



# SEGments



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# Scientific Expedition Group Inc.

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**Cover Photo:** Coastline of Innes National Park.  
Photograph Greg Johnston

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.

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## EDITORIAL

Travel can be mind expanding and there are some places, once very much off-limits for Western Tourism during the Cold-War that have now opened for tourists providing amazing travel experiences. The Kamchatka Peninsula in Russia is one such place.

Kathleen and I have recently returned from a holiday in Kamchatka. Where, you ask? Most people haven't heard of it and that is what makes it so special.

The Kamchatka Peninsula extends south and west from the far eastern end of Siberia. It is on the Pacific Rim of Fire with over 90 volcanoes, at least 34 being classified as active. Although the Peninsula is part of Russia, the locals say they are “going to the mainland” when they travel to other parts of Russia, as there are no roads which go to the rest of the country. There are also very few roads on the Peninsula away from the main towns. All transport to other parts of Russia and to other countries is by aeroplane or ship from the main city Petropavlovsk.

From a tourists' point of view it is a great place to visit because there are not many other tourists,

which perhaps sounds selfish, but it is better not to be shuffling along in a queue waiting to look at things.

Tourism in Kamchatka, not surprisingly, is nature-based. In ten days we bushwalked, climbed into a volcano, fished, rafted and observed wildlife. Transport to tourism sites is by ex-Russian Defence force MI-8 cargo helicopters converted for passengers, sometimes with rows of seats and sometimes with a bench seat down each side and cargo in the middle. We were routinely supplied with ear muffs.

In Kronotsky Reserve about 170 km north of Petropavlovsk we saw an extensive geyser field and dropped into a volcanic caldera. Nearer Petropavlovsk we went into Nalychchevo Park where we stayed for a few days and walked through birch forests and tundra and bathed in thermal pools, carefully choosing a part which was at an acceptable temperature. Twice when we were walking we came upon brown bears grazing on berries on the tundra. They ignored us and continued grazing.

Down at the south western end of the peninsula we visited Kuril Lake and saw large numbers of brown bears fishing for salmon in a river flowing into the lake. On another river flowing out from the lake, we saw salmon counting equipment which was used to restrict commercial and recreational fishing until 1.7 million salmon had entered the lake, when the river could then be opened.

On another day we rafted down a swiftly flowing river with fantastic scenery around us fishing as we went. One sockeye salmon plus a number of smaller fish were caught.

On a boat trip out into the Pacific Ocean we saw spotted seals, orca and humpback whales, whilst in a bay a diver collected sea urchins while we fished for flounder. We had quite a seafood feast that day.

Perhaps the piece-de-resistance was a drive south to the Mutnorsky Volcano area about 3 hours south of Petropavlovsk. Before we walked into the active volcano we stopped at a lookout from which we could see five volcanoes. Very spectacular! Our walk into Mutnorsky Volcano involved walking across a snowfield, over a moraine and up a glacier extending out of the volcano. Once inside we climbed up to the fumarole field. Inside, the volcano the walls were multi-coloured with a range of different minerals.

We were warned that it would be good if we liked salmon on the tour. It was lucky that we did because we sometimes had salmon for three meals in a day.

Kamchatka is a great place to visit and in this day and age one that is not overrun by tourists.

Alun Thomas

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# RFID in WILDLIFE – Part 2

## Dr Doug Black

In the first part of RFID in Wildlife we discussed the RFID technology and its various components, the reason for using RFID in wildlife research and how it differs from GPS tracking technology. In this second part, we will look at some of the newer advances in RFID technology and remote monitoring systems for wildlife. We will also highlight some examples of RFID equipment that we have designed for various wildlife projects in Australia in recent years.

### New Advances in RFID Technology

Although everyone would like us to produce a microchip that could be read from tens of metres away (“I wonder if that falcon perched 25 metres up in that tree is the one I released last year?”) this is still not achievable. And, given the size of the transponders and the nature of the low frequency RFID technology, it is unfortunately not likely to ever be achievable.

However, we have made many advances in the last few years that make RFID an even more useful tool than it already was.

#### 1. Transponder Size

The standard implantable RFID transponders such as those that are commonly used in companion animals are approximately 11mm long and 2 to 2.5mm diameter but now we have transponders that are much smaller such as the Trovan Unique Midi-Chip (8mm x 1.4mm). The implanting needle for the Midi-Chip is obviously also substantially smaller than the needle used to implant the standard-sized transponders and this makes them ideal for the identification of very small birds, reptiles, microbats, frogs and small or young mammals....animals that we weren't previously able to identify by microchip.



Trovan Unique ID100 microchip and Trovan Unique Midi-Chip

Not all transponders can be read by all readers and it is important to consider this before making a choice of which transponder to use.

#### 2. Hand Held Reader Features

Hand held RFID readers have become smaller and lighter over the years and many are now powered by standard AA or 9v alkaline batteries. Some readers are read-only readers with no capacity for storing scanned identification codes, whereas others have RS232, USB, Bluetooth or WiFi connectivity allowing you to connect to a computer and transfer stored read data from the reader to your laptop, desktop, computer or PDA. Some of the Trovan

hand held readers have a unique feature, a custom coding function! This allows you to assign custom codes for each transponder so that when your reader scans the transponder it will display a code that allows you to better identify the animal without going to a computer. It does nothing to the code of the transponder and the standard RFID code will be displayed in the normal format if scanned by another reader. The custom coding is limited to a 30 alpha-numeric code. So, instead of 000876D6G, it could display a code that either matches your current i/d system or uses something like:

LCH012MFT1009ZLC0911XCFREE – *Litoria chloris* (Red-eyed Tree Frog), No.012, Male, First tagged & released October 2009 Area Z, Last caught September 2011 in Area X and was Chytrid free.

You just change the codes and transfer them to the reader while the computer is “connected” to the reader and then go into the field and read each animal to verify its identity, correct location, current status etc.

#### 3. New Remote Monitoring System Features

##### Optical Beam Sensors

a) Single Optical Beam Sensor (transmit and receive units) – This sensor is used to conserve battery power. When sensors are used the antenna always stays in “sleep” mode until the beam between the sensors is broken. When the beam is broken the antenna turns on for a fixed amount of time and then turns off (can be changed via the software). This is very useful in applications where the batteries cannot be charged on a regular basis, in areas where solar panels cannot be used effectively or in high power consumption units.

b) Double Optical Beam Sensors (two pairs of transmit and receive units) - Two sets of sensors can be used to determine the direction of animals generating In/Out data. The sensors are positioned on each side of the antenna and, depending on which sensor beam is broken first, the corresponding direction is then added to the identification/day date/time record. This method also helps in conserving battery power since the antenna is only turned on when either sensor beam is broken.

