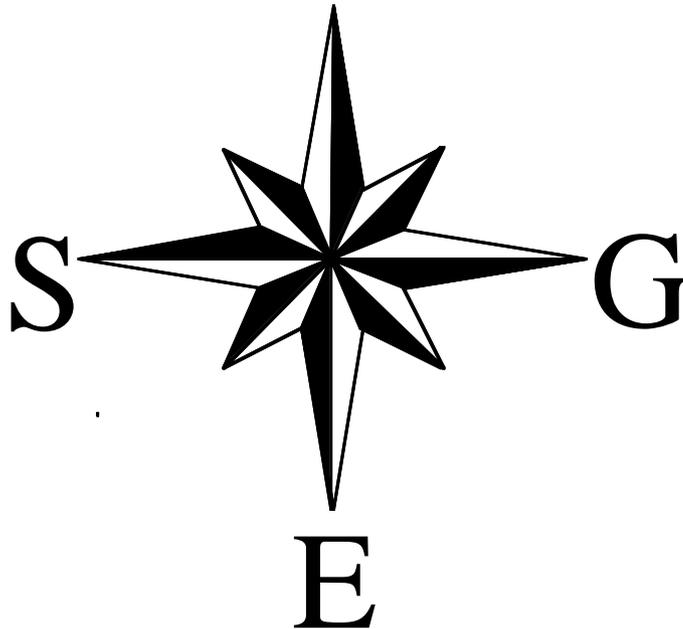


# **SCIENTIFIC EXPEDITION GROUP**



## **EXPEDITION WARRAWEENA**

### **SCIENTIFIC REPORT**

SCIENTIFIC EXPEDITION GROUP INC  
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UNLEY SA 5061

## 1. Foreword

By **C Warren Bonython**, President of the Scientific Expedition Group

The philosophy of SEG has been to provide its members - mainly young people - with the opportunity to carry out scientific investigation useful to the community combined with adventure in challenging surroundings.

Although past expeditions have encompassed diverse terrain, including the sea coast, river flood-plains and mountain ranges, it is not surprising that mountains have exerted the greatest attraction. Early on, parts of the Flinders Ranges - particularly the Gammon Ranges - grabbed SEG's attention, and now another component - Warraweena - was the target for this expedition.

Warraweena, a pastoral station now being rehabilitated for conservation, backs on to the striking Mount Hack/Mount Tilley high country where the main, north-trending Flinders chain forks as a gigantic 'Y'. Chris Wright and his dedicated leaders and expeditioners have worked hard and competently to assemble data for the management plan so necessary to steer the site in it's new conservation role.

In the Adventure phase, exciting bushwalks, largely in the less accessible high country, will have given members some enduring memories.

I congratulate our veteran leader, Chris Wright, his dedicated co-leaders and all the other expeditioners on their hard work and excellent report.

# Expedition Warraweena 2-17 July 1999

## Expedition Leaders

Chief leader  
Adventure Phase leader (& treasurer)  
Catering leaders  
Communications leader  
Project leaders  
    -Archaeology  
    -Mammals  
    -Reptiles  
    -Birds  
    -Drooping Sheoak Exclosures  
    -Vegetation Photopoints & Erosion

Chris Wright  
Graham Oats  
David Wilson and Matthew Ward  
Rob Matthias  
  
Sarah Hayes and John Love  
Graham Medlin  
Bob Sharrad  
Wendy Telfer  
Brendan Lay  
Annie Bond and Paul Wainwright

## Expeditioners

Jim Allen  
Nari Anderson  
Fiona Bennett  
Bindi Bennett  
Alex Coombe  
Shannon Carne  
Mandy Carter  
Fleur De Laine  
Chris Deering  
David Ireland  
Melanie Jackson  
Peter Love  
Susan Love  
Bryan McMullan  
Joe Mack  
Melissa Minerds  
Martin Nicksen  
Trudy O'Connor  
Guy Olding  
Camilla Osborne

## Acknowledgements

Expedition Warraweena 1999 would not have been possible without the assistance of sponsors and supporters. We extend our grateful thanks to the following people and organisations:

### Sponsors

Geo Ocean Horizons (Bobbie Rice)

Copy World

### Special Assistance and In-kind contributions

Primary Industries and Resources SA for communications and logistical support, the loan of the marquee, the barbecue and heaps of other equipment without which the expedition would have been very difficult to run.

CFS Port Augusta for the loan of the water heater, the SA Police Radio section for radio equipment and the State Emergency Service Pt Augusta for communications support.

The University of South Australia was a partner in the expedition with students from the Conservation and Park Management course being among the expeditioners; the School of Environmental and Recreation Management helped by supplying equipment; the University helped with transport; Bob Sharrad an Adjunct Senior Lecturer led the reptile project and Janice White, a Research Associate of the University and director of Wetlands and Wildlife, helped in the planning of the expedition.

Graham Willis for a fund of information on Warraweena including the archaeological sites, and water points.

The Invertebrate, Herpetology and Mammal sections of the South Australian Museum for equipment and identification of animals.

DEHAA for logistic support through Brendan Lay and for loan of equipment such as crowbars and traps.

The Bureau of Meteorology for loan of weather station equipment, survey equipment, and for providing daily weather bulletins.

Brendan and Elizabeth Lay for supplying the fruit for the expedition and for organising the camp at Yellow Well.

### Suppliers

The bulk of the expedition food supply came from Blackwood Foodland who put together the whole order, extremely efficiently, had it ready for collection, and at the end of the expedition took back anything that we did not use. Particular thanks are extended to Andrew Desteno and Peter Minervini for their untiring efforts and support.

Tulloch's Bush Baker at Copley once again provided first class bakery products for the expedition and arranged delivery to Beltana.

Thanks are extended to Graham Ragless of Puttapa Station who supplied the sheep for the Barbecue on the Open Day.

### Vehicles and transport

The expedition depended completely on the supply of vehicles to move the groups around Warraweena. The University of South Australia, DEHAA and PISA's support have been acknowledged. The following people made their vehicles available without fuss or conditions, and we thank them most sincerely:

John Love (two reconnaissance trips plus the expedition) Prado

Chris Wright (two reconnaissance trips plus the expedition) Subaru and trailer

Graham Medlin (two reconnaissance trips plus the expedition) Mazda Dual cab ute

Joe Mack Ute

Fiona Bennett Ute

Graeme Oats Daihatsu

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# Expedition Warraweena 1999 Report

## 1 Introduction

### 1.1 Introduction & spiel on SEG - Chris Wright

Expedition Warraweena '99 came about as a result of the need to develop a Management Plan for Warraweena, a Pastoral Lease in the Northern Flinders which had become badly degraded due to overgrazing, and which had been acquired by Wetlands and Wildlife Inc. to be run as a Conservation Park. Funding to undertake the plan was obtained by the Nature Conservation Society from the Natural Heritage Trust, and was used to employ Wendy Telfer as the Management Plan Coordinator. SEG undertook to run an expedition to Warraweena, providing leaders and volunteers to collect baseline data on the flora, fauna, archaeology and history of Warraweena. Wendy Telfer, in her role as Coordinator, participated fully in the planning and running for the Expedition. The SEG objectives of running expeditions of a scientific nature, for young people, in field science, self reliance and bushwalking, were fully met. The combination of SEG's experience in organising and running expeditions, and Wendy Telfer's drive and enthusiasm to make it all happen, worked extremely well.

### 1.2 Location of Warraweena

Warraweena is located in the Northern Flinders Ranges, about 6 hours drive north of Adelaide. It lies to the east of Beltana, on the road from Hawker to Leigh Creek. Mount Hack is on its north east border, Mt Stuart in the west, and Mt Hemming in the south. The Mt Tilley range lies just to the east of Warraweena, but is easily accessible from the Old Warraweena Road. Warraweena is being developed for tourists and visitors, and has an abundance of good camp sites in beautiful settings. Black Range Springs, Hallies Well, Old Warraweena are easily reached by motor vehicle, while the more remote locations such as Dunbar, Yellow Well, Cockatoo Hut require a heavy four-wheel drive vehicle for access. (At least for access on wheels). Bushwalking through the area is varied and offers spectacular views of the Northern Flinders. The ranges in this area offer many watering points, which makes the planning of hikes relatively easy. Figure 1 shows the main features of Warraweena.

Figure 1. Map of Northern Flinders Ranges showing location of Warraweena.

### 1.3 Description of Warraweena

Warraweena is a property of 355km<sup>2</sup> in the northern Flinders Ranges. It was previously a pastoral lease, stocked with sheep for some 130 years. It has recently been destocked (1996) because unsustainable grazing pressures led to it becoming non-viable as a pastoral concern. The property is now leased by Wetlands and Wildlife, a non-profit environmental company that manages substantial wetland areas in the South East of South Australia. The property is managed as a private conservation park or wildlife sanctuary, with recreation and tourism being the other land uses.

Warraweena encompasses some of the highest parts of the Flinders Ranges including Mount Hack, one of the few peaks to exceed 1000m in height. The property is predominantly hill country. In the north and along the eastern boundary there are rugged quartzite ranges. In this eastern section and in much of the southern parts of the property the vegetation is dominated by native pine (*Callitris glaucophylla*) open woodland. To the south and west is a strip of

country with calcareous plains and rises with predominantly ephemeral cover with native pine and prickly wattle overstorey.

The central and southern parts of the lease are comprised of low siltstone hills and rises dominated by shrubs and ephemeral species. The central-western area, encompassing Yellow Well Paddock and towards Mt Stuart, is characterised by open grasslands of lemon-scented and wallaby grasses with (originally) a sparse overstorey of drooping sheoak and with eucalypts and pine in the creeklines. There are also some regions of open shrubland (*Acacia victoriae*, *Eremophila duttonii*, *Alectryon oleifolius*), over chenopod low shrubland. The south western corner has areas of *Atriplex vesicaria*, *Maireana astrotricha*, *Sclerolaena* spp. or *Zygophyllum aurantiacum* low shrubland. Also within this region are areas of *Acacia* spp., *Eremophila* spp., *Senna* spp., *Dodoneae microzyga* and *Ptilotus obovatus* shrubland with an open overstorey of *Casuarina pauper* and *Callitris glaucophylla*.

There are several ephemeral creeks through the area, the largest being Black Range Spring Creek, Sandy Camp Creek and Warrioota Creek. There are also some 27 permanent springs on Warraweena that support sedge communities.

The vegetation has been described by the Pastoral Management Program and the Flinders Ranges Management Review. Where there is substantial record of the vegetation, there is almost nothing recorded about the fauna present. There is also much work to be done in the monitoring of plant communities including threatened species, examining regeneration and erosion.

The data gathered in this SEG expedition will be used in a report on the biodiversity of Warraweena and will be used in the formulation of recommendations on biodiversity for the property's management plan. The plan for the property will focus on working towards biodiversity protection and enhancement.

## 2. Expedition report and logistics

### 2.1 *The Chief Leader's Perspective - Chris Wright*

The Expedition left Adelaide, starting with the advance party on Friday 2 July, followed by the main group on Saturday 3 July. Base Camp was established some 3 km south of Warraweena Homestead in open ground, with tremendous views of the Mt Hack range. Expeditioners and leaders provided their own tents for sleeping. A large marquee was used as a kitchen and amenities tent, and provided shelter during some of the colder evenings. The smaller tent owned by SEG was used as the "Scientific" tent. The fauna and vegetation work, and data compilation was done there, mainly by Bob Sharrad and Graham Medlin.

There were some 22 expeditioners and 10 leaders. Expeditioners were drawn mainly from Adelaide University and the University of South Australia. There were no high school students in the group although two did apply and later withdrew. With one or two exceptions, all expeditioners performed well at all times, showed great enthusiasm and willingness to help with routine and often arduous and unpleasant tasks, under conditions that were cold and exposed in the South Australian outback winter. Joe Mack, from Loxton in the South Australian Riverland was the oldest of the group, aged 71. He and John Love particularly, felt the cold, but it did not deter them from participating to the fullest extent. The youngest expeditioner, Bindy Bennett (12), from Sydney showed great interest, and obviously enjoyed the experience immensely.

Brendan Lay of the Pastoral Management Division of DEHAA planned an Exclosure project, to demonstrate the effect of protecting a rare *Allocasuarina* species from grazing pressures. This took place at Yellow Well, some 40 minutes drive south of the Base Camp, on a ridge on the south west side of Mount Stuart. Two adjacent exclosures were constructed, each 50 metres square, and a control plot was marked out, some 30 metres to the north. Full rabbit and goat proof fencing was constructed, and will remain in place for at least 20 years, while the regeneration process is monitored. Access to the site was extremely difficult, by heavy 4-wheel drive in low ratio. Brendan had brought most of the materials up during an earlier trip, and established a camp close by. His wife Elizabeth and sons Greg (12) and Sandy (10) were there also, and each day one of the Expedition groups went up to Yellow Well to assist, and stay there overnight.

Rob Matthias and I visited the camp on three days and provided assistance. Joe Mack also spent three days up there. The fencing was constructed well under very difficult conditions due to the steeply sloping hill, stony ground and inexperience of the helpers. Brendan himself worked incredibly hard to get the job done, and even got up at 3 am one morning to replace a defective corner post, by the light of the moon, because he was worried about its possible failure. Elizabeth participated with cheerful enthusiasm keeping the camp in order, her boys occupied, and helping with the fencing on all possible occasions. The expeditioners worked like Trojans, and some in particular, made up for their lack of physical strength with dogged perseverance and good humour. On the final day of construction, when the fence was complete and the control plot laid out, *Allocasuarina* seedlings grown from seed collected at the site, were planted in the middle of each of the plots. The sites were photographed, but will be scored by Brendan at a later date.

A comprehensive pitfall, Elliott and cage trapping program was undertaken at 8 sites covering a representative range of vegetation communities. The logistics for this work were demanding, with 16 pitfall lines laid out, each with drift netting pegged down and a total of 16x6=96 pitfalls to be dug in hard and rocky ground. Elliott traps, and cage traps were laid, and insect pitfall lines were set up. Led by Bob Sharrad and Graham Medlin the program was completed satisfactorily and the requisite number of trapping nights were achieved. They led by example with boundless hard work, good humour and enthusiasm. Although the winter conditions meant that there was little activity from reptiles and small mammals, the catches were reasonable, and the trapping program will be repeated later in the year under warmer conditions.

