BIOLOGICAL SURVEY OF

THE SOUTHERN LITTLE SANDY DESERT

Project (N706)

Progress Report 1

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PRECIS

BIOLOGICAL SURVEY OF SOUTHERN LITTLE SANDY DESERT

Project N706

Fifteen sampling sites in the southern portion of the Little Sandy Desert have been selected. These site represent the array of biotic assemblages present in the project area and were delimited with reference to geological, landform and soil considerations. The arrangement of sampling sites within the study area will facilitate the documentation of heterogeneity between similar habitats as a consequence of any north-south environmental gradients. Unfortunately, the actions of any east-west environmental gradient on the biotic assemblages in the project area will not be comprehensively sampled because of logistic constraints. Planned opportunistic and supplementary flora sampling across the project area should address this deficiency in the project's sampling strategy.

Numerous flora records of interest have been obtained from the project area during opportunistic activities. These records include the identification of several new population of Eucalyptus rameliana *and a novel* Calothamnus *(*C. 'footeana' *ms). Range extensions were also recorded for many other species and possibly a new population of the Declared Rare Flora species,* Thryptomene wittweri, *was also identified. Seventy four species of bird were observed in the project area with the Beyondie Lakes area being particularly rich in waterbirds.*

Trapping grids and flora sampling quadrats will be installed during a visit to the project area in October and the first systematic sampling will occur in April - May 1996.

TITLE OF PROJECT:

Biological survey of the Southern Little Sandy Desert

AGENCY:

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

CHIEF INVESTIGATOR:

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AIM OF PROJECT:

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

SCOPE:

1. Provide an overview of the physical environment (geology, geomorphology, soils and climate), including descriptions of vegetation gradients and patterns and their extent within the southern Little Sandy Desert.

2. In the context of the above review, develop a systematic survey design for sampling the flora and fauna (flora/vegetation, mammals, birds reptiles, amphibians, ants) using existing biophysical information (surveys, maps, reports, remote sensing data), as well as field inspections.

3. Based on CALM's standards for biological surveys, ie - 10 000 m^2 nested quadrats, used in the CALM Pilbara survey, select and permanently locate sites that represent the array of vegetation assemblages typical of the southern portion of the Little Sandy Desert.

4. Undertake the first of three systematic surveys of landform units, biotic composition, habitat types and vegetation associations typical of the southern portion of the Little Sandy Desert.

5. For the data compiled and collected above, commence data entry into computer databases (for use in GIS mapping and analysis) and undertake preliminary data checking.

PROGRESS TOWARDS COMPLETION OF SCOPE ITEMS:

Since the commencement of this project in February, the majority of research towards fulfilment of the project's aims and completion of the 1995 Scope items has been based around literature reviews, office investigations, liaison and logistic/human resource organisation. One reconnaissance trip, incorporating the selection of camps, sampling sites and trapping grids, was undertaken to the project area. During this trip, opportunistic flora collections and bird observations from numerous locations were obtained.

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

Scope 1:

An overview of the physical environment and description of the environmental gradients and patterns within the southern Little Sandy Desert was completed. The overview process and associated literature review failed to locate new information on the project area further reinforcing the Chief Investigator's belief that the area is poorly known. No biological or ecological investigations, other than those undertaken in conjunction with the rediscovery of Giles' mallee (*Eucalyptus rameliana*) in 1991, have been undertaken in the project area since Ernest Giles traversed the region in 1876.

During this review process the boundaries of the project area were refined and delimited on topographical and cadastral maps. After consultation with colleagues the final boundaries chosen for the study area were akin to those of the Keartland Botanical District in the west, along the Savory Creek in the north, the 121° of longitude alignment in the east (will be extended to the Canning Stock Route eventually) and the northern apron of the Carnarvon Range in the south. Figure 1 provides an overview of the project area. The majority of the project area falls on the Bullen (SG 51-1) 1:250 000 map sheet with smaller portions on the Robertson (SF 51-13), Collier (SG 50-4) and Nabberu (SG 51-5) map sheets.

Scope 2:

The development of a systematic survey design was initiated following the overview process of Scope item 1. The sampling design strategy promoted to encompassed the array of representative biological assemblages present in the project area was based on the presumption that the flora and fauna of the project area would exhibit a strong relationship with the underlying geology, landforms and soils. This assumption was founded on information provided by colleagues for other regions of the State (McKenzie, Burbidge and Keighery, personal communication) and promoted in various publications such as Beard's (1975) 'Vegetation Survey of Western Australia - Pilbara'. The use of geology, landforms and soils as the initial delimiters in the development of the survey design strategy was also necessitated by the availability of this information in comparison to reliable biological information. The only biological information covering the project area was obtained from Beard's *op. cit.* 'Vegetation Survey of Western Australia - Pilbara'. Table 1 provides a summary of the land units

identified in the project area which are based principally on geology and inherently confer differences in landforms and soils and thus biotic assemblages.