##### Modems

Identification, day, date and time data recorded and stored in the decoder can be transmitted from remote locations to a researcher via GPRS or 3G mobile phone network modems. The modems can be programmed to transmit data whenever a “read” is detected or at set times each day, week or month.

##### Weigh Scales

The Trovan LID608 decoder can be linked to weigh scales with serial output capability to then allow recording of not only the identification code of the animal, the day, date





Single optical beam sensors (arrowed) sited either side of a Trovan flat panel square antenna on a rope bridge used for monitoring possums and gliders crossing the Hume Highway

antenna detects that animal passing through, then the relay can be triggered and the “door” is closed behind it!

#### Scheduler Software

Software is also now available to allow the user to program in the times on each day that the remote monitoring system is to be turned on. This can be a great power-saving feature especially for monitoring diurnal or nocturnal species.

#### Examples of Projects

Along with the number of projects referred to above, Microchips Australia have supplied RFID transponders, hand-held readers and remote monitoring systems to a large number of projects involving a wide range of species including many threatened and endangered species. To list all of these would be very difficult but they include Northern and Southern Hairy-Nosed Wombats, Tasmanian Devils, Saltwater Crocodiles, Leadbeater’s Possums, native Frogs, Skinks, Turtles



“In-Out” optical beam sensors on a Trovan circular 50mm diameter antenna used to monitor Leadbeater’s Possums in and out of an artificial fire-proof nest box



Leadbeater’s Possum

and time that the animal passed over, next to or through the antenna, but also the weight of the animal at that time! To allow the decoder to communicate with the weigh scales requires a significant amount of software programming but Microchips Australia have now established a large range of weigh scales where this communication has been already established. These scales range from 500 gm maximum (with 0.1 gm resolution) up to 500 kg maximum.

#### Relay Systems

It is now possible to provide systems that provide linkage software for the decoder to communicate with a relay system. This allows certain mechanical actions such as the closing of a door or gate, the opening of a feeder, the turning on of a light etc to occur when a particular microchip number/ animal is detected. So, after entering in the microchip number of an animal that you want to capture and examine, if the



4G mobile phone network modems are used to transmit data from these rope bridge monitoring systems on the Hume Highway in NSW to researchers in Melbourne

and snakes, a wide range of Macropods (from Red Kangaroos to Bettongs) and Marsupials (from Koalas to Antechinus), various Fish species, Sharks, Dugongs and a huge range of Birds (from Ostriches and Emus, Birds of Prey, Penguins to Helmeted Honeyeaters).

I hope that this two-part article has highlighted the value of RFID in wildlife monitoring and research. RFID allows the ability of the researcher 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 information can then help us to understand more about the plight of and challenges being faced by our precious wildlife. Then, in turn, we can hopefully make better decisions in our conservation efforts and RFID can again allow us to more precisely monitor the results of those decisions.

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Here are some more photos of these RFID systems in action



Blue penguin monitoring in New Zealand



Semi-submerged large “pipe” antennas to monitor platypus in a stream in Tasmania

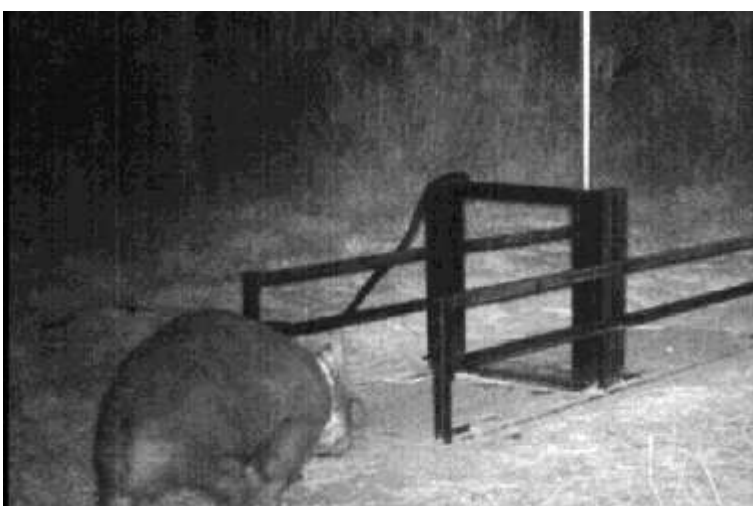
Photo courtesy of Dr James Macgregor



Scanning an immature Port Jackson Shark  
Photo courtesy of Behaviour Ecology and Evolution of Fishes (BEEF) Laboratory, Macquarie University, NSW



Microchipping a Green Tree Frog  
Photo courtesy Dr Robert Johnson



A Northern Hairy-Nosed Wombat approaching a Trovan 500mm square antenna linked to a weigh scale platform in Queensland

**SEG is very grateful to our corporate sponsor  
Microchips Australia for its support to the  
Minnawarra project.**





Photo: Annette Vincent

## IMPROVING OUR KNOWLEDGE OF BIODIVERSITY RESOURCES WITHIN THE COONGIE LAKES RAMSAR SITE

### Cat Lynch – Natural Resources, SA Arid Lands

The Coongie Lakes RAMSAR site is situated in the north-east of South Australia, and is listed as a 'wetland of international importance' through an international agreement, signed by the Australian Government. The agreement aims to protect the wetlands and associated natural values of an area that encompasses most of the wetlands associated with the Cooper Creek in South Australia.

The area is listed for its outstanding ecological processes, status as an unregulated natural water system, and its migratory birds, waterfowl and fish diversity. The area supports dryland dunefield and gibber plain habitats also known to support threatened species listed under Federal and State environmental legislation.

The South Australian Arid Lands (SAAL) NRM Board successfully tendered for funding under the Australian Government's National Landcare Program to deliver a project aimed at maintaining the values and improving the ecological function of the Coongie Lakes RAMSAR wetlands.

To protect and maintain the Coongie Lakes RAMSAR values, it is critical to manage threats from land uses and development that are incompatible with the RAMSAR listing because they could alter water flows and cause downstream pollution. Other threats to the ecological integrity of the system that supports the fish, birds and other species of conservation significance include invasive species such as feral pigs and other feral herbivores, livestock and weeds, all of which have the capacity to alter the structure and function of wetland communities.