Wendy Telfer led the bird identification survey, which was conducted morning and evening, at the same locations as the trapping lines, by successive groups of Expeditioners. The program went extremely well and Wendy was pleased with the record of birds identified. I participated in one of the survey days, and was most impressed at the competency and knowledge of the leaders, and their willingness to instruct those of us who knew very little about birds.

John Love and Sarah Hayes conducted the archaeological and historical survey of a variety of sites on the property. I will leave John to present the results of the work in due course, however there have been some surprises, particularly in finding some stockyard constructions that are most unusual. Unfortunately it was not possible in the time to contact the previous owner, Keith Nichols, to try to find out the origins. I am sure that John Love will follow this up in due course. I would like SEG to note in particular John's meticulous preparation for the expedition and the survey, including at least 3 reconnaissance visits, and his careful work at photographing, recording and storing the artefacts. This is in addition to his willingness to take his vehicle to some most inaccessible locations with considerable nerve and determination. John's quiet manner hides a very active mind and an excellent sense of humour which we have all enjoyed. John also kept the minutes at all meetings, organised the mailouts to leaders and expeditioners, without much help from the rest of us. The Love family managed to recruit a major portion of the expeditioners.

Wendy Telfer is the Coordinator, appointed by the Nature Conservation Society, to prepare baseline data for the Warraweena management plan. Her appointment was recent (April 99), and although she was not required to take on a major role in running the expedition, she offered her services immediately and in full. She was heavily involved with the development of a management plan for Warraweena, and participated /led much of the planning and preparation for the expedition. Thanks to Wendy, the Expedition secured the services of David Wilson and Matthew Ward, who (as soon as their examinations were over) quickly took charge of the major tasks of organising the expedition and in particular the catering. This task, for some 35 people, was accomplished with an efficiency and lack of fuss which disguised the sheer hard work that it took. Although at the start, it was made clear that all Expeditioners would assist with the food preparation and associated tasks, the large number of groups and the long program each day, made it difficult to share the tasks, and on most days David, Matt, Wendy and Paul Wainwright, did the bulk of the food preparation and distribution. In a report that records a large number of superlative efforts, it is hard to do justice to the hard work and efficiency of this team, particularly as each member made it seem just a routine contribution. The compelling evidence was that all members of the expedition were well fed, and everyone acknowledged that the catering was the best that they had experienced on an expedition. Food for the Adventure Phase was provided with great efficiency and minimum fuss, and there were no grumbles or complaints, a tribute to their efforts. Foodland once again put together the whole food order, offered a discount, and had it ready for collection with their usual thoroughness.

Annie Bond was involved with planning the vegetation survey and logistics. She prepared the expedition handbook, complete with hand-drawn dragon lizard on the cover, and she and Paul Wainwright undertook the resurvey of the photo points set out by Brendan Lay. Annie handled the tricky problem of working out how 7 groups of Expeditioners would be deployed, how to provide transport to get them where they needed to be, and somehow to ensure that the tasks and experiences of each expedition were fairly distributed. The setting up and adjusting of the matrix of people, groups, vehicles, drivers and tasks, on the Whiteboard in the big marquee, was a challenging task that was well done and effective. The first day proved to be the most difficult, and somehow we managed to get everyone to where they were supposed to be, without needing to pack Annie or Paul into the narrow confines of the cupboard space in the back of Joe Mack's Ute.

Rob Matthias supplied critical logistic support with communications equipment. His Repeater station, set up with grunt and effort on a small hill to the west of the camp, provided a most effective means of communication between vehicles, expeditioners and the base camp. This was an essential safety feature in case of accident, and made the tricky problem of moving people and vehicles at the right place and time, possible. Rob made available a heavy 4-wheel

drive vehicle which made the critical daily trip to Yellow Well, supplying Expeditioners and their food and equipment. His huge caravan disgorged a host of vital equipment such as the large barbecue and the water heater, and a dozen most welcome chairs. His Satellite phone gave us essential communications to the outside world. Rob gave willing assistance to the fencing program at Yellow Well, spent time with most of the scientific programs, and notably took over the cooking at Base Camp during the adventure phase, allowing the scientists to concentrate on their investigations and data recording.

Graeme Oats has kept financial control of the expedition with his customary efficiency. This, as SEG well knows, is vital if we are to survive. He has kept our expenditure within budget, planned the Adventure Phase walks, and led a group of inexperienced hikers on a 5-day hike through some remote country. We have learned to expect this unending voluntary contribution from Graeme, but I think it is important to remember how valuable it is. Graeme was active throughout the planning phase, and managed to get up to Warraweena to help with establishing the camp. Work commitments required him to return to Adelaide in the first week, but he was back at Warraweena by Friday night, set up the information displays at the Open Day, and then went bush for the 5 days. He generously lent his car to Sarah Hayes and 4 others who needed to be back in Adelaide by the weekend. Graeme put on an excellent SEG display at the Open Day.

On Sunday 11 July, an Open Day was held by Wetlands and Wildlife, the owners of Warraweena, to explain how the organisation works, and their plans for the future for Warraweena. Janice White and Keith Frost represented Wetlands and Wildlife and gave a talk lasting about 30 minutes. Chris Wright then spent a few minutes explaining what SEG was and what we were doing. At the end of the formal presentations, the guests were invited to participate in a barbecue, prepared and cooked by SEG, to look at the various displays and talk to SEG and Wetlands & Wildlife people. Bob Sharrad had several calico bags with reptiles and one snake. He put on an excellent "Show and Tell" presentation, in an entertaining manner to about 30 onlookers including pastoralists and their kids and several aboriginal families. His efforts were commendable and he did a great deal to convince the neighbours about the value of SEG's involvement on Warraweena and the way we helped Wetlands and Wildlife.

Water for use at Base Camp came from the tank at Sliding Rock. Chris and Graeme took the bus for a run and filled the 12 water drums every couple of days. It took some ingenuity to work out how to fill 15 plastic drums from a ball valve at the end of a plastic pipe, but by the end, a Heath-Robinson arrangement with stones and bits of corrugated iron, the filling of drums went smoothly.

The Adventure Phase consisted of three groups, totalling 19 Expeditioners and leaders. Graeme had planned 4 different walks, and Expeditioners were required to nominate their choice of walk. Originally the program was for a 4-day walk, later extended by an extra day, allowing the inclusion of a day climbing Mount Hack. Ten Expeditioners nominated for the Red route, including the peaks, Mt Hack, Mt Gill or Tilley, and Mount Stuart, and extensive walks along Sliding Rock Creek and Warrioota Creek. These were divided into two groups, led by Graeme Oats and Chris Wright. Wendy, David, Paul and Matt, and three others chose their own shorter walk, so that they could prepare the Friday night dinner, and then spent a hard day climbing peaks on the Mt Hack range. Graeme and Chris' groups tackled the walk with determination, climbed mountains, counted feral goats, looked at waterfalls, survived the cold, went to bed at dusk and started afresh at dawn for 5 hard but enjoyable days. Chris Deering and David Ireland suffered knee problems, but were not too much the worse for wear. The rest did well and obviously enjoyed the experience. One of the leaders was recorded on film, having a cold bath in the sheep trough at Hallies Well.

The Expedition returned safely to Adelaide on Saturday 17 July. By 6:30 pm the last Expeditioner had been collected from the Victor Richardson gates at Adelaide Oval, and all that was left was Chris Wright and a huge pile of assorted traps, rather dirty boxes, equipment, and 4 dustbins of non-recyclable garbage. However the arrival of Wendy Telfer and Matt Ward with the Subaru and trailer allowed the Met Bureau equipment to be returned to Kent Town, the garbage dumped in the Met Bureau hopper, Wendy and Matt to be delivered to their house in Unley, the cage traps unloaded at Graham Medlin's house in Bedford Park, and finally for Chris

to park a very dirty vehicle, trailer and contents in the back garden of his house at about 8:00 pm. Sorting of gear, returning of unused food, returning of the bus to Kanga, and various unpacking and washing, took place over the next few days, thanks to ongoing help of so many willing volunteers. A great experience was enjoyed by all.

Transport was a major issue for the expedition, and there were only just enough vehicles to move the groups to their respective sites each day. The first day was the most difficult, but thereafter we managed without too many dramas. SEG should note the generous contribution of the bus, by the University of South Australia. The University also provided the Food Trailer, and a huge enclosed trailer for transporting gear. The equivalent value of this support is well over \$2,000. Thanks to arrangements by Bob Sharrad. SEG paid only for the fuel, and hire of the trailer. Rob Matthias arranged for the supply of the heavy 4-wheel drive vehicle, communications equipment, the barbecue, and the hot water heater. Equivalent value of this equipment would be another \$2,000. Private vehicles were provided by John Love (Prado), Chris Wright (Subaru & trailer), Fiona Bennett (Nissan 4-wd ute), Graeme Oats (Daihatsu), Graham Medlin (Mazda dual cab ute), Joe Mack (Hilux Ute & trailer). SEG paid fuel costs on site and for the repair of a couple of tires.

## **2.2 Weather monitoring**

A weather monitoring station was set up at Base Camp. Equipment was loaned by the Bureau of Meteorology and included:

a Stephenson Screen

Raingauge

Maximum Thermometer and Minimum Thermometer

Wet Bulb temperature and Dry Bulb Temperature.

The Screen, raingauge and instruments were set up, some 50 metres west of the Base Camp. Readings were taken at 09:00 am and 03:00 pm. Wind speed and direction were estimated, with help from the observers manual. After each reading, the data was entered into the observations book, the relative humidity was calculated and the results phoned to the Bureau of Meteorology, and entered onto the Bureau official weather charts.

The Bureau provided the expedition with weather forecasts for the area, and the forecast was posted up on the notice board each day.

The weather monitoring project was useful in demonstrating the weather measurement process, and several expeditioners participated in reading the instruments and recording the data for each schedule. Reading the clouds was a much more difficult task, the observers estimated cloud cover in eighths, but were not able to identify the cloud type and height.

Maximum temperature recorded was 20.1°C.

Minimum temperature recorded was 3.8°C.

Humidity varied between 40% and 100%.

6.6mm of rainfall was recorded on 9 July 1999.

The process of data collection and recording was of interest to many people, and for me it was an objective lesson in the process of collection weather data, and the difficulties that are inherent in the process.

The success of surveying mammals, reptiles and birds is affected by the weather conditions. Some record of what conditions were like at the time of sampling are helpful for interpreting results. The days were primarily fine and sampling was not thought to be biased dramatically by weather conditions. 6.6mm of rain was recorded on the 8-9 July 1999. Following the rain cracks in the gilgai soils of sites 1 and 2 enlarged as the soil dried out and there were signs of digging to clean out some of the small holes which were previously present.

Table 1. Weather observations made at base camp 4-11 July 1999.

Date	Time	Dry Bulb °C	Wet Bulb °C	Wet Bulb Depress <sup>s</sup>	Dew Point	Relative Humidity %	Wind Direct <sup>n</sup>	Wind Speed knots	Visibility km	Cloud Eighths	Temperature Max °C	Temperature Min	Rainfall mm	Weather Description
4-Jul	1500	15.6	9.1	6.5	0.7		W	5	30	0	17	14.8	0	Fine, Sunny, no cloud
5-Jul	900	13.1	9.5	3.6	5.6	60	0	<1		0	17.3	13.1	0	Fine, bright sunshine
	1500	17	10.6	6.4	3.4	40	0				17.6	13.1	0	Fine, sunny, no cloud
6-Jul	900	11.5	8.5	3	5.1	65	0	0	>80	3	17.6	3.8	0	Fine, calm
	1500	19.2	12.6	6.6	6		W	9	>80	>1	19.4	19.4	0	Fine, light breeze
7-Jul	900	14.5	10.5	4	6.4	58	E	<1	>80	0	19	8.5	0	Fine calm, warm
	1500	19.5	13.6	5.9	8.3	48	NW	9	>80	0	20	19.5	0	Fine, gusty breeze
8-Jul	900	18.1	14	4.1	10.5	62	ENE	5		7	20.1	11.5	0	Cloudy, mild, light breeze
	1500													
9-Jul	900	10.9	11	-0.1	11	100	0	0	>80	0	19.9	8.9	6.6	Fine, clear
	1500	16.5	14.5	2	13	79	SW	8			17	11.5		Sunny with cloud patches
10-Jul	900	12.5	11.5	1	10.6	88	ENE	5	>80	0	17	7.5	0	Fine, clear, light dew
	1500	16.5	13.5	3	11	70					15	13.5	0	Overcast, light breeze
11-Jul	900	13.9	11.8	2.1	10	77	0	0	>80	<1	18	7.5	0	Fine, calm

## **2.3 Radio and Satellite Communications - Rob Matthias**

The base camp and all teams were equipped with VHF handheld radios that operated through a solar powered repeater installed on a small hilltop 400 metres from the base camp. The range of the handhelds provided coverage to all the scientific sites, on a line-of-site basis, except the Dunbar Hut area which was directly behind Mt Stuart from the repeater site. Due to its portability, the repeater could have been relocated but this was not considered necessary. One 4wd vehicle was equipped with a mobile radio to provide coverage beyond the Warraweena property to Beltana and Leigh Creek.

All groups accepted the need for regular radio schedule calls on group locations and welfare reports. They understood how to transmit in very difficult areas from hilltops and how to assist each other in passing messages and information. The radios also performed well during the bushwalking phase. Groups communicated with each other on conditions, progress and other arrangements. None of the equipment gave any problems and batteries were recharged at the base camp using a portable generator.

A mobile satellite telephone system was used to provide daily reports on weather data collected at Warraweena to the Adelaide Bureau of Meteorology. It was also used to contact expeditions members regarding a serious illness in the family.

