

# Collected to extinction? History and records of the Western Rufous Bristlebird

Robert A. Davis<sup>1, 2\*</sup> 

<sup>1</sup>School of Science, Edith Cowan University, 100 Joondalup Drive, Joondalup WA 6027, Australia

<sup>2</sup>Western Australian Museum, 49 Kew Street, Welshpool WA 6106, Australia

\*Email: robert.davis@ecu.edu.au

**Abstract.** The Rufous Bristlebird *Dasyornis broadbenti* is a species endemic to Australia and now found only in Victoria and South Australia. The enigmatic western subspecies, Western Rufous Bristlebird *D. b. litoralis*, was described in 1901 and is now considered extinct. Because of the paucity of information on this subspecies, I aimed to locate all known museum specimens, document its known range and ecology, and ascertain the key drivers of its decline. In total, 16 specimens were collected between 1901 and 1907, with no definitive evidence of its survival subsequently. The Western Rufous Bristlebird occupied a very small range between Cape Naturaliste and Cape Mentelle, Western Australia, and was seemingly extirpated within a 7-year period, potentially by over-collecting, because of its small area of occupancy and likely strong territoriality. Habitat change wrought by fire and clearing, as well as feral predators, were additive stressors. Putative sightings in 1945 and the 1970s, 1980s and to present times, have continued but all are unsubstantiated.

## Introduction

The Rufous Bristlebird *Dasyornis broadbenti* is endemic to Australia. Two extant subspecies are recognised: Otways Rufous Bristlebird *D. b. caryochrous* distributed from near Torquay to Peterborough and inland to the Otways in southern Victoria, and Coorong Rufous Bristlebird *D. b. broadbenti*, the nominate subspecies, found in coastal south-eastern South Australia and south-western Victoria from the mouth of the Murray River and through the Coorong in South Australia to Port Fairy in Victoria (Higgins & Peter 2002). An extinct subspecies, the Western Rufous Bristlebird *D. b. litoralis*, is known from south-western Australia, where it was recorded in coastal environments between Cape Naturaliste and Cape Mentelle (Burbidge & Garnett 2021).

The Rufous Bristlebird is currently classified as of Least Concern under the *Environment Protection and Biodiversity Conservation Act 1999* and by Garnett & Baker (2021), although *D. b. caryochrous* is listed as Vulnerable and *D. b. broadbenti* as Endangered under the Victorian *Flora and Fauna Guarantee Act 1988*. Under the South Australian *National Parks and Wildlife Act 1972*, *D. b. broadbenti* is listed as rare.

The Western Rufous Bristlebird was described by Milligan (1902) as *Sphenura litoralis* and denoted the Lesser Rufous Bristlebird. It was collected on 12 October 1901 in coastal shrubs near the Ellensbrook settlement south of present-day Gracetown in the Margaret River region of Western Australia (Milligan 1902). It was originally described as a new species on account of its being smaller than what is now recognised as both the Otways and Coorong Rufous Bristlebirds, and having a brighter-rufous head and lighter underparts. It was also thought to lack a yellow gape and triangular loreal spot known in these eastern Rufous Bristlebird subspecies (Milligan 1902).

The objective of this study was to determine all existing and verifiable records of the extinct Western Rufous

Bristlebird. Specifically, I aimed to: (1) summarise all museum specimens of this subspecies, and (2) determine the potential cause of its decline.

