New records of the Eastern Grass Owl, *Tyto longimembris*, in South Australia

REECE D PEDLER & BEN J PARKHURST

Abstract

The Eastern Grass Owl, Tyto longimembris, *has been recorded infrequently from arid zone springs, boredrains and wetlands in South Australia since first reported in the far north-east of South Australia in 1975. During the 2010-2012 La Niña event, rainfall in inland South Australia was at its highest in decades, resulting in irruptions of small native mammal populations, particularly the Long-haired Rat,* Rattus villosissimus. *We present seven new records of Grass Owls from five locations, including the first records from the western Lake Eyre Basin. Habitat and food resources are discussed in context with the sightings and we suggest methods for future surveys targeted at Grass Owls, along with reference to the management of the artificial bore drain habitats often used by the species.*

INTRODUCTION

The Eastern Grass Owl, *Tyto longimembris,* is known from high rainfall environments in Queensland and New South Wales as well as arid inland sites in the Lake Eyre Basin and Murray-Darling Basin (Parker 1977; Debus, Maciejewskie and McAllan 1998).

After the first report of the species in South Australia from floodplain habitats near Koonchera Waterhole in Goyder Lagoon (Cox 1976; Foale 1982), the Eastern Grass Owl has been recorded at further floodplain sites, artesian boredrains and mound springs in the north-east and southern Lake Eyre Basin. Subsequent records include sightings and specimens from upstream in the Diamantina and Eyre Creek systems near the Queensland/South Australia border (Parker 1977); Mirra Mitta Bore on the mid Birdsville Track (Parker 1977, Schodde 1978); a resident population at Coward Springs Bore Drain in the Lake Eyre South region between December 1992 and March 1993 (Read 1995); Morris Creek Bore, Callanna Station in 1993 (Read 1995) and Trinity Well, Mt Freeling Station in 2001 (Rogers 2003).

The presence of Eastern Grass Owls in the Lake Eyre Basin has previously been linked to irruptions of the Long-haired (or Plague) Rat, *Rattus villosissimus* (Cox 1976; Parker 1977); a species well known in the Channel Country for its population irruptions during exceptional seasons (Predavec and Dickman 1994). However in the southern Lake Eyre Basin, Eastern Grass Owls have also been linked to high numbers of other small mammals such as House Mouse, *Mus musculus*, and Forrest's Mouse, *Leggadina forresti*, following infrequent high rainfall conditions (Read 1995).

This note summarises some our own and others' recent opportunistic observations of Eastern Grass Owls in the far north of South Australia during such a period of exceptional rainfall and flooding, with irruptions of Long-haired Rats and similar population expansion in other small mammal species.

METHODS

Following the opportunistic discovery of Eastern Grass Owl feathers at Pandiburra Boredrain in October 2009 and further reports of owls flushed from bore-fed wetland vegetation on at Big Blyth Boredrain, other sites of appropriate habitat in

Table 1. Summary of targeted search effort for Eastern Grass Owls during 2009-2013.

Location	Dates	No. of Observers
Pandiburra Boredrain, Clifton Hills Station	25 Oct 2009 17 June 2011 13 April 2013	5 2 2
Coward Springs Boredrain, Oodnadatta Track	9 Jan 2011 10 April 2011 15 May 2011 5 Nov 2011 27 Nov 2011 22 Sept 2012 24 Mar 2013	3 4 2 4 3 2 2
Coward Springs (proper), Stuart Creek Station	5 Nov 2011	4
Big Blyth Boredrain, The Peake Station	8 Oct 2011 26 Oct 2011	4 5
Outside Springs and Johnson's No.3 Bore, The Peake Station.	26 Nov 2011	3
Wabma Kadarbu Mound Springs (6 vents), Wabma Kadarbu Conservation Park	5 Nov 2011	4
Buttercup Springs, Stuart Creek Station	5 Nov 2011	4
Emerald Springs, Stuart Creek Station	5 Nov 2011	4
Jacob Springs, Stuart Creek Station	5 Nov 2011	4
Johnson's No. 3 Boredrain, The Peake Station	26 Nov 2011	3
Outside Springs, The Peake Station	26 Nov 2011	3
Mirra Mitta Boredrain, Cowarie Station	21 Aug 2012 2 Sept 2012 6 Sept 2013	4 3 3
The Bubbler Mound Spring, Wabma Kadarbu Conservation Park	22 Sept 2012 24 Mar 2013	2 3

northern South Australia were searched between 2009-2013 by the authors and other observers (Table 1). Twenty-four individual searches were undertaken (Table 1) and our techniques for detection evolved with increasing experience, becoming progressively targeted and intensive (see Discussion).