## **2.4 Catering - Matthew Ward and David Wilson**

### **2.4.1 Introduction**

While playing frisbee in late May, Dave Wilson and Matt Ward were recruited for the catering job by the opportunistic survey co-ordinator Wendy Telfer. While their previous catering experience was extensive, they had yet to tackle catering for forty people. In fact, they had problems catering for themselves. However they knew that if they put their heads together, they would look silly. Considerable thought produced three essential aims:

- To cook food, which people would subsequently eat.
- To diversify people's eating habits.
- To avoid introducing *E. coli* into base camp.

### **2.4.2 Methods**

The five major food groups were assorted in various shapes, textures and flavours. These were then mixed together and quite often warmed. This was then served to the masses in large, flaky aluminium pots. Many of the group may now struggle to recall these incidents. Everyone chipped in to do their own washing up, while Chris Wright did his and everyone else's.

### 2.4.3 Results

A survey of participants indicated that the food quality was above average, while satisfaction levels were high (Fig. 2,  $n = 1$ ). The mean amount of food produced was not significantly different from the amount of food consumed ( $P = 0.34$ ,  $n = 15$ ). The rate of Sultana Bran consumption was significantly greater than that of Muesli ( $P < 0.001$ ,  $n = 15$ ).

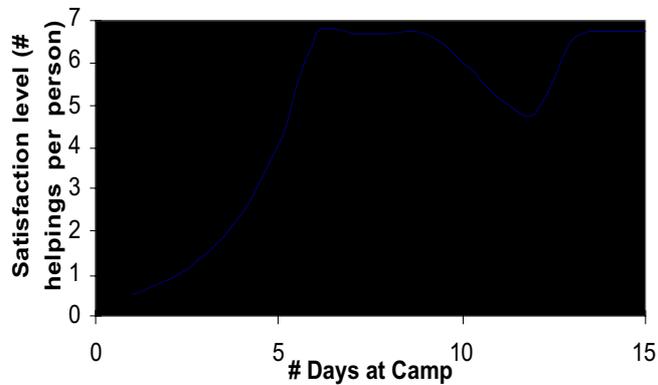


Figure 2. Satisfaction level of participants over the course of expedition, 2 - 17 July 1999.

### 2.4.4 Conclusion

We had a great time cooking for everyone.

### 2.4.5 Acknowledgments

Special thanks to Chris Wright for extra washing up, quandong pies, storage and food collection. Thanks to Paul, Annie, Trudy and anyone else who helped chopping. Thanks to Joe Mack for the 'Humour' file, and Shakrapandi for spiritual guidance.

## **3. Fauna**

### **3.1 Mammals - Graham Medlin and Wendy Telfer**

#### **3.1.1 Introduction**

Very little is recorded about the fauna of Warraweena. Species such as red kangaroos, western-grey kangaroos and euros all commonly inhabit the region. Several yellow-footed rock wallaby colonies are also known to exist on the property, although much of their range has been taken over by goats. Other small native mammals such as Dasyurids and native rodents are not recorded but may well exist on the property.

Introduced mammals species are plentiful, with goats being present in high numbers throughout the northern Flinders Ranges. Their browsing prevents growth of plants and regeneration, and thus they are a significant management problem. Ground shooting of goats occurs on the property, however now that destocking has occurred, they will continue to move on to Warraweena from neighbouring properties due to the greater amount of feed available. Rabbits have also been present in high numbers and have caused substantial damage to the vegetation and soils. The release of the calicivirus in 1995 has decreased numbers dramatically. Dead rabbits still continue to be found affected by the virus but a few live rabbits are now beginning to be seen on the property again (autumn 1999, pers comm G. Willis). Cats and foxes are also seen and can be major predators of native fauna.

The aim of this project was to survey the mammal species inhabiting Warraweena. We also sought to teach expeditioners various surveying techniques and to give them big muscles!

#### **3.1.2 Methods**

Following the methodology of the 'Biological Survey of South Australia' (a major program of the Department of Environment), we set up pitfall lines and traps in eight habitat types on Warraweena. Descriptions of the dominant plant species and the soils present at the sites are given in table 2. At each site two 50m drift fence pitfall lines were positioned about 200m apart. This was hard work - at many of the sites we hit baked clay or rock and both perseverance and muscle were required (and pep talking from Bob and Graham was invaluable). Along each line, six pitfalls were dug (each 40cm deep and 15cm in diameter). We managed to dig the 96 holes over the course of the first week. The traps at sites 1-4 were opened for four nights in the first week and sites 5-8 were opened for four nights in the second week.

15 Elliot traps, primed with peanut butter and oat bait, were placed in an arc 10 metres from each pitfall line and 10 metres apart. A cage trap to catch larger mammals was placed at each end of the pitfall lines. As with the pitfalls, traps were opened for four days and nights. All traps were checked daily in the morning and late afternoon or evening for animals. The first male and female of each species caught were anaesthetised and liver samples taken in liquid nitrogen. The identifications of these specimens (referred to as 'voucher specimens') are verified by the South Australian Museum and the liver samples will be used in the future for DNA and electrophoresis studies.

When traps were checked in the evening some spotlighting was undertaken. This involved spanning the site with a high beam torch for any animals - the reflection of their eyes in the light make them easily visible. Observations of large mammals (such as kangaroos and feral animals) or their traces (scats, footprints, bones) were also recorded at each site and opportunistically when travelling around the property.

An Anabat bat detector was used to survey the bat fauna present near base camp at Warraweena. The detector records the echolocation calls of bats, which differ between species. These calls are analysed and identified by Terry Reardon of the South Australian Museum.

Table 2. Descriptions of the dominant vegetation and soils at the eight primary survey sites.

Site name	Site description
WAR 001 01	<i>Sclerolaena longicuspis</i> chenopod shrubland site. Gilgai soil <sup>1</sup> present. Many holes among the cracking clays. Two major rabbit warren systems between Lines A and B.
WAR 002 01	<i>Atriplex vesicaria</i> chenopod low shrubland site. Significant gilgai soil present around Line A, more limited gilgai soil immediately adjacent to Line B. Some areas badly affected by sheet erosion.
WAR 003 01	<i>Casuarina pauper</i> low open woodland site. Many quartzite/sandstone rock fragments were found on the surface and embedded in the soil, which appears to have been derived from the calcareous shales and limestones of the Wonoka Formation. The soil was particularly sticky when wet. Quartzite/sandstone fragments have probably come from the erosion of the Pound Subgroup (Bonney Sandstone and Rawnsley Quartzite) which overlies the Wonoka formation. <i>Maireana</i> low shrubs form part of the sparse understorey.
WAR 004 01	<i>Alectryon oleifolius</i> open shrubland site. <i>Alectryon oleifolius</i> with <i>Zygophyllum</i> understorey.
WAR 005 01	<i>Acacia ligulata</i> tall open shrubland site. Rocky bare areas with interspersed large <i>Acacia ligulata</i> shrubs. For Line B, after visually locating the secondary marker, walk through a thick grove of <i>Callitris</i> on the bearing indicated, down to the creek, past large river red gums, and up the slope on the other side.
WAR 006 01	<i>Cymbopogon ambiguus</i> tussock grassland site. The <i>Cymbopogon</i> tussocks are found in the shales of the Bunyeroo Formation which outcrop prominently in this area.
WAR 007 01	<i>Callitris glaucophylla</i> open woodland site. Old <i>Callitris</i> grove with little understorey, situated near an alluvial creekbed. The shallow soil covers shales of the Bunyeroo Formation which also frequently outcrops here. Heavy logging has produced more open woodland and open areas than would normally be the case.
WAR 008 01	<i>Eucalyptus socialis</i> open mallee woodland site. The <i>Eucalyptus socialis</i> is growing in calcareous shales of the Wonoka Formation. Orange coloured mistletoe is present in many trees. Termite-ridden fallen limbs and leaf litter provides good additional habitat for invertebrates and reptiles. A steep gully separates the two sites.

### 3.1.3 Results

All traps and pitfall lines were successfully set up and left open for four days and nights. This represented a total of 1472 trap nights (refer to table 3). Ants were a problem at sites 4 and 5 but this problem was overcome by use of insect repellent. At site 7 two Elliott traps were shifted and closed and signs of fox presence were obvious.

<sup>1</sup> Gilgai Soils: Soil developed in parts of Australia with local surface relief up to 2.4 m, consisting of mounds or ridges known as puffs composed of calcareous soil with lime nodules, and depressions or valleys termed shelves underlain with non-calcareous soil (American Geological Institute 1962).

Table 3. Summary of trapping effort.

Site	Nights open	# pitfall traps	# pit nights	# large cages	# cage nights	# Elliott traps	# Elliot nights	Total trap nights
WAR00101	4	12	48	4	16	30	120	184
WAR00201	4	12	48	4	16	30	120	184
WAR00301	4	12	48	4	16	30	120	184
WAR00401	4	12	48	4	16	30	120	184
WAR00501	4	12	48	4	16	30	120	184
WAR00601	4	12	48	4	16	30	120	184
WAR00701	4	12	48	4	16	30	120	184
WAR00801	4	12	48	4	16	30	120	184
Total	32	96	384	32	128	240	960	1472

13 fat-tailed dunnart (*Sminthopsis crassicaudata*) and four stripe-faced dunnarts (*Sminthopsis macroura*) were caught in the pitfall traps. The majority of dunnarts were found at the *Sclerolaena* and *Atriplex* chenopod shrubland sites. These sites are characterised by cracking gilgai soils, the cracks of which provide ideal homes for invertebrates. Both of these dunnart species feed nocturnally on invertebrates on the ground surface. The abundance of these invertebrates is affected by rainfall and the subsequent herbaceous vegetation available. Thus dunnart numbers also tend to correlate with rainfall. The dunnarts also live in the soil cracks and in the more covered areas close to these cracking soil plains.

The only other mammal species caught was one house mouse (*Mus domesticus*) at the *Eucalyptus* site. We were surprised that we did not catch any other rodents or *Dasyurids*. Bolam's mouse, Forrest's mouse, Giles' planigale and the narrow-nosed planigale are all known to be surviving in the northern Flinders Ranges. Their presence and population densities are also dependent on the success of summer and winter rainfall and the subsequent herbaceous vegetation. Some of these species may be caught in the survey work that is occurring in spring.

A male and female of both dunnart species were anaesthetised, their livers removed and placed in liquid nitrogen, and their bodies kept in formalin. The house mouse was also taken in formalin. These samples were given to the museum on return to Adelaide for validation of our species identification and for their collections and for future study of DNA and electrophoresis.

Many red kangaroos and euros were sighted around the property. Note that the red kangaroos were present at the open chenopod sites in the flat open parts of Warraweena, whereas the euros were sighted throughout the property. Interestingly no western-grey kangaroos were recorded although they are known to frequent the area. Yellow-footed rock wallabies were observed on a rocky ridge close to the base camp. Little was seen during the spotlighting except the odd kangaroo.

Many introduced species were observed including goats, rabbits, foxes, sheep, horses and cattle. Droppings observed showed the presence of both native and introduced fauna. Some sub-fossil material was found by Graham Medlin in a cave east of Mt Stuart. He identified the bones to be Brush-tailed possum (*Trichosurus vulpecula*). A fur ball likely to have been regurgitated by a wedge-tailed eagle was also found which may be a source of information about fauna present in the region.

The white-striped freetail bat was heard on several occasions throughout the expedition. The Anabat recorded primarily over one night and although the quality of the signals was not good, three species were able to be identified. The species were: the Little Mastiff bat (*Mormopterus planiceps*), Gould's wattled bat (*Chalinolobus gouldii*) and the Lesser Long-eared bat (*Nyctophilus geoffroyi*).

Table 4. Mammals observed at Warraweena at eight sites and opportunistically during the SEG Survey 2-17 July 1999.

Species	Common name	Sites								Opportunistic Sightings
		1	2	3	4	5	6	7	8	
<i>Bos taurus</i>	Cow	1	0	0	0	0	0	0	0	1
<i>Capra hircus</i>	Goat	0	1	0	1	1	1	0	1	2
<i>Equus caballus</i>	Horse	0	1	0	0	0	0	0	0	0
<i>Macropus robustus</i>	Euro	2	1	0	1	1	1	1	1	7
<i>Macropus rufus</i>	Red kangaroo	1	1	0	0	0	0	0	0	1
<i>Mus domesticus</i>	House mouse	0	0	0	0	0	0	0	1	0
<i>Oryctolagus cuniculus</i>	Rabbit	1	1	0	0	1	1	1	1	4
<i>Ovis aries</i>	Sheep	0	0	0	0	0	0	0	0	2
<i>Petrogale xanthopus</i>	Yellow-footed rock wallaby	0	0	0	0	0	0	0	0	1
<i>Sminthopsis crassicaudata</i>	Fat-tailed dunnart	8	5	0	0	0	0	0	0	0
<i>Sminthopsis macroura</i>	Stripe-faced dunnart	1	2	0	0	0	1	0	0	0
<i>Vulpes vulpes</i>	Fox	0	2	0	0	0	0	2	0	2

### 3.2 Reptiles & amphibians - Bob Sharrad and Wendy Telfer

#### 3.2.1 Introduction

The Flinders Ranges support a wonderful variety of reptiles. The rocky terrain and warm, dry conditions are ideal for both lizards and snakes. For amphibians, in contrast, there is limited suitable terrain, although a few species do exist in the soaks and springs in the region. Since the survey was conducted in winter, conditions were not ideal for observing active reptiles. Most species, particularly the larger ones, will be resting in burrows, rock crevices, log hollows, trees, bushes or clumps of porcupine grass at these times.

Very little is currently recorded about the reptiles and amphibians in the Warraweena region. As with native mammals, this is likely to reflect the limited sampling conducted rather than the actual diversity of reptile species present on the property. This project aimed to fill this void of information by surveying the reptile and amphibian fauna of Warraweena.

#### 3.2.2 Methods

The pitfall lines and traps used to catch mammals were also used to catch reptile species. When traps were checked each morning and late afternoon, any reptiles in the traps were recorded and released. Since reptiles are difficult to determine the sex of, two individuals of each species were anaesthetised, set in formalin and liver samples taken in liquid nitrogen.

