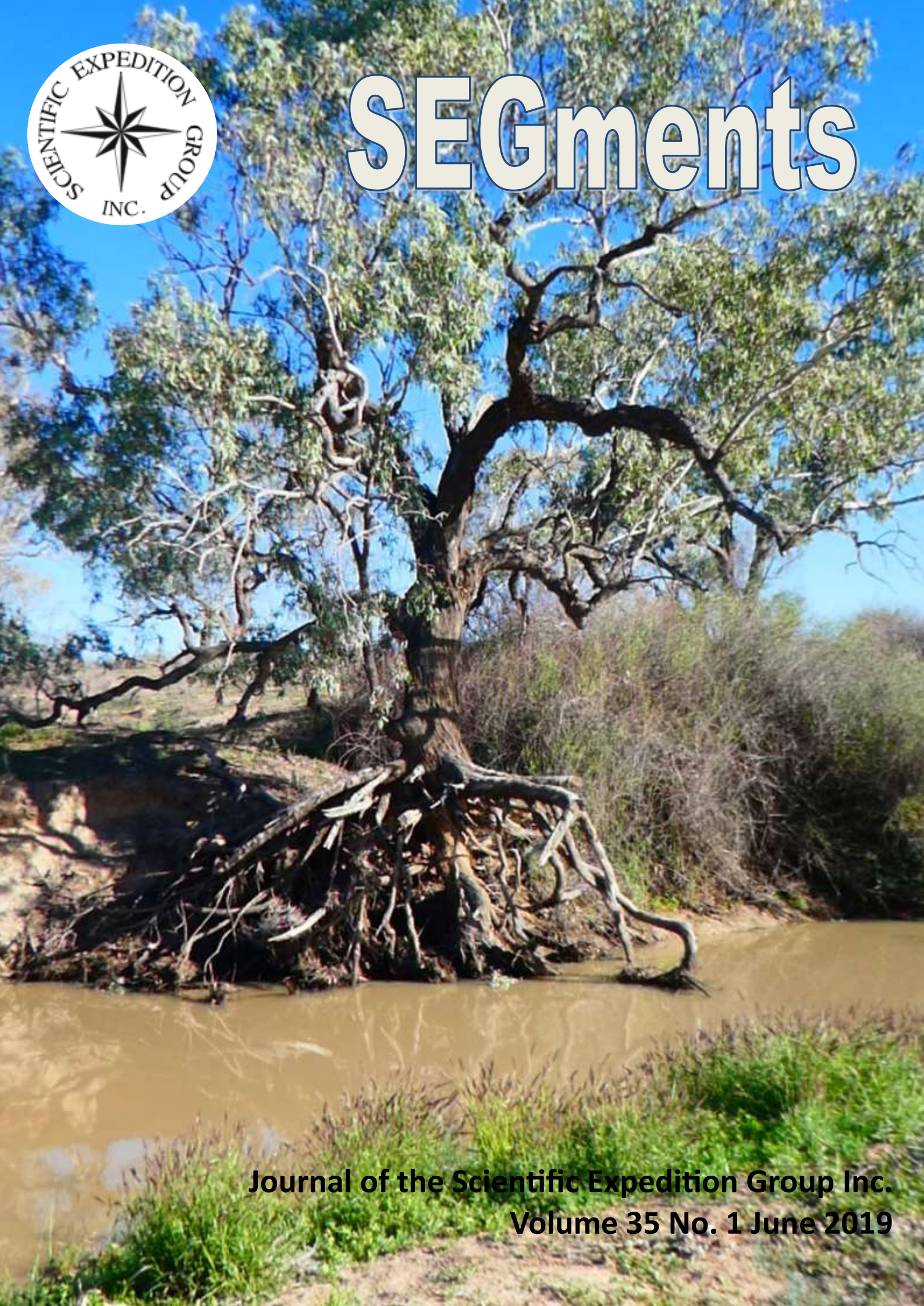

Journal of the Scientific Expedition Group Inc.
Volume 35 No. 1 June 2019

Scientific Expedition Group Inc.

Cover Photo: A survivor. A gum tree high and dry on the Strzelecki Creek, a branch of the Cooper Creek at Innamincka.

The Scientific Expedition Group is a not-for profit organisation which began in 1984. SEG undertakes several expeditions each year to record scientific information on wildlife and the environment in many parts of South Australia.

A major expedition to conduct a biodiversity survey occurs each year over two weeks. Scientific experts lead volunteers in surveying mammals, reptiles, invertebrates, vegetation, birds and physical geography. The data collected on each survey are archived with the relevant State scientific institutions to ensure they are available to anyone interested in our State's environment.

In addition to the major expedition, a number of trips for the Vulkathunha-Gammon Ranges Scientific Project are organised annually. A long term study of rainfall on the ranges and of water flow in arid-zone creeks is undertaken. All data are supplied to the Department of Environment Water and Natural Resources and to the Bureau of Meteorology and are available for analysis.

SEG conducts four-day biodiversity surveys at eight different sites each autumn and spring in the Heritage Area of scrub on "Minnawarra" farm near Myponga. Data collected are entered into the Biological Data Base of SA. SEG also conducts annual mallee-fowl monitoring over a weekend in the Murraylands.

ISSN 2208-7443
SEGments is the authorised journal publication of the Scientific Expedition Group Inc., PO. Box 501, Unley SA 5061. It is published four times a year to promote articles about biodiversity, scientific exploration and ecological research.

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SEGments

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GUEST EDITORIAL

My face in speckled, shifting shade,
My back and all my small weight
Drawn down on pliant sand prostrate
Against the vastness of this earth,
My original form.

I toil over sand, over rocks, between bushes
That scratch, out of a creek with no water,
Scrambling and grunting up a steep heap
Of clinking, slipping stone fragments,
Puffing and swearing.

And here as I stand at the top of the scree
Pressing my hand on the dusty face
Of the cliff, squinting up at the hard
Outline against a dazzling depth
Of blue with a haze of gold where the sun
Strains to tumble over the edge,
This red-brown hardness, this heat in the shade,
I sweat and thirst and am almost at one
With these thousands of tonnes of rock, my earth,
My ultimate form.