RESULTS

Eastern Grass Owls were found at seven sites during the survey as detailed in Table 2 and shown on Figure 1.

DISCUSSION

Significance of records

The observations presented here include the first records of Eastern Grass Owls from the western Lake Eyre Basin and the first records for many years from a number of previous sites in the north-east and southern Lake Eyre Basin.

During the period of our observations, Eastern Grass Owls were also reported elsewhere in northern South Australia and neighbouring western Queensland. A female Eastern Grass Owl was flushed from samphire and sedge at Coward Springs on 2 November 2011 by Colin Rogers and Peter Koch, who subsequently saw an Eastern Grass Owl, suspected to be the same bird, near The Bubbler Mound Spring (~7 km to the east) while spotlighting (South Australian Rarities Committee #51). Three Eastern Grass Owls (and numerous Eastern Barn Owls) were observed in a spotlight using call playback on Cooper Creek near Moomba in June 2012 by Ian and Pat May (Eremaea Birdline South Australia; accessed 6 July 2013, South Australian Rarities Committee #53) and a bird was flushed from vegetation in the Cooper Creek floodplain east of Ballera Gas Centre on 6 November 2012 (Jaensch *et al*. 2013).

Table 2. Details of confirmed Eastern Grass Owl records 2009-2013.

	Location	Date	Observers	Observation details
1	Pandiburra Boredrain, Clifton Hills Station	25 Oct 2009	R Pedler, L Pedler, P Langdon, G Carpenter, A Black	Primary feathers found in *Cyperus* sp dominated clearings between dense *Typha domingensis* reed beds (feathers verified through comparison with specimens in SA Museum and then lodged, specimen B58512, Figure 2). Localised Long-haired Rat irruption following full flooding of Goyder Lagoon. No owls were flushed from the boredrain despite two hours of searching by two observers and additional observations after dark with a spotlight.
2	Big Blyth Boredrain, The Peake Station	Nov 2010	D Schmarr, D Cheshire	Two owls flushed in the tail of boredrain during fish survey.
3	Big Blyth Boredrain, The Peake Station	8 Oct 2011	R Pedler, J Rees, T Gotch, J Gotch	Five Eastern Grass Owls flushed from low areas of *Cyperus* sp. dominated areas on edge of boredrain at dusk following shots fired in air from 12 ga. shotgun (prior to the capping/closure of bore). Long-haired Rats and their signs very abundant.
4	Big Blyth Boredrain, The Peake Station	26 Oct 2011	R Pedler, B Parkhurst, H Spronk, D & H Balnaves	Eastern Grass Owl and multiple Eastern Barn Owls, *Tyto javanica*, attracted into floodlights over camp at ~9 pm while Long-haired Rat distress calls broadcast through car stereo. Likely that more than one individual Eastern Grass Owl observed, but only one seen at a time (two weeks post capping/closure of bore).
5	Fence line ~20 km East of Algebuckina Waterhole, The Peake Station	Oct 2011	N & J Keogh	Eastern Grass Owl found caught on fence (alive) between Smithfield and Algebuckina Paddocks. Removed and cared for, but later died (primary feathers lodged with SA Museum, specimen B58513).
6	Mirra Mitta Boredrain, Cowarie Station, Birdsville Track	2 Sept 2012	R Pedler, B Parkhurst, D Kovac	Two Eastern Grass Owls flushed from roost in sparse patch of *T. domingensis* reeds (~3 m in diameter) amongst shorter, thicker *Cyperus* beds in tail of boredrain (Figure 3). Some signs of Long-haired Rat observed, but numbers thought to be much lower than their peak during 2011. Body feathers found in the roost lodged with SA Museum, specimen B58669.
7	The Bubbler Mound Spring, Wabma Kadarbu Conservation Park, Oodnadatta Track	22 Sept 2012	R Pedler, B Parkhurst	One owl flushed from thick patch of *Cyperus laevigatus* amongst shorter surrounding sedges. A single pellet found at roost site contained the skull of a Plains Mouse, *Pseudomys australis*.

