

**Report to the Saving Our Species Program of the Office of  
Environment and Heritage on the status of the Grey Grasswren  
*Amytornis barbatus barbatus* in North-western NSW in 2014.**



**J. R. Farrell, J. W. Hardy and K. Wilkins**  
on behalf of the Australian Bird Study Association Inc

saving our species 

# **Report to the Saving Our Species Program of the Office of Environment and Heritage on the status of the Grey Grasswren *Amytornis barbatus barbatus* in North-western NSW in 2014.**

**J.R. Farrell, J.W. Hardy and K. Wilkins**

**on behalf of the Australian Bird Study Association Inc**

## **INTRODUCTION**

The habitat of the Grey Grasswren (*Amytornis barbatus barbatus*) in New South Wales is very restricted. The known distribution of the subspecies extends from the northern Bulloo River in the vicinity of *Tickalara Station* in south-western Queensland, south through Caryapundy Swamp and its eastern outflow channels to the northern margin of the Bulloo River overflow in north-western NSW. In NSW the species is almost totally confined to the remaining area of dense, tall lignum in the north east corner of *Narriearra Station* (Fig. 1).

The primary threat to the Grey Grasswren is loss and degradation of habitat through grazing and trampling of regrowth by livestock (cattle) and feral animals, particularly feral pigs but potentially also rabbits. They are also potentially threatened through loss of habitat through unsuitable fire regimes, invasive weeds or future diversion of water from the Bulloo River.

Through the Saving Our Species Program, the Office of Environment and Heritage (OEH) has funded conservation actions for the Grey Grasswren. Identified actions include the protection of key populations from grazing, reduction in pig numbers and on-going monitoring of the population on *Narriearra*.

This report details actions undertaken in April/May 2014 to satisfy the key objectives of a Contract of the project, i.e. the establishment of a monitoring program to track the species' abundance and habitat condition over time. This is to basically comprise two components:

1. Monitoring - to establish set monitoring sites at known and potential locations utilised by Grey Grasswrens within the study area. A sufficient number of sites are to be chosen to allow for the occupation and abandonment of sites in accordance with expected flooding of the swamp. This would include monitoring of Grey Grasswren populations and habitat condition, notably evidence and impact of domestic stock and feral animals; details of monitoring protocols (including details of the location all monitoring sites), and
2. Banding - the continuation of the current long-running capture/recapture study of Grey Grasswrens with adjustments to methodologies, if required, to maintain statistical rigour. This would include a summary of Grey Grasswren sightings in NSW with an assessment of whether opportunities to target these birds for capture existed, as well as a summary of all efforts to capture and band Grey Grasswrens.

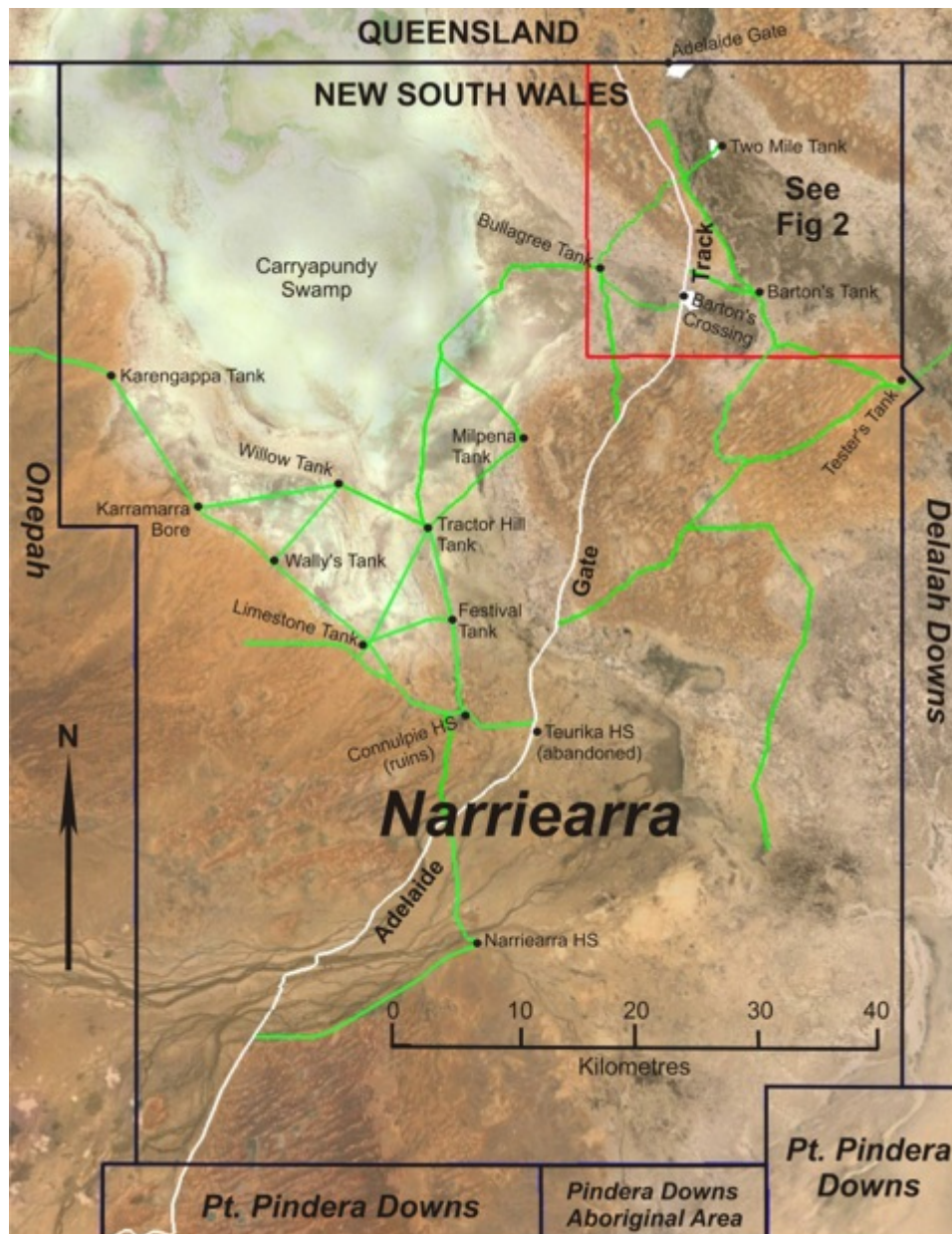


Figure 1: *Grey Grasswren Saving Our Species Project* study area. The green lines are major property management tracks. Image courtesy of Google Earth.

## INITIATION OF THE PROJECT

A team of thirteen volunteers spent 5 days from 7 to 11 April 2014 in the study area to initiate the project, but they were frustrated in their efforts by local rain which made most property management tracks impassable. Consequently, access to many of the previously recorded Grey Grasswren observation sites was not possible. However, banding efforts were completed in the two previously studied sites (Hardy 2010) and two vegetation surveys were completed within these sites.

In an effort to complete the expectations expounded in the Contract, three of the original team of volunteers returned to the area for a further five days from 19 to 23 May 2014. During this

second visit to the area a third banding site, vegetation survey and several monitoring transects were established.

## PREVIOUS STUDIES

The nominate species of Grey Grasswrens *Amytornis barbatus barbatus* was first described by Favaloro and Adams (1968) from an area just north of the now abandoned *Teurika* homestead adjacent to the Adelaide Gate Track. Sightings over a number of years in NSW and in particular within *Narriearra* have been published and are pin pointed in Hardy (Figure 1, 2010).

References pertaining to *Amytornis b. barbatus* are listed below:

### Australian grasswrens *Amytornis*

- Christidis, L., Rheindt, F. E., Boles, W. E. and Norman, J. A. (2010). Plumage patterns are good indicators of taxonomic diversity but not of phylogenetic affinities in Australian grasswrens *Amytornis* (Aves: Maluridae). *Molecular Phylogenetics and Evolution* **57**: 868–877.
- Higgins, P. J., Peter, J. M. and Steele, W. K. (2001). 'Handbook of Australian, New Zealand and Antarctic Birds. Volume 5: Tyrant-flycatchers to Chats'. (Oxford University Press: Melbourne.)
- Schodde, R. and Christidis, L. (1987) Genetic differentiation and subspeciation in the Grey Grasswren *Amytornis barbatus* (Maluridae) *Emu* **87**: 188–192.