John Love

Post Script:

To make some pretence of relevance to science, you could say that this is about the interaction of geology and biology. Five thousand million years of evolution, geological and biological, have produced what we consider to be the highest form of life that has inhabited the earth: a marvellous organism that can move itself and other objects, that can be conscious of itself and interested in everything around, exquisite engineering, highly complicated chemistry, energy not fully understood, an organism that interacts with all its surroundings - for better and worse. We evolved in a world where we have to strive to live, in harmony and in conflict with land, sea and air, with other species, with other members of our own species and within ourselves.

Sometimes we get it right and sometimes we don't. So we go on accumulating small pieces of information which become part of a growing body of knowledge which might or might not be directly beneficial to our generation. This is pure science.

But the aims of SEG are not purely scientific: '… appreciation of the natural environment … promote the value and philosophy of wilderness …' These underlie our scientific endeavours. When the bio- ceases, our mortal remains return to the geo- but we will have left something for our grandchildren - more, we hope, for better than worse.

John Love

Editor's Note: John Hayes a Vice-Chairman of SEG, invited John Love to join SEG's Expedition Gawler Ranges 1995. John had such a good time that he decided to put something back into SEG. A long-time Committee Member, John Love was Secretary for about twelve years, has been on all the major expeditions since 1995, and on many of the Vulkathunha-Gammon Ranges Scientific Project trips. John's daughter Susan and son Peter also became involved in SEG.

RFID in WILDLIFE – Part 1

Dr Doug Black

How do we easily and positively identify wildlife such that there is no question as to the identity of the animal, bird, reptile, fish or amphibian, but in a way that does not jeopardise the chances of survival for that animal after release? The answer is RFID! And once the animals are permanently and irrefutably identified, we unlock the ability to obtain so much more information and data, such as survivability in the wild, behaviour, food and water intake, movement patterns, body weight and reproductive behaviour. This can then help us to understand more about the plight of and challenges being faced by our precious wildlife and enable us to make better decisions in our conservation strategies and efforts.

What is RFID?

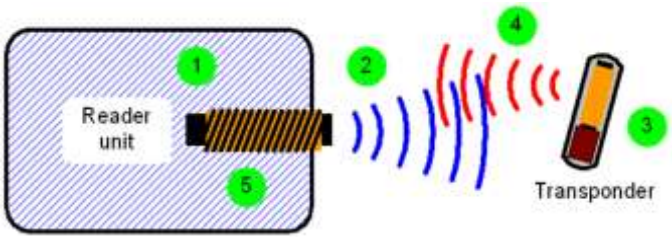
Radio-frequency identification relies on the use of radio-frequency electromagnetic fields to transfer data from an identification device (implanted or external) to a reader. Most people commonly refer to the identification devices as "microchips" or transponders. This is almost the same system that is used today for the identification of dogs and cats and many horses and it can be readily applied to wildlife to help monitor movements, breeding, feeding, some aspects of health and survivability.

My two veterinary partners and I introduced microchip identification for animals into Australia in the 1980's and, since forming Microchips Australia, we have been involved in supplying microchip identification systems for the companion animal industry, zoos, wildlife researchers, fisheries and many other applications ever since.

How does RFID work?

Although microchip identification is now an accepted form of identification of animals, exactly how the system works is often not well understood by many users.

The overall explanation is that a microchip, transponder or PIT tag is a passive transponder (no battery involved) that relies on radio-frequency electromagnetic fields produced by a reader unit to excite the transponder which then transmits the unique transponder code back to the reader. Unlike other identification systems that rely on line of sight or visual examination, the RFID microchip can be implanted under the skin or into the body of the animal and is there for life ....well in most animals...but more of that later!



It is a common misconception (probably because of the false representation in Hollywood movies) that the position of a microchipped animal can be tracked via the GPS satellite system. This in reality is still a long way off.

Components

The *transponder or microchip* contains a microscopic integrated circuit board, a coil inductor that acts as a radio antenna and a capacitor and these are all contained in a capsule that is generally made of glass or biocompatible glass in the case of Trovan microchips. This capsule is either heat-sealed or preferably laser-sealed to ensure no connection between the animal tissue and the internal components of the transponder.

Microchipping a lace monitor

There are many types of *microchip readers* and reading systems on the market, from:

- Small pocket-sized hand-held readers
- Larger hand-held readers with better read range

A koala being scanned with a larger hand held scanner

1.The reader is triggered
2.The reader transmits radiofrequency energy to the transponder (microchip)
3.The energy from the reader is converted to an electrical charge in the transponder
4.The transponder then sends its uniquely coded low energy transmission back to the reader
5.The reader receives and processes the received signal from the transponder and then displays the unique code as a numeric or alphanumeric code on an LCD screen

Solar-powered wombat burrow monitoring system

- Pole readers
- Remote monitoring reading systems

Why use RFID in wildlife?

Once an animal is permanently identified, a tremendous amount of information can be generated for research to help us understand more about the animal and hopefully help ensure the long-term survival of both the individual and the species into the future. Of course, this is not restricted to identification via RFID – the animal may have some form of external identification such as external tag, leg band/ring, tattoo, ear punch or tail or toe clipping. Most of these identification methods can be easily removed, difficult or impossible to read or interpret, or have some negative animal welfare issues associated with them. Animals that are externally tagged can be at greater risk to predation, injury from peers, injury due to the tag being caught or ripped out or, with respect to leg bands/rings, causing constriction to the lower leg and possible loss of that limb. Implanted transponders pose little to no risk to the health of the animal apart from a small amount of pain associated with the initial implantation.

Significant information can be gained from simply scanning an animal when it is captured or found injured or dead. How many of us have released an animal, bird or reptile back into the wild after extensive care and rehabilitation and then wished we had a way of knowing where that individual ends up and for how long it survives. This information is only achievable if the animal is permanently identified. Of course, this is also dependent on an accurate and easily accessible database.

