

BIRD ASSESSMENT SURVEYS IN THE COORONG, LOWER LAKES AND MURRAY MOUTH REGION

Prepared for
Department of Environment, Water and Natural Resources as a part of the
Coorong, Lower Lakes and Murray Mouth Project

Prepared By
BirdLife Australia

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Introduction

Background

The Department of Environment, Water and Natural Resources (DEWNR) Coorong, Lower Lakes and Murray Mouth (CLLMM) Recovery Project is delivering a five year restoration project in the CLLMM region. This project forms part of the Vegetation Monitoring and Research Project Plan, part of the Coorong, Lower Lakes and Murray Mouth (CLLMM) Vegetation Program. The Coorong, Lower Lakes Program began in 2009 as part of the Commonwealth's Bioremediation and Revegetation Project. Works were undertaken as an emergency response to the prolonged drought. Before water returned to the Lower Lakes system in mid-2010, the Bioremediation and Revegetation Project was designed to build community spirit and support for the broader program, and capacity of local community groups to have the skills, experience and equipment necessary to be involved in the ongoing environmental care of the region.

The purpose of this project is to fill spatial gaps in bird knowledge across the CLLMM region. This will help inform and improve the continued delivery of the vegetation program through better design of habitat restoration strategies.

The bird assessment surveys are being undertaken to gather baseline data on species distribution and density across different environmental settings. Bird surveys were conducted at 63 sites, selected to represent the dominant environmental settings in a range of landscapes, including remnant patches, restored patches and modified sites.

The results of these surveys are to be applied to the greater CLLMM recovery project assisting decisions as to whether any particular environmental settings are under threat and require restoration, and determining how restored sites are tracking towards a desirable state.

Scope

This project scope consisted of conducting bird surveys at 63 sites in remnant native, modified and restored vegetation across the CLLMM region.

The scope of the works was as follows:

- Assemble and coordinate a field crew for the bird surveys;
- Undertake field-based bird surveys at the 63 identified sites;
- Enter bird survey data into the supplied Microsoft Access database; and,
- Write a simple, high-quality report summarising the bird survey results.



Study Area

This project forms part of the Vegetation Monitoring and Research Project Plan, located in the Coorong and Lower Lakes region of South Australia, approximately 65 kilometres south-east of Adelaide.

Bird surveys were undertaken at 63 sites located throughout the CLLMM region. Figure 1 shows the area of the CLLMM region and 54 of the sites are located within this border. The remaining nine sites are located just outside this area (Figures 1-3).

Methodology

Literature and Database Review

The following resources and databases were reviewed over the duration of the project:

- BirdLife Australia's Atlas Project Database;
- BirdLife Australia's Shorebirds 2020 Database;
- The Atlas of Living Australia (ALA);
- Department of the Environment (DoE) Protected Matters Search Tool which identifies matters of National Environmental Significance (e.g. listed fauna species, ecological communities and Ramsar wetlands) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DoE 2014);
- Known ecological reports relevant to the CLLMM area.

Field Surveys

Bird surveys were undertaken at 63 sites located throughout the CLLMM region as defined by DEWNR. Bird surveys were all conducted in spring (September – November) in 2013. Due to the distribution of the sites within the CLLMM region being divided by Lake Alexandria and Lake Albert, two separate survey periods were implemented. Most sites on the west of the lakes were surveyed between 15/10/2013 - 19/10/2013, while sites on the east of the lakes were surveyed between 8/11/2013 – 16/11/2013.

Landowners were contacted up to one week prior to each site visit or as specified, following initial induction and introduction by DEWNR. Sites were accessed by either vehicle or on foot, depending on the proximity of the site to the nearest public road or landholder's private access point. All assessments were undertaken on foot with 10x42 binoculars, records being noted onto the supplied datasheets at the time of the survey.

The majority of surveys were undertaken by teams of two. Due to time constraints some surveys were undertaken by single observers (this data is available in the associated database). All October surveys were undertaken by



BirdLife Australia staff. The November surveys were carried out by BirdLife Australia staff and a sub-contracted consultant. All surveys had at least one BirdLife staff member present. All BirdLife Australia staff have a minimum of 10 years birding and bird identification experience including call identification.

Methodology implemented was as per the original project brief, and is outlined below:

Structured surveys:

- The survey areas consisted of pre-determined two hectare sites. GPS waypoints were provided for each site to locate the centre point of the assessment.
- Weather conditions and any other observations relevant to the visit (e.g. flowering species) were recorded at the start of each survey. Record the species observed, including whether it was in or out of the assessment area, method of observation and any notes relating the species (e.g. feeding, flying etc). These data were recorded on the datasheets provided.
- At each visit a 20 minute search for bird species over a 2 hectare area surrounding the waypoint (= 80 metre radius) was undertaken.
- Records included both observed and heard species within the 2ha plot. Reference calls were available through portable devices and used to confirm ambiguous or novel bird calls.
- Each site was visited on three separate occasions. While the original brief was to conduct the three visits on three different mornings, after visiting the sites during both morning and afternoon periods no major difference in bird species diversity, abundance or detectability was apparent. After discussing this with Nigel Willoughby, two morning surveys and one evening survey were conducted at each of the 63 sites.
- Morning surveys were generally commenced within 4 hours of sunrise, unless weather conditions were suitable for further surveys to be undertaken after this time (i.e. mild conditions, birds still actively calling, detectability unchanged from early morning).
- Evening surveys were generally conducted within 4 hours of sunset.
- Species were recorded, not individuals. Species were only recorded on the datasheet once against each visit. Numbers of individuals observed in each visit were also noted.
- Any observations of other vertebrate species that could be identified to Genus level were also recorded (e.g. rabbits, goats, deer, or kangaroos from tracks, scats, skeletons etc.).
- 5 minutes at the end of the 20 minute bird survey were used to look for signs of other vertebrate species. These were recorded on the same datasheet using the same codes.



Opportune records:

- Opportune records were noted to assist in the identification of sub-landscape distribution of species that are characteristic of the area
- When taking opportune records, surveyors spent 30 seconds recording any other species that were detectable in the immediate area.
- Opportune records were recorded straight onto the same datasheet using Waypoint IDs that are pre-assigned to individual observers.
- Whilst species recorded opportunistically have been included in the overall species list, if they were not recorded during the fixed 20min 2 ha surveys, they have not been included in the analysis below.

Table 1 lists the waypoint ID, “community group” and treatment as used for the surveys. It must be noted that sites 77 and 512 differed in the treatment allocated between the GIS shapefile and the Access database provided by DEWNR. The shape file allocation of treatment for both sites was Reveg11, whilst the database had them as Reveg12. The initial shapefile was followed with the treatment allocation. These changes were updated in the access database.