### *Amytornis barbatus barbatus*

- Australian Government (2005). 'Commonwealth listing advice on Grey Grasswren (Bulloo) (*Amytornis barbatus barbatus*).'  
<http://www.environment.gov.au/biodiversity/threatened/species/mytornis-barbartus-barbartus.html>.
- Birdlife International (2011). 'Species factsheet: *Amytornis barbatus*.' <http://birdlife.org/>.
- Black, A., Carpenter, G., Jaensch, R., Pedler, L and Pedler, R. (in press). A survey of outlying populations of the Grey Grasswren *Amytornis barbatus* (Maluridae). *Corella*
- Chenery, A. (1922). Notes on birds seen during a recent visit to the Western Darling, NSW, Part 3. *South Australian Ornithologist* **6**: 153–155.
- Cooper, R. M. and McAllan, I. A. W. (1995). 'The Birds of Western New South Wales: A Preliminary Atlas'. (N.S.W. Bird Atlassers Inc.: Albury)
- Department of the Environment, Water, Heritage and the Arts (2009). '*Amytornis barbatus barbatus* in Species Profile and Threats Database'. (Department of the Environment, Water, Heritage and the Arts: Canberra.)
- Favaloro, N. J. and McEvey, A. (1968). A new species of Australian Grasswren. *Memoirs of the National Museum of Victoria* **28**: 1–9.
- Garnett, S. T. and Crowley, G. M.. (2000). Recovery Outline – Grey Grasswren (Bulloo). In 'The Action Plan for Australian Birds, 2000'. Pp 425–426. (Commonwealth of Australia, Environment Australia: Canberra.)
- Garnett, S. T., Szabo, J. K. and Dutson, G. (2011). Subspecies Conservation Summary – Grey Grasswren (Bulloo). In 'The Action Plan for Australian Birds, 2010'. (CSIRO Publishing: Collingwood).

- Hardy, J. W. (2002). A Banding Study of the Grey Grasswren *Amytornis barbatus barbatus* in the Caryapundy Swamp of South-western Queensland. *Corella* **26**: 106–109.
- Hardy, J. W. (2010). Distribution, status and options for the future management of the Grey Grasswren *Amytornis barbatus barbatus* in New South Wales. *Corella* **34**: 25–35.
- MacGillivray, W. (1923). A trip to the north and north-west of Broken Hill. *Victorian Naturalist* **39**: 131–147.
- McAllan, I. A. W. (2000). On some New South Wales records of the Grey Grasswren and Thick-billed Grasswren. *Australian Bird Watcher* **18**: 244–246.
- McAllan, I. A. W. and Cooper, R. M. (1995). The distribution of the Grey Grasswren in New South Wales. *Australian Birds* **28**: 65–70.
- New South Wales National Parks and Wildlife Service (2003). 'Grey Grasswren (*Amytornis barbatus*). Draft Recovery Plan'. (NSW NPWS: Hurstville, NSW.)
- NSW Scientific Committee (2004). 'Grey Grasswren – Endangered species determination – final'. (DEC (NSW): Sydney.)

Numerous other papers have been published that relate specifically to the subspecies *Amytornis barbatus diamantina* which occurs to the north and west of the distribution of *A. b. barbatus*, but not in NSW. Those references are listed below as they may contain information relevant to management issues for the NSW population:

#### ***Amytornis barbatus diamantina***

- Black, A., Carpenter, G., Pedler, L., Langdon, P and Pedler, R. (2009). 'Distribution and habitats of the Grey Grasswren *Amytornis barbatus* in South Australia'. (South Australian Arid Lands Natural Resources Management Board.)
- Black, A., Carpenter, G., Pedler, R., Pedler, L and Langdon, P. (2012). Habitats of the Grey Grasswren *Amytornis barbatus diamantina* and a review of the species' distribution. *Corella* **36**: 29–37.
- Black, A., Carpenter, G., Jaensch, R., Pedler, L and Pedler, R. (in press). A survey of outlying populations of the Grey Grasswren *Amytornis barbatus* (Maluridae). *Corella*.
- Carpenter, G. (2002). The Grey Grasswren on the Cooper Creek south west Queensland. *Sunbird* **32**: 52–55.
- Cox, J. B. (1976). Grey Grasswrens and Grass Owls at Goyder's Lagoon, South Australia; *South Australian Ornithologist* **27**: 96–100.
- Jaensch, R. (2009). 'Floodplain Wetlands and Waterbirds of the Channel Country'. (South Australian Arid Lands Natural Resources Management Board.)
- Jaensch R. and McFarland, D. (2002). A population of Grey Grasswren *Amytornis barbatus* in the Diamantina channel country, Queensland. *Sunbird* **32**: 56–61.
- Joseph, L. (1982.) A further population of the Grey Grasswren. *Sunbird* **12**: 51–53.
- May, I. A. (1982) In: Bird Notes (Ed. B. Glover): *South Australian Ornithological Association Newsletter* **102**: 11.
- Reid, J. R. W. (2000). Cooper Creek and the Far North East. In 'Birds, Birders and Birdwatching 1899–1999' (Eds R. Collier, J. Hatch, B. Matheson and T. Russell, T.) (South Australian Ornithological Association: Flinders Press, Adelaide.)

## SUMMARY

### Grey Grasswren distribution

An overall review of Grey Grasswren distribution within NSW was discussed in a previous publication (Hardy 2010).

In the course of this monitoring event on *Narriearra* only, Grey Grasswrens were heard at:

- Adelaide Gate Banding Site,
- Two Mile Tank Banding Site,
- Barton's Crossing Banding Site (one trapped),
- Transect 2 north of Bullagree Tank, and,
- Transect 4 west of Barton's Crossing.

The observation north of Bullagree Tank is a new record site.

It appears, from the areas that were visited and readily accessible via property management tracks, that small groups/pairs of Grey Grasswrens were confined to areas of densest Lignum growth.

The flood channel that crosses the Queensland border near Adelaide Gate contains the thickest and densest lignum stands in New South Wales and is thought to be the most secure primary habitat of the Grey Grasswren. From the border, this channel flows south past Two Mile Tank and then splits into two distinct channels in the vicinity of Barton's Tank. The south-east flowing channel crosses the eastern boundary of *Narriearra* north of Tester's Tank into *Delalah Downs* and then south toward the Bulloo Overflow. Access to the south-east flowing channel is very difficult due to the absence of property management tracks, so this area was not investigated.

The channel that flows south-west from the split passes Barton's Tank, then flows westerly to cut the Adelaide Gate Track at Barton's Crossing, then onto Bullagree Tank and eventually into the southern portion of Caryapundy Swamp..

No Grey Grasswrens were heard/seen around the south extremities of Caryapundy Swamp where they had been previously recorded:

- Original observation (1921) and collection (1967) site which is in the only channel that drains the Caryapundy Swamp, flows south-easterly to the Bulloo Overflow. According to the property owner the Lignum in this area has not regenerated to its former tall, dense status since a devastating flood in 1974–75 (Hardy 2010). The channel both east and west of this site is virtually denuded of any living Lignum clumps. Apart from small green shoots, there has been no regrowth of Lignum since 2009 when the photograph below was taken even though the area has received water during ensuing floods and regular local rainfall.



*Type Specimen Collection Site no longer capable of supporting grasswrens. September 2009 photograph looking west up the Caryapundy overflow channel.*

- The areas south-east of Karengappa Tank and just north of Limestone Tank have degraded considerably since 2009 and no habitat now exists where Grey Grasswrens could survive (see photographs below).



