Threatened Species Assessment

Burhinus grallarius
Bush Stone-curlew

Taxonomy

Burhinus grallarius (Latham, 1801)

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* as *Burhinus magnirostris* (SAC 1994).

Categorised as Endangered in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

Proposed conservation status

Critically Endangered in Victoria

Criterion C2a(ii)

Species Information

Description and Life History

The Bush Stone-curlew is an upright woodland bird that stands between 50 and 60 cm tall, with long legs and mottled brown, white and grey plumage. Males are generally heavier than females (Marchant and Higgins 1993). The Bush Stone-curlew has a large, yellow eye, a short dark bill and a hunched appearance when walking (Marchant and Higgins op. cit.). In flight, the birds fly with the neck stretched forward and legs trailing beyond the tail tip. The Bush Stone-curlew exhibits some variation in feather colour across its range, with a rufous and a grey morph described (Marchant and Higgins op. cit.). The rufous morph occurs only in northern Australia and is most prominent in arid areas (Marchant and Higgins 1993). It intergrades with the grey morph along the eastern and western coasts of Australia.

Bush Stone-curlews are mainly nocturnal in habits in the south-east and tend to lie or stand motionless in woodlands during the day. Their presence is most often indicated by distinctive whistling and wailing 'weer-lo' calls after dark. Although a member of the shorebird order, it is generally known as a bird of open woodlands (Department of Environment and Conservation NSW 2006, Pizzey and Knight 2003,).

By day, the birds shelter on the ground in lightly timbered habitats amongst fallen tree debris, where their mottled plumage provides camouflage and the open terrain provides good visibility. These daytime roosts are typically found in woodland patches that are less than 1 km from other patches of similar habitat and less than 250 metres from water (Johnson and Baker-Gabb 1994; Webster and Baker-Gabb 1994). At night, they travel as far as 3 km from the roost site to feeding grounds in paddocks, swamps or woodland remnants. Bush Stone-curlews usually feed solitarily, with the members of a pair feeding separately. They feed on the ground, mostly on ground-dwelling invertebrates occurring within the leaf litter, around timber, and in grassland. In northern Victoria they feed mainly on insects, with the major groups being beetles, crickets, weevils, ants, and grasshoppers. Other dietary items commonly include molluscs, crustaceans, and spiders, as well as frogs, lizards and snakes. Mice have also been recorded as being taken, and seeds and small fruit may also be eaten. The bird's diet varies little with the seasons.

The nests consist of a simple scrape or clearing. Eggs (usually two) are laid directly on the ground. The nest site is typically in or on the edge of woodland patches where there is good ground-level visibility for at least 100 metres in every direction (Johnson and Baker-Gabb 1994). The same nesting areas tend to be re-used in successive years and may be used for as long as 30 years. The nests are sometimes abandoned if the grass around the nest becomes too tall, for example, more than about 15 cm (Johnson and Baker-Gabb 1994).

Generation Length

The generation length of the Bush Stone-curlew is inferred to be 10 years. This is based on information in Garnett et al. (2000).

Distribution

The Bush Stone-curlew is found principally in the coastal and subcoastal regions of mainland Australia. It is still moderately common in northern and north-eastern Australia, but in southern Australia and the arid region its range has declined markedly in the past 100 years (Marchant and Higgins 1993). Historically, the Bush Stone-curlew was widespread and reasonably common from the Queensland to the Victorian border east and west of the Great Dividing Range in grassy woodlands (Marchant and Higgins 1993). In Victoria, the main distribution of Bush Stone-curlew is on the Northern Plains in an area bounded roughly by Wodonga, Seymour and Kerang. Other areas comprise the Wimmera Plains and Northern Goldfields regions between about Nhill, Edenhope and Maryborough, the Millicent Plains to the west and south of the Grampians, and the Army reserves at Puckapunyal and Mangalore. Scattered populations exist along the Murray Valley west of Kerang, in north-central Victoria and in the Mallee (Marchant and Higgins 1993, VBA data).

Habitat

The important structural elements of Bush Stone-curlew habitat appear to be a low sparse ground cover, some fallen timber and leaf litter, a general lack of a shrubby understory and open woodlands. Bush Stone-curlews appear to be associated with lower elevations in fairly flat or rolling country (Johnson and Baker-Gabb 1994). A study of 167 sites in northern Victoria found that virtually all sites were below 300m elevation and that 59% were below 150 m. West of the Great Dividing Range, Bush Stone-curlews are recorded in lowland grassy woodland and open forest remnants. Vegetation communities include Grey Box *Eucalyptus microcarpa*, River Red Gum *E. camaldulensis*, Black Box *E. largiflorens* and Yellow Box *E. melliodora*, with a ground cover of low, sparse native grasses and few or no shrubs, although wattles *Acacia* spp. are occasionally present (Marchant and Higgins 1993, Johnson and Baker-Gabb 1994). Bush Stone-curlews also occasionally occur in box-ironbark forests and patches of she-oaks *(Allocasuarina* spp.). Wallaby grasses *Austrodanthonia* spp. are often present in the ground cover at sites with Bush Stone-curlews, and introduced Barley Grass *Hordeum leporinum* in some more disturbed sites (Johnson and Baker-Gabb 1994). Several other species of grasses from the genera *Austrostipa, Poa, Agropyron* and *Bromus* are often recorded at roost sites. Exotic species such as Common Onion Grass *Romulea rosea* and clovers *Trifolium* spp. are infrequently recorded at roost and nest sites over summer when the birds are breeding, but are abundant and dominant after autumn rains (Johnson and Baker-Gabb 1994).

