

NSW Threatened Species Scientific Committee

Conservation Assessment of *Saltuarius kateae* Couper, Sadlier, Shea & Worthington-Wilmer 2008 (Gekkonidae)

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***Saltuarius kateae* Couper, Sadlier, Shea & Worthington-Wilmer 2008 (Gekkonidae)**

Distribution: Endemic to NSW

Current EPBC Act Status: Not listed

Current NSW BC Act Status: Not listed

Proposed listing on NSW BC Act: Not listed (as it is Data Deficient)

Conservation Advice: *Saltuarius kateae*

Summary of Conservation Assessment

Saltuarius kateae was found to be ineligible for listing as it is Data Deficient under all Criteria. Although understood to be relatively range restricted (with an EOO of 40 km² and AOO of 16 km²), survey effort has been inadequate to determine distribution and habitat requirements. In addition, there is no information on threats to the population or habitat of this species. There are no data available on population size or trends.

Description and Taxonomy

Cogger (2014) describes *Saltuarius kateae* as “Olive-green to dark brown above, usually with an irregular series of darker blotches that form an obscure, irregular pattern; flanks and limbs with dark brown flecks, mottling and reticulations. Rarely a distinct russet-red vertebral stripe, especially in the young. Head above often with a W- or V-shaped dark brown mark between the eyes and otherwise with irregular lines and reticulations. Whitish below, often peppered with brown. Original tails usually with several pale, relatively wide cross-bands. Scales on the dorsal surface small, flat, granular, through which are scattered numerous rosettes formed by circles of slightly enlarged flat scales enclosing a single, enlarged pointed tubercle. A distinct lateral skin-fold along each flank, between axilla and groin, with a series of relatively short spinose scales, not recurved, arising from circles of scales which themselves lack spines. Head large, triangular, flat. Body strongly depressed. Tail broad, flat, leaf- or shield-shaped, original tails ending in a short spinose, slender tip. Limbs long and spindly. 11 cm (snout – vent).”

This species is distinguished from its congeners by the following combination of character states: rostral shield usually excluded from nostril; scales on snout usually grade evenly from small to large (in dorsal-ventral transect); dorsal surface of hand free of large conical tubercles; digits without spinose tubercles along dorsal surface; body darkly pigmented, reducing extent of dorsal cross-bands between fore and hind limbs (Couper *et al.* 2008).

The common names for this species are Kate’s Leaf-tailed Gecko, Mount Marsh Leaf-tailed Gecko and Upper Clarence Leaf-tailed Gecko.

Distribution and Abundance

Saltuarius kateae is endemic to New South Wales (NSW), where it is known to occur on the eastern side of the Clarence River, at the far southern end of the Richmond Range in north-eastern NSW (Couper *et al.* 2008). The species has been recorded at only four sites (Atlas of Living Australia; S.

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Mahony *in litt.* September 2018). Two sites (both around Wyans Creek Road) are located on private land adjacent to state forest, one site is within Mt Neville Nature Reserve, and one is within Banyabba Nature Reserve. The furthest most sites are approximately 22 km apart.

The distribution of *Saltuarius kateae* appears to be naturally restricted. However, it is possible that a large amount of potential habitat occurs in the area for this species (of up to 800 km²; S. Mahony *in litt.* September 2018), and further surveys may locate this species at additional sites. Its specific habitat requirements are unknown, and few surveys have been undertaken to confirm its existence beyond the known locations. It is also possible that a broader area may provide very little actual suitable habitat, given a reported association with the faces of outcropping sandstone ridges (R. Sadlier *in litt.* October 2018).

Only opportunistic surveys have been undertaken in the area for this species and information is limited (S. Mahony *in litt.* September 2018; R. Sadlier *in litt.* October 2018).