The funding received for this project will enable the SAAL NRM Board to assess impacts from exploration track and infrastructure development on surface flows and vegetation, work to control pest animals and plants and assess their impacts on the system's natural values. It also supports a strategic adaptive management planning approach through the Lake Eyre Basin Partnership. The funding will also allow us to improve our understanding of the extent and condition of the region's natural values through carrying out biological surveys across the project area.

The first biological survey undertaken as part of this project was carried out in May 2019 and was based near Innamincka. A hardy troop of SEG volunteers and taxonomic experts split into two separate teams and assisted SAAL staff Cat Lynch and Rob Brandle to install 16 survey sites, in a variety of habitats including sand dune, floodplain, gibber plain, interdune swale, and swamp. Each site comprised two lines of six pitfall traps, 30 Elliott traps, four funnel traps, and four cage traps. Unfortunately most of the sites required digging with jack-hammers and by the end of the second day once all the sites had been installed everyone was well and truly exhausted. The great effort and teamwork of everyone involved was very much appreciated, and of course meant we could sit back and wait to see what critters turned up.

A total of 114 animals, excluding invertebrates, were captured across the 16 trapping sites (26 reptile, 10 native and 4 feral mammal and 1 frog species), with the dune habitats providing the majority of captures. Five mammal species were captured in pit traps – 4 carnivorous marsupials and 1 native rodent, with 2 bat species being trapped in harp traps. Reptile diversity was higher, with 21 different species being trapped and a further 5 hand caught or observed. These ranged from skinks and dragons to geckos and snakes. The most common reptile species captured were the Eyrean Ctenotus (*Ctenotus taeniatus*) and Painted Dragon (*Ctenophorus pictus*). Another three reptile species were found by searching under rocks and leaf litter, including the striking Red-naped Snake (*Furina diadema*) and Eastern Tree Dotted-lia (*Gehyra versicolor*). There were also several captures of Sudell's Frog (*Neobatrachus sudellae*) (see photo).

Vegetation surveys were also undertaken at each site, with a list of flora species and their relative abundance and cover recorded for each site. A small amount of rainfall prior to the survey provided some relief from the previously very dry conditions, with excellent cover of plants on the dunes and plains, and many ephemeral grasses and shrubs having germinated recently. Around 200 different plant species were recorded across the project area. Bird surveys were also undertaken at each site but, unfortunately for the



Stripe-faced dunnart *Sminthopsis macroura*

ornithologists, bird diversity and abundance was relatively low for this survey given the extended dry conditions prior to the survey. A total of 72 bird species were recorded across the project area, with the most common species including Willie Wagtails, Australian Ravens, Crimson Chats and Zebra Finches. Small numbers of the attractive Blue-winged Parrot,

listed as vulnerable in SA, were also found across the project area.

Another biological survey of sites inside and outside the Malkumba-Coongie Lakes National Park is planned for September 2019, as well as further surveys each year in other locations across the project area. This will provide us with invaluable information on the current condition of biological resources within the Coongie Lakes RAMSAR site and the effectiveness of management activities.

Without SEG's involvement this study would not have been possible so we thank everybody for their assistance and enthusiasm.

Catherine.Lynch@sa.gov.au  
Photographs Cat Lynch



Sudell's Frog *Neobatrachus sudellae*



Setting up a trapline in gibber desert



## ANIMALS TRAPPED OR CAUGHT ON THE INNAMINCKA SURVEY

Species	Common name	CUL sites	MUD sites	Oppor-tune
<b>Amphibian</b>				
<i>Neobatrachus sudellae</i>	Sudell's Frog	16	32	0
<b>Mammal</b>				
<i>Bos taurus</i>	Cattle (European Cattle)	0	3	0
<i>Camelus dromedarius</i>	One-humped Camel (Dromedary, Arabian	1	0	1
<i>Canis lupus dingo</i>	Dingo	1	1	2
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	0	1	0
<i>Equus caballus</i>	Horse (Brumby)	2	2	1
<i>Felis catus</i>	Domestic Cat (Feral Cat)	0	2	0
<i>Macropus rufus</i>	Red Kangaroo	2	0	0
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat	2	1	0
<i>Planigale gilesi</i>	Giles' Planigale (Paucident Planigale)	0	1	0
<i>Planigale ingrami</i>	Long-tailed Planigale	2	1	0
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	2	5	0
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart	0	4	0
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	10	1	0
<i>Tadarida sp.</i>		0	1	0
	<b># species</b>	<b>8</b>	<b>12</b>	<b>3</b>
<b>Reptile</b>				
<i>Ctenophorus fordi</i>	Mallee Dragon	2	0	0
<i>Ctenophorus isolepis</i>	Military Dragon	0	1	0
<i>Ctenophorus nuchalis</i>	Central Netted Dragon	1	0	0
<i>Ctenophorus pictus</i>	Painted Dragon	7	4	0
<i>Ctenotus inornatus</i>	Brown Ctenotus	0	1	0
<i>Ctenotus leae</i>	Centralian Coppertail	0	1	0
<i>Ctenotus regius</i>	Eastern Desert Ctenotus	1	6	0
<i>Ctenotus schomburgkii</i>	Sandplain Ctenotus	2	2	0
<i>Ctenotus strauchii</i>	Short-legged Ctenotus	2	0	0
<i>Ctenotus taeniatus</i>	Eyrean Ctenotus	5	10	0
<i>Diplodactylus laevis</i>	Desert Fat-tailed Gecko	2	2	0
<i>Diporiphora winneckeii</i>	Canegrass Dragon	2	2	0
<i>Emydura macquarii</i>	Macquarie River Turtle	0	0	5
<i>Eremiascincus phantasmus</i>	Ghost Skink	1	1	0
<i>Furina diadema</i>	Red-naped Snake	0	0	1
<i>Gehyra versicolor</i>	Eastern Tree Dtella	0	6	4
<i>Heteronotia binoei</i>	Bynoe's Gecko	1	2	0
<i>Lerista aericeps</i>	Yellow-tailed Slider	0	0	1
<i>Lerista labialis</i>	Eastern Two-toed Slider	2	1	0
<i>Lucasium stenodactylum</i>	Sandplain Gecko	0	1	0
<i>Menetia greyii</i>	Dwarf Skink	3	0	0
<i>Nephrurus levis</i>	Common Knob-tailed Gecko	0	2	0
<i>Pogona vitticeps</i>	Central Bearded Dragon	1	0	0
<i>Pseudechis australis</i>	Mulga Snake	1	0	0
<i>Pseudonaja modesta</i>	Five-ringed Snake	0	1	0
	<b># species</b>	<b>16</b>	<b>18</b>	<b>4</b>

# THE IMPORTANCE OF INSECTS – INNAMINCKA BIOLOGICAL SURVEY

## Annette Vincent

Insects have no backbone, just a hard outer exoskeleton. They are the base of the food chain; if there were no insects many other plants and animals would soon become extinct. Many of our agricultural crops and other plants depend on insects for pollination, and it was reported recently that almond trees will require a lot more beehives to pollinate this year's crop.