Reptiles and frogs were also caught by searching in potential habitats such as under logs, iron sheets, in trees and in soaks. This searching was conducted both in the vicinity of the trapping sites and opportunistically throughout the property.

#### 3.2.3 Results

The SEG survey of Warraweena yielded a surprising number of reptiles. While few of these heat loving creatures were active during our Winter survey, diligent searching by expeditioners resulted in a healthy return. Only three species were caught in pitfall traps (all were terrestrial geckos) however hand captures brought the total haul to 17 reptile species and one frog. Individuals of each species found were anaesthetised, their livers removed and samples kept in formalin for the SA Museum.

The most commonly found reptiles were those revealed by turning over rocks, logs or rubbish near buildings or ruins. The species found most often included the Tree Dtella, Binoe's Gecko,

Eastern Striped Skink (very common under old sheets of iron), the Common Snake-eye and the Dwarf Three-toed Slider.

The Tree Dtella was the lizard most often seen during the survey - dozens were found under rocks, the bark of trees and old iron or other rubbish, and many more were found by spotlighting soon after dusk. Many of the latter were found on the stumps of Cypress-pines (*Callitris glaucophylla*) cut down long ago; the stumps retain much of the original bark which seems to provide the ideal home for the geckos. Geckos were observed on these stumps even when the temperature was quite low (12°C). It should also be noted that the precise taxonomic status of some dtellas is a bit uncertain - some individuals may be assigned to another species (the yet to be described 2N = 44, sometimes called the Southern Rock Dtella). We decided to keep them lumped together as *Gehyra variegata* for now as some individuals were difficult to determine. Some that appeared to be "Rock Dtellas" were associated with trees!

The tiny Steambank Froglet (also known as the Flinders Ranges Froglet) was very common at the many sites of permanent water in the area. The frog is noteworthy because it alone of the vertebrates observed during the survey is confined to the Flinders Ranges.

The reptiles and frogs found are listed in table 5. In addition to those listed, information was given during an open day at Warraweena, of other species in the area. Most notable of these was the Carpet Python (*Morelia spilota*) which were said to live at Sandy Camp not far from the homestead. It was said that Stimson's Python (*Antaresia stimsoni*) can also be found in the general area. Surprise was also expressed by locals when they discovered that we had not found any legless lizards (Pygopodidae) - it was observed that Burton's Legless Lizard (*Lialis burtonis*) is usually quite common near the Warraweena Homestead. No doubt many such species will be found in surveys during the warmer months.

Table 5. Reptiles and Frogs identified at Warraweena during the SEG Survey 2-17 July 1999. \*PF - caught in pitfall trap; HC – handcaptured

Species	Common name	Family	Observation method*
<i>Gehyra variegata</i>	Tree Dtella	Gekkonidae	HC
<i>Heteronotia binoei</i>	Binoe's Gecko	Gekkonidae	HC
<i>Diplodactylus vittatus</i>	Eastern Stone Gecko	Gekkonidae	PF & HC
<i>Diplodactylus tessellatus</i>	Tessellated Gecko	Gekkonidae	PF
<i>Nephrurus milii</i>	Barking Gecko	Gekkonidae	HC
<i>Rhynchoedura ornata</i>	Beaked Gecko	Gekkonidae	PF
<i>Ctenophorus vadrappa</i>	Red-barred Dragon	Agamidae	HC
<i>Cryptoblepharus plagiocephalus</i>	Desert Wall Skink	Scincidae	HC
<i>Ctenotus robustus</i>	Eastern Striped Skink	Scincidae	HC
<i>Eremiascincus richardsonii</i>	Broad-banded Sandswimmer	Scincidae	HC
<i>Lerista muelleri</i>	Dwarf Three-toed Slider	Scincidae	HC
<i>Lerista punctatovittata</i>	Spotted Slider	Scincidae	HC
<i>Morethia boulengeri</i>	Common Snake-eye	Scincidae	HC
<i>Tiliqua rugosa</i>	Sleepy Lizard	Scincidae	HC
<i>Simoselaps australis</i>	Coral Snake	Elapidae	HC
<i>Suta nigriceps</i>	Mitchell's Short-tailed Snake	Elapidae	HC
<i>Suta suta</i>	Curl snake	Elapidae	HC
<i>Crinia riparia</i>	Streambank Froglet	Leptodactylidae	HC

### 3.3 Birds - Wendy Telfer

#### 3.3.1 Methods

The bird survey followed the methodology used in the Biological Survey of South Australia. Bird observations were concentrated around the eight primary sampling sites where the trapping was being conducted. Birding began at 7.30am on Day One of the scientific phase of the expedition but due to it being very cold, few birds were active. Thus on subsequent mornings we gratefully began birding at about 8am. We observed birds for an hour at this time and at about 4-5pm each afternoon.

Bird observation was conducted at each site in both the morning and afternoon on different days with a different group of birders. At least one experienced bird watcher was present at each session, who explained to others bird features to look out for. Birding consisted of walking/ creeping through the habitat of the site. Only those birds that were positively identified were recorded. Those birds that were heard but not seen were only recorded if the birder was sure of its identification.

Interesting birds observed outside of these structured birding times and outside these habitat types were recorded on opportunistic datasheets. This also included bird lists made at Base Camp, Old Warraweena and the lists made on Day 6 of the expedition when Jim Allen and Paul Wainwright led a group on a 'birding bonanza' to areas such as Sandy Camp Creek. Paul and Jim were also instrumental in organising and doing searches for the Birds Australia Atlas project which is seeking to obtain data about the densities and distributions of birds throughout Australia.

### **3.3.2 Results**

A total of 550 birds were recorded at the eight primary survey sites and in opportunistic sightings during the survey. One quarter of all of these birds were Inland Thornbills and one eighth were Southern Whitefaces. Other species of which more than 25 birds were seen included Australian Ringnecks, Yellow-throated Miners, Red-capped Robins and White-browed Babblers.

The opportunistic records only represented 8% of the birds recorded. This was due firstly to the nature of opportunistic sightings, where only birds of interest are recorded. For example a White-browed Tree Creeper was recorded in a bullock bush but the five Inland Thornbills that may well have been in the same tree were not recorded. Secondly the birding conducted at the primary survey sites represented 16 structured hours of birding whereas opportunistic records were made while travelling between sites, hiking, sitting at base camp etc and in one substantial effort on day 6. Thus low numbers of birds were recorded in the opportunistic sightings but a high number of species not observed in the primary sites were recorded (table 6).

47 species were observed during the expedition. 31 of these were recorded at the eight primary survey sites and 32 species were recorded opportunistically. Out of the eight primary sites, the greatest species richness was recorded at the *Eucalyptus* site. This is likely to reflect the presence of nesting sites, hollows and food availability such as nectar and insect abundance. Interesting birds seen include the Grey Currawong that is not usually found so far north and the Blue-winged parrot which is a vulnerable species in South Australia.

Many thanks to Jim Allen, Paul Wainwright, Matthew Ward, David Wilson and Joe Mack for birding expertise, enthusiasm and leadership.

Table 6. Birds recorded at the eight primary sampling sites and opportunistic sightings at Warraweena by SEG 2-17 July 1999.

Species	Site	1	2	3	4	5	6	7	8	Opp	Total
<i>Anas superciliosa</i>	Pacific Black Duck	0	0	0	0	0	0	0	0	1	1
<i>Aquila audax</i>	Wedge-tailed Eagle	0	0	0	0	1	1	0	0	2	4
<i>Accipiter fasciatus</i>	Brown Goshawk	0	0	0	0	0	0	0	1	0	1
<i>Phaps chalcoptera</i>	Common Bronzewing	0	0	0	0	0	0	0	0	1	1
<i>Ocyphaps lophotes</i>	Crested Pigeon	1	0	0	0	0	0	0	0	0	1
<i>Barnardius zonarius</i>	Mallee Ringneck	0	0	2	13	0	10	0	0	0	25
<i>Psephotus varius</i>	Mulga Parrot	3	0	0	0	0	2	0	6	1	12
<i>Neophema chrysostoma</i>	Blue-winged Parrot	0	0	0	0	0	0	0	0	1	1
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	0	0	0	0	0	0	0	0	1	1
<i>Climacteris affinis</i>	White-browed Treecreeper	0	0	0	0	0	0	0	0	1	1
<i>Malurus lamberti</i>	Variiegated Fairy Wren	0	0	0	0	0	0	0	0	1	1
<i>Malurus leucopterus</i>	White-winged Fairy Wren	0	5	0	0	0	0	0	0	1	6
<i>Pardalotus striatus</i>	Striated Pardalote	0	0	0	5	0	0	0	1	2	8
<i>Smicromnis brevirostris</i>	Weebill	5	0	0	2	4	0	2	9	2	24
<i>Acanthiza apicalis</i>	Inland Brown Thornbill	4	1	15	3	24	22	27	35	2	133
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill	0	3	1	0	1	7	3	5	0	20
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	0	6	2	0	0	0	6	0	1	15
<i>Aphelocephala leucopsis</i>	Southern Whiteface	0	16	0	0	9	20	26	5	0	76
<i>Manorina flavigula</i>	Yellow-throated Miner	0	0	4	15	0	0	0	8	2	29
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater	0	12	1	0	1	0	0	0	0	14
<i>Lichenostomus virescens</i>	Singing Honeyeater	0	0	1	4	0	0	1	0	1	7
<i>Lichenostomus plumulus</i>	Grey-fronted Honeyeater	0	0	0	0	0	0	0	3	3	6
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	0	0	0	0	0	0	0	0	1	1
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	0	0	0	0	0	0	0	2	1	3
<i>Petroica goodenovii</i>	Red-capped Robin	1	2	1	2	7	7	2	2	1	25
<i>Melanodryas cucullata</i>	Hooded Robin	0	1	0	0	0	0	0	0	0	1
<i>Pomatostomus superciliosus</i>	White-browed Babbler	8	9	1	0	0	8	0	1	1	28
<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler	8	0	0	6	0	0	0	0	0	14
<i>Daphoenositta chrysoptera</i>	Varied Sittella	0	0	0	0	0	0	0	0	1	1
<i>Pachycephala inornata</i>	Gilbert's Whistler	0	0	0	0	2	0	0	0	2	4
<i>Pachycephala rufiventris</i>	Rufous Whistler	0	0	1	0	1	0	0	0	2	4
<i>Colluricincla harmonica</i>	Grey Shrikethrush	0	0	1	0	0	0	0	0	2	3
<i>Rhipidura leucophrys</i>	Willie Wagtail	0	0	0	0	0	0	0	0	2	2
<i>Coracina novaehollandiae</i>	Black-faced Cuckooshrike	0	0	0	0	0	0	0	0	1	1
<i>Artamus personatus</i>	Masked Woodswallow	0	0	0	0	0	0	0	0	2	2
<i>Artamus cinereus</i>	Black-faced Woodswallow	0	4	0	0	0	0	0	0	0	4
<i>Cracticus torquatus</i>	Grey Butcherbird	0	0	1	1	0	2	1	3	1	9
<i>Gymnorhina tibicen</i>	Australian Magpie	4	2	1	0	0	0	1	4	0	12
<i>Corvus coronoides</i>	Australian Raven	1	4	3	2	1	3	2	5	2	23
<i>Anthus novaeseelandiae</i>	Richard's Pipit	2	7	0	0	0	0	0	0	0	9
<i>Taeniopygia guttata</i>	Zebra Finch	0	12	0	0	0	0	0	0	0	12
<i>Dicaeum hirundinaceum</i>	Mistletoebird	0	0	0	2	1	0	0	2	1	6
<i>Hirundo nigricans</i>	Tree Martin	0	0	0	0	0	0	0	0	2	2
<i>Zosterops lateralis</i>	Silvereye	0	0	0	0	0	0	0	0	1	1

### **3.4 Invertebrates**

#### **3.4.1 Introduction**

There is currently no information recorded about the invertebrate fauna of Warraweena. Infact relatively little is known about the invertebrates of the Flinders Ranges as a whole. This is primarily due to there being thousands of species and few people with the expertise and resources to identify them. While we recognised that the soaks and springs on the property would have their own microcosm of species, consistent with the Biological Survey of South Australia methodology, we chose to sample only terrestrial invertebrates. Some information about the freshwater invertebrates present was being obtained by SAWater staff who were sampling various springs and creeks in the area and stayed at our base camp with us one night.

#### **3.4.2 Methods**

To collect terrestrial invertebrates we set up micro-pitfalls located 1-2 metres to one side of each macro-pitfall hole. Each micro-pitfall consisted of a small plastic vial full of 75% alcohol placed in the ground flush to the surface. Micropitfalls were left open for a week. In addition to these we had a large glass jar of alcohol at the end of each trapline into which we put invertebrates that dropped into the macro-pitfall traps during the survey. Sorting and identification of the invertebrates occurred after the expedition by the Invertebrate section of the South Australian Museum.

Some insects were also collected opportunistically. Alex Coombes often had his nose to the ground examining and collecting meat ants (while simultaneously mumbling quotes from the Simpsons) and others found the odd interesting insect that flew into their face or that they stumbled over.

#### **3.4.3 Results**

At several of the sites micro-pitfalls were disturbed. At site 2, four out of the six invertebrate micropitfalls were dug out and one had teeth marks consistent with the canines of a fox. At site 7 a fox dropping was found in an open invertebrate micropitfall in Line A and five out of the six micropitfalls were dug out in Line B, probably by the same fox involved with Line A. Some micro-pitfalls were also disturbed at sites 5 and 8 presumably by foxes or ravens.

Final lists of species of insects and arachnids are still being collated by the SA Museum. Initial counts of each order suggest ants were abundant at all sites. The high numbers of spiders found at sites 1 and 2 were consistent with the hypothesis that dunnarts favour this area because of the large invertebrates that live in the cracks of the gilgai soils. Other invertebrates found included low numbers of beetles, mites, cockroaches, grasshoppers, flies, collembolas and centipedes. Due to low numbers it is difficult to comment on species diversity by site. We also found a large dead Stick insect while at Black Ranges Springs which was almost of a size that one could stumble over.

