

NSW Threatened Species Scientific Committee

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Notice and reasons for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo) Temminck 1807 as a VULNERABLE SPECIES in Part 3 Division 1 of Schedule 1 of the Act; and as a consequence, to omit the listing of:

1. *Calyptorhynchus lathami* Temminck 1807 Glossy-Black Cockatoo in Part 3 Division 1 of Schedule 1 (Vulnerable species) of the Act. Listing of Vulnerable species is provided for by Part 4 of the Act; and
2. The *Calyptorhynchus lathami* (Temminck, 1807) Glossy Black-Cockatoo, Riverina population in Part 2 Division 4, of Schedule 1 (Endangered species) of the Act, as provided for in clause 4.1(5)(a) of the Biodiversity Conservation Regulation 2017.

The NSW Threatened Species Scientific Committee is satisfied that the South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami* (Temminck 1807) has been duly assessed by the Commonwealth Threatened Species Scientific Committee under the Common Assessment Method (DCCEEW 2022). The acceptance of this assessment is provided for by Part 4.14 of the Act.

Summary of Conservation Assessment

The Threatened Species Scientific Committee accepts the assessment outcome of the Commonwealth Threatened Species Scientific Committee in its Conservation Advice for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo) (DCCEEW 2022).

The South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami* (Temminck 1807) was found to be Vulnerable in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.2 (1)(c) and 2 (b)(c) and 4.4 (c) (e i, ii B) because: i) the species has undergone a moderate reduction in population size; ii) the estimated total of mature individuals is moderately low and continuing to decline; iii) all or nearly all mature individuals of the species occur in one population.

The NSW Threatened Species Scientific Committee has found that:

1. The South-eastern Glossy Black-Cockatoo, *Calyptorhynchus lathami lathami* (Temminck 1807), is one of three subspecies. The *Calyptorhynchus* spp. are the smallest of the black cockatoos, with a body length of around 48 cm and weight of 420 g. Plumage mostly dull black, with a blackish-brown head, an inconspicuous crest and a broad bulbous bill. Adult males have bright red panels in the tail. Adult females have yellowish-red panels in the tail, and variable yellow patches on their heads. Juveniles are similar to adult females but with spotted pale-yellow patches on their heads, lower breast, belly and flanks, and barred undertail (Higgins 1999;

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Menkhorst *et al.* 2017). The three subspecies have identical plumage and differ mainly in size and shape of their bills. *C. l. lathamii* have moderate sized bills in comparison to a disproportionately large bill in *C. l. halmaturinus*, and *C. l. erebus* exhibit disproportionately small bills (Schodde *et al.* 1993; Higgins 1999).

2. South-eastern Glossy Black-Cockatoos are uncommon but widespread. South-eastern Glossy Black-Cockatoos can be found from Mitchell, Queensland, through eastern New South Wales to Mallacoota, Victoria. Birds in the Riverina region were previously thought to be isolated from the main population (Garnett *et al.* 2011); however, they are now considered to be connected to the main population (Cameron *et al.* 2021). Their distribution is continuous through the forested parts of the Great Dividing Range but becomes scattered more inland, to as far west as the Riverina in New South Wales (Higgins 1999; Garnett *et al.* 2011).
3. The geographic distribution of the South-eastern Glossy Black-Cockatoo is widespread. The extent of occurrence (EOO) is 470,000 km² and their area of occupancy (AOO) is 40,000 km². The Extent of Occurrence (EOO) is based on a minimum convex polygon enclosing all mapped occurrences of the species and the AOO is based on 2 x 2 km grid cells, the scale recommended for assessing area of occupancy by IUCN (2022), the method of assessment recommended by IUCN (2022). The EOO is considered contracting and is based on all observation since 1990 (Cameron *et al.* 2021). The minimum AOO is also based on all observations the 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.
4. South-eastern Glossy Black-Cockatoos feed almost exclusively on the seeds of nine She-oak species (*Allocasuarina* spp. and *Casuarina* spp.), usually relying on one or two species within a region (Higgins 1999). This preference may explain the patchy distribution of the subspecies in parts of its range. They extract the seeds from closed cones, leaving characteristic feeding litter under the feeding trees (Clout 1989). South-eastern Glossy Black-Cockatoos may spend up to 88 percent of their day foraging and feeding, suggesting that the rate of intake is likely to be critical (Clout 1989). They show preferences to particular feeding trees, with the nutritional value of trees being the main driver of preference (Clout 1989; Crowley & Garnett 2001; Cameron & Cunningham 2006; North *et al.* 2020).
5. The number of mature individual South-eastern Glossy Black-Cockatoos is estimated to be 7,500 (range 6,000–10,500) with a declining trend. The population estimate is based on the assumptions that the AOO is twice that recorded, the density of one mature bird per 200 ha of ideal habitat (Cameron 2009), 50% of occupied grid cells include ideal habitat and the 2019/2020 fire season rendered 30% of the habitat unsuitable for cockatoos for at least ten years, with high percentages in parts of the range (e.g., 55 percent in Victoria east of Lake Tyers; P Menkhorst unpublished data).
6. South-eastern Glossy Black-Cockatoo subspecies has undergone a moderate reduction (30-50 %) in the last three generations (Cameron *et al.* 2021). This reduction was mostly caused by the 2019/2020 bushfires. An expert elicitation process was used to estimate the proportional population change for this

