

**Advice to the Minister for the Environment and Water Resources  
from the Threatened Species Scientific Committee (the Committee)  
on Amendments to the List of Threatened Species  
under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

**1. Scientific name (common name)**

*Stipiturus mallee* (Mallee Emu-wren)

**2. Reason for Conservation Assessment by the Committee**

This advice follows assessment of information provided by a public nomination to change the category of Mallee Emu-wren, from **vulnerable** to **endangered**.

This is the Committee's first consideration of the species under the EPBC Act.

**3. Summary of Conclusion**

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 2 to make it **eligible** for listing as **endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 3 to make it **eligible** for listing as **vulnerable**.

The highest category for which the species is eligible to be listed is **endangered**.

**4. Taxonomy**

The species is conventionally accepted as *Stipiturus mallee* (Campbell, 1908).

**5. Description**

The Mallee Emu-wren is one of three species of emu-wren (Family Maluridae) (Schodde, 1982). It is a very small bird, weighing around 4-6 grams, with a long distinctive tail of six emu-like feathers, about 1.5 times longer than its body. The male of the species has a sky blue face and upper breast with a rusty red capped head and back of its neck; the rest of its body is brownish-grey. Females and juveniles are similar but lack the blue markings, have a black streaked crown, white lores and white cheek streaks. The species call is high pitched and weak.

**6. National Context**

The Mallee Emu-wren occurs in mallee regions south of the Murray River in north-west Victoria and adjacent areas in South Australia (Blakers et al., 1984). Victoria contains the vast majority of numbers and populations, with significant Mallee Emu-wren populations distributed across sites in Murray-Sunset National Park, Hattah-Kulkyne National Park and adjacent Crown land. A small population exists at Wyperfield National Park and it is possible that another small population could persist in Big Desert Wilderness Park and/or Big Desert State Forest, however no birds were recorded in the northern regions of this area during targeted surveys in 2006 (Clarke & Brown, 2007).

South Australia is known to be home to smaller Mallee Emu-wren populations, at Ngarkat Conservation Park and near Billiatt Conservation Park (Carpenter & Matthew, 1986;

Carpenter & Matthew, 1992). It is possible that an additional small population could persist in Carcuma National Park, however the status of this population is unknown, following a series of recent fires that have burnt out most of the suitable habitat in this region (DEH, 2006).

The Mallee Emu-wren is currently listed as **threatened** in Victoria, under the *Flora and Fauna Guarantee Act 1988*, and **endangered** in South Australia, under the *National Parks and Wildlife Act 1972*. It is listed as **vulnerable** under the EPBC Act 1999.

## 7. Relevant Biology/Ecology

The Mallee Emu-wren principally occupies Spinifex (*Triodia* sp.) dominated vegetation that has not been burnt for many years (Clarke, 2005). These mallee areas usually include low eucalypts two to four metres high. It has also been recorded in mallee heath communities without Spinifex in the southern portion of its range. Limited by habitat, the Mallee Emu-wren is probably relatively sedentary, with a home range of 0.5 -3 hectares (DEH, 2006); the birds are also poor fliers and reluctant to fly over open areas. The Mallee Emu-wren feeds on beetles and other insects, as well as seeds and some other vegetable matter (Schodde, 1982).

Little specific information is available on the life cycle of the Mallee Emu-wren, however anecdotal observations show Mallee Emu-wren breeding ecology to be very similar to the Southern Emu-wren, *Stipiturus malachurus*. Life expectancy is expected to be short (four or five years), generation length is estimated to be three years and the species is thought to be capable of breeding at less than one year of age. Breeding success rates may be broadly similar to those of the Southern Emu-wren, which produces an average of 1.8 fledgelings per clutch of eggs (Maguire & Mulder, 2004). When nesting, the Mallee Emu-wren builds a well-hidden domed nest, usually inside a dense clump of Spinifex. From September to early October it lays two to three eggs and normally raises one brood per year.