## 4. Flora & Erosion

### 4.1 Photopoint monitoring - Annie Bond

#### 4.1.1 Introduction

Over the course of the scientific phase, while others toiled with crow bars and shovels, the photopoint group went on leisurely drives in search of photopoints. These photopoints were set up about ten years ago by pastoral management staff (from the Department of Environment) to monitor land condition on the Warraweena pastoral lease. In particular they aim to record changes in vegetation and soils and the impact of grazing management.

#### 4.1.2 Methods

The photopoints were set up, at least one in each paddock, a certain distance away from the watering point, and in areas which were thought to be representative of the main vegetation communities or pasture types. Some photopoints are simple observation points where photos are taken in a number of directions to show the surrounding landscape, soil and vegetation, while others combine this with a Jessup transect which gives quantitative data on the vegetation in the view of the photo. The Jessup transects were 100m long divided into ten quadrats (10m x 2m) on either side of the transect. In each quadrat the number of individuals of the perennial species was recorded. Annual plant species and perennial plants in the surrounding area were also recorded, as was information on their abundance (crown separation ratios or CSR), dominance, and grazing evidence. Soil stability, presence of dung and tracking were also recorded. The aim of this method is to obtain a rapid assessment of land condition.

#### 4.1.3 Results-what did we find?

During the scientific phase ten of the thirteen photopoints on Warraweena were monitored. We visited a range of vegetation types, including *Callitris* woodland, chenopod shrubland, and *Cymbopogon* (lemon scented grass) grassland. In places the country appeared badly degraded with few palatable species and evidence of continued grazing pressure. Recruitment of some plant species was observed, most notably of *Callitris* (Native pine) which every one will remember covering the hillsides.

As an example of the change in vegetation on Warraweena, have a look at the pictures of photopoint 1981, below. Here are some things you might notice:

In the first pair of pictures: (photos ## and ##)

the area in the mid-foreground which was bare in 1994 is now covered with low, green bushes of *Zygophyllum aurantiacum*.

and the *Senecio magnifucus* bushes in the foreground (1994) are no longer present in 1999.

In the second pair: (photos ## and ##)

there is a dramatic increase in *Callitris* (native pine); where they were scattered on the hillside in 1994 now they cover the area thickly.

and an *Acacia* (wattle) shrub which was not visible in 1994 can be seen in 1999 in the foreground to the right of the largest *Callitris*.

These observations are supported by the information collected on the transect at this photopoint site, as *Callitris* was assessed as having a larger crown separation ratio (ie there is more of it) in 1999 than in 1994. *Zygophyllum* was not observed in 1994 but was considered the third most dominant species in 1999.

Evidence of goats, rabbits, kangaroos, sheep and cattle grazing was observed. Goat and kangaroo dung were the most common, and were observed at all the photopoints visited.

Rabbit dung was also common and seen at most sites, while sheep were only seen once and cattle dung was observed at two sites. This indicates that although Warraweena has been destocked, grazing pressure, particularly from kangaroos and goats, is still present.

Table 7. List of plant species found in photopoints on Warraweena (visited in July 1999)

<i>Abutilon leucopetalum</i>	<i>Exocarpus aphyllus</i>
<i>Acacia aneura</i> var.	<i>Frankenia plicata</i>
<i>Acacia calamifolia</i>	<i>Hakea edniana</i>
<i>Acacia ligulata</i>	<i>Maireana astrotricha</i>
<i>Acacia oswaldii</i>	<i>Maireana georgii</i>
<i>Acacia</i> sp.	<i>Maireana pyramidata</i>
<i>Acacia tetragonophylla</i>	<i>Maireana sedifolia</i>
<i>Acacia victoriae</i> ssp.	<i>Marrubium vulgare</i>
<i>Alectryon oleifolius</i>	<i>Melaleuca lanceolata</i>
<i>Aristida nitidula</i>	<i>Myoporum platycarpum</i>
<i>Atriplex linleyi</i> ssp. <i>conduplicata</i>	<i>Olearia decurrens</i>
<i>Atriplex vesicaria</i> ssp.	<i>Olearia pimeleoides</i>
<i>Callitris glaucophylla</i>	<i>Pittosporum phylliraeoides</i>
<i>Carthamus lanatus</i>	<i>Ptilotus obovatus</i>
<i>Cassinia leavis</i>	<i>Rhagodia spinescens</i>
<i>Casuarina pauper</i>	<i>Sclerolaena longicuspis</i>
<i>Chenopodium</i> sp.	<i>Sclerolaena</i> spp.
<i>Composita</i> sp.	<i>Scleroleana obliquicuspis</i>
<i>Cymbopogon ambiguus</i>	<i>Senecio magnificus</i>
<i>Danthonia</i> sp.	<i>Senna artemisiodes</i>
<i>Dodonaea lobulata</i>	<i>Sida</i> sp.
<i>Echium plantagineum</i>	<i>Solanum ellipticum</i>
<i>Enneapogon avenaceus</i>	<i>Stipa</i> sp.
<i>Eremophila alternifolia</i>	<i>Triodia irritans</i>
<i>Eremophila freelingii</i>	<i>Vittadinia</i> sp.
<i>Eremophila oppositifolia</i>	<i>Zygophyllum apiculatum</i>
<i>Eremophila</i> sp.	<i>Zygophyllum aurantiacum</i>
<i>Eucalyptus socialis</i>	

The information that we collected will be stored and will provide an important snapshot of the land condition on Warraweena in 1999.

## 4.2 Drooping sheoak exclosures - Brendan Lay

### 4.2.1 Background

Warraweena pastoral lease has had a long history of uncontrolled grazing by both feral and native herbivores. This is due to the difficulty of access for mustering or shooting, particularly in the more remote and rugged parts with permanent water such as Sandy Camp creek area and the Mt Stuart and Mt Gill ranges, coupled with the lack of any stock-proof fences. While it was used as a sheep station, it was not uncommon for mobs of woolly sheep and feral goats to remain more-or-less permanently in these areas.

This lack of active stock management coupled with high euro, kangaroo and rabbit numbers has resulted in the highly degraded and eroded landscapes which characterise the station today. Although the sheep are now largely removed, the areas remote from main tracks still support mobs of goats and high euro numbers.

The aim then of this component of Expedition Warraweena was to use selective exclusion of main herbivore types to see if regeneration of the drooping sheoaks occurred, as well as the other vegetation typical of these bare shaley hills.

#### **4.2.2 The enclosure site.**

The site chosen for the enclosures is typical of such areas. It was selected to evaluate the effect of selective exclusion of goats (and euros) and rabbits on the survival and regeneration of the threatened plant community dominated by the highly palatable drooping sheoak *Allocasuarina verticillata*. This community, the most northerly occurrence in SA, is restricted to the shaley hills of the Mt. Stuart range above about 700m in elevation. The area is so highly modified that the original groundcover of palatable grasses such as kangaroo and wallaby grasses has now largely disappeared and been replaced largely by horehound, lemon-scented grass and weedy annuals.

Finding a site where fencing was practicable proved a challenge, as it had to be close enough to a track to be able to transport materials in by vehicle, and had to have three 50x50m areas (goat-proof, stockproof and control (unfenced), all on the same slope, and each with at least one female seed source sheoak tree. This configuration conforms to a standard design used by National Parks and the Pastoral Board of SA when evaluating grazing impacts this way. The site was located on an earlier trip in March, which Annie Bond took part in. On that trip we also checked out the view, and goat damage, by climbing Mt Stuart. To check the viability of the seed from the seed-source trees, fruits were harvested and germinated at my home in the Adelaide hills.

The site is about three kilometres south-east of Mt. Stuart, a similar distance north-east of Yellow Well, and less than one kilometre north of old Pinery Bore. It is on a 20% slope high up on a hill with little except the “bones” of old sheoaks, but was the most accessible area found. Before the expedition, I brought the fencing material up to the site on a second trip, on which I also harvested some dead native pine trees for corner posts.

#### **4.2.3 The camp-site**

On the Friday night, my wife Elizabeth and I selected a campsite in a secluded valley of dense native pine forest only a few hundred metres from the enclosure site. The criteria was that it had to be protected from the gale-force frigid gully winds which blew that night, and yet close to the access track. This was to be a “satellite camp” run with the same arrangements as base camp (including a similar menu) with the major exception that we used a fire for all cooking and for keeping warm at night. The camp was run by Elizabeth and our boys Greg and Sandy also came along and stayed there for the week. They occupied themselves with “nature-studies” and building a mini-golf course played with golf balls and paddy melons.

Extra assistance and support was provided by Fleur Delaine and Joe Mack, who stayed permanently at this camp (lured, possibly, by the prospect of campfire-warmed nights and our stimulating company!). Joe had an inexhaustible supply of camp yarns and made a delectable roast on the Wednesday using his camp-oven. Our only casualty was Joe who got the gripes the next (and last) day but fortunately recovered back at base.

Rob Matthias did a sterling job with the communications arrangements, and we were always able to make VHF contact on daily schedules with the base station by taking a morning “constitutional” up the hill from the camp.

#### **4.2.4 How we built the fences**

It is many years since I have erected a set of enclosures, However I was confident that we could do the task in the time based on how long it took to build a similar set (albeit on more open flat country) with ANZSES volunteers back in 1991.

It was originally arranged that each group of expeditioners would be transported to the site from base camp after lunch, and stay until after lunch the next day. However as the magnitude and difficulty of the task unfolded, Chris kindly arranged on several days for the relieving team to arrive early so two groups could work together for a few hours

On the first Saturday, before most expeditioners arrived, Elizabeth and I set up the camp and accurately measured out each 50x50m area, marking corners with flagging tape on re-bar rods. After spending the Sunday with Paul Wainwright, & Annie, formalizing about seven holes at the Mt. Hack Golf Course area and perfecting the photopoint technique and erosion monitoring, we started the fencing in earnest on Monday, finishing on the Thursday just before the rain.

The main challenges were digging the post-holes, some of which were in absolutely solid rock, and erecting the rabbit-netting. **Helen** and David did a sterling job getting the holes deep enough, and we had all hands on deck getting the bottom flap of the rabbit-netting covered with rocks (in lieu of burying it).

Another disaster was averted when we ran out of plain wire. Chris ferreted some high-tensile rolls from the Station and delivered them by "express courier". We were able to feed this out without tangles by making a bush wire spinner using an old oil-can, a tree-stump and some droppers (see photo ##). This was done, to quote Joe Mack "...after much gnashing trying to unravel the bleeding stuff".

On the last day, we "ceremonially" planted five of the propagated sheoaks in the centre of each plot. (see photo ##). An hour or two later it began to rain, and we had about 7mm overnight. As our family had to leave for the Gammons the next day, we had to pack up a sodden tent and muddy swags. The rain was much-needed however.

The only work which we did not do was the measurements and photos, they were done later by Guy and Paul respectively.

#### **4.2.5 Future plans for the enclosures.**

The plan now is to observe the areas and regularly record changes in the ground-cover and any perennial shrubs or sheoak seedling which emerge or die. This will no doubt be built in to the management plan for the property by Wetlands and Wildlife. Could be a good job for future SEG volunteers! I will be talking to Wendy and Janice about this aspect.

I would like to express my appreciation for all expeditioners who laboured on this project, particularly the girls who put in at least as good an effort as any of the male members! I also appreciated the effort made by Chris, Rob and other leaders at Base camp for keeping us supplied, and particularly for bringing up the satellite phone on the first Monday when a message came through that my father was seriously ill in Melbourne. (We visited him later that month and he was hale and hearty).

### **4.3 Monitoring threatened plants - Annie Bond**

#### **4.3.1 Codonocarpus pyramidalis (Slender bell fruit)**

*Codonocarpus pyramidalis* is a tree species that grows primarily on the crests and slopes of low ridges and hills in the northern and central Flinders Ranges. The species is described by Briggs and Leigh (1988) as nationally vulnerable and its recruitment to be limited due to goat, rabbit and stock browsing in the Flinders Ranges.

Large populations of *C. pyramidalis* previously existed on Warraweena, and are recorded on the Threatened Plant Population Database (held by the Department of Environment). When the populations were reassessed around 1995 some could not be relocated (that is, they had probably died out) and others were reduced to five or ten plants. Our searches in 1999 could not relocate a number of the populations, however these were the ones that were not relocated in 1995. One population that we could relocate contained 9 living trees with about 9 dead trees. All the trees showed signs of grazing damage, and 8 had at least one dead trunk. Two isolated plants were found in the creek bed downstream from the main population, and these appeared younger and healthier although they had also been grazed. Another single plant (which had been previously recorded was located fairly close to the main population).

#### **4.3.2 Acacia menzeli (Menzel's wattle)**

Another threatened plant species on the property is *Acacia menzeli*, which is listed as nationally vulnerable (Briggs and Leigh 1988). The population on Warraweena is situated on a high saddle on Sandy Camp pound, northeast of Mt Hack and consists of some 200 individuals over an area of approximately eight hectares (Davies 1995). Goats are considered to be the greatest threat to this population.

Our purpose was to find the population and re-measure plants in a permanent monitoring site, previously set up by Rick Davies. This monitoring site consisted of a permanently marked 50m long Jessup transect, subdivided into ten contiguous 2m x 10m quadrats, five on each side of the transect centre line and 2 permanent photopoints. In the quadrats, the location, dimensions and condition of each *Acacia menzeli* plant was recorded.

The population appeared quite healthy with little evidence of grazing damage and some young plants approximately 30cm high. This observation was reflected in data collected from the transect. Only one plant in the transect has died and at least one new seedling has appeared since 1993.

#### **4.4 Monitoring erosion - Paul Wainwright**

(Producing snapshot profiles of gullies, to help evaluate change over the longer term).