*Photograph on the left shows a substantial Canegrass area and was taken at the 1975 observation site south-east of Karengappa Tank in 2009. Photograph on the right was taken in May 2014 of the same area.*



*Photograph on the left is of a mixed Lignum and Canegrass area taken at the Grey Grasswren observation site just north of Limestone Tank in 2009. Photograph on the right is of the same area in May 2014.*

### **Notes on the health of Lignum**

The site at Adelaide Gate appeared to be in better condition than at the other two sites:

- clumps of Lignum were, on average, larger,
- most of the Lignum bushes displayed green shoots on the outer layers, and,
- suckering of new branches onto the clay flood paths was very apparent.

The Lignum at Barton's Crossing was growing in well-established clumps that showed some suckering and regrowth of green shoots along stems particularly on the outer edges of the clumps.

Lignum clumps at Two Mile Tank Site were well-established but showed little sign of green shoots along branches or suckering from the base.

Flowering was observed at both Adelaide Gate and Barton's Crossing sites (April) but it had finished at Two Mile Tank Site on our second visit (May) and only a few dried flowers remained (no seeding was observed).

### **Domesticated Stock, native and feral animals**

**Cattle** – None were observed at the Adelaide Gate Site. Small numbers were present at the Two Mile Tank Site but were travelling through and after the first day of our arrival we saw few. Cattle in the vicinity of Barton's Crossing were confined to the east of the banding site near a small watering hole adjacent to Barton's Tank.

Cattle tracks were recorded at all sites as were their droppings. Cattle were not observed browsing on Lignum but were seen grazing on green shoots growing on the dry lake bed and adjacent sand ridges. This green growth was a result of localized rainfall.

The main concentrations of cattle were confined to areas adjacent to tanks that were filled with bore water – particularly in the southern regions of Caryapundy Swamp. These tanks would have been used to water cattle throughout drought. It is in this southern Caryapundy Swamp area that most of the observed habitat changes had occurred. All other tanks that were

visited (i.e. those that are filled by pumping water into them during floods) were found to be dry.

**Kangaroos** – many mobs were sighted but all were encountered away from the Lignum areas although their droppings were recorded throughout all survey sites.

**Pigs** – little/insignificant damage was observed. Some wallows were found between clumps and several flattened areas within Lignum clumps at Adelaide Gate and Two Mile Tank. Tracks were observed at Barton's Crossing.

**Rabbits** – very few rabbits were sighted. None were within the Lignum clumps although their droppings were recorded throughout the Adelaide Gate Site.

**Horses** – several small groups of feral? horses were recorded adjacent to the main track south of Barton's Crossing and further east, but none were recorded in areas of Lignum.

**Goats** – There was no evidence observed of the presence of feral goats on *Narriearra* .

## MONITORING PROTOCOLS FOR BOTH AVIAN AND VEGETATION SURVEYS

All banding and surveys listed below were carried out within the boundaries of the Narriearra property with the consent of the landholder.

### Banding

Three sites were identified for banding activities within the area of the greatest occurrence of tall, dense Lignum:

- *Adelaide Gate Site*
- *Two Mile Tank Site*
- *Barton's Crossing Site*

These sites were established to sample the avian fauna at the northern, central and southern regions of dense Lignum slightly east of the main Adelaide Gate Track between the abandoned *Teurika* HS and the Queensland border. Grey Grasswrens had been captured or observed at these three sites over several years. These sites are accessible during periods of moderate local rainfall, but none of the Grey Grasswren observation localities are accessibly during flood periods.

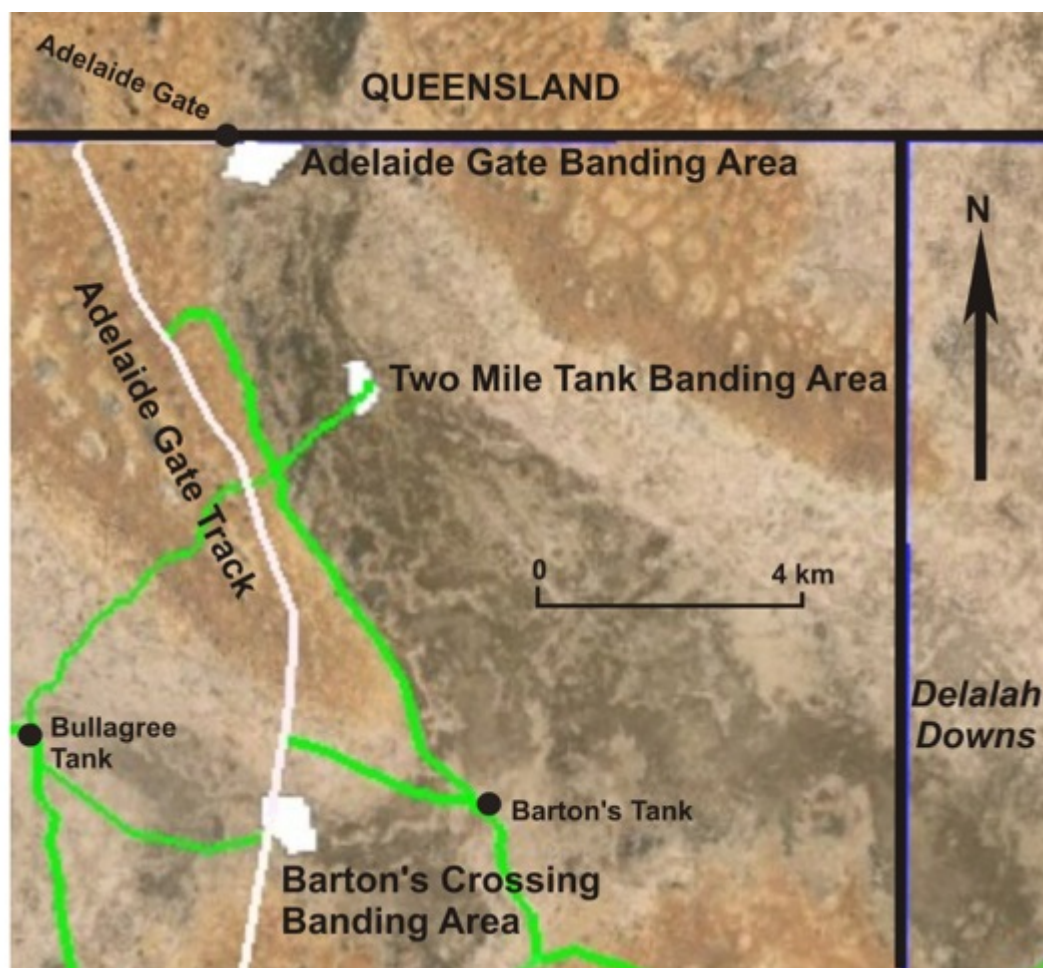


Figure 2: Satellite image showing the location of the three banding sites and the approximate sampling area covered. Image courtesy of Google Earth.

The availability of standing water would have an effect on the avian fauna present so to standardise, in a general sense, the amount of water present the following categories were established. The three different sites, at the time of this survey, were then placed on this generalized continuum.