Even more information can be achieved in using a remote monitoring system where a strategically located RFID antenna (e.g at a nest entrance, feed station, water point or burrow etc) is linked to a decoder/datalogger, and any movement of a microchipped animal over, next to, or through the antenna is automatically recorded and stored for later transfer to a computer. These remote monitoring systems can be linked to optical beam sensors, weigh scales and other devices to gain information on frequency of visits, direction of movement, length of stay in a nest, burrow or feed/water station, weight of the animal and even the amount of food eaten! The information can be stored within the datalogger memory or on a USB storage device and can be directly downloaded to a laptop or other computer, or a modem can be linked to the datalogger in the field and the data sent remotely to a computer server and accessed by a researcher anywhere in the world.

RFID vs GPS/VHF tracking

Tracking the movements of animals can also be achieved by using GPS or VHF tracking technology. This is fantastic technology providing vital real-time information on the movements and behaviours of animals, birds, fish etc., and is a very useful tool in wildlife research. However, there are some disadvantages with GPS and VHF technology:

- Virtually all GPS/VHF tracking devices are externally attached to the animal via bands, collars, gluing or surgery
- The tracking devices are active devices relying on batteries with a finite life
- The devices are generally much bigger than implanted RFID Transponders (although they are getting smaller

An example of a more complex remote monitoring system used in a bridled nail-tail wallaby research project in NSW.
L to R: weigh scale platform, 500mm square RFID antenna, weigh scale indicator, RFID decoder, 20W solar panel, 12V batteries

as time goes by), and
- The devices are significantly more expensive than RFID transponders

The obvious major advantage of the implanted RFID transponders is that the transponders remain as a permanent identification of the animal for the entire life of that animal...long after the batteries of the active GPS or VHF tracking device have died and/or the collar or device has fallen off the animal. Ideally the combination of both technologies provides the greatest amount of data and information for wildlife research.

Points of caution

In recent years there has been an influx of cheap imported microchips into Australia. Unfortunately the quality of these microchips is highly variable, leading to an unacceptable level of chip failures and breakages in recent times and even a massive "recall" of one brand of microchips that had been implanted into companion animals across Australia as well as in other countries across the globe. Chip failures and breakages are EXTREMELY RARE in proven, high quality transponders/microchips such as German-manufactured Trovan microchips.

Although it is an expectation that all stray or injured dogs or cats are scanned for the presence of a microchip, this is still not the case for native wildlife. As an avian veterinarian, I have been promoting the routine scanning of all native wildlife presented to veterinary clinics and animal welfare and wildlife rescue shelters for several years but this is still to become a routine procedure.

It makes perfect sense to microchip rehabilitated wildlife prior to release to enable us to start gathering data on survivability, movement and behaviour patterns in these released animals. However, in most States of Australia legislation controls who is authorised to implant microchips into companion animals and horses and, in some States, this is also true for the microchipping of wildlife. It is therefore advisable to check this out fully before embarking on a microchipping program of released wildlife.

Finally, microchips in wildlife are absolutely useless unless they are supported by current and accurate data located on a database. For rehabilitated wildlife, the use of a readily accessible, authorised, incorruptible national animal registry such as Central Animal Records www.car.com.au is worth considering but the cost may be prohibitive. There are many researchers, veterinarians and wildlife carers who maintain their own databases for individual projects, but there is little if any communication between these databases and so sometimes the identity of the animal or even the project under which they are being studied cannot be established. We have had cases of microchips being detected by remote monitoring antenna/decoder systems that were not associated with the project that deployed these antennas. Consequently, without the concurrent use of remote cameras, there was no way of identifying even the species of the microchipped animal that triggered the microchip reader.

Although wildlife researchers generally administer their own databases, some microchip suppliers, such as Microchips Australia, do keep skeleton records to at least be able to identify to whom a microchip has been sold. This measure could help in determining the identity details of some injured wildlife that had been subject to monitoring in a wildlife research project. There is a growing need for the establishment of a single wildlife registry in Australia but how it would be funded and administered are challenges to be addressed.

Ultimately RFID or microchip identification can contribute to the one thing we are all striving for – the survival of our precious native wildlife. In the second article on this topic, I will discuss some of the newer advances in RFID monitoring of wildlife, and highlight some examples of RFID equipment that we have designed for various wildlife projects in Australia in recent years.

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A possum and a koala with GPS collars. Photos courtesy of Sirtrack www.sirtrack.com

MY STRZELECKI TRIP DIARY—SEG'S EXPEDITION TO INNAMINCKA MAY 2019

Andrew Barr

The word Desert conjures up ideas and connotations to people; dry, deserted, hot and empty.

I have just returned from a ten-day trip to the Strzelecki desert. I was incredibly surprised as it was not what I expected. It had rained two weeks ago, and so the landscape was very green with wildflowers everywhere. There were frogs in the water holes. It was unusual to see the red centre so green...this part of South Australia where we were was not dry now.

When we set up at our base camp twenty kilometres south of Innamincka on the Strzelecki River, it did seem deserted. A second camp of SEG and DEW personnel was set up 20 km away, to the east of Innamincka on the SA/Queensland border.

SEG's Bush camp cooking tent

Our crew of ten are here to do a biological survey. For the last ten years I have been going with the Scientific Expedition Group to isolated areas of South Australia. I feel fortunate to be part of this expedition as it allows me to do my biological science as well as sketch and paint the landscape.

As I set up my tent, I noticed chips of worked stone tools in the sand. This part of the desert was occupied for a long time, so it is not deserted. Aboriginal people have been here, and I want to know how they lived in this environment.

It is May, the weather is warm during the days and cold at night. In the summer it is forty plus degrees during the day, so it is an enjoyable time to be here when it is not too hot. But as the day warms up trillions of flies come up from the ground, and so we all wear fly nets so that we can work.

The first day's job is to set up our ten traplines on different vegetation sites. Site one is on the top of a red sand dune. We place a small wire mesh fence, 20 cm high by 60 meters along

Cooper Creek near Innamincka

Setting up a trap line

the sand ridge. At ten-metre intervals we dig pits to insert polypipe tubes as traps (macropits). The theory is that animals walk into the mesh, move along it, and fall into a trap. Only nine more 60 m lines to complete today!

After a long exhausting day, we arrive back at base camp as the sun is setting. At sunset the flies stop being a pest so we can eat in peace. A cold beer, rice and chicken curry are on the menu. We all chat about our day and the new things that we experienced. Early to bed for all of us.