##### **4.4.1 Sites**

###### *Yellow Well*

YW1A, 272999 E, 6584888 N

YW1B, 272967 E, 6585031 N

YW2A, 274903 E, 6585475 N

YW2B, 275006 E, 6585521 N

###### *Golf course*

Hal 1A, 286392 E, 6591900 N.

Hal 1B, 286292 E, 6591855 N

(Cadnia 6636-3 and Narrina 6636-2 1:50,000 topographic sheets)

##### **4.4.2 Preamble**

Examples of active gully erosion were selected for monitoring adjacent to some of the permanent vegetation photopoints at Warraweena. Intensive exploitation of the land has disturbed the natural soil vegetation cover and exposed its surface to the effects of erosive agents. Although our monitoring will only begin to show results over the longer term, the outcomes should be interesting. How long will it be before the erosion gullies begin shrinking? At what point does deterioration cease and recovery begin? Since soil stability is influenced by vegetation condition we can assume that the vegetation recovery must precede any significant improvement in the former.

Vegetation loss due to overstocking and feral animals has left many areas devoid or sparsely covered. Delicate lichens and microphytic crust have been destroyed making the soil prone to erosive forces. Vegetative cover protects the soil surface from the direct impact of raindrops and from the effects of wind. It enhances the infiltration of rainfall into the soil and slows down surface runoff thereby improving the physical, chemical and biological properties of the soil. By shading the soil the vegetative cover reduces evaporation and conserves moisture, significantly affecting the stability of the soil aggregates.

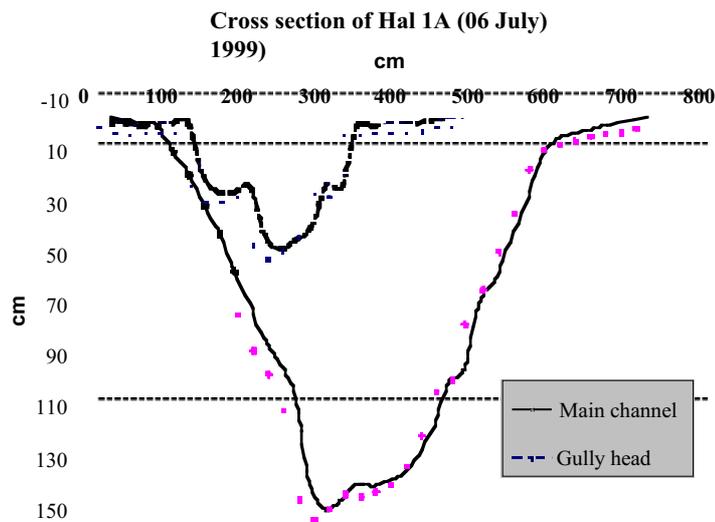
Water erosion is caused by the kinetic energy of raindrops impinging on the soil surface and by the mechanical force of surface runoff. Once a depression forms, water accelerates, with additional force it then erodes deeply with a cutting action on the active wall.

##### **4.4.3 Methodology**

At each site a permanent line intercept was installed across the erosion gully. Reinforcing rods was hammered into the ground on both ends of the line leaving 100mm above the surface. The width of the line intercept was determined subjectively, depending on the width of the gully and the possibility of sidewall extension in the future.

A measuring tape was placed across the gully between the two pegs so that the profile could be plotted in cross section. Information was recorded at 20cm intervals. Depth from ground to tape, substrate type, vegetation types (if present) were some of the variables recorded by the expeditioners. A mud map was sketched of the gully cross section, indicating the position of the photopoint and the proximity of other gullies. Topographic features which were likely to influence run off, were also mapped or noted, since it is likely that they will influence gully behaviour in the future. We decided not to use a dumpy level because the higher level of accuracy was not consistent with other aspects of the survey methodology.

Slide and print photos were taken of the active wall(s) of each erosion gully. The position of the photopoint was indicated on the mud map drawn for each site. A compass bearing and distance from one of the permanent markers is indicated on the maps.



The graph above compares a gully head at the 'golf course' with a main channel downstream. The obvious distinction is depth, however, the gully head shows interesting bench formation at a depth of 28cm. The shape of these cross-sections should change with subsequent rainfall events, and will be interesting to monitor. To be valuable, this project needs to be repeated, preferably several times. Only then can graphs be compared and the real extent of the problem be known. A challenge for SEG expeditioners in the future!

## **5. Archaeology**

### **5.1 Background - Sarah Hayes and John Love.**

#### **5.1.1 Introduction**

The archaeology part of Expedition Warraweena involved an archaeological investigation of a range of historical sites within the Warraweena Sanctuary. The aim was to explore the experiences of people at Warraweena in the past as opposed to the environmental aspects.

#### **5.1.2 Historical Background**

Pastoralism in the northern Flinders Ranges began soon after the initial European settlement of South Australia in 1836 (Bonython 1971:126). During the years that followed squatters established a string of sheep-runs and cattle-runs north of Adelaide.

Originally most of Warraweena Sanctuary was a part of Moolooloo which was a pastoral station run by John and James Chambers. When the drought of the 1860s hit they sold it. Then sometime during the nineteenth century Moolooloo was divided. Keith Nicholls' grandfather then bought the section that was Warraweena in 1902. The present homestead was established around 1910 (Willis 1998).

Around 1846 mineral wealth began to be vastly exploited in South Australia. The discovery of copper and silver was the most important event in turning the new colony of South Australia from near bankruptcy. Copper was first found in the Northern Flinders in 1856. This was along the Warrioota Creek near Beltana Station. In early 1870 the Sliding Rock Mine (now situated inside the Warraweena Sanctuary) was established. Despite being so far from Adelaide the mine became relatively successful. At its peak the mine directly employed 70 men and indirectly supported many others in a town of 300 people including women and children.

Although relatively successful, copper mining at Sliding Rock was essentially a battle with problems and setbacks. Unsuccessful attempts were also made to mine silver and gold at Sliding Rock. The mine was eventually abandoned after more than 100 years of men and women trying to build a life and failing (Klaassen 1986:7-225). In what is now the Warraweena Sanctuary, other mining attempts were made. These were mostly small mines which were commonly unsuccessful in South Australia.

The invasion of European settlers into Australia brought much hardship and tragedy to the indigenous population. Indigenous people tried to continue their traditional way of life surviving off the land. When they killed sheep or cattle, or robbed a hut conflict arose. Many European settlers needed little or no provocation to shoot and kill indigenous people, who also suffered from radically altered living conditions, sickness and loss of hope (Mincham 1965:208-210). When studying historical archaeology in areas such as the Flinders Ranges it is important to remember the impacts of European settlement on indigenous groups.

### **5.1.3 Significance**

Although records have been made for the historical period of Australia, it is rare for everyday people and everyday occurrences to be recorded. The lives and experiences of the people who have been a part of the mining or the pastoralism that took place at what is now Warraweena are the sorts of things that can be researched through archaeology. Sometimes archaeology can be used to give us information about the class, gender, ethnicity and race of the people who left what we are studying in the archaeological record (Orser and Fagan 1995:199-219). Industries such as pastoralism and mining are what built South Australia economically. As such it is important to try to gain an understanding of the lives and experiences of the people who were a part of these industries.

## **5.2 *The Archaeological Survey***

### **5.2.1 Reconnaissance Trip**

A reconnaissance of three days and half an afternoon was made by Sarah Hayes, John Love, Michael Wood and Susan Love, in December 1998. We were hospitably received and helped a great deal by Graham Willis, the resident manager, and his wife, Margaret. Graham's local knowledge was essential to the success of the project.

The following areas were visited on the reconnaissance: Sliding Rock Mine and part of Cadnia town; two ruins on the road that follows Sandy Camp Creek; Old Warraweena and places on the road to it and beyond; places on the road that goes past Bob Mooney Well, Dunbar Well, Blinman Mine and Yellow Well.

### **5.2.2 Methodology**

The project concentrated on evidence of pastoral and mining activity. No indigenous archaeology was attempted although some stone flakes of Aboriginal making were found at a few places. A surface survey was conducted and resulted in the collection of artefacts which were examined and catalogued and some were photographed, using colour slides. A representative selection was taken for display in a proposed interpretive centre at the present Warraweena homestead. Although removed from their original location, they will stay at Warraweena instead of being stolen by souvenir hunters. Buildings and other structures were photographed using black and white film. Most of these photographs include scale rods.

### **5.2.3 The Expedition**

Four areas were selected for archaeological work: the two ruins on Sandy Camp Creek; Old Warraweena and ruins on a ridge about 0.5km south of it; Dunbar Well, hut and crutching shed and a ruin on a ridge about 1km north of it; two buildings in Cadnia.

In addition to the sites listed above, some photography, in black and white, colour negatives or colour slides, was done, during the reconnaissance and the main expedition, at Bob Mooney Well, Arkey Warren Mine, Blinman Mine, Yellow Well, Pinery Bore, Cockatoo Well, Halleys Well, Yednadunga Well, a ruined hut and yard about 2km north of Yednadunga, and other sites in Cadnia.

### **5.3 List of sites of historical interest**

This list refers to evidence of pastoral and mining activities. No attempt was made to record Aboriginal sites.

Grid references are to the 1:50,000 topographical map series, sheets named Cadnia and Goddard. All grid references are approximate.

#### **Sandy Camp Creek bore (Cadnia 771947)**

There is water in the bore but the windmill has been removed, the tank and trough are dry and the yard fence is mostly fallen down.

#### **Sandy Camp Creek, western site (Cadnia 783949)**

A ruined hut with a very large stone fireplace and chimney, a few pine posts standing and some logs, probably from the walls, lying on the ground. Nearby is a fairly well preserved smaller stone fireplace and ash from other campfires. This site has evidently been used a lot.

#### **Sandy Camp Creek, eastern site (Goddard 824959)**

A hut with thick stone walls and a clearly defined doorway in the western wall. The walls are now barely one metre high at most and the fallen stone does not appear to be enough to make a house of normal height. Just east of the hut are some logs that may have been part of a small yard. At the foot of the spur on which this hut is built is a spring.

#### **Halley's Well (Cadnia 824911)**

The well, with water at about 50 cm, is covered by a sloping tin roof and steel grid. About 200m north of it are the remains of post and rail yards which appear to have extended over the present road. Beside the road is an old trough, empty, and a new one, filled by gravity from the well. Nearby is an abandoned rain gauge. A short spur road leads to a wood and iron hut with a black plastic rain water tank in working order, and sheep yards in fairly good condition. A wooden structure in a yard, consisting of two short posts and two horizontal sawn beams, is presumably an engine mounting for a small crutching plant. Driven into a living pine in line with the engine mounting is a steel bracket, presumably for mounting the shearing gear. On a small flat across the creek from the well is a ring of stones for a fireplace.

#### **Hut about 2km north of Yednadunga Well**

Remains of a fireplace and stone paved floor are to be seen a few metres west of the road. The hut was built beside a fairly big yard made of pine logs without posts, wire or nails, the logs being morticed to fit together. Close to the hut is a structure forming six small enclosures, made by the same method.

#### **Hut near fence**

Close to the fence between Halley's and Warraweena paddocks is the ruin of a small

hut made of horizontal pine logs, and down the hill from it are beer, sauce, cordial and other bottles, tobacco, bully beef and other tins.

#### **Yednadunga Well (Cadnia 810869)**

This well has green water at about 3m. It is not covered or timbered and appears to be partly fallen in. It is potentially dangerous to unwary visitors. There is a rusty tank, and between tank and well is another engine mounting. There is no sign of a windmill. There used to be a fence round the well and tank.

### **Old Warraweena** (Cadnia 800850)

There are several structures, in various stages of disrepair. Half of the main house has been demolished, leaving the front part, of corrugated iron lined with masonite, more or less habitable. About a quarter of an acre of land round the house is enclosed by a fence still in fairly good condition. This used to include a garden with retaining walls to level the ground and a shade house along the northern side. On top of a heap of iron on the southern side of the garden is a two-bladed propeller from a wind powered domestic lighting plant. Other remains at this site include a shed containing a pair of concrete wash troughs, a latrine, a dog kennel, a small fowl yard, a rain guage, the concrete floor of the single men's quarters with a heap of corrugated iron on it. A little further away is what appears to be a small horse yard and the timber frame of a small shed, possibly for saddles and harness. South-east from the house is a yard about 9m x 9m containing at least one grave, possibly three or four. Further up the hill is a dry tank and trough and across the road, a well in the creek, covered with sheets of iron. A windmill and windlass lie in ruins beside the well and running south from it there used to be a stock trough. North-east of the homestead are fairly extensive sheep yards.

### **Old Warraweena ridge**

Beside the road about 500m south of the homestead are two stone ruins obviously very much older than the buildings now known as Old Warraweena. The more southerly had a well built fireplace and stone paved floor. Near it is a large ash heap. The north ruin is a tumbled heap of stones barely recognisable as a fireplace. Across the road from these ruins are two posts with morticed slots, evidently for receiving a rail. To the east is a small yard enclosing two graves, marked by un-hewn stones and irises.

The road forks about 2km south of Old Warraweena. The east branch leads to a gate into Magpie paddock near the boundary fence. Not far from the gate is a small yard with an enamelled bath tub in it but no visible source of water. Nearby is the tubular steel frame of a portable sheep loading ramp.

### **Bob Mooney** (Cadnia 701887)

On a ridge on the Warraweena side of the boundary fence are two fireplaces, obviously much older than the stone hut and other structures on the Moorillah side. North of these, an attempt has been made to sink a well into the rock bank of a small creek that runs into the creek made by Bob Mooney Spring. There was a sheep trough in this creek, supplied by a pipe, possibly from the spring, which is in Moorillah.

### **Arkey Warren Mine** (Cadnia 689839)

This is a small excavation in a rock outcrop on top of a ridge.

### **Dunbar Well** (Cadnia 704837)

The well is in a small tributary to Warrioota Creek. The windmill is out of order. On flat land south of the well stands a tin hut with a black plastic rain water tank and a rain guage. Fairly elaborate sheep yards surround a crutching shed which contains an engine mount, a post for mounting the shearing gear and a wooden shearing floor. Between the well and the yards is a discarded old iron tank, a new black plastic one and troughs.

