LANDSCOPE EXPEDITIONS

Western Australian Department of Conservation and Land Management,
Locked Bag 29, Bentley Delivery Centre, WA 6983
in association with
UWA Extension, The University of Western Australia, Nedlands, WA 6907

Mallee, Mulgara and Thorny Devils: Exploring the Little Sandy Desert 1999. *LANDSCOPE* Expeditions. Report No. 34

FROM THE EXPEDITION LEADERS

On behalf of CALM and UWA Extension we would like to thank all participants of the Little Sandy Desert expedition for their enthusiasm, perseverance, resilience and support. Without the participation of expeditioners, the trip would not have been possible and the biological survey research that CALM is undertaking in the region would not be as comprehensive and adequate. The primary purpose of the expedition was to visit localities throughout the southern Little Sandy Desert that had not been adequately sampled by CALM previously and to collect and document new plant and animal records. This objective was overwhelmingly achieved through a relaxed and opportunistic approach to sampling and data gathering.

The expedition leaders extend a heartfelt vote of thanks to Yvonne Muller, the expedition's cook and camp coordinator, for her superb gastronomic skills under primitive conditions and for her unwavering encouragement and support. We also acknowledge the support and assistance provided by Travelabout's Bob Hollis, especially in respect to his nurturing of the OKA over some trying terrain, and for assisting Yvonne. The leaders thank all participants of the expedition and look forward to the opportunity to again sharing some time together in the Little Sandy Desert or on other *LANDSCOPE* Expeditions.

Stephen van Leeuwen, Tony Start, Bob Bromilow, Phil Fuller and Tricia Handasyde

Members of the Mallee, Mulgara and Thorny Devils: Exploring the Little Sandy Desert *LANDSCOPE* Expedition1999

EXPEDITION ACHIEVEMENTS

From a biological stance, the expedition was an overwhelming success and a credit to all involved. The biological survey work being undertaken by CALM in the southern portion of the Little Sandy Desert has been substantially enhanced as a consequence of data and species records collected during this expedition. Biological outcomes included:

- Recording 301 plant species of which 173 specimens were collected. Thirty-two of the plants collected represent new records for CALM's Biological Survey.
- The collection of two species which appear to be new to science, three species which are listed on the Priority Flora List (*Dampiera ramosa*, *Microcorys macredieana*, *Stemodia linophylla*) and documenting noteworthy range extensions for another seven.
- Observing 56 bird species, two of which were new records for the project area (little corella, spotted bowerbird).
- Recording breeding records for 15 bird species.
- Collecting supplementary records for 21 mammal species of which 11 were for extant natives and six were introduced.
- Documenting the previous existence of four mammals now presumed extinct (chuditch, rock wallaby, stick-nest rat, burrowing bettong) in the project area; and
- Recording 36 species of reptile during the expedition, including two which had not been previously documented by CALM (yellow-tailed sand swimmer, cave gecko).

Perhaps the most rewarding outcome was the immense comradeship that developed between all participants and the friendships that were fostered.

DIARY OF THE MALLEE, MULGARA AND THORNY DEVILS *LANDSCOPE* EXPEDITION 1999

Sunday September 12 Early morning cool, calm, overcast. Noon mild, light north-east breeze. Some hazy cloud. Late afternoon mild, calm, clear. A long and quite varied day. Away from Perth only a little late, due to maintenance problems with the OKA. Up to New Norcia for mid-morning break – roadside very wet. Considerable amounts of the striking blue lechenaultia, the bizarre plants contrasting with the relatively natural bush. Onward through the changing geological areas and ever-decreasing rainfall patterns. The roadside dominated by the brilliant yellows of the *Acacia* and *Senna* families. A stop to view an example of the wreath lechenaultia.

Lunch stop at Gibbering White Wells. Large tadpoles in the water and a host of ground covers. Considerable flowering also occurring on the gums. The brilliant gold soon faded, leaving only the ground flowers, but by mid-afternoon, these too had faded, leaving the country almost in its summer garb, except for the flowers of the almost ever-present mulla mulla which at least adds some colour to the almost sombre landscape. At Cue turned west, fauna being somewhat rare – only 4 pairs of emu, three pairs of goats in very healthy condition, a few sheep and a single marvellous flock of brilliant emerald budgerigars wheeling and darting in the late sun. From Cue, an hour's drive first into red sunset and then north with headlights to the campsite at Wilge-Mia Ochre Mine, where it was a relief to find the camp fire going and the rest of the crew who had come down from the north. A beautiful calm clear night, the Milky Way soaring across the sky and stars down to the horizon.

Monday September 13 Woke to a lovely day. We all breakfasted, packed and explored the ochre mine. A fascinating spot with a long history of ochre mining and occupation. A desiccated sheath-tail bat was found in the tunnels and is now part of the Expeditions collection. A mob of smaller bats (*Vespadelus* spp.) was found in a side tunnel. Onward to Meekatharra through more wildflowers and nearly to Kumarina when the OKA blows a hydraulic (power steering) hose. Some inventive repairs get the OKA moving again to the Kumarina Roadhouse.

After lunch the reorganisation began, the objective was to pack all the gear into the vehicles and leave the OKA's trailer behind until our return. Heading for Willie Soak but the light beat us again and we camped in a woodland near where we joined the old No. 1 vermin-proof fence.

A great curry for tea, thanks to Mum (Yvonne) and the gang, and a few bat recordings were made. This finished off another interesting day. Look forward to tomorrow.

Tuesday September 14 An unhurried morning. Left just east of Tupee Well at 7.30 am. Day cool, fine, pleasant breeze. Drove through some quite overgrown spinifex track. Passing Kulonoski East Well. Driving through flowering grevilleas (*Grevillea spinosa*). Arrived at Willie Soak Camp at 9.00 am. After morning tea, off to set pitfall traps and open metal Elliott traps, also flora gathering, hoping the traps will yield something in the morning. Back for a sausage sizzle prepared by "Mum" for lunch.

After lunch, a "smoothie" drive along the highway out to see Giles Mallee. A splendid showing of "no flowers" but hakeas and grevilleas were brilliant. Two punctured tyres during this trip along the newly made "highway". Back to camp at 5.30 pm. Tea of noodles and mince and a blind burrowing snake came in to the camp-fire during tea. After tea, wind died. We went spotlighting for whatever – found eggs but no bacon and egg tomorrow! Looking forward to seeing what transpires tomorrow.

Wednesday September 15 Cool morning. Tony and Dave checked the traps near camp while the rest of us had breakfast. Packed up and moved out to check the other trap lines. Found several spinifex hopping mice. At the plain site, we found three sandy inland mice, first record for that site. Headed off across the sand dunes, had to de-bus twice and let the tyres down. Stopped at 1.00 pm for lunch and to view the bizarre *Halosarcia* 'Michelin Man' plant. Headed off again, stopping several times to find the track, twice to pull vehicles out of bogs and once to change a flat tyre. The last major dune proved the worst and we had to realign a section of track over the crest and make several attempts to get all the vehicles over. Arrived

next to Yanneri Lake at about 4.30 pm and set up camp. Put in four lines of 25 Elliott traps and two lines of pitfall traps, total of 10.

Dinner was Hangi style – vegetable onion, pumpkin, cabbage, potato with hamburger and steak – a great feed, again! A lovely evening secure in the knowledge there is no move tomorrow!

Thursday September 16 Yes, no move today but there sure was plenty yesterday, travelling with Stephen in the lead vehicle. My Scottish-Jewish granny once remonstrated with me for spending money on the Big Dipper. She had the philosophy that if you wanted something but did not actually need it, then if things were right it would just arrive free. She was right – riding with Stephen was all of that. It was also good to see Stephen and his crew operate at the front end of the expedition. They are an interesting and capable bunch that function well in the real uncertainties of genuine off-road travel.

Lake Yannerie, a brown salt slush lake, very beautiful in its own way. It is pristine as Tony explained the logic that apart from a helicopter visit from an unknown origin some time back and Stephen and Bob's survey 18 months ago, we are the first European visitors. Yes, we are honoured. We are doing something previous generations endured much to see while our children will never be able to have a similar experience. However, pristine as it is, we wonder what shock waves have preceded us, for example, the introduction of the rabbit and the disappearance of the aborigines – the original tenants and stewards.

More traps are laid in the morning and other specimens from the night's catch were recorded in Tony's 'big book'. The lizards, dragons, snakes and mice are intriguing and lovely in their own way but I cannot warm to them as a vocation. But the land catches us all. We've all talked about why this landscape holds us. Maybe it's a latent memory in our genes of that African rift valley we abandoned about 100 000 million years ago. It's not the animals and flora that I came for – it's the landscape and its relation with bigger things that have escaped the hunters, collectors and cataloguers. It is not a criticism – their work is intriguing and essential (amateur as well as professional) for a hope of maintaining this place. Without them I would not be here. But I look for other things. Jupiter rising at about 8 pm and Venus too at around 4.30 in the morning are very special without town lights, industry haze and the clutter of most country skylines. And who noted the moon rising late morning over the north end of the lake, just reflecting in the last of the outfall water? It was my private treat and now my secret is out.

A grand lunch, a combination of Yvonne's skill, timing and good company. The meals are a highlight that just happen three times a day.

The afternoon was spent on the other (eastern) side of the lake, hunting, scratching, digging and burning. Some were interesting specimens for Tony. I wish I had their eyes, the scientists, amateur and pros alike have quicker eyes and hands than I. They even see things in the landscape that I cannot see, so obvious once pointed out. But the haunting breeze in the casuarinas does not have to be seen, and just heard, it touches my soul, it always has.