It has been estimated that in high quality habitat (complex weathered outcrops that provide suitable shelter and foraging sites), between six to ten mature individuals could occupy around 100 m of escarpment (R. Sadlier *in litt.* October 2018). Assuming that all known potential habitat (approximately 22 km of escarpment is contiguous with known sites) was of high quality, the number of mature individuals could be up to 2,200. However, the actual population size of *Saltuarius kateae* is unknown and requires investigation.

Ecology

Habitat Requirements

No specific studies of the habitat requirements of this species have been undertaken. *Saltuarius kateae* is thought to be saxicolous (i.e. rock dwelling) occurring on sandstone escarpments in open forest (blackbutt/bloodwood communities) (Couper *et al.* 2008). It is unknown if the species is restricted to the rock faces alone, or also extends into the surrounding woodland (other *Saltuarius* species in NSW such as *S. moritzi* inhabit trees as well as rock faces) (G. Shea *in litt.* February 2018). This species has been observed sheltering during the day and emerging at night to forage for invertebrates on the outcrops (Cogger 2014).

No information is available on the species' ability to disperse, but it is possibly very limited particularly if it is restricted to rock habitat (R. Sadlier *in litt.* October 2018).

Life cycle/Reproduction

There have been no detailed behavioural or ecological studies on this species. Like other members of the genus, *Saltuarius kateae* is oviparous and thought to lay a clutch of two eggs per year (Hagger *et al.* 2013).

No firm data are available on generation length, longevity or age at maturity for any *Saltuarius* species, but Australian geckos seem to reach maturity around 2–3 years of age (G. Shea *in litt.* February 2019; Doughty and Shine 1995) and *S. kateae* is thought likely to be a relatively long-lived species, possibly living up to 20 years (R. Sadlier *in litt.* October 2018).

Threats

There are no documented threats to *Saltuarius kateae* and much of its known range is protected within nature reserves.

While this species is likely to be desirable in the pet trade, it has not yet been recorded there (Couper *et al.* 2018).

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The impact of fire on this species is unknown. The crevice habitat it occupies would offer some protection against the direct effect of fire, although high intensity fires in the eucalypt forest around the rock outcrops could result in population declines. Possible causes of declines include: direct mortality during the fire, loss of adjacent understory vegetation and increased exposure of rock faces (possibly limiting foraging area, reducing invertebrate prey densities and increasing predation risk post-burning) (R. Sadler *in litt.* October 2018). Such impacts would be exacerbated by extended periods of dryness (e.g. during El Nino). Cattle grazing occurs in the area supporting the main population at Wyans Creek. Burning of grass in spring or early summer to promote regeneration is a common practice associated with cattle grazing and leads to an increased risk of fire occurring during unfavourable conditions (OEH 2016).

The small distribution, limited dispersal ability and low genetic diversity of this species could limit its capacity to adapt to climate change (Couper *et al.* 2008).

Other potential threats include weed invasion and predation by introduced species including cats and foxes.

Assessment against IUCN Red List criteria

For this assessment it is considered that previous surveys of *Saltuarius kateae* have been inadequate and therefore there is insufficient scientific evidence to support any listing outcome at this time.

Criterion A Population Size reduction

Assessment Outcome: Data deficient.

Justification: To be listed as threatened under Criterion A, the species must have experienced a population reduction of $\geq 30\%$ (VU threshold) over three generations or 10 years (whichever is longer). No quantifiable data are available on the population size or dynamics of this species and there are no data on population declines over any relevant time frames (10 years or 3 generations). Therefore, there are insufficient data to assess *Saltuarius kateae* against this criterion.

Criterion B Geographic range

Assessment Outcome: Data deficient.

Justification: *Saltuarius kateae* appears to have a very highly restricted geographic distribution, although survey effort is inadequate to determine the actual distribution. Based on the current records for the species (only being known from four sites), both extent of occurrence (EOO) and area of occupancy (AOO) are small. EOO was estimated to be 40 km², based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2017). A species with an EOO of less than 100 km² potentially qualifies under the Critically endangered threshold. The area of occupancy (AOO) was estimated to be 16 km², based on 2 km x 2 km grid cells, the scale recommended for assessing area of occupancy by IUCN (2017). A species with an AOO of less than 500 km² potentially qualifies under the Endangered threshold.