## 8. Description of Threats

Vegetation clearance has historically been the major cause for the Mallee Emu-wren decline, as more than half of the former range of this species has been cleared of suitable habitat (Schodde, 1982). Inappropriate fire regimes now pose the most significant threat to the species. Remaining isolated Mallee Emu-wren populations are highly susceptible to wildfires and their limited dispersal ability can prevent birds from finding refuge in nearby unburnt habitat. Conversely, fire plays an important role in maintaining the habitat suitability of this species. The Mallee Emu-wren appears to favour heath vegetation which was last burnt between 16 to 29 years ago, in preference to areas burnt either more or less recently (Clarke, 2005).

In South Australia, recent wildfires have caused the rapid decline of the Mallee Emu-wren. The species was moderately common at Billiatt Conservation Park in the early 1980s (Carpenter & Matthew, 1986) but a fire in 1988 decimated the population, which has failed to recover and is now on the verge of extinction (Mustoe, 2006). Similarly, the Mallee Emu-wren population at Ngarkat Conservation Park was distributed across an area of about 2000 km<sup>2</sup> and possibly numbered in the thousands in the early to mid 1990s, but a series of large fires since 2004 have reduced this population to about 100 individuals distributed across an area of about 100km<sup>2</sup> (Paton et al., 2005). Fires also eliminated suitable habitat from Carcuma Conservation Park (DEH, 2006).

Drought poses an additional threat to the Mallee Emu-wren, as the species has disappeared from heaths that have not been burnt and those disappearances have coincided with extended periods of low rainfall (Paton et al., 2005). The suitability of habitat may be affected by rainfall gradients and explain why the species is more abundant in the eastern parts of its range, where rainfall is highest (Mustoe, 2006). Rainfall influences habitat suitability and the abundance of insects, which Mallee Emu-wrens use almost exclusively as a food source. Given that the species probably lives for only five years, a prolonged drought can lead to poor reproductive performance and result in population crashes.

Grazing by mammalian herbivores, including domestic stock, native species, and feral animals is thought to have an impact on Mallee Emu-wren numbers (Baker-Gabb, 2007). Amongst other effects, grazing removes understorey plants, prevents tree regeneration and leads to a reduction in invertebrate diversity and abundance. Being predominantly ground-dwelling, the Mallee Emu-wren is also susceptible to predation by feral cats and foxes.

## **9. Public Consultation**

The nomination used in this assessment was made available for public exhibition and comment for six weeks. The Committee has had regard to all public comment that was relevant to the survival of the species.

## **10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations**

The Committee judges that the species is **eligible** for listing as **endangered** under the EPBC Act. The assessment against the criteria is as follows:

### **Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers**

There are no historical estimates of population size for the Mallee Emu-wren. Current population estimates are limited and inconsistent (Clarke & Brown, 2007; Mustoe, 2006). Whilst the species is thought to have undergone a reduction in numbers at specific locations (Paton et al., 2005; Clarke & Brown, 2007), there are insufficient quantitative data available to judge that there has been an observed and measurable reduction in numbers for the Mallee Emu-wren across its range.

The current extent of occurrence of the Mallee Emu-wren represents a decline from the species' historical distribution (Clarke & Brown, 2007). The Mallee Emu-wren once occupied a region extending from Annuello Fauna Reserve in Victoria to Billiatt and Ngarkat Conservation Parks in eastern South Australia, and from the northern Sunset Country to south of the Big Desert at Yana (Blakers et al., 1984). Land clearing last century fragmented the populations into two large regional areas and several isolated reserves. A series of large wildfires in 2003 and 2005, compounded by prolonged drought, have reduced the east and south-western populations in the large reserves (ie Billiatt, Ngarkat and Big Desert conservation areas), leaving the Murray Sunset and Hattah Kulkyne reserve complexes as the species' remaining stronghold (Clarke & Brown, 2007).

The extent of occurrence of the Mallee Emu-wren is likely to decline further in the near future given that the very small population near Billiatt Conservation Park may be close to extinction, the extent of occurrence in Ngarkat National Park has declined by 95% since the

early to mid 1990s (Paton, 2007), and only a small and declining population persists at Wyperfield National Park in Victoria (Clarke & Brown, 2007).