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subspecies from pre-fire levels to immediately after the fire and then out to three generations after the fire, when exposed to fires of varying severity. Combined with the spatial analyses of fire overlap, these results suggest that one year after the fire, the subspecies has experienced an overall decline of 15 % from pre-fire levels, but that the decline could be as large as 32 %. After three generations, the estimate for the overall population decline relative to the pre-fire population is predicted to be 22 %, but potentially as much as 46 % (Legge *et al.* 2021).

7. South-eastern Glossy Black-Cockatoos are hollow nesters, utilising large hollows in both living and dead eucalypt trees (Higgins 1999). Cameron (2006b) found that in central New South Wales, the majority of the nesting hollows were in narrow-leaved ironbark (*Eucalyptus crebra*; 74%). Other species of trees used were the blue-leaved ironbark (*E. nubila*; 16%) and Blakely's red gum (*E. blakelyi*; 10%). South-eastern glossy black cockatoos are known to nest in river red gums (*E. camaldulensis*) along the Murrumbidgee River and other inland waterways in NSW (M Cameron 2021, pers comm 27 August). Trees may be living or dead (Cameron 2006b). As a guide, potential nest hollows for the subspecies have the following traits: >8 m above ground; located in branches >30 cm in diameter; branch or stem no more than 45° from vertical; and minimum entrance diameter of >15 cm (Cameron 2006b).
8. The species usually occurs in pairs or in groups of three (made up of a breeding pair and their offspring), in woodlands (Higgins 1999; Garnett *et al.* 2011). They have a clutch size of one, and eggs are incubated by the female parent only. Once hatched, the nestling is brooded and fed by the female only. Males are present throughout incubation and nestling period to feed the females. Fledglings becomes independent after around three months (Higgins 1999) and they have an estimated generation length of 11.9 years (Bird *et al.* 2020).
9. Threats to the South-eastern Glossy Black-Cockatoo are land clearing resulting in habitat fragmentation and degradation, wildfire and inappropriate fire regimes, grazing by rabbits and other feral herbivores on foraging habitat, invasive weeds, competition for nesting hollows, increased likelihood of extreme events and the temporal or spatial shift of resources as a result of climate change, disease outbreak, predation from Common Brushtail Possum *Trichosurus vulpecula*, feral cats *Felis catus* and foxes *Vulpes vulpes* and illegal bird and egg collection.
10. Land clearance for activities such as agriculture and urban development has been the main threat causing the decline of the subspecies (Garnett & Crowley 2000; NSW Scientific Committee 2008; Garnett *et al.* 2011) and is a known, severe threat to South-eastern Glossy Black-Cockatoos across their entire range. Past timber harvesting activities are also implicated in the decline of hollow trees, resulting in reduced nesting opportunities and competitive pressure on this resource (Garnett & Crowley 2000; NSW Scientific Committee 2008; Garnett *et al.* 2011). The loss of feeding habitat and trees likely contributed to the fragmented distribution of the subspecies (Clout 1989).