Late afternoon. I'm for helping with dinner. The duty is light, more social than manual.

Friday 17 September After a cold night (minimum of 1°C), woke to a beautiful day. The overnight traps (20 pit and 100 Elliott) revealed five sandy inland mice, one dunnart and one spinifex hopping mouse. They needed warming under Chris' jumper before release. The aluminium eater of the day before remains anonymous.

Left Yanneri Lake camp at about 7.45 am and headed around the edge of the lake and over a couple of sand dunes before ABC Radio, Karratha interviewed Stephen and Graeme (whose name had been pulled out of a "hat" the night before) at 8.30 am. The interviewer was particularly intrigued with the sand swimming skink and the 1°C overnight temperature. I found a thorny devil which was much photographed, as are all the live "captures".

A number of sand dunes later (complete with bogged vehicles and track making) we came to a sheoak knoll surrounded by low lying country. A large sink hole contained the remains of a camel (didn't want to think too hard about how long it took to die). This was about 10.30 am. At 11.00 am we arrived at Ilgarari Creek. Lots of large *Melaleuca* and flower-laden *Acacia* bushes, also weeds (washed in?). Thence through mallee woodland slowly was Stephen, collecting en route? Flagged a bird's nest (honeyeater) for Phil to check out.

12.15 pm lunch in the mulga. Mulla mullas in profusion. A rufous whistler, budgerigars and zebra finches. 2.00 pm came on to a lovely sandstone escarpment called "Scrubby Hill" by Peter Muir (certainly not into the romantic names like Giles). We walked about 500 m to where he'd engraved his initials and date in 1966. Continued on through sand dune country but no more bogged vehicles. Saw a couple of sand dunes which had been partly washed away when the creek was in flood – normal course over 2 km away – must have been a big cyclone. Passed through more *Grevillea spinosa*, then into blackboy country – three with big new spears (flower spikes).

At about 4.00 pm we arrived at our Dreamtime Gully camp site with a lovely view across to a sandstone escarpment and in the shade of a beautiful *Eucalyptus* (or is it *Corymbia*?) *deserticola*. After setting up camp, work parties set out trap laying and others birdwatching.

Saturday September 18 Another glorious sunrise to a cloudless sky with Venus fading into the blue. A restful breakfast as we are not moving today. A couple of pre-breakfast parties left to check the traps, returning with a catch of four rock rats. Post-breakfast groups went out in search of plants, birds and lizards. We didn't see many birds but collected quite a few flowers. After morning tea, some people had showers behind the specially erected screens – others went collecting, birding, flowering. Collected after breakfast one spinifex hopping mouse, two sandy inland mice and three house mice from the traps. Tony led an expedition to the cave where they found a

cave gecko, a nursery colony of little brown bats, echidna droppings and quills and evidence of recent echidna diggings. Kestrel nest with eggs. Petroglyphs were also found in the cave. A sub-fossil skull of a chuditch was collected and so was a mummified rat, possibly a central Australian rock rat. Rock wallaby droppings were in evidence as were euro droppings. Also found were the remains of stick-nest rats. John and Bill saw an adult euro with young and Dave caught a beautiful moon snake (*Furina ornata*).

After lunch of delicious minestrone and cheese scones, followed by watermelon, we set off for Dreamtime Gully. We climbed a rocky outcrop with a few petroglyphs (including emu tracks). Steve pointed out different features of the gully and then we dispersed to inspect these at our leisure. There were boomerang petroglyphs, a gnamma hole with water in it, a strange quite large oval depression in the cliff where Aborigines had obviously rubbed something there. We walked further down the gully and found grinding stones. Several large *Ficus platypoda* grew on the cliff edges. There was an ochre painting of a serpent on the roof of a shallow cave. We saw where Peter Muir had constructed a ramp to enable him to drive his car out. Several different birds were seen – a western bower bird, a red-capped robin, white-browed babbler, spotted nightjar and a small flock of diamond doves, camel tracks, dingo tracks, cat tracks, macropod tracks, "micropod" tracks, lizard tracks and now boot tracks are all through the gully.

People drifted back to camp and some showered and smelt beautiful. Just walking to the shower was beautiful, the nectareous perfume from the prolific *Grevillea stenobotrya* leading the way. It was amazing how easily the brush went through the hair after a wash. Kaye found an iridescent red harlequin bug.

We found a garden of brilliant pink *Stylidium inaequipetalum*, *Newcastelia spodiotricha* and *Calytrix carinatus*, all with excellent horticultural potential. Of course, the area was thick with prickly spinifex – *Triodia brizoides*. Also found was a *Drosera indica*, a *Jasminum calcarium* and a nardoo. A light plane was heard which reminded us that we hadn't heard or seen anything from the outside world, not even jet vapour streams in the sky.

Sunday September 19 A positively tropical evening by comparison with previous evenings and mornings – a warm 5°!! As it was Sunday, everyone was a little slower off the mark for breakfast. Most of the pit traps and Elliott traps were emptied after breakfast, with quite a good haul – eight rock rats, one house mouse, two dunnarts, one spiny tailed gecko and, unfortunately, one dead hopping mouse.

After the breakfast clean-up, we all got organized and most of the party walked across the plateau to Smokey Soak. It was a lovely cool morning and once off the plain and on top of the ridge, it opened out to an almost gibber type plain covered with *Grevillea spinosa* that was almost head high. As we came to the other side of the plateau, Giles' Red Bluff came into view. Coming down onto the plain again Tony Start came across a kestrel's nest with three eggs tucked onto a small rock ledge. Tony also came across the two mistletoes he was in search of that only has hakeas and grevilleas as host – *Amyema gibberula*, the other was *A. hilliana*.

Everyone climbed over and around the bluff and found Peter Muir's graffiti Smokey Soaks. We did a group photo session at the base with a few humorous moments as the delayed settings on the various types of cameras were sorted out. Steve found what he thinks is a brand new *Drosera* and Tony located a long since abandoned stick nest rats nest.

Most again chose to walk, some of us took a more circuitous route than others! (Spotted some euros on the way though.) Lunch was delicious as usual – "Mum" had been busy baking bread while we were out. At 2.00 pm most of the party left for our investigation of the top end of the valley.

That excursion produced a number of new plants on the walk back to camp. Very warm afternoon, some clouds rolled up in the afternoon but vanished by evening. Our final meal at Dreamtime Gully camp was excellent – vegetable casserole, chicken casserole and rice followed by baked apples, raisins, cream and custard. Some members accompanied Tony over to the caves in the breakaways for some late afternoon bat detecting, which proved to be quite successful.

After dinner we had a round campfire discussion and comments on the trip and what everyone thought about the arrangements and any improvements that could be made. Tony rounded off the results to date of our endeavours: 28 different reptiles, remains of numerous extinct reptiles and mammals, evidence of feral mammals and approximately 25 birds. Stephen had a number of new plants, including what he thinks may be a new pygmy *Drosera* for the survey area.

Monday September 20 After the morning shovel relay, an event in which the *LANDSCOPE* team must be a certainty for gold at Sydney, we left the Dreamtime Gully camp at 7.40 am bound for Kumarina. We were all sad to leave this beautiful spot and would have been happy to spend more time exploring the numerous gullies and ridges. All the animals we trapped here seemed to be in excellent condition. This morning we had trapped and released a large desert goanna (*Varanus eremius*) as well as a 14 line skink (*Ctenotus quattuordecimlineatus*), a two-legged sand swimmer (*Lerista*), two rock rats, several sandy-inland mice and a house mouse.

At the old vermin proof fence, Bob Hollis made the fatal mistake of hoping that the OKA wouldn't get snagged by any wire – almost immediately the wire accepted this challenge and destroyed the seal on the rear differential. However, thanks to John Tucker's incredible technological skill and a piece of string, we made it to Ilgarari Creek by 11.00 am. There was brackish green water in the creek and numerous donkey and dingo tracks covered the area. Emil Thoma found a Priority 1 plant – *Stemodia linophylla* – near the creek and counted about 30 of this rare species.

We lunched straddling the Pilbara and the Goldfields although we weren't sure which side was which. "Mum" did her usual magic and conjured up a delicious luncheon which we enjoyed in the shade of the melaleucas and casuarinas bordering the creek bed.

On the way to Tupee Well, the OKA became sugar coated with nectar from the thick stands of *Grevillea spinosa*. We made a couple of brief stops to let the mistletoe hunters in the lead car collect samples and then set up camp a short distance from Kumarina Station and the Great Northern Highway. While we waited our turn in the showers at Kumarina, we were entertained by a circus of galahs in the eucalypts around the camping area. Luxuriously clean and fresh after nearly two weeks of red dust and baby wipes, we were treated to a magnificent lamb roast, complete with the telly and pink flamingos.

As we were camped near the creek bed and as Kumarina had been flooded last year, it was reassuring to see the dugout canoe that decorated the beer garden wall. We all slept more soundly that night.

Tuesday September 21 The day of our return to Perth. Everyone up early (as has been the habit throughout the trip). Swags rolled, bags packed and stacked near the OKA by 6.00 am. Breakfast was a rather hasty affair followed by sorting of camping equipment into either the OKA and the hired vehicle or the CALM vehicles returning to the north. Goodbyes said and heartfelt thanks given to the CALM participants and reciprocated to the volunteers, the OKA and escorting Landcruiser left at 7.05 am. Meekatharra was our first lengthy stop, followed by Cue and Mount Magnet in the usual order. We stopped at Cue to photograph the Masonic Lodge, now in a rather sad state of repair but once rather grand and reputed to be the largest corrugated iron building in the southern hemisphere. It was dark by the time we reached Dalwallinu and we stopped and had a quick supper on the run. The large and very hungry mosquitoes did nothing to make us want to tarry. Back at UWA by 10.30 pm to be met by Jean Paton and Kevin Kenneally. A long day but we live in a big State! A very interesting, informative and happy trip, all told. When is the next one?