## Methods

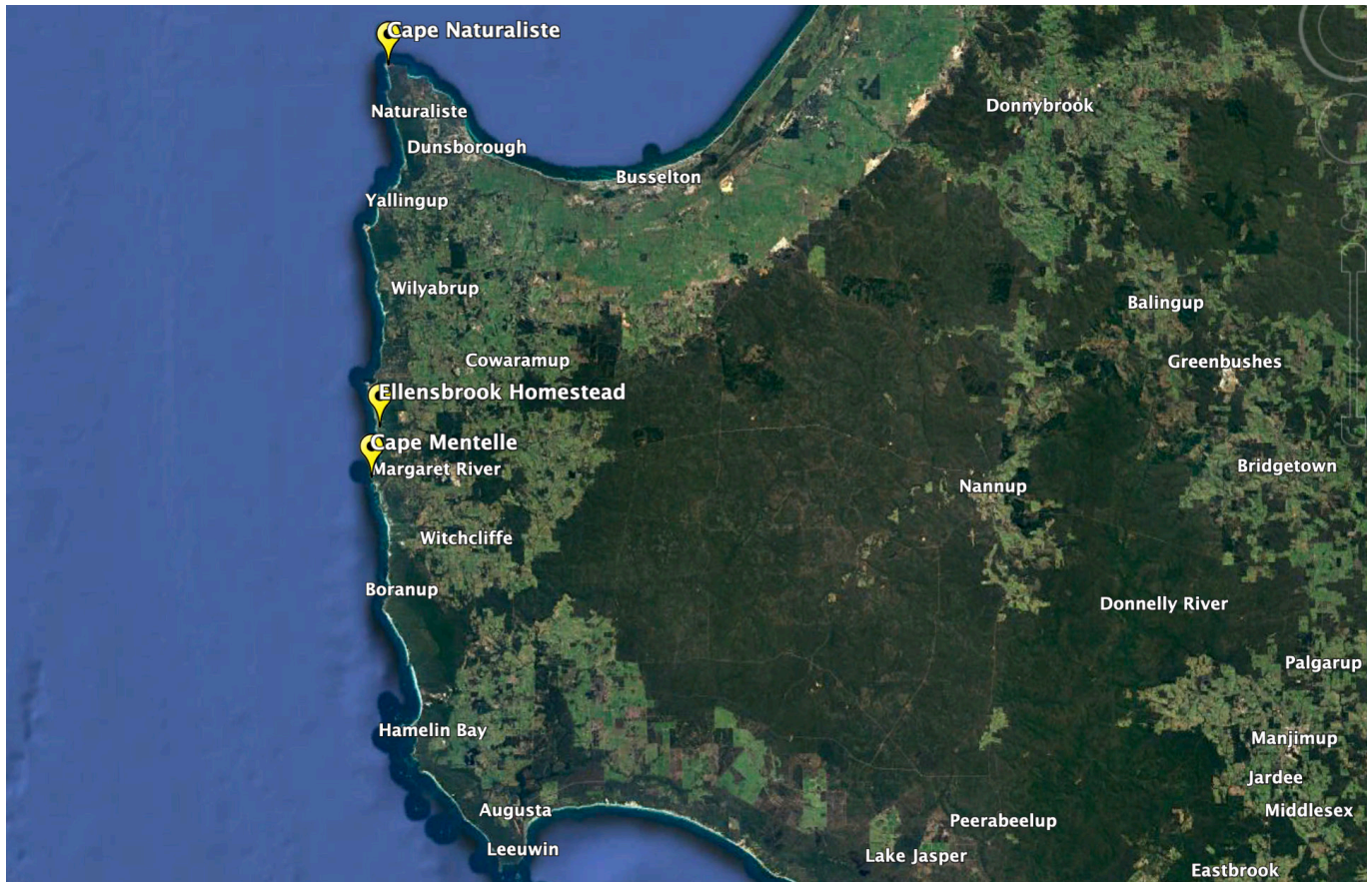
A thorough search of specimen databases [Ozcam (Online Zoological Collections of Australian Museums) and Atlas of Living Australia] of Australian museums was performed for both *D. b. litoralis* and any records of *D. broadbenti* for Western Australia. Internationally, I searched the same terms using GBIF (Global Biodiversity Information Facility) and made contact with the American Museum of Natural History, Academy of Natural Sciences of Drexel University, Philadelphia, USA, and the Natural History Museum, UK, as these institutes are known to have been the recipients of most early natural-history collections for Australia, including the collections of John Gould and John Gilbert (Fisher 2008).

To uncover relevant literature, I searched Web of Science, Scopus and Google Scholar for the terms ‘rufous bristlebird’ and ‘Western Australia’ as well as ‘*Dasyornis broadbenti litoralis*’. I also manually searched all copies of the unindexed publications, the *Western Australian Naturalist* (journal of the Western Australian Naturalists Club) and *Western Australian Bird Notes* as well as the *Journal of the Royal Society of Western Australia*.

