BIOLOGICAL SURVEY OF

THE SOUTHERN LITTLE SANDY DESERT

Project (N706)

Progress Report

June 1999

Prepared by: **Stephen van Leeuwen**

Date: **June 1999**

Research and the collation of information presented in this report was undertaken with funding provided by Environment Australia. The project was undertaken for the National Reserves System Cooperative Program. This report details research conducted under project N706.

The views and opinions expressed in this report are those of the Chief Investigator and do not reflect those of the Commonwealth Government, the Minister for the Environment, Sport and Territories, or the Director of Environment Australia Biodiversity Group.

Copies of this Report
may be borrowed from the library:

Environment Australia
GPO Box 636
CANBERRA ACT 2601
AUSTRALIA

or

Stephen van Leeuwen
Research Scientist
CALM**Science** Division
CALM Karratha
PO Box 835
KARRATHA WA 6714
AUSTRALIA

PRECIS

BIOLOGICAL SURVEY OF THE SOUTHERN LITTLE SANDY DESERT

Project N706

Fifteen permanent biological sampling quadrats have been established in the southern portion of the Little Sandy Desert. In addition to these biological sampling sites, an extra twenty three permanent flora sampling quadrats have also been established. Cumulatively these quadrats represent the array of biotic assemblages present in the project area. The permanent biological quadrats have been sampled repetitively and systematically on three occasions, June 1996, October 1996 August 1997. A total of 461 person hours have been amassed while systematically and opportunistically sampling the biota in the project area. This survey effort has culminated in a 3 600 pitfall, 6 375 Elliott and 300 cage trap trapping effort.

During the survey, 870 plant specimens representing approximately 500 taxa have been collected or recorded in the project area. Many new populations of Eucalyptus rameliana *have been discovered along with one new population of* Stemodia linophylla. *Several populations of the disjunctly distributed* Calothamnus aridus *have also been recorded in the project area. A* Halosarcia *taxon that has not previously been recorded in the scientific literature has also been collected.*

One hundred and three species of bird have been observed during the survey. Interesting observations include Cygnus atratus *(Black Swans) on Savory Creek and* Hamirosta melanosternon *(Black-breasted Buzzards) overhead at most sandstone ridge sampling sites. Twenty six species of extant, indigenous mammals have been recorded in the study area including* Pseudomys chapmanii *(Pebble-mound mouse),* Dasycersus cristicauda *(Mulgara) and* Sminthopsis longicaudata *(Long-tailed Dunnarts). Eighty four species of reptile and six species of amphibian were also collected. The most noticeable reptile records were for* Lerista ips, L. macropisthopus remota *and an undescribed* Ramphotyphlops sp. nov. *(Blind Snake).*

The development of specimen databases, the identification of vouchers and their incorporation into the appropriate repositories is continuing. The acquisition and development of a GIS atlas has also continued, as highlighted by a joint investigation with the Leeuwin Centre, into NDVI stochasticity throughout the project area. The delineation of a conservation reserve in the project area that encompasses a representative array of communities, especially for species of biological and conservation significance, has been proposed and will continue to be developed.

TITLE OF PROJECT:

Biological Survey of the Southern Little Sandy Desert

AGENCY:

CALM**Science** Division, Western Australian Department of Conservation and Land Management (CALM).

CHIEF INVESTIGATOR:

Dr Stephen van Leeuwen
Research Scientist
CALM Karratha
P.O. Box 835
KARRATHA WA 6714 (091) 431 628

AIM OF PROJECT:

To conduct a comprehensive biological survey of the southern Little Sandy Desert, Keartland Botanical District, to facilitate an evaluation of the nature conservation values of the region and make recommendations for reservation.

SCOPE:

1. Continue to refine an overview and appraisal of the physical environment (geology, geomorphology, soils and climate), including a description of gradients and patterns and extent, of the southern part of the Little Sandy Desert Biogeographic Region.

2. Continue to review the systematic survey design for the flora and fauna (flora/vegetation, animals, birds, reptiles, amphibians and ants) within the Little Sandy Desert Biogeographical Region using existing biophysical information (surveys, maps, reports, remote sensing data) as well as field inspections. Ensure sites selected represent the array of assemblages typical of the southern portion of the Little Sandy Desert.

3. Undertake the third and final systematic survey of landform units, biotic composition, habitat types and vegetation associations of the southern portion of the Little Sandy Desert in July/August 1997. Undertake subsequent minor infill surveys a required.

4. Finalise data compilation, entry and verification into computer databases (for use in GIS mapping and analysis) for information collected during field surveys.

5. Finalise the identification of the conservation values in the area with reference to species and communities of conservation significance, together with the broader nature conservation values of the region.

6. Finalise the analysis of the representativeness of the existing reserve system with reference to species and communities of conservation

significance, together with the broader nature conservation values of the region.

7. Finalise the identification of the threatening processes impinging on the nature conservation values of the region.

8. Finalise the identification of the range of appropriate conservation management options available to the Department of Conservation and Land Management for mapping the conservation values identified within the region. Discuss the costs and benefits of these options to all stakeholders in the area.

9. Finalise the formulation of management guidelines and priorities for any proposed additions to the reserve system.

10. Finalise the identification of the resources required to define the hierarchy of biophysical sub-regions within the study area from existing resource survey information.

11. Prepare the final report detailing the biological and biophysical attributes of the study area. Highlight and evaluate the nature conservation values and representativeness of the project area and make recommendations for further reservation and management.

PROGRESS TOWARDS COMPLETION OF SCOPE ITEMS:

Since submission of the last progress report in January 1997, considerable progress has been made towards completion of many of this project's scope items. The research effort over the past 30 months has been directed towards both field work and the processing of numerous flora and fauna specimens, especially invertebrates. Research has also continued on the development and enhancement of specimen databases and the GIS atlas.

Progress on this project, addressing each of the Scope items, is outlined below.

Scope 1:

No new data on the biological and ecological attributes of the project area have been identified. This is despite ongoing literature and bibliographic searches of State libraries, especially those belonging to Government agencies like the Department of Minerals and Energy, Land Administration, Agriculture Western Australia and the Library Board of Western Australia.

No additional information was located on Ernest Giles other than that already cited in his narrative of his 1876 expedition through the project area which was published in "Australia Twice Traversed: The Romance of Exploration"[1]. Another explorer who visited the area was Frank Hann. Frank Hann visited the area in

[1] Giles, E. (1889). *Australia Twice Traversed: The Romance of Exploration. Vol. II.* Sampson Low, Marston, Searle and Rivington Ltd. London.

early October 1902. Unfortunately, his expedition followed a route along the northern apron of the Carnarvon Range and only touched the extreme south of the project area in the vicinity of Bullen Hill (24° 53' 22" S, 120° 36' 58" E), which at the time he called Rev. Bullen Hill[2].

Informative accounts of the project area prepared by A. W. Canning and R. J. Anketell in 1905-06 during the survey and construction of the No 1 Rabbit Proof Fence have been cited in the book "The Longest Fence"[3]. Efforts to locate Canning's journals that may provide more information on the project area have been futile. Similarly, the surveyor Newman also worked in the project area during the early 1900's, although no record of his journal has been forthcoming.

Knowledge of the geology and geomorphology of the project area has been enhanced through the revision and re-publication of the Bullen 1:250 000 geological survey map[4]. Similarly, the publication "Geology of the Savory Basin"[5] has provided a greater appreciation of the project area's geological setting.

Knowledge of the botanical attributes of the project area was enhanced through an interrogation of the Western Australian Herbarium Specimen Database (WAHERB). This interrogation identified 210 plant taxa that had been previously collected in the Little Sandy Desert, Keartland Botanical District. Many of these species may occur in the project area. Subsequent interrogation of this database for specimens collected by Nancy Burbidge and R.D. Royce who visited the Savory Creek area in 1947 and 1958 have also been undertaken.

Scope 2:

A systematic survey design has been developed for the study that encompasses the array of representative biological assemblages present in the project area. This survey design incorporated 30 permanent benchmark quadrats in which all targeted biota (flora, vegetation, birds, mammals, reptiles, amphibians and selected invertebrate groups) have been sampled in a systematic, repetitive manner. These quadrats were replicated twice within the 15 survey sites and are positioned across the project area (Figure 1).

This survey design and site selection protocol was based on the premise that the flora and fauna of the project area exhibited a strong relationship with the underlying geology, landforms and soils. The use of geology, landforms and soils as the initial delimiters in the development of the survey sampling protocol was also necessitated by the availability of such information in comparison to biological information. Details on the location of each of the sampling sites and their geological, landscape and biological setting are presented in Table 1.

[2] Donaldson, M and Elliot, I. (1988). *Do Not Yield To Despair: Frank Hann's Exploration Diaries in the Arid Interior of Australia, 1985-1908.* Hesperian Press, Perth.

[3] Broomhall, F. H. (1991). *The Longest Fence in the World.* Hesperian Press, Perth.

[4] Williams, I. R. (1995). *Bullen, W.A. 1:250 000 Geological Series Explanatory Notes.* 2nd Edition. Western Australian Geological Survey. Perth.

[5] Williams, I. R. (1992). *Geology of the Savory Basin, Western Australia.* Geological Survey of Western Australia, Bulletin 141.

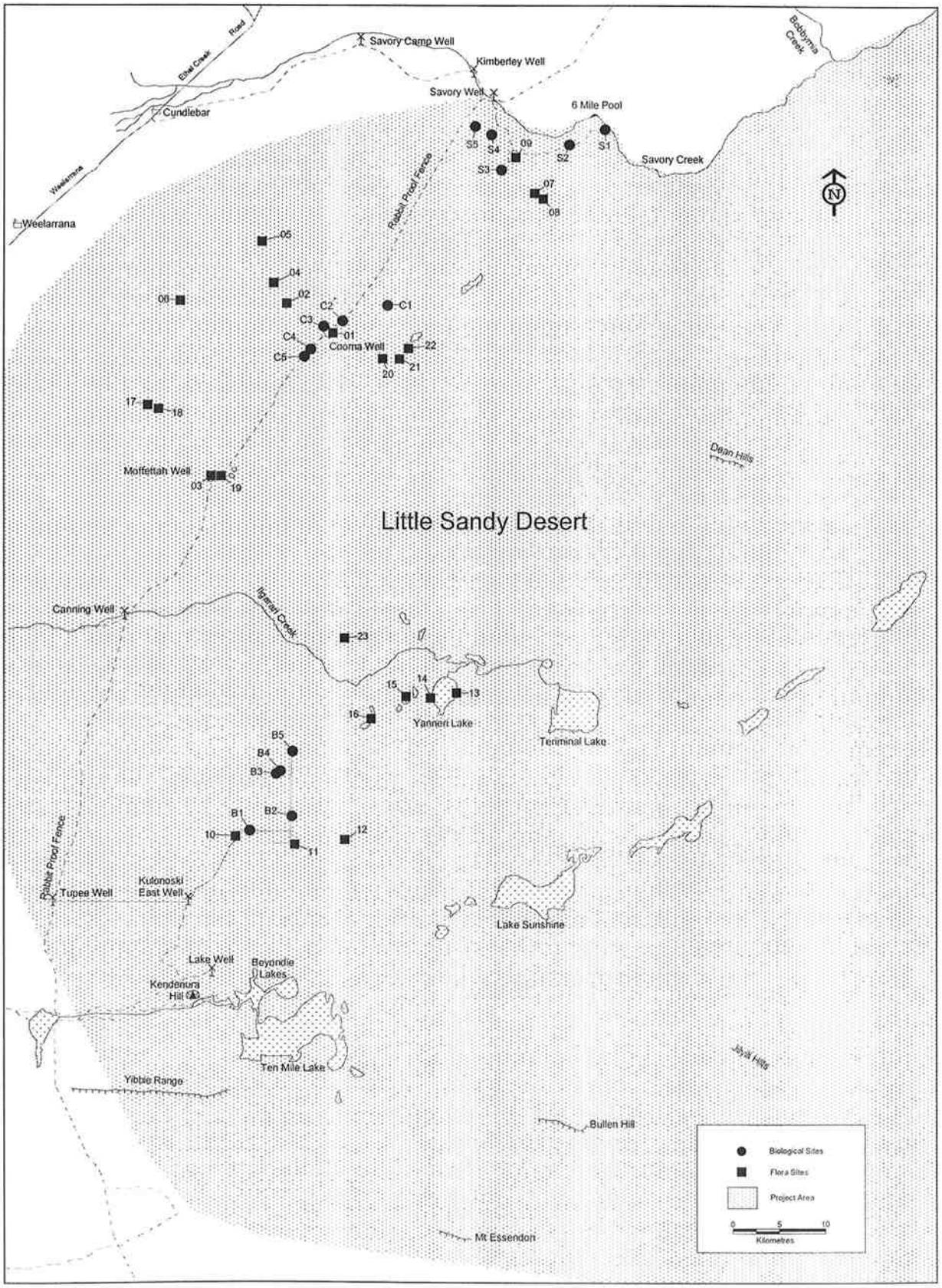

Figure 1 **Location of the Southern Little Sandy Desert project area, the 15 permanent benchmark biological survey quadrats and the 23 permanent flora survey quadrats.**

In addition to these biological quadrats, an additional 23 permanent benchmark flora quadrats have also been established (Figure 1). These quadrats are located throughout the project area and are of an identical design to the biological quadrats. The rationale behind the establishment of these flora quadrats was to sample community types not captured by the biological quadrats. These communities are not dominant within the project area, however, are sufficiently abundant to warrant sampling and documentation as they contribute to the array of biota and assemblages typical of this biogeographical region.

Information gathered from these flora quadrats will not only add to the botanical database for the project area but will also enhance the opportunity to explain heterogeneity in environmental patterns. It is envisaged that the majority of these flora quadrats will be sampled only once, however, where and when the opportunity arises a secondary sampling will occur. It is also envisaged that additional flora quadrats will be established as new sections of the project area are visited during the September 1999 Landscope Expedition.

The edaphic attributes (chemistry, nutrient status and texture) of each sampled flora quadrat have being delimited with the assistance of the Chemistry Centre (WA). This biophysical information will provide an important tool that will assist with explaining patterns of environmental heterogeneity and stochasticity observed across the project area. Results from these analyses are presented in Appendix 1 for all 53 quadrats. Exploratory multivariant examination of this data indicates that quadrats can be grouped into five distinct clusters based on landform considerations (Figure 2).