Table 1. Geological land units present within the southern Little Sandy Desert and the location of biological sampling sites within these units.

Land unit	Description	Geological Age	Sampling Sites[A]
Lake deposits	mud, sand, saline, gypsum	Cainozoic - Quaternary	S1, B5
Wind blown sands	dunes, red	Cainozoic - Quaternary	S4, C4, B4
Alluvium	gravel and sand along watercourses	Cainozoic - Quaternary	
Colluvium	gravel, rubble, sands on slopes	Cainozoic - Quaternary	S2, C2, B3
Hardpan	consolidated colluvium and alluvium	Cainozoic - Tertiary	
Calcrete	limestone in modern and ancient drainage	Cainozoic - Tertiary	C3
Laterite	pisolitic ferruginous deposits	Cainozoic - Tertiary	S3, C5, B1
Dolerite sills	doleritic hills and screes	Middle Proterozoic	
Sandstones	shale, siltstone and conglomerate	Middle Proterozoic	S5, C1, B2
Granites		Precambrian	

([A] Sampling Sites: S = Savory Creek sites, C = Cooma Well sites, B = Beyondie Lakes sites.)

This survey design strategy was validated and ratified during a ten day reconnaissance trip to the project area in July - August. During this trip the relationship between the biotic assemblages and geology, landforms and soils was discernibly evident. The survey design strategy promoting the selection of sample sites across any biophysical gradient (climatic) present in the project area was, however, not achievable upon field reconnaissance. This deficiency can be attributed to logistic constraints imposed through deficiencies in access to large portions of the project area as depicted in Figure 1. Vehicle access on established tracks was only possible along the western margins of the project area and along easterly intrusions off this corridor. Nevertheless, the Chief Investigator feels that the selection of sampling sites as depicted in Figure 1 should adequately sample any north-south biophysical gradient which may persist in the project area. It is also the intent of the Chief Investigator to sample any east-west biophysical gradient in the project area by conducting a series of vehicular traverses longitudinally across the project area establishing flora sampling sites in the process.

Scope 3:

During the July - August field trip 12 sample sites were permanently located throughout the project area, centred on three camp sites. The location of these sites is depicted in Figure 1 and the nomenclature applied to them for identification together with their coordinates is presented in Table 2. An additional two sites have been temporary located in the southern part of the project area - Beyondie Lakes site - and will be fixed permanently during the forthcoming October installation and opportunistic sampling trip.

Table 2. Latitude and longitude coordinates for the 15 permanent sample sites employed in the biological survey of the southern Little Sandy Desert.

Location	Site number	Latitude	Longitude
Savory Creek	S1	23° 53' 04" S	120° 38' 29" E
	S2	23° 53' 55" S	120° 36' 15" E
	S3	23° 53' 22" S	120° 31' 58" E
	S4	23° 53' 16" S	120° 31' 16" E
	S5	23° 52' 45" S	120° 30' 13" E
Cooma Well	C1	23° 03' 36" S	120° 24' 34" E
	C2	24° 04' 31" S	120° 20' 39" E
	C3	24° 04' 51" S	120° 20' 26" E
	C4	24° 06' 14" S	120° 19' 36" E
	C5	24° 06' 41" S	120° 19' 11" E
Beyondie Lakes	B1	24° ?? ?? S	120° ?? ?? E
	B2	24° ?? ?? S	120° ?? ?? E
	B3	24° 38' 51" S	120° 12' 57" E
	B4	24° 37' 44" S	120° 13' 53" E
	B5	24° 45' 49" S	120° 13' 39" E

The survey's design strategy sanctioned the establishment of five sampling sites in the vicinity of the three camps. The five sampling sites will consist of the following:

- two independent vertebrate pitfall trap arrays of eight pits linked by 100 m of continuous drift fence.
- two independently located, 16 pit, temporally operating invertebrate pitfall trapping grids.
- six permanent, continuously sampling, invertebrate traps.
- one random bird sampling transect.
- two nested flora quadrat (10 000 m^2) sampling sites.