Although the Committee judges that the species is suspected to have undergone a reduction in numbers (based on the decline in its extent of occurrence), there are insufficient data available to judge whether the reduction has been very severe, severe or substantial. Therefore, the species has not been demonstrated to have met each of the required elements of Criterion 1, and is **not eligible** for listing in any category under this criterion.

**Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited**

The Mallee Emu-wren is found in the mallee region south of the Murray River in north-west Victoria and adjacent areas of South Australia. The species resides in around four to eight geographically distinct locations within its range. Whilst some locations are connected by suitable habitat, others have become fragmented by agricultural clearing. The population can be said to be split into two large regional areas: Murray Sunset/Hattah Kulkyne National Park in the north and Wyperfield/Big Desert/Ngarkat reserve complex in the south, and it is highly likely that little gene flow occurs between the two.

This fragmented distribution, even within continuous mallee vegetation, suggests the species' ability to recolonise into suitable habitat may be limited (Silveira, 1993). This is especially so after fire, as the Mallee Emu-wren prefers *Spinifex* habitats that have been at least 16 years unburnt (Clarke, 2005; Clarke & Brown, 2007). Given the suspected low reproduction rates based on Southern Emu-wren studies (Maguire & Mulder, 2004), the preference for specific age-class post-fire habitats and the threat of wildfire and drought across its range, the geographic distribution of the species is considered to be severely fragmented.

There is evidence to suggest that the current extent of occurrence of the species represents a decline from its historical distribution. The Mallee Emu-wren formerly extended west to Carcuma Conservation Park (Carpenter & Matthew, 1992) in South Australia and east to Wathe Flora and Fauna Reserve and Bronzewing Flora and Fauna Reserve in Victoria (Clarke & Brown, 2007). The diminishing populations in South Australia (Paton et al., 2005) and in the Big Desert area of Victoria (Clarke & Brown, 2007) are evidence of a decline in extent of occurrence. Given the likelihood of continuing drought, reduced habitat suitability and the persistent threat of wildfire caused by these conditions, the Committee judges that there is an inferred continuing decline in extent of occurrence of the Mallee Emu-wren.

Given a severely fragmented population and continuing decline in extent of occurrence, the Committee judges that the geographic distribution of the Mallee Emu-wren is precarious for the survival for the species.

The extent of occurrence of the Mallee Emu-wren has been variously estimated. Garnett and Crowley (2000) estimated it to be less than 20 000 km<sup>2</sup>. Taking into account obvious discontinuities in habitat such as cleared agricultural land and habitat that contains no suitable vegetation for Mallee Emu-wren, the total occurrence has more recently been conservatively estimated to be less than 4000 km<sup>2</sup> (Mustoe, 2006). Having regard to its narrow home range of 0.5 - 3 hectares (DEH, 2006), the suspected low reproduction rates based on Southern Emu-wren studies (Maguire & Mulder, 2004), and the limitations on dispersal due to the species being a (probably sedentary) habitat specialist, the geographic distribution of the Mallee Emu-wren is considered to be restricted.

The Committee considers that the Mallee Emu-wren has a restricted geographic distribution, which is precarious for the survival of the species. Therefore the species has been demonstrated to have met the relevant elements of Criteria 2 to make it eligible for listing as **endangered**.

**Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**  
**(a) evidence suggests that the number will continue to decline at a particular rate; or**  
**(b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

Population information for the Mallee Emu-wren exists in several reports. Garnett and Crowley (2000) gave a rough population estimate of 10 000 individuals. Mustoe (2006) used habitat suitability models to estimate the population to be between 2131 and 4164 individuals, with the number of mature individuals likely to be about 30% less (between about 1500 and 2800 birds). Expert opinion suggested that the actual population size may be nearer to the larger of the two figures (Mustoe, 2006).