In an effort to identify areas of high biological activity/productivity, an analysis of Normalised Difference Vegetation Index (NDVI) imagery over the project area was undertaken in 1997 with the assistance of the Department of Land Administration at the Leeuwin Centre. This analysis consisted of calculating the mean and variance in NDVI twice monthly over the project area between 1991 and 1995. The interrogation of the NDVI data over this time frame was designed to minimise the impact of temporal fluctuations promoted by rainfall events and fire and to reduce the impact of 'noise' in the imagery promoted primarily through atmospheric conditions (cloud and smoke).

A total of 105 samples were interrogated to produce the final greyscale NDVI imagery. Figure 3 illustrates the results of the mean NDVI interrogation with dark pixels indicating low greenness index while lighter pixels indicate a higher greenness index. Inherently, drainage lines (eg. Ilgarari Creek) and drainage run-on areas are depicted as an almost white signature while water run-off areas (eg. Bullen Hill) return a dark grey signature. Figure 4 illustrates the results of the NDVI variance interrogation. Dark signatures illustrate areas of low variation in the greenness index while lighter signatures indicate areas that are more heterogeneous. Combined these images demonstrate that between 1991 and 1995 the northern portion of the study area was less variable than the southern portion.

Table 1 Site characteristics of the 15 sample sites established for the Biological Survey of the southern Little Sandy Desert

Site	Geological age	Geological type	Soils type	Landform	Dominant vegetation
Savory					
S1	Quaternary	Alluvium	clay loam	alluvial wash	*Halosarcia*, *Triodia*
S2	Quaternary	Aeolian sand	red sand	sand plain	*Triodia*, *Hakea*, *Grevillea*
S3	Tertiary	Laterite - duricrust & pebbles	laterite	rolling rises high in landscape	*Triodia*, Mulga
S4	Quaternary	Aeolian sand	red sand	sand dune	*Triodia*, *Corymbia. chippendalei*, *Grevillea*
S5	Proterozoic	Coarse grained sandstone	skeletal sand & sandstone	sandstone breakaway	*Acacia rhodophloia*, *Triodia*
Cooma					
C1	Proterozoic	Quartz sandstone	skeletal sand & sandstone	sandstone breakaway & gorge	Mulga, *A. rhodophloia*, *A. pruinocarpa*
C2	Quaternary	Wind blown sand	red sand	sand plain	*Eucalyptus gamophylla*, *Triodia*
C3	Tertiary	Calcrete	red gritty loam & calcrete	flat terrain with calcrete rises	Mulga, *Eremophila forrestii*
C4	Quaternary	Wind blown sand	red sand	sand plain	*Thryptomene*, *Triodia*
C5	Tertiary	Lateritic ferruginous deposits	laterite	rolling rises	Mulga, *A. pruinocarpa*, *Triodia*
Beyondie					
B1	Tertiary	Lateritic ferruginous deposits	clay loam & laterite	flat terrain low in landscape	Mulga
B2	Tertiary	Calcrete	red gritty loam and calcrete	flat terrain with calcrete rises	Mulga, *Grevillea*
B3	Quaternary	Wind blown sand	red sand	sand dune	*Triodia*, *C. chippendalei*
B4	Quaternary	Wind blown sand	red sand	sand plain	*Xanthorrhoea*, *Triodia*
B5	Proterozoic	Quartz sandstone	skeletal sand & sandstone	sandstone plateau & breakaway	*Grevillea spinosa*, *Triodia*, *E. oldfieldii*

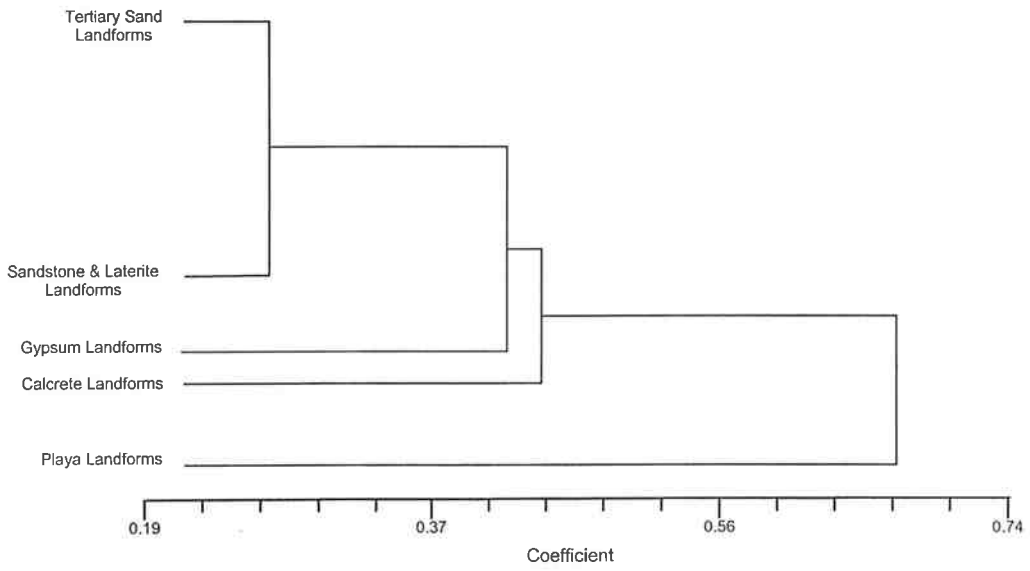

Figure 2 **Dendrogram of Little Sandy Desert quadrats classified according to similarities in their soil chemical attributes.** (The clustering procedure employed the Bray-Curtis similarity coefficient of and the UPGMA fusion method (β = -0.1).)

Further analyses and interrogation of these NDVI data sets using all available information between 1991 and 1999 is planned. Comparisons between the NDVI variance imagery, vegetation mapping and vegetation types identified through multivariant analyse of quadrats floristic data should be useful and will be pursued to justify biogeographical patterns observed across the project area.

Scope 3:

Since the January 1997 progress report, one systematic and two opportunistic sampling trips to the southern portion of the Little Sandy Desert were conducted. Four research staff from CALM, two personnel from Kings Park Botanic Gardens and three CALM volunteers were involved in fieldwork in the project area during this period (Table 2). Cumulatively, the number of personnel who have now participated in the field component of this project stands at 16. Cumulatively, a total of 461 person days have been spent in the field undertaking survey work since the commencement of this project. During this time, the biota in all permanent quadrats has been systematically sampled on three occasions. Considerable opportunistic sampling has also undertaken within the project area, especially for flora, through vehicle and foot traverses. Data collected from these opportunistic collecting trips will be used to augment the flora specimen database. A summary of ground traverses undertaken within the project area is provided in Figure 5.

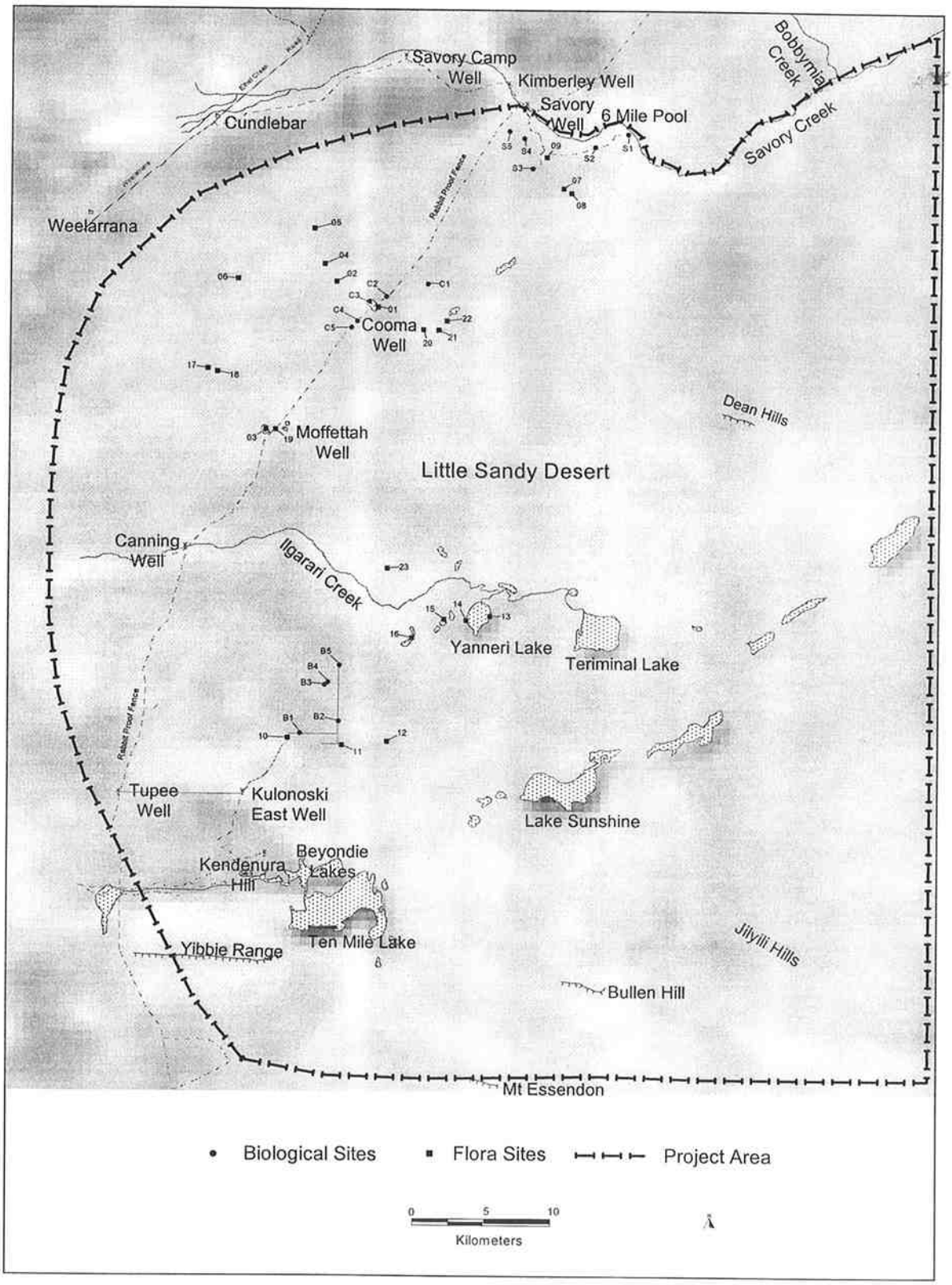

Figure 3 **Mean NDVI imagery of the Southern Little Sandy Desert project area between 1991 and 1995.** (Dark signatures indicate low greenness, light signatures indicate high greenness.)

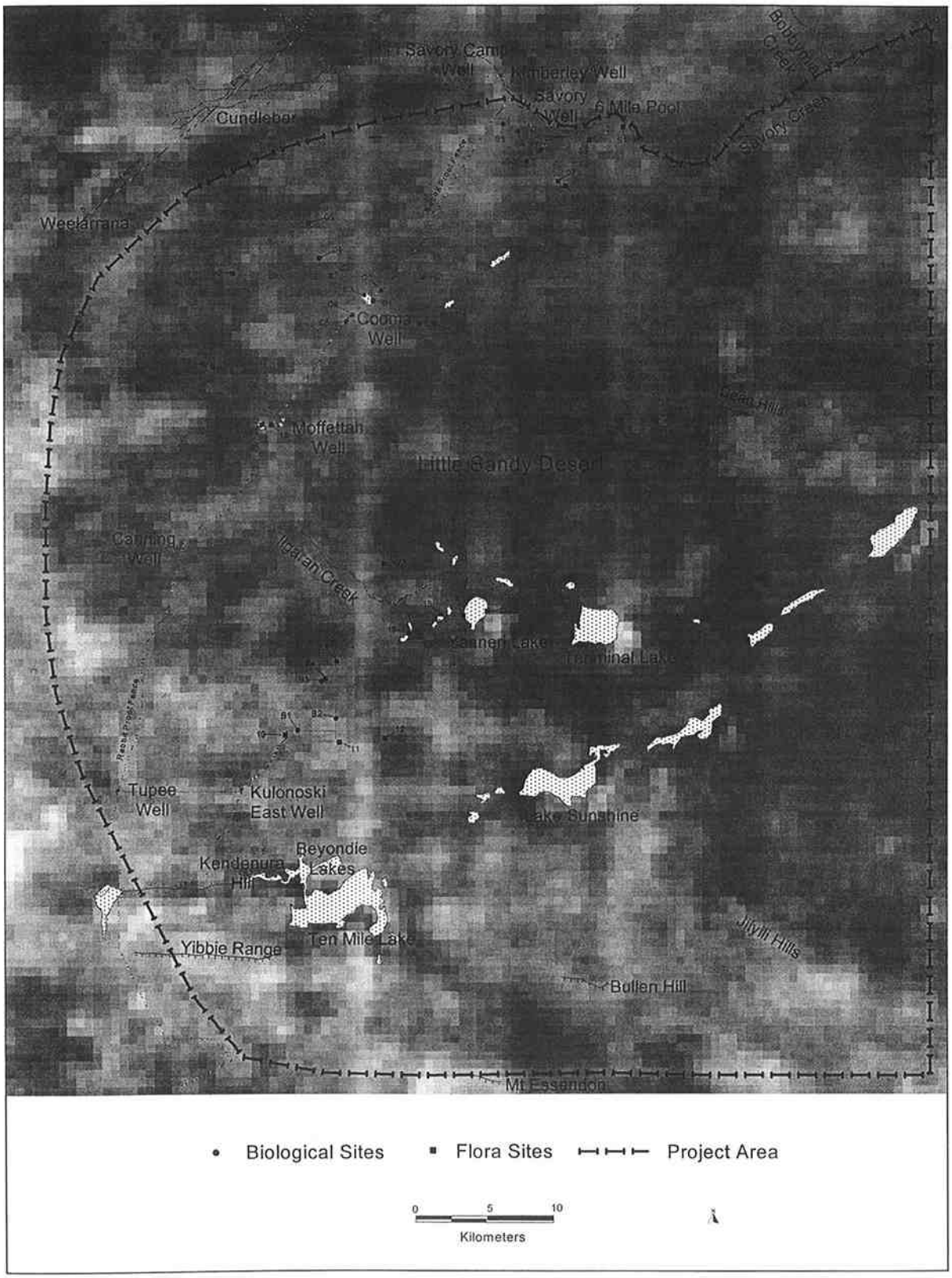

Figure 4 **Variance in NDVI imagery of the Southern Little Sandy Desert project area between 1991 and 1995.** (Dark signatures indicate low variation in the greenness index, light signatures indicate high variation in the greenness index.)