Amount of Standing Water			
Two Mile Tank Site	→	1	Totally dry with no standing water
Barton's Crossing Site	→	2	Channels dry with some shallow pools on clay pans
Adelaide Gate Site	→	3	Small pools of standing water in channels plus larger shallow pools on clay pans
		4	Many pools of standing water in channels plus larger pools on clay pans
		5	Water flowing along channels with most claypans covered in water

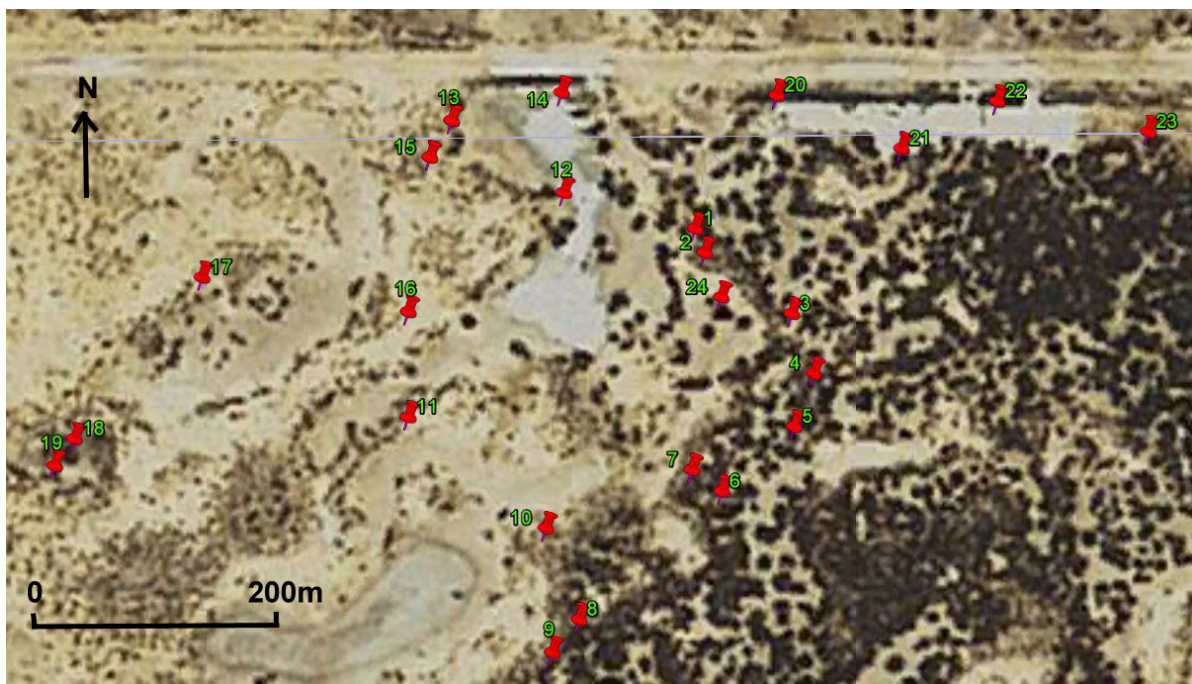
So that nets could be easily relocated within the tall Lignum (averaging approximately 2m tall), the height of the net poles at one end of the erected nets was extended to 3.6m and an orange marker flag was attached to the top. Co-ordinates of each net were also recorded on a hand-held GPS.

Modified two or three-shelf nets were erected with the bottom shelf string placed on the ground. From previous banding experience Grey Grasswrens were never sighted above the height of the Lignum clumps and were always caught in the bottom-most two shelves of a standard four-shelf mist net.

### *Adelaide Gate Site*

This site (Fig. 2 and 3) was selected because of regular sightings and because banding had previously been carried out in October 2000, April 2001, June/July 2002 and September 2009, with a total of 12 Grey Grasswrens being trapped and banded. Grey Grasswrens had been observed, but none were captured at this site during a two-day banding attempt in September 2004.

During this survey, up to 25 nets totalling 327m in length were erected in an area covering approximately 40 ha. Almost half of these nets were erected in Old Man Saltbush *Atriplex nummularia* in the vicinity of Lignum. During past banding activities grasswrens had been observed moving west into saltbush early of a morning and returning easterly to the tall, dense lignum in late afternoons. The strategy with net placement had been an attempt to confirm a suspicion that grasswrens in this area move into saltbush to forage and return to more secure lignum stands to roost.



**Figure 3:** *Satellite image showing the positions of the nets erected at the Adelaide Gate Site. Image courtesy of Google Earth.*

**Table 1: Co-ordinates of netlanes at Adelaide Gate Site**

Adelaide Gate Site					
No	Latitude	Longitude	No	Latitude	Longitude
AG001	S 29.00003	E 142.612113	AG013	S 29.000906	E 142.609707
AG002	S 29.000474	E 142.612217	AG014	S 29.000027	E 142.611024
AG003	S 29.000796	E 142.612355	AG015	S 28.999499	E 142.610074
AG004	S 29.000927	E 142.612953	AG016	S 28.999291	E 142.610006
AG005	S 29.001361	E 142.61314	AG017	S 28.999769	E 142.609894
AG006	S 29.001759	E 142.612971	AG018	S 29.000653	E 142.607961
AG007	S 29.002237	E 142.612357	AG019	S 29.00185	E 142.60688
AG008	S 29.002077	E 142.612108	AG020	S 29.002044	E 142.606718
AG009	S 29.003185	E 142.611156	AG021	S 28.999311	E 142.612823
AG010	S 29.003426	E 142.610926	AG022	S 28.999702	E 142.613878
AG011	S 29.002513	E 142.610874	AG023	S 28.999355	E 142.614688
AG012	S 29.001686	E 142.609707	AG024	S 28.99958	E 142.615962

Nets were opened on 7–9 April for a total of 10.5 hrs during the morning and late afternoon. They were closed during mid-day on 8 April due to high temperatures. The more easterly nets were erected in dense Lignum and the westerly nets were in more open Saltbush.

**Table 2: Banding effort at Adelaide Gate Site (7 April – 9 April)**

Adelaide Gate Site				
Net Lengths	7.4.14	8.4.14	9.4.14	
18m		3	7	7
12m	10	14	14	14
9m	3	3	3	3
6m	1	1	1	1
Total	148m	249m	327m	327m
Hours Open	1600-1800	0630-1100	1700-1800	0630-0930
No. Hours	2	4.5	1	3

## Two Mile Tank Site

This site (Fig. 2 and 4) was chosen because it was an easily accessible area between the established banding sites at Adelaide Gate and Barton's Crossing and it contained prime Grey Grasswren habitat with tall stands of Lignum spread across a broad flood channel where grasswrens had previously been observed.

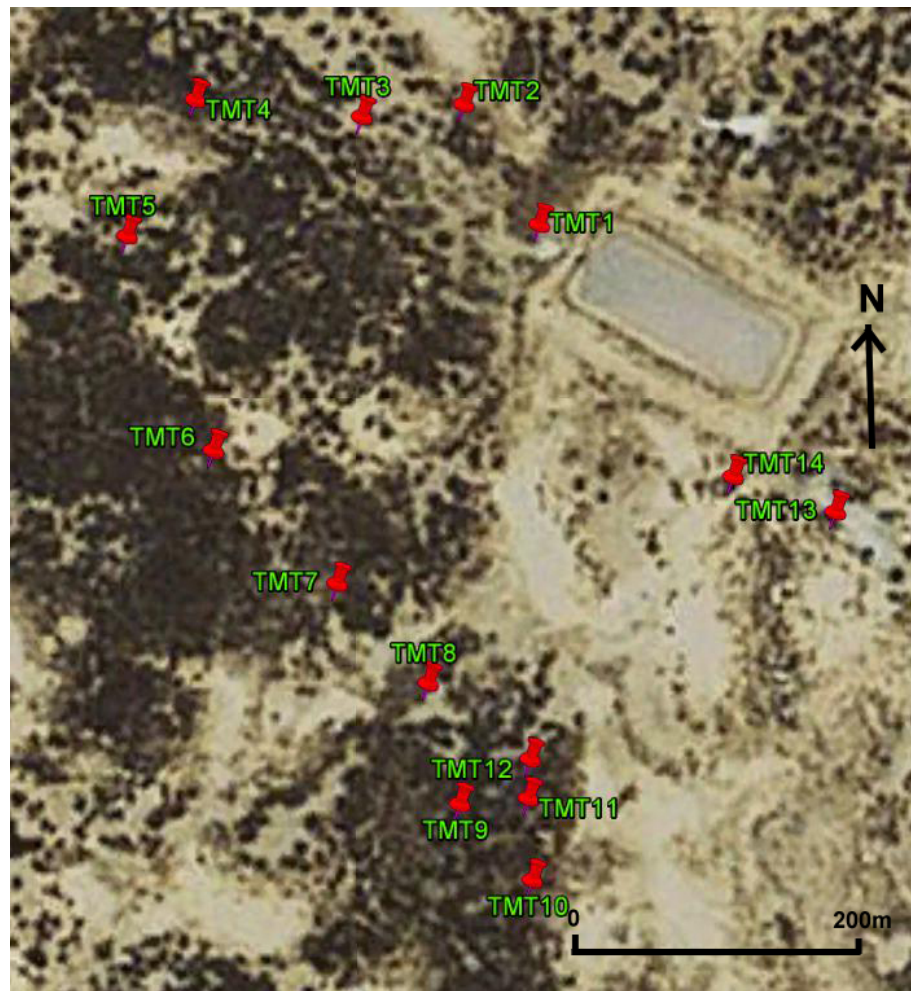


Figure 4: Satellite image showing the positions of the nets erected at the Two Mile Tank Site. Image courtesy of Google Earth.