### **Ruin in Warrioota Creek** (Cadnia 721829)

There is a fireplace and signs of a hut at the junction of Warrioota Creek and the creek with the waterfall.

**Ridge north of Dunbar** (Cadnia 703845)

Set among trees on a saddle is a ruined hut with stone fireplace and walls of horizontal pine logs, some of which are still lying on the ground.

**Blinman Mine** (Cadnia 714850)

There appear to have been two shafts, not very deep, and now partly caved in. Traces of green copper ore can be seen in the mullock on the surface.

**Yellow well** (Cadnia 728846)

This is neatly timbered and covered with a steel grating. The spring in the creek is surrounded by a broken down goat trap.

**Pinery Bore** (Cadnia 752851)

The mill, tank and trough are all out of order.

**Cockatoo Well** (Cadnia 768879)

There is a tin hut with a black plastic rain water tank beside the ruin of an older hut with a stone fireplace. Also at this site are a rain gauge, a corrugated iron chimney lying on the ground, fairly extensive yards, a windmill with a windlass mounted on the mill stand and a trough.

**Sliding Rock Mine**

The most obvious monuments are the round mine chimney and the square smelter chimney. There are other substantial stone buildings, mostly in fairly good condition, a steel shed that used to house a pump that supplied Leigh Creek with water, and numerous remains of mine surface workings. The mine shafts have been fenced off but the fences are not in very good condition.

On the hillside, between the mine and Cadnia, are several small dug-outs and small u-shaped stone structures, probably miners' dwellings.

**Cadnia town**

The town was laid out in a narrow strip running south from the bank of Sliding Rock Creek, east of the mine. It straddles a small tributary to Sliding Rock Creek. At the northern end are the hotel and store, both rapidly deteriorating, and numerous other signs of human habitation. Between the hotel and store is a deep well with water in it and the stumps of a windmill stand. It is not fenced and is quite dangerous.

A lime kiln was built in the south-west bank of the tributary creek. Most of it has fallen away, revealing its inner structure. A little further up this creek is a fair sized house cut into the hillside. Near it is another well with a mullock heap with a dry stone retaining wall and a dry stone yard wall. This well also contains water and is also dangerous, although the timbering at the mouth of the well is still more or less intact. Still further south are more domestic ruins and yet another well, with water near the surface, partly covered by logs.

On a hill west of the southern part of the town is a mine shaft, clearly visible but unfenced and potentially dangerous when tourists begin to find their way to this area. (Cadnia 704927)

On a hillock east of the town there is a large concrete tank containing an abundant supply of good water.

There are two cemeteries, one west of the mine and one east of Cadnia.

**Other sites**

Some of these were not seen either in the reconnaissance in December 1998 or in the main SEG expedition in July 1999. Those seen have not been examined in detail.

Old yards and bore near the junction of Lambing Camp Creek and Sliding Rock Creek.

Well or bore near headwaters of Lambing Camp Creek? The remains of a tank are wrapped round a tree in the creek.

New Bore, north of road to Mount Hack.

Sapling Well and yard, east of New Bore.

Riley's, a stone ruin east of the road between Bob Mooney and Dunbar.

Veseys Claim Mine, shown on Cadnia topographical sheet at 816852.

Warraweena Spring: signs of habitation.

At Warraweena homestead there are two substantial houses and a small portable house, shearers' quarters, wool shed and yards, bores, tanks and other structures, all of considerable historical interest.

## 6. The Adventure Phase

### 6.1 *Strange Adventures of Red Group 1 - Chris Wright*

Led by Chris Wright, the group consisted of:

David Ireland  
Marty Nickson  
Camilla Osborn  
Mandy Carter  
Bryan McMullan

Filled with enthusiasm, we set off south along the creek that runs beside Base Camp, gradually gaining ground for the first couple of hours, until, after a scramble through thorny scrub, we were on the top of the ridge and within sight of the ridges and bluffs that make up Mount Stewart. After a fairly easy descent, we crossed the track that leads to Yellow Well, and followed a ravine, winding up towards the summit. Packs were deposited near the top of the ridge, because we were due to come back the same way on return from the summit. All of the group reached the top of Mt Stuart without too much difficulty and were rewarded, while eating lunch, by spectacular views, to the west Lake Torrens, north west the Leigh Creek ranges, to the north the Moccatoona ranges, east to Mt Gill and Mt Tilley, with Mt Hack an imposing cliff in the background, and to the south Mt Hemming.

From Mt Stuart, we tracked back to the east, collecting packs en-route, and then traversed around a couple of deep valleys which drain the area south and east of the mountain, passing some large flocks of goats, and a bunch of euros, we eventually found our way down to Yellow well, past Blinman Mine, and down the steep "Suicide Track" to Dunbar Hut in the late evening. The Hut has a rainwater tank, and we enjoyed the best water we had tasted for some time. (Water at Base Camp came from Sliding Rock, and although quite palatable, has a significant salt content). With an eye on the weather, we camped on the west side of the hut, getting some protection from the cold easterly wind that blew up that evening. There were ominous looking clouds that night, but not more than a few spots of rain. Nevertheless it was a cold camp and I was pleased to be on the move the next morning.

On Tuesday we set off at about 8:30am, following the tortuous Warrioota Creek. This creek has a huge catchment, and like many of its kind, carries huge floods from time to time, as evidenced by the remnants of river red gums, and large boulders scattered along its path. The 50,000 map shows a waterfall on a tributary, close to the confluence with Warrioota creek, and we thought we had found it, but having enjoyed what we thought was the feature marked on the map, we later discovered that we had been looking in the wrong place, and had to leave the discovery to Graeme Oats' Blue group. Our group was in good shape on this second day, and we steadily moved up the catchment as the day wore on, and had developed a routine, stopping every half hour or so for scroggin and a mouthful of water. We were fortunate in that we did not need to carry much water with us, as there was a certain supply at the next night's stop at Old Warraweena. As we got further into the headwaters of the catchment, the scenery gradually changed from wide, open creek bed, to smaller, twisting channels, and at length to the scrubby, sloping downs of the upper catchment. At the headwaters, there are some open patches of ground, and remnants of camps and tracks, presumably used by shepherds in earlier days. At length the ground started to slope down to the north, and we knew we were into Sliding Rock Creek catchment, and close to our destination.

We reached Old Warraweena Homestead in the late afternoon, to find the Rainbow group Matt, Dave, Wendy, Paul and others, sitting in the sun, enjoying a game of 500. There was also a Duke of Edinburgh Award walking group camped a few hundred metres to the east on the Mt Tilley side. Our camp was duly selected, by the old stockyards south west of the homestead, a spot that proved to be cold and exposed to the easterly wind. There were scudding showers that night, and the dawn brought overcast conditions that obscured the Mt Tilley range. Since the Rainbow group and Duke of Ed party were planning to climb Mt Tilley, we

decided that two was more than a crowd, and that we would climb Mt Gill to the west, and then follow the drainage lines north east to our camp at Hallies Well. Much of the walking that day was through thick Native Pine (*Callitris*) scrub forest. Most of the trees were quite small, but growing very thickly together and in places quite difficult to walk through. Our destination, Mt Gill was shrouded in cloud, but we did manage to get glimpses of the valleys to the west, and some reasonable views of the ridges. It was too cold to sit around for long. I recall that we used our 2-way radio to talk to Base Camp and tell them that we were in good shape, we also chatted to Graeme Oats of the Red group 2 who was hoping to meet us for morning tea, on their way up Mt Tilley, however we were much too far to the west.

Our track from Mt Gill was to the north and east, generally following the drainage lines towards the main Sliding Rock Creek, which at that place flows due north. We had lunch enjoying patches of sun, since the cloud was starting to break up, while sitting in the sandy bed of yet another creek line. Then steadily on our way, reaching the main creek at about 3 pm, we took a short cut across another thickly wooded ridge, and found ourselves on the track that leads to Old Warraweena. From there it was another 3 or 4 km to Hallies Well, the site for our third and fourth nights camps. The well is a natural spring in the bed of Sliding Rock Creek that has been protected against floods and animals by a steel enclosure, with a pipe leading to a sheep trough a hundred metres or so downstream. The water is of good quality. The camp was set up in a creek bed a couple of minutes walk to the east. By this time the group had got into a routine, and the camping and cooking went more or less without a hitch. A fox investigated the camp overnight, and removed a bag of Deb (dehydrated potato), however he seemed to think it was over-rated as far as food goes, because he had torn open the bag, but left the contents more or less untouched.

On Thursday the plan was to climb Mt Hack, and to return to the same camping spot at Hallies. We took enough food and water for the day, and the Trangia so that the group could enjoy a brew-up on the summit. This walk was most enjoyable, crossing the north end of the Mt Tilley range, across the plains with full views of the mountain ahead. The approach to Mt Hack is through attractive woodlands, gradually making way for smaller eucalypt scrub. The access is by way of a creek line. The grade gradually steepens until in the upper reaches there is so much undergrowth and debris that the walking is easier straight up the slope. Despite having been up Mt Hack previously, I was diverted off the intended route, and ended up on a fairly steep bluff leading to one of the lesser summits west of the main peak. Nevertheless the group coped with the somewhat exposed conditions well, Bryan followed an easier route to the ridge at the headwaters of our creek. We all got to the top without any real drama. It was a beautiful day with perfect views in all directions. We were able to identify all the main peaks and features of the Gammon Ranges to the north, and to the south as far as the Wilpena formation. The Trangia came in handy, and we all enjoyed hot soup, tea and a plentiful supply of chocolate, hoarded for the occasion. On the return journey, David Ireland took over the navigation, and I think, quite enjoyed the challenge. He had no difficulty in directing us back to the camp.

That night we enjoyed the last of a 2-litre cask on "medicinal" port, and as the poem relates, some horrific experiences by torchlight. The fearless leader of the group had a bath in the sheep trough. Rumours that he had to break the ice first were totally false.

On the final day, David's knee was in poor shape, and rather than risk permanent damage, we contacted Base Camp and arranged for him to meet up with a vehicle that was visiting Old Warraweena. The rest of us packed up camp and followed Sliding Rock Creek downstream, as it runs west towards the plains. Bryan did the navigating, and soon got the hang of picking out features from the map, and using the compass to check that we were where he thought we were. We stopped briefly at Black Range Springs, meeting up with Bob Sharrad and Graham Medlin, who were investigating something or other. It always seems strange after wandering through apparently uninhabited bush to suddenly come across a vehicle, it almost seems an intrusion. Our walk down the main creek was interspersed with sightings of goats watching us from the ridges that form the southern wall of the creek. They obviously found our group of humans trailing along the creek, to be most interesting. In the early afternoon, Bryan led us out of the main creek, across the main vehicle track, and cross country to the Base Camp.

Lest it be thought, from this rather straight-laced account of the Red Group's adventures, that there was no amusement or good humour, the following poem was contributed by Bryan, Camilla, Mandy and Marty.

Mt Stuart, Mt Gill and more  
the prickles, the stones it was no chore  
Packs full of scroggin, flasks full of water  
Chris led his troops like lambs to the slaughter.

Packet pasta and rice, crackers, mettwurst and cheese,  
the food was great, but no more Deb, please.  
For Deb to excrete came no ease, as a certain fox near Hallies Well will know, this plight of  
Deb may cause some flow.  
While Deb and peas were enough to bear (bare?)  
Chris gave Marty quite a big scare.  
Marty's dacks were down, the night was dim  
Chris' torch had packed it in.  
Stumbling down the lonely creek bed  
Marty's arse dead ahead.  
Chris was grateful and thanked his friend Fate  
For he will survive to see the next SEG gate.

## **6.2 The trials and triumphs of Red Group 2 - Graeme Oats**

This is Red Group 2 Calling Warraweena Base.....- Susan Love

Graham Oats leader  
Shannon Carne  
Chris Deering  
Susan Love  
Guy Olding  
Melissa Minerds

"Peaks 'n' Creeks" Red Walk Two, starting from Base camp heading clockwise on a round trip tour of the station over five days.

### **Day 1: Warraweena base camp to Halley's Hut.**

Our first day of hiking was a pleasant walk along the eucalypt-shaded Sliding Rock Creek, and a welcome change after a week of digging pitfall traps. We found occasional puddles of water from seeps and also took a small detour to Black Range Spring where we watched some low cloud hover over the range. The weather remained fine however as we headed up the track to Halley's Hut. And back down the track when Graham's short cut turned out to be rather longer than we expected. So back up the track we went, it turned out he nearly had it right the first time after all. When we found it, the campsite was a sheltered and comfortably leafy little spot off a small creek just down from the hut, where there was plenty of rainwater. We then discovered why Chris had been struggling a bit and made him leave his stove, half his wardrobe and the kitchen sink in the hut to be picked up by the base camp crew later on. Graham redeemed himself by offering plenty of chocolate around after dinner around the fire and we radioed in on schedule.

### **Day 2: Halley's Hut - Mt Hack - Halley's Hut**

Our day walk did indeed take up the whole day - even with a relatively early start we didn't make it back until after dusk. The view from Mt Hack was definitely worth it though. Navigating our way through the flats our correct general direction was confirmed by contact with another party of hikers - Bob Sharrad's daughter and friends. Our combined forces slowed somewhat as we hit the steep slopes of the range. Rest stops grew more frequent ("just admiring the view") and lunch at the summit looked a long way off. We made it at about 2 o'clock but only stopped long enough to eat, make the obligatory entry in the logbook and be

impressed with the view - looking south to Wilpena, north to Mt Serle and the Gammons and east and west to salt lakes.

