



# SEGments



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# Scientific Expedition Group Inc.

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**Cover Photo:** Spider wasp attacks a huntsman spider. Photograph Nicholas Birks

**Back Cover Photo:** Pygmy Possum at Morella. Photograph Jill Tugwell

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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## GUEST EDITORIAL

### The Biggest Go First

The saying “it isn’t rocket science” is a common cliché in English to state, rather sarcastically, that something isn’t that difficult (with the implication that the person complaining about it, well, shouldn’t). But I really think we should change the saying to “it isn’t ecology”, for ecology is perhaps one of the most complex disciplines in science (whereas rocket science is just ‘complicated’). One of our main goals is to predict how ecosystems will respond to change, yet what we’re trying to simplify when predicting is the interactions of millions of species and individuals, all responding to each other and to their outside environment. It becomes quickly evident that we’re dealing with a system of chaos. Rocket science is following recipes in

comparison.

Because of this complexity, ecology is a discipline plagued by a lack of generalities. Few, if any, ecological laws exist. However, we do have an abundance of rules of thumb that mostly apply in most systems, such as the effect of [habitat patch size on species diversity](#), the [importance of predators for maintaining ecosystem stability](#), and that [low genetic diversity doesn’t exactly help your chances of persisting](#). Another big one is, of course, that in an era of rapid change, big things tend to (but not always — there’s that lovely complexity again) drop off the perch before smaller things do.

The prevailing wisdom is that big species have slower life history rates (reproduction, age at first breeding, growth, etc.), and so cannot replace themselves fast enough when the pace of their environment’s change is too high. Small, rapidly reproducing species, on the other hand, can compensate for higher mortality rates and hold on (better) through the disturbance. Ask any fisher about it. The first (and perhaps best) predictor of a problem in an exploited stock of fish is when the average size starts to drop. When you see the big ones become rarer, you know that your mortality source is picking off the big ones by preference. Usually this also means that the best reproducers are being taken out of the system, so recruitment goes down too. We’ve even seen [this effect in the world’s largest fish](#) — whale sharks. So how many readers up until now had ‘animals’ in the mind’s eye? Probably most of you. It turns out that plants, and in particular, trees, follow the same general rule. Specifically, a clever *Perspective* came out in the journal *Science* in 2012 by my good friend and colleague, Bill Laurance (along with David Lindenmayer and Jerry Franklin). Spawned by Bill’s article in *New Scientist* earlier that year, the *Perspective* [reported the nearly global trend of large trees disappearing](#) — from the jungles of the Amazon to the wet eucalypt forests of southern Australia.

Of course, selective logging has historically taken out the biggest trees first (much like fisheries have done to big fish), and from Bill’s earlier work we know that fragmentation hits big trees the hardest, but it’s actually more complex than that. As the climate warms, increasing frequencies of drought means that the big individuals have a hard time drawing the necessary volume of water up to their canopy leaves, giving rise to leaf loss and eventual death of the tree. Also, increasing invasion of things like opportunistic lianas and [lantanas](#) prevent recruitment of tree seedlings on the forest floor. Diseases are also hitting big trees the hardest, as are outbreaks of tree-eating insects like the [mountain pine beetle](#) in western North America. So, like the [Home Tree](#) of Pandora that succumbed to the greed of extra-planetary humans, the species depending on large trees the world over are also losing ground. If we lose the biggest of the forest, we’ll lose countless other species. This is just another sad chapter in the [synergistic loss of life](#) on Earth.

Professor Corey Bradshaw  
Matthew Flinders Fellow in Global Ecology,  
Flinders University

# COLLECTING SPIDERS WITH SEG AND MY CONTINUING FASCINATION

## Nicholas Birks

During the course of a biological survey of any group or family of organisms, the resulting specimens sighted or collected are influenced by a number of factors. Selection of survey sites is based on soil and vegetation type and physical features of the landscape. General seasonal conditions and the weather predicted at the time of the survey play a part; including temperature, wind velocity and rainfall.