Table 3: Co-ordinates of netlanes at Two Mile Tank Site

Two Mile Tank Site					
No	Latitude	Longitude	No	Latitude	Longitude
TMT01	S 29 01.823	E 142 37.545	TMT08	S 29 01.904	E 142 37.498
TMT02	S 29 01.776	E 142 37.514	TMT09	S 29 02.042	E 142 37.513
TMT03	S 29 01.785	E 142 37.470	TMT10	S 29 02.074	E 142 37.544
TMT04	S 29 01.774	E 142 37.397	TMT11	S 29 02.039	E 142 37.541
TMT05	S 29 01.827	E 142 37.369	TMT12	S 29 02.024	E 142 37.543
TMT06	S 29 01.910	E 142 37.408	TMT13	S 29 01.932	E 142 37.676
TMT07	S 29 01.958	E 142 37.460	TMT14	S 29 01.918	E 142 37.632

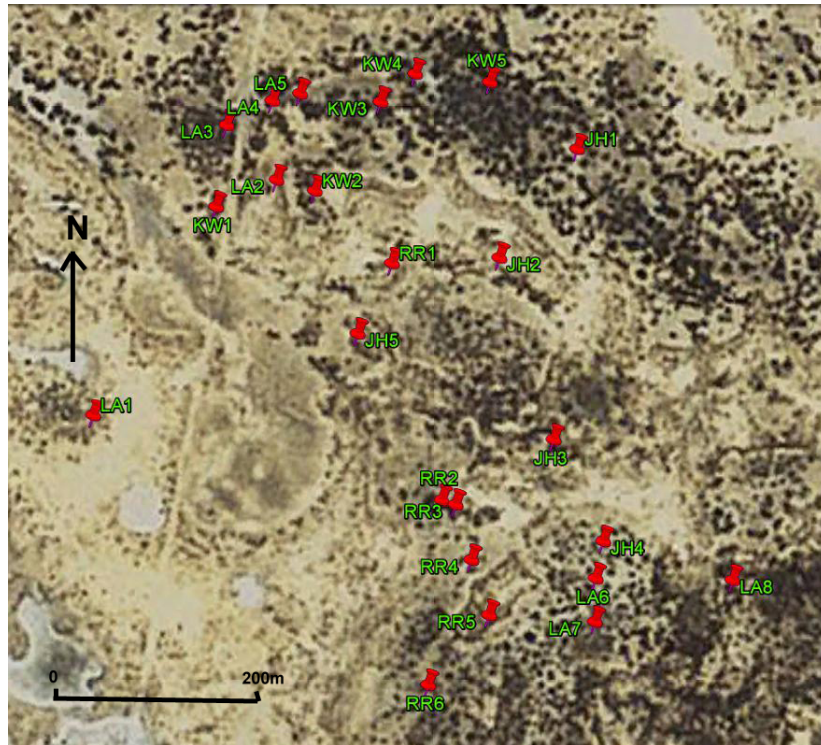
Up to 15 nets totaling 183m were erected on 20–21 May 2014 and distributed across an area of approximately 17.5 ha. Three nets were erected on sandy areas amongst Old Man Saltbush, adjacent to the Lignum dominated flood channel area.

**Table 4: Banding effort at Two Mile Tank Site (20 May – 21 May)**

<b>Two Mile Tank Site</b>		
Net Lengths	20.5.14	21.5.14
18m	3	3
12m	8	8
9m	2	3
6m	1	1
Total	174m	183m
Hours Open	0800-1600	0630-1130
No. Hours	8	5

### ***Barton's Crossing Site***

This site (Fig. 2 and 5) was selected as a monitoring site as a total of 20 Grey Grasswrens had been trapped during previous banding activities in October 2000, April 2001, July 2002, September 2004 and September 2009.



**Figure 5:** *Satellite image showing the positions of the nets erected at the Barton's Crossing Site. The Adelaide Gate Track is on the left hand side of the image. Image courtesy of Google Earth.*

**Table 5: Co-ordinates of netlanes at Barton's Crossing Site**

Barton's Crossing Site					
No	Latitude	Longitude	No	Latitude	Longitude
BC KW001	S 29.087398	E 142.611093	BC LA008	S 29.09097	E 142.616741
BC KW002	S 29.087247	E 142.61218	BC RR001	S 29.087937	E 142.613025
BC KW003	S 29.086381	E 142.612893	BC RR002	S 29.090206	E 142.613574
BC KW004	S 29.08611	E 142.613271	BC RR003	S 29.090248	E 142.613728
BC KW005	S 29.086192	E 142.614101	BC RR004	S 29.090778	E 142.613897
BC LA001	S 29.089402	E 142.609765	BC RR005	S 29.091297	E 142.614095
BC LA002	S 29.087133	E 142.611756	BC RR006	S 29.091958	E 142.613433
BC LA003	S 29.086617	E 142.611209	BC JH001	S 29.086842	E 142.615057
BC LA004	S 29.086371	E 142.611704	BC JH002	S 29.087887	E 142.614204
BC LA005	S 29.086308	E 142.612017	BC JH003	S 29.08963	E 142.614796
BC LA006	S 29.090951	E 142.615259	BC JH004	S 29.090601	E 142.615337
BC LA007	S 29.091369	E 142.615247			

Up to 23 nets were erected during this survey totaling 282m. These nets were opened for a total of 13.5 hrs spread over 2 days (10–11 April 2014). The area covered was approximately 37 ha and mostly sampled the area of Lignum, but some were placed in adjacent sand ridges covered predominantly by Old Man Saltbush.

**Table 6: Banding effort at Barton's Crossing Site (10 April – 11 April)**

Barton's Crossing Site				
Net Lengths	10.4.14		11.4.14	
18m	1	3	3	3
12m	12	14	16	16
9m	3	3	4	4
6m				
Total	189m	249m	282m	282m
Hours Open	0730-1030	1030-1630	1630-1730	0630-1000
No. Hours	3	6	1	3.5

## Area Searches

During each banding session *ad hoc* observations (when checking the nets) of all avian fauna heard or seen in or flying over the area, defined by the net positions, were recorded.

## Avian Survey Transects

Survey transects were established at 4 additional sites (Fig. 6):