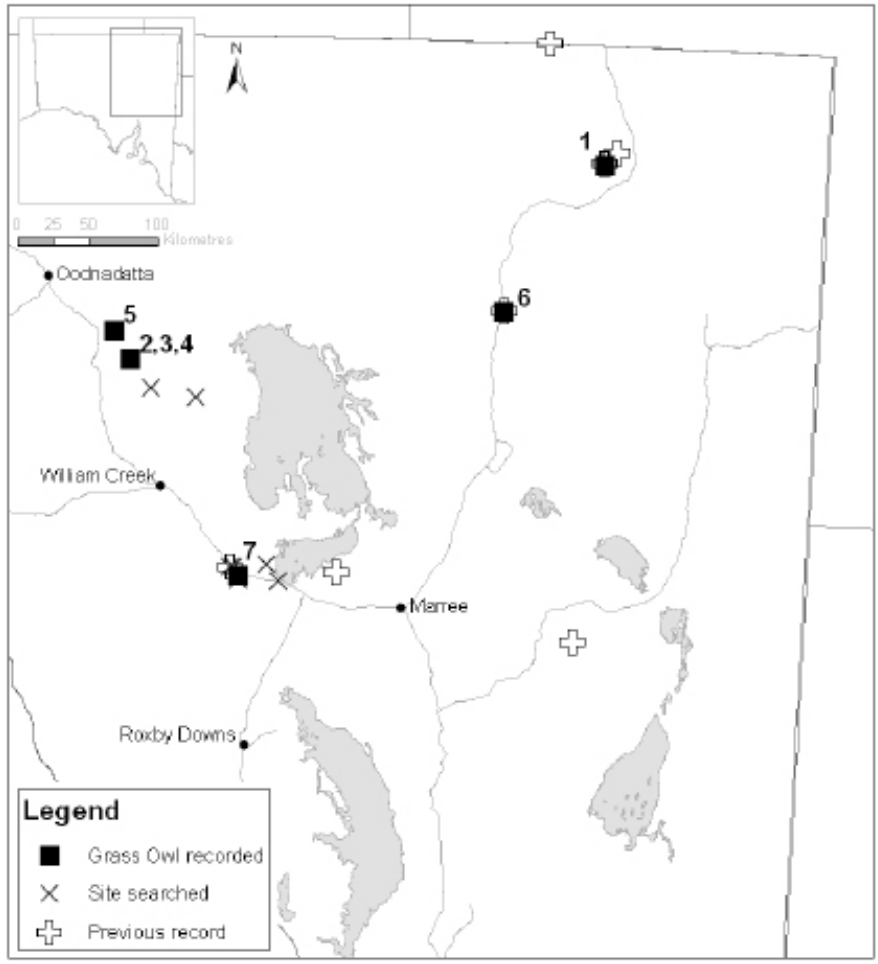

Figure 1. South Australian Eastern Grass Owl records, showing confirmed records from this study (numbers refer to Table 2), additional sites searched and previous confirmed records.

Other probable sightings of Eastern Grass Owls were reported to the authors during this study and included an observation by Craig and Sharon Oldfield of Cowarie Station, who flushed two owls from the ground in a dense stand of Mitchell Grass *Astrebla* sp. while mustering cattle in August 2012. At the time of their sighting Long-haired Rats remained abundant in the area following a sustained population irruption which reached that area in late 2010. The observers were quite familiar with Eastern Barn Owls, which were also particularly numerous and observed regularly at the time.

After observing Eastern Grass Owls at Big Blyth Boredrain in 2011 (Table 2), Travis Gotch recalled flushing similar large pale-coloured owls from vegetated spring vents at West Finniss, Gosse and Wabma Kadarbu Mound Springs in the summer of 2002/2003 while in the process of studying mound spring invertebrates at these sites.

Other sightings lacking sufficient detail to be regarded as confirmed records are listed on line from South Creek on the Strzelecki Track in August 2011 and the Cowarie Station area in August 2010 (Atlas of Living Australia; accessed 6 July 2013).