## Results

### *Specimens*

The holotype collected by Milligan in October 1901 is accessioned in the Western Australian Museum as specimen number A31526 (Appendix 1). In total, 16 skin specimens and one egg specimen (clutch of two eggs)



**Figure 1.** The three collection localities (shown by yellow balloons) for the Western Rufous Bristlebird in the capes region of south-western Australia. The type locality was Ellensbrook Homestead, and Cape Mentelle represents the most southerly distribution of this taxon. Map source: Google Earth

attributed to the Western Rufous Bristlebird were located in museums (Appendix 1). The Western Australian Museum apparently received all of the known specimens (but not the eggs), with at least three subsequently having been transferred to other institutions (Appendix 1). A lack of detailed records and the age of collections preclude an accurate understanding of where some specimens that had originally been registered at the Western Australian Museum were transferred.

Some specimens have been lost. A32797 may be the precursor label for O15811 at the Australian Museum as it was listed as 9054 and exchanged with the Australian Museum in the original register. The difference in dates is problematic, however, as A33458 was listed in the Western Australian Museum register as exchanged to Mathews in 1910. It does not appear to be the same as any of the three known specimens at the American Museum of Natural History, so may be lost. A33469 was listed as exchanged to L. Harrison and its whereabouts are now unknown.

The egg specimen (clutch of two eggs) housed at Museums Victoria (BE3383) is now thought not to be a clutch of the Western Rufous Bristlebird from 'Jarnadup' (= Jardanup, now = Jardee) in southern Western Australia in 1919. Burbidge (2007) thoroughly investigated this specimen and suggested that there was a location error and that this was a clutch of one of the eastern subspecies. Given this, there are no known eggs of the Western Rufous Bristlebird in museum collections.

All specimens of the Western Rufous Bristlebird were collected in just a 7-year period between 1901 (the

year of description) and 1907. Collection localities were broad and non-specific but all were confined to just two stated locations – Cape Mentelle (seemingly including Ellensbrook) and Cape Naturaliste in the vicinity of the lighthouse (Figure 1).

### Sightings

Some historical sightings are documented in the literature. The first after Milligan's type-description was the observation of Carter (1903), who described seeing a Western Rufous Bristlebird in November 1903 and hearing them calling near Ellensbrook — the type locality. Though he initially ascribed this to the Western Whipbird *Psophodes nigrogularis*, he later realised and corrected his mistake (Carter 1924). Subsequently, former director of the Western Australian Museum L. Glauert (Glauert 1945, p. 334), reported a sighting on the coast "west of the Mammoth Cave and south of Cape Mentelle". This represents a sighting of high veracity in close proximity to the original collections, raising the spectre that the Western Rufous Bristlebird persisted for several decades beyond its last collection date. The location is also further south than that of known specimens.

Several more recent sightings were documented from 1977 to 1989. Graeme Chapman heard a call that he ascribed to this species in December 1977 (Chapman 1979). He also described the 'recent' sighting of a bristlebird near Sugarloaf Rock, Dunsborough, with no further details provided. Chapman (1980) also documented

a targeted survey by members of the Royal Australasian Ornithologists Union in all areas of former Western Rufous Bristlebird habitat and, although unsuccessful, commented that the best remaining habitat was in the vicinity of Sugarloaf Rock and Ellensbrook. A further series of surveys was undertaken on 6–11 September 1983 at ten localities between Boranup and Yallingup (Beckingham 1983) but these were unsuccessful.

### *Habitat and food*

The only information on the diet of the Western Rufous Bristlebird was in the type description, where Milligan (1902) noted that the specimen's stomach contained a single snail with an intact shell. Although this has been used to suggest that this subspecies might have been a snail specialist, this seems unlikely and speculation based on a single sample should be avoided. The other subspecies are known to feed primarily on insects, with some fruit and seeds, and forage on the ground amongst dense vegetation (Higgins & Peter 2002).