### ***Day 3: Halley's Hut to Old Warraweena***

Our original plans to visit Vesey's Claim mine and take a hike up Mt Tilley on our way were revised when we saw the fog entirely shrouding the range and making things generally grey and atmospheric. We decided to head straight through to Old Warraweena, and spent our morning scroggin stops trying to contact Chris Wright's Red 1 group on the radio to see if we meet up somewhere. It turned out they also had changed their plans and having previously been up Mt Tilley were over the other side of Old Warraweena heading up Mt Gill, in the fog. We nevertheless encountered other human life when we arrived at Old Warraweena at lunchtime - the rainbow group was playing hacky-sack in the yard. As they ran up the next mountain, we set up camp in the creek. It still being early in the day, half of us were eager to get as much tourism in as possible, and decided to take in a visit to Mt Tilley, the summit of which was now free of fog. Shannon, Guy and Sue took off while Chris, Melissa and Graham took it easy back at camp hunting for artifacts. Mt Tilley was in sight for almost all of the hike, so there were no problems knowing where we were going, but the ascent was more of a challenge.

Having been warned by Graham, we headed up the right-hand gully, which still appeared to end in a spectacular rock face. We found our way over at the head, but finding the best way onto the ridge was even trickier, the three of us choosing our own scrambles up. We were rewarded with another spectacular view and the sight of a close-flying wedge-tailed eagle. The easiest path proved quite visible from the top, of course. We didn't make it back until after dark, and had to radio in while still on the move, but with Shannon's navigation and an amount blind luck we hid the track right at the yards at Old Warraweena.

### ***Day 4: Old Warraweena to Dunbar Hut***

Early on we walked through some of the most open land on the property, but soon we headed down the beginnings of Warrioota Creek and out of radio contact. A perfectly innocent-looking tributary funnelled us into a narrow rock cleft ending in a drop to the main creek, forcing us to take an undignified scabble along and up the bank before dropping into the creek again. However, from then on the walking was quite easy as we headed down the cliff-lined gorge. We congratulated ourselves on not having to walk up it, as Chris Wright's party had done. As we'd made good progress, we took a walk up to the Waterfall, which had the most water we'd seen during our time here. From there, it was a short walk to Dunbar Hut and a campsite in the creek.

### ***Day 5: Dunbar Hut to Warraweena Base***

Our last day proved to be our most stress-ridden. We set off in two groups, with the first steep climb bringing us out of the radio shadow and past Blinman Mine - some holes in the ground - on the road to Yellow Well. It wasn't as simple as that however, as Graham, Guy and Sue managed to overtake Melissa, Chris and Shannon without realizing it by taking a "short cut." Somewhat later than expected, we all finally regrouped at the Yellow Well campsite, which still had plenty of evidence of a week of camping there. After lunch, we gave Graham a look at our lovingly crafted exclosure site, then headed along the track towards Base Camp. We decided we could still take in Mt Stuart, so while Chris took a rest in the shade, we set off up and over the ridge. It was quite a steep climb up the next big slope - Melissa deciding enough was enough headed back - and at the top we had a look at how far we had to go - "it that it all the way over there... or over there?" Once again, Shannon, Guy and Sue decide to not leave the job half finished, and in fact the hard work had been done. However, as we stood by the small cairn at the end of the ridge, we looked over at the next ridge: "er, is that an even bigger cairn over there?" "Buggerit, the view's good enough from here!" - and it was - the weather was perfect and we could see Mt Hack, Mt Tilley and the route we'd taken in the past five days. After a last radio check, we descended Not-Mt-Stuart and followed a tributary of Sliding Rock Creek from its origin, noting what had to be eagle nests in some of the big trees, to where it widens out at Base Camp, arriving back just on sunset.

### 6.3 The Green / Dream / Rainbow Team - Paul Wainwright

Trudy O'Connor  
Peter Love  
Alex Coombe  
Dave Wilson  
Matt Ward  
Wendy Telfer  
Paul Wainwright

Dunbar Well – Mt Hemming – Warrioota Spring – Warrioota Creek – Old Warraweena – Mt. Tilley – Mt Gill – Cockatoo Well – Nantibury Spring – Bullocky Water – SEG base – Mt Hack

Having revised Graeme Oates' walking route to accommodate a four-day walk, a few creeks and a couple more peaks, the blue team turned green. We set off from base camp early on the 12<sup>th</sup> of July with John Love and Joe Mack providing the shuttle down to Dunbar Hut. After saying our sweet good-byes we tracked southwest across a number of tributaries to a larger anabranch which would lead us towards Horseshoe Spring. The creekbeds were testing on our ankles, but we were enjoying the mild, sunny conditions and the prospect of wandering free across the ranges over the next couple of days. In places the creek banks turned gorge-like with vertical deeply coloured walls, marbled with folding. Reds, ochres, golds and chocolates – colours which are so reminiscent of the Flinders'. Horseshoe Spring was a little disappointing, a series of small stagnant pools, enriched with algae and macropod faeces. Clearly an important watering point for the fauna but hardly a place to refill the water bottle!

We followed the winding gorge south of Horseshoe, selected a tributary heading out to the east and dropped our backpacks. The group was in great spirits and had made good time thus far. Our intention was to climb Mt Hemming, to take in the views from the southwest of the reserve and to create some room for lunch on our return. At 799m in height we had a two kilometre horizontal walk with 250m of vertical ascent. Taking off like unrestrained kites, with cameras in tow, we made easy work of the lower scree. The southern side of the massif looked like an easier approach, a number of rolling saddles ameliorates any loss in altitude prior to the final climb. Thick stands of *Acacia*, bright green in colour and looking surprisingly healthy dominated the southern and western aspects. The summit of Mt Hemming is completely devoid of vegetation, it looks like a gibber plain, the only prominent feature being a large stone cairn. Views out to the plains in the west are impressive but a chilling reminder of the impact of agriculture in the semi-arid region.

Returning to our packs, we did our best to lighten our loads before heading east. Over the next couple of hours we crossed some undulating country and from one creek system into another. The terrain presented us with some challenging navigation and we concluded that the Cadnia mapsheet has some mis-represented anabranches (or the navigators have some misrepresented ideas about terrain interpolation!) Our desire was to drop into a creek, which would take us north towards Warrioota Spring. Selecting the correct ridge-gully-spur-re-entrant combination we found ourselves tracking north. I thought that the team would probably want to camp at Warrioota Spring since we were losing the light and the day had been fairly arduous. However, every walking group has a self-appointed campsite expert. Dave in my opinion had taken this task to heart, and wanted to carry on towards 'the waterfall'. After a brief team discussion we decided to continue, dodging small rock pools and negotiating small vertical drops in the creek. Wendy's cackle was never really out of earshot and was a good indicator of group morale, spirits were soaring!

The geomorphologic wonder marked on the map as 'the waterfall' is little more than a vertical step, and is similar to many others upstream (strictly no repelling equipment required!). I was anticipating a drop similar to Chris's crevice (the well-known waterfall in the Gammon Ranges, tackled in 1996, and named after the intrepid leader!) We found a campsite on the northern side of Warrioota Creek, rolled out the bags and fired up the stoves for dinner. The concoctions prepared didn't make it to print in my gourmet cooking guide but smells wafting down the creekline attracted a friendly fox who seemed to think more highly of the Segger's culinary abilities than I did! A strong cold wind blowing through the camp curbed any late night antics as

most retreated to the warmth of their bags. I am unsure whether some of the team knew that we were only two kilometres from where we had started walking at Dunbar earlier that morning. Our 19km circuit was really just for fun!

Day two saw us follow the scenic but generally convoluted Warrioota Creek eastwards towards Old Warraweena. Peter and Alex spent most of the day setting the pace; Wendy, Trudy, Matt and Dave discussed the merits of animals, vegetables and minerals. We saw few goats whilst walking but Dave spied an opportunity he couldn't resist. A kid bleating wildly on a cliff above the creek sent him scrambling. After speed climbing and a little traversing he managed to corner the rogue and sent it barreling into the creekbed towards Alex whom received the gift with open arms. A small sacrifice was made- for the *Acacia* seedlings next spring.

We arrived at Old Warraweena early in the afternoon a couple of hours earlier than anticipated, a tribute to the drive and enthusiasm of the group. A side trip was contemplated but the consensus, a little rest and relaxation might be more appropriate. Cheese and greens, and other small hors-d'oeuvres were prepared by the catering department whilst others began playing cards (gambling) and smoking cigars. Before long we were met by a Duke of Edinburgh's group camping at Old Warraweena overnight and heading south to Patawerta Well the following day. Chris Wright arrived with his chargers not half an hour later; they had been following our footprints along Warrioota Creek for most of the day.

Having made the silly decision to lie under the stars on a very damp evening, I awoke on the morning of day three with my sleeping bag covered in moisture. The cloud had closed in and threatened to postpone the morning's activity. We had planned to climb Mt Tilley but quickly realised that our view would be seriously compromised. Not being ones to let a good opportunity pass, we left early to climb it anyway. The walk to the summit involves strolling across 3-4kms of rolling country before the climb proper. Our destination was obscured most of the way but this seemed to make the summit all the more intriguing. Reaching the summit we were greeted by cold, windy conditions, our view estimated at 30 metres. We filled in a wet logbook found in the cairn and made a rapid descent out of the wind. Walking in the clouds was an experience enjoyed by all.

Arriving back at Old Warraweena we were enjoying lunch only to be greeted by Graeme and his team who had walked south from Halley's Well. They had spent the previous day climbing Mt Hack. We were preparing to walk towards Mt Gill to snap some panoramas. Climbing over the ridge at the back of Old Warraweena the *Callitris* pines became very dense. Closer than pack width, they were slow to negotiate. My tip, walk directly behind somebody who is bigger than yourself. My problem, unnamed persons were taking advantage of my hospitality! Mt Gill provided us with some wonderful views of surrounding peaks because of its central location. After taking photos we dropped onto a saddle to the northwest and followed the creekline down to Cockatoo Well. The hut is positioned close to the creek and is sheltered by enormous red gums. Few camping spots are as picturesque. Alex and Peter spent some time honing their rock throwing skills at a pannikan positioned on a fence post. Hit to miss ratio (1:500)!! To add insult to injury, Matt had the audacity to interrupt proceedings and sent the pannikan skyward on his first attempt.

Day four greeted us with sunny mild conditions once more. Rather than an early morning yoga or tai chi session we opted for a quick game of hacky. The sack, much to my surprise stayed in the air long enough for everyone to give it a kick (controlled of course!). Navigation duties were placed in the eager hands of Trudy; she had to ensure that we didn't leave the creekline enroute to base camp. We stopped at Bullocky water for Dave to explore a small water filled cave. A caver in his other life, clothes were stripped off, headtorch strapped on and into the water he stepped. The cave extended only ten metres but the experience was sufficient to curb deleterious symptoms from his two-week abstinence. Our trek to basecamp was now no more than a stone's throw. Heading westerly out of the creek we could see the repeater tower positioned behind the camp. The rest was merely a formality.

Day Five we set out reinvigorated for a big day of hiking up on the Mt Hack Range. We headed straight up, climbed a few waterfalls for fun value and reached the top by mid morning. Well,

we thought it was the top, actually the top was the furthest peak far away on the horizon. Several hours of hiking up peaks and down saddles along the top of the Range we finally got to the cairn. It was beautiful hiking despite a few loose boulders and nasty spinifex. The views were spectacular as we hiked along and incredible from the top of Mt Hack itself. We opted for a more direct route down, straight down the nearest creek and then a few kms of walking back to the car. A fabulous day to end a great week.

#### **6.4 *The Base camp group***

While most were off taking in the lofty heights of Warraweena, a dedicated group remained at Base camp to continue to check the traps, to run the daily radio scheds and to generally 'keep the home fires burning'. Many laughs were had with Joe's stories, songs and jokes and with the continual banter of jibes from Bob after a little fox got away ...

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## Appendix 1

Brief plant lists for some sites on Warraweena (visited July 1999).

Courtesy of Fiona Bennett (and Ben and Annie).

Species	<i>Acacia ligulata</i> site 5	Old Warra- weena	Mallee site 8	Bullock bush site 4	<i>Acacia menzeli</i> site	Base camp
<i>Aristida sp</i>		?				
<i>Acacia calamifolia</i>		*				
<i>Acacia ligulata</i>	*	*				
<i>Acacia menzeli</i>					*	
<i>Acacia victoriae</i>	*	*		*		
<i>Acacia spp</i>	*	*	*	*	*	
<i>Alectryon oleaefolius</i>				*		
<i>Allocasuarina verticillata</i>					*	
<i>Beyeria lechenaultii</i>					*	
<i>Bursaria spinosa</i>					*	
<i>Callitris glaucophylla</i>	*	*				
<i>Cassinia leavis</i>	*			*		
<i>Cassytha sp.</i>					*	
<i>Casuarina pauper</i>				*		
<i>Cymbopogon ambiguus</i>	*	*		*		
<i>Dianella sp.</i>						
<i>Dissocarpus sp.</i>				*		
<i>Dodonaea lobulata</i>					*	
<i>Dodonaea viscosa</i>					*	
<i>Dodonaea sp.</i>			*			
<i>Eucalyptus camaldulensis</i>	*	*		*		
<i>Eucalyptus flindersii</i>					*	
<i>Eucalyptus gracilis</i>					?	
<i>Eucalyptus odorata</i>					*	
<i>Eucalyptus socialis</i>			*			
<i>Eremphila sp.</i>					*	
<i>Exocarpus aphyllus</i>					*	
<i>Glycine clandestina</i>						?
<i>Goodenia sp.</i>					*	
<i>Hakea edniana</i>	*			*		
<i>Lomandra sp.</i>		*				
<i>Marsdenia australis (native pear)</i>	*					
<i>Melaleuca glomerata</i>	*					
<i>Melaleuca lanceolata</i>	*		*			
Mistletoe	*			*	*	
<i>Olearia muelleri</i>			*			
<i>Olearea pimeleoides</i>			*			
<i>Pimelea sp.</i>					*	
<i>Pittosporum phylliraeoides</i>	*			*		
<i>Santalum sp.(Quandong)</i>			*			
<i>Scleroleana sp</i>	*			*		
<i>Senna ssp</i>				*		
<i>Solanum sp</i>	*			*		
<i>Ptilotus obovatus</i>	*					
<i>Zygophyllum apiculatum</i>	*			*		
<i>Zygophyllum aurantiacum</i>	*					
<i>Zygophyllum sp.</i>			*			

\* indicates the species found at each site