Liaison with neighbouring pastoralists was undertaken during the reconnaissance trip and has continued subsequently. This liaison was to inform the lease holders of our intent, the aims and scope of the project and its duration. Permission was also obtained to establish some site on portions of their leases which were remote from grazing activities and not impacted by pastoral operations. For logistical reasons, permission to access tracks and wells was also obtained.

Scope 4:

No systematic sampling of permanently established sample sites will occur during 1995. It is anticipated that the first sampling session, of 20 days duration, will be undertaken in April - May 1996. This sampling session will involve six CALM personnel sampling all targeted biotic groups.

Opportunistic sampling was undertaken in the project area during the reconnaissance trip. A total of 63 plant specimens were collected with numerous field observations made on the distribution and the assemblages into which the more abundant species were partitioned. A provisional list of the flora species collected during the reconnaissance trip is not currently available as many

specimens await identification. Interesting flora records obtained during the reconnaissance trip were:

- The identification of eight new populations of *Eucalyptus rameliana*. Three of the new populations were located in the vicinity of known populations to the north west of Moffettah Well. The remaining five populations were all located to the south east of Beyondie Lakes in the vicinity of Bullen Hill and Mt Essendon. Several of these southern populations were in the proposed Carnarvon Range National Park.

- The identification of numerous new populations of a novel One-sided Bottlebrush (*Calothamnus 'footiana'* ms) which were chiefly found in association with *E. rameliana* populations. Several of the new populations were within the bounds of the proposed Carnarvon Range National Park

- The collection of a fringed lily (*Thysanotus* aff. *manglesianus*) from the summit of Mt Essendon. This taxon appears to be identical to specimens collected from Mt Meharry in the Hamersley Range and Mt Augustus in the Ashburton District. Typical *Thysanotus manglesianus* is restricted to south-western Western Australia west of a line from Meekatharra to Balladonia, where it usually grows in mallee sandplain habitats. Clearly this taxon requires further taxonomic investigation with the Mt Essendon and two previously located hilltop populations representing either a closely related novel taxon or disjunct outliers. Duplicate specimens of this collection have been forwarded to the appropriate taxonomist.

- The possible collection of the Mountain Thryptomene, *Thryptomene wittweri* from the southern breakaways, cliffs and scree slopes of Mt Essendon. This species is a Declared Rare Flora species which is known from two further populations in Western Australia, on Mt Meharry and Mt Augustus. The species appears to be relictual, growing on the southern slope on all three known sites which are presumably micro-climatically more amenable. The specimen from Mt Essendon has been forwarded to the appropriate taxonomist for confirmation.

- The collection and recording of numerous new populations of the poorly collected and recently described *Grevillea spinosa*. Most collections have previously been from the Canning Stock Route east of the project area. Populations located during the reconnaissance trip represent a range extension approaching 100 km for this species. Within the project area this species occurred, usually in abundance, on many of the sandstone ridges, especially those in the southern portion of the project area south on Ilgarari Creek.

- The collection of the Hamersley Range wattle, *Acacia hamersleyensis*. This species was previously thought to be endemic to the Hamersley Range in the Pilbara Region.

- The collection of a specimen of *Eucalyptus mannesis* in the dune field between the Yibbie and Carnarvon Ranges. This collection represents a range extension of approximately 100 km for this species.

Opportunistic information and observations were also obtained on the pollination by the Brown Honeyeater (*Lichmera indistincta*) and Yellow-throated Miner (*Manorina flavigula*) of *Swainsona formosa*, Sturt's desert pea.

Numerous records of birds within the survey area were also collected during the reconnaissance trip. A total of 74 species were recorded. The Beyondie Lakes wetland system was particularly rich in species with numerous waterbirds being recorded as foraging or nesting on these semi-permanent water bodies. Species present included the Black Swan, Pacific Black Duck, Maned Duck, Pink-eared Duck, Avocet, Red-kneed Dotterel and Marsh Tern.

Scope 5:

Data entry and compilation of databases for GIS mapping and data analysis has commenced. Herbarium specimens label information, principally locality and habitat details, for the flora specimens collected during the reconnaissance trip has been incorporated into a GIS database. Similarly, bird species observed during the reconnaissance trip have been databased and are ready for incorporation into the GIS database for the project area.

Acquisition and compilation of GIS data, including digitising of topographical, cadastral, physical and biological resources maps has commenced for those themes where information is available.

PLANNED ACTIVITIES TOWARDS COMPLETION OF SCOPE ITEMS:

Over the coming months work will continue on this project. This work will include the installation of trapping grids and establishment of flora sampling quadrats, development of the various GIS themes and compilation of mapping data. Plant specimens collected during the reconnaissance trip will also be identified and incorporated into the Pilbara Regional and Perth herbaria.