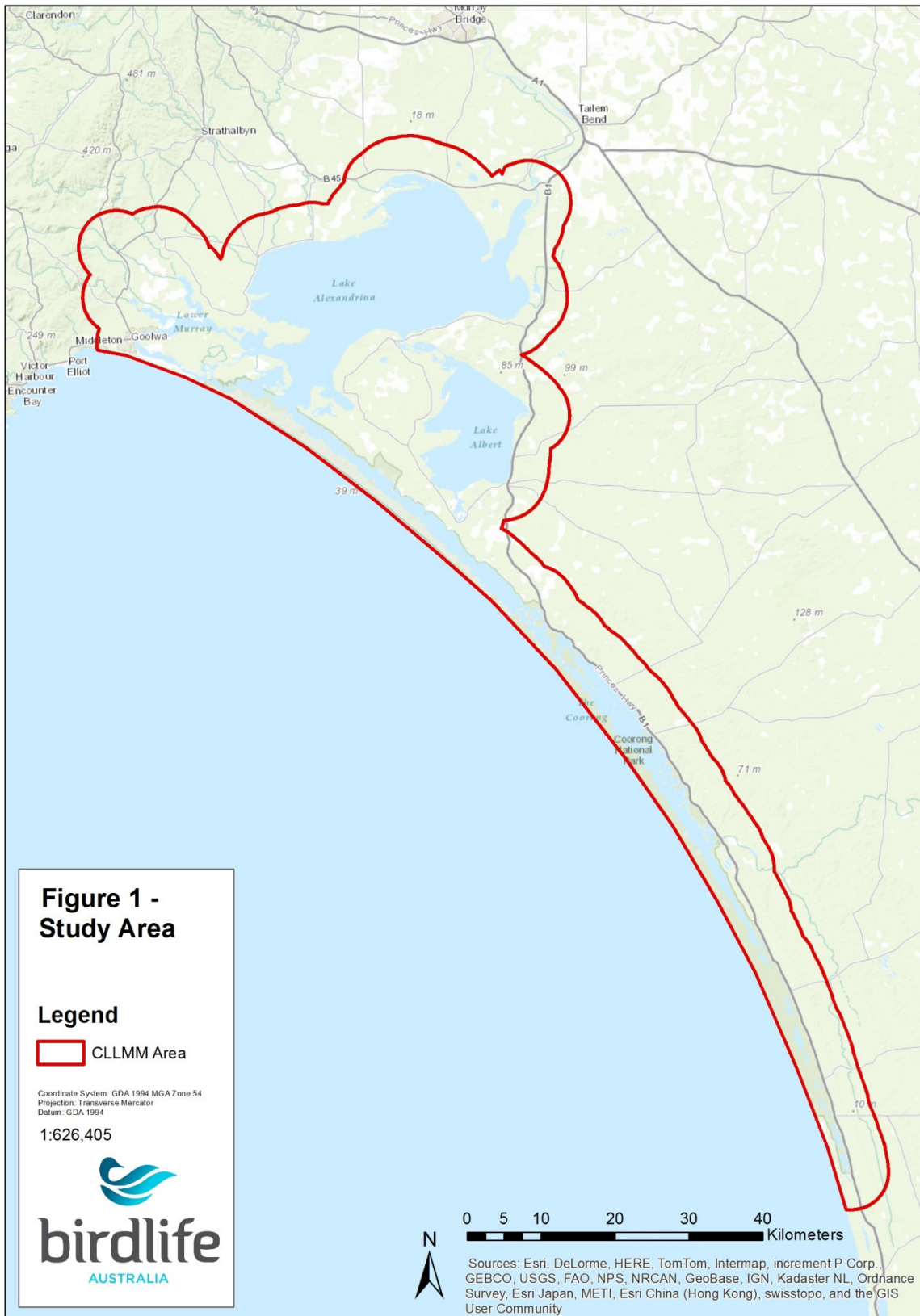
Table 1 Summary of survey site ID vegetation community and treatment.

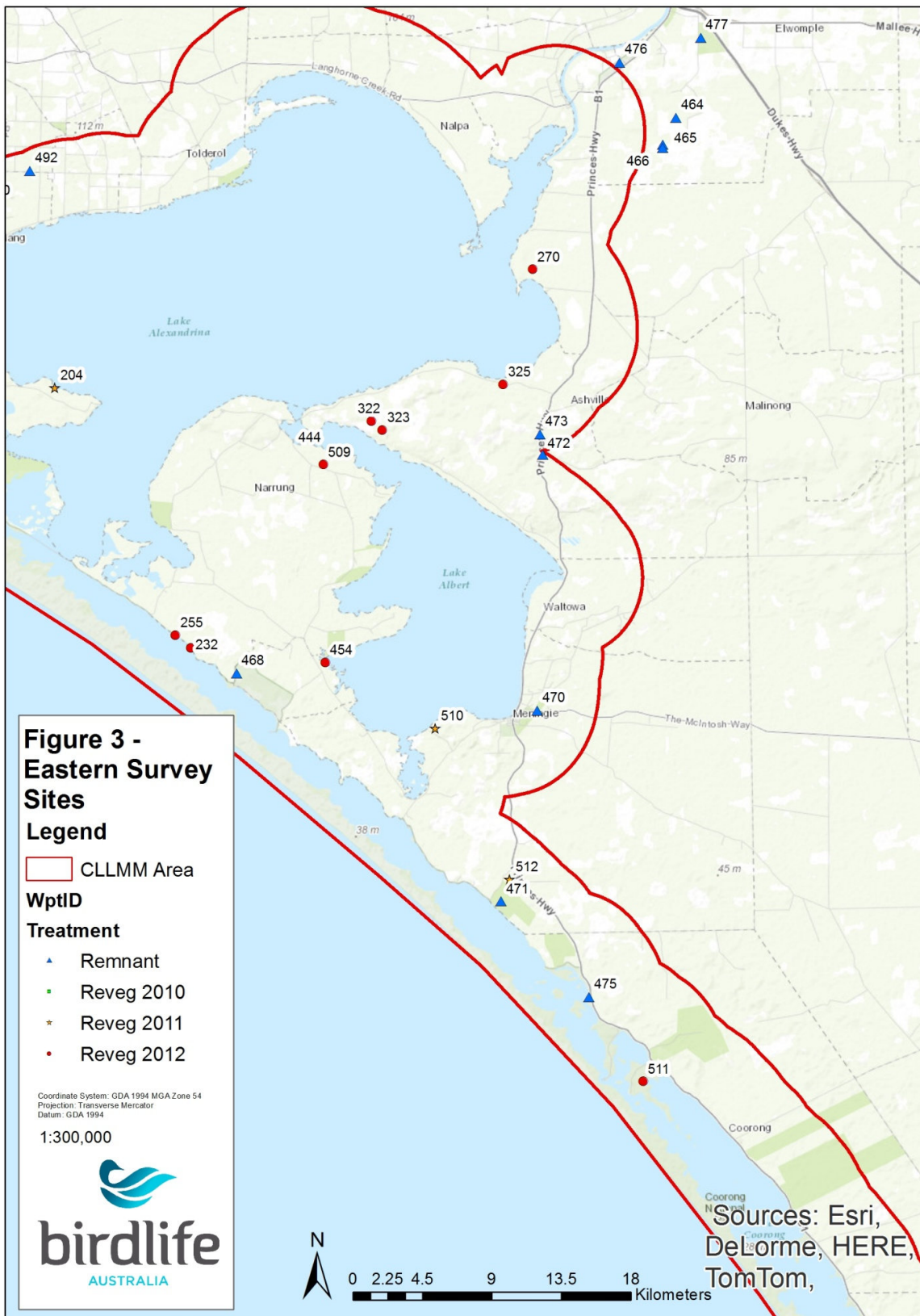
Site ID	Vegetation	Comm Group	Treatment
5	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg11
77	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg11
78	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg11
204	Samphire sp. & <i>Melaleuca halmaturorum</i>	8	Reveg11
208	<i>Melaleuca brevifolia</i> shrubland	9	Reveg11
232	<i>Melaleuca brevifolia</i> shrubland	9	Reveg12
255	Samphire sp. & <i>M. halmaturorum</i>	8	Reveg12
270	Samphire sp. & <i>M. halmaturorum</i>	8	Reveg12
322	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
323	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
325	Samphire sp. & <i>M. halmaturorum</i>	8	Reveg12
328	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
345	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
348	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
351	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
360	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
363	<i>Eucalyptus diversifolia</i> mallee	3	Reveg12
364	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
406	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
408	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
417	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg12
444	<i>A. verticillata</i> low grassy woodland	5	Reveg12
454	<i>A. verticillata</i> low grassy woodland	5	Reveg12
464	<i>E. diversifolia</i> mallee	3	Remnant
465	<i>A. verticillata</i> low grassy woodland	5	Remnant
466	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
468	<i>A. verticillata</i> low grassy woodland	5	Remnant
470	<i>E. diversifolia</i> mallee	3	Remnant