BACKGROUND

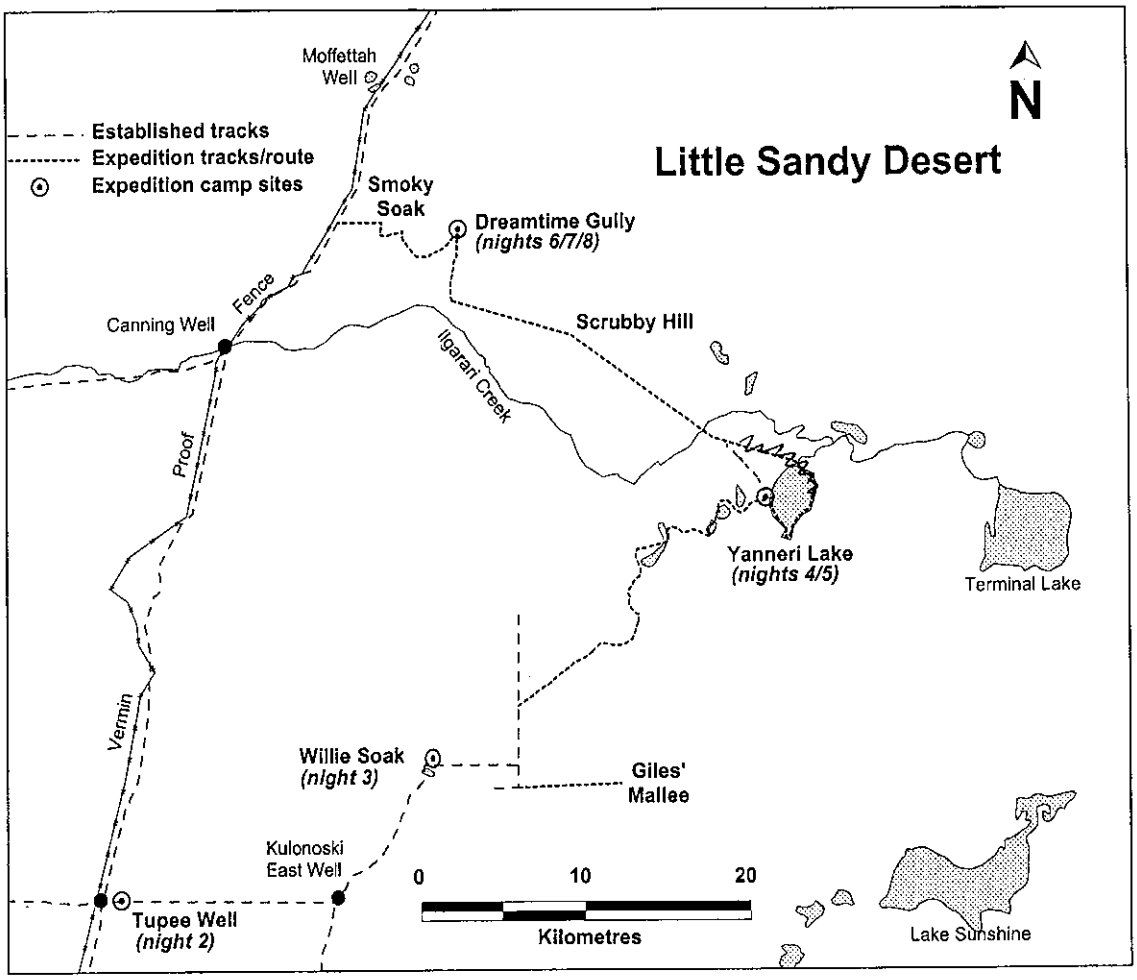
The Little Sandy Desert *LANDSCOPE* Expedition's study area was located approximately 950 km NNE of Perth in the southern portion of the Little Sandy Desert. The study area was within the Little Sandy Desert Biogeographical Region, a region of approximately 10.9 million sq km. This region has previously been identified as poorly known biologically and inadequately represented on the conservation estate. Rudall River National Park is the only conservation reserve encroaching upon the region, providing less than 6% representation of the biogeographical region. This reserve, being located on its northern margin, does not adequately represent the array of biophysical gradients and biotic communities within the region.

The Little Sandy Desert Biogeographical Region conforms to Beard's Kearland Botanical District. The climate is designated as typically arid with predominantly summer rainfall that originates from tropical lows and cyclonic activity. The region is characterized by red dune fields with abrupt protuberance of sandstone ridges and lateritic gravel rises. The region's biota together with the floristic and faunal communities into which they are arranged is determined by edaphic and ultimately geological considerations.

The characteristic vegetation types of the region are shrublands of acacias with myrtaceous (e.g. *Thryptomene maisonneuvei*) and proteaceous (e.g. *Grevillea spinosa*) shrubs over an understorey dominated by hummock grasses (spinifex), particularly *Triodia* species. Scattered emergent bloodwood trees (*Corymbia chippendalei*), eucalyptus mallees (*Eucalyptus gamophylla, E. rameliana*) and woodlands of mulga (*Acacia aneura*) are also commonly encountered throughout the study area, particularly on the crests of dunes, along intermittent watercourses, on alluvial fans and on the fringing aprons of small ephemeral lakes and depressions. Extensive grasslands dominated by hummock grasses with scattered tussock grasses (*Eragrostis* species) are also distributed across the region, particularly throughout the dune fields. Bottlebrush thickets (*Melaleuca* species) with woodlands of sheoak (*Allocasuarina decaisneana, Casuarina cristata*) are also prominent communities in the study area, particularly along Ilgarari Creek and fringing the margins of the larger ephemeral lakes. The floral and faunal elements that dominate these communities are mostly ubiquitous species of the Western Australian deserts and Australian arid zone, although elements typical of more mesic southern climates are also present (e.g. grass trees and mountain devils).

The biota and the biological communities of the study area have received little scientific attention. The study area is biologically one of the most poorly known regions in the State, if not Australia. This claim-to-fame is emphasized by the fact that the Little Sandy Desert was only proposed as a distinct natural region, different from the Great Sandy and Gibson Deserts, in 1970. The adoption of this biogeographic proposal in 1987 together with the realisation that the underlying geological formation of the Savory Basin was not recognized until 1992, further emphasises the deficiencies in our knowledge and comprehension of this fascinating natural region.

The only biological investigations undertaken in the study area, apart from those conducted in conjunction with this biological survey, were associated with the explorer Ernest Giles and his final expedition of discovery in 1876. During this trip, Giles collected numerous plant specimens for the Victorian government's botanist Baron F. von Mueller. Among the specimens was the enigmatic Giles' mallee, *E. rameliana,* which for many years had the dubious status of being Australia's only presumed extinct eucalypt. Through the diligent endeavours of naturalist Nic Foote and CALM's biological survey program, Giles' mallee is now known to be reasonably abundant although geographically restricted to the southern Little Sandy Desert. The mallee is so abundant that at many localities it is the dominant species in the associated vegetation community. The prevalence of Giles' mallee in the study area, despite the interest and intrigue it created as the 'holy grail' of Australian botany among botanists, horticulturalists and naturalists alike in the 1970s and 1980s, fortifies the assertion that the project area is poorly known. Similarly, the collection from three localities of



Map 1. Map of the Expedition study area showing route travelled and the location of campsites

Stemodia linophylla, another species that was only known from Giles' collection prior to the commencement of CALM's biological survey program, also highlights the inadequacies in our biological knowledge of the study area. Indeed, prior to the commencement of CALM's biological survey program no information was available on the fauna of the study area.

The biological attributes and nature conservation values of the study area have slowly been unveiled since the commencement of biological investigations during the late 1980s, particularly since the initiation of CALM's biological survey program in 1995. Currently, some 480 plant, 110 bird, 24 mammal, 88 reptile and four amphibian species are known from the study area. Biological highlights of CALM's program include the:

- Identification of numerous populations of *Eucalyptus rameliana*;
- Collection of *Stemodia linophylla;*
- Collection of a novel taxon belonging to the genus *Halosarcia;*
- Observation of nesting by black swans on Savory Creek in the north of the study area;
- Observation of black-breasted buzzards overhead on most sandstone ridges;
- Collection of the pebble-mound mouse and the identification of several active mounds;
- Collection of the mulgara, hairy-footed dunnart, lesser hairy-footed dunnart and the long-tailed dunnart, all poorly known species throughout the arid interior and adjacent Pilbara;
- Documentation of several abandoned nests of the lesser stick-nest rat, a species which is now presumed extinct;
- Collection of the lozenge-marked dragon, pygmy spiny-tailed skink and night skink, all species at the edge or beyond the extent of their previously documented range;
- Collection of several species of sand swimmers (e.g. *Lerista ips, L. macropisthopus remota*) which are beyond their previously documented range; and
- Collection of a blind snake (*Ramphotyphlops* sp.) which appears to represent a taxon not previously recognized in the scientific literature.

FLORA

Methods

Plant species were collected and recorded opportunistically throughout the expedition. No systematic sampling was undertaken. Opportunistic recording was used to check observational records against the already established flora list for the project area. Flora specimens were collected when they represented a new record for the project area or were good vouchers (i.e. flowering/fruiting specimens). Sampling effort principally concentrated on areas and habitats in which the flora had not previously been investigated. Flora sampling principally occurred during

foot traverses although some vouchers were collected while travelling in convoy between campsites.