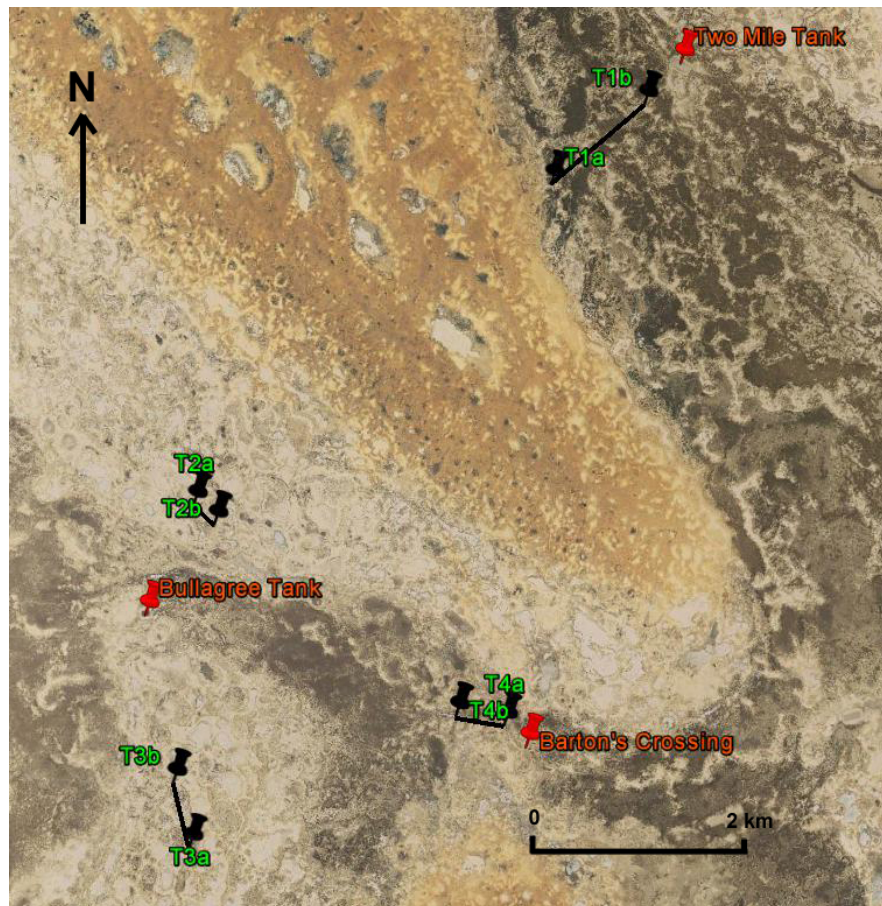


Figure 6: Satellite image showing locations of the four avian survey transects. Image courtesy of Google Earth.

- **Transect 1** (21.5.14) along property management track from near cattle loading yard to Two Mile Tank on the eastern side of the main track. This transect crosses much of the south flowing main flood channel from Adelaide Gate. Scattered old growth Lignum ~2m high lines both sides of the track.



- **Transect 2** (22.5.14) within flood channel containing young Lignum ~ 2m high north of Bullagree Tank (photograph above). Because of the presence of Grey Grasswrens this location was considered as a potential 4th banding area, but lack of time precluded establishment.



- **Transect 3** (22.5.14) along management track across the westerly flowing flood channel south of Bullagree Tank (photograph above). Scattered old growth lignum 1.5m to 2m tall.



- **Transect 4** (23.5.14) along the westerly flowing main channel from Barton's Crossing toward Bullagree Tank (photograph above). Old growth lignum with substantial green shoots 2.5 to 3.5m tall.

Co-ordinates were recorded at the beginning and end of each transect. The length of transects varied from site to site and was determined by the extent of the Lignum. The observer walked at a slow, steady pace, stopping every ~50m to play Grey Grasswren calls and then listened for any responses. All species seen/heard within 50m on either side of the transect line were recorded. The duration of each survey was recorded.

### Spot Surveys

In major flood events when the Bulloo Lake in Queensland overflows, waters first flow into Caryapundy Swamp, followed by the flooding of the channels to the immediate east. The deepest channel crossing the border is near Adelaide Gate and when this overflows, the channels farther to the east fill and water then crosses the state border into *Delalah Downs*.

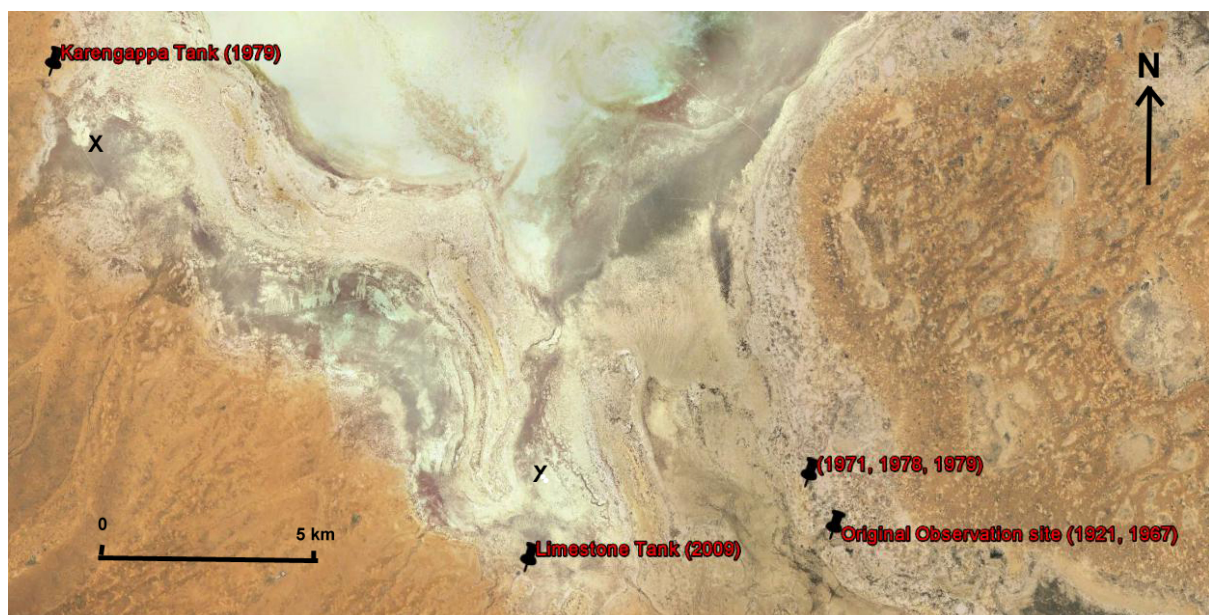
It is suspected that the observations of 1988 and 1991 within *Delalah Downs* were of temporary populations that would have been established when major floods from the Bulloo River in Queensland flowed into channels leading to *Delalah Downs* and the habitat had regenerated to the extent that it could support grasswrens. Whether these outlier groups retreat back to major flood channels or die out is unknown.

These sites were visited in 2009 and at that time there was no suitable habitat that would support grasswrens (Hardy 2010). As there has been no major flood event since 2009 this area was not visited – the chance of this habitat regenerating during the intervening time was extremely remote.

Areas where previous sightings of Grey Grasswrens were recorded within *Narriearra* were visited (Fig. 7):

- South-east of Karengappa Tank (1979)
  - North of Limestone Tank (2009)
  - Original observation site (1921, 1967)
  - Slightly west of original observation site (1971, 1978, 1979)
- (See photographs above)

In addition to these, areas to the east of the Main Track within the Bulloo Overflow (from Barton's Tank to the eastern boundary of *Narriearra*) and to the west around the eastern edge (in the vicinity of Bullagree Tank) and southern edge of the Caryapundy Swamp (from Limestone Tank to Karengappa Tank) were examined. Stops were made at all likely habitats containing substantial Lignum growth. Observations consisted of ~10–15 min duration with recordings of Grey Grasswren calls being played.



**Figure 7:** Satellite image showing locations visited where previous observations of Grey Grasswrens were recorded. “X” marks the location of the sightings SE of Karengappa Tank and “Y” the sighting N of Limestone Tank. Image courtesy of Google Earth.

## Vegetation Surveys

Three areas were chosen where Grey Grasswrens had been observed and where banding sites were established, i.e. Adelaide Gate, Two Mile Tank and Barton's Crossing. Each transect was 180m long with co-ordinates recorded at the start and at 60m intervals along the tape. A distinctive marker was recorded at the start of each one:

*Adelaide Gate Site* – start (28° 59.974'S; 142° 36.689'E) was 60m from a wooden post on dog/border fence with two stands of wire around the 4th strand up from the ground, on a bearing of 167 degrees.

*Two Mile Tank Site* – start (29° 01.84'S; 142° 37.537'E) was at the western end of a concrete trough, on a heading of 300 degrees.

*Barton's Crossing Site* – start (29.08872°S; 142.613116°E) was at a star post, on a heading of 45 degrees.

Transects were aligned (within a range of headings) to transverse the Lignum habitat. Actual headings were then randomly determined by throwing an elongated piece of wood over the shoulder. The direction the wood pointed, within the predetermined range, was then recorded. The transect then followed this heading.