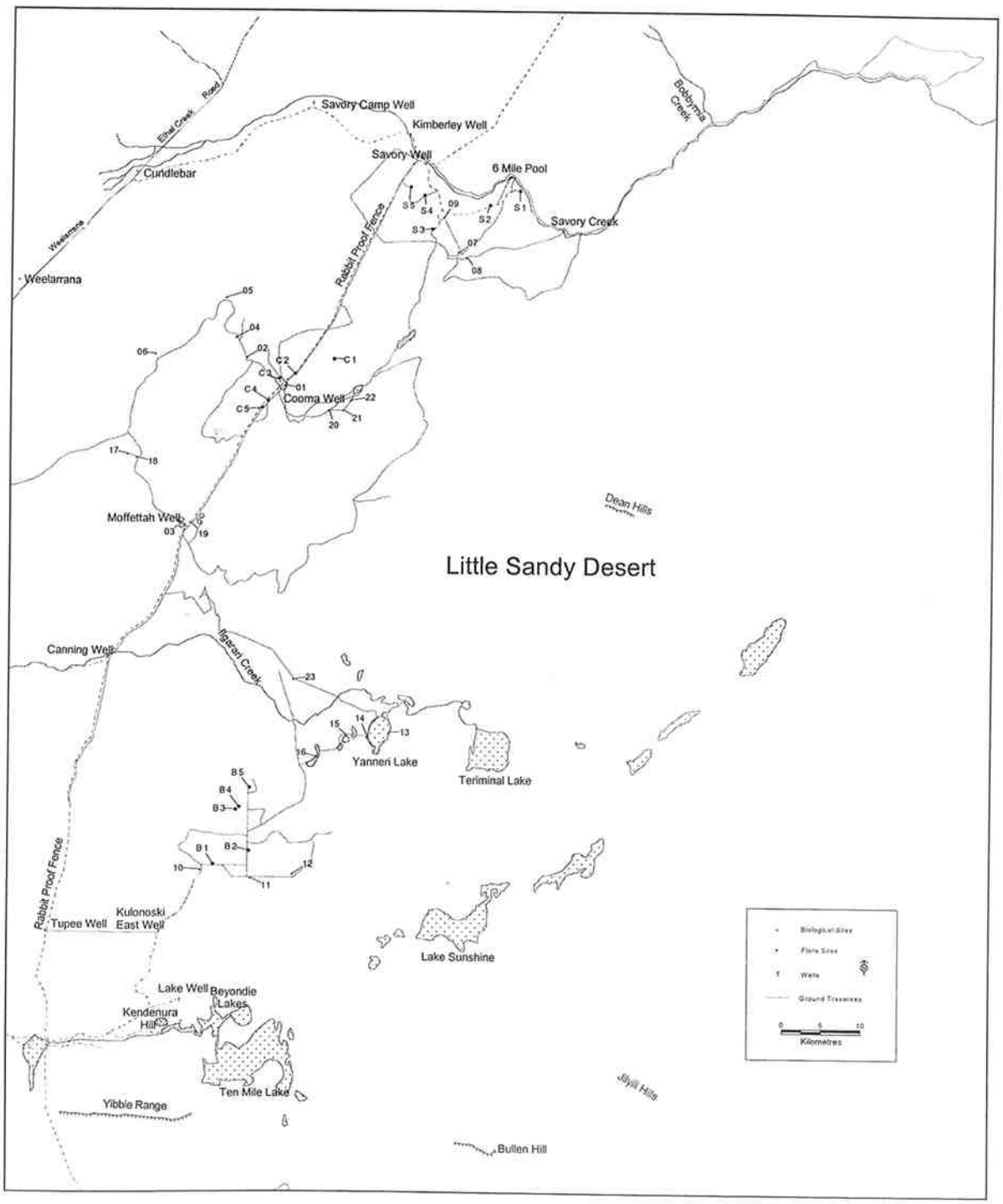

Figure 5 **Location of ground traverses throughout the Southern Little Sandy Desert project area.**

Table 2. Personnel involved in the 1996-1999 field program.

Personnel	Organisation	Duties
Stephen van Leeuwen	CALM – CALM**Science** Division	Project Leader – Flora, Invertebrates
Bob Bromilow	CALM – CALM**Science** Division	Technical support – Flora, Invertebrates
Tony Start	CALM – CALM**Science** Division	Vertebrate Fauna
Phil Fuller	CALM – CALM**Science** Division	Avifauna
Norm McKenzie	CALM – CALM**Science** Division	Bat Fauna
Bill Muir	CALM – CALM**Science** Division	Bat Fauna
Peter Kendrick	CALM – Pilbara Region	Vertebrate Fauna
Andrew Chapman	CALM – Goldfields Region	Vertebrate Fauna
Kim Phillips-Jones	CALM – Goldfields Region	Vertebrate Fauna
Stephen Hopper	Kings Park Board	Flora opportunistic
Luke Sweatman	Kings Park Board	Flora opportunistic
John Angus	CALM Volunteer	Vertebrate Fauna
David Knowles	CALM Volunteer	Reptiles & Amphibians
David Robinson	CALM Volunteer	Reptiles & Amphibians
Brad Maryan	CALM Volunteer	Reptiles & Amphibians

Scope 4:

During the field program for this project 870 plant specimens have been collected representing at least 497 taxa (Appendix 2). Many of these plants represent poorly known taxa or taxa not well represented in herbarium collections. Some specimens appear to represent novel taxa not previously recorded in the scientific literature. Many more species will be added to the flora list for the project area as identifications are provided and confirmed by specialist taxonomists.

While many specimens await identification, it would appear that the flora of the project area is dominated by taxa within the families Mimosaceae, Chenopodiaceae, Poaceae and Myrtaceae. Dominant genera appear to be *Acacia*, *Eucalyptus, Eremophila*, *Ptilotus* and *Senna* (Appendix 2). Considerable difficulty has been experienced with distinguishing and determining many of the grass specimens, especially the *Triodia* and *Aristida* taxa, as sterile material is notoriously difficult to identify.

Interesting flora records obtained during the field program include:

- The identification of numerous new populations of *Eucalyptus rameliana*. These new populations extend the range of the species to the approaches of Savory Creek and provide many infill locations between the core population area around Cooma - Moffettah Wells and the Carnarvon Range (Figure 6). The species is now known from 30 populations representing approximately 15 000 individuals over a geographic range of 115 km.

  Interesting ecological records were obtained of flowering phenology and birds, particularly honeyeaters, visiting inflorescences of *E. rameliana*. Observations of plants in bud and full flower in October indicate that this species has a protracted flowering season that extends into summer.

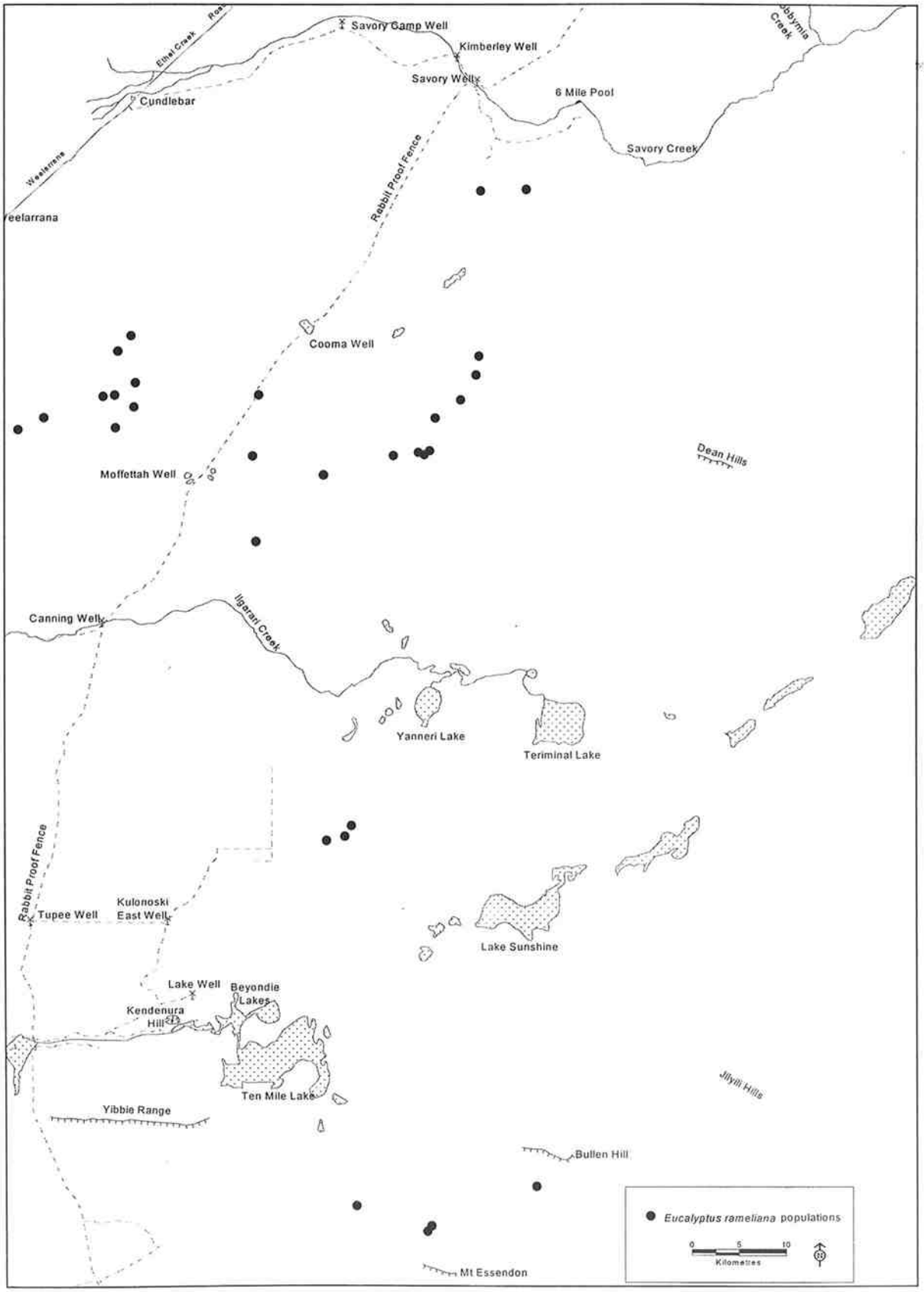

Figure 6 **Location of populations of *Eucalyptus rameliana* within the Southern Little Sandy Desert project area.**

- Several new populations of *Calothamnus aridus* were also located, especially along the approaches to Savory Creek. All populations consisted of numerous plants. These populations represent disjunct outliers approximately 200 km north of conspecific populations in the Gascoyne Bioregion.

- The collection of a *Halosarcia* which has been confirmed as a novel taxon (Paul Wilson, personal communication). This taxon was found on several playas near Yanneri Lake (24° 26' 54" S, 120° 28' 15" E) where it is represented by several thousand individuals. On the apron around Yanneri Lake, this taxon is the dominant species emergent from other sandfire vegetation and growing amongst spinifex on small dunes and adjacent swales. The taxon has been collected in bud, flower and fruit. Sufficient material is now available to proceed with the development of a diagnostic description for the taxon.

- The identification and collection of *Stemodia linophylla* a poorly known species previously collected from only two localities in the Little Sandy Desert. Although not confirmed, TYPE material was probably collected by Earnest Giles as the species was described by Ferdinand von Mueller in 1876. The second known specimen was collected by Nic Foote near Ilgarari Creek (Bill Barker, South Australian Herbarium, personal communication). No specimens of this taxon are vouchered in the Western Australian Herbarium. Collections of this species were made during the August 1997 field program. The collections were obtained from the apron of Savory Creek where the species grew in damp clay depressions with assorted herbs under a canopy of *Eucalyptus victrix*.

- The identification and collection of *Daviesia eremaea* in the project area. Specimens of this taxon were located on sandplain country adjacent to Ilgarari Creek and Yanneri Lake. The specimens collected during this survey represented the first record of this species in Western Australia. Subsequently the species has been collected along the Canning Stock Route to the east (24° 25' S, 121° 59' E) and on isolated hilltops in the Hamersley Range (Stephen van Leeuwen, personal observation). The species was originally thought to be endemic to the Northern Territory. The species is listed as a Priority 3 taxon on the Department of Conservation and Land Management's Priority Flora list.

- Several new populations of *Eucalyptus mannensis* were also located, significantly extending the geographical range of this species. These populations were near Moffettah Well and the Ilgarari Creek. This taxon was previously restricted to the Murchison Bioregion however, it has now been recorded on numerous occasions in the project area.

Numerous fauna records have also been obtained during fieldwork undertaken as part of this project. A total of 103 species of avifauna (47 non-passerines and 56 passerines) have been observed in the project area during the project (Appendix 3). Most records were obtained from within the permanent benchmark quadrats however

considerable opportunistic observation augmented these records. This opportunistic observing concentrated on habitats not represented by the permanent benchmark quadrats. Interesting records included the observation of nesting *Cygnus atratus* (Black Swans) on Savory Creek and *Hamirosta melanosternon* (Black-breasted Buzzards) overhead at most sandstone ridges sites.

Preliminary multivariant analysis of the passerine birds observed on quadrats tentatively identified four primary associations into which birds were clustering (Figure 7). The fidelity of the birds to clusters depicted in the dendrogram was poor (cophenetic correlation, $r = 0.68$). Consequently, it is difficult to provide an ecological explanation for the observed clustering pattern of quadrats, although some lineages can be attributed to ecological similarities between habitat types (Figure 7). For example, quadrats in mulga woodland are clustered together as are quadrats on sandstone ridges. Further interrogation of the data is required to provide satisfactory explanations for the clusters depicted in Figure 7. A noticeable zonation in the abundance of all avifauna was observed along a north-south gradient throughout the project area with the greatest species richness and numerical abundance of individual birds being towards Savory Creek.