Results and Discussion

Three hundred and one plant species were recorded during the expedition (Table 1). These species were representative of 145 genera from 58 families. One hundred and seventy three voucher specimens were collected. These voucher specimens will be lodged in the Pilbara Regional Herbarium (KARR), Western Australian Herbarium (PERTH) and with the institutions of specialist plant taxonomists in eastern States and overseas. Thirty-two of the 173 specimens collected during the expedition were new records for the project area having not been recorded previously by CALM. Many of these species were annual or ephemeral and may have been overlooked on previous trips because of season and climatic considerations.

Table 1. Plants recorded during the Little Sandy Desert Expedition (arranged systematically by families).

OPHIOGLOSSACEAE
- *Ophioglossum lusitanicum*

ADIANTACEAE
- *Cheilanthes brownii*
- *Cheilanthes sieberi*

MARSILEACEAE
- *Marsilea hirsuta*

POTAMOGETONACEAE
- *Ruppia maritima*

POACEAE
- *Amphipogon caricinus*
- *Amphipogon contorta*
- *Aristida contorta*
- *Chrysopogon fallax*
- *Enneapogon caerulescens*
- *Enneapogon polyphyllus*
- *Eragrostis dielsii*
- *Eriachne aristidea*
- *Eriachne dominii*
- *Eriachne mucronata*
- *Eulalia aurea*
- *Iseilema membranaceum*
- *Paraneurachne muelleri*
- *Triodia brizoides*
- *Triodia pungens*
- *Triodia schinzii*
- *Triodia wiseana*
- *Xerochloa laniflora*

CYPERACEAE
- *Bulbostylis barbata*
- *Fimbristylis sieberiana*

DASYPOGONACEAE
- *Lomandra leucocephala* subsp. *robusta*

XANTHORRHOEACEAE
- *Xanthorrhoea thorntonii*

ANTHERICACEAE
- * *Thysanotus* sp. (SVL 4454)

COLCHICACEAE
- *Wurmbea deserticola*

CASUARINACEAE
- *Allocasuarina decaisneana*
- *Casuarina cristata*

MORACEAE
- *Ficus platypoda* var. *minor*

PROTEACEAE
- *Grevillea eriostachya*
- * *Grevillea eriostachya* x *juncifolia*
- *Grevillea juncifolia*
- *Grevillea spinosa*
- *Grevillea stenobotrya*
- *Grevillea wickhamii* subsp. *aprica*
- *Hakea lorea*
- *Hakea rhombales*

SANTALACEAE
- *Anthobolus leptomerioides*
- *Santalum acuminatum*
- *Santalum lanceolatum*

LORANTHACEAE
- *Amyema fitzgeraldii*
- *Amyema gibberula*
- *Amyema hilliana*
- *Amyema preissii*
- *Amyema sanguinea* var. *pulcher*
- *Lysiana murrayi*

CHENOPODIACEAE
- *Dysphania knappii*
- *Dysphania melanoma*
- *Enchylaena tomentosa*
- *Halosarcia* sp. (Yanneri Lake)
- *Maireana melanocoma*
- *Maireana planifolium*
- *Maireana tomentosa*
- *Maireana villosum*
- *Rhagodia eremaea*
- *Salsola tragus*
- *Sclerolaena alata*
- *Sclerolaena cuneata*
- *Sclerolaena eriacantha*

AMARANTHACEAE
- *Ptilotus aervoides*
- *Ptilotus aphyllus*
- *Ptilotus astrolasius*
- *Ptilotus exaltatus*
- *Ptilotus fusiformis*
- *Ptilotus helipteroides*
- *Ptilotus macrocephalus*
- *Ptilotus polystachyus*
- *Ptilotus obovatus*
- *Ptilotus rotundifolius*

NYCTAGINACEAE
- *Boerhavia coccinea*

GYROSTEMONACEAE
- *Codonocarpus cotinifolius*
- *Gyrostemon ramulosus*

AIZOACEAE
- *Trianthema turgidifolia*

PORTULACACEAE
- *Calandrinia balonensis*
- *Calandrinia eremaea*
- *Portulaca filifolia*

CAPPARACEAE
- *Capparis lasiantha*
- *Capparis spinosa*

BRASSICACEAE
- *Lepidium pedicellatum*

Stenopetalum anfractum
Stenopetalum nutans

DROSERACEAE
* *Drosera burmanni*
Drosera indica

PITTOSPORACEAE
Pittosporum phylliraeoides

SURIANACEAE
Stylobasium spathulatum

MIMOSACEAE
Acacia abrupta
Acacia adoxa
Acacia adsurgens
Acacia ancistrocarpa
Acacia aneura
Acacia bivenosa
Acacia coriacea
Acacia coriacea subsp. *seriophylla*
Acacia cuthbertsonii
Acacia daviesioides
Acacia dictyophleba
Acacia eriopoda
Acacia hilliana
Acacia inaequilatera
Acacia kempeana
Acacia ligulata
Acacia linophylla
Acacia maitlandii
Acacia marramamba
Acacia minyura
Acacia pachyacra
* *Acacia prainii*
Acacia pruinocarpa
Acacia retivenia
Acacia rhodophloia
Acacia spondylophylla
Acacia stowardii
Acacia synchronicia
Acacia tetragonophylla
Acacia validinervia
Acacia wanyu
Acacia xiphophylla

CAESALPINIACEAE
Petalostylis cassioides
Senna artemisioides subsp. *artemisioides*
Senna artemisioides subsp. *helmsii*
Senna artemisioides subsp. *oligophylla*
Senna glutinosa subsp. *glutinosa*
Senna glutinosa subsp. x *luerssenii*
Senna glutinosa subsp. *pruinosa*
Senna notabilis
Senna pleurocarpa

PAPILIONACEAE
Crotalaria cunninghamii
Cullen pustula
Daviesia eremaea
Gastrolobium grandiflorum
Gompholobium polyzygum
Indigofera georgei
Indigofera monophylla
Isotropis forrestii
Kennedia prorepens
Mirbelia viminalis
Phyllota luehmannii
Willdampia formosa

ZYGOPHYLLACEAE
Tribulus suberosa
Zygophyllum tesquorum

EUPHORBIACEAE
Euphorbia boophthona
Adriana hookeri

STACKHOUSIACEAE
Macgregoria racemigera
Stackhousia intermedia
Stackhousia megaloptera

SAPINDACEAE
Diplopeltis stuartii
Dodonaea coriacea
Dodonaea lanceolata
Dodonaea lanceolata subsp. *spathulatum*
Dodonaea petiolaris

TILIACEAE
Corchorus aff. *sidoides*

MALVACEAE
Abutilon sp. (SVL 2527)
Alyogyne pinoniana
Hibiscus burtonii
Hibiscus coatsii
* *Hibiscus sturtii* var. *truncatus*
Lawrencia densiflora
Sida arenicola
Sida cardiophylla

STERCULIACEAE
Brachychiton gregorii
Keraudrenia integrifolia
Rulingia rotundifolia

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

VIOLACEAE
Hybanthus aurantiacus

THYMELAEACEAE
Pimelea ammocharis
Pimelea trichostachya

MYRTACEAE
Calothamnus aridus
Calytrix carinata
Corymbia aff. *aspera*
Corymbia chippendalei
Corymbia deserticola
Corymbia terminalis
Eucalyptus gamophylla
Eucalyptus gypsophila
Eucalyptus kingsmillii
Eucalyptus mannensis
Eucalyptus oldfieldii
Eucalyptus oleosa
Eucalyptus pachyphylla
Eucalyptus rameliana
Eucalyptus trivalvis
Eucalyptus victrix
Lamarchea sulcata
Melaleuca eleuterostachya
Melaleuca glomerata
Melaleuca lasiandra
Micromyrtus flaviflora
Thryptomene maisonneuvei

HALORAGACEAE
Gonocarpus eremophilus

Haloragis gossei

APIACEAE
* *Trachymene pilbarensis*
Xanthosia sp.

GENTIANACEAE
* *Centaurium spicatum*

OLEACEAE
Jasminum calcareum

LOGANIACEAE
* *Logania centralis*

ASCLEPIADACEAE
Marsdenia sp. (SVL 2874)
Sarcostemma viminale subsp. *australe*

CONVOLVULACEAE
Bonamia sp. (SVL 2369)
Evolvulus alsinoides
Porana commixta

BORAGINACEAE
Halgania cyanea
Halgania glabra
Halgania gustafsenii
* *Halgania solanacea* var. *hirsuta*
Trichodesma zeylanicum

CHLOANTHACEAE
Dicrastylis exsuccosa
Dicrastylis georgei
Newcastelia spodiotricha
* *Pityrodia loricata*
Pityrodia loxocarpa

LAMIACEAE
* *Microcorys macredieana*
Prostanthera albiflora
* *Prostanthera wilkieana*

SOLANACEAE
* *Duboisia hopwoodii*
Nicotiana benthamii
Nicotiana rosulata
Solanum centrale
Solanum horridum
Solanum lasiophyllum
Solanum phlomoides
Solanum sturtianum

SCROPHULARIACEAE
Buchnera linearis
* *Mimulus gracilis*
* *Mimulus* sp. (4458)
* *Peplidium* sp. (4456)
Stemodia linophylla

MYOPORACEAE
* *Eremophila citrina* ms
Eremophila clarkei
Eremophila cuneifolia
Eremophila exilifolia
Eremophila forrestii
Eremophila fraseri
Eremophila glabra
Eremophila jucunda ms
Eremophila lanceolata
Eremophila latrobei
Eremophila longifolia
Eremophila margarethae (red)
* *Eremophila platythamnos*
* *Eremophila* sp. (SVL 4443)
Myoporum platycarpum

