et al. 2011). Further research is required to ascertain the predation pressure of possums in the ACT and to determine which species pose the greatest level of competition for nesting hollows.

The Gang-gang Cockatoo is susceptible to Psittacine beak and feather disease (Sarker et al. 2014) and future research on the Gang-gang Cockatoo should include a protocol to detect this disease, such as swabbing or taking blood samples (Davey and Eyles 2016).

MAJOR CONSERVATION OBJECTIVE

The primary objective is to maintain a viable, wild population of Gang-gang Cockatoos in the ACT and region.

CONSERVATION PRIORITIES

Conservation actions are detailed in the Commonwealth Conservation Advice (DAWE 2020). Priorities for the ACT are included under the main ACT action categories of protect, manage threats, improve and collaborate and should be further developed in an action plan for the species.

Protect

- Protect all known nesting trees in recognition of this resource being critical, rare and declining across the Gang-gang Cockatoo's extent of occurrence.
- Protect breeding and foraging habitat, especially stands of trees within or adjacent to known breeding areas.

Manage threats

- Manage known and emerging threats to the population viability and critical habitats of Gang-gang Cockatoos
- Undertake strategic monitoring and research to better understand threats, including threatening processes, interactive threats, and how threats might be altered, moderated or exacerbated by climate change.
- Undertake further research to identify critical habitat for the species across the ACT.

Improve

- Enhance existing and future breeding habitat with consideration of potential movement pathways and increasing competitive pressure for nesting hollows.
- Apply results of monitoring and research to improve conservation outcomes for the Gang-gang Cockatoo and its habitats.

Collaborate

- Engage with other jurisdictions to support regional and national recovery of the species.
- Encourage and support the continuation and further development of community and indigenous-based conservation activities.

OTHER RELEVANT ADVICE, PLANS OR PRESCRIPTIONS

- ACT Conservation Advice – Loss of Mature Trees (Scientific Committee 2018)
- ACT Draft Action Plan – Loss of Mature Native Trees (ACT Government 2022)
- ACT Woodland Conservation Strategy (ACT Government 2019)
- Commonwealth Conservation Advice – Gang-gang Cockatoo (DAWE 2022)

LISTING BACKGROUND

The Gang-gang Cockatoo is listed as an Endangered species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), effective 2 March 2022. It is assessed as Endangered under Criterion 1 (A2bc) of the EPBC Act. In 2023, under the *Nature Conservation Act 2014*, the ACT Scientific Committee recommended the Gang-gang Cockatoo be listed in the Endangered category in the ACT Threatened Native Species List to align with the EPBC Act listing.

ACTION PLAN DECISION

Further research, monitoring and conservation actions in the ACT will be critical to the success of national recovery efforts for this species. The ACT Scientific Committee recommends that the Minister for the Environment should make the decision to have an action plan for the species in the ACT under the *Nature Conservation Act 2014*.

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FURTHER INFORMATION

Further information on the Action Plan or other threatened species and ecological communities can be obtained from: Environment, Planning and Sustainable Development Directorate (EPSDD). Phone: (02) 132281, EPSDD Website: https://www.environment.act.gov.au/

ATTACHMENT A: NATIONAL LISTING ASSESSMENT (DAWE 2022)

THREATENED SPECIES SCIENTIFIC COMMITTEE

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

The Threatened Species Scientific Committee finalised this assessment on 12 October 2021.

Attachment A: Listing Assessment for *Callocephalon fimbriatum*

Reason for assessment

This assessment follows 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	25,300	17,600	35,200	The population estimate of Gang-gang Cockatoos is based on several assumptions: the real AOO is twice that represented by records of presence (allowing for incomplete survey of distribution); the average density of birds 3.1 birds/km^2; the 2019/2020 fire season reduced the carrying capacity of 40% of grid cells by half; and the 2019/2020 fire season resulted in 10% reduction in the overall population size. In 2019/2020 at least 30% of all 1x1 km squares from which birds have been recorded since 1990 were burnt (Cameron et al. 2021). Legge et al. (2021) also estimated an overall population decline at one year post fire of 21% (80% confidence limits: 9-38%) but this is not incorporated in the current population estimate provided by Cameron et al. (2021).