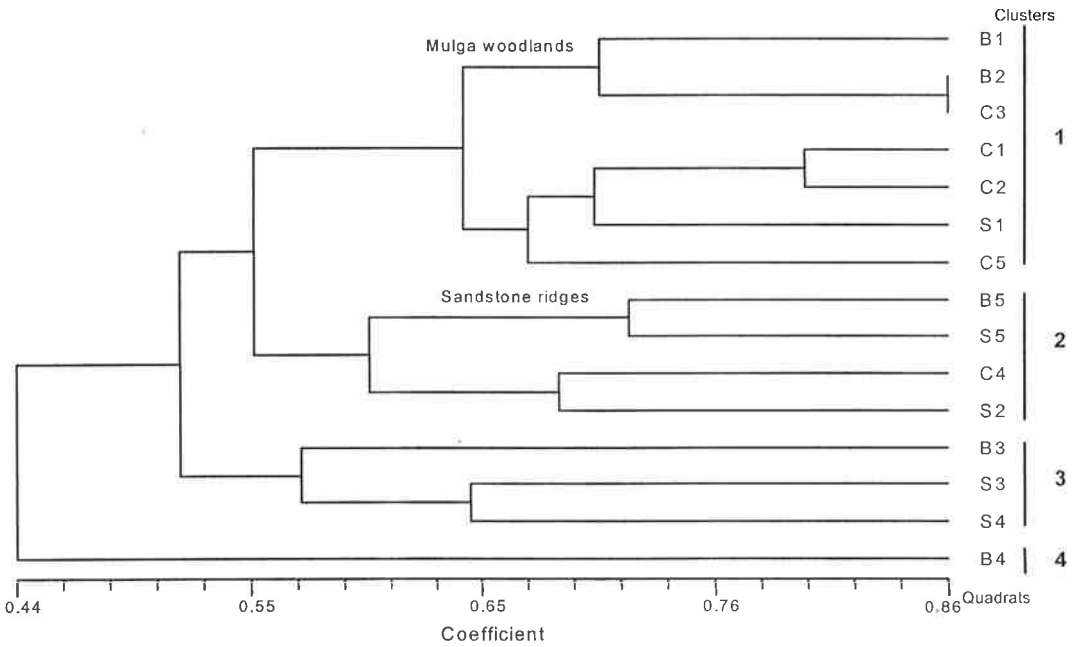

Figure 7 **Dendrogram of Little Sandy Desert quadrats classified according to similarities in their passerine bird species.** (Excludes singletons and *Corvus* species. The clustering procedure employed Czekanowski's binary similarity coefficient of and the UPGMA fusion method ($\beta = -0.1$).)

One hundred and twenty six terrestrial vertebrates have been recorded in the project area. These vertebrates were recorded through trapping in pitfall, Elliott and cage traps and through intensive hand foraging and searching activities. A total trapping effort of 3 600 pitfall, 6 375 Elliott and 300 cage trap nights have been amassed during the survey. This trapping effort was entirely focused on the permanent biological survey quadrats. Hand foraging and searching primarily focused on these

quadrats also, however other habitats within the project area were also examined. Hand foraging and searching involved both diurnal and nocturnal searches and included collection techniques such as mist netting, ultrasonic recording, shooting, raking, spinifex burning and hand collecting.

Thirty four species of mammal have been recorded during the field program (Appendix 4). Seven of these mammals are non-indigenous species. Evidence of the now extinct Stick-nest Rat (probably the Djooyalpi or Lesser Stick-nest Rat) was also obtained in the project area. Of the twenty six extant indigenous mammals recorded, thirteen were marsupials, five were rodents, six were bats, one was a monotreme and the remaining taxon was the dingo. Interesting mammal records obtained during the survey include:

- The collection of *Pseudomys chapmanii* (Ngadji or Western Pebble-mound Mouse) and the identification of several active mounds. These mounds were located on sandstone screes and breakaways near Savory Creek. This location represents a link between western populations in the Hamersley and Collier Ranges and those found to the east in the Rudall River National Park and Throssell Range. The Rudall River and Throssell Range populations may represent a novel taxon of Ngadji. This species is current listed as a Priority 4 taxon on the Department of Conservation and Land Management's Priority Fauna List. This classification implies that the species is adequately known and not considered currently to be under threat or in need of special protection but could be if present circumstances change.

- The collection of *Dasycersus cristicauda* (Mulgara). This species is known from isolated populations predominantly throughout the arid zone of central Australia. Populations of Mulgara have previously been located at Marymia and in the Collier Range National Park, sites approximately 150 km removed from the project area. This species is gazetted as Schedule 1 Threatened Fauna in Western Australia. Two individuals of this species have been caught in sandplain country near Cooma Well (Quadrat C4). Upon closer inspection of this habitat, many distinctive burrows of this species were located.

- The collection of several specimens of the *Sminthopsis longicaudata* (Long-tailed Dunnart). This rodent was previously thought to be extinct, however, it has been collected on several occasions over the past decade from remote and rough regions in the Pilbara and adjacent deserts. This species was collected from sandstone habitats at the Savory Creek and Beyondie study sites. This species is current listed as a Priority 4 taxon on the Department of Conservation and Land Management's Priority Fauna List.

- The recording of several abandoned nests of *Leporillus apicalis* (Djooyalpi or Lesser Stick-nest Rat) on sandstone ridges in the Cooma study area. This species is now extinct.

Eighty four species of reptile and six species of frog have been recorded during the field program (Appendix 5). Members of the skink and gecko families were the most abundant with species in the genus *Ctenotus, Lerista* and *Diplodactylus* dominating. The

collection of nine *Varanus* species is also noteworthy. Interesting records obtained included the following:

- The collection of *Ctenophorus scutulatus* (Lozenge-marked Dragon) from both Savory and Beyondie sites which are at the margins of its previously recorded distribution.

- The collection of *Ctenotus ariadnae* in the project area. These Little Sandy Desert records extend the species distribution west and out of the Gibson Desert and northern Goldfields.

- Several specimens of *Egernia depressa* (Pygmy Spiny-tailed Skink) were collected from mulga woodland at the Beyondie study area. This location represents a link between the species main distribution and disjunct outliers further east.

- The collection of several specimens of *Egernia striata* (Night Skink) which extends the species distribution further west from typical central desert regions.

- The collection of several specimens of *Lerista ips* which previously was only known from a few collections in the Great Sandy Desert and adjacent Northern Territory. These Little Sandy Desert collections considerably extend the species distribution to the south west.

- The collection of several specimens of the recently recognised *Lerista macropisthopus remota.* Previously only one voucher of this species was recorded in the Western Australian Museum's collections. This voucher was collected from the Jiggalong area, which is north of the current project area.

- The collection of one specimen of *Moloch horridus* (Mountain Devil) at the Beyondie study area. This collection fills a gap in the species distribution for the central western portions of Western Australia.

- The collection of several *Ramphotyphlops* (Blind Snake) specimens that appear to represent a taxon not previously recognised in the scientific literature. An examination of Western Australian Museum specimens is underway to determine the taxonomic status of these specimens.

- The collection of *Vermicella bertholdi* (Jan's Banded Snake) in the project area. This species in essentially a southern Australian taxon although its range does extend into the southern Pilbara and northern Goldfields. Records from the project area represent a north easterly extension to the species current known distribution.

Sorting of invertebrate samples collected during the field program has commenced and is ongoing. Sorting and identification of ant (Formicidae) specimens collected from the temporary pitfall traps has been completed. Sorting of invertebrate material collected in the permanent pitfall traps is ongoing and is expect to take at least

another six months. Cumulatively a total of 120 person days have already been amassed sorting invertebrate material collected in the temporary and permanent pitfall traps. Apart from ants, the invertebrate groups of particular interest in the permanent pitfall trap material include Arachnida (except Acari) (spiders, scorpions and allies) and Myriapoda (centipedes, millipedes and allies).

Ninety two ant taxa were identified from the temporary pitfall trap invertebrate collections (Appendix 6). Eight of the species were novel taxa having not previously been observed while a further four were of considerable taxonomic interest (Jonathan Majer, personal communication). Species representing fifty four taxa have not previously been described in the scientific literature. Preliminary multivariant analysis of presence absence data for the 77 taxa recorded from more than one sampling quadrat suggests that ants are associating into distinct assemblages (Figure 8). Ecological accounts to justify these assemblages are ambiguous although vegetation and soil considerations appear valid.

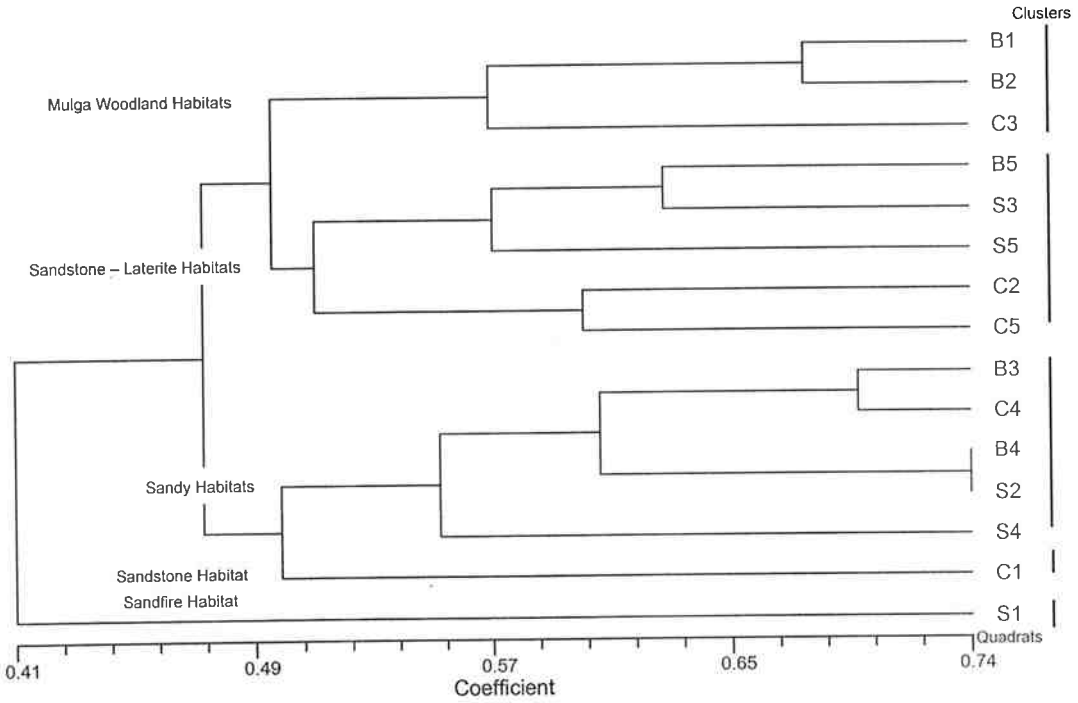

Figure 8 **Dendrogram of Little Sandy Desert quadrats classified according to similarities in their ant fauna.** (The clustering procedure employed Czekanowski's binary similarity coefficient of and the UPGMA fusion method (β = -0.1).)

Identification, confirmation, processing and incorporation of voucher specimens collected during the field program are continuing. Similarly, the deposition of vouchers into the appropriate repository is ongoing. Augmentation of the specimen database developed for each biotic group has progressed and will continue as additional specimens are processed and identified. The identification of many specimen is being undertaken by specialist taxonomists with expertise in particular groups of plant or animals.

Scope 5:

Identification of the conservation values of the project area has commenced. Preliminary results indicate that several species of flora and fauna in the project area are of conservation significance. These species are primarily *Eucalyptus rameliana*, the novel *Halosarcia, Stemodia linophylla, Daviesia eremaea*, *Pseudomys chapmanii, Dasycersus cristicauda, Sminthopsis longicaudata* and *Lerista ips.* Undoubtedly, other species of conservation significance will be identified as more of the specimens collected during the field program are processed, identified and databased.

Several communities of conservation significance have already been identified. They include:

- The alluvial flats along the fringe of Savory Creek. These alluvial flats support a diverse assemblage of annual plants, many of which appear to be at the limit of their distribution or are rare (eg. *Stemodia linophylla*). This community is threatened through intensive grazing by stock and feral donkeys. Such communities along Savory Creek are currently under consideration for addition to the list of Threatened Ecological Communities in Western Australia.

- The sandstone rises and ridges within the project area, which support populations of *Sminthopsis longicaudata* and provide suitable habitats for *Pseudomys chapmanii.*

- Sandplain country around Cooma Well which supports populations of *Dasycersus cristicauda*.

- Playa systems in the vicinity of Yanneri Lake which support populations of the novel *Halosarcia*.

- Dune fields and sandstone ridges to the west and east of Cooma and Moffettah Wells which support large populations of *Eucalyptus rameliana* and the disjunctly distributed *Calothamnus aridus*.

- *Allocasuarina decaisneana* woodlands to the east of Cooma Well as they represent an atypical vegetation association in the project area. These woodlands are extensive and support a diverse understorey dominated by shrub mallee (*Eucalyptus mannensis*) and *Acacia* thickets.

Scope 6:

As there are no existing reserves in the project area or in close proximity, it appears that the existing conservation reserve system inadequately represents the species and communities present in the project area. The closest conservation reserve is Collier Range National Park, approximately 70 km to the west of the project area. This reserve, located in the Gascoyne Biogeographical Region, has an underlying geology dominated by sandstone. It contains only a small dunefield and appears to be predominantly vegetated by *Acacia* and *Eremophila* shrub savanna. While no comprehensive flora and fauna list is available for Collier Range National Park, there

appears to be large inconsistencies in species composition between this reserve and the project area. This is highlighted by the absence of *E. rameliana*, *C. aridus* and *A. decaisneana* from Collier Range. Incongruity between this reserve and the project area is also emphasised by the absence of a playa lake system in the former that supports populations of the novel *Halosarcia*. Nevertheless, this reserve and the project area are similar in that they both support populations of *D. cristicauda* and *P. chapmanii*.