The second day starts at five am as the sun rises; a quick coffee and a bowl of cereal before we jump into the trucks to head off to check the traplines and record the catch from the night before. We find three different dragon lizards, two frogs, a fat tailed dunnart that was pregnant and a variety of beetles.

Andrew painting in the desert

We have four more traplines to install today in saltbush country. This a harder area to work as the ground is compacted clay and hard to dig. My job today is to set up a series of micropits, which consist of small vials of alcohol, set at ground level to capture ants and other invertebrates. I set out 6 pits at each trapline to line up with the macropit positions. I am taking lots of photographs, partly because I want to paint the images. I am amazed at how green this part of the desert is after recent rain. Flowers are abundant, yellow

Andrew Barr's painting "The greening of the Red Centre"

daisy, purple flowered grasses and flowering spinifex cover the red dunes. I will be drinking 2 litres of water today because it is hotter, and I was feeling dehydrated last night. Another day of relentless flies and challenging work, and we get back to base camp at sunset.

It is a later start today as I am working with the botany crew. Our job is to find and collect plant specimens for the SA Herbarium in a 100 m quadrat near each trapline. I am the scribe and plant press collector as I have limited Australian botany knowledge. I really enjoy learning about the plants in

Andrew at the flooded Cooper Creek at Innamincka

The pregnant fat-tailed dunnart

this desert landscape. We don't need to be back at camp until noon, so I have free time to paint and draw.

Painting in this environment is exceedingly difficult. I am using Acrylic paint and the flies land and stick to the paint. One frustrating hour later I take a photograph of the scene and retreat to the truck to drive back to camp.

Another chilly early morning start. It has been a week now and so it is time to dismantle our traplines and complete the paperwork. Then we pack up the base camp and head back to Innamincka, where we spend the night in a bunkhouse with showers and soft beds. After dinner we sit around the bunkhouse discussing what happened in the two camps. From the discussions it seems like we had the best camp for location and good personnel, but the other camp might disagree.

Before we leave Innamincka we take a short trip to see the flooding Cooper Creek. All the flood water from Queensland early in the year is flowing into Lake Eyre via the Cooper Creek and the Channel Country.

It is over four hundred and fifty kilometres over the rough Strzelecki Track to Lyndhurst as we head south-west in a convoy. Trouble then starts: first one vehicle has a flat tyre which is easily fixed; then the SEG trailer's new welded axle rattles apart; one car has a hot/cold radiator and has to mosey along at 40 km/hr; and finally the clutch burns out on another vehicle, which is retrieved and sent on a trailer to Copley after a four hour wait. Thank goodness for the satellite phones which we have.

We arrive at the Lyndhurst Pub after dark joining some of the other crew members. The next day we drive to Adelaide.

I am now sitting quietly in my art studio writing this article. The paint smells are faint. I look at the painting I have just finished. I am pleased as it shows the place as it was.

A male painted dragon *Ctenophorus pictus* caught near Innamincka.
Photograph Helen Johnson

I consider myself fortunate at my age to be able to still go on these expeditions, as I see landscapes and animals that other people never get to see.

barrandrew73@gmail.com

MINNAWARRA BIODIVERSITY PROJECT - AUTUMN SURVEY 2019

Janet Furler

The Minnawarra Biodiversity Project has been running since the year 2000, each autumn and spring, on the Willing property "Minnawarra" near Myponga in Heritage Scrub. Sheep and cattle have been fenced out in areas where 8 permanent traplines are set up. Traps are open for four nights and checked each morning and afternoon. Captured animals are micro-chipped, which means less handling if they are recaptured. Animals are weighed, micro-chipped if new, and released after data on each animal has been recorded.

For the autumn survey, April 24th to 28th, the weather was lovely with pleasant days, 15 -18 degrees, and nights 9 -12 degrees. We were at the end of 6 months of dry weather with only 40 mm rain for the year to date. The week after the survey was the beginning of May, and 188 mm of rain was recorded for the month. I am very glad that we didn't have to negotiate the rain, having done so on a previous survey when a storm caused the State blackout in 2016.

The participant numbers were manageable, with 9 -13 in total on rounds. This smallish but efficient team had the full complement of Willing/Furlers (4), which was great. There were also repeat volunteers who are looking to be regular, one being Harriett our TV star from the "Totally Wild" segment. Long time SEG supporter Amanda Ruler and her friend Fernando Gonçalves, a professional photographer,

Sam and Andreas checking and recording captures. Photograph by Fernando Gonçalves

attended a round to take photos that we can use for publicity. All the volunteers put in over 300 hours over the 5 days.

We caught 149 mammals. One skink (*Lampropholis guichenoti*) was the only non-mammal. The long dry would have a bearing on the lack of skinks and frogs. These 150 individuals were handled 276 times, being caught from 1 to 6 times. The peanut butter and oat baits in the Elliott traps are a tempting drawcard for multiple visits.

Twenty mammals were recaptured animals which had previously been micro-chipped. This left 129 captures being new, often juvenile animals. 32 captures were male antechinus which are not microchipped as they are short-lived. There were 3 ferals – 2 mice (*Mus musculus*) and one rat (*Rattus rattus*).

Sites, 9, 8, and 5 had no recaptures. There was 1 recapture at site 7; 3 at site 4; 4 at site 3 and 6 at sites 1 and 2. Sites 7, 8 and 5 are all on the south side of the road. Is it less dry at these sites and therefore is there more breeding, with older animals being outcompeted, and thus fewer captured animals having previously been microchipped? Such questions arise when we consider the long-term data. Site 9 is high on a hill, well away from water and has always had lower numbers. Sites 1 and 2 are closest to swamps and still had older populations. They were the sites which remained busy during the millennium drought in the noughtys (2000 to 2009).

All in all it was a successful survey with lovely people. The biggest disaster was felt by the campers who were using the shed. The microwave which came from our mechanic some years ago decided not to heat! Fortunately they were a resourceful lot (or ate cold food). If anyone has a microwave which would like a change of view (trees and birds) we would give it a good home.