At 10m intervals a coin was tossed to randomly sample the nearest Lignum bush to the right or left of the transect tape. The following data were then collected:

- Measurement of bush from the tape
- Height of individual bush
- Area of clump
- Extent of flowering
- Extent of budding
- Extent of new shoots
- Suckering

In addition, note was taken of any animal tracks and/or droppings along the transect tape.

A scale was used to classify the size of Lignum clumps and the amount of flowering/budding/shoots.

#### **Clumps**

6 = >5mx5m

5 = Between 5mx5m and 4mx4m

4 = Between 4mx4m and 3mx3m

3 = Between 3mx3m and 2mx2m

2 = Between 2mx2m and 1mx1m

1 = <1mx1m

#### **Flowering/Budding/Shoots**

5 = Plant covered in flowers/buds/shoots

4 = covering between 90% and 75%

3 = covering between 75% and 50%

2 = covering between 50% and 25%

1 = covering between 25% and 0%

0 = none observed

Four photographs of the general area, at 90 degrees to each other starting with a view along the transect tape and then in a clockwise direction, were taken at the start, 60m, 120m and the end of the transect.

## RESULTS

### Banding and Area Search

#### *Adelaide Gate Site*

Seven different species were banded with an extra five species sighted/heard (see below).

#### *Additional notes:*

- Grey Grasswrens were heard at three sites within the banding area – two within the Lignum and one within the area of Old Man Saltbush.

		No. Banded			Sighted
		7.4.14	8.4.14	9.4.14	
Spotted Nightjar	<i>Eurostopodus argus</i>				X
Black Kite	<i>Milvus migrans</i>				X
Wedge-tailed Eagle	<i>Aquila audax</i>				X
White-winged Fairy-wren	<i>Malurus leucopterus</i>		2	1	X
Variegated Fairy-wren	<i>Malurus lamberti</i>	1	5	1	X
Grey Grasswren	<i>Amytornis barbatus</i>				X
Redthroat	<i>Pyrrholaemus brunneus</i>		4	2	X
Singing Honeyeater	<i>Lichenostomus virescens</i>	2	1		X
Chirruping Wedgebill	<i>Psophodes cristatus</i>				X
Grey Fantail	<i>Rhipidura albiscapa</i>	1			X
Little Crow	<i>Corvus bennetti</i>				X
Red-capped Robin	<i>Petroica goodenovii</i>			1	X
Zebra Finch	<i>Taeniopygia guttata</i>			1	X

## ***Two Mile Tank Site***

Six different species were banded with an extra eighteen species sighted/heard (see below).

### *Additional notes:*

- Grey Grasswrens were heard at two different locations within the banding area.
- Large flocks of Zebra Finches were observed feeding on seed on the ground.
- Flocks of corvids were seen flying across the area on most days.
- A Wedge-tailed Eagle's nest was situated on the perimeter of the banding area within a low dead tree.
- Two Mile Tank was dry but had held some water recently as the bottom was still damp

		<b>No. Banded</b>		<b>Sighted</b>
		20.5.14	21.5.14	
Grey Teal	<i>Anas gracilis</i>			X
Crested Pigeon	<i>Ocyphaps lophotes</i>			X
Wedge-tailed Eagle	<i>Aquila audax</i>			X
Australian Kestrel	<i>Falco centroides</i>			X
Brown Falcon	<i>Falco berrigora</i>			X
Masked Lapwing	<i>Vanellus miles</i>			X
Galah	<i>Eolophus roseicapillus</i>			X
Little Corella	<i>Cacatua sanguinea</i>			X
Blue-winged Parrot	<i>Neophema chrysostoma</i>			X
White-winged Fairy-wren	<i>Malurus leucopterus</i>			X
Variegated Fairy-wren	<i>Malurus lamberti</i>	2	1	X
Grey Grasswren	<i>Amytornis barbatus</i>			X
Redthroat	<i>Pyrrholaemus brunneus</i>	5		X
Singing Honeyeater	<i>Lichenostomus virescens</i>	1		X
Orange Chat	<i>Epthianura aurifrons</i>			X
Chirruping Wedgebill	<i>Psophodes cristatus</i>			X
Grey Fantail	<i>Rhipidura albiscapa</i>		1	X
Willie Wagtail	<i>Rhipidura leucophrys</i>	1	2	X
Black-faced Woodswallow	<i>Artamus cinereus</i>			X
Australian Raven	<i>Corvus coronoides</i>			X
Little Raven	<i>Corvus mellori</i>			X
Little Crow	<i>Corvus bennetti</i>			X
Welcome Swallow	<i>Hirundo neoxena</i>			X
Zebra Finch	<i>Taeniopygia guttata</i>		1	X

## ***Barton's Crossing Site***

Five species were banded with an additional eleven species being sighted/heard (see below).

### *Additional notes:*

- One Grey Grasswren was trapped and banded (Fig. 8) while others (~4) were heard at two separate locations within the banding area. All were within the Lignum clumps (Fig. 8).



**Figure 8: Photographs of banded Grey Grasswren and the net and habitat in which it was trapped.**

		<b>No. Banded</b>		<b>Sighted</b>
		10.4.14	11.4.14	
White-throated Needletail	<i>Hirundapus caudacutus</i>			X
Great Cormorant	<i>Phalacrocorax carbo</i>			X
Masked Lapwing	<i>Vanellus miles</i>			X
Australian Pratincole	<i>Stiltia isabella</i>			X
Blue-winged Parrot	<i>Neophema chrysostoma</i>			X
White-winged Fairy-wren	<i>Malurus leucopterus</i>	3		X
Variegated Fairy-wren	<i>Malurus lamberti</i>	6	1	X
Grey Grasswren	<i>Amytornis barbatus</i>	1		X
Redthroat	<i>Pyrrholaemus brunneus</i>	3		X
Orange Chat	<i>Epthianura aurifrons</i>		1	X
Chirruping Wedgebill	<i>Psophodes cristatus</i>			X
Willie Wagtail	<i>Rhipidura leucophrys</i>			X
Australian Raven	<i>Corvus coronoides</i>			X
Little Crow	<i>Corvus bennetti</i>			X
Welcome Swallow	<i>Hirundo neoxena</i>			X
Zebra Finch	<i>Taeniopygia guttata</i>			X

## Avian Survey Transects

### *Transect 1 – Two Mile Tank*

21.5.14	<b>Start</b>	<b>Finish</b>
<b>Co-ordinates</b>	29° 02.463' S	29° 02.045' S
	142° 36.856' E	142° 37.400' E
<b>Time</b>	0910ES	1030ES
<b>Birds Recorded</b>		
Chirruping Wedgebill		
Singing Honeyeater (x2)		
Little Crow (x2)		
Australian Kestrel		
Black-faced Woodswallow		
Variegated Fairy-wren		

### *Transect 2 – north of Bullagree Tank*

22.5.14	<b>Start</b>	<b>Finish</b>
<b>Co-ordinates</b>	29° 04.093' S	29° 04.194' S
	142° 34.794' E	142° 34.912' E
<b>Time</b>	0925ES	0945ES
<b>Birds Recorded</b>		
Variegated Fairy-wren		
Zebra Finch (x2)		
Blue-winged Parrot		
White-winged Fairy-wren		
Grey Grasswren (~4 – two parties)		

### *Transect 3 – south of Bullagree Tank*

22.5.14	<b>Start</b>	<b>Finish</b>
<b>Co-ordinates</b>	29° 05.806' S	29° 05.486' S
	142° 34.783' E	142° 34.688' E
<b>Time</b>	1035ES	1105ES
<b>Birds Recorded</b>		
Chirruping Wedgebill		

***Transect 4 – west of Barton’s Crossing***

23.5.14	<b>Start</b>	<b>Finish</b>
<b>Co-ordinates</b>	29° 05.201' S	29° 05.152' S
	142° 36.579' E	142° 36.305' E
<b>Time</b>	1415ES	1450ES
<b>Birds Recorded</b>		
Chirruping Wedgebill		
Variegated Fairy-wren (x4)		
Zebra Finch		
Willy Wagtail		
Grey Grasswren (~4 – two parties)		