Site ID	Vegetation	Comm Group	Treatment
471	<i>E. diversifolia</i> mallee	3	Remnant
472	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
473	<i>A. verticillata</i> low grassy woodland	5	Remnant
475	Samphire sp. & <i>M. halmaturorum</i>	8	Remnant
476	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
477	Irongrass grassland	7	Remnant
478	Samphire sp. & <i>M. halmaturorum</i>	8	Remnant
479	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Remnant
480	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Remnant
482	<i>E. fasciculosa</i> , <i>E. incrassata</i> , <i>E. leucoxylon</i> , <i>E. odorata</i> woodland	6	Remnant
485	<i>E. fasciculosa</i> , <i>E. incrassata</i> , <i>E. leucoxylon</i> , <i>E. odorata</i> woodland	6	Remnant
488	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Remnant
489	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Remnant
490	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Remnant
491	<i>E. fasciculosa</i> , <i>E. incrassata</i> , <i>E. leucoxylon</i> , <i>E. odorata</i> woodland	6	Remnant
492	<i>E. camaldulensis</i> over lignum swamp	10	Remnant
493	<i>E. fasciculosa</i> , <i>E. incrassata</i> , <i>E. leucoxylon</i> , <i>E. odorata</i> woodland	6	Remnant
494	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
495	<i>A. verticillata</i> low grassy woodland	5	Remnant
497	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
498	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
500	<i>A. verticillata</i> low grassy woodland	5	Remnant
501	<i>A. verticillata</i> low grassy woodland	5	Remnant
503	Samphire sp. & <i>M. halmaturorum</i>	8	Remnant
505	<i>Callitris gracilis</i> , <i>E. fasciculosa</i> & <i>E. leptophylla</i> woodland, incl <i>M. uncinata</i>	2	Remnant
507	Samphire sp. & <i>M. halmaturorum</i>	8	Remnant
509	<i>A. verticillata</i> low grassy woodland	5	Reveg12
510	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg11
511	<i>A. verticillata</i> low grassy woodland	5	Reveg12
512	<i>A. verticillata</i> low grassy woodland	5	Reveg11
513	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg10
514	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg10
515	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg10
516	<i>Allocasuarina verticillata</i> /Eucalyptus woodland	4	Reveg10

The study landscape and the distribution of sites can be seen in Figures 1 - 3.







Data Management

All information collected on datasheets in the field was entered into the Microsoft Access database supplied by DEWNR. Datasheets and database information were returned to DEWNR at the completion of the project.

Survey Limitations

Bird survey data collected during the field surveys and information obtained from relevant sources (e.g. biological databases and relevant literature) were reviewed. This information was considered sufficient to provide an assessment of the avian biodiversity values within the CLLMM area during the survey period.

Although the objective of the assessment was to document avian species diversity within the survey areas, the relatively short duration of the surveys meant that migratory, transitory or uncommon bird species are likely to have been missed. It is possible that more bird species may have been detected had there been additional surveys conducted at each site. Likewise, the diversity and abundance of bird species varies between seasons and across years. Ongoing surveys structured to detect seasonal and temporal variations would rectify these limitations.

Treatment type can play a role on the detectability of some species. For a number of the remnant sites the vegetation was dominated by densely growing shrubs. This made observational detection difficult and as such call identification became more important. The use of portable call playback devices ensured accurate call identification. This method was also used to confirm the presence of some of the more cryptic species in the landscape. For example at a number of sites calls of Southern Emu-wrens were detected. To confirm the identification of this species as present (and to confirm the identification of the call) recorded calls were played back allowing the bird to be observed. Similar techniques were used for ambiguous species (such as Brown and Inland Thornbills) with call response, and better observation of the species allowing for confident identification.

The short term frame of the survey does not allow for any extensive analysis of the data. These results show a snap-shot of the birds found at survey sites during the Spring of 2013. Further survey will be required to draw definitive conclusions on habitat use and/or preferences of individual species.



Results

In total 167 faunal species were recorded across surveys – 155 birds, 6 mammals, 5 reptiles and 1 frog. (See appendix for complete list). Non-birds are incidental records and will not be analysed at any depth.

Four treatments types have been surveyed. These are Remnant sites, Revegetation site with planting under taken in 2010, revegetation undertaken in 2011 and revegetation undertaken in 2012. Table 2 shows the number of sites within each treatment, total number of surveys undertaken within each treatment type and the number of species recorded within each treatment type during set surveys. Survey effort across all treatments is not equal. A total of 42 species were recorded only in remnant sites. Three species were only recorded in Reveg12 sites. These species are identified in Appendix 1A and 1C.

Table 2 Distribution of sites within each treatment and total number of surveys per treatment.

Treatment	Number sites	Number of surveys	Number of species recorded on site
Remnant	31	93	127
Reveg10	4	12	41
Reveg11	7	21	59
Reveg12	20	60	83
Total	62	186	136

The mean number of species recorded per survey was calculated for each of the treatment types (Figure 4) as well as for each site (Figures 5-7). Generally higher numbers of species were recorded per survey in the remnant sites than for the revegetation sites (Figure 8). The numbers of species recorded per site between the revegetation treatments was variable.

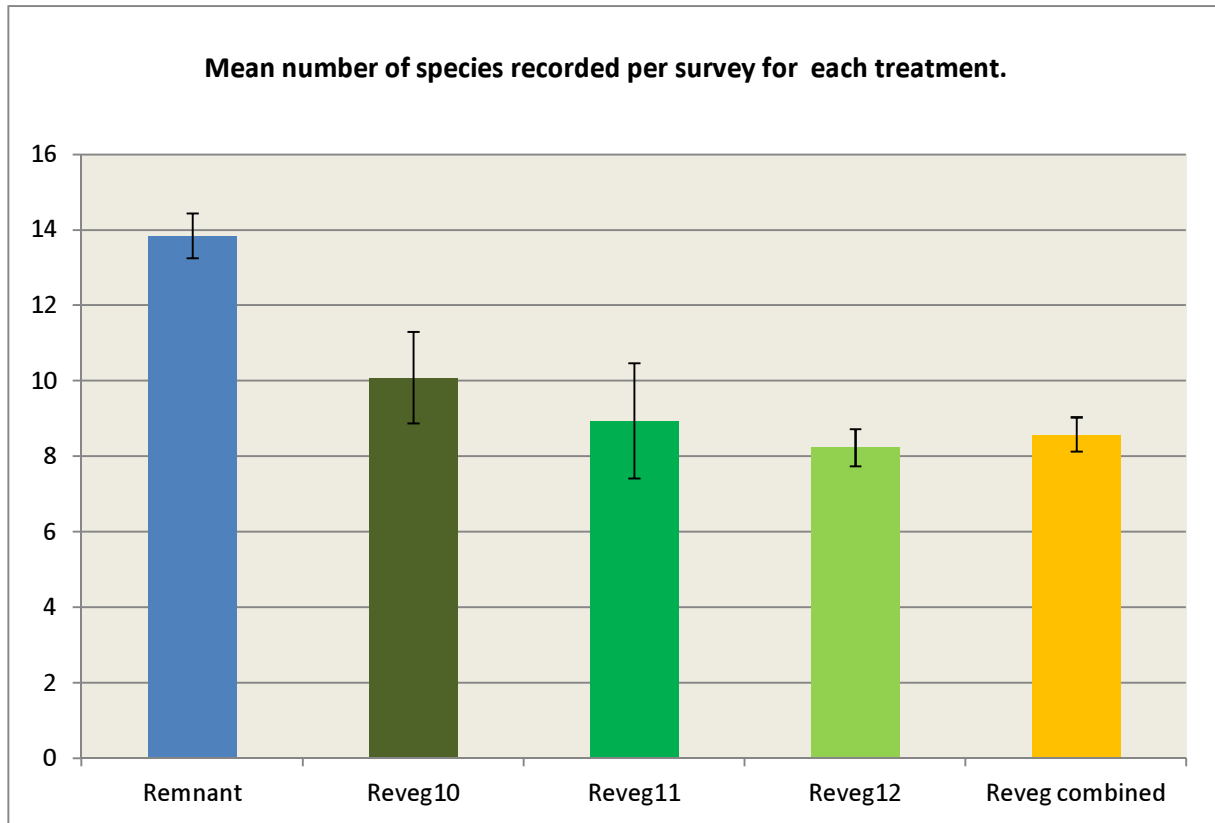


Figure 4. Mean number of species (±s.e) recorded per survey for the different treatment types.