Rudall River National Park is the only conservation reserve in the Little Sandy Desert Biogeographical Region. Many of the flora species collected in the project area also appear to occur at Rudall River, however, dune fields dominated by communities of *E. rameliana* and *C. aridus* are not represented in this conservation reserve. No comparison can be made for the fauna at present, as records for the Rudall River National Park are limited and have not been databased. Interrogation of flora and fauna records for the Kintyre Project Area, which abuts the northern boundary of the National Park, are underway and should help in assessing the similarities in species composition between the northern portion of the bioregion and the project area.

Land included in the proposed Carnarvon Range National Park may encompass a representative example of the flora and fauna of the project area, however, further examination of this reserve proposal is required. No comprehensive flora and fauna list is available for this proposed reserve. Problems may exist with this reserve proposal as mineral prospects are considered significant.

No adequate assessment of the representativeness of the existing and proposed reserve system and the project area can be made until more biological data has been collected and analysed.

Scope 7:

Several threatening processes within the project area have been identified. They include:

- Grazing by *Camelus dromedarius* (Camel) and *Equus asinus* (Donkey). Camels are common throughout the project area especially near Savory Creek, Ilgarari Creek and Yanneri Lake. During the October 1996 field trip an estimated 200 camels and 100 donkeys were observed over five days while working at sites in the vicinity of Savory Creek. Superficially, their impact appears to be minimal, however, on closer examination they appear to have a marked affect on the chenopod scrub communities fringing some playas. This effect is manifested through grazing and trampling. Grazing pressure by camels also appears to be responsible for the 'lollipop' appearance of *Brachychiton* trees, where the canopy skirt is neatly trimmed to 'camel-reach' height. Similarly, grazing by camels may be responsible for the general absence of any *Brachychiton* seedlings or juvenile plants. Camel grazing may also be having a similar affect on *A. decaisneana* plants.

Donkeys are abundant in areas adjacent to Savory Creek and appear to be having a noticeable effect on the riverine vegetation and surrounding chenopod communities. Donkeys were also observed foraging on the lateritic and sandstone rises adjacent to Savory Creek.

Rabbits are also having an impact on the vegetation of many playas, especially those which support a mixed chenopod – ephemeral tussock grass community. Heavy grazing by rabbits is obvious at Cooma Well where their impacts are also evident on the fringing mulga woodland. Within this mulga woodland, many of the juvenile mulga trees have been heavily grazed and there is an abundance of dead seedlings which exhibit signs of damage by rabbits.

Feral cats were observed at all three camp sites. Accordingly, they are undoubtedly having an impact on the fauna.

- Grazing by cattle and horses along Savory Creek and in the vicinity of the Beyondie study area may also be having an affect, however, this is a legitimate activity on pastoral lease areas.

- Fire may also be considered a threatening process as the project area generally appears to have been unburnt for a long period and consists of relatively homogeneous fuels. Examination of thematic Landsat imagery indicates very few fire scars over the project area. The apparent scars appear to be confined to shrublands adjacent to sandstone ridges and on lateritic rises. In the dune fields, fire scars are small and appear to be restricted to swale areas. The apparent homogeneous nature of the project area with respect to burn history may indicate that the area is not susceptible to large conflagrations. Anecdotal evidence supporting this proposition is provided through the persistence of extensive *Acacia aneura* (mulga) woodlands in the project area. These woodlands, and in particular individuals of *A. aneura,* are fire sensitive and usually restricted to refugial sites (fire avoiding) in environments where fire is a frequent habitat modifying force.

Scope 8:

Management options to ensure the conservation of the flora and fauna in the project area include:

- The reservation of an appropriate representative area of the southern Little Sandy Desert. This reservation will ensure that the biota of the project area is protected and will provide a legislative framework for the implementation of future management programs. The formalisation of such a reserve proposal will also facilitate discussion and negotiation with other land users (Native Title, miners and pastoralists) who have tenure aspirations over the project area. Such discussions and negotiations should hopefully resolve any conflicting landuse issues.

- The implementation of a feral animal control program. This program will be designed to reduce the impacts of grazing by camels and donkeys on the project area. Adjacent leaseholders will benefit from such a program as a reduction in feral animal numbers will reduce competition with stock for natural pastures and will also minimise damage to infrastructure like fences and improved waters.

- The development and implementation of a fire management strategy that mitigates any deleterious burning impacts. To reduce the potential for large conflagrations it may be appropriate to implement fire management strategies that aim to create a heterogeneous mosaic of fire histories across the project area. This management aim may be implemented through controlled burning with the aid of aerial ignition. CALM currently implement similar fire management strategies in the Gibson and Great Victoria Deserts.

Scope 9:

The selection of priority zones within the project area for addition to the reserve system has begun. This process however, is in its infancy and is not based on any quantifiable data at present. Preliminary discussions with colleagues, field inspections and interrogation of the existing GIS atlas indicates that a reserve centred on Moffettah and Cooma Wells, which encompasses the Dean Hills and the majority of the Ilgarari Creek drainage (catchment) system and its associated lakes (Yanneri Lake and Terminal Lake), may be appropriate (Figure 9). The proposed reserve boundary extends north to include parts of Savory Creek and abuts the southern boundary of Weelarrana Station. To the south, the reserve abuts the northern boundary of Kumarina Station. The entire area encompassed by the proposed reserve, which is 637 500 hectares, is Unallocated Crown Land.

This reserve proposal encompasses all the landforms and vegetation associations present in the project area, although the representativeness of the biota has not been determined. Tentatively, the proposed reserve would encompass the majority of flora populations of biological and conservation significance as well as all significant faunal populations.

Scope 10:

Resources required to identify the biophysical sub-regions in the project area using the information collected during this survey will primarily focus on the use of satellite imagery. Preliminary ideas focus on the use of Landsat imagery to identify and delimit the extent of the geological and landscape themes that govern the distribution of biota, especially the vegetation, in the project area. Further sampling and analysis of the biota throughout the project area and comparison with information from adjacent areas in the same and neighbouring Biogeographical Regions is required before the suitability of this approach to the identification of bio-physical sub-regions can be undertaken. The use of multivariant statistical procedures will also help delimit biophysical sub-regions in the project area.

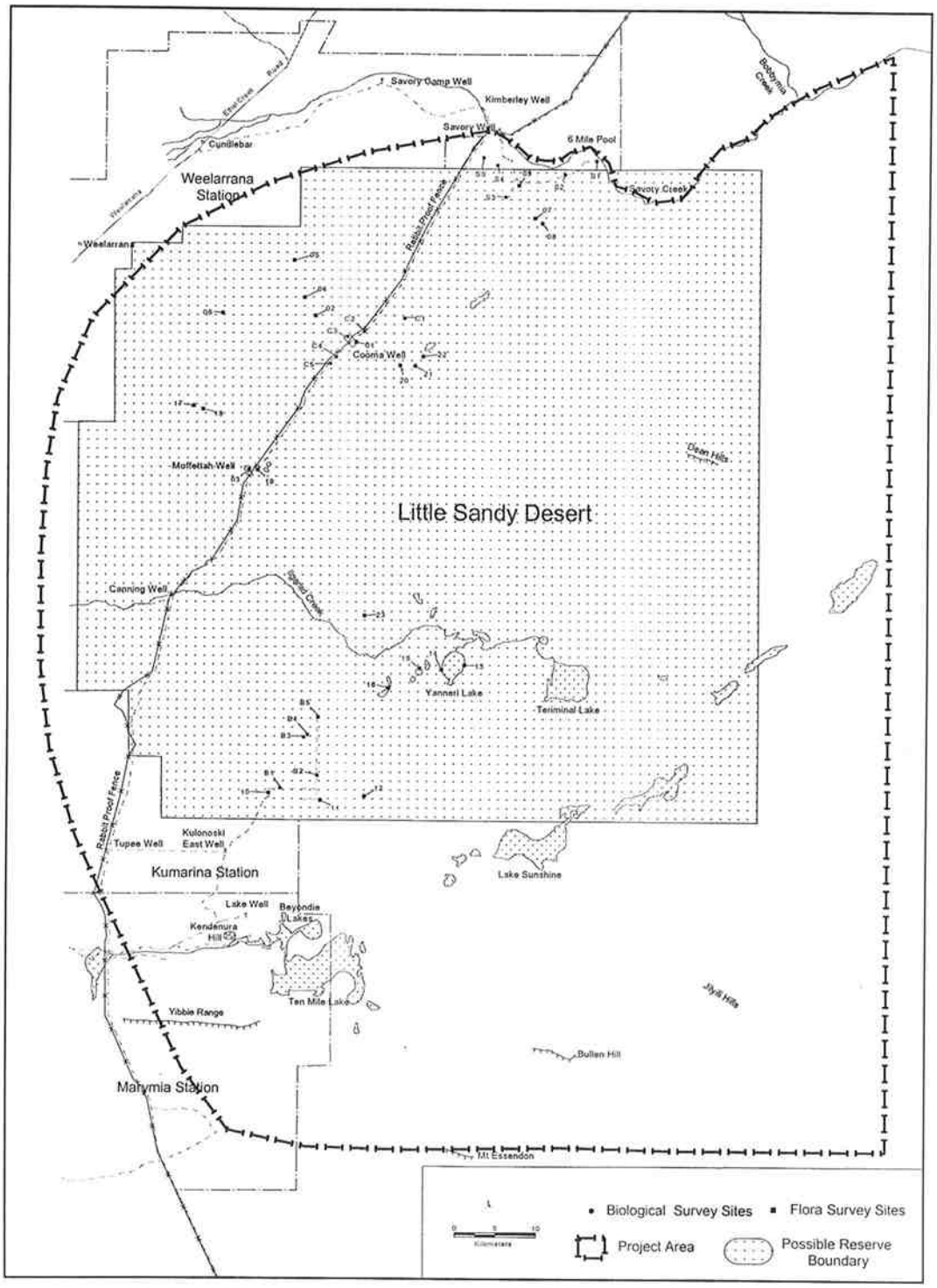

Figure 9 **Location of the principal conservation priority area in the southern portion of the Little Sandy Desert.**

Scope 11:

The final report for this project in currently at an early stage of preparation. The primary focus of research activities at present is the continued identification of flora and fauna specimens and the development of the GIS atlas. It is anticipated that a drafting of chapters for the final publication will not commence until after the

September field excursion and probably not until early 2000. The primary theme of the final report will be to highlight and evaluate the nature conservation value and representativeness of the biota of the project area and make recommendation for reservation and future management.

PLANNED ACTIVITIES TOWARDS COMPLETION OF SCOPE ITEMS:

Research is continuing on this project. Voucher specimens collected during previous field programs are still being processed, identified and data based, especially flora and invertebrate specimens. Specimen databases and the GIS atlas for the project area are continually being augmented with the addition of new records and themes.

The next trip to the project area is planned for September 1999. This trip will form part of a Landscope Expedition and will involve extensive systematic and opportunistic biological sampling in the vicinity of Yanneri Lake and along the course of Ilgarari Creek. It is expected that 20 personnel will participate in this twelve day field program. A sampling trip to Savory Creek is also planned for September.

The commencement of data analysis and preparation of chapters for the final report will commence in early 2000.

* * * * * * * * * * *

Appendix One

Chemical and physical attributes of soil samples collected from 53 permanent biological sample sites in the Southern Little Sandy Desert.

Sample	Quadrat	EC (1:5) mS/m	pH (H_2O)	pH ($CaCl_2$)	Org C (W/B) %	N (total) %	P (total) ppm	P (HCO_3) ppm	Sand %	Silt %	Clay %	Ca (exch) me%	Mg (exch) me%	K (exch) me%	Na (exch) me%	Al (exch) me%	Mn (exch) me%
LSD-1	LSD-C4-F2	1	5.0	4.4	0.10	0.008	76	2	93.0	1.0	6.0	0.16	0.06	0.05	<0.02	0.14	0.05
LSD-2	LSD-C4-F1	<1	5.4	4.8	0.14	0.009	64	<2	96.5	0.5	3.0	0.27	0.11	0.04	<0.02	0.07	0.02
LSD-3	LSD-C5-F1	1	4.9	4.3	0.12	0.011	111	2	89.0	3.0	8.0	0.14	0.03	0.06	<0.02	0.41	<0.02
LSD-4	LSD-C5-F2	2	5.0	4.4	0.13	0.014	117	3	80.5	3.5	16.0	0.71	0.42	0.13	<0.02	0.17	0.04
LSD-5	LSD-C3-F2	6	7.1	6.6	0.40	0.041	150	11	85.0	8.0	7.0	3.20	1.39	0.52	<0.02	-	-
LSD-6	LSD-C3-F1	4	7.1	6.5	0.19	0.022	134	3	81.0	8.5	10.5	2.25	1.82	0.66	0.02	-	-
LSD-7	LSD-C2-F1	1	5.1	4.3	0.11	0.009	78	2	89.0	1.0	10.0	0.38	0.19	0.08	<0.02	0.16	0.03
LSD-8	LSD-C2-F2	<1	5.5	4.8	0.11	0.008	68	2	91.5	1.0	7.5	0.56	0.34	0.08	<0.02	0.02	0.02
LSD-9	LSD-C1-F2	2	4.4	4.0	0.48	0.025	115	4	94.0	1.0	5.0	0.31	0.03	0.08	<0.02	0.26	<0.02
LSD-10	LSD-C1-F1	2	4.4	4.1	0.13	0.012	163	6	85.5	4.5	10.0	0.10	0.03	0.04	<0.02	0.46	<0.02
LSD-11	LSD-S2-F2	<1	5.1	4.5	0.08	0.005	70	2	94.0	0.5	5.5	0.19	0.11	0.03	<0.02	0.05	0.02
LSD-12	LSD-S2-F1	1	4.9	4.3	0.08	0.007	78	<2	92.5	0.5	6.5	0.18	0.08	0.04	<0.02	0.14	0.03
LSD-13	LSD-S3-F2	1	4.8	4.2	0.17	0.016	136	4	82.5	4.0	13.5	0.42	0.28	0.14	<0.02	0.20	0.08
LSD-14	LSD-S3-F1	1	4.9	4.3	0.10	0.011	109	3	88.0	3.0	9.0	0.41	0.18	0.14	0.03	0.12	0.06
LSD-15	LSD-S5-F1	4	5.7	5.2	1.05	0.069	107	5	90.0	4.0	6.0	3.56	0.78	0.20	<0.02	<0.02	0.08
LSD-16	LSD-S5-F2	1	5.2	4.4	0.18	0.020	99	2	85.0	3.0	12.0	0.71	0.38	0.19	<0.02	0.10	0.06
LSD-17	LSD-S4-F1	<1	5.3	4.7	0.06	0.005	47	<2	98.0	<0.5	2.0	0.19	0.05	0.03	<0.02	0.02	<0.02
LSD-18	LSD-S4-F2	1	5.5	5.0	0.07	0.003	49	<2	98.0	<0.5	2.0	0.25	0.07	0.02	<0.02	<0.02	<0.02