## Vegetation Surveys

### Adelaide Gate Site

#### Additional notes:

- No fresh droppings were observed (except for some kangaroo)
- No sightings of cattle or rabbits in vicinity
- Several pig wallows were discovered in the banding area
- Kangaroos were sighted on all days but away from the banding area

<b>Start:</b>		S 28° 59.974'	74m a.s.l.	Acc. 6m								
		E 142° 36.689'										
			<b>Height (m)</b>	<b>Clump</b>	<b>Flowering</b>	<b>Buds</b>	<b>Shoots</b>	<b>Sucker</b>				
	<b>From Tape</b>								<b>Scats, tracks etc</b>		<b>Co-ordinates</b>	
10m	Left	20m	2.7	6	0	5	2		Rab., Roo, Ding. droppings			
20m	Right	30m	2.2	4	5	0	5		Rab., Roo, Cattle droppings			
30m	On line		1.8	6	1	0	1		Roo droppings			
40m	On line		1.1	6	0	0	0		Rab. , Roo droppings			
50m	On line		1.5	6	0	0	0					
60m	On line		2.2	6	1	0	1	Y			S 29.000084°	E 142.611605°
70m	On line		3	6	3	0	2	Y	Rab., Roo droppings			
80m	Left	3m	1.4	6	4	0	3	Y	Roo droppings			
90m	Right	19m	1.7	6	0	1	3					
100m	Left	4m	1.4	3	3	0	4	Y	Rab. droppings			
110m	Right	47m	2.3	2	4	0	4	Y	Rab droppings, cattle tracks			
120m	Left	3m	2.5	5	2	0	4	Y	Cattle tracks		S 29.000605°	E 142.611754°
130m	Right	15m	3.5	6	3	3	1	Y	Rab., Cattle (+tracks), Roo droppings.			
140m	Left	2.5m	2.3	4	1	1	4	Y	Roo droppings			
150m	Right	4m	3.4	6	0	2	2					
160m	Right	10m	1.2	1	1	0	1					
170m	On line		2.5	6	1	0	4		Roo and Cattle tracks			
180m	Left	10m	3	6	1	0	3		Cattle droppings		S 29.001133°	E 142.611934°
<b>Average</b>			<b>2.2</b>	<b>5.1</b>	<b>1.7</b>	<b>0.7</b>	<b>2.4</b>					

## Two Mile Tank Site

### Additional notes:

- Flowering had finished – a few dried flower buds remained, no seed pods were observed.
- Cattle tracks were observed throughout the Lignum clumps with many well-defined pathways meandering across the area.
- Mobs of cattle were present in the area on our arrival but disappeared over the following days.
- Two Mile Tank was fenced off to cattle.

<b>Start:</b>		S 29° 01.84'	78m a.s.l.	Acc. 4m						
		E 142° 37.537'								
	From Tape		Height (m)	Clump	Flowering	Buds	Shoots	Sucker	Scats, tracks etc	Co-ordinates
10m	R	1m	1.2	1	0	1	1		Cattle and Roo droppings	
20m	R	1m	1	1	0	0	1		Cattle and Roo droppings	
30m	L	0.6m	1.1	1	0	0	1		Cattle and Roo droppings	
40m	L	2m	0.9	1	0	0	0		Cattle tracks	
50m	On line		2	6	0	0	1			
<b>60m</b>	L	4m	0.9	1	0	0	1		Cattle tracks	S29° 01.822' E142° 37.506'
70m	On line		2	6	0	0	0		Roo droppings	
80m	On line		2.5	6	0	1	0		Roo droppings	
90m	L	1m	2	2	0	0	1			
100m	L	5m	2.5	6	0	0	0		Cattle tracks	
110m	R	5m	1.9	3	0	1	1		Cattle and pig tracks	
<b>120m</b>	L	10m	2.1	6	0	1	1		Cattle tracks	S29° 01.801' E142° 37.477'
130m	L	3m	2	6	0	0	1		Cattle tracks	
140m	On line		2.2	6	0	0	1		Cattle tracks	
150m	L	7m	1.9	6	0	0	1		Cattle tracks	
160m	L	5m	2.5	6	0	4	1		Cattle tracks	
170m	On line		2	4	0	1	1		Cattle tracks	
<b>180m</b>	On line		2.5	5	0	0	0			S29° 01.781' E142° 37.450'
<b>Average</b>			<b>1.8</b>	<b>4.1</b>	<b>0</b>	<b>0.5</b>	<b>0.7</b>			

## ***Barton's Crossing Site***

### *Additional notes:*

- Cattle tracks meandered throughout the banding area
- Only one set of pig tracks was observed

<b>Start:</b>		S 29.08872°	74m a.s.l.	Acc. 6m							
		E 142.613116°	<b>Height (m)</b>	<b>Clump</b>	<b>Flowering</b>	<b>Buds</b>	<b>Shoots</b>	<b>Sucker</b>			
	<b>From Tape</b>								<b>Scats, tracks etc</b>	<b>Co-ordinates</b>	
10m	Right	5m	1.9	3	4	0	4		Cattle tracks		
20m	Left	1m	1.6	2	2	0	4	Y	Cattle tracks		
30m	Right	6m	1.8	4	4	0	4	Y	Cattle tracks		
40m	On line		1.9	4	4	0	3	Y	Cattle tracks		
50m	Left	6m	2.3	3	1	2	2		Cattle tracks		
60m	Right	7m	1.8	2	3	1	3		Roo droppings	S 29.088393°	E 142.61357°
70m	Left	6m	1.6	2	1	0	3				
80m	Left	5m	1	1	1	1	2				
90m	Right	5m	1.4	2	4	0	2				
100m	On line		2.5	6	4	0	4				
110m	Right	12m	1.8	5	4	0	1				
120m	Right	3m	1.6	3	4	0	3	Y		S 29.088043°	E 142.614037°
130m	Left	4m	1.5	6	1	0	4		Cattle tracks		
140m	Left	4m	2.5	6	2	2	2		Cattle tracks		
150m	On line		1.5	3	0	2	1		Cattle, pig and roo tracks		
160m	Left	4m	1.5	2	1	1	1		Cattle droppings and tracks		
170m	Left	13m	2.5	5	0	1	1		Cattle droppings and tracks		
180m	Right	15m	0.3	1	0	0	0		Cattle and Horse tracks	S 29.087708°	E 142.614495°
<b>Average</b>			<b>1.7</b>	<b>3.3</b>	<b>2.2</b>	<b>0.6</b>	<b>2.4</b>				

## **RECOMMENDATIONS**

1. Continuation of the protocols established to monitor the distribution of Grey Grasswrens, the health of the remaining environment and the effect of grazing.
2. It is strongly recommended that future monitoring activities be carried out in late Winter/early Spring because Grey Grasswrens are most active and vocal during and immediately after their late Winter breeding season. The difficulties in confirming financial support for a project to be conducted early in a new financial year are appreciated, however, we feel that successful monitoring should be restricted to this time of year.
3. The establishment of a fourth banding area north of Bullagree Tank where Grey Grasswrens were heard calling in 2014.
4. Visitation to more remote areas around the western boundary of Carypundy Swamp and east of Barton's Tank. Some of these areas are not adequately serviced by existing management tracks, so prior consultation with the property owner may be necessary if these areas are to be accessed.
5. Ensure that the Wild Dog Destruction Board that patrols and maintains the dingo fence along the NSW/Queensland border and property owners are informed of all impending visits and grant permission for access to the dingo fence track and property management tracks.

## **RREFERENCES**

All references cited in the text can be found listed in the 'Previous Studies' section.

## **ACKNOWLEDGEMENTS**

This project could not have been completed without the financial support from the Saving Our Species Program and a grant to J. Hardy from the ABSA Fund for Avian Research; the consent of Bill O'Connor, the owner of *Narriearra*; the dingo fence patrol officer who gave consent for access along the fence to the Adelaide Gate site; and most importantly the field assistance provided by Ken Gover, Darryl McKay, Rebecca and Rudi Jacobs, Liina and Anthony Pittaway, Heather Parsons, Karen Russell, Marie Callins and Ros Farrell.