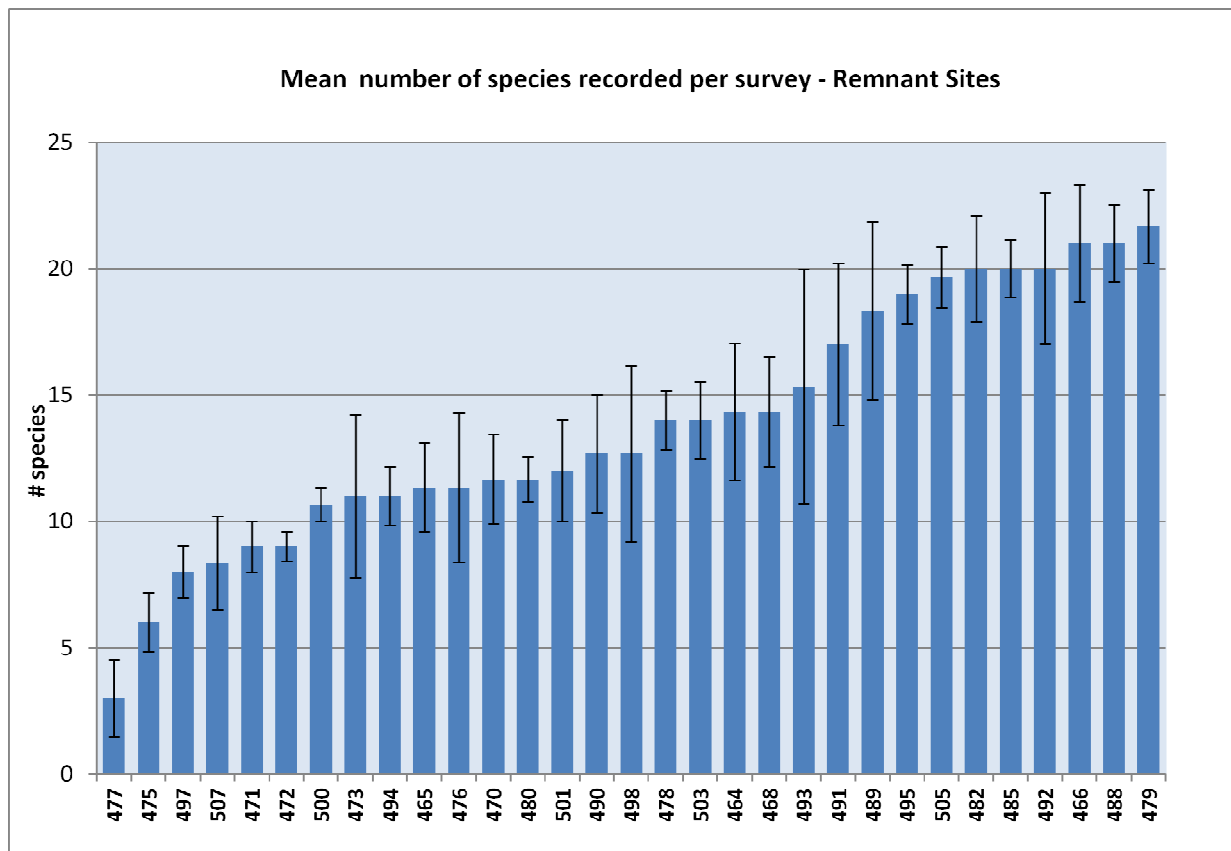


Figure 5. Mean number of species (±s.e) recorded per survey at remnant sites.

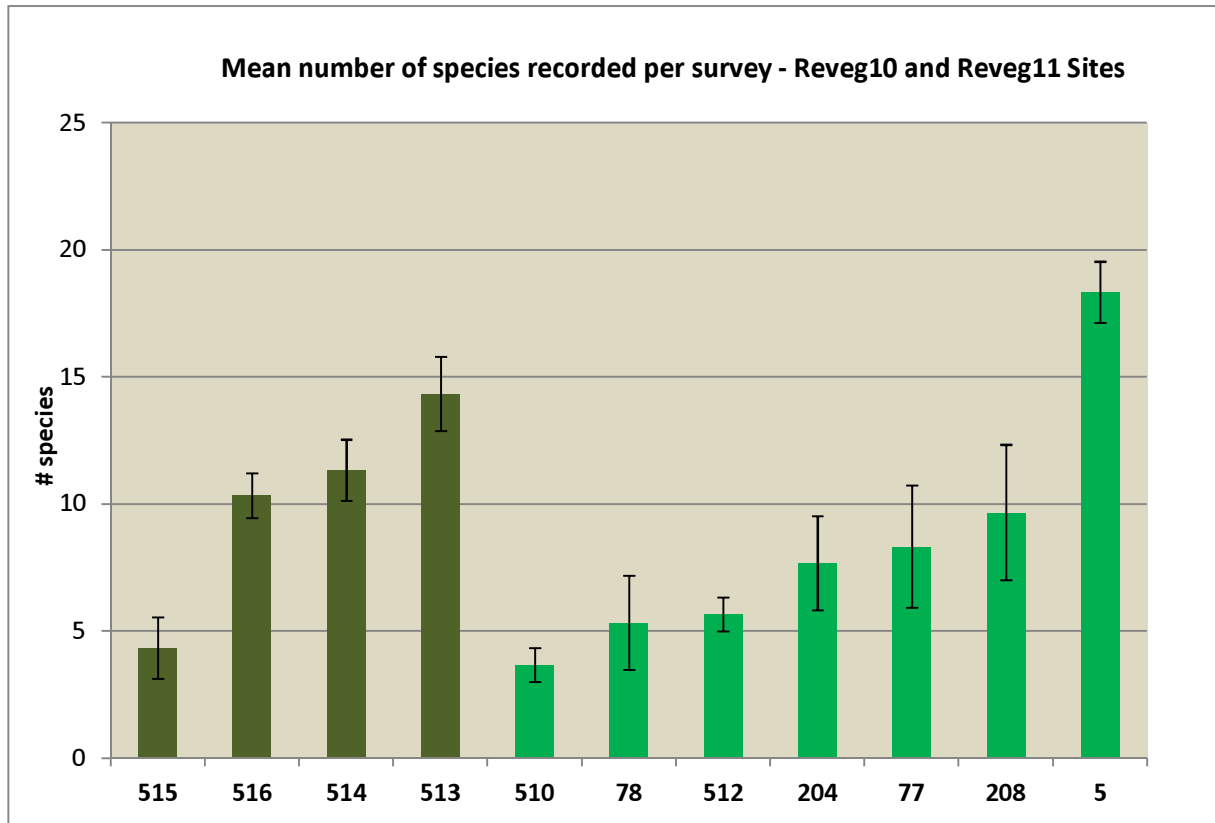


Figure 6. Mean number of species (\pm s.e) recorded per survey at Reveg10 and Reveg11 sites. Reveg10 sites are the light green bars and Reveg11 are the olive green bars .