If you want to do something interesting in the autumn and spring school holidays, consider coming to "Minnawarra" to learn how a biodiversity survey is done. Help trap and weigh bush rats and antechinus; sort out the skinks; record bats; identify plants in the scrub; see what birds are around and see kangaroos, bandicoots and echidnas. Come for one day or more. Camping facilities are available.

SEG is very grateful to our corporate sponsor **Microchips Australia** for the support to the Minnawarra Project. For the past few years we have been chipping native rats, female antechinus and bandicoots, and it has had a huge impact on how we handle recaptured animals. They are rapidly identified with a hand-held reader, with little stress to the animal. SEG

An *Antechinus flavipes* climbing a trouser leg. Photograph by David Muirhead

uses large numbers of microchips on each of its two annual Minnawarra surveys, so Microchips Australia's sponsorship is very welcome. Microchips Australia is a distributor of Trovan products (including microchips) in Australia, and already sponsor other wildlife projects in Africa and Borneo. SEG is honoured to be an Australian project that they are sponsoring. Read about radio frequency identification (RFID) in the article by Doug Black, Microchips Australia, in this edition of SEGments.

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JANET FURLER WINS TREES FOR LIFE AWARD

Janet Furler has been manager of the Minnawarra farm for several years now. During this time she has worked with Bush for Life (BFL) in managing weeds in the 120 ha Heritage Area. This is high quality scrub and Minnawarra has been listed as a "BFL site", with native vegetation worthy of permanent preservation and containing many rare species. Monthly on a Sunday morning for the past six years a small group of volunteers has come to the farm to weed an area of the scrub. This becomes quite a social outing, with home-made cakes for morning tea and plenty of discussion about the abundant native plants seen during the morning.

BFL is part of Trees for Life (TFL), whose members grow and distribute seedlings for revegetation. Each year TFL awards its volunteers for outstanding service. Janet was given a Thank You Tree Award for her ongoing contribution. Congratulations, Janet!

Monthly weeding at the Minnawarra BFL site continues, weather permitting. Many SEG members have helped in the past with revegetation, weed control and fencing scrub. If you feel like a stimulating Sunday morning in splendid surroundings with good company while achieving environmental satisfaction give Janet a ring on 0419 842 667.

VULKATHUNHA-GAMMON RANGES DATA RECOVERY TRIP APRIL 2019

Alex Cornish, Graham Blair, Garry Trethewey, Helen Johnson

Introduction

The Scientific Expedition Group's Vulkathunha-Gammon Ranges Scientific Project (V-GRaSP) began in the Arcoona Creek catchment area in 1988 as a long-term rainfall monitoring project which would also provide a valuable opportunity for SEG to assist in the training of young people in scientific field work.

The project arose out of questions by hydrologists about how the Gammon Plateau, in a low rainfall area, supported the dense growth of vegetation that was observed. Extremely heavy rain was observed to be almost entirely confined to the ranges. It was agreed that a long-term rainfall and monitoring project to study the variability of rainfall with height in this semi-arid climate would likely answer some questions about whether the orographic (topography/mountain ranges) effects cause a significant increase in rainfall in favourable locations. On 11 September 1988 the SEG project was officially commenced with the turning on of a pluviometer (rainfall gauge) installed on the Gammon Plateau.

The Vulkathunha-Gammon Ranges in the far northern Flinders Ranges is famous among bushwalkers for its eastern half's deeply dissected quartzite plateau with steep gorges and spectacular cliffs. The rainfall measurement sites for the SEG project are located on the more manageable western side of the range, as well as on the flatter 'station country' closer to Copley.

From its humble start and with the help of many people and organisations, V-GRaSP has now grown into a significant, broad, environmental monitoring exercise. Groups of volunteers now visit the project area twice a year, but visits were more frequent in the first 25 years of the Project.

The program has gradually expanded to include five activities as outlined below:

- Continuous rainfall records at high and low altitudes from nine sites
- Streamflow monitoring in Arcoona Creek
- Photographic botanical monitoring
- Yellow-footed rock-wallaby monitoring
- Feral and native vertebrate observations

At times it has also served as a backbone for other projects, including fox baiting, short term but more intensive animal and plant surveys, long term monitoring of differential animal impacts on vegetation via exclosures, minor palaeontological work, specific reptile observation, and introduction of students to remote area field work.

Rainfall monitoring

Nine pluviometers are located at elevations from 320 to 930 metres to investigate the orographic effect of the ranges on rainfall. Five of the pluviometers send telemetred rainfall data which is retrieved at three hourly intervals by the Department of Environment and Water and published on the WaterConnect website. A copy is immediately forwarded to the Bureau of Meteorology for publishing on the BOM website. A further copy is forwarded to the SES Floodmon system providing near real-time rainfall conditions in the Northern Flinders Ranges.

Streamflow monitoring

Since 1991 V-GRaSP has operated a streamflow monitoring program in Arcoona Creek. When heavy rains fall a stream-gauge instrument in the creek records the rise and fall of the water level, which is then converted to flow rate from which the total volume of water is calculated. It is then possible to compare the volume of water that fell as rain (recorded via a pluviometer at the head of the creek) with the amount of water that flowed down the creek as runoff. This can give an indication of how much water recharges the groundwater supply, and how much goes to support the trees and other vegetation.

A very significant rainfall event occurred in January 2017 resulting in the highest flow recorded at the Arcoona Creek

Neil and Lynn Topping, Alex Cornish and Billy Cahill on the A**pri**l V-GRaSP Trip

stream-gauge since data logging equipment was installed in 1993. Peak flow rate was recorded at 113 cubic metres per second.

Photographic botanical monitoring

In 1988 and 1989 vegetation photo-points with associated quadrats were installed in each of the six identified plant communities on the Gammon Plateau and on the slopes of North Tusk Hill. As part of the V-GRaSP program, long-term changes in vegetation are recorded twice a year by taking photographs from fixed photo-points.

Yellow-footed rock wallaby counts

In September 1997 the Scientific Expedition Group, with help from the Animal and Plant Control Commission and the Department of Environment, Heritage and Aboriginal Affairs (as it was then) embarked on a program to control foxes and monitor wallaby populations in the Arcoona Creek area. Fox baiting by SEG ceased in 2002 when aerial baiting began. Counting of wallabies happens opportunistically. The populations of other large herbivores are similarly monitored. Data is entered on to the Biological Databases of South Australia, BDBSA.