All these conditions vary from year to year and day to day, and so it is difficult to use the information to prove that certain species are in decline or increasing, even with follow-up surveys. The collected fauna does prove that they are present at the time.

In the case of many invertebrates the number collected is boosted by a shower of rain overnight; so being dry or damp can lead to dramatically different results. It is exciting to have a new record for a region and even more exciting to discover a species new to science!

There is a Human factor that has an influence on the numbers of certain species collected during a survey. There may be an individual or group of people with a particular interest in a family or species who singlehandedly collect huge numbers of their chosen objective, and who may ignore or pass over many interesting specimens. I think I refer to myself!

Since the age of 8 years old I have been interested in trapdoor spiders. In particular, those species of trapdoor spiders found on the Adelaide Plains and in the Hills. I used to fill the pages of my school exercise books with detailed drawings of trapdoor spiders and their natural history. At the age of 12, I managed to stay up all night and watch as a trapdoor spider spun a cocoon and laid eggs in a test tube. The aim was to record how long the incubation period was. I was foiled by misfortune as the spider promptly consumed its freshly laid eggs.

Since that time I have witnessed a number of spiders laying eggs. Two of these were unusual: a St Andrews Cross Spider and a large Golden Orb Weaving Spider. Both laid eggs and then displayed the most unusual habit of chewing green vegetation to producing green silk with which they coated



Blakistonia trapdoor spider at entrance to burrow with a lid-like trapdoor. Olary SA.

their egg cases to camouflage them! Trapdoor Spiders lay eggs beneath the ground in their burrow and so have no need for cryptic colouration. Their egg case is white.

Very quickly I became interested in the behaviour of animals, and in particular trapdoor spider behaviour and survival. Trapdoor spiders use a burrow as a survival shelter against the elements: some species have lid-like trapdoors and some have open topped holes. Their burrows can vary from a few centimetres deep, to one metre deep. The deepest, used by the giant tarantula the Barking Spider *Selenotholus stirlingi*, is over one metre.

A number of species survive in a range of climates in South Australia; from the highest rainfall in the Adelaide Hills to the driest N-E desert. Their survival depends on the efficiency of their burrows. The female spiders are sedentary, and dispersing spiderlings do not travel great distances from their mothers' home. The young moult their exoskeleton (outer skin) as they grow, and also regularly ream out their burrow to a larger size as they grow. Females can live beyond 30 years, whereas males probably live about 5 or 6 years before maturity, when they then search for mates and often die shortly afterwards.



Misgolas female (left) eats male

Spiders are mid-way in the food chain so they eat other invertebrates as well as being eaten by them! Trapdoor spiders' main enemies are various parasitic wasps, centipedes, and scorpions. Birds and goannas eat lots of spiders. Scorpions have an unfair advantage with their long "reach". They can grasp a spider with their yabby-like claws, hold it at "arms length" and inject it with its tail sting. A species of spider wasp will entice a spider from its burrow and disable it with a sting, and then lay a single egg on its abdomen before sliding it back down the spider's burrow and shutting the lid. Many of the trapdoor species of the *Infraorder mygalomorphae* don't have lids so these are blocked with soil. The wasp larvae hatches and feeds on its paralysed host, leaving vital organs until last, so the host remains "fresh". Finally it pupates. Some months later the freshly hatched wasp tries to push open the trapdoor lid which has solidified

with time, and so will rarely open. The wasp chews a hole in the lid or digs out to escape and fly off to continue the cycle.

At various times when overnight rain falls after prolonged dry periods, male trapdoor spiders may migrate in amazing numbers across the landscape in both suburbia and the countryside. Before this emergence takes place, males at the stage of their penultimate moult, must undertake their final moult. On becoming mature the male's secondary sexual characteristics become evident. Their pedipalps become enlarged like boxing gloves. The newly formed pedipalps, which have complicated insemination devices, have to be charged with sperm. The spider spins a small mat of silk in his burrow on which he deposits sperm, and he charges his pedipalps from that supply. The spider then has to wait for the right conditions before venturing out to look for a mate. All male spiders have this indirect complicated method of fertilization. The palp design with its amazing variation is used to assist in identifying most species within a family of spiders.