Australia has a very diverse number of ant species, many of which are very flexible and tolerant of climate variability. This diversity means that Australia is often regarded as the "ant capital" of the world. Ants are our rubbish collectors, they till the soil, and they also provide food for lizards and other insects and organisms. Ants are also important pollinators for some species of plants, and they play an important role in seed dispersal and germination. Many species of ants have yet to be named, but very little time or effort is spent on collecting and learning about them.

Insects are the forgotten part of so many biodiversity surveys. Ants in particular, are much smaller than birds and mammals and are therefore not as 'sexy' from an environmental viewpoint. It takes a lot more time, equipment, and effort to identify and classify them into Family, Sub-family and Genera. There are very few people who have the knowledge to identify ants to species level.

To process the insects collected on a biological survey, a binocular microscope is required, together with glass vials, and a supply of 95% ethanol for DNA testing, labels and a lot of patience. An insect without a label is useless. For the SA Museum collection, the label must record, date, place, GPS, soil type, vegetation, and the name of the collector.

On SEG's recent Innamincka survey in May 2019, two teams (Team 1-Cullyamurra (INNCUL) and Team 2-Mudera Cooter (INNMUD) separated by about 20 km) installed a total of 16 survey sites, each with two lines of 6 pitfalls (macropits).



An ant of the *Iridomyrmex* genus mounted for study

Alongside each of the macropits, about 2m away, the smaller insect micropits were put in (12 per site: a total of 192 micropits). Insects were also collected from the macropits.

What happens to the insects that were collected during the Innamincka survey? Each micropit is emptied through a very fine sieve and the contents are tipped on to a shallow dish for sorting. The specimens are sorted first into size under the binocular microscope and then into Order (*Formicidae* for ants). The specimens from each micropit are counted and recorded in a workbook before they are placed into individual vials, one vial for each genus of ant. All the *Collembola* (springtails) go into one vial per site. Thus 16 vials are passed onto Mark Stevens (Head of Entomology at the SA Museum) to identify. The "other invertebrates" (everything except the ants and springtails) are sorted into their common name and similarly recorded. There will be a number of vials for each site, for example: 17 vials for a site with 10 for genera of ants, 1 for *Collembola*, and 6 for the "other invertebrates".

Each individual ant is studied using the binocular microscope in order to identify it to genus level. This requires that the ant be manipulated under the microscope so that all external features are visible, sometimes the ant is held in a slit in a piece of sponge. It may need to be mounted. This is done by putting a pin through a small triangular piece of cardboard, then pushing the pin into a piece of cork or blue-tack to give one something to hold. Just the tip of the cardboard is dipped into a small drop of PVC glue and the ant is carefully threaded through the legs onto the tip of the cardboard triangle. Traditionally the head is facing to the left.

The numbers and types of specimens taken from each micropit, and previously logged in the workbook, are entered into the computer: for *Formicidae* the genera of each ant; for *Collembola* the description; and for "other invertebrates" the common name. When total numbers from the 12 micropits for each survey site are entered into the computer (for Innamincka, a survey site has two lines each with 6 micropits), a summary table is generated.

As an example the Table on the next page shows the summary data for each site for ants captured during the first week of SEG's Witchelina 2015 Survey based at Pug Hut. Further data analysis is done and presented as a Report which was published in the South Australian Naturalist. Descriptions of landform and vegetation for each site are included in the Report as well as pen and ink drawings that were sketched on site and finished later. A copy of each report which is published is lodged with the Scientific Expedition Group and is on the SEG website, with an acknowledgement to the publishers, South Australian Naturalist.

Some interesting results from the Innamincka survey include two genera that I have seen only once before.

*Leptogenys* and *Odontomachus* were found at one site each. The only other time that I have come across these genera was on the 2009 SEG Arkaroola survey; *Leptogenys* was found in the micropits and *Odontomachus* was found opportunistically.

On the Innamincka survey a total of over 8900 specimens were collected in the micropits, 2545 were collected from the INNCUL sites: 52.32% *Formicidae* (11 genera present, with at least 35 morpho-species), 40.65% other invertebrates (18 common names) and 7.03% *Collembola* (9 descriptive morpho-species). The INNEMUD sites had over 5300 specimens collected in the micropits (approx. 4500 specimens from one site, with 4,400 specimens filling up the 8<sup>th</sup> micropit (maybe it was near a nest!), 84.28% *Formicidae* (12 genera, and possibly 40 morpho-species), 12.46% other invertebrates (17 common names) and 3.66% *Collembola* (8 descriptions).

Invertebrates were also collected as “opportunistic” during the time of the survey, 665 specimens. The majority of the opportunistic were other invertebrates, over 400 (61.4%). Some of these specimens were fascinating. The *Formicidae* specimens numbered over 250 (38.5% of the opportunistic collection). For the mathematicians amongst you, a total of over 9600 invertebrate specimens were collected from the Innamincka Regional Reserve Survey during May 2019.

A big Thank You to all those who helped collect the invertebrates, and especially to Andrew Barr for his time and energy to put Team-2 micropits into the ground. It’s like planting 96 seedlings, hard on the hands and back and worse if it is rocky ground. Thank you to those who helped to carefully sort and collect insects from the micropits. We have some wonderful “beetles”. My workbook descriptions are “big

black”, “rhino”, “dinosaur”, “pie dish”, “sun hat”, but in the official report they are just - Beetles.

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Some of the beetles collected around Innamincka. Top, a weevil species and bottom, a pie dish species.