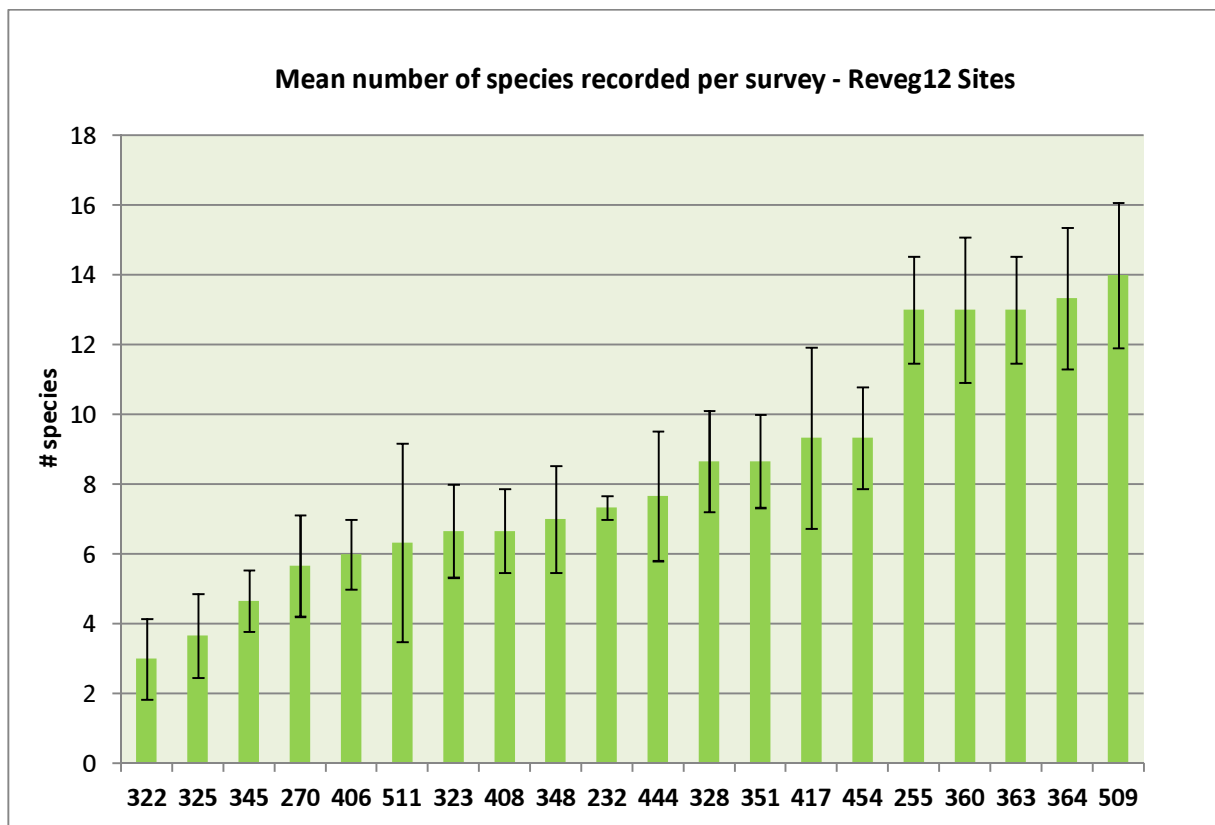


Figure 7. Mean number of species (\pm s.e) recorded per survey at Reveg12 sites.

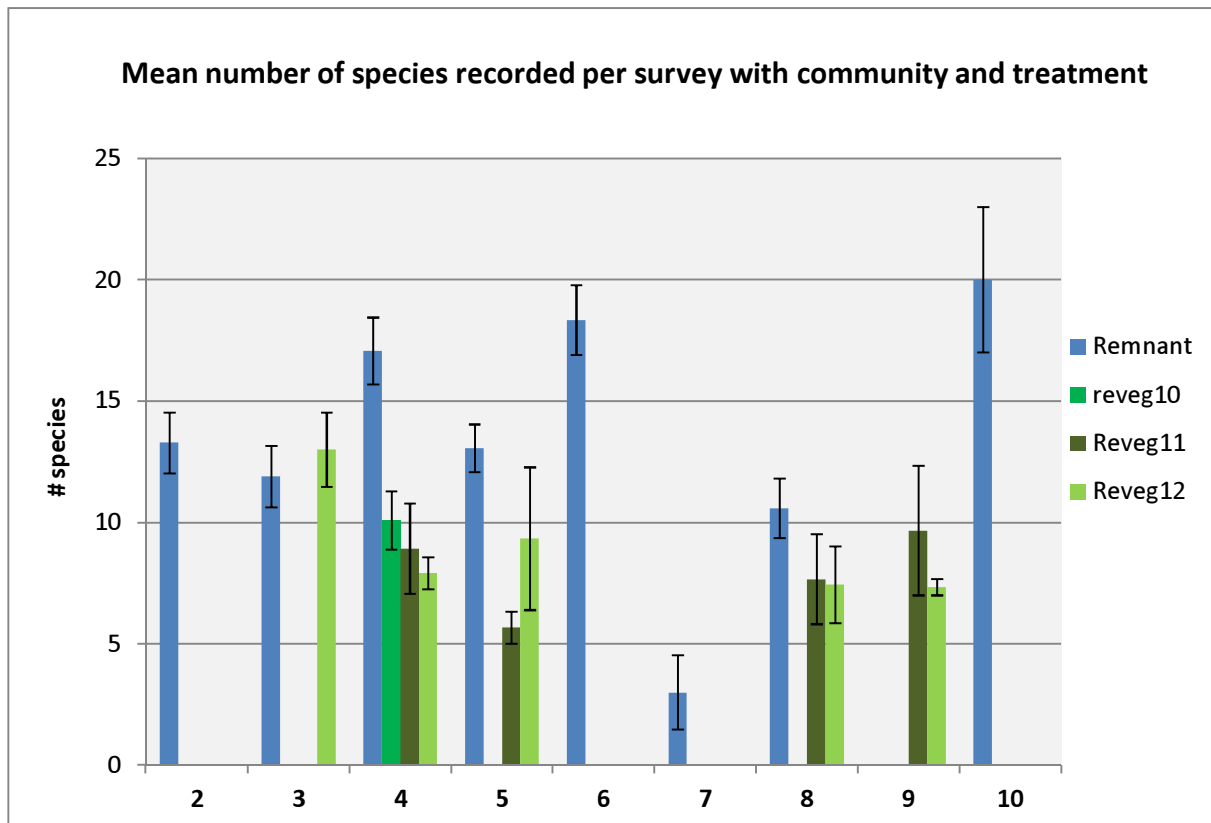


Figure 8. Mean number of species (\pm s.e) recorded across surveys. Numbers across the X axis correspond to the vegetation communities listed in Table 1

Results were pooled for each of the treatment types and species accumulation curves generated. Survey data for days was pooled. This gives a general overview of the efficacy of the survey protocol and effort. Figure 9 shows the combined survey results and indicates that the current survey regime is sufficient across the region. For three of the four treatments – Remnant, Reveg11 and Reveg12 the current survey effort appears to effectively capture the full range of species that are present across these sites. The survey results for the Reveg10 sites fall short of the desired asymptote (flattening) of the species accumulation curve (See Figures 9 - 13). Data has been split into species recorded during the standard 20 min 2ha surveys (On site only) and all species recorded at a site; both formal surveys plus records (All recorded species). The difference between the two lines is generally attributed to the removal of the more aquatic species that occur peripherally to the terrestrial survey sites.