Appendix One

Sample	Quadrat	EC (1:5) mS/m	pH (H_2O)	pH ($CaCl_2$)	Org C (W/B) %	N (total) %	P (total) ppm	P (HCO_3) ppm	Sand %	Silt %	Clay %	Ca (exch) me%	Mg (exch) me%	K (exch) me%	Na (exch) me%	Al (exch) me%	Mn (exch) me%
LSD-19	LSD-S1-F1	404	7.9	7.9	0.43	0.038	126	13	82.0	11.0	7.0	9.90	4.51	1.50	0.53	-	-
LSD-20	LSD-S1-F2	71	8.3	8.1	0.30	0.036	132	14	61.0	23.0	16.0	7.50	2.03	2.18	0.22	-	-
LSD-21	LSD-B1-F2	2	5.9	5.1	0.16	0.023	261	12	63.0	15.5	21.5	2.35	2.70	0.58	<0.02	<0.02	0.02
LSD-22	LSD-B1-F1	3	6.7	6.0	0.27	0.034	246	8	60.0	16.5	23.5	4.04	3.08	0.84	0.06	-	-
LSD-23	LSD-B2-F1	8	8.7	8.2	0.53	0.056	114	9	92.0	5.0	3.0	3.84	0.65	0.46	<0.02	-	-
LSD-24	LSD-B2-F2	7	8.7	8.0	0.39	0.040	146	8	85.5	5.5	9.0	3.74	0.76	0.83	0.04	-	-
LSD-25	LSD-B4-F1	1	4.6	4.1	0.14	0.009	86	<2	92.0	1.0	7.0	0.26	0.06	0.05	<0.02	0.16	0.04
LSD-26	LSD-B4-F2	1	4.7	4.2	0.16	0.011	69	2	94.0	1.0	5.0	0.09	0.03	0.03	<0.02	0.23	0.02
LSD-27	LSD-B3-F1	1	4.9	4.3	0.18	0.010	60	<2	95.0	0.5	4.5	0.18	0.04	0.03	<0.02	0.13	0.04
LSD-28	LSD-B3-F2	1	4.6	4.3	0.17	0.008	62	2	96.5	0.5	3.0	0.02	<0.02	<0.02	<0.02	0.17	0.02
LSD-29	LSD-B5-F2	1	5.1	4.5	0.29	0.026	102	3	90.0	2.5	7.5	0.64	0.22	0.15	<0.02	0.07	0.07
LSD-30	LSD-B5-F1	1	5.1	4.4	0.08	0.012	78	2	84.5	2.5	13.0	0.43	0.37	0.10	0.06	0.05	0.07
LSD-31	LSD-01	18	8.7	8.2	0.36	0.036	58	4	85.5	7.0	7.5	6.70	1.19	0.30	<0.02	-	-
LSD-32	LSD-02	1	4.9	4.4	0.09	0.006	60	2	95.5	<0.5	4.5	0.14	0.07	0.04	<0.02	0.06	0.05
LSD-33	LSD-03	514	8.8	8.6	0.46	0.046	76	4	-	-	-	-	-	-	-	-	-
LSD-34	LSD-04	5	4.9	4.6	0.16	0.010	70	2	95.0	0.5	4.5	0.66	0.30	0.08	0.04	0.06	0.05
LSD-35	LSD-05	2	4.7	4.2	0.13	0.013	102	2	89.5	2.0	8.5	0.15	0.06	0.08	<0.02	0.37	0.02
LSD-36	LSD-06	1	5.2	4.6	0.16	0.011	62	2	93.5	0.5	6.0	0.38	0.12	0.05	<0.02	0.03	0.04
LSD-37	LSD-07	1	4.9	4.1	0.32	0.016	111	4	90.0	2.5	7.5	0.18	0.04	0.10	<0.02	0.31	<0.02
LSD-38	LSD-08	1	5.0	4.4	0.15	0.008	49	3	96.5	1.0	2.5	0.13	0.03	0.11	<0.02	0.10	<0.02
LSD-39	LSD-09	<1	5.6	5.1	0.09	0.005	91	3	95.5	<0.5	4.5	0.48	0.14	0.05	<0.02	<0.02	0.02
LSD-40	LSD-10	505	8.8	8.4	0.80	0.079	156	6	81.0	13.0	6.0	4.21	0.67	7.40	3.65	-	-
LSD-41	LSD-11	2	4.6	4.1	0.21	0.016	239	6	80.5	5.0	14.5	0.37	0.13	0.12	0.02	0.40	<0.02
LSD-42	LSD-12	1	6.3	5.8	0.06	0.003	43	<2	98.5	<0.5	1.5	0.38	0.06	0.03	0.05	-	-
LSD-43	LSD-13	246	8.4	8.2	0.14	0.016	73	10	-	-	-	-	-	-	-	-	-

Appendix One

Sample	Quadrat	EC (1:5) mS/m	pH (H_2O)	pH ($CaCl_2$)	Org C (W/B) %	N (total) %	P (total) ppm	P (HCO_3) ppm	Sand %	Silt %	Clay %	Ca (exch) me%	Mg (exch) me%	K (exch) me%	Na (exch) me%	Al (exch) me%	Mn (exch) me%
LSD-44	LSD-14	84	7.4	7.2	0.08	0.004	49	3	95.5	<0.5	4.5	6.31	0.03	0.08	0.04	-	-
LSD-45	LSD-15	5	5.0	4.7	0.16	0.006	50	2	97.5	<0.5	2.5	0.34	0.09	0.04	<0.02	0.04	<0.02
LSD-46	LSD-16	1592	8.3	8.3	1.22	0.092	145	34	-	-	-	-	-	-	-	-	-
LSD-47	LSD-17	1	5.4	4.2	0.1	0.008	73	2	90.5	1.5	8	0.1	0.02	0.04	0.02	0.34	0.03
LSD-48	LSD-18	0	5.8	4.7	0.04	0.005	38	2	98.5	0.5	1.5	0.06	0.04	0.02	0.02	0.04	0.02
LSD-49	LSD-19	1	7.3	6.6	0.13	0.008	41	2	91	2	7	1.09	1.28	0.12	0.04	-	-
LSD-5-	LSD-20	1	6.1	4.7	0.11	0.006	50	2	96	0.5	3.5	0.32	0.09	0.02	0.02	0.05	0.02
LSD-51	LSD-21	1	6.6	5.7	0.09	0.005	44	2	96.5	0.5	3	0.75	0.59	0.06	0.05	-	-
LSD-52	LSD-22	230	8	7.8	0.19	0.02	53	2	56.5	5.5	38	-	-	-	-	-	-
LSD-53	LSD-23	1	5.9	5	0.05	0.005	44	2	93.6	0.5	6	0.42	0.2	0.06	0.02	0.04	0.03

Appendix Two

Vascular plant species collected in the Southern Little Sandy Desert project area.

This list of vascular plants includes all specimens collected during the 1996, 1997 and 1998 field programs and subsequently identified before 1 June 1999. Taxa are listed alphabetically in the order of genus and species in their respective families. The family sequence follows approximately the classification presented in FloraBase (Western Australian Herbarium 1998) [6].

[6] Western Australian Herbarium (1998). FloraBase - Information on the Western Australian flora. Department of Conservation and Land Management. http://www.calm.wa.gov.au/science/florabase.html.

Appendix Two

OPHIOGLOSSACEAE

Ophioglossum lusitanicum

ADIANTACEAE

Cheilanthes brownii
Cheilanthes sieberi

MARSILEACEAE

Marsilea sp. (SVL 2604)

POTAMOGETONACEAE

Ruppia aff. *maritima*

POACEAE

Amphipogon caricinus
Amphipogon contorta
Amphipogon sp. (SVL 2503)
Aristida contorta
Aristida sp. (SVL 2363)
Chrysopogon fallax
Cymbopogon sp. (SVL 2559)
Dichanthium sp. (SVL 3046)
Enneapogon caerulescens
Enneapogon polyphyllus
Enneapogon sp. (SVL 2962)
Eragrostis dielsii
Eragrostis sp. (SVL 2349)
Eragrostis sp. (SVL 2478)
Eragrostis sp. (SVL 2512)
Eragrostis sp. (SVL 2513)
Eragrostis sp. (SVL 2626)
Eragrostis sp. (SVL 2829)
Eragrostis sp. (SVL 2830)
Eragrostis sp. (SVL 2946)
Eriachne aristidea
Eriachne dominii
Eriachne mucronata
Eriachne sp. (SVL 2491)
Eulalia aurea
Iseilema membranaceum
Paraneurachne muelleri
Paraneurachne sp. (SVL 2846)
Paspalum sp. (SVL 2592)
Setaria sp. (SVL 2606)
Triodia pungens
Triodia schinzii
Triodia wiseana
Triodia sp. (SVL 2440)
Triodia sp. (SVL 2498)
Xerochloa laniflora
Genus sp. nov. (SVL 2418)
Genus sp. nov. (SVL 2538)
Genus sp. nov. (SVL 2620)

CYPERACEAE

Bulbostylis barbata
Cyperus bulbosa
Fimbristylis sieberiana
Genus sp. nov. (SVL 2661)
Genus sp. nov. (SVL 2912)

DASYPOGONACEAE

Lomandra leucocephala subsp. *robusta.*

XANTHORRHOEACEAE

Xanthorrhoea thorntonii

ANTHERICACEAE

Caesia sp. (SVL 2639)
Corynotheca micrantha

COLCHICACEAE

Wurmbea deserticola
Wurmbea aff. *deserticola* (SVL 2642)

CASUARINACEAE

Allocasuarina decaisneana
Casuarina cristata

MORACEAE

Ficus platypoda var. *minor.*

PROTEACEAE

Grevillea eriostachya
Grevillea spinosa
Grevillea striata
Grevillea wickhamii subsp. *aprica*
Grevillea sp. (SVL 2351)
Grevillea sp. (SVL 2358)
Grevillea sp. (SVL 2365)
Grevillea sp. (SVL 2532)
Grevillea sp. (SVL 2619)
Hakea lorea subsp. *suberea*
Hakea preissii
Hakea rhombales

SANTALACEAE

Anthobolus leptomerioides
Exocarpus sp. (SVL 2389)
Exocarpus sp. (SVL 2640)

Appendix Two

Santalum acuminatum
Santalum lanceolatum
Santalum sp. (SVL 2400)

LORANTHACEAE

Amyema aff. *bifurcatum* (SVL 2388)
Amyema fitzgeraldii
Amyema gibberula
Amyema preissii
Amyema hilliana
Amyema sanguinea
Amyema sp. (SVL 2399)
Lysiana murrayi

CHENOPODIACEAE

Dysphania knappii
Dysphania melanoma
Dysphania sp. (SVL 2484)
Enchylaena tomentosa
Halosarcia sp. (SVL 2944)
Halosarcia sp. (SVL 2947)
Halosarcia sp. (SVL 2948)
Halosarcia sp. (SVL 2972)
Halosarcia sp. (SVL 2973)
Halosarcia sp. (SVL 2992)
Halosarcia sp. (SVL 3019)
Halosarcia sp. (SVL 3020)
Halosarcia sp. (SVL 3022)
Maireana amoena
Maireana eriosphaera
Maireana melanocoma
Maireana planifolium
Maireana tomentosa
Maireana villosum
Maireana sp. (SVL 2429)
Rhagodia eremaea
Rhagodia sp. (SVL 2448)
Rhagodia sp. (SVL 2949)
Rhagodia sp. (SVL 2965)
Salsola kali
Sclerolaena alata
Sclerolaena cuneata
Sclerolaena eriacantha
Sclerolaena sp. (SVL 2385)
Sclerolaena sp. (SVL 2945)
Sclerolaena sp. (SVL 3021)
Sclerolaena sp. (SVL 3023)
Tecticornia sp. (SVL 2653)
Genus sp. nov. (SVL 2570)
Genus sp. nov. (SVL 2583)
Genus sp. nov. (SVL 2599)
Genus sp. nov. (SVL 2621)
Genus sp. nov. (SVL 2636)
Genus sp. nov. (SVL 2659)
Genus sp. nov. (SVL 2832)
Genus sp. nov. (SVL 2997)

AMARANTHACEAE

Amaranthus sp. (SVL 2561)
Ptilotus aervoides
Ptilotus aff. *aphyllus*
Ptilotus astrolasius
Ptilotus exaltatus
Ptilotus fusiformis
Ptilotus helipteroides
Ptilotus aff. *helipteroides* (SVL 2884)
Ptilotus macrocephalus
Ptilotus polystachyus
Ptilotus obovatus
Ptilotus rotundifolius
Ptilotus symonii
Ptilotus sp. (SVL 2362)
Ptilotus sp. (SVL 2405)
Ptilotus sp. (SVL 2593)
Ptilotus sp. (SVL 2871)
Ptilotus sp. (SVL 2925)
Ptilotus sp. (SVL 2940)

NYCTAGINACEAE

Boerhavia coccinea

GYROSTEMONACEAE

Codonocarpus cotinifolius
Gyrostemon ramulosus
Gyrostemon sp. (SVL 2923)

AIZOACEAE

Trianthema turgidifolia
Trianthema sp. (SVL 2424)
Trianthema sp. (SVL 2611)

PORTULACACEAE

Calandrinia balonensis
Calandrinia eremaea
Calandrinia schistorrhiza
Calandrinia sp. (SVL 2356)
Calandrinia sp. (SVL 2396)
Portulaca filifolia