April V-GRaSP trip, 20 to 24 April 2019

Leaders were Alex Cornish and Graham Blair with expeditioners Peter Bayliss, Lynn & Neil Topping, Billy Cahill, Janet and Phill Davill and Michelle and Garry Trethewey.

Tasks were;

- maintain a little used vehicle track,
- replace batteries in pluvios (5 yearly and now due, 27 in all),
- calibrate pluvios,
- re-familiarize with procedures and updated equipment (new pluvio calibrator, battery exchange and calibration procedures),
- regular photopoints (Michelle and Garry Trethewey),
- regular opportunistic vertebrate sightings and vegetation observations.

Garry also undertook to prepare photos, measurements etc., for re-writing the photopoints guide.

Saturday 20 April. Travel from Adelaide to Bob's camp at Arcoona Creek, Gammon Ranges National Park and calibrate the four station pluvios as time allowed (North Moolooloo, Pfitzner's Well, Maynard's Well and Mocatoona)

Sunday 21 April. Exclosure Pluvio (near Bob's camp) and Arcoona Creek Stream-gauge. Different groups to Arcoona Bluff and South Branch (Arcoona Creek) Pluvios. Walk to Upper Vandenberg (about 7 km up Arcoona Creek).

Monday 22 April. Climb Gammon Plateau to service Plateau Pluvio and photopoints up the hill, and service the SAMBOT Pluvio.

Tuesday 23 April. Walk back to Bob's camp. All depart by lunch time. Tretheweys to Arkaroola, others to finish station pluvios and other odd jobs, look at Red Gorge, stay at North Moolooloo.

Wednesday 24 April. Travel back to Adelaide.

Volunteers hours were 514.

Description of expedition

Now with two pluvio calibrators, Graham's group went to Arcoona Creek South Branch, while Phil's group climbed Arcoona Bluff to the Pluvio, reducing back-tracking and optimising time use. A couple of 'teaching workshops' allowed updating of skills. Heavy batteries were divided up for carrying up the creek, and routes and meeting points arranged to minimise unnecessary carrying.

Garry's intention to prepare photos, measurements etc., for re-writing the photopoints guide proved premature. Harder than he expected, given a lack of permanent star droppers and changing landmarks. "Find the bush with the broken branch where the Goodia used to be, look 2m towards the creek and a little bit right, and stand on the three small rocks". To make a meaningful guide will require some re-thinking.

The water cache still has around 70 litres, so no urgency, but there was some talk of doing a special trip if it rains, just to refill it.

Observations - Garry Trethewey

Overall it is extremely dry. There are obvious signs of a major drought which, although shorter than the Millennium Drought (so far), is far more intense.

Dead gum trees on the the Clay Patch, near the Plateau Pluvio

Normally on these trips we expect to see a small number of yellow-footed rock-wallabies along the way, and larger numbers of euros and goats.

Last trip, six months ago, there were lots of animals including an unusual number of YFRW's contending for water at the two 'permanent' salty water sources, The Seeps and Woodcutter's Well, but not many away from water.

On this trip the only live vertebrates seen in 2 days and 25km walking were 3 goats, away from water, 6 euros near water, and an eagle. No live yellow-footed rock-wallabies were sighted, but 4 dead ones seen. A lot of dead goats and euros around the springs and in dry creek beds away from The Seeps and Woodcutter's Well. No reptiles seen, but probably because it was a bit cool.

There are interesting anomalies, and some differences from what I remember in the Millennium Drought, and plenty of questions.

While most *Eremophila freelingii* are in full drought mode, with brown flaccid leaves, there is a line running a couple of hundred metres down from the salty Woodcutter's Well that are still green, with the occcasional flower. Elsewhere, an odd *E. maculata* and a Senna are flowering, and a *Marsdenia australis* is bearing fruit.

In my experience, as dry times progress, gum trees slowly drop their leaves and become 'see-through'. However, almost all the gum trees on The Clay Patch, near the Plateau Pluvio, are suddenly dead, in full leaf. Next to the clay patch, however, on quartzite and skeletal soil, broom bush (*M. uncinata*) and gum trees are generally alive, if not thriving.

As Rob Brandle pointed out in another context, River Red Gums seem unaffected, so far, whereas by the end of the Millenium Drought they definitely were.

During the Millennium Drought, with reduced rainfall, *Ptilotus obovatus* and *Sida petrophila* tended to be eaten back by animals, to eventually become chewed twigs. Now, however, both can be found standing dead with leaves on. So it seems that as well as different tolerances to lack of moisture, there is a time component that different plants respond to differently.

Why are the animals dying? Are the springs too salty now? Or as has been suggested, (and seemingly demonstrated at Arkaroola and Nepowie Spring) water is adequate, but there is inadequate feed. But in places there is plenty of vegetation left, although arguably not the right kind. (A trip to Nepowie Spring three weeks later showed strong flow, plenty of vegetation, and 30 dead macropods next to 30 metres of pool.)

Woodcutter's Well is fuller and more overflowing than I ever remember, perhaps because of not being used by animals.

Overall this trip was fairly cool, windy on the tops, and interestingly, Monday morning had a mist heavy enough to wet gum tree leaves and trunks and provide rainbows.

Because I'm discussing drought and ecological responses, I'll mention that a trip to Chambers Gorge in early May 2019 revealed a similar dearth of animals and plants. However, the area obviously got a spot of rain 4-6 weeks ago, so various plants are regenerating from roots, and there are small (1/2 metre) patches of dicotyledons appearing. But because there are almost no surviving euros and goats, this re-growth is not being eaten, and there are occasional fringes of lovely soft tussock grasses, *Ptilotus obovatus* and *Sida petrophila*.

It is interesting to speculate that when the drought breaks, many plants will get a head start before the animals.