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11. The loss of large hollow-bearing trees due to land clearance and deforestation is problematic as these large hollows take centuries to form in eucalypts (Gibbons & Lindenmayer 2002). Larger, older trees have a higher chance of bearing larger hollows (Gibbons *et al.* 2000), which is an important characteristic for *C. lathami* nest sites (Garnett 1999). It is crucial to implement actions to prevent the loss of, and encourage the recruitment of, large hollow-bearing trees in order to minimise the lag effect and long-term risk of extinction of hollow-dependent species (Manning *et al.* 2013; Le Roux *et al.* 2014) like the South-eastern Glossy Black-Cockatoo.
12. Wildfire and adverse fire regimes present an increasing, severe, known threat to South-eastern Glossy Black-Cockatoos which could affect both their habitats and the birds directly. On Kangaroo Island, repeated severe fire in the 1990s effectively excluded the drooping She-oak from areas within Flinders Chase National Park, which resulted in the local extinction of a flock of the Kangaroo Island subspecies (Pepper 1997). Recent post-fire surveys in south-east Queensland confirmed the presence of glossy black cockatoos only in areas that were unburnt or affected by low-moderate fire. Areas of high or severe fire impact showed no sign of presence (D Teixeira unpublished report to the Department of Environment and Science). The 2019/2020 bushfires burnt approximately 25 % of the overall distribution (Legge *et al.* 2021) and 34 % of their area of occupancy (Cameron *et al.* 2021). The 2019/2020 fire season rendered 30 % of the habitat unsuitable for cockatoos for at least ten years, with high percentages in parts of the range. Inappropriate fire regimes (i.e., too intense or too frequent) may significantly impact the subspecies' feeding and breeding habitats (DEPI 2013). Burning of fire-sensitive species (e.g., *A. littoralis* and *A. verticillata*) may render feeding habitat unsuitable for extended periods of time (Garnett & Crowley 2000; Garnett *et al.* 2011). Conversely, habitats that have been unburnt for too long may also decrease in quality. Delzoppo *et al.* (2021) found that on Kangaroo Island, old, long unburnt habitat (60+ years post-fire) offers poor food quality and were rarely used by Glossy Black-Cockatoos.
13. As a result of land clearance and wildfire, habitat fragmentation has become an increasing, severe threat to South-eastern Glossy Black-Cockatoo. Habitat fragmentation, is both a current threat and potential major threat in the future if subpopulations become isolated, leading to the loss of genetic diversity. Wildfire may accelerate and increase the extent and degree of fragmentation. Increasing frequency and intensity of wildfires, may lead to more habitat becoming unsuitable for both foraging and breeding, leading to further fragmenting of habitats and populations. Fragmented habitat may encourage competitors from more open habitat (e.g., Common Brushtail Possum (*Trichosurus vulpecula*); Downes *et al.* 1997), which is one of the main threats impacting the Kangaroo Island subspecies' breeding success (Mooney & Pedler 2005).
14. Grazing by Rabbits *Oryctolagus cuniculus* (Commonwealth of Australia 2016a), other feral herbivores and stock is an inferred, moderate threat to the South-eastern Glossy Black-Cockatoo. Not only do grazers cause a decline in extent and productivity of foraging habitat of the subspecies, but they also impede the regeneration ability of native vegetation, including feed tree species for the subspecies, after bushfires (Garnett *et al.* 2011).