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

CAMPANULACEAE
Wahlenbergia tumidifructa

LOBELIACEAE
* *Lobelia heterophylla*
Lobelia sp. (SVL 2861)

GOODENIACEAE
Brunonia australis
Dampiera candicans
Dampiera cinerea
Dampiera dentata
* *Dampiera ramosa*
* *Dampiera roycei*
Goodenia lamprosperma
Goodenia microptera
Goodenia mueckeana
Goodenia pinnatifida
Goodenia prostrata
Goodenia stobbsiana
Goodenia aff. *stobbsiana* (SVL 2514)
Goodenia triodiophylla
Goodenia xanthosperma
* *Goodenia* sp. (SVL 4463)
* *Lechenaultia striata*
Scaevola amblyanthera
* *Scaevola browniana*
Scaevola parvifolia subsp. *pilbarae*
Scaevola sericophylla
Scaevola spinescens
Velleia connata
* *Velleia glabrata*
Velleia panduriformis

STYLIDIACEAE
Levenhookia chippendalei
* *Stylidium inaequipetalum*
Stylidium humphreysii

ASTERACEAE
Angianthus tomentosa
* *Angianthus* sp. (SVL 4474)
Bidens bipinnata
Calocephalus knappii
Chrysocephalum apiculatum
Chrysocephalum pterochaetum
Chrysocephalum semicalvum
* *Gnephosis* sp. (SVL 4424)
Helichrysum gilesii
* *Olearia pimeleoides* subsp. *incana*
Olearia xerophila
Podolepis canescens
Rhodanthe helipterioides
Rhodanthe humboltianum
Rhodanthe pollackii
Rutidosis helichrysoides
Schoenia cassiniana
Streptoglossa bubakii
* *Streptoglossa decurrens*

* = Taxa recorded for the first time in the Little Sandy Desert project area during the expedition.

Many of the plants recorded and collected, especially those representing new records, were of scientific, botanical or conservation interest. These interesting plants are discussed below.

Acacia prainii This is the first collection of Prain's Wattle from the Little Sandy Desert. The locality (Yanneri Lake) represents a significant north-westerly range extension for the species that is typically found throughout the northern and central wheatbelt with scattered occurrences north-easterly through the southern Murchison, Gibson Desert and Central Ranges.

Calothamnus aridus This species of one-sided bottlebrush was collected from a small population east of the Dreamtime Gully sandstone ridge by Emil Thoma. The species occurs in small scattered populations throughout the southern Little Sandy Desert. These populations are disjunct outliers from the species typical range that is in the Murchison.

Dampiera ramosa This *Dampiera* is very poorly collected being represented by only five collections in the WA Herbarium. All collections, with the exception of one collected from the Carnarvon Range by CALM volunteer Daphne Edinger, are from the Great Victoria Desert and Murchison. The species is listed on CALM's Priority Flora list where it is afforded P2 conservation status which implies the species is known from one or a few (generally < 5) populations, at least some of which are not believed to be under immediate threat. The specimen collected during the expedition came from the sand dune area near the Beyondie campsite.

Dampiera roycei This *Dampiera* was collected near Ilgarari Creek on the trip from Yanneri Lake to Dreamtime Gully. This location represents a range extension of over 300 km for this species which has a distribution throughout the western Great Victoria Desert and Murchison districts.

Drosera burmanni This pygmy *Drosera* (tropical sundew) was a very exciting find for the expedition. The locality of the collection was the floriferous herbfield below Giles' Red Ridge, which makes this population the most westerly recorded in the State. Apart from a few populations just to the south in the Carnarvon Range and some localities in the Great Sandy Desert this sundew is principally restricted to the tropical Kimberley region.

Eremophila sp. (SVL 4443) Specimens of this *Eremophila* are not represented in the WA Herbarium and hence this taxon may represent a novel species not previously recorded in the scientific literature. The specimen was collected from the gypsum dunes adjacent to Yanneri Lake. Vouchers have been forwarded to Bob Chinnock, *Eremophila* taxonomist, at the South Australia Herbarium for taxonomic investigation.

Goodenia sp. (SVL 4463) Specimens of this taxon collected from the Ilgarari Creek crossing on the old Vermin Proof Fence are undocumented in the WA Herbarium. The specimens appear to represent a new species not previously reported in the scientific literature.

Grevillea eriostachya x *juncifolia* This strange *Grevillea* from the Dreamtime Gully sandplain appears to be a hybrid between *G. eriostachya* and *G. juncifolia*. It has features, especially with respect to its leaves and the inflorescence (flower head), which are intermediate although the overall habit is similar to *G. eriostachya*. Perhaps the most striking feature of the hybrid was its very hairy and pungent leaves. Plants were scattered throughout the Dreamtime Gully valley suggesting that the hybrid may be fertile and capable of reproducing by seed.

Halosarcia sp. (Yanneri Lake) This bizarre undescribed taxon collected previously by CALM is still only known from the Yanneri Lake area of the Little Sandy Desert. Ongoing taxonomic research by colleagues at the WA Herbarium indicate that this taxon my represent an entirely new genus within the Chenopodiaceae (saltbush) family.

Lechenaultia striata This spectacular upright *Lechenaultia* was collected from recently burnt dune country adjacent to the *Eucalyptus rameliana* population near the Beyondie camp. This locality represents a significant north-westerly range extension of several hundred kilometres for this species. Based on the 13 specimens housed at the WA Herbarium the species had a distribution that was typically in the southern Murchison, Great Victoria Desert and eastern Gibson Desert.

Microcorys macredieana This species is represented by only 11 specimens in the WA Herbarium. Consequently, the species is listed on CALM's Priority Flora list where it is afforded a P3 conservation code which implies the species is known from several populations and is not believed to be under immediate threat. The collection obtained during the expedition for west of Yanneri Lake is the most northerly known. The species has a distribution typically in the Great Victoria Desert. Daphne Edinger recently collected a specimen from the Carnarvon Range supporting the assertion that the species is poorly known.

Olearia pimeleoides subsp. *incana* This poorly collected daisy is represented by only three specimens in the WA Herbarium. The specimen collected near Yanneri Lake during the expedition represented a large range extension for the species that previously had a distribution in the southern Murchison and Great Victoria Desert.

Pityrodia loricata The population of this foxglove located during the expedition between Yanneri Lake and Dreamtime Gully represents the most westerly occurrence for this species. The species has a distribution throughout the arid interior of Western Australia from Queen Victoria Springs in the Goldfields to Warburton in the Great Sandy Desert.

Stemodia linophylla This poorly collected species is only known from three localities, two in the Little Sandy Desert. The collection of specimens from the Ilgarari Creek

crossing on the old Vermin Proof Fence confirmed the existence of this population that was previously represented by only a specimen fragment in the South Australian Herbarium. The species is listed on CALM's Priority Flora list where it is afforded P2 conservation status.

Stylidium inaequipetalum This poorly collected trigger plant is represented by only six specimens in the WA Herbarium. With the exception of a collection from the Carnarvon Range by Daphne Edinger, all other specimens are from Tanami Desert and Central Ranges area in central Australia. The population of this species found in the floriferous herbfield below Giles' Red Ridge makes this population the most westerly recorded.

Thysanotus sp. (SVL 4454) This undescribed taxon is poorly collected and represented by only five specimens in the Western Australian Herbarium. Two collections of this plant were made during the expedition, one from sandplain terrain near Yanneri Lake while the other was obtained from the sandstone plateau between the expedition's Dreamtime Gully camp and Smokey Soak. Cautiously the taxon appears to have a disjunct distribution throughout the sandy deserts of central Western Australia, although this pattern is likely to be an artefact of deficient collecting effort throughout this region.

Clearly, the large number of poorly collected species and specimens representing significant range extensions recorded during the expedition highlights the inadequacies in our botanical knowledge of the Little Sandy Desert. This is also undoubtedly a reflection on our understanding and appreciation of the botanical and biological resources present outside the south-west corner of the State.

Stephen van Leeuwen and Bob Bromilow

BIRDS

Methods

Birds were recorded opportunistically during the expedition. No systematic standardized sampling was undertaken. Opportunistic observations were principally made during morning and late afternoon census sessions that characteristically involved arbitrary walks through the habitats typical of each of the campsites visited. A total of 64 person hours of sampling effort were accumulated in this manner. A road log was also maintained of birds observed while travelling between the various campsites. Records were also maintained on species abundance and evidence of breeding.

Results and Discussion

Fifty-six species of bird were observed in the project area during the expedition (Table 2). All birds were typically arid zone species. Many were characteristically nomadic species (e.g. black honeyeater, budgerigar) while a few were sedentary (e.g. hooded robin, rufous-crowned emu wren).

Sixty per cent of the birds previously recorded in the Little Sandy Desert project area by CALM were recorded during this expedition. Three of the species (red-necked avocet, little corella, spotted bowerbird) recorded during the expedition represent new records for the project area. The first two records represent highly nomadic birds. The failure to record these species previously was probably a reflection of unsuitable environmental conditions. The presence of these two species in the project area during the expedition may indicate that environmental conditions were more favourable in 1999 than in previous years. The record for the spotted bowerbird, which was obtained from Dreamtime Gully, may well reflect sampling error or bias during previous surveys in that habitats suitable (sheltered gullies with large figs) for this species were not surveyed.

Interesting records were obtained for a number of species.