Various pictures are available on request.

garrytre@bigpond.com

The effect of drought. Two views of Wild Ass Waterhole - Apr 2012 and Apr 2019

ENVIRONMENTAL VOLUNTEERING

Lauren Heddle

I have been asked by the Helen Johnson to describe my activities and involvement in the natural environment. My name is Lauren Heddle and I'm 18 years old, currently studying Environmental Science at Flinders University. Ever since I was young, I have always loved the outdoors. This interest grew when I attended Urrbrae Agricultural High School.

Urrbrae gave me so many opportunities to get involved in activities out in the environment. From year eight to year twelve I was a part of the Environmental Focus Group and River Murray Group. These groups involved Kids Teaching Kids events and the annual World Environment Day. For these events I ran workshops for primary school students on a range of environmental topics. These included; River Murray introduced and native fish, identifying macro invertebrates, native plants of wetlands, reptiles, water quality, and a project on how to collect biogas for our school's farm.

I helped to run Open Days at my high school from year eight to year twelve which involved taking future high school students and their parents on tours around the school, the wetland and the school's farm. In year ten I was lucky enough to be in the Urrbrae Trails Group, taking a variety of people, mainly primary school students on tours around our farm. I really enjoyed interacting with the kids and teaching them about the different farm animals.

Lauren receiving a Young Achievers Award.
Photograph by Scouts Australia

Throughout high school I was involved with the Youth Environment Council and worked in the Agriculture Learning Centre at the Royal Adelaide Show. I volunteered at Warrawong Sanctuary, helping to clean up the site for the new owners. After my time doing work experience at both Cleland Wildlife Park and Black Hill Conservation Park with the park rangers, I joined the volunteer group Friends of Belair National Park. In this group I have helped with the many weeding and planting sessions which are run in the park. Being a part of this group is enjoyable because all the members are so knowledgeable, and I have learnt so much about different native and introduced plant species.

As a result of my involvement in the Friends of Belair National Park, I was invited in 2018 to become a Board Member of the Friends of Parks, for which I am very grateful. As a young person I enjoy being able to express my opinion within the group, and also being assigned different responsibilities.

Through my environmental science subject in years eleven and twelve I developed a strong interest in the River Murray, and came to understand how the lack of environmental flow has had a great impact on the native flora and fauna. Through this interest I have been working as a volunteer with ecologists at the Banrock Station Wetlands. My major environmental science investigation conducted over two years was continual testing of the water quality of the wetlands.

Through my environmental activities in and out of school, in 2018 I was nominated for a Channel Nine Young Achiever Award. I was a finalist in both the Leadership and Community Service categories, and was lucky enough to win the Leadership Award. I also received

Urrbrae Wetlands Open Day. Lauren is in the hi-vis vest running a workshop. Photograph by Ann-Louise Breeding of Urrbrae Wetlands.

two awards last year for my environmental work in the Oliphant Science Awards. In 2018, my school Principal nominated me for the Student Citizenship Award, and I was fortunate to receive the award at Government House, meeting the Governor.

After all my volunteering work over the years and especially after working closely with the ecologists at Banrock Station, I have decided that in the future I wish to work in the field, where I would hope to be involved in different research projects to better improve the environment. Also, I have found that I really enjoy teaching about the environment and sharing my knowledge with a variety of people.

Testing soil salinity at Banrock Station Wetlands. Photograph by Aedan Magee.

SEG ANNUAL GENERAL MEETING

The Scientific Expedition Group Inc. Annual General Meeting and Talk will be held as follows:

Date: 18 October 2019

Time: 7:30 pm

Place: Fullarton Centre, Corner of Fullarton Road and Fisher Street, Fullarton

HERBIVORE IMPACT ASSESSMENT SURVEY IN THE OLARY RANGES

Trent Porter

Latish one hot evening, in mid February this year, the phone rang. On the other end, it turned out to be an old acquaintance, Ben MacCallum, now working as a Community Ecologist for the Department of Environment and Water (DEW). Those who were on the Boolcoomatta Expedition ('06) will remember his hilarious impersonation of John Morely demonstrating the very innovative "Morely Roller" on the entertainment evening there. He also joined us at Ikara, co-incidentally there to take part in a Kangaroo Survey.

Ben explained that he had to do a Herbivore Impact Assessment Survey in the Olary Ranges on Boolcoomatta and Bimbowrie properties and needed an assistant. Could I help?? As it was to take place very, very soon and the forecast was for very hot weather and other participants were a bit thin on the ground, how could I say no? I had always had a hankering to go back to both these places since doing some volunteer work there previously so here was the chance!

We met in Yunta, Ben coming from Pt. Augusta and me from Adelaide – we were there within five minutes of each other … a great omen! Fueling up, we both drove on to Boolcoomatta, accepting the emphatic recommendation of a passing Highway Patrolwoman, NOT to leave a car anywhere in Yunta for a week, not even in the Police compound!

The welcome in Boolcoomatta from the Bush Heritage Ranger Kurt, his wife Andrea and their two daughters (Gerry and Maya) was most warm and they offered us the use of the quite palatial "Green House" which was getting a new roof as we arrived. The weather was hotting up a bit so the ceiling fans were gratefully put to use in the evenings.

Our first venture was out to Dome Rock, where we refreshed the methods of the assessment: noting, on a transect, the damage inflicted by grazing on a selection of vegetation species which are found to be palatable to particularly goats, rabbits and to a lesser extent, kangaroo.

These plants include mulga, indigofera, plum bush, striated mint bush and even the very, very spiky "Dead Finish" and all will be eventually eliminated by the unsustainable overgrazing by feral animals.

The next morning was spent sorting out the changed road & track system, very confusing for those with close memories of the old tracks (but now much improved for driving) and clambering up and down the geologically amazing Wiperaminga Hill and Eagle Rock where we were occupied surveying for a couple of days.

Our next task was to locate a transect on a mountain called Meuleugore using a GPS unit which had been really good before it had its screen busted (before Ben). Really interesting squinting through the cracks!! But, Ben eventually figured it out and we started what looked like a fierce climb to the ridge above. After covering roughly a quarter of the distance (about 1 km), my eye was suddenly caught by apparent movement on the mountain top. Careful watching by Ben through the binoculars showed it to be a yellow-footed rock-wallaby and

Yellow-footed rock-wallaby near Old Boolcoomatta Station. Trent in the background.

as it was part of our brief to note yellow-footed rock-wallaby colonies, we sped up the mountain to confirm its position. All we could find though, were quite a few dead goats and several abandoned emu nests, all built on ledges with superlative views but all left to rot.