## Discussion

### *Specimens and sightings*

Since all of the 16 collected specimens passed through the Western Australian Museum and were catalogued in the original handwritten register, the fate of many specimens can be easily traced. The three specimens in the American Museum of Natural History plus the one in the Natural History Museum, UK, all still contain the original Western Australian Museum register number on the specimen labels (Figure 2), allowing a match with the register book in the Western Australian Museum.

It is apparent that all collected specimens were procured in a very short period of just 7 years (1901–1907) from description. Discounting the 1919 eggs (now thought to be in error), based on collections there is a very rapid decline to probable extinction, and this represents a very rapid extirpation. Although it is impossible to judge the veracity of any of the subsequent sightings, the sighting by Glauert (1945) represents plausible survival until the 1940s. The more-contemporary sightings are difficult to corroborate but would represent the persistence of some individuals into the 1980s. It is telling, however, that extensive surveys, including following up recent reports of potential occurrences (A.H. Burbidge pers. comm.), have failed to relocate the Western Rufous Bristlebird, which, although extremely cryptic, is territorial and has an obvious and different call to other extant species in the region.

### *Agents of decline*

Carter (1924) wrote of revisiting, in 1916, 1919 and 1922, locations where he had observed Western Rufous Bristlebirds with Milligan in 1901 and 1902, and reported that they did not observe any Western Rufous Bristlebirds. He further detailed that there had been significant habitat change with the “dense impenetrable scrub” (p. 310) having been converted to areas of bare sand because of fire and grazing by Cattle *Bos taurus*. Carter (1924) also speculated that Cats *Felis catus* were a key threat and were becoming more abundant in the district.

Ashby (1921) also revisited Ellensbrook, in 1921, and noted that the Western Rufous Bristlebird was not encountered. He also noted the changes in habitat, referring to a reduction in density and a halving in height of vegetation (from “four feet to 18 inches or two feet”: p. 123) from frequent fires and grazing. Ashby speculated that the Western Rufous Bristlebird might have persisted in the



**Figure 2.** Label for Western Rufous Bristlebird Skin 598149 in the American Museum of Natural History showing the number 6864 corresponding to the original accession number in the Western Australian Museum. Photo: Leo Joseph

vicinity of Yallingup where higher-quality bush existed, and that the Western Rufous Bristlebird is best searched for in areas not subjected to frequent fires. As a result of these observations, most more-recent sources (Higgins & Peter 2002; Burbidge & Garnett 2021) have listed the cause of extinction of the Western Rufous Bristlebird as too frequent fire and habitat change.

One puzzle that remains is why the Western Rufous Bristlebird was already so geographically restricted at the time of its description. Smith (1977) speculated that traditional burning regimes before European colonisation might have already restricted it as the recovery time of habitat post-fire might have exceeded the burning intervals. However, if this is true, it is unlikely that this burning occurred at a scale that restricted the range so much, and this implies that the capes region where the Western Rufous Bristlebird occurred acted as a refuge from fires. Another possibility is that this taxon's range was poorly documented, with many potential suitable locations not searched before its extirpation. Historical climate changes might also have resulted in a range contraction, or perhaps competition with the Western Bristlebird *Dasyornis longirostris* might have further diminished its range. It is possible that the Western Rufous Bristlebird's range was also highly restricted from other, unknown resource limitations.

Why the Western Rufous Bristlebird was not more widespread at the time of European colonisation is even more puzzling, given the broader documented range of the congeneric and threatened Western Bristlebird as well as of the ecologically similar Noisy Scrub-bird *Atrichornis clamosus* and Western Whipbird. All these other threatened species persisted in long-unburnt refugia into modern times but were far more widespread than was the Western Rufous Bristlebird at the time of its discovery.