Week 1	PUG	PU	PU	PU	PUG	PU	PUG	PUG	Total	%	Sites
<i>FORMICIDAE</i>	01	G02	G03	G04	05	G06	07	14			
Genera											
<i>Camponotus</i>	49				1			1	51	2.78	3
<i>Doleromyrma</i>	13							1	14	0.76	2
<i>Iridomyrmex</i>	15	13	26	24	110	15	330	873	1406	76.58	8
<i>Melophorus</i>	5	1		1	13	1	14	20	55	3.00	7
<i>Meranoplus</i>				1	2	4			7	0.38	3
<i>Monomorium</i>	17	55	3	1	32	3	58	32	201	10.95	8
<i>Pheidole</i>	2		2	13	4	1	4	15	41	2.23	7
<i>Ponera</i>					1				1	0.05	1
<i>Rhytidoponera</i>	17	1	3	10	3	3	3	6	46	2.51	8
<i>Tetramorium</i>	3	3			2			6	14	0.76	4
Total No.	121	73	34	50	168	27	409	954	1836		
No. of Genera	8	5	5	6	9	6	5	8	10		

TABLE Summary of ant genera collected in micro-pits at sites during Week 1 at Pug Hut on Witchelina



## EXPEDITION INNES - SOUTHERN YORKE PENINSULA

Associate Professor Greg Johnston



Yorke Peninsula will be the home of a rewilding project, named the 'Great Southern Ark', aimed at reinstating natural ecological processes. Rewilding is an approach to restoration ecology that uses control of feral pest species and reintroduction of locally extinct species for conservation and the benefit of human society. Humans are part of nature. The idea behind rewilding is that because we have lost so many species and the ecological relationships between them are so degraded, human endeavour is being limited. For example, insects have declined globally as a result of human activity, leading to a reduction in pollination of plants that is (at least partially) behind a decline in the health of natural vegetation and productivity of agricultural crops.

There are now rewilding projects on most continents. Wolves have been reintroduced to Yellowstone National Park in North America and have reduced the number of elk grazing vegetation, allowing trees to recover from overgrazing. Beavers have been reintroduced to parts of Europe where their long-forgotten dams have now returned to the landscape and resulted in recovery of riverside vegetation. Large mammals are being returned to the steppes of Siberia and Canada to reduce forest encroachment that has caused the previously frozen tundra to thaw. Allowing the tundra to refreeze is expected to

reduce the amount of CO<sub>2</sub> entering the atmosphere and help reduce the rate of change in our climate.

On Yorke Peninsula fox-baiting has already reduced predation on lambs and seen a 30% increase in lambs being taken to market from the properties that have been involved. The reduction in fox abundance has also seen an increase in the number of endangered Heath Goannas detected. The Great Southern Ark will involve further fox and cat control over the coming 20 years, using a combination of barrier fences and aerial baiting. Native soil engineers (bettongs and bandicoots) will be reintroduced to improve soils. Native



Coastal mallee heath showing regrowth following a fire in 2013



Lichens on native pines in Innes National Park

rodents will be reintroduced to improve soil seed bank and vegetation regeneration. Native predators (red-tailed phascogale and western quoll) will be reintroduced to control introduced feral rodents (mice, rats and rabbits). These reintroductions will also help halt the loss of Australian native

mammals. Historically 80% of native mammals on Yorke Peninsula have become extinct on the peninsula.

This year's SEG expedition to Yorke Peninsula (27<sup>th</sup> October to 9<sup>th</sup> November) will be the first of several to help monitor changes in animals and plants in response to the Great Southern Ark rewilding project. Expeditioners will revisit previously established biological survey sites to document what changes have happened over the past few decades, for comparison with ecological recovery expected over the next twenty years due to the Great Southern Ark rewilding project. This involves SEG in a global restoration program that aims to help redress the damage we have done to nature, and re-engage people with the natural world, on which we rely.

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All photographs Greg Johnston



Remnant native vegetation in Warrenben Conservation Park on Yorke Peninsula. Stuart Pillman in photo.

## SEG SCIENCE TALK AND AGM— PUBLIC WELCOME

The Scientific Expedition Group Inc. Science Talk and Annual General Meeting will be held on:

**Date: 18 October 2019**

**Time: 7:30 pm**

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

**Speaker: Dr Greg Johnston "Pelicans Progress"**



# PHILANTHROPY: HOORAY FOR SEG SUPPORTERS, DONORS AND SPONSORS

## Dr Richard Willing, President SEG

The lifeblood of not-for-profit organisations is their volunteers and supporters. During the 35 years that SEG has been operating hundreds of volunteers have given thousand of hours of their time to keep it running and achieving its goals of scientific field work and care of the environment.

Donors have several ways that they can assist. The best way is through SEG's Gift Fund, known as the Scientific Expedition Foundation. All donations to this in excess of \$2 are tax deductible, and thousands of dollars have been donated over the years. These funds are used to purchase equipment and sponsor scholarships to graduates undertaking scientific field work for their Honours or Masters degrees. In addition to these gifts some have included bequests in their wills. Others have donated reference books or scientific equipment.

Sponsors are a vital part of SEG's working. The most regular being Blackwood Foodland which generously provides groceries at discounted prices for each annual expedition, when we "go bush." Many others have helped in providing logistics, assistance, fuel etc for individual expeditions. More recently Microchips Australia have become generous sponsors of SEG by providing microchips and ongoing support for the Minnawarra Biodiversity Surveys, which have now been running for nearly 20 years.

A recent generous donation to support the Minnawarra Biodiversity Project was made by Peter Reuter to cover the cost of a batch of microchips used during the survey last autumn. Peter has been a longstanding supporter of Minnawarra, often coming for a few days to help with surveys.

He was introduced to this long-term monitoring project by his son Andreas. Janet Furler's elder son Alex and Andreas were in primary school together many years ago and have kept in contact over the years – in fact the Reuter and Furler families have had a close relationship for many years. The spin-off for SEG is that we now have a valuable group of young adults, including Andreas and Alex, helping on surveys. They have extensive experience in animal handling including obtaining and recording scientific data, and micro-chipping animals before their release back into the wild. This makes the handling of recaptured animals quick, easy and less stressful because of the ease of identification.

So, there are many ways of helping SEG. Donations small or large are always welcome, but they can be targeted, like Peter's micro-chips. Would you care to donate something towards providing micro-chips for small mammals? We use up to \$1000 worth of chips each survey, every autumn and spring. They are giving us valuable insight into the long term patterns of animals' survival and effects of a changing climate. Would you care to donate a couple of thousand dollars to provide a scholarship for a science graduate? It could even bear your name as donor. A bequest to the Scientific Expedition Foundation in your will? Maybe a smaller gift to SEF would suit better. Talk to our Hon Treasurer Graeme Oats 0407 266 627 or contact him at [gdoats@bigpond.net.au](mailto:gdoats@bigpond.net.au) and join the ranks of SEG's generous supporters. [rwilling01@gmail.com](mailto:rwilling01@gmail.com)

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### ***Not "Terra Nullius"***

Since I was a child  
I could sense if something was different.  
I notice a small rock in the sand  
A different color from the other rocks.