1. The red-necked avocet record, as represented by an addled egg found on the edge of Yanneri Lake, denotes a locality at the fringe of the species distribution in north-western Australia. This species has a distribution that generally abuts the Western Australian deserts with the exception of disjunct occurrences along the Fitzroy River and around Lake Gregory in the Kimberley.

2. The reclusive rufous-crowned emu-wren observed on the Beyondie sandplain represents a poorly known species, which is often difficult to locate. This bird is secretive and its distribution across arid central Australia appears to be influenced by the presence of well-developed spinifex habitats.

3. The black-shouldered kite recorded from Yanneri Lake was an interesting record as this species is typically associated with coastal areas in arid Western Australia, although it is also common throughout the wheatbelt and southern Kimberley.

Table 2. Summary of the birds encountered on the Little Sandy Desert expedition.

Species	Location	Abundance[1]
Emu *Dromaius novaehollandiae*	Yanneri Lake	UC
Black-shouldered Kite *Elanus axillaris*	Yanneri Lake	UC
Spotted Harrier *Circus assimilis*	Scrubby Hill	UC
Wedge-tailed Eagle *Aquila audax*	Yanneri Lake	UC
Brown Falcon *Falco berigora*	Smokey Soak	UC
Nankeen Kestrel *Falco cenchroides*	Smokey Soak	MC
Australian Bustard *Ardeotis australis*	Sandplain	UC
Little Button-quail *Turnix velox*	Smokey Soak	MC
Red-necked Avocet *Recurvirostra novaehollandiae*	Yanneri Lake	
Red-capped Plover *Charadrius ruficapillus*	Yanneri Lake	C
Common Bronzewing *Phaps chalcoptera*	Dreamtime Gully	UC
Crested Pigeon *Ocyphaps lophotes*	Dreamtime Gully	UC
Diamond Dove *Geopelia cuneata*	Dreamtime Gully, Smokey Soak	C
Spinifex Pigeon *Geophaps plumifera*	Smokey Soak	UC
Galah *Cacatua roseicapilla*	Woodland & stony ranges	MC
Little Corella *Cacatua sanguinea*	Yanneri Lake	UC
Australian Ringneck *Barnardius zonarius*	Dreamtime Gully	UC
Budgerigar *Melopsittacus undulatus*	Overhead	MC
Mulga Parrot *Psephotus varius*	Beyondie	UC
Horsfield's Bronze-cuckoo *Chrysococcyx basalis*	Overhead	UC
Pallid Cuckoo *Cuculus pallidus*	Yanneri Lake	MC
Tawny Frogmouth *Podargus strigoides*	Dreamtime Gully	UC
Spotted Nightjar *Eurostopodus argus*	Dreamtime Gully	UC
Australian Owlet-nightjar *Aegotheles cristatus*	Yanneri Lake	UC
Rufous-crowned Emu-wren *Stipiturus ruficeps*	Beyondie sandplain	UC
White-winged Fairy-wren *Malurus leucopterus*	Yanneri Lake	MC
Banded Whiteface *Aphelocephala nigricincta*	Beyondie sandplain	UC
Chestnut-rumped Thornbill *Acanthiza uropygialis*	Mulga woodlands	C
Slaty-backed Thornbill *Acanthiza robustirostris*	Yanneri Lake	UC
Weebill *Smicrornis brevirostris*	Woodland & mallee	MC
Black Honeyeater *Certhionyx niger*	Throughout Expedition	VC
Crimson Chat *Ephthianura tricolor*	Throughout	C
Grey-headed Honeyeater *Lichenostomus keartlandi*	Beyondie	UC
Pied Honeyeater *Certhionyx variegatus*	Throughout Expedition	VC
Singing Honeyeater *Lichenostomus virescens*	Dreamtime Gully, Yanneri Lake	UC
Spiny-cheeked Honeyeater *Acanthagenys rufogularis*	Throughout Expedition	C
White-fronted Honeyeater *Phylidonyris albifrons*	Throughout Expedition	VC
Yellow-throated Miner *Manorina flavigula*	Throughout Expedition	C
Hooded Robin *Melanodryas cucullata*	Beyondie woodland	UC
Red-capped Robin *Petroica goodenovii*	Beyondie woodland	MC
White-browed Babbler *Pomatostomus superciliosus*	Dreamtime Gully	C
Crested Bellbird *Oreoica gutturalis*	Beyondie, Smokey Soak	UC
Rufous Whistler *Pachycephala rufiventris*	Beyondie woodland	MC
Willie Wagtail *Rhipidura leucophrys*	Yanneri Lake	MC
Black-faced Cuckooshrike *Coracina novaehollandiae*	Smokey Soak	UC
Black-faced Woodswallow *Artamus cinereus*	Throughout Expedition	MC
Grey Butcherbird *Cracticus torquatus*		UC
Little Woodswallow *Artamus minor*	Smokey Soak	UC
Masked Woodswallow *Artamus personatus*	Sandplain	UC
Pied Butcherbird *Cracticus nigrogularis*	Throughout Expedition	C
Little Crow *Corvus bennetti*		UC
Spotted Bowerbird *Chlamydera maculata*	Dreamtime Gully	UC
Richard's Pipit *Anthus novaeseelandiae*	Yanneri Lake	MC
Zebra Finch *Taeniopygia guttata*	Throughout Expedition	C
Fairy Martin *Hirundo ariel*	Smokey Soak	UC
Brown Songlark *Cincloramphus cruralis*	Yanneri Lake	MC

[1] Abundance codes: UC = Uncommon; C = Common; MC = Moderately common; VC = Very common.

It was also worthwhile noting the abundance of honeyeaters in the project area during the expedition. Seven species were recorded mainly foraging on a profusion of grevillea and hakea flowers.

Breeding records were obtained for 15 species during the expedition (Table 3). Most records were for current season nests or nests with eggs. All the breeding records obtained were for nomadic or transient species. An interesting observation was obtained for one singing honeyeater nest near Yanneri Lake that contained two eggs and one pallid cuckoo chick.

Table 3. Summary of the bird breeding recorded obtained on the Little Sandy Desert expedition.

Species	Breeding Status[1]
Emu *Dromaius novaehollandiae*	C
Nankeen Kestrel *Falco cenchroides*	E
Little Button-quail *Turnix velox*	ON
Red-necked Avocet *Recurvirostra novaehollandiae*	E
Pallid Cuckoo *Cuculus pallidus*	C
Banded Whiteface *Aphelocephala nigricincta*	N
Crimson Chat *Ephthianura tricolor*	N
Pied Honeyeater *Certhionyx variegatus*	N
Singing Honeyeater *Lichenostomus virescens*	N
White-fronted Honeyeater *Phylidonyris albifrons*	N
Red-capped Robin *Petroica goodenovii*	N
White-browed Babbler *Pomatostomus superciliosus*	N
Willie Wagtail *Rhipidura leucophrys*	E
Zebra Finch *Taeniopygia guttata*	N
Fairy Martin *Hirundo ariel*	ON

[1] Breeding Status: N = Nest; E = Eggs in nest; C = Chick in nest; ON = Old nest.

Phil Fuller and Stephen van Leeuwen

MAMMALS AND REPTILES

Methods

Traps

A total of 120 medium-size Elliott traps and a variable number of pit traps were used at each of the campsites. Elliott traps were baited with a mixture of peanut butter and rolled-oats and checked each morning. Where ants were attracted to the bait (mostly at Dreamtime Gully), the traps were re-baited in the evening. Except at the Willie Soak sites, pit traps consisted of 20-litre white, plastic buckets. They were set in lines of six or seven pits spaced at five metre intervals and interconnected by nylon flywire drift-fences. At Willie Soak, previously installed pit traps were re-opened. Each line comprised six pits lined by 150 mm PVC pipe installed to a depth of 60 cm. The pits were interconnected by aluminium flywire drift-fences about five metres long and 30 cm high. On each side of the line, there was a 20-litre bucket set between two five-metre drift fences. Table 4 records the number of trap nights at each site.

Opportunistic searching

At all times, expeditioners kept a look out for animals, their tracks or other signs of their presence (or former presence). Additionally, caves and breakaways were searched, rocks turned over, hollow trunks investigated and soil below fallen logs and leaf litter was raked. On many evenings, an Anabat bat-detector connected to a Walkman professional tape recorder was deployed near camp to record bats flying overhead. Dingo and feral cat scats were collected for later analysis of hair and bone. This method may yield evidence of marsupial moles in the project area.

Results and Discussion

Mammals

Mammals that were recorded are summarized in Table 5 and listed in Table 6. The results should be treated as provisional because the identity of some species requires confirmation. This will only be achieved by detailed examination of specimens in conjunction with the analysis of predator scat that will not be undertaken for some time.

There were some notable features of the mammal records.

1. There was evidence that four species which are (at least locally) extinct occurred in the project area.

• The chuditch (*Dasyurus geoffroyi*) has not been recorded during earlier surveys in the project area although they are known to have occurred in the region. A mummified skull and some other bones were found in the cave near Dreamtime Gully. There may be enough soft tissue to obtain a DNA sample, which would allow the genetic similarities between the desert chuditch and those that still live in the south-west to be determined. It may also be possible to date (age) the specimen.

In the Pilbara, another species of *Dasyurus*, the northern quoll, occurs in rocky habitats. Our knowledge of the distributions of the two species suggests that they did not overlap. Finding that the chuditch used to live in the project area may explain the apparent absence of the northern quoll from rocky sites in the Little Sandy Desert.

• Old rock wallaby (*Petrogale* sp.) scats were found on a ledge in the Dreamtime Gully cave, although skeletal material is required to determine which species lived there (*P. rothschildi* occurs in the Pilbara to the west while *P. lateralis* has been recorded from desert ranges to the east).