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15. Invasive weeds across part of the South-eastern Glossy Black-Cockatoo's range are an inferred, moderate threat. Invasive weeds have the ability to change the floristic and structural characteristics of habitat, thereby changing resource availability (French & Zubovic 1997). Furthermore, some weeds may increase the flammability of the habitat, amplifying wildfire risks (Salvo Aires 2014).
16. Competition for nest hollows from hollow nesting birds and arboreal marsupials is an ongoing threat to the South-eastern Glossy Black-Cockatoo. (Saunders *et al.* 1982; Newton 1994(Lindenmayer *et al.* 1991). Some potential hollow competitors include Common Brushtail Possum (*Trichosurus vulpecula*), Galah (*Eolophus roseicapillus*), Little Corella (*Cacatua sanguinea*), Sulphur-crested Cockatoo (*Cacatua galerita*) and other South-eastern Glossy Black-Cockatoos (Mooney & Pedler 2005; Garnett *et al.* 2011).
17. The increased likelihood of extreme events, including fires, heatwave and drought, as a result of climate change, presents a severe, known threat to the South-eastern Glossy Black-Cockatoo. Average temperatures in Australia have increased by just over 1 degree Celsius in the past century (BOM & CSIRO 2020), and globally it is expected to rise up to another 2 degrees Celsius by 2050 (IPCC 2018). As more frequent and extreme heatwaves are expected across Australia, rainfall patterns have also been affected, with lowest rainfall records in parts of south-eastern Australia (BOM & CSIRO 2020). The cumulative effect of the climate anomalies has led to and will continue to increase the likelihood of extreme events such as wildfire, drought and heatwaves (BOM & CSIRO 2020), which may have detrimental impacts on South-eastern Glossy Black-Cockatoos and their habitat.
18. The temporal or spatial shift of resource availability as a result of climate change is an inferred, moderate threat to the South-eastern Glossy Black-Cockatoo as they have a very specialised diet and their distribution appears to be associated with resource availability (Clout 1989; Cameron 2006b). Changes in resource availability caused by climate change may impact the subspecies' distribution, breeding success and survival. Climatic factors, such as rainfall, appear to be linked to cone production (Cameron 2006a), meaning that changing rainfall patterns and other climatic factors in Australia (Evans *et al.* 2017; Herold *et al.* 2018) may affect the future resource availability for the subspecies.
19. Psittacine Beak and Feather Disease (Pbfd) is a potentially fatal disease caused by psittacine circovirus, typically transferring between adults, nestlings and contaminated nest hollows (DEE 2016). It is an inferred, moderate threat to South-eastern Glossy Black-Cockatoos across their entire range. Although South-eastern Glossy Black-Cockatoos are susceptible to Pbfd, the threat level is relatively low compared to other threats (Department of Environment 2015). With decreasing nesting hollows and intensified competition, it is possible that the likelihood of disease transmission could be greater in the future.

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20. Nest predation by Common Brushtail Possum (*Trichosurus vulpecula*) is an inferred, moderate threat to the South-eastern Glossy Black-Cockatoo; however, predation by introduced predators such as Cats (*Felis catus*) and Foxes (*Vulpes vulpes*) does not appear to be a major threat. Further research is required to fully understand the extent of the threat of predation on South-eastern Glossy Black-Cockatoos, including both native and introduced predators.
21. Like many other endangered parrots in Australia, the illegal collection of adult birds and eggs is a suspected, severe threat to the South-eastern Glossy Black-Cockatoo (Mooney & Pedler 2005). The extent of this threat is unknown, but if active it may have detrimental impact on the subspecies reproductive success.
22. *Calyptorhynchus lathami lathami* Temminck 1807 is not eligible to be listed as an Endangered or Critically endangered species.
23. *Calyptorhynchus lathami lathami* Temminck 1807 is eligible to be listed as a Vulnerable species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a high risk of extinction in Australia in the medium-term future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome: Vulnerable under Clause 4.2 (1)(c) and 2 (b)(c) and 4.4 (c) (e)(i)(ii)(B).

**Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)**

Assessment Outcome: Vulnerable under Clauses 4.2 (1)(c) and 2 (b)(c).

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

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**Clause 4.3 - Restricted geographic distribution of species and other conditions
(Equivalent to IUCN criterion B)**

Assessment Outcome: Not eligible.

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

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

(Equivalent to IUCN criterion C)

Assessment Outcome: Vulnerable under 4.4 (c)(e)(i)(ii)(B).

The estimated total number of mature individuals of the species is:				
	(a)	for critically endangered species	very low, or	
	(b)	for endangered species	low, or	
	(c)	for vulnerable species	moderately low,	
and either of the following 2 conditions apply:				
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):		
		(i)	for critically endangered species	very large, or
		(ii)	for endangered species	large, or
		(iii)	for vulnerable species	moderate,
	(e)	both of the following apply:		
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and	
		(ii)	at least one of the following applies:	

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		(A)	the number of individuals in each population of the species is:
		(I)	for critically endangered species
		(II)	for endangered species
		(III)	for vulnerable species
		(B)	all or nearly all mature individuals of the species occur within one population,
		(C)	extreme fluctuations occur in an index of abundance appropriate to the species.

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

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

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

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

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

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

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). Consultation document for *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo). Australian Government, Canberra, ACT.

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