Conditions and food resources

Seasonal conditions in the South Australian arid zone were exceptional between 2010-2012, with rainfall very much above average or highest on record at many recording stations (150-300%

of annual mean for entire region) and similar to the high rainfall years of the mid 1970s (Bureau of Meteorology, 2011). Consequently, numbers of small mammals were very high during this time, with irruptions of the Long-haired Rat widespread across the north-east and western Lake Eyre basin (R Pedler pers. obs.). Long-haired Rats were observed in abundance at the sites of almost all Eastern Grass Owl observations reported here, as they were during the 1970s (Parker 1977). Despite prevailing dry conditions in 2009, Long-haired Rats were also abundant at Pandiburra Bore following a full flood of surrounding Goyder Lagoon in the months prior.

As with previous records from the Lake Eyre South area (Read 1995), Long-haired Rats were not confirmed at the site of the Eastern Grass Owl observation from the Bubbler Mound Spring in 2012, however they were present at several other sites within 50 km (R Pedler unpublished trapping data) and are likely to have been present in low numbers. Between 2010-12 other small mammals such as the nationally vulnerable Plains Mouse, *Pseudomys australis*, Spinifex Hopping-mouse, *Notomys alexis*, and House Mouse, *Mus musculus*, were detected in abundance in the Lake Eyre South area (R Pedler unpublished trapping data). The Plains Mouse remains found in the pellet collected in the Grass Owl roost site at the Bubbler Mound Spring is the first time this species has been recorded as a dietary item, with House and Forrest's Mice representing the main dietary items in Eastern Grass Owl pellets collected at Coward Springs in 1992-3 (Read 1995).

Habitat preferences

Searches during the early part of this survey were targeted at spring vents and parts of boredrains with thick, tall *Typha* or *Phragmites* reed beds (1-3 m high) as we assumed this to be their preferred habitat. However our subsequent observations of Eastern Grass Owls demonstrated that they were not roosting in these densest areas, but rather in the shorter and less dense sedges which were often found fringing the taller reeds. On several occasions, Eastern Grass Owls were flushed from the thickest, tallest patches of *Cyperus* sedges (up to 40-50 cm high) and on one occasion from a very sparse and isolated patch of *Typha* in amongst shorter sedges on the periphery of the thick reeds. Similarly the feathers found at Pandiburra Bore were found in clearings with shorter *Cyperus* sedges between the taller reed beds.

Previous records of Eastern Grass Owls in the Lake Eyre Basin show that they can be found in a range of aquatic vegetation fringing mound springs and boredrains or on floodplains. Eastern Grass Owls were flushed from Lignum, *Muehlenbeckia florulenta*, with surrounding Spike-rush, *Eleocharis acuta* (syn. *E. pallens*) sedge on the Goyder Lagoon floodplain (Cox 1976, Parker 1977) and from dense *E. pallens* east of Ballera on the Cooper Creek floodplain (Jaensch *et al.* 2013). Eastern Grass Owls at Mirra Mitta Bore in 1976 were apparently using thick *Typha* beds and fringing Lignum as roost sites (Parker 1977) and those at Coward Springs in the 1990s were in burrow-like tunnels in low thick sedges (Read 1995) and similarly at Mirra Mitta Bore, where they were flushed from tunnels in the vegetation (Schodde 1978).

The record of an Eastern Grass Owl using the Bubbler Mound Spring wetland represents only the second confirmed South Australian record of the species in a mound spring, following the 2001 Trinity Well sighting (Rogers 2003). Mound springs may have presented higher value habitat prior to the introduction of cattle grazing which has had a significant impact on mound spring vegetation (Harris 1992), however there are no historic records of Eastern Grass Owl to support this. The observations by Travis Gotch involving owls flushed from other mound spring vents in the Lake Eyre South area are of great interest and effort should be made to continue surveys for Eastern Grass Owls at mound spring vents, particularly during small mammal irruptions. In particular, the Dalhousie Mound Springs

Figure 2. The two primary feathers found at Pandiburra Bore in October 2009 (SA Museum specimen B58512), between spread wing specimens of Eastern Barn Owl (top) and Eastern Grass Owl (bottom) from the South Australian Museum.

complex in Witjira National Park contains the largest flowing mound springs in South Australia and appears to support the largest areas of appropriate habitat of any natural mound spring sites. Although we were unable to carry out searches at Dalhousie during the recent La Niña event (when we know from local observers that Long-haired Rats and other small mammals were abundant), it is highly likely that the species occurs there in such conditions.