A third study by Clarke and Brown (2007) is based on recent surveys in Victoria, where density estimates were developed using distance sampling and habitat suitability. Population sizes were extrapolated from these estimates. Preliminary results point to a higher population estimate for the Mallee Emu-wren than presented in Mustoe (2006): an estimated 7887 family groups, or 16 882 adult birds. More recent, unpublished data on breeding numbers by these authors have pointed to a reduced figure, of about 15 308 individuals. Several experts broadly support the study's methodology and findings, while two experts believe the extrapolation to be too simplistic as it over-estimates the area of habitat that is suited to Mallee Emu-wren occupation.

Having regard to the population information available to date, the Committee considers the total number of individuals to be somewhere in the range of around 2000 to 15 000 individuals. Further targeted surveys would be needed to more accurately estimate total number of mature individuals. Given this range of estimates and the suspected low reproduction rates, based on Southern Emu-wren studies (Maguire and Mulder, 2004), the Committee considers that the estimated total number of mature individuals of the species is limited.

The Mallee Emu-wren resides in around four to eight geographically separate locations. Given its narrow home range of 0.5 - 3 hectares (DEH, 2006) and the limitations on dispersal due to the species being a (probably sedentary) habitat specialist, the Committee considers the geographic distribution of the species to be severely fragmented and thus precarious for its survival. Based on recent fire histories, the Committee judges that there is an inferred continuing decline in extent of occurrence of the Mallee Emu-wren and consequent likelihood of a continuing decline in its numbers.

The Committee considers that the total number of mature Mallee Emu-wrens is limited, the number is likely to continue to decline and its geographic distribution is precarious for its survival. Therefore, the Mallee Emu-wren has been demonstrated to have met the relevant elements of Criteria 3 to make it **eligible** for listing as **vulnerable**.

**Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

Two recent studies have generated estimates of the Mallee Emu-wren population in Victoria (Clarke & Brown, 2007; Mustoe, 2006). Because of the range of estimates provided, the Committee cannot determine with certainty that the total number is at least 'low'. Therefore, as the species has not been demonstrated to have met this required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

**Criterion 5: Probability of extinction in the wild that is at least:**

- a) **50% in the immediate future; or**
- b) **20% in the near future; or**
- c) **10% in the medium-term future.**

There are insufficient data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

## **11. CONCLUSION**

### **Conservation status**

*Stipiturus mallee* (Mallee Emu-wren) was nominated for transferring from the **vulnerable** to the **endangered** category in the list of threatened species referred to in section 178 of the EPBC Act. The Committee accepts that the species has a highly fragmented distribution, is reduced to a handful of viable populations and has a reducing area of occupancy. Given the limitations on dispersal due to the species being a (probably sedentary) habitat specialist, its suspected low reproduction rates, preference for specific age-class post-fire habitats and the threat of wildfire and drought across its range, the geographic distribution of the Mallee Emu-wren is considered to be restricted and precarious for its survival. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 2 to make it eligible for listing as **endangered**.

The Committee accepts that the total number of Mallee Emu-wrens to be somewhere in the range of around 2000 to 15 000 individuals. The dispersal ability of the species is limited, being a weak flyer and displaying the specialised post-fire habitat preferences, the Committee considers the geographic distribution of the species to be severely fragmented and thus precarious for its survival. Based largely on recent fire regimes, the Committee judges that there is an inferred continuing reduction in extent of occurrence of the Mallee Emu-wren and consequent likelihood of a continuing decline in its numbers. Therefore, the species has been demonstrated to have met sufficient elements of Criterion 3 to make it eligible for listing as **vulnerable**.

The Committee considers that the highest category for which the species is eligible to be listed is **endangered**.

### **Recovery Plan**

The Minister has decided that there should be a Recovery Plan for this species. A recovery plan for the Mallee Emu-wren (including other bird species) is in preparation. The Committee recommends no change to the Minister's initial recovery plan decision.

## 12. Recommendations

- (i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **transferring** from the **vulnerable** category to the **endangered** category:

*Stipiturus mallee* (Mallee Emu-wren)

- (ii) The Committee recommends no change to the Minister's initial recovery plan decision (to have a recovery plan for the species).

Associate Professor Robert J.S. Beeton

Chair

Threatened Species Scientific Committee

### 13. References cited in the advice

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