I pick it up and it belongs in my hand  
Dark, blood red and smooth  
A sharp serrated edge  
It moulds between finger and thumb.

Where did it come from?  
What was it used for?  
Who made it?  
Am I holding a tool?

"I want to save the skin  
Give me my knife  
What? You lost it?"

Now, eons later, I find you  
I sense that you are different.

**Andrew Barr 2019**





# VGRaSP RAINFALL MONITORING – SEASONAL TRENDS

Graham Blair

## Seasonal rainfall trends

Large areas of Eastern Australia including the Northern Flinders Ranges are once again within the grip of severe drought. This has been confirmed by data collected from 9 rainfall monitoring sites that form part of SEG's Vulkathunha Gammon Ranges Scientific Project (VGRaSP). The monitoring sites geographically span a representative east-west cross-section of the Northern Flinders Ranges.

Using data collected over the life of the VGRaSP project (more than 30 years), for wet years highest rainfall exceeds 475 mm across all nine sites, while annual averages of rainfall over the 30 years are between 200 and 330 mm. This year rainfall collected from each of the 9 sites ranged between 66 and 110 mm. For most sites, the totals are the lowest on record.

The impact of the dry conditions was observed during the April 2019 maintenance trip. Many Eucalypts were showing signs of stress with dried and shedding leaves. More than usual numbers of dead kangaroos were seen near usually reliable, but now dried up water sources. Almost certainly, the extreme heat events experienced across Southern Australia during January were a contributing factor.

The current dry spell began abruptly in early 2017 following around 7 years of average or above average rainfall. While the duration of the previous drought (Millennium Drought) spanned around 7 years, the severity of the current

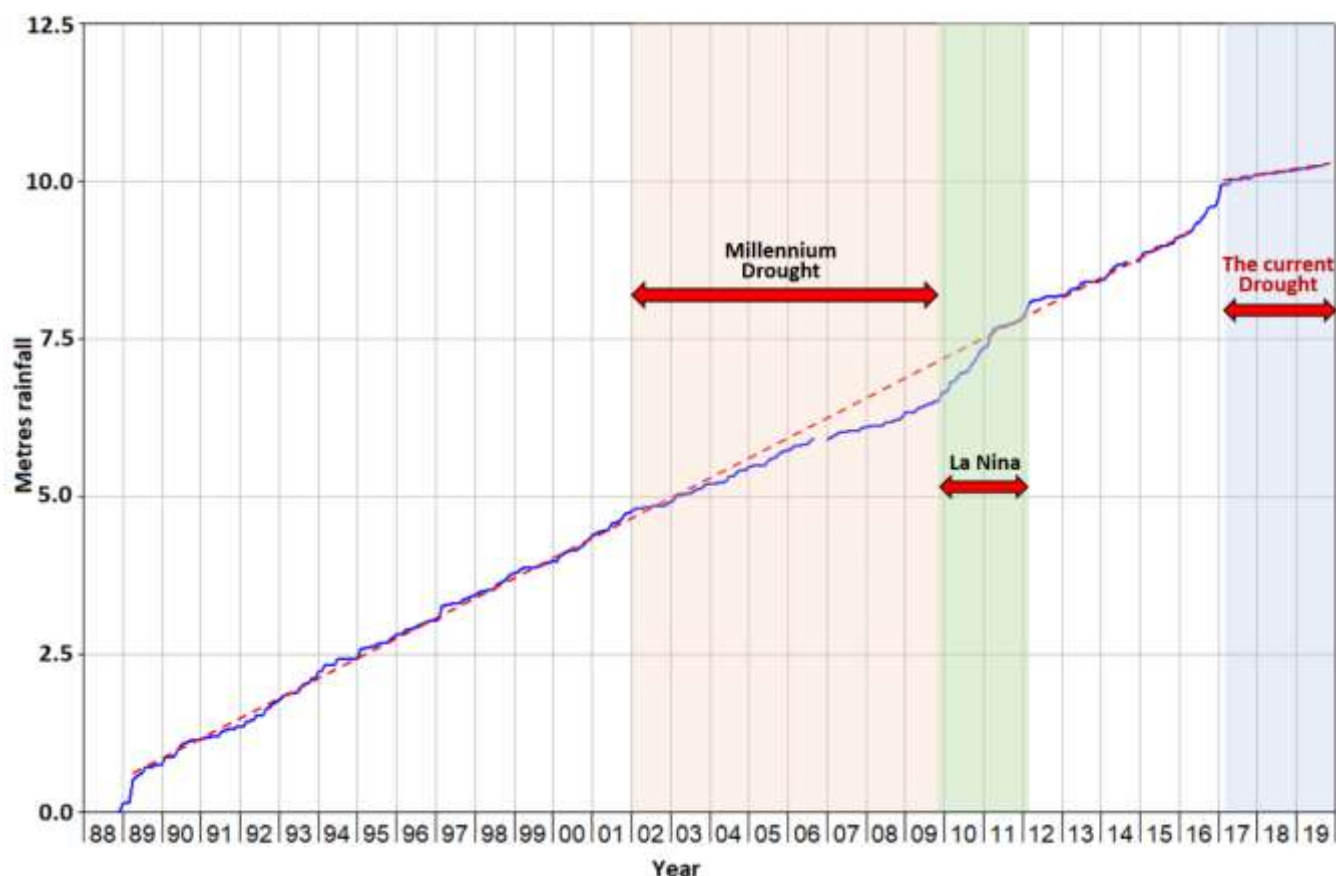
event appears to be more dramatic in terms of rapid onset and low annual totals.

With 30 years of rainfall recorded at some sites, enough data is available to get a picture of seasonal variation. The following graph shows continuously accumulated rainfall from the Gammon Plateau rain gauge. The slope of the trace indicates the rainfall trend. The Millennium Drought and the following La Nina event stand-out clearly. The current flattening trend since the wet start of 2017 signals a return to a period of below average rainfall.

## Equipment performance

The middle of this year (2019) marks the fifth anniversary since the upgrade of all data loggers within the monitoring network. The new generation data loggers have provided outstanding service, far exceeding the reliability experienced from the assortment of data loggers previously deployed over the project's 30-year history.