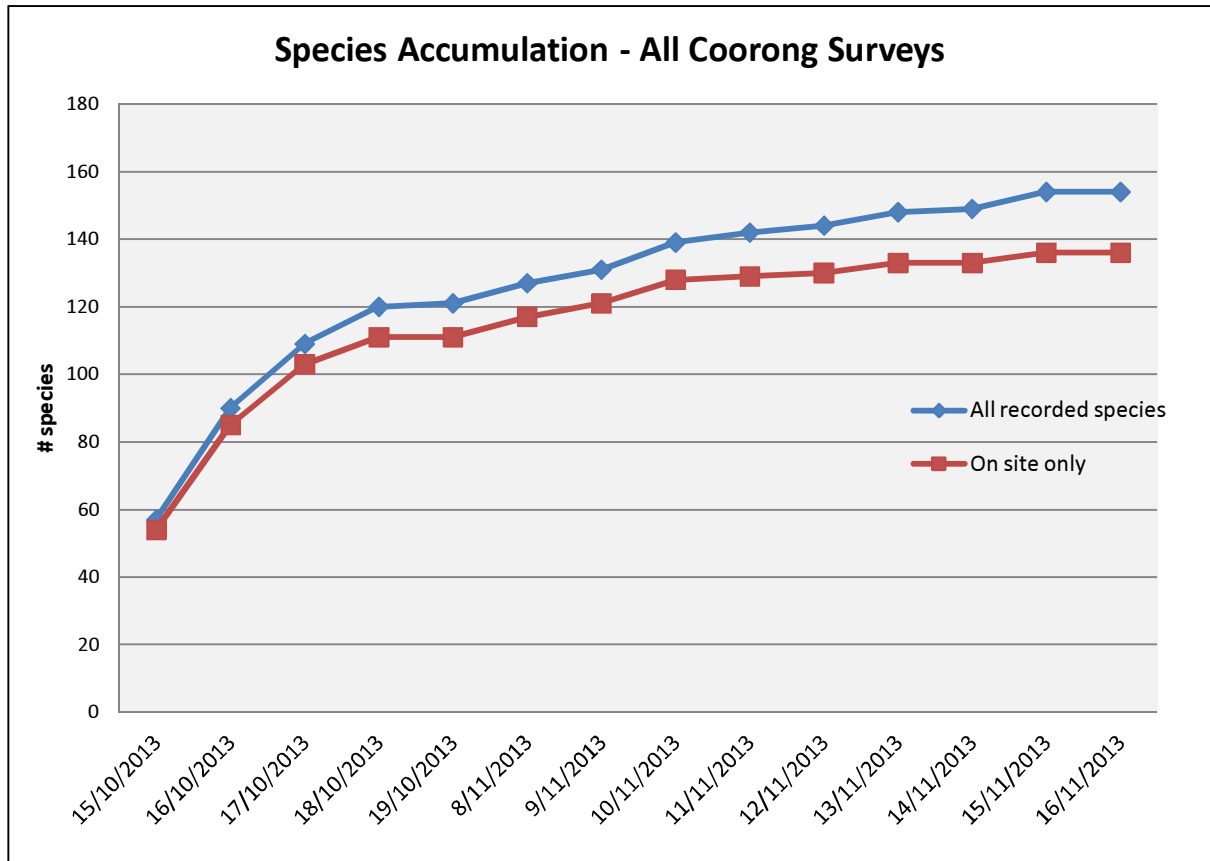


Figure 9. Species accumulation curve of recorded species across the survey area. Counts have been tallied for survey days.

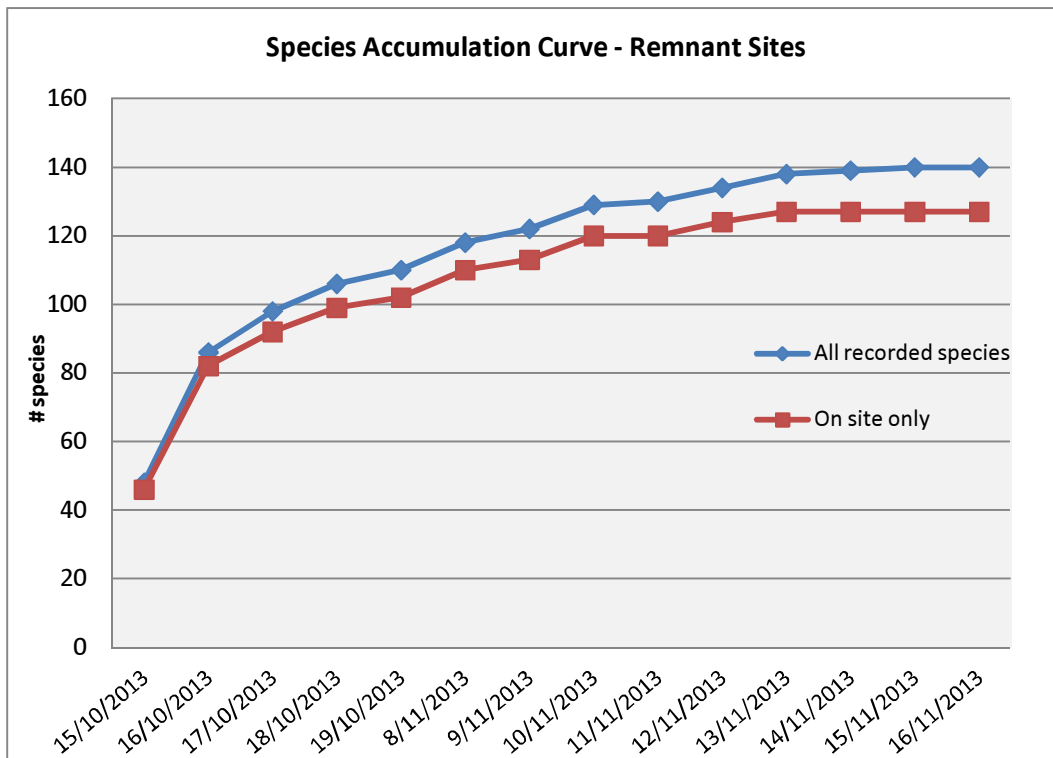


Figure 10. Species accumulation curve for remnant sites. Counts have been tallied for survey days

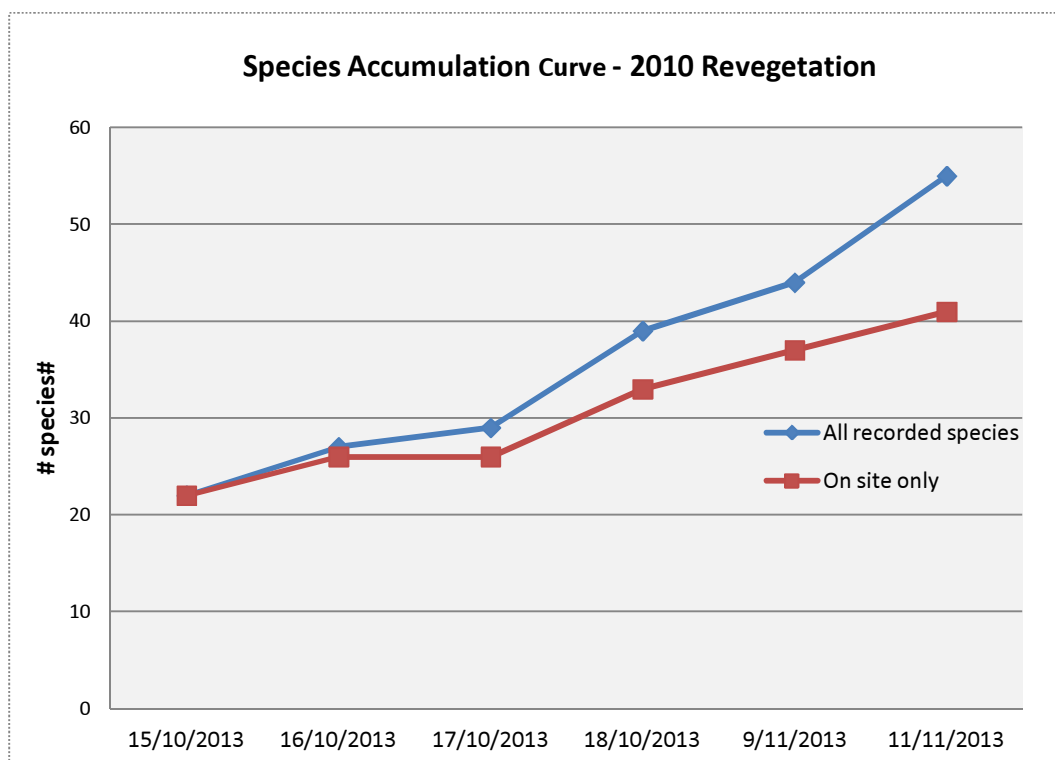


Figure 11. Species accumulation curve for sites where plantings were undertaken in 2010. Counts have been tallied for survey days