• The former warrens of burrowing bettongs (*Bettongia lesueur*) were evident at several places, notably under limestone cap-rock and on gravelly uplands near Willie Soak. Rabbits had taken over some warrens under cap-rock, although they appeared abandoned during our visit.

• Stick-nest rats (*Leporillus apicalis*). The black resinous "amberat" which formed in the stick nests of these animals was common in rocky shelters and caves at Dreamtime Gully and on Giles' Red Ridge. Sticks, grass and other

Table 4. Deployment of traps and trapping effort on the Little Sandy Desert expedition.

Site	Habitat	Pit trap-nights [1]	Elliott trap-nights
Willie Soak			
	Mulga woodland	8 bucket + 24 PVC pits	40
	Sandstone	8 bucket + 24 PVC pits	100
	Sand plain (swale)	8 bucket + 24 PVC pits	50
	Sand dune	4 bucket + 12 PVC pits	50
Lake Yanneri			
	Gypsum/sand ridge	12 bucket	120
	Saline lake margin	22 bucket	100
Dreamtime Gully			
	Sand plain	42 bucket	135
	Sandstone	Nil	225
TOTAL		104 bucket + 84 PVC pits	820

1 = X traps set for Y nights. Thus, 4 trap-nights = 4 traps set on 1 night or 2 traps on 2 nights, etc.

Table 5. Summary of the mammal fauna encountered on the Little Sandy Desert expedition.

Group	Family	Indigenous		Introduced
		Living	Locally Extinct	
Monotremes	Echidnas	1	0	N/A [1]
Marsupials	Dasyurids (Carnivores)	3	1	N/A
	Macropods (Kangaroos etc.)	2	2	N/A
Placental mammals	Rodents	4	1	1
	Bats	1	0	N/A
	Carnivores	N/A	N/A	2
	Herbivores	N/A	N/A	3
TOTAL	**(21 species)**	**11**	**4**	**6**

N/A = not applicable because there are no species in this category that might occur in the LSD.

plant remains were found in some nests. Sandalwood nuts, with one side-chewed open to extract the kernel, were found in two of the nests.

2. During the expedition six desert mice (*Pseudomys desertor*) were caught at two sites near Willie Soak. The desert mouse is widespread in Australian sandy deserts but it is usually rare and often "missed" by survey teams. It was seldom collected (and not at any Willie Soak sites) on the three previous CALM surveying trips to the project area. Significantly, five of the six specimens caught during the expedition were young animals suggesting that conditions were ideal for this species at the time of the trip. (Huge population fluctuations corresponding with environmental conditions, including time since fire and recent rainfall patterns, are characteristic of many arid zone small mammals.)

3. The expeditioners caught nine rock-rats (*Zyzomys argurus*) on rocky sites at Dreamtime Gully. This species was collected only once on CALM's three previous survey trips at the sandstone site near Willie Soak, although none were caught there this time. The collections were all adult and four of the five females had recently been lactating. Like the desert mice, they were apparently responding to favourable conditions.

4. Bats were notably scarce. None were heard or detected by the Anabat equipment (except at the Dreamtime Gully cave when little cave bats emerged in the evenings). This may be attributable to the cold nights. The Dreamtime Gully cave housed a maternity colony of about 25 Finlayson's cave bats. Some females were pregnant while others carried small, suckling infants. Another cave in the same area housed a few more Finlayson's cave bats. (Five other species of bat have been recorded previously in the project area.)

Despite conditions that were obviously favourable for rodents, only three species of carnivorous marsupials were caught. Eleven species have been recorded on previous survey trips.

Reptiles

During the expedition 36 species of reptile were recorded. No frogs were observed. Table 7 summarizes the composition of the groups and compares the results of the Expedition with those of previous CALM surveys in the project area. Table 8 lists all the reptile species recorded during the expedition.

There were some notable features of the reptile records.

Table 6. Mammals recorded on the Little Sandy Desert expedition.

Family	Species	Locality			
		Willie Soak	Yanneri Lake	Dreamtime Gully	Elsewhere
Dasyurids	*Sminthopsis youngsoni* Lesser Hairy-footed Dunnart	Mulga	Sand Ridge	Sandplain	
	Ningaui ridei Wongai Ningaui	Dune		Sandplain	
	Planigale sp. Planigale	Sandstone			
	# Dasyurus geoffroyi Chuditch			Skull in cave	
Macropods	*Macropus robustus* Euro (Walleroo)	Sandstone		Sandstone	Many areas
	Macropus rufus Red Kangaroo	Mulga			Many areas
	# Petrogale (?) lateralis Rock Wallaby			Scats in	
	# Bettongia lesueur Burrowing Bettong	Old warrens, many areas			Old warrens, many areas
Rodents	*# Leporillus apicalis* Stick-nest Rat	Old nests, sandstone		Old nests, sandstone	Old nests, sandstone
	** Mus domesticus* House Mouse	Mulga, dune sandplain	Samphire & sand ridge	Sandstone & sandplain	
	Notomys alexis Spinifex Hopping Mouse	Dune	Gypsum, sand ridge	Sandplain	
	Pseudomys desertor Desert Mouse	Dune & sandplain			
	P. hermannsburgensis Sandy Inland Mouse	Dune	Samphire & ridge	Sandstone & sandplain	
	Zyzomys argurus Common Rock-rat			Sandstone	
Bats	*Vespadelus finlaysoni* Finlayson's Cave Bat			Cave	
Echidna	*Tachyglossus aculeatus* Echidna			Scats & quills in cave	
Dogs	** Canis lupus dingo* Dingo	Widespread	Widespread	Widespread	Widespread
Cats	** Felis catus* Feral Cat	Widespread	Widespread	Widespread	Widespread
Horses	** Equus asinus* Donkey				Ilgarari Creek
Camels	** Camelus dromerarius* Dromedary Camel	Mostly non-rocky areas	Mostly non-rocky areas	Mostly non-rocky areas	Mostly non-rocky areas
Rabbits	** Oryctolagus cuniculus* European Rabbit	Scats in mulga	Scats in samphire		Scats near lakes

\# = Records of presumed extinct mammals.
* = Records for introduced mammals.

1. One remarkably coloured sand-swimming skink, *Lerista xanthura*, has previously been reported from only two Western Australian locations, neither in the Little Sandy Desert. The record obtained during this expedition from the eastern side of Yanneri Lake extends its known distribution by almost 500 km (from Telfer in the Great Sandy Desert).

2. The cave gecko, *Heteronotia spelea*, has not been recorded previously during the CALM surveys of this area.

Table 7. Reptiles and frogs recorded on the Little Sandy Desert expedition. (Percentage values refer to the proportion of reptiles and frogs encountered during the current expedition versus the total number recorded previously from the project area.)

Faunal Group	*LANDSCOPE* Expedition	All previous Expeditions
Dragons	6 (60%)	10
Skinks	14 (42%)	33
Geckos	8 (57%)	14
Legless Lizards	3 (60%)	5
Goannas	2 (22%)	9
Snakes	3 (25%)	12
Tortoises	0 (0%)	1
Frogs	0 (0%)	6
Total Reptiles	**36 (40%)**	**90**

The results clearly demonstrate some of the factors causing bias in reptile and frog surveys. These include

1. *Visibility* The dragons (60%) are well represented. They are diurnal, active and fairly large, and they were 'out-and-about' during the expedition.

2. *Season* The larger goannas (22%) are inactive for long periods, particularly in winter. Although there were plenty of old goanna diggings, there were relatively few tracks. Many larger goannas were probably still inactive. The same probably applied to some skink groups. The expeditioners recorded five (74%) of seven sand-swimmers (*Lerista* spp.) now known from the area, including one that was not previously known in the Little Sandy Desert. However, only four (27%) of the fifteen diurnal, surface-hunting (and so more visible) skinks in the genus *Ctenotus* were recorded. Many *Ctenotus* species are inactive in cooler parts of the year.

3. *Weather* Tortoises (0%) and some frogs (0%) live at rare, freshwater pools but there are frogs throughout the deserts. Most species bury themselves, emerging to breed after substantial rain. The absence of these groups from the expedition record was to be expected. Similarly, many other reptiles, particularly snakes (25%), are more active after rain and in humid conditions.

4. *Luck* Chance always plays a part. Normally blind snakes are poorly represented in collections because of their habit of living under ground. Only two species have been collected on previous CALM survey trips. The Expedition collected two species, one coming to the surface in our midst while we were seated round the campfire in the evening. (The species have not yet been identified; they may be additions to the known fauna list for the Little Sandy Desert.) Legless lizards (60%) are also hard to find. Yet, expeditioners caught two species in an hour at Yanneri Lake.

Given the relatively short duration of the expedition, the time of year and the absence of recent rain, recording 40% of the previously reported fauna is a good result and adding to the total species list was a valuable result.

We kneed your dough: Mum (Yvonne Muller) preparing bread in the Dreamtime Gully kitchen

Table 8. Reptiles recorded on the Little Sandy Desert expedition.