A very significant rainfall event occurred in January 2017 resulting in the highest flow recorded at the Arcoona Creek stream gauge since data logging commenced in 1993. It was pleasing to capture this significant event with reliable operation of equipment at all sites. Typically, during events like these, intense thunderstorm activity is present putting equipment at considerable risk. During a similar event in September 2014, lightning activity on the Plateau resulted in the electrical contacts of the Plateau rain gauge fusing



Gammon Plateau accumulated rainfall demonstrating seasonal variation over 30 years

together. Although this was promptly rectified the incident resulted in 5 weeks of record loss. Since that incident a lightning arrestor has been fitted to the Plateau rain gauge which should minimise the risk of future data loss through lightning activity.

Batteries used to power data loggers and telemetry, installed in 2014, have reached the recommended end of serviceable life and so they were replaced at all sites during the April 2019 maintenance trip. Without a planned replacement strategy, batteries left to run until failure result in loss of data.

### Ongoing Support

The viability of Citizen Science projects like VGRaSP depend largely on volunteer enthusiasm along with financial support from external parties who recognise its worth. Over the 30-year life of the project, there has never been a shortage of enthusiasm from volunteers. A rough estimate suggests more than two hundred people have taken part in expeditions, participating in various aspects of environmental data collection in this remote and rugged natural heritage of South Australia.

Over the years, the Department for Environment and Water (DEW) and the Bureau of Meteorology (BOM) have been noteworthy supporters making substantial contributions towards equipment. Of even greater significance however, both Departments have made provision for the data to be securely archived and published to the Web. Making the data publicly available gives the project relevance, particularly during an era when concern is rising over the impacts of drought and climate change.

Telemetry is available at most sites with data from 8 sites routinely uploaded at 3 hourly intervals to the DEW WaterConnect website. A copy is forwarded to BOM for publishing on their website, while a third copy is forwarded to the State Emergency Services FloodMon system used to manage flood events across South Australia.

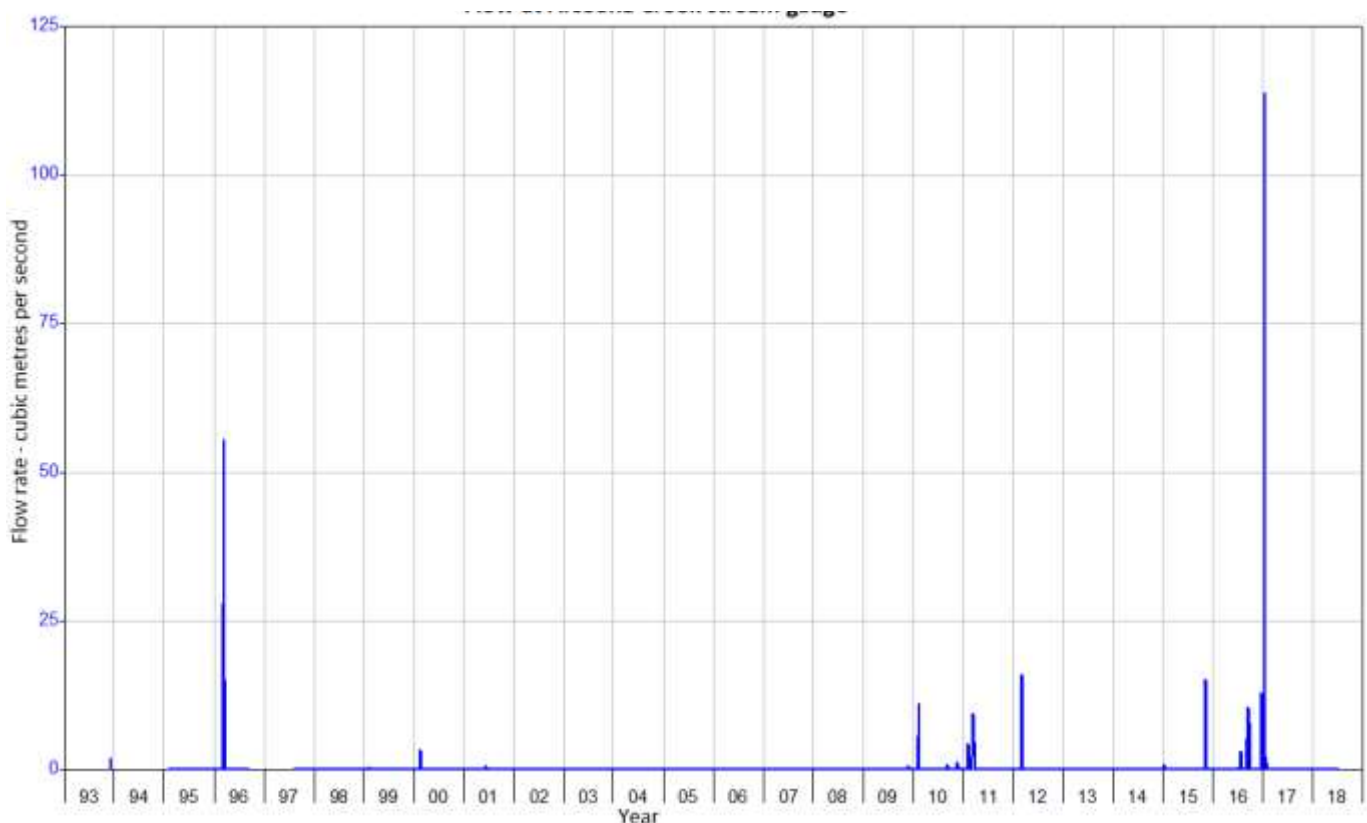
DEW is in the process of modernising telemetry, archiving and web publishing systems to improve public access to data collected by water monitoring programs. To ensure VGRaSP data loggers remain compatible with the new telemetry system, DEW have provided SEG with connectivity to the State Government private telemetry network and agreed to continue collection, archiving and publishing of VGRaSP data at no cost.

### The Future

SEG's Vulkathunha Gammon Ranges Scientific Project has reached a sweet spot in its 30-year history with enthusiasm from the volunteer base remaining strong. Equipment performance is excellent resulting in very low loss of record, with the record now reaching a length where seasonal patterns are becoming evident. Telemetry transmits data to essential services and the public in near-real-time. The data is securely archived and openly available for all to benefit.

Thirty years is a great achievement for a Citizen Science project. With continued enthusiasm and support it should persist for many years to come.