CARYOPHYLLACEAE

Polycarpaea sp. (SVL 2488)

Appendix Two

LAURACEAE

Cassytha sp. (SVL 2549)

CAPPARACEAE

Capparis lasiantha
Capparis spinosa

BRASSICACEAE

Lepidium pedicellatum
Lepidium sp. (SVL 2603)
Lepidium sp. (SVL 2605)
Menkea villosula
Stenopetalum anfractum
Stenopetalum nutans

DROSERACEAE

Drosera indica

PITTOSPORACEAE

Pittosporum phylliraeoides

SURIANACEAE

Stylobasium spathulatum
Stylobasium sp. (SVL 2464)

MIMOSACEAE

Acacia abrupta
Acacia adoxa
Acacia adsurgens
Acacia aff. *adsurgens* (SVL 2454)
Acacia ancistrocarpa
Acacia aneura
Acacia aff. *aneura* (SVL 2334)
Acacia aff. *aneura* (SVL 2419)
Acacia aff. *aneura* (SVL 2525)
Acacia aff. *aneura* (SVL 2545)
Acacia aff. *aneura* (SVL 2898)
Acacia bivenosa
Acacia aff. *bivenosa* (SVL 2643)
Acacia aff. *catenulata* (SVL 2432)
Acacia coriacea
Acacia coriacea subsp. *seriophylla*
Acacia daviesioides
Acacia aff. *dictyophleba* (SVL 2360)
Acacia aff. *dictyophleba* (SVL 2434)
Acacia aff. *dictyophleba* (SVL 2453)
Acacia eriopoda
Acacia hilliana
Acacia inaequilatera
Acacia aff. *kempeana* (SVL 2443)
Acacia aff. *kempeana* (SVL 2455)
Acacia aff. *kempeana* (SVL 2629)
Acacia ligulata
Acacia aff. *ligulata* (SVL 2449)
Acacia aff. *ligulata* (SVL 2865)
Acacia linophylla
Acacia maitlandii
Acacia marramamba
Acacia miniura
Acacia pachyacra
Acacia pruinocarpa
Acacia retivenia
Acacia rhodophloia
Acacia aff. *rhodophloia* (SVL 2428)
Acacia spondylophylla
Acacia stowardii
Acacia aff. *stowardii* (SVL 2451)
Acacia aff. *stowardii* aff. (SVL 2872)
Acacia synchronicia
Acacia tetragonophylla
Acacia aff. *tetragonophylla* (SVL 2397)
Acacia validinervia
Acacia aff. *validinervia* (SVL 2401)
Acacia wanyu
Acacia aff. *wanyu* (SVL 2878)
Acacia xiphophylla
Acacia aff. *xiphophylla* (SVL 2433)
Acacia sp. (SVL 2450)
Acacia sp. (SVL 2470)
Acacia sp. (SVL 2573)
Acacia sp. (SVL 2627)
Acacia sp. (SVL 2930)

CAESALPINIACEAE

Petalostylis cassioides
Senna artemisioides subsp. *artemisioides*
Senna artemisioides subsp. *helmsii*
Senna artemisioides subsp. *oligophylla*
Senna aff. *artemisioides* subsp. *oligophylla* (SVL 2422)
Senna artemisioides subsp. nov. (SVL 2346)
Senna artemisioides subsp. nov. (SVL 2462)
Senna artemisioides subsp. nov. (SVL 2550)
Senna artemisioides subsp. nov. (SVL 2628)
Senna artemisioides subsp. nov. (SVL 2963)
Senna glutinosa subsp. *glutinosa*
Senna glutinosa subsp. *luerssenii*
Senna glutinosa subsp. *pruinosa*
Senna notabalis
Senna pleurocarpa
Senna sp. (SVL 2347)

Appendix Two

Senna sp. (SVL 2409)

PAPILIONACEAE

Crotalaria cunninghamii
Cullen sp. (SVL 2586)
Daviesia eremaea
Gastrolobium grandiflorum
Gompholobium polyzygum
Indigofera georgei
Indigofera monophylla
Indigofera sp. (SVL 2390)
Isotropis forrestii
Jacksonia sp. (SVL 2515)
Kennedia prorepens
Leptosema sp. (SVL 2575)
Phylota luehmanii
Pultenaea sp. (SVL 2517)
Swainsona formosa
Swainsona sp. (SVL 2568)
Swainsona sp. (SVL 2591)
Templetonia sp. (SVL 2999)
Genus sp. nov. (SVL 2535)
Genus sp. nov. (SVL 2563)
Genus sp. nov. (SVL 2581)
Genus sp. nov. (SVL 2595)

ZYGOPHYLLACEAE

Tribulus suberosa
Tribulus sp. (SVL 2968)
Zygophyllum tesquorum
Zygophyllum sp. (SVL 2417)
Zygophyllum sp. (SVL 2569)
Zygophyllum sp. (SVL 2608)

EUPHORBIACEAE

Euphorbia boophthona
Euphorbia aff. *drummondii* (SVL 2631)
Euphorbia sp. (SVL 2610)
Euphorbia sp. (SVL 2852)
Adraiana hookeri
Phyllanthus sp. (SVL 2602)
Phyllanthus sp. (SVL 2638)
Genus sp. nov. (SVL 2852)

CELASTRACEAE

Maytenus sp. (SVL 2883)

STACKHOUSIACEAE

Macgregoria racemigera
Stackhousia intermedia
Stackhousia megaloptera
Stackhousia sp. (SVL 2866)
Stackhousia sp. (SVL 2995)
Genus sp. nov. (SVL 2598)

SAPINDACEAE

Diplopeltis stuartii
Diplopeltis sp. (SVL 2391)
Dodonaea coriacea
Dodonaea lanceolata
Dodonaea lanceolata subsp. *spathulatum*
Dodonaea petiolaris
Dodonaea sp. (SVL 2998)

TILIACEAE

Corchorus aff. *sidoides* (SVL 2556)
Corchorus sp. (SVL 2402)

MALVACEAE

Abutilon sp. (SVL 2527)
Abutilon sp. (SVL 2630)
Alyogyne pinaniana
Hibiscus burtonii
Hibiscus coatsii
Hibiscus sp. (SVL 2908)
Lawrencia densiflora
Lawrencia sp. (SVL 2567)
Lawrencia sp. (SVL 2585)
Lawrencia sp. (SVL 2655)
Lawrencia sp. (SVL 2847)
Sida arenicola (SVL 2548)
Sida cardiophylla
Sida aff. *fibulifera* (SVL 2485)
Sida aff. *fibulifera* (SVL 2486)
Sida aff. *fibulifera* (SVL 2967)
Sida sp. (SVL 2412)
Sida sp. (SVL 2666)
Sida sp. (SVL 2964)
Genus sp. nov. (SVL 2383)
Genus sp. nov. (SVL 2487)
Genus sp. nov. (SVL 2562)
Genus sp. nov. (SVL 2845)

STERCULIACEAE

Brachychiton gregorii
Keraudrenia integrifolia
Rulingia rotundifolia

FRANKENIACEAE

Frankenia sp. (SVL 2601)
Frankenia sp. (SVL 2994)

Appendix Two

VIOLACEAE

Hybanthus aurantiacus

THYMELEACEAE

Pimelea ammocharis
Pimelea trichostachya

MYRTACEAE

Calothamnus aridus
Calytrix carinata
Corymbia aff. *aspera* (SVL 2342)
Corymbia chippendalei (SVL 2411)
Corymbia deserticola
Corymbia terminalis
Corymbia aff. *terminalis* (SVL 2885)
Eucalyptus gamophylla
Eucalyptus gypsophila
Eucalyptus kingsmillii
Eucalyptus mannensis
Eucalyptus oldfieldii
Eucalyptus aff. *oldfieldii* (SVL 2663)
Eucalyptus oleosa
Eucalyptus pachyphylla
Eucalyptus rameliana
Eucalyptus trivalvis
Eucalyptus victrix
Eucalyptus sp. (SVL 2471)
Eucalyptus sp. (SVL 2662)
Eucalyptus sp. (SVL 2668)
Eucalyptus sp. (SVL 2881)
Eucalyptus sp. (SVL 3001)
Lamarchea sulcata
Melaleuca eleuterostachya
Melaleuca glomerata
Melaleuca lasiandra
Melaleuca sp. (SVL 2338)
Melaleuca sp. (SVL 2607)
Melaleuca sp. (SVL 2624)
Melaleuca sp. (SVL 2656)
Melaleuca sp. (SVL 2834)
Melaleuca sp. (SVL 2835)
Melaleuca sp. (SVL 2849)
Melaleuca sp. (SVL 2925)
Melaleuca sp. (SVL 2969)
Melaleuca sp. (SVL 2978)
Micromyrtus flaviflora
Thryptomene maisonneuvei
Thryptomene sp. (SVL 2862)

HALORAGACEAE

Gonocarpus eremophilus
Haloragis gossei

APIACEAE

Xanthosia sp. (SVL 2374)

OLEACEAE

Jasminum calcareum

ASCLEPIADACEAE

Gymnema sp. (SVL 2407)
Gymnema sp. (SVL 2459)
Marsdenia sp. (SVL 2874)
Sarcostemma viminale subsp. *australe*
Genus sp. nov. (SVL 2413)

CONVOLVULACEAE

Bonamia sp. (SVL 2369)
Evolvulus alsinoides
Porana commixta

BORAGINACEAE

Halgania cyanea
Halgania glabra
Halgania gustafsenii
Halgania sp. (SVL 2966)
Heliotropium sp. (SVL 2520)
Trichodesma zeylanicum

VERBENACEAE

Clerodendrum sp. (SVL 2398)

CHLOANTHACEAE

Dicrastylis exsuccosa
Dicrastylis georgei
Dicrastylis sp. (SVL 2364)
Dicrastylis sp. (SVL 2367)
Dicrastylis sp. (SVL 2557)
Dicrastylis sp. (SVL 2870)
Newcastelia spodiotricha
Newcastelia sp. (SVL 2641)
Pityrodia loxocarpa
Genus sp. nov. (SVL 2410)
Genus sp. nov. (SVL 2933)
Genus sp. nov. (SVL 2937)

LAMIACEAE

Prostanthera albiflora

SOLANACEAE

Nicotiana benthamii

Appendix Two

Nicotiana rosulata
Solanum centrale
Solanum aff. *centrale* (SVL 2379)
Solanum horridum
Solanum lasiophyllum
Solanum phlomoides
Solanum aff. *phlomoides* (SVL 2508)
Solanum sturtianum
Solanum sp. (SVL 2917)

SCROPHULARIACEAE

Buchnera linearis
Stemodia linophylla
Genus sp. nov. (SVL 2536)
Genus sp. nov. (SVL 2537)

MYOPORACEAE

Eremophila clarkei
Eremophila cuneifolia
Eremophila aff. *cuneifolia* (SVL 2408)
Eremophila exilifolia
Eremophila forrestii
Eremophila fraseri
Eremophila "jucunda" (SVL 2421)
Eremophila lanceolata
Eremophila latrobei
Eremophila aff. *latrobei* (SVL 2461)
Eremophila aff. *latrobei* (SVL 2474)
Eremophila longifolia
Eremophila margarethae (red) (SVL 2576)
Eremophila margarethae (yellow) (SVL 2577)
Eremophila sp. (SVL 2469)
Eremophila sp. (SVL 2618)
Eremophila sp. (SVL 3012)
Myoporum platycarpum

RUBIACEAE

Psydrax attenuata
Psydrax latifolia
Psydrax suaveolens
Hedyotis crouchiana
Pomax aff. *umbellata* (SVL 2468)

CAMPANULACEAE

Wahlenbergia tumidifructa
Wahlenbergia sp. (SVL 2928)

LOBELIACEAE

Lobelia sp. (SVL 2861)

GOODENIACEAE

Brunonia australis
Dampiera candicans
Dampiera cinerea
Dampiera dentata
Dampiera sp. (SVL 2404)
Dampiera sp. (SVL 2511)
Dampiera sp. (SVL 2522)
Goodenia lamprosperma
Goodenia microptera
Goodenia pinnatifida
Goodenia prostrata
Goodenia aff. *stobbsiana* (SVL 2382)
Goodenia aff. *stobbsiana* (SVL 2514)
Goodenia triodiophylla
Goodenia xanthosperma
Goodenia sp. (SVL 2442)
Goodenia sp. (SVL 2510)
Goodenia sp. (SVL 2572)
Goodenia sp. (SVL 2594)
Goodenia sp. (SVL 2637)
Goodenia sp. (SVL 2657)
Goodenia sp. (SVL 2926)
Goodenia sp. (SVL 3006)
Scaevola amblyanthera
Scaevola parvifolia
Scaevola sericophylla
Scaevola spinescens
Velleia connata
Velleia sp. (SVL 2938)

STYLIDIACEAE

Levenhookia sp. (SVL 3165)
Stylidium sp. (SVL 2502)
Stylidium sp. (SVL 2927)

ASTERACEAE

Angianthus tomentosa
Bidens bipinnata
Brachycome sp. (SVL 2582)
Calocephalus knappii
Calocephalus sp. (SVL 2831)
Chrysocephalum apiculatum
Chrysocephalum pterochaetum
Chrysocephalum semicalvum
Helichrysum gilesii
Olearia sp. (SVL 2415)
Podolepis canescens
Podolepis sp. (SVL 2590)
Podolepis sp. (SVL 2833)
Rhodanthe helipterioides
Rhodanthe humboltianum

Appendix Two

Rhodanthe pollackii
Rutidosis helichrysoides
Schoenia cassiniana
Streptoglossa bubakii
Genus sp. nov. (SVL 2578)
Genus sp. nov. (SVL 2589)
Genus sp. nov. (SVL 2597)
Genus sp. nov. (SVL 2600)
Genus sp. nov. (SVL 2931)
Genus sp. nov. (SVL 2968)
Genus sp. nov. (SVL 3000)

Appendix Three

Avifauna recorded in the

Southern Little Sandy Desert project area.