The possible Eastern Grass Owls flushed from thick Mitchell Grass on Cowarie Station are of note, given the lack of other records from this habitat type. Parker (1977) discussed previous accounts of supposed Eastern Grass Owls flushed from thick grass in the downs east of Cloncurry, Queensland, but stressed that habitat alone is not sufficient to identify Eastern Grass Owls and that although Eastern Barn Owls more frequently roost in trees, they may at times roost or hunt in these areas. Regardless, it seems likely that in good seasons, thick vegetation on gibber areas may provide similar structure to that used on floodplains and these observations should not be discounted.

Detection methods and lack of other observations

Despite a wealth of rare or unusual bird records being submitted from across northern South Australia during the period of this study by visiting ornithologists (Carpenter 2011a, 2011b, Rogers 2010, 2012), very few other Eastern Grass Owl observations were reported. Most of the sites that we visited were publicly accessible and were being visited by other ornithologists at the time. Some observers may not have publicised their sightings to avoid the resulting large numbers of visitors which would cause

disturbance to the birds and property owners (as was the reason in delaying the reporting of our own observations). However it seems more likely that the reason for the lack of records is due to the cryptic nature of Eastern Grass Owls and most observers' lack of knowledge of or reluctance to employ the intensive techniques that may be needed for their detection.

While trying to flush Eastern Grass Owls from aquatic vegetation, we found that they were not always detectable despite their likely presence. On 21 August 2012 the Mirra Mitta boredrain was searched unsuccessfully for nearly 30 minutes by up to four observers, with two walking through aquatic vegetation while loudly clapping their hands and launching rocks into thick patches of vegetation. On a return visit two weeks later on 2 September, the same methods were used to flush two owls. On this second occasion, one observer passed within 10 m of the roosting site of two owls while loudly clapping, but the owls were not flushed until a rock landed within 50 cm of them.

At a site where we had necessary approvals to use a firearm, we found that a 12 gauge shotgun fired into the air was particularly successful for flushing owls hidden in vegetation anywhere within the boredrain. At Big Blyth bore drain shots fired into the air flushed up to three owls at once, with some ~150 m distant from the observer. We suggest that making loud bangs of comparable volume to a loud gunshot in proximity to mound springs or boredrains is likely to be the most effective and least destructive way of detecting the species. Given the potential issues with using firearms on public lands or on privately managed pastoral properties, a starter gun or similar device might be used and would be likely to create sufficient noise to flush owls.

Two of the previous South Australian Eastern Grass Owl records were birds that were found after hitting fences at night (Parker 1977). The bird reported in this study from The Peake Station adds a further record of this nature and illustrates the tendency of this and other nocturnal species to hit fences. Further records of Eastern Grass Owls may be gathered by examining bird carcasses hanging from or beneath fences. The presence of roosts, tunnels, pellets or feathers within mound spring or bore drain vegetation may also be used to suggest the presence of Eastern Grass Owls and feathers may be used for positive identifications without observing the birds themselves (as was the case in this study, Figure 2).

Habitat management and conservation

Since the previous records of Eastern Grass Owls in northern South Australia, many of the boredrain sites where they were recorded have had flow controlled or ceased as part of the Great Artesian Basin Sustainability Initiative (DEWR 2008). The important process of preserving this finite water resource and restoring flow pressure to natural mound springs led to the capping and closure of Big Blyth Bore in October 2011, just days after five Eastern Grass Owls were observed there. The sites of other previous records such as Morris Creek Boredrain near Lake Eyre South (Read 1995) has also been capped and the flow rate to Coward Springs, Mirra Mitta and Pandiburra boredrains have all been significantly reduced since Eastern Grass Owls were recorded previously at these sites (with the last site having the extensive reed beds destroyed by a fire between 2011-13, vastly reducing the area of roost habitat).

Under current South Australian government policy, bore-fed wetlands are deemed as having no biodiversity value (Phipps 2008), despite their previous recognition as important sites for a range of waterbird species (Badman 1987). A small number of remaining boredrains are in the process of being allocated flows for human social and amenity values (Phipps 2008). Although Eastern Grass Owls are also recorded in other natural mound spring and floodplain sites, boredrains are likely to provide important habitat for them during dry times and their value

Figure 3. One of the two Eastern Grass Owls flushed at Mirra Mitta Boredrain in September 2012 (photo Ben Parkhurst).

for this species (listed as Vulnerable in South Australia, NPW Act 1972) should be recognised and balanced with the need to preserve the water resources of the Great Artesian Basin.