Specific habitat requirements for nesting, foraging and roosting appear to be different and the proximity of suitable areas for each activity is likely to influence abundance and distribution of Bush Stone-curlews (I. Davidson pers. comm., Gates 2001,). The presence and abundance of predators or other disturbances reduces the suitability of habitat for particular activities, especially nesting. In northern Victoria, nest sites were an average distance of 12.7m from the nearest tree, and 3.9m from fallen timber (Johnson and Baker-Gabb 1994).

Threats

The taxon's decline in its southern range has been attributed to predation by the introduced Red Fox (*Vulpes vulpes*), habitat clearance for agriculture and urban development, habitat degradation by pastoralism, and removal of fallen timber from habitat remnants. Other threats include poisoning from pesticides or insecticides and in urban areas, road mortalities and predation by cats and domestic dogs. Population monitoring in south-eastern South Australia suggests that poor nesting success and a lack of juvenile recruitment are significant factors limiting populations. Nestling mortality, probably owing to predation, appears to be the main cause of nesting failure.

IUCN Criteria

Criterion A. Population size reduction.
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered	Endangered	Vulnerable
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

Evidence:

Eligible under Criterion A2 as Vulnerable

The population reduction over the past 30 years is inferred to be 28 to 40%, based on (b), (c) and (e) above.

It is agreed amongst woodland bird biologists that the Bush Stone-curlew has declined substantially in southeastern Australia, and possibly lost from southern Victoria. It declined historically in the southern parts of its range, primarily owing to the destruction and degradation of its preferred woodland habitat, predation by introduced foxes and interactions with habitat loss. Robinson et al. (2002) documented significant extinctions and declines. Since the 1960s, there has thought to have been up to an 80% loss of small fragmented groups.

Eligible under Criterion A3 as Endangered

The population reduction over the next 30 years is projected to be 45 to 80% (midpoint 60%), based on (b) and (c) above.

Even within their 'stronghold' in northern Victoria, Bush Stone-curlews are distributed sparsely (Johnson & Baker-Gabb 1994) and are continuing to decline in abundance. An early 1990s survey of 72 sites on the Northern Plains demonstrated a 42% decrease in abundance in just six years (Webster & Baker-Gabb 1994). Longer-term records by landholders further indicate that densities on some properties have declined from four to one pair per property in the last 30 years, and that large autumn flocks are no longer seen (Johnson & Baker-Gabb 1994). The birds are now in very small numbers, and their ground-dwelling habitat is likely to make them more susceptible to predators.

Eligible under Criterion A3 as Endangered

The population reduction over any 30 year period, including both past and future, is inferred to be 50 to 70%, based on (b), (c) and (e) above.

Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (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			

Evidence:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 168,310 km² and the Area of Occupancy (AoO) is estimated to be 2,113 km², both of which exceed the thresholds for criterion B.

Criterion C. Small Population size and decline				
		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1	An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2	An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions:			
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals				

Evidence:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 50 to 100 mature individuals. Johnson and Baker-Gabb (1994) found that about half of breeding pairs manage to raise one young to independence each year. While this level of breeding success might seem adequate, there are no data on recruitment of juveniles into the adult breeding population.

There has been no state-wide census of the population size of the Bush Stone-curlew in Victoria. However, within a 1.1 million ha stronghold on the Northern Plains, the population size has been estimated to consist of some 300 to 330 breeding birds on private land (Johnson and Baker-Gabb 1994). A 1990s extrapolation from those numbers suggests that the total Victorian population could consist of between 500 and 1000 breeding pairs (Robinson and Johnson 1997), although the current opinion is that population numbers are likely to be much lower, possibly half this number).

In Australia, the taxon is now largely absent south and east of the Great Dividing Range and is scarce elsewhere in southern Australia. Historic declines led to its disappearance from 90% of its mainland range in South Australia (D. Harley in litt. 2006), however it remains common in northern Australia and on many continental islands, even within towns (S. Garnett 2006, 2011), although it has declined in southern Queensland. In 2010 the total Australian population was estimated to almost certainly exceed 10,000 mature individuals (BirdLife International (2016, Garnett. et al. 2011). Where ongoing fox and cat control programs have been undertaken, such as at Puckapunyal Military Area in central Victoria, populations of Bush Stone-curlews have increased (Sleigh et al. 2010).

The number of mature individuals is projected to continue to decline, and the percentage of mature individuals in one subpopulation is 90-100%.

Continuing decline is based on documented declines as a result of historic land clearing (Garnett et al. 2011). The loss of subpopulations of the taxon is likely to continue and this may result in a 'remnant' population restricted solely to the northern plains. By the mid-1980s, a decline in numbers and distribution of the taxon in Victoria was evident and significant fragmentation of the population had begun. Studies from 1985-92 confirmed the parlous state of the taxon in the northern Goulburn-Broken catchment and, by extrapolation, across south-east Australia.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	< 50	< 250	< 1,000
D2 Only applies to the VU 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: AoO < 20 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 50 to 100 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

References

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