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Notice of and reasons for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the Granite Belt leaf-tailed gecko *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997 as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

The NSW Threatened Species Scientific Committee is satisfied that the Granite Belt leaf-tailed gecko *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997, has been duly assessed by the Commonwealth Threatened Species Scientific Committee under the Common Assessment Method, as provided by Section 4.14 of the Act. After due consideration of Commonwealth DCCEEW (2024), the NSW Threatened Species Scientific Committee has made a decision to list the species as Endangered.

Summary of Conservation Assessment

The Granite Belt leaf-tailed gecko *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997 was found to be Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(b)(d)(e i,ii,iii) because: 1) the species has a highly restricted geographic distribution with an area of occupancy of 144 km^2; 2) the species is found in three threat-defined locations; and 3) continuing decline is inferred in the geographic distribution, area, extent and quality of habitat, and the number of mature individuals due adverse fire regimes, habitat loss due to land clearing, and encroachment by weeds.

The NSW Threatened Species Scientific Committee has found that:

1. *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997 (family Carphodactylidae) is a relatively large (~20 cm total length), flat-bodied gecko with a thin body and limbs with long, thin toes and claws (Wilson and Swan 2021). The head is broader than the body and the broad tail is leaf-like in shape. The species is tan to grey in colour with dark blotches. A narrow, pale-coloured stripe down the back is broken by four lighter patches, and there is a distinctive pale 'V-shaped' mark between the eyes. The tail has two pale cross-bands on its broader proximal part and rapidly tapers to a narrow tip (Wilson and Swan 2021). Juveniles resemble adults in their appearance and patterning.

2. *Saltuarius wyberba* is distributed between the Gibraltar Range region in northern New South Wales (NSW) and Queen Mary Falls in south-eastern Queensland (Qld) (Wilson and Swan 2021). Over 90% of occurrence records are from Basket Swamp National Park (NP), Boonoo Boonoo NP, Gibraltar Range NP, and Washpool NP in NSW, and Girraween NP in Qld. Records are mostly concentrated in two broad patches: the first in the vicinity of Boonoo Boonoo NP and Girraween NP, and the second in the southern part of Washpool NP and the northern part of Gibraltar Range NP. Whether this represents distinct subpopulations is unknown

as the area between these two clusters of records is rugged and remote and may harbour the species, but a subpopulation at Queen Mary Falls in Qld appears to be genuinely isolated given the distance from other records. This means that the species may occur across 2–3 subpopulations.

3. *Saltuarius wyberba* has a highly restricted geographic distribution. The extent of occurrence (EOO) is based on a minimum convex polygon enclosing confirmed point records, the method of assessment recommended by the IUCN (2024) and was estimated at 7,425 km^2. The area of occupancy (AOO) is estimated to be 144 km^2 based on 2 x 2 km grid cells, the scale recommended by the IUCN (2024).

4. No population surveys have been undertaken for *Saltuarius wyberba*. Therefore, there are no estimates for the number of mature individuals.

5. *Saltuarius wyberba* are strongly associated with granite outcrops in open woodlands (Couper *et al*. 1997). The geckos presumably shelter in cracks and crevices during the day and emerge at night to forage on open rock faces. Geckos occasionally forage in shrubs and on trees adjacent to rock outcrops (Porter 1999). Continuous woodland between rock outcrops allows the species to disperse between granite formations.

6. Leaf-tailed geckos of the genus *Saltuarius* are nocturnal generalist predators, primarily feeding on arthropods and are known to consume spiders (Araneae), bugs (Hemiptera), moths (Lepidoptera), grasshoppers (Orthoptera), cockroaches (Blattodea) and beetles (Coleoptera) (Wilson 2012).

7. The main threats to *Saltuarius wyberba* are adverse fire regimes; habitat loss and fragmentation due to land clearing; weed encroachment primarily by *Lantana camara*, and predation by invasive species, particularly European red foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) (Commonwealth DCCEEW 2024). ‘High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition’, ‘Clearing of native vegetation’, ‘Invasion, establishment and spread of Lantana, *Lantana camara*’, ‘Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)’, and ‘Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)’ are listed as Key Threatening Processes under the Act.

8. The 2019–2020 bushfires affected 35% of the known distribution of *Saltuarius wyberba* and demonstrated that substantial tracts of continuous forest can be affected in a single event. Given the distance and lack of connecting habitat between the areas identified the number of threat-defined locations is considered to be 1–3.

9. Continuing decline is inferred in the geographic distribution (both in EOO and AOO), the area, extent, and quality of habitat, and the number of mature individuals of *Saltuarius wyberba*. The species is likely to have been historically more widespread, although it now occurs primarily in protected areas in NSW and Qld with habitat in peripheral areas remaining under threat from land-clearing for

agriculture and development. Around 35% of the known distribution of *S. wyberba* was affected by the 2019–2020 bushfires (Legge *et al*. 2022). The extent of the 2019–2020 bushfires in south-eastern Australia demonstrated that significant proportions of the species' distribution could be affected by large-scale fire events. Such events are expected to increase in frequency, and their effects are becoming more likely to be compounded by drought in the future. Fire is likely to result in direct mortality of *S. wyberba*, as well as degrade the quality of habitat available (including via facilitating weed encroachment and reduced availability of foraging resources) and reducing connectivity of suitable patches of habitat. Expert elicitation considered that population declines after the 2019–20 bushfires could be modest (estimated at a 4%–18% decline one year after the fire) (Legge *et al* 2021). However, recent surveys (in 2021) for a closely related and ecologically similar species, *S. kateae*, suggest that rock outcrops may not necessarily provide protection from such disturbance in the weeks and months after fire and population declines in fire-affected areas may be at least 30%, assuming this species is affected similarly to *S. kateae* (Greenlees and Jago 2022). Fires are also likely to interact with the effect of habitat loss through clearing, and the effects of invasive predators, which may exploit fire scars and target vulnerable survivors (Hradsky 2020). Further fragmentation of the species' habitat may also result in the extirpation of more isolated patches and subpopulations.

10. *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997 is not eligible to be listed as a Critically Endangered species.

11. *Saltuarius wyberba* Couper, Schneider & Covacevich, 1997 is eligible to be listed as an Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a very high risk of extinction in Australia in the near 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: Endangered under Clause 4.3(b)(d)(e i,ii,iii)

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Data Deficient

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	

	(b)	an index of abundance appropriate to the taxon,
	(c)	a decline in the geographic distribution or habitat quality,
	(d)	the actual or potential levels of exploitation of the species,
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

Clause 4.3 – Restricted geographic distribution of species and other conditions (Equivalent to IUCN criterion B)
Assessment Outcome: Endangered under Clause 4.3(b)(d)(e i,ii,iii)

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

Clause 4.4 – Low numbers of mature individuals of species and other conditions (Equivalent to IUCN criterion Clause C)
Assessment Outcome: Data Deficient

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

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

Clause 4.5 – Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Data Deficient

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.

Professor Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2024). Conservation advice for *Satluarius wyberba* (Granite Belt leaf-tailed gecko). Australian Government, Canberra, ACT.

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