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Plot of flow history from Arcoona Creek stream gauge

# SCIENCE ALIVE! 2019

## John Love and Helen Johnson

In South Australia, National Science Week runs for the four weeks of August but in other States National Science Week runs for one week. As part of National Science Week in South Australia, Science Alive! the largest single interactive science exhibition in Australia has been running for over 20 years. For the past few years the Adelaide Showground has organised the event, but for many years prior to that Science Alive! was managed largely by Rona Sakko (Junior Field Naturalists) and Rob Morrison (The Curiosity Show and a Scientific Expedition Foundation Board member). The event features over 60 exhibitors, including South Australia's three Universities, Defence Industries (as major sponsors), many animal and environmental exhibits, space, astronomy and hands-on robotics displays, etc.

Events showcasing science in Adelaide and the Regions are presented in a booklet (also available online) which this year listed 45 public events about the environment and nature (of 108 events listed). On Saturday 10<sup>th</sup> August Dr Karl Kruschelnicki explained science to an audience of 1200 at the Adelaide Convention Centre. Even though outside the August date, details of Minnawarra's spring survey are included in the booklet.

Once again, SEG joined the Science Alive! fun at the Wayville Showgrounds on 2nd, 3rd and 4th August. Friday was the schools' day, this year called Stem Day Out. Ninety local schools participated with over 5,500 high school students attending. There seemed to be more young students than adolescents this year.



Annette Vincent preparing ant exhibits at Science Alive.

Our allotted space and facilities were adequate. Being over on the side away from the main entrance was no disadvantage – there was a fairly constant stream of visitors. Our basic display was much the same as last year: three long tables covered by black cloths laden with books and brochures and a laptop screen showing a podcast of some Minawarra activities; photos and other documents on the velcro-friendly black backing screen; SEG's four banners, and a card table converted to a model of pitfall trapline with Elliott and cage traps on and under it.

However, there were two star attractions. Annette Vincent invited people to look at ants through her binocular microscope and a desk-mounted powerful magnifying glass. Annette does not miss a chance to talk about her beloved ants.

Helen Owens brought a glass box about 40 cm high containing a tree (or part of a tree), a bowl of water maintaining humidity, and 4 green tree frogs. More exciting were several specimens of the 'spiny leaf insect', a strange-looking beast more or less resembling a thin witchetty grub with very long legs. Student reactions were interesting. Some recoiled while others were eager to pose for photos with an insect slowly climbing on their clothing. It is fairly likely that some students would remember getting up close and personal with an ant or a leaf insect while having no recollection of SEG. Well, one of SEG's aims is to encourage interest in natural history.

Saturday and Sunday are Public Days when excited children, mostly young, are accompanied by parents and grandparents. SEG's exhibit was a hit with the live animal displays enhanced on Saturday morning by Jewels, a spotted python, and Noodles, a woma python worn like scarves around the necks of their proud owners Tamika and Lily. SEG's young members certainly engaged the enthralled audience. We were joined by another of SEG's young members Joel, on Saturday afternoon. Tamika and Joel have been enthusiastic supporters of SEG since their expedition to Ikara-Flinders Ranges in 2018.

Leaf insects do not worry young children, and many thrust their hands forward to hold one. One parent asked whether the insect was a praying mantis, and his 7 year old son replied "Dad, it's a leaf insect. It's a phasmid!" It seems that Nature is a wonder to children and retirees, but during teenage years there is a pulling away, and in the middle years, perhaps life becomes too busy.

Our visitors mostly spent time with the live animals first, then queued to look at ants under Annette's binocular microscope, and finally asked what SEG does. At that stage we would explain the operation of the pitfall trap, show the map with SEG's expedition locations marked, suggest people use



their phones to record details of the upcoming Minnawarra survey and the Innes Expedition and finally hand them a SEG brochure. Several people bought copies of "The Wildlife of Greater Adelaide". All in all, the SEG exhibit was always a crowded space with visitors staying in excess of 10 minutes.

Annette, Jill and Helen manned the exhibit for multiple days and other SEG members willingly helped for a full day or half day session.

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kdolphin@internode.on.net



Annette Vincent, Helen Owens and Helen Johnson setting up the Science Alive! stand



Leafy Stick Insect shown at Science Alive

**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 2019**

**Saturday 28<sup>th</sup> September to Wednesday 2<sup>nd</sup> October 2019 during 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](mailto:thefurlers@gmail.com)

Richard Willing on 0408 807 517 or [rwilling01@gmail.com](mailto:rwilling01@gmail.com)



**SCIENTIFIC EXPEDITION GROUP INC.**  
**APPLICATION FOR MEMBERSHIP AND MEMBERSHIP**  
**RENEWAL for 2019 — 20**

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:

.....

.....

**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](mailto: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



## SCIENTIFIC EXPEDITION GROUP EXPEDITION SOUTHERN ARK

You are invited to join us on this year's Expedition to Southern Yorke Peninsula to undertake a baseline biological survey as a part of the Great Southern Ark Rewilding Project. This is a collaborative effort between a number of organisations seeking to improve the natural landscape of southern Yorke Peninsula and is an innovative approach to land management.

Over the next 15 - 20 years the Great Southern Ark project aims to reintroduce a carefully selected suite of native species to the area to foster the ongoing conservation of the district's unique environment and improve agricultural productivity.

During the next five years, the project anticipates the reintroduction of two native soil engineers –the woylie (*Bettongia penicillata*) and the southern brown bandicoot (*Isodon obesulus*). The reintroduction of these species will 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 establish. Small predators (Red-tailed Phascogales and Western Quolls) will be reintroduced at a later date to help control some of the smaller feral animal populations not necessarily affected by ongoing baiting programs for foxes and cats.

This is a great opportunity for people of all ages and expertise to observe and participate in professionally conducted field survey work with experienced biologists and natural historians. You won't need any special skills – just a love of exploring the bush and learning about it's many inhabitants in the magnificent coastal surrounds of Innes National Park.

**DATES:** - The Expedition departs early on the morning of Sunday 27th October 2019 and returns on Saturday 9th November 2019.

**ACCOMMODATION:** - On this survey we will be based at the Stenhouse Bay Community Centre with all the home comforts including kitchen, toilets, showers and a Ladies and a Gents bunkrooms, large lounge/dining area, veranda and gazebo. There is also a large grassed area with spectacular views for those who prefer to camp.

**COSTS:** - Total cost including food, transport and all activities is set at \$400 for members, \$450 for non-members and \$200 for students.

To register your interest, please phone Trent Porter on 0438827890 or e-mail to [trentasaurus@bigpond.com](mailto:trentasaurus@bigpond.com).

**PLEASE BE QUICK AS THIS ONE IS GOING TO FILL FAST**