Greatly disappointed, we started down the face of the mount and about halfway down, suddenly, there were the wallabies all about. It seemed that they were laughing at us, so effortlessly leaping from rock to rock. Worth the climb after all!

Having completed all the rocky ridge country on Boolcoomatta, the next day we drove on through Kalabity Station to meet all the folks there and then on to Bimbowrie where we were greeted (again warmly) by Peter Watkins, the Ranger there. He apologised for the pervading smell of death but explained that, because of the drought there, the unfenced house dam south of the homestead had become a death trap for kangaroos seeking water and getting bogged in the mud. Although he could shorten their suffering every morning, it had proved impossible to recover the bodies so they lay decomposing in large numbers and wafting in on the southerly breeze!

Our next targets were on the rocky ridges above Old Boolcoomatta Homestead and we were joined for this by Di Makotter from the Clare office of DEW. The temperatures were getting higher every day and we found that shade was a very welcome relief even if it meant everyone hiding behind each other. You can probably guess who was the greatest provider of the shade.

On nearly every ridge of any height we were coming in contact with yellow-footed rock-wallabies and they proved to be very approachable (see photo). A wonderful experience!!

On one day, driving and roadbuilding as we went along the Outalpa boundary, we crested one very steep section of track to have a great plain displayed below us. In the middle of this plain was a very large whirly-whirly about 150m across rising to perhaps 400m and rotating rapidly. In this column were three wedge-tailed eagles swirling, swooping and diving at each other seemingly in high speed play. It only lasted a few minutes before the whirly subsided but it was an absolutely magical "Nature Moment" to add to the mental collection.

Ben was also keen to record any *Codonocarpus pyramidalis* trees that we could find and following clues provided by Peter Watkins we were able to record quite a few, often growing in bizarre places including two right on top of Porcupine Hill which could have been planted deliberately to act as AFL goalposts miles from anywhere. Would have been an interesting footy match.!

Thanks Ben, it was a fabulous experience!!

trentasaurus@bigpond.com

Nominations are open for positions on the SEG Committee. Nominations forms can be obtained from the Secretary and should be received by the Secretary at least one month before the AGM.

MINNAWARRA BIODIVERSITY SPRING SURVEY DATE FOR 2019

Saturday 28th September to Wednesday 2nd October 2019, in school holidays.

Come for half a day, one day or several days.

Minnawarra is situated on the southern Fleurieu Peninsula

For further information and registration forms, contact:

Janet Furler on 0419 842 667 or thefurlers@gmail.com

Richard Willing on 0408 807 517 or rwilling01@gmail.com

SCIENTIFIC EXPEDITION GROUP INC.

APPLICATION FOR MEMBERSHIP AND MEMBERSHIP RENEWAL for 2018 —19

Membership is open to any persons, family or organisation interested in the following aims:

* The promotion and running of expeditions of a scientific, cultural and adventurous nature.
* The furthering of knowledge, understanding and appreciation of the natural environment.
* Promotion of the values and philosophy of wilderness.
* Enabling people to learn the skills required for planning and running expeditions, and to develop sound field techniques

SUBSCRIPTION RATES

Adult member - - - - - - - - - - - - - - - - - - $35.00
Concession cards/ student - - - - - - - - - $15.00
Family or Corporate membership - - - - $40.00

HARD COPY SEGments:- If you like to receive a hard copy through Australia Post of our quarterly journal – SEGments, please include in your payment an additional $30.00 for a SEGments subscription. All members will receive an electronic copy by email.

Name. . . . . .

Address . . . . . .

. . . .

Telephone (H) . . . . . (W) . . . . . .

E-mail . . . . . .

Details of scientific, cultural, and adventuring or other relevant skill or interests you may be prepared to share with the group:

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ELECTRONIC PAYMENT

If you have access to the internet, payment can be made using SEG's bank account at Bank of South Australia, details as follows:
Acc Name: Scientific Expedition Group Inc.
BSB: 105-086 Acc No.: 330629440

Please use your last name if possible to identify your payment **AND** also advise us by email that you have made a payment to our bank account via email to – gdoats@bigpond.net.au

PLEASE NOTIFY ANY CHANGE OF POSTAL OR ELECTRONIC ADDRESS

Or send a cheque payable to Scientific Expedition Group Inc. with a photocopy of this page to:

The Secretary
Scientific Expedition Group Inc.
P.O. Box 501
Unley S.A. 5061

EXPEDITION INNES – SOUTHERN YORKE PENINSULA

SEG will be involved with base-line data collection for the proposed Great Southern Ark Project for the re-wilding of Southern Yorke Peninsula.

The Great Southern Ark Project has evolved from ten years of Community Action Planning and substantial community engagement. The purpose of the project is to develop a safe-haven for Australia's most threatened species, restore habitat and improve agricultural productivity. Reintroduction of key native species is the key to managing the iconic vegetation of southern Yorke Peninsula. These species will reinstate the necessary ecological processes to maintain the condition of bushland.

Over the next 20 years, the project seeks to reintroduce two soil engineers, the Woylie (Brush-tailed Bettong) and the Southern Brown Bandicoot to breathe new life into the region's native vegetation by improving nutrient turnover and water infiltration within soils, and create the right conditions for native plant seedlings to become established. Reintroducing the Red-tailed Phascogale will help to manage mouse populations in native vegetation, and the Western Quoll will help to manage rabbit populations. The project also aims to augment the Peninsula's population of Barn Owls to manage mice across farmlands.

To enable species reintroductions, the ongoing control of feral predators (foxes and cats) is required. To maximize the cost efficiency of the predator management program, strategic fencing will be constructed across the Peninsula to limit reinvasion by foxes and cats.

Woylie (*Bettongia penicillata*)

The proposed dates for the expedition are 27th October to 9th November 2019. This expedition promises to be interesting, and will be closer to Adelaide than previous expeditions.

Keep the dates free. More details to follow.