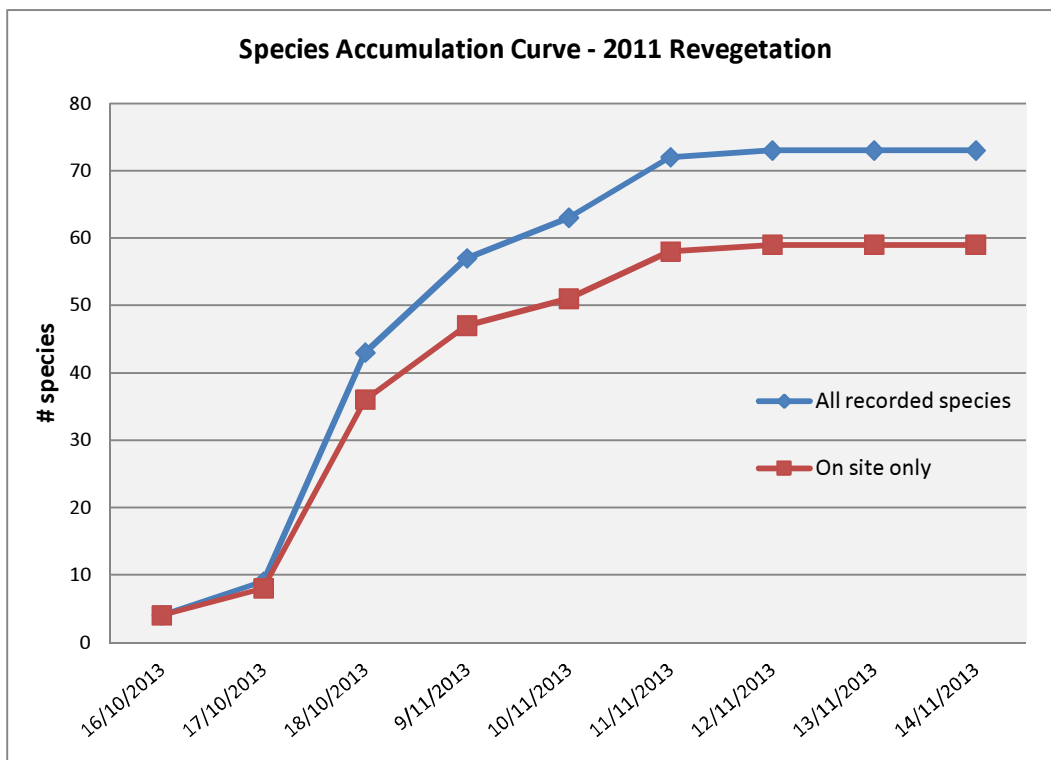


Figure 12. Species accumulation curve sites where plantings were undertaken in 2011. Counts have been tallied for survey days

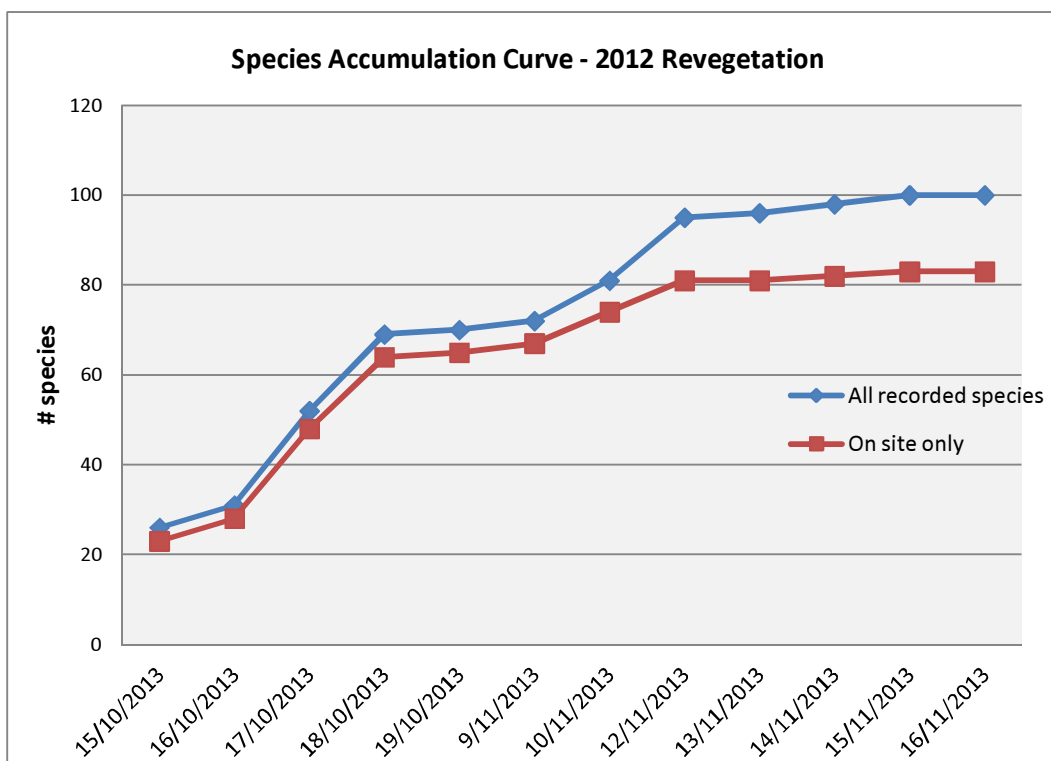


Figure 13. Species accumulation curve for sites where plantings occurred in 2012. Counts have been tallied for survey days



Reporting Rates of Common Species

Common species are those that are abundant and widespread. Table 3 presents the reporting rate for the 20 most common species across the survey and the 20 most common species for each of the treatment types. The most common species for each treatment type are displayed in bold and colour coded – red being most common in remnants, green being most common in Reveg10 treatments, blue being most common in reveg11 treatments, brown being most common in Reveg12 treatments and black being the overall reporting rate. Some of these overlap across treatments, whilst others are more limited in their distribution – for example Weebills (*Smicrornis brevirostris*) was one of the most frequently recorded species within remnant sites (reporting rate of 0.28), but was only recorded within one other treatment (Reveg11) at a very low rate (0.048). The species that are common in the remnant sites but not across other treatments may provide good indicator species for the progression of revegetation sites. Also provided are species that were recorded across all treatment types (4). The six species shaded in grey would be the most “common” species encountered during the surveys.

Reporting rates for all species within treatments and across the survey region are available in Appendix 2.

Threatened Birds

Across the surveys, 15 bird species were recorded that are listed under the South Australia *National Parks and Wildlife Act 1972* as endangered, vulnerable or rare. No federally listed species (*Environment Protection and Biodiversity Conservation Act 1999*) were recorded, though three migratory species included in JAMBA, CAMBA or ROCAMBA listings were recorded.

Table 3 lists these species and provides the reporting rate for each of the treatments and the overall survey reporting rate. Two species were recorded incidentally during surveys and subsequently have no reporting rates calculated.



Table 3. Reporting rates of “common” bird species.