Family	Species	Locality			
		Willie Soak	Yanneri Lake	Dreamtime Gully	Elsewhere
Dragons	*Ctenophorus caudicinctus* Ring-tailed Dragon	Sandstone		Sandstone	Sandstone
	C. isolepis Military Dragon	Dune & sandplain	Gypsum & sand ridge	Sandplain	Dune & sandplain
	Diporiphora winneckei				Dune & sandplain
	Gematophora longirostris	Mulga			
	Moloch horridus Moloch / Thorny Devil				Sandplain
	Pogona minor Western Bearded Dragon	Mulga	Gypsum & sand ridge		
Skinks	*Ctenotus calurus*				Sandplain
	Ctenotus pantherinus	Mulga	Gypsum & sand ridge	Sandplain	
	Ctenotus ? piankai	Sandplain			
	Ctenotus quattuordecimliniatus Fourteen-lined Skink			Sandplain	
	Egernia depressa Spiny-tailed Skink	Mulga			
	Eremiascincus richardsonii Broad-tailed Sand-swimmer	Mulga		Sandplain	
	Lerista bipes Sand Swimmer			Sandplain	
	Lerista macropisthopus Sand Swimmer	Mulga	Gypsum & sand ridge		
	Lerista muelleri Sand Swimmer				Ilgarari Creek
	Lerista neander Sand Swimmer			Sandplain	
	Lerista xanthura Yellow-tailed Sand Swimmer		Casuarinas		
	Menetia greyi		Casuarinas		
	Morethia ruficauda		Gypsum & sand ridge		
	Cyclodomorphus melanops	Mulga	Casuarinas		
Geckos	*Diplodactylus conspicillatus* Fat-tailed Gecko		Gypsum & sand ridge		
	Diplodactylus wellingtonii Spiny-tailed Gecko			Sandplain	
	Diplodactylus elderi Jeweled Gecko				Sandplain
	Gehyra punctata Spotted Gehyra			Sandstone	
	Gehyra purpurascens Gehyra		Ridge & casuarinas		
	Gehyra variegata Tree Gehyra	Mulga	Gypsum & sand ridge		
	Heteronotia spelea Cave Gecko			Sandstone cave	
	Nephrurus levis Knob-tailed Gecko	Dune			
Legless Lizards	*Delma nasuta*		Casuarinas		
	Delma pax		Casuarinas		
	Lialis burtonis Burton's Legless-lizard		Samphire & ridge		

Family	Species	Locality			
		Willie Soak	Yanneri Lake	Dreamtime Gully	Elsewhere
Goannas	*Varanus caudolineatus* Stripe-tailed Monitor	Mulga	Gypsum & sand ridge		
	Varanus eremaeus Desert Pygmy Monitor			Sandplain	
Snakes	*Furina ornata* Moon Snake			Sandstone	
	Ramphotyphlops sp 1. Blind Snake	Mulga			
	Ramphotyphlops sp 2. Blind Snake	Mulga			

Tony Start

Tricia Handasyde, Robert Ingpen and Bill Morrow photographing *Halosarcia* sp. (Yanneri Lake)

VOLUNTEER PROFILES

Susan Clarkson, a regular on *LANDSCOPE* Expeditions, has a passion for the Western Australian outback having grown up in the Murchison. Susan has a keen interest in birds and plants and was eager to compare the flora and fauna of the project area with that of the Carnarvon Range, an area she had visited a few weeks earlier. She was also excited to visit such remote places as Dreamtime Gully and Yanneri Lake.

Clare Constantine was taking a break from her PhD studies and was looking for something that would combine her love of nature with science and new experiences. Clare was interested to see how plants and animals persist in such a harsh environment and was eager to experience the desert environs.

Christine Crafter was doing something she loves, getting away to remote areas and discovering what secrets were there to reveal. Chris works for the South Australian equivalent of CALM and has a great interest in desert regions and their ecology. Her eagerness to check traps and handle animals was only tempered by her desire to assist around camp where and whenever possible.

Graeme Harper (Harps) was on long service leave from the University of Melbourne although like all good scientists took the opportunity to gather data on people's perceptions of vocational training and skill utilisation in the field. Graeme developed an appreciation for the outback while living at Woomera in the '60s and has enjoyed many desert holidays since.

Heather Harper, Graeme's dedicated wife, also shared his passion for the outback and enjoyment of its subtle, often forgotten grandeur. Heather is senior nurse at the Royal Children's Hospital in Melbourne. She was not looking forward to re-entering the bedlam of city life at the completion of their around-Australia adventure.

Robert Ingpen was on a break from his role as an emergency services officer with Alcoa. He has travelled widely throughout the State including a journey down the Canning Stock Route. Robert enjoys photography and was very interested in the plants and wildlife of a remote area like the Little Sandy Desert.

David Loton, the enthusiastic morning fire-stoker who is 'widely experienced in many occupations' was always up to the challenge and ready to participate. His enthusiasm to explore and discover was only moderated by appeals for assistance from the kitchen, appeals that he cheerfully addressed and willingly fulfilled.

Jessie MacIver hailed from down Denmark way and should have felt at home on those cold mornings experienced at Yanneri Lake. Jessie was looking forward to the environmental learning experience that the trip offered and was keen to find out more about the flowers and plants which we encountered.

Bill Morrow, an old acquaintance of Phil Fuller's, was keen to interact with CALM personnel following his pleasurable experiences during the Montebello Renewal Project. Bill described himself as a birdwatcher and native plant enthusiast who was often observed wandering through the bush, binoculars in hand collecting plant specimens.

Suzy Speirs was the expedition's landscape designer/ architect who was impressed with our selection of campsites, especially at Dreamtime Gully. Suzy was also taken by the colour and horticultural potential of many of the plants encountered and undoubtedly now has a small selection of desert plants growing in downtown Hawthorn. Like Bill, Suzy was also often observed with binoculars in one hand and a fist full of plant specimens in the other.

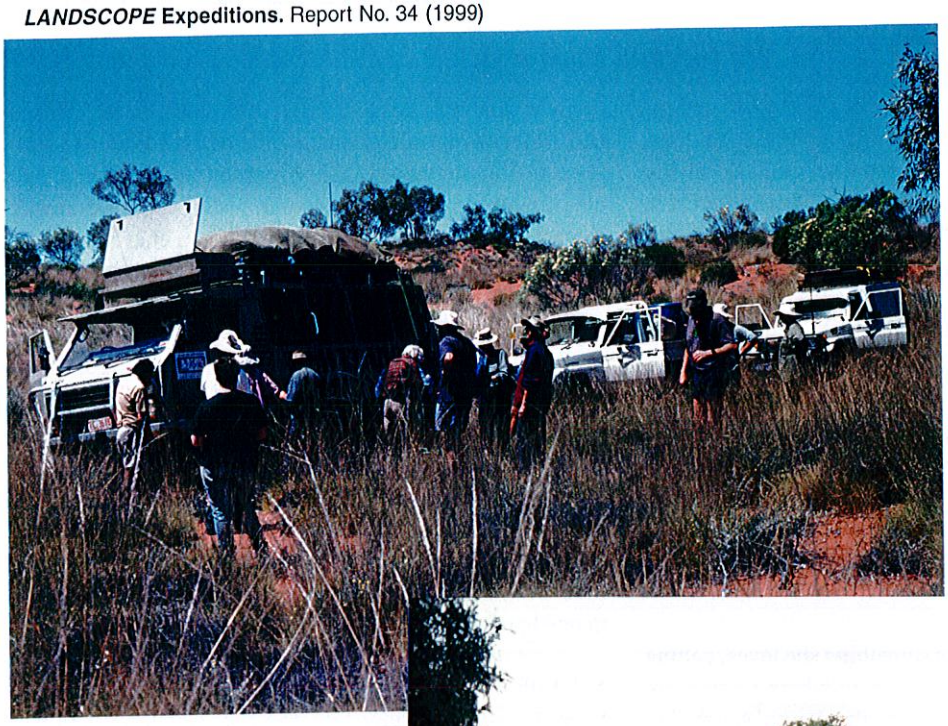
Val Talbot is another veteran of previous *LANDSCOPE* Expeditions and survived the Naturalists' Club trip to the Carnarvon Range. Val has had a life-long interest in natural history, particularly birds, and has taken every opportunity to extend her knowledge on the Western Australian biota, especially when travelling with like-minded people.

Emil Thoma has a broad knowledge of the flora in northwestern Australia and saw the trip as a chance to enhance these skills and develop new ones in other areas, particularly bird and mammal recognition. His observational abilities and investigative yearning greatly assisted in this learning experience and in his desire to expose the perpetrator of mischievous deeds within the camp.

John Tucker has travelled extensively throughout the Gibson and Little Sandy Deserts retracing the footsteps of early explorers like Carnegie. He harbours a wealth of knowledge with respect to desert wildlife and plants, Aboriginal art and pre-history and early Australian explorers. He likes to explore and search out new and remote places, why not with "legs like an Emu!"

Kathleen Vaux (Kaye) was our passionate matriarch who described herself as the "young oldie" from Ongerup. Kaye has a great appreciation of the State's flora and fauna having participated in five previous *LANDSCOPE* Expeditions. Her awareness of things botanical was reflected in the superb quality of her simple but stunning sketches. We can only wish to be as carefree, passionate and vivacious as Kaye should we be so lucky to become "young oldies".

Diane Wood (Di) has previously lived in the Pilbara and spent a lot of time exploring desert country that abounds with life. Diane's principal reason for joining the expedition while on long service leave from teaching duties, was to learn more about the environment (flora, fauna) of this remote region. Hopefully, through the fascinating evening campfire exchanges and subsequent interactions she achieved this gaol.



Inflating the Oka tyres after dune crossing on way to Yanneri Lake

Dreamtime Gully campsite

Foraging for reptiles on eastern side of Yanneri Lake (Bob Hollis, Tony Start, John Tucker, and Robert Ingpen)

This report is to be cited as van Leeuwen, S.J., Start, A.N., Fuller, P.J., Bromilow, R.N. and Handasyde, T. (2000) "Mallee, Mulgara and Thorny Devils: Exploring the Little Sandy Desert 1999", *LANDSCOPE* Expeditions, CALM, Perth, Western Australia.