In addition to these thresholds, at least two of three other conditions must be met. These conditions are:

- a) The population or habitat is observed or inferred to be severely fragmented or number of locations = 1 (CR), ≤ 5 (EN) or ≤ 10 (VU).

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Assessment Outcome: Data Deficient.

Justification: There are insufficient data to assess whether *Saltuarius kateae* is severely fragmented in population or habitat. Additionally, there are no documented threats to determine the number of locations.

- 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

Assessment Outcome: Data Deficient.

Justification: There is no information for this species from which to determine whether or not there is a continuing decline in population size, geographic distribution or habitat quality.

- c) Extreme fluctuations.

Assessment Outcome: Data deficient.

Justification: There are no available data to assess the likelihood of extreme fluctuations in population size or geographic distribution of *Saltuarius kateae*.

Criterion C Small population size and decline

Assessment Outcome: Data deficient.

Justification: Currently there are no available census data to assess the population size or decline in *Saltuarius kateae*. Therefore, there is insufficient information to assess this species under Criterion C.

At least one of two additional conditions must be met. These are:

- C1. An observed, estimated or projected continuing decline of at least 25% in 3 years or 1 generation (up to a max. of 100 years in future).

Assessment Outcome: Data deficient.

Justification: There are no documented threats to *Saltuarius kateae* and no data on population declines over any relevant time frames to determine whether or not there is a continuing decline in population size.

- C2. An observed, estimated, projected or inferred continuing decline

Assessment Outcome: Data deficient.

Justification: There is no information for this species for which to determine whether or not there is a continuing decline in population size.

In addition, at least 1 of the following 3 conditions:

- a (i). Number of mature individuals in each subpopulation ≤ 50 (CR), ≤ 250 (EN) or ≤ 1000 (VU).

Assessment Outcome: Data deficient.

Justification: There are no available census data to assess number of mature adults per subpopulation of *Saltuarius kateae*.

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- a (ii). % of mature individuals in one subpopulation = 90-100% (CR), 95-100% (EN), 100% (VU).

Assessment Outcome: Data deficient.

Justification: The percentage of mature adults per subpopulation is unknown. There is insufficient data to assess *Saltuarius kateae* against this subcriterion.

- b. Extreme fluctuations in the number of mature individuals

Assessment Outcome: Data deficient.

Justification: There are no available data to assess the likelihood of extreme fluctuations in population size or geographic distribution of *Saltuarius kateae*.

Criterion D Very small or restricted population

Assessment Outcome: Data deficient

Justification: Currently there are no available census data to assess the population size of *Saltuarius kateae* and there are no documented threats to the species. It is restricted to sandstone escarpments in open forest on the eastern side of the Clarence River at the far southern end of the Richmond Range in north-eastern NSW, but survey effort is inadequate to determine the actual distribution. Based on known records, the area of occupancy (AOO) was estimated to be 16 km², based on 2 x 2 km grid cells, the scale recommended for assessing area of occupancy by IUCN (2017). A species with an AOO less than 20 km² potentially qualifies under the Vulnerable threshold. However, there are no documented threats and there are no plausible future threats driving the species to Critically Endangered or Extinct in a short time.

Criterion E Quantitative Analysis

Assessment Outcome: Data deficient.

Justification: There are insufficient data available to undertake a quantitative analysis to determine the extinction probability of *Saltuarius kateae*.

Conservation and Management Actions

A comprehensive survey of *Saltuarius kateae* should be undertaken to properly assess biology, population numbers and distribution and to better assess any threats to the species.

References

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Expert Communications

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APPENDIX

Assessment against BC Act criteria

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: Data deficient

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.

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

(Equivalent to IUCN criterion 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.

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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: Data Deficient

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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Overall Assessment Outcome: Not listed (Data deficient)