Appendix Three

NON-PASSERINES

- Emu (*Dromaius novaehollandiae*)
- Australian Shelduck (*Tadorna tadornoides*)
- Black Swan (*Cygnus atratus*)
- Grey Teal (*Anas gracilis*)
- Pacific Black Duck (*Anas superciliosa*)
- Pink-eared Duck (*Malacorhynchus membranaceus*)
- Darter (*Anhinga melanogaster*)
- White-necked Heron (*Ardea pacifica*)
- White-faced Heron (*Egretta novaehollandiae*)
- Black Kite (*Milvus migrans*)
- Black-breasted Buzzard (*Hamirostra melanosternon*)
- Black-shouldered Kite (*Elanus axillaris*)
- Brown Goshawk (*Accipeter fasciatus*)
- Collared Sparrowhawk (*Accipiter cirrhocephalus*)
- Little Eagle (*Hieraaetus morphnoides*)
- Spotted Harrier (*Circus assimilis*)
- Wedge-tailed Eagle (*Aquila audax*)
- Whistling Kite (*Haliastur sphenurus*)
- Australian Hobby (*Falco longipennis*)
- Australian Kestrel (*Falco cenchroides*)
- Brown Falcon (*Falco berigora*)
- Australasian Coot (*Fulica atra*)
- Australian Bustard (*Ardeotis australis*)
- Little Button-Quail (*Turnix velox*)
- Common Sandpiper (*Actitis hypoleucos*)
- Wood Sandpiper (*Tringa glareola*)
- Black-winged Stilt (*Himantopus himantopus*)
- Black-fronted Plover (*Elseyornis melanops*)
- Red-capped Plover (*Charadrius ruficapillus*)
- Common Bronzewing (*Phaps chalcoptera*)
- Crested Pigeon (*Ocyphaps lophotes*)
- Diamond Dove (*Geopelia cuneata*)
- Spinifex Pigeon (*Geophaps plumifera*)
- Cockatiel (*Nymphicus hollandicus*)
- Galah (*Cacatua roseicapilla*)
- Budgerigar (*Melopsittacus undulatus*)
- Mulga Parrot (*Psephotus varius*)
- Ringneck Parrot (*Barnardius zonarius*)
- Black-faced Cuckoo-Shrike (*Coracina novaehollandiae*)
- Horsfield's Bronze-Cuckoo (*Chrysococcyx basalis*)
- Pallid Cuckoo (*Cuculus pallidus*)
- Southern Boobook (*Ninox novaeseelandiae*)
- Tawny Frogmouth (*Podargus strigoides*)
- Spotted Nightjar (*Eurostopodus argus*)
- Australian Owlet-Nightjar (*Aegotheles cristatus*)
- Red-backed Kingfisher (*Todiramphus pyrrhopygia*)
- Rainbow Bee-eater (*Merops ornatus*)

PASSERINES

- Rufous-crowned Emu-Wren (*Stipiturus ruficeps*)
- Striated Grasswren (*Amytornis striatus*)
- Variegated Fairy-Wren (*Malurus lamberti*)
- White-winged Fairy-Wren (*Malurus leucopterus*)
- Banded Whiteface (*Aphelocephala nigricincta*)
- Chestnut-rumped Thornbill (*Acanthiza uropygialis*)
- Inland Thornbill (*Acanthiza apicalis*)
- Slate-backed Thornbill (*Acanthiza robustirostris*)
- Southern Whiteface (*Aphelocephala leucopsis*)
- Striated Pardalote (*Pardalotus striatus*)
- Weebill (*Smicrornis brevirostris*)
- Western Gerygone (*Gerygone fusca*)

Appendix Three

Yellow-rumped Thornbill
(Acanthiza chrysorrhoa)
Black Honeyeater
(Certhionyx niger)
Brown Honeyeater
(Lichmera indistincta)
Crimson Chat
(Ephthianura tricolor)
Grey-headed Honeyeater
(Lichenostomus keartlandi)
Orange Chat
(Ephthianura aurifrons)
Pied Honeyeater
(Certhionyx variegatus)
Singing Honeyeater
(Lichenostomus virescens)
Spiny-cheeked Honeyeater
(Acanthagenys rufogularis)
White-fronted Honeyeater
(Phylidonyris albifrons)
White-plumed Honeyeater
(Lichenostomus penicillatus)
Yellow-throated Miner
(Manorina flavigula)
Hooded Robin
(Melanodryas cucullata)
Jacky Winter
(Microeca fascinans)
Red-capped Robin
(Petroica goodenovii)
Grey-crowned Babbler
(Pomatostomus temporalis)
White-browed Babbler
(Pomatostomus superciliosus)
Cinnamon Quail-Thrush
(Cinclosoma cinnamomeum)
Varied Sittella
(Daphoenositta chrysoptera)
Crested Bellbird
(Oreoica gutturalis)
Grey Shrike-Thrush
(Colluricincla harmonica)
Rufous Whistler
(Pachycephala rufiventris)
Grey Fantail
(Rhipidura fuliginosa)
Magpie-lark
(Grallina cyanoleuca)
Willy Wagtail
(Rhipidura leucophrys)
Black-faced Woodswallow
(Artamus cinereus)
Ground Cuckoo-Shrike
(Coracina maxima)
White-winged Triller
(Lalage sueurii)
Australian Wood Duck
(Chenonetta jubata)
Australian Magpie
(Gymnorhina tibicen)
Grey Butcherbird
(Cracticus torquatus)
Little Woodswallow
(Artamus minor)
Masked Woodswallow
(Artamus personatus)
Pied Butcherbird
(Cracticus nigrogularis)
Little Crow
(Corvus bennetti)
Torresian Crow
(Corvus orru)
Singing Bushlark
(Mirafra javanica)
Richard's Pipit
(Anthus novaeseelandiae)
Painted Firetail
(Emblema picta)
Zebra Finch
(Taeniopygia guttata)
Fairy Martin
(Hirundo ariel)
White-backed Swallow
(Cheramoeca leucosternus)
Brown Songlark
(Cincloramphus cruralis)
Spinifexbird
(Eremiornis carteri)

Appendix Four

Mammals recorded in the

Southern Little Sandy Desert project area.

Appendix Four

TACHYGLOSSIDAE

Tachyglossus aculeatus (Short-beaked Echidna)

DASYURIDAE

Antechinomys laniger (Kultarr)
Dasycersus cristicauda (Mulgara)
Dasykaluta rosamondae (Little Red Kaluta)
Ningaui ridei (Wongai Ningaui)
Planigale sp 1.
Planigale sp 2.
Pseudantechinus woolleyae (Woolley's Pseudantechinus)
Sminthopsis longicaudata (Long-Tailed Dunnart)
Sminthopsis macroura (Striped-faced Dunnart)
Sminthopsis ooldea (Ooldea Dunnart)
Sminthopsis youngsonii (Lesser Hairy-footed Dunnart)

MACROPODIDAE

Macropus robustus (Euro)
Macropus rufus (Red Kangaroo)

MURIDAE

Leporillus sp. (Djooyalpi, Stick-nest Rat)
Mus domesticus (House Mouse)
Notomys alexis (Tarrkawarra, Spinifex Hopping-mouse)
Pseudomys chapmani (Ngadji, Western Pebble-mound Mouse)
Pseudomys desertor (wildjin, Desert Mouse)
Pseudomys hermannsburgensis (Mingkiri, Sandy Inland Mouse)
Zyzomys argurus (Djoorri, Common Rock Rat)

MOLOSSIDAE

Mormopterus beccarii (Beccari's Free-tailed Bat)

EMBALLONURIDAE

Saccolaimus flaviventris (Yellow-bellied Sheath-tailed Bat)

VESPERTILIONIDAE

Chalinolobus gouldii (Gould's Wattled Bat)
Scotorepens greyi (Little Broad-nosed Bat)
Nyctophilus geoffroyi (Lesser Long-eared Bat)
Vespadelus findlaysoni (Inland Cave Bat)

EQUIDAE

Equus asinus (Donkey)
Equus caballus (Brumby)

BOVIDAE

Bos taurus (Cattle)

CAMELIDAE

Camelus dromedarius (Dromadary Camel)

ORYCTOLAGIDAE

Oryctolagus cuniculus (European Rabbit)

FELIDAE

Felis cattus (Feral Cat)

CANIDAE

Lupus canis dingo (Dingo)

Appendix Five

Reptiles and Amphibians recorded in the

Southern Little Sandy Desert project area.

Appendix Five

MYOBATRACHIDAE

Limnodynastes spenceri
Neobatrachus aquilonius
Neobatrachus sp.
Notaden nichollsi

HYLIDAE

Cyclorana maini
Litoria rubella

CHELIDAE

Chelodina steindachneri

GEKKONIDAE

Diplodactylus ciliaris aberrans
Diplodactylus conspicillatus
Diplodactylus elderi
Diplodactylus pulcher
Diplodactylus stenodactylus
Diplodactylus wellingtonae
Gehyra punctata
Gehyra purpurascens
Gehyra variegata
Heteronotia binoei
Nephrurus laevissimus
Nephrurus levis
Oedura marmorata
Rhynchoedura ornata

PYGOPODIDAE

Delma bulteri
Delma nasuta
Delma pax
Lialia burtonis
Pygopus nigriceps

AGAMIDAE

Ctenophorus caudicintus mensarum
Ctenophorus inermis
Ctenophorus isolepis gularis
Ctenophorus reticulatus
Ctenophorus scutulatus
Diporiphora winneckei
Diporiphora sp.
Gemmatophora longirostris
Molloch horridus
Pogona minor minor

SCINCIDAE

Carlia tricantha
Cryptoblepharus carnabyi
Cryptoblepharus plagiocephalus
Ctenotus ariadnae
Ctenotus atlas
Ctenotus brooksi brooksi
Ctenotus calurus
Ctenotus dux
Ctenotus grandis grandis
Ctenotus helenae
Ctenotus leae
Ctenotus leonhardii
Ctenotus nasutus
Ctenotus pantherinus ocellif
Ctenotus piankai
Ctenotus quatturodecimlineatus
Ctenotus saxatilis
Ctenotus schomburgki
Cyclodomorphus melanops melanops
Egernia depressa
Egernia striata
Eremiascincus fasciolata
Eremiascincus richardsoni
Lerista bipes
Lerista ips
Lerista macropisthopus remota
Lerista muelleri
Lerista neander
Lerista vermicularis
Menetia greyi
Morethai ruficauda ruficauda
Notoscincus ornatus
Teliqua multifasciata

VARANIDAE

Varanus acanthurus
Varanus brevicauda
Varanus caudolineatus
Varanus eremius
Varanus giganteus
Varanus gilleni
Varanus gouldi
Varanus panoptes rubidus
Varanus tristis tristis

TYPHLOPIDAE

Appendix Five

Ramphotyphlops grypus
Ramphotyphlops sp.
(*endoterus/hamatus*)

BOIDAE

Antaresia perthensis

ELAPIDAE

Demansia psammophis cupreiceps
Demansia rufescens
Furina ornata
Pseudonaja modesta
Pseudonaja nuchalis
Rhinoplocephalus monarchus
Vermicella anomala
Vermicella bertholdi
Vermicalla fasciolata

Appendix Six

Ant taxa recorded in the

Southern Little Sandy Desert project area.

Appendix Six

CERAPACHYINAE

Cerapachys brevis
Cerapachys greavesi
Cerapachys JDM 942

DOLICHODERINAE

Iridomyrmex agilis
Iridomyrmex cappoinclinus
Iridomyrmex chasei concolor
Iridomyrmex ? *discors aeneogaster*
Iridomyrmex dromus
Iridomyrmex hartmeyeri
Iridomyrmex hartmeyeri group JDM 327
Iridomyrmex sanguineus
Iridomyrmex viridiaeneus
Iridomyrmex JDM 133
Iridomyrmex JDM 311
Iridomyrmex JDM 313

FORMICINAE

Calomyrmex JDM 239
Camponotus ceriseipes group JDM 569
Camponotus claripes minimus
Camponotus dryandrae
Camponotus ephippium group JDM 692
Camponotus evae
Camponotus gibbinotus group JDM 296
Camponotus gibbinotus group sp. indent.
Camponotus midas
Camponotus ? near *pellax*
Camponotus near *sanguineus*
Camponotus tasmani
Camponotus tricaloratus
Camponotus wiederkehri
Camponotus sp. indet.
Camponotus JDM 394
Camponotus JDM 598
Camponotus JDM 772
Melophorus near *aeneovirens*
Melophorus bagoti
Melophorus iridescens group
Melophorus turneri
Melophorus JDM 199
Melophorus JDM 24
Melophorus JDM 272
Melophorus JDM 51
Melophorus JDM 520
Melophorus JDM 743
Melophorus JDM 789
Melophorus JDM 971
Opisthopsis haddoni rufoniger
Paratrechina rosae
Polyrhachis (*Chariomyrma*) *aurea*
Polyrhachis (*Campomyrma*) near *gravis*
Polyrhachis (*Chariomyrma*) *lata* sp. 'A' JDM 122
Polyrhachis (*Campomyrma*) *macropus*
Polyrhachis (*Campomyrma*) near *schwiedlandi*
Stigmacros aemula
Stigmacros near *elegans*
Stigmacros termitoxenus
Stigmacros JDM 341
Stigmacros JDM 827

MYRMECIINAE

Myrmecia desertorum
Myrmecia hilli
Cardiocondyla nuda
Crematogaster dispar
Crematogaster laeviceps chasei
Meranoplus dimidiatus
Meranoplus diversus group JDM 637
Meranoplus diversus group JDM 987
Meranoplus JDM 424
Meranoplus JDM 867
Meranoplus JDM 988
Monomorium fieldi
Monomorium laeve
Monomorium rothsteini
Monomorium sordidum
Pheidole indet.
Pheidole JDM 164
Pheidole JDM 271
Pheidole JDM 280
Tetramorium near *megalops*
Tetramorium spininode
Tetramorium near *striolatum*
Tetramorium JDM 685
Tetramorium JDM 886

PONERINAE

Odontomachus ruficeps
Pachycondyla (*Bothroponera*) JDM 460
Pachycondyla (*Bothroponera*) JDM 984
Rhytidoponera JDM 535
Rhytidoponera JDM 904

Appendix Six

Rhytidoponera JDM 985
Rhytidoponera JDM 986
Rhytidoponera taurus
Rhytidoponera tyloxys
Rhytidoponera violacea