	Remnant	Reveg10	Reveg11	Reveg12	Overall	Treatment types
'Adelaide Rosella'	0.237	0.167	0.143	0.050	0.161	4
Australasian Pipit		0.250	0.048	0.150	0.070	3
Australian Magpie	0.301	0.500	0.143	0.433	0.339	4
Australian Reed-Warbler	0.022	0.250	0.048	0.033	0.043	4
Australian White Ibis	0.032	0.417	0.238	0.117	0.108	4
Black-faced Cuckoo-shrike	0.054	0.083	0.143	0.033	0.059	4
Brown Songlark	0.032	0.167	0.048	0.250	0.113	4
Common Blackbird	0.312	0.250	0.095	0.067	0.204	4
Common Bronzewing	0.269		0.048	0.017	0.145	3
Common Starling	0.366	0.417	0.095	0.433	0.360	4
Crested Pigeon	0.183	0.167	0.238	0.300	0.226	4
Eurasian Skylark	0.054		0.095	0.450	0.183	3
European Goldfinch	0.140	0.083	0.048	0.050	0.097	4
Galah	0.419	0.500	0.143	0.333	0.366	4
Golden-headed Cisticola	0.011	0.333	0.190	0.050	0.065	4
Great Cormorant	0.022	0.167	0.048	0.100	0.059	4
Grey Fantail	0.548	0.167	0.095	0.050	0.312	4
Grey Shrike-thrush	0.495		0.095	0.033	0.269	3
House Sparrow	0.065	0.333		0.100	0.086	3
Little Grassbird	0.065	0.167	0.143	0.017	0.065	4
Little Raven	0.344	0.417	0.143	0.300	0.312	4
Little Wattlebird	0.075		0.143	0.050	0.070	3
Magpie-lark	0.108	0.083	0.143	0.100	0.108	4
Musk Lorikeet	0.129	0.083	0.143	0.067	0.108	4
New Holland Honeyeater	0.409	0.417	0.238	0.283	0.349	4
Rainbow Lorikeet	0.075	0.167	0.095	0.133	0.102	4
Red Wattlebird	0.376		0.095	0.083	0.226	3
Rufous Whistler	0.237		0.048		0.124	2
Silveryeye	0.495	0.667	0.048	0.183	0.355	4
Singing Honeyeater	0.280	0.250	0.238	0.483	0.339	4
Southern Emu-wren	0.022	0.167	0.143		0.038	3
Spiny-cheeked Honeyeater	0.344			0.217	0.242	2
Straw-necked Ibis	0.065	0.333	0.333	0.050	0.108	4
Striated Pardalote	0.258	0.167	0.048	0.017	0.151	4
Stubble Quail		0.167	0.143	0.367	0.145	3
Superb Fairy-wren	0.796	0.667	0.286	0.267	0.559	4
Weebill	0.280		0.048		0.145	2
Welcome Swallow	0.194	0.583	0.286	0.483	0.323	4
Whiskered Tern			0.048	0.183	0.065	2
White-browed Babbler	0.301		0.048	0.033	0.167	3
White-browed Woodswallow	0.204		0.048	0.150	0.156	3
White-fronted Chat	0.043			0.150	0.070	2
White-plumed Honeyeater	0.161	0.250	0.048	0.167	0.156	4
Willie Wagtail	0.215	0.333	0.286	0.267	0.247	4
Yellow Thornbill	0.312	0.083		0.017	0.167	3
Yellow-rumped Thornbill	0.258	0.250	0.095	0.117	0.194	4



Table 4 Threatened and Conservation priority species recorded during the Coorong surveys.

	Status	Remnant	Reveg10	Reveg11	Reveg12	Overall	# sites	Community
Black-chinned Honeyeater	Vulnerable	0.011				0.005	2	4
Brown Quail	Vulnerable	0.011	0.083		0.083	0.038	8	4, 5, 8
Cape Barren Goose	Rare	0.011			0.033	0.016	5	4,8
Caspian Tern	CAMBA	0.011			0.050	0.022	8	3,4,5,8
Chestnut Quail-thrush	Rare	0.022				0.011	2	2
Crested Shrike-tit	Rare	0.022				0.011	1	10
Crested Tern	JAMBA			0.048	0.050	0.022	5	4,5,8,9
Diamond Firetail	Vulnerable	0.032				0.016	4	2,4,6
Elegant Parrot	Rare	0.204			0.117	0.140	15	2,4,5,6,8,9
Hooded Robin	Rare	0.043				0.022	3	2,4,6
Jacky Winter	Rare	0.011				0.005	2	2,6
Little Lorikeet	Endangered	0.043				0.022	3	2,4,6
Purple-gaped Honeyeater	Rare	0.065				0.032	3	2,3
Red-chested Button-quail	Rare	Incidental						
Shy Heathwren	Rare	0.054				0.027	3	2,5
Southern Emu-wren (South eastern SA subspecies)	Rare	0.022	0.167	0.143		0.038	3	4,8,9
White-winged Black Tern	JAMBA	Incidental						
Yellow-tailed Black-Cockatoo	Vulnerable	0.032		0.048		0.022	5	4,6



Discussion

The Department of Environment, Water and Natural Resources (DEWNR) has undertaken a long-term project to restore the ecological values of the Coorong, Lower Lakes and Murray Mouth (CLLMM). This project works with landholders and managers to revegetate the landscape. As a component of this project BirdLife Australia was contracted to collect baseline data on the bird species within the project region at a selection of pre-determined survey sites located within the CLLMM region.

The Coorong National Park Management plan (DEP 1990) notes that 227 species of birds are known to occur within the region. Of these 85 species are water birds (DEH 2000) and these were generally not surveyed during the current project. The current surveys detected 155 species of birds in the landscape. These are predominately terrestrial species, however a range of waterbird species were also recorded.

The current surveys have been set up to compare three different revegetation age groups and a fourth 'control' treatment that surveyed remnant habitats. Species accumulation curves indicate that the current survey regime is sufficient to detect the suite of terrestrial species expected in the region. It is likely that a few species known in the survey region have not been detected (for example any potential winter migrants to the area), however generally the survey regime appears to be effective. When looking specifically at the survey regime for the different treatments and the species accumulation curves associated with these individually, it is apparent that the current survey effort within the Reveg10 treatment is deficient. This treatment has only four survey sites which does not appear to be sufficient to effectively survey the bird species associated with this treatment. Additional sites should be sourced for this treatment in the future if feasible.

Generally greater numbers of species were recorded per survey in the remnant sites than across the other treatments. This is to be expected as intact sites should support and retain a greater range and abundance of species given the age of the remnant vegetation and structural diversity present in these sites. As seen in Table 4 and Appendix 1A, many of the species considered to be of conservation priority or those that are woodland specific, were recorded in these intact sites only.

It is generally expected that the older the revegetation, the greater the bird species diversity that will be encountered within the site. This has not been found during this survey if we focus on the overall species diversity recorded within the sites. The older plantings (Reveg10 sites) appear to have a much depleted species diversity, though the number of species recorded per individual survey is slightly higher than the other revegetation treatments. This may be a result of the reduced survey effort in this treatment type rather than a true ecological affect. However, the methods of revegetation, species composition and structural diversity of these treatments differ to the more recent plantings (S. Jellinek pers. comm.) which may also contribute to reduced species diversity. As stated above, additional sites within this treatment type should be explored for future surveys and analyses.



There were no species in the list of common species that were unexpected. Species such as Australian Reed-warblers, Little Grassbirds and Golden-headed Cisticola reflect the location of many of the revegetation sites, and their proximity to the lignum and reed beds of Lake Alexandrina and Lake Albert. Similarly, the rare Southern Emu-wren (south eastern SA subspecies) was most frequently encountered in those revegetation sites close to the lake edges. A full list of the reporting rates calculated for birds recorded on site during surveys is provided in Appendix 2.

Eighteen threatened or priority bird species were recorded during the survey. These tended to be contained to remnant vegetation and were not widespread or abundant. The Elegant Parrot however was found to be quite prolific across the landscape and has quite a high reporting rate of 0.14. This species was regularly encountered within both remnant sites and a number of the Reveg12 sites. The Reveg12 sites were generally in proximity to remnant vegetation (for example sites 232 and 255), and were utilised for foraging by many individuals. Though abundances were not required for the purposes of this survey, these were recorded and during the survey period it was not uncommon to have high counts of these parrots recorded. Elegant Parrots were also the most variable in their habitat selection of the threatened species recorded. As seen in Table 4 this species was encountered in six of the 10 vegetation community groups.

The overall outcomes of these initial surveys are to collect baseline data for the CLLMM project implemented by DEWNR. The results of these surveys show a fairly diverse avian assemblage present across the landscape. Threatened species tend to be constrained in their distribution and are found predominately within remnant vegetation. The differences in the species diversity between remnant and restoration sites are also apparent in the mean number of species recorded with surveys (see figures 1-4). Across all but community group three, higher species counts per survey were recorded in remnant sites.

The calculated species accumulation curves indicate that the current survey effort across the region is sufficient to record the majority of the species utilising the terrestrial survey sites. On a treatment by treatment basis consideration should be given to increasing the number of sites included in the Reveg10 treatment (assuming there are additional sites available).



References

DEH (2000) Coorong, and Lakes Alexandrina and Albert Ramsar Management Plan. Department of Environment and Heritage, Government of South Australia.

DEP (1990) Coorong National Park Management Plan. Department of Environment and Planning, SA.



Appendices 1A-D Species list and number of surveys present for treatment types



Appendices 2 Reporting Rates