This manuscript benefited from feedback from Andrew Black and two anonymous reviewers, one of whom provided unpublished information from South Australian Rarities Committee Reports 51 and 53.

ACKNOWLEDGMENTS

The managers/owners of the properties visited during this work are thanked for their interest and support, particularly Nathan and Jodie Keogh of The Peake Station, Dion Kahn of Stuart Creek Station, the Oldfield family of Cowarie Station, and Greg Emmett and Prue Coulls of Coward Springs.

Graham Medlin (SA Museum) assisted by identifying small mammal remains and Philippa Horton (SA Museum) verified the identity of owl feathers from various sites.

Several observers made their own opportunistic observations available to us for publication. A large number of people assisted with our informal surveys, many of which yielded no sightings.

REFERENCES

Atlas of Living Australia. *Eastern Grass Owl records search* <www.biocache.ala.org.au> (retrieved 6 July 2013)

Badman, F.J. 1987. *Boredrains and the birds of Inland South Australia – a study of the relationships of bore drains to native bird populations in the far north of South Australia.* Nature Conservation Society of South Australia, Adelaide.

Bureau of Meteorology. 2011. *Rainfall Deciles for Australia.* <www.bom.gov.au> (retrieved 19 May 2012).

Carpenter, G. 2011a. Bird Records. *Birds SA Newsletter* 219: 17-20.

Carpenter, G. 2011b. Bird Records. *Birds SA Newsletter* 220: 14-16.

Cox, J.B. 1976. Grey Grasswrens and Grass Owls at Goyder's Lagoon, South Australia. *South Australian Ornithologist* 27: 96-100.

Debus, S.J.S., Maciejewski, S.E., and McAllan, I.A.W. 1998. The Grass Owl in New South Wales. *Australian Birds* 31: 29-45.

Department of the Environment and Water Resources. 2008. *Great Artesian Basin Sustainability Initiative, mid-term review of Phase 2.* DEWR, Canberra. Available online: <www.gabcc.org.au> (retrieved 19 May 2012).

Eremaea Birdline South Australia. *Eastern Grass Owl sightings* <www.eremaea.com> (retrieved 6 July 2013)

Foale, M.R. (ed). 1982. *The Far North East of South Australia: a biological survey conducted by the Nature Conservation Society of SA (Inc.) 2nd -30th August 1975.* Nature Conservation Society of South Australia; Adelaide.

Harris, C. 1992. Mound Springs: South Australian conservation initiatives. *The Rangeland Journal* 14: 157-173.

Jaensch, R., Pedler, L., Carpenter, G. and Black, A. 2013. Records of the Golden-headed Cisticola, Yellow Chat, Tawny Grassbird, and Eastern Grass Owl in the Channel Country following several wet years. *Sunbird* 43: 1-11.

Parker, S. 1977. The distribution and occurrence in South Australia of owls of the genus *Tyto*. *South Australian Ornithologist* 27: 207-215.

Phipps, L. 2008. *Assessment of the social amenity and physical characteristics of Great Artesian Basin bore-fed wetlands in South Australia, Phase 1. South Australia Arid Lands Natural Resources Management Board.* Available online: <www.saalnrm.sa.gov.au> (retrieved 13 November 2013)

Predavec, M. and Dickman, C.R. 1994. Population dynamics and habitat use of the Long-haired Rat (*Rattus villosissimus*) in South-western Queensland. *Wildlife Research* 21: 1-10.

Read, J.L. 1995. The Ecology of the Grass Owl *Tyto capensis* south of Lake Eyre. *South Australian Ornithologist* 32: 58-60.

Rogers, C. 2003. Bird Report 2001. *South Australian Ornithologist* 34: 57-69.

Rogers, C. 2010. Bird Records. *Birds SA Newsletter* 214: 13-16.

Rogers, C. 2012. Bird Report 2010. *South Australian Ornithologist* 38: 12-23.

Schodde, R. 1978. The Lake Eyre basin at the end of the good years. *Canberra Bird Notes* 4(2): 2-14.

Editor's note: Full URLs for web-based sources are available from the Secretary, Birds SA <secretary@birdssa.asn.au>

Reece D Pedler
PO Box 712
Roxby Downs, South Australia 5725