### Collected to extinction?

The very short window of specimen collection followed by no further records is unusual, particularly in a location that was being actively settled and becoming accessible. This implies both a rapid rate of decline and a potential impact of collection on the declining Western Rufous Bristlebird. If it was a range-restricted species that was already subject to the impacts of changed fire regimes, feral predators and habitat change from grazing, collecting might have pushed at least some of its populations beyond recovery. Although a very elusive bird, the calls were loud and obvious, and this meant that individuals could be shot after patient pursuit. At least four collections represented more than one individual being shot, as seen by the shared collection date of specimens. These were sometimes a pair (e.g. A11621 and A11622 in Appendix 1) and one was of three, possibly five, individuals (series collected by C.P. Conigrave on 9–10 July 1904: Appendix 1). The Rufous Bristlebird (Coorong and Otway subspecies) is known to occupy territories and have a high site fidelity, with radio-tracking studies in South Australia revealing that adults moved only  $\leq 420$  m, although immature birds could range over much greater distances and one moved  $> 7$  km (Seymour *et al.*

2003). Such high site fidelity would render this species vulnerable to extirpation from all of the habitat-based threats and the demand for collection after the description as a new species (and subsequent subspecies) might have fuelled its demise.

Although the prognosis for the persistence of the Western Rufous Bristlebird is poor, there is hope that in its former range it may still remain in some of the large tracts of inaccessible bushland that have escaped broadscale, high-frequency wildfires. However, the likelihood of occurrence of such habitat is low.

### Acknowledgements

I am grateful for assistance from Leo Joseph in providing advice and specimen information. Alex Bond (Natural History Museum, UK), Paul Sweet (American Museum of Natural History) and Nate Rice (Academy of Natural Sciences of Drexel University, Philadelphia, USA) all searched for specimens for me in their respective institutions. Graeme Chapman and Allan Burbidge provided constructive feedback on earlier drafts of the manuscript. Kenny Travouillon and Ron Johnstone provided specimen records and access to the Western Australian Museum facilities.

### References

- Ashby, E. (1921). Notes on the supposed "extinct" birds of the south-west corner of Western Australia. *Emu* **20**, 123–124.
- Beckingham, D. (1983). Yallingup campout, September 6–11. *Western Australian Bird Notes* **28**, 4.
- Burbidge, A.H. (2007). What was the Jarndup bristlebird? *Records of the Western Australian Museum* **24**, 1–7.
- Burbidge, A.H. & Garnett, S.T. (2021). Western Rufous Bristlebird *Dasyornis broadbenti litoralis*. In: Garnett, S.T. & Baker, G.B. (Eds). *The Action Plan for Australian Birds 2020*. pp. 594–595. CSIRO Publishing, Melbourne.
- Carter, T. (1903). Some south-western notes (Oct., 1902–Jan., 1903). *Emu* **3**, 38–40.
- Carter, T. (1924). Birds of the Broome Hill District. Part 3. *Emu* **23**, 306–318.
- Chapman, G. (1979). Western Australia's rarest bird? *Western Australian Bird Notes* **10**, 1–2.
- Chapman, G. (1980). October long weekend. *Western Australian Bird Notes* **16**, 1.
- Fisher, C. (2008). A man of great zeal and assiduity: The pioneering naturalist John Gilbert in Australia, 1838–1845. In: Davis, W.E., Recher, H.F., Boles, W.E. & Jackson, J.A. (Eds). *Contributions to the History of Australasian Ornithology*. pp. 1–119. Nuttall Ornithological Club, Cambridge, Massachusetts, USA.
- Garnett, S.T. & Baker, G.B. (2021). *The Action Plan for Australian Birds, 2020*. CSIRO Publishing, Melbourne.
- Glauert, L. (1945). Bristle-birds in Western Australia. *Emu* **44**, 334.
- Higgins, P.J. & Peter, J.M. (2002). *Handbook of Australian, New Zealand & Antarctic Birds, Volume 6: Pardalotes to Shrike-thrushes*. Oxford University Press, Melbourne.
- Milligan, A.W. (1902). Description of a new bristle bird (*Sphenura*). *Emu* **1**, 67–69.
- Seymour, J., Paton, D.C. & Rogers, D.J. (2003). The conservation status of the Rufous Bristlebird, *Dasyornis broadbenti*, in South Australia. *Emu* **103**, 315–321.
- Smith, G.T. (1977). The effect of environmental change on six rare birds. *Emu* **77**, 173–179.