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Trend	Decreasing			Reporting rates from 500 m radius area searches (recorded in 20,094/328,201 surveys), arguably the most reliable of the available survey methods for the species, declined by 69% from 1999–2019. This follows a significant decline of 22% between 1977–1981 and 1998–2001 (Barrett et al. 2002), including a decline of 44% in New South Wales (Barrett et al. 2007). However, the decline in 2 ha, 20 min surveys from 1999–2019 (recorded 8987/267 885 surveys) was only 15% with no clear trend (BirdLife Australia 2020; Cameron et al. 2021).
Generation time (years)	6.9	6.2	7.6	Bird et al. (2020)
Extent of occurrence	400,000 km²	380,000 km²	410,000 km²	Gang-Gang Cockatoos occur along the Great Dividing Range from the Hunter Region of the central north coast of New South Wales in a broad arc around south-eastern Australia to the Otway Ranges and inland as far as Wagga Wagga, Albury, Rutherglen, Seymour and Ballarat with largely isolated subpopulations in the Otway Ranges, Grampians and southwestern Victoria to the South Australian border.
Trend	Stable			Cameron et al. (2021)
Area of Occupancy	30,000 km²	22,700 km²	40,000 km²	The minimum AOO is the number of 2x2 km squares within which 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 (Cameron et al. 2021). In 2019/2020 at least half of the 30% of all 1x1 km squares from which birds have been recorded since 1990 were burnt (Cameron et al. 2021).
Trend	Stable			Cameron et al. (2021)
Number of subpopulations	1	1	4	Cameron et al. (2021)
Trend	Stable			Cameron et al. (2021)
Basis of assessment of subpopulation number	There could be three discrete subpopulations within south-western Victoria (Otway Ranges, Grampians and the far south-west), which may separate from those further east.			

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
No. locations	>10	>10	Not calculated	Cameron et al. (2021)
Basis of assessment of No. locations	An estimate of >10 locations was used in this assessment based on the most plausible serious threat – fire (Cameron et al. 2021). The number of locations was determined using the 2019/2020 fire extent across south-eastern Australia, which burnt 28 to 36% of the species' distribution (Legge et al. 2020; Ward et al. 2020; Legge et al. 2021); though unburnt habitat fragments remain within the fire-affected area. The risk of a fire extirpating all individuals of the species was considered. Given the extremely large range of the species, the lack of continuous vegetation cover, the nonuniform nature of fire severity, and the high access to fire-fighting resources, the risk of fire impacting this entire area is extremely unlikely. It is extremely unlikely that a single fire event would extirpate all individuals within one generation (6.9 years) (Cameron et al. 2021). The geographic position of unburnt locations will vary between fires, but there are always likely to be >10 locations (Cameron et al. 2021).			
Trend	Not calculated			Cameron et al. (2021)
Fragmentation	Not severely fragmented.			
Fluctuations	Not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals.			

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%

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 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.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [*(a) cannot be used for A3*]

A4 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.

Based on any of the following

(a) direct observation [except A3]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

Criterion 1 evidence

Eligible under Criterion 1 A2bc for listing as Endangered

Gang-gang Cockatoos are endemic to south-eastern Australia. The species' habitat was heavily impacted during the 2019/2020 bushfires. Estimates of the percentage of the distribution impacted by fire range from 28 to 36% (Legge et al. 2020; Ward et al. 2020; Legge et al. 2021). The 2019/2020 fires may have reduced the carrying capacity of 40% of occupied grid cells by half and resulted in a 10% reduction in the overall population size (Cameron et al. 2021). An analysis based on expert elicitation estimated an overall population decline of 21% one year post-fire (80% confidence limits: 9-38%), and that three generations post-fire the population would still be 29% lower, and possibly as much as 52% lower, than the pre-fire population size (Legge et al. 2021). These predictions assume no further extreme drought or extensive fire events; however, such events are likely to reoccur over the assessment period, which would worsen the extent of population decline.