The installation trip is planned for late October and will last for a duration of 18 days. Three CALM personnel, one CALM volunteer and four Australian Trust for Conservation Volunteers personnel will be involved in this trip. As detailed previously, the two temporarily position Beyondie Lakes sampling sites will be fixed during the installation trip.

The first systematic sampling trip to the project area is planned for April - May 1996.

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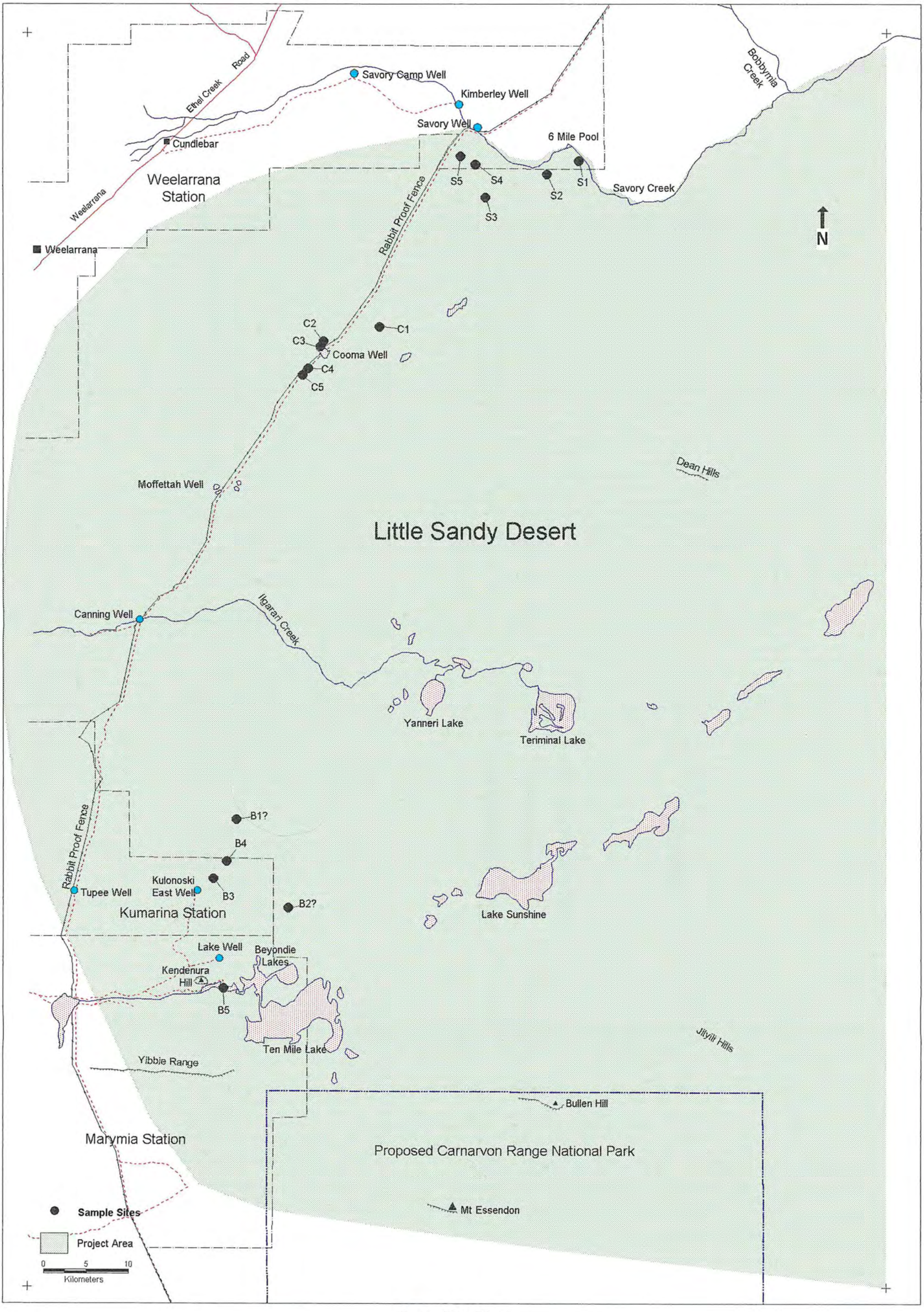

Locality Plan
Biological Survey of Southern Little Sandy Desert

FIGURE 1

LOCALITY PLAN FOR

THE SOUTHERN

LITTLE SANDY DESERT

Stephen van Leeeuwen, CALM September 1995 Figure 1.