**Appendix 1.** All known specimen records of the Western Rufous Bristlebird *Dasyornis broadbenti litoralis*. Dates are shown as day/month/year. Sex: F = female, M = male, U = unknown, not recorded. Catalogue number is the institutional accession number for the specimen. Institutions: AM = Australian Museum; AMNH = American Museum of Natural History; MV = Museums Victoria; NHMUK = Natural History Museum, UK; SAM = South Australian Museum; WAM = Western Australian Museum; Ex-WAM indicates a specimen that was originally registered in the WAM but has either been disposed of or transferred.

<i>Date</i>	<i>Sex</i>	<i>Collection location</i>	<i>Specimen type</i>	<i>Catalogue no.</i>	<i>Institution</i>	<i>Collector</i>	<i>Notes</i>
1901	F	Cape Mentelle	Skin - taxidermy	A11621	WAM	A.W. Milligan	Listed as locality Ellensbrook in original register.
1901	M	Cape Mentelle	Skin - taxidermy	A11622	WAM	C.P. Conigrave	Listed as locality Ellensbrook in original register. Listed originally as 4626 and no sex specified.
10/1901	F	Ellensbrook	Skin	A31526	WAM	A.W. Milligan	Holotype. Originally accessioned as 4355 and listed as Cape Mentelle.
26/12/1901	F	Cape Mentelle	Skin	A16423	WAM	C.P. Conigrave	Appears in original register as Ellensbrook. Original number 4627.
9/7/1904	U	Cape Naturaliste	Skin	1905.1.240.37	NHMUK	C.P. Conigrave	6866 in original WAM register. Specimen in NHMUK still bears this number.
9/7/1904	M	Cape Naturaliste	Skin	SKIN 598149	AMNH	C.P. Conigrave	Labelled "in dense thickets near coast". Inscribed with 6864 WAM number on specimen label. Listed as exchanged to Mathews in WAM register.
9/7/1904	F	Cape Naturaliste	Skin	SKIN 598150	AMNH	C.P. Conigrave	Specimen label inscribed with 6867 WAM number. Listed as exchanged to Mathews in original register.
10/7/1904	F	Cape Naturaliste	Skin	A32550	WAM	C.P. Conigrave	Previously A16421. Re-registered 6865.
10/7/1904	M	Cape Naturaliste	Skin	A32797	Ex-WAM	P. Baird	Missing from WAM. Listed in original register as re-registered A32797. Originally ascribed to 9054, which was exchanged to AM.
19/7/1906	M	Cape Naturaliste	Skin	B7866	SAM	C.P. Conigrave	Specimen label: "shot whilst uttering loud notes from dense thicket". Received from WAM.
1/8/1906	M	Cape Naturaliste	Skin	A33458	Ex-WAM	C.P. Conigrave	Specimen not found in WAM collection in 2002. Listed as Exchanged with Mathews 1910. 8431 original WAM number.
27/12/1906	M	Cape Naturaliste	Skin	HLW2731	MV	C.P. Conigrave	Ex-WAM specimen. Former accession number unknown.

## Appendix 1 continued

<i>Date</i>	<i>Sex</i>	<i>Collection location</i>	<i>Specimen type</i>	<i>Catalogue no.</i>	<i>Institution</i>	<i>Collector</i>	<i>Notes</i>
27/12/1906	U	Cape Naturaliste	Skin	A16422	WAM	P. Baird	Previously 8547. Location listed as The Lighthouse.
16/1/1907	M	Cape Naturaliste	Skin	A33469	Ex-WAM	C.P. Conigrave	Exchanged to L. Harrison, 16/1/1907. Specimen not found in collection in 2002. 8546 old WAM.
1/10/1907	U	Cape Naturaliste	Skin	SKIN 598151	AMNH	P. Baird	WAM A33502. Listed as exchanged to G. Mathews, 1910. 9055 old WAM number visible on label.
21/12/1907	M	Cape Naturaliste	Skin	O15811	AM	C.P. Conigrave	Possibly synonymous with A32797/9054 listed as exchanged to AM. Date difference is problematic.
1919		Near Jarnadup, Warren River, South-West Australia	Eggs (clutch of 2 eggs)	BE3383	MV	J. Stephens	Jalbarragup Bristlebird – almost certainly a location error: see Burbidge (2007).