The decline in Gang-gang Cockatoo populations had been occurring prior to the 2019/2020 wildfires. Data from the Atlas of Living Australia indicate that Gang-gang Cockatoos declined in NSW between the first atlas (1977-81) and the second atlas (1998-2001). The reporting rate for the species declined across its overall NSW range by 44%, and in the Sydney Basin bioregion by 57%. In addition, there is evidence of sudden and dramatic declines in the number of Gang-gang Cockatoos in the Hornsby and Ku-ring-gai Local Government Areas between the 2000s and 2010s (Smith & Smith 2018). The population of Gang-gang Cockatoos in these areas have been reduced to such a critical level, and its habitat has been so drastically reduced, that the species is considered to be in immediate danger of extinction (NSW DIPE 2019; P & J Smith 2021. pers comm 27 July).

Reporting rates from 500 m radius area searches (arguably the most reliable of the available survey methods for the species) declined by 69% from 1999–2019 (i.e., before the 2019-2020 fires). This follows a significant decline of 22% between 1977–1981 and 1998–2001 (Barrett et al. 2002). However, the decline in 2 ha, 20 min surveys from 1999–2019 was only 15% with no clear trend (BirdLife Australia 2020). Given the evidence of declines before the 2019, followed by substantial mortality caused by the 2019-2020 fires from which the species may struggle to recover, it is most likely that the overall decline in a three generation (21 year) period exceeds 50%.

The Committee considers that the species has undergone a severe reduction in numbers of 50–80% over the last three generations (approximately 20.7 years). The reduction has not ceased, the causes have not all ceased and are not fully understood. Therefore, the species has met the relevant elements of Criterion 1 to make it eligible for listing as **Endangered**.

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

		Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1.	Extent of occurrence (EOO)	**< 100 km²**	**< 5,000 km²**	**< 20,000 km²**
B2.	Area of occupancy (AOO)	**< 10 km²**	**< 500 km²**	**< 2,000 km²**
AND at least 2 of the following 3 conditions:				
(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

The EOO is estimated at 400,000 km² (range 380,000–410,000 km²) and the AOO estimated at 30,000 km² (range 22,700–40,000 km²) (Cameron et al. 2021). The EOO is based on all records since 1990. The minimum AOO is the number of 2x2 km squares within which the species has 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 (Cameron et al. 2021). The 2019/2020 fire burnt an estimated 30% of all 1x1 km squares from which birds have been recorded since 1990 (Legge et al. 2020). The number of locations has not been calculated, but the spatial nature of the threats, even though stochastic in space and time, is such that there are >10 geographically or ecologically distinct areas where a single threatening event could affect all individuals of the taxon present within a period of one generation. The total population is not severely fragmented, and the species is not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations, or mature individuals.

Following assessment of the data the Committee has determined that the species' geographic distribution is not precarious for its survival. Therefore, the species has not met this required element of this criterion.

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 generation (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 number of mature individuals is estimated to be 25,300 (range 17,600–35,200) (Cameron et al. 2021). The population is estimated to have declined by approximately 10% due to the 2019/2020 fires and was also likely experiencing ongoing, continuous decline of over 50% before the fires (Cameron et al. 2021). The species' geographic distribution is not precarious for its survival, and it is not subject to extreme fluctuations (Cameron et al. 2021).

The number of mature individuals of the species is not considered low, therefore the species does not meet the required elements to be listed as threatened under this criterion.

Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
D. Number of mature individuals	< 50	< 250	< 1,000
D2.[1] *Only applies to the Vulnerable category* 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 km² or number of locations ≤ 5

[1] 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 total number of mature individuals is estimated to be 25,300 (range 17,600–35,200). This estimate is based on the assumptions that the real AOO is twice that recorded; the birds occur at an average density of 3.1 birds/km^2; and that the 2019/2020 fire season reduced the carrying capacity of 40% of grid cells by half and resulted in 10% mortality.

The total number of mature individuals not considered low, therefore the species has not met this required element of this criterion.

Criterion 5 Quantitative analysis

	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the wild to be:	≥ 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

Population viability analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

Adequacy of survey

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

Public consultation

Notice of the proposed amendment and a consultation document was made available for public comment for 35 business days between 9 July and 27 August 2021.

Listing and Recovery Plan Recommendations

The Threatened Species Scientific Committee recommends:

(i) that the list referred to in section 178 of the EPBC Act be amended by **including** *Callocephalon fimbriatum* in the list in the Endangered category.

(ii) that there should be a recovery plan for this species.