The males of a number species of trapdoor spiders have amazing equipment that is used for defence against large and powerful females of their own species who are inclined to kill and eat them. Spiders in the family *Nemesiidae* have defensive devices in the form of sharp elongated spurs that allow them to restrain the female during mating. Spiders in the family *Idiopidae* have sets of spines (apophysis) on the tibia of their first pair of legs. During courtship a male will cautiously approach the female's burrow while tapping the ground with its front feet. The female often sits at the entrance ready to launch out to catch passing prey, however the male can detect her presence. The male is quite capable of



Black Ananias species showing mating spurs on second pair of legs. One type of defensive system.

flicking open the lid of a burrow and will often carefully descend in pursuit of the female as she retreats backwards down the burrow. She may then come forward moving the male back towards the surface while rearing up as if to strike. He then taps her legs and deftly slips his restraining devices (apophysis) over the tip of her fangs and locks them so she cannot bite. A very clever strategy! The male can now reach



*Aganippe substrictis* mating. Male (left) grips female's fangs with spines (apophysis) on his first pair of legs.

down to inseminate the female through her external genital structure, the epigynum. He uses one palp at a time and a few minutes later mating is complete. The male then retreats as he releases his grip on the female's fangs and moves some distance from the burrow before stopping to thoroughly clean the sensory areas of his front legs. This is often assisted by steady rain. The male then continues his search for females. I have followed individual males for some hours while they successfully mate with up to five females. At times there can be up to ten female nests in a square metre of native bush or parkland and at half of those nests spiders will be mating. In nature there are always more questions for us than answers. Why do many species of trapdoor spiders lack the protection of apophysis and special mating spurs without detriment to their ability to successfully reproduce

As one jets into Adelaide Airport over the suburbs one is aware of the huge number of private swimming pools. It turns out that these pools constitute massive pitfall traps, reminiscent of our little pitfalls on survey sites. Swimming pool owners are often amazed at the number of male trapdoor spiders that cover the bottom of their pools when conditions are right. The spiders have left their burrows with no intention of returning and have dispersed in all directions. Often there may be hundreds of spider burrows in lawns and gardens near a pool and many males fall in. Most species do not float, and sink to the bottom and drown. Not all are dead when fished out in a pool net. If thrown on the ground many will recover and are quite capable of biting some hours later. The spider is left for dead upside down, but will clamp on with its fangs if trodden on. Two years ago at Watervale, a man caught 900 male trapdoor spiders roaming his house and garden on one rainy night in April. These dispersals can be spectacular! On my farm at Willalooka I

collected 9 species of trapdoor spiders from my swimming pool over a 35 year period.

Most biological surveys last ten days or so and in that time we may go for a week with very few specimens caught in pitfall traps. It takes just one night of steady rain and the traps can overflow with invertebrates - in particular male trapdoor spiders!

Volunteer, Arachnid Department, S A Museum

Photos: Nicholas Birks Copyright 2017

sales@wildflight.com.au



A male mouse spider approaches a massive female in her burrow. He has no apophysis or tricks.



Misgolas trapdoor spider mating while pinning female's fangs

# ESTUARY CARE FOUNDATION SA

## Catherine McMahon

The Estuary Care Foundation SA was incorporated on September 1<sup>st</sup>, 2016 and is focussed on the Port River and Barker Inlet Estuary, its conservation and restoration. Improvements in water quality make conservation and restoration in the Estuary more possible, and enable timely nature-based responses to some of the increasing risks facing the Estuary and the communities along its banks. These nature-based solutions can contribute to climate adaptation measures and carbon sequestration, while protecting estuarine habitat and improving biodiversity and water quality.



Port River and Barker Inlet Estuary

### Background

Originally the Port River and Barker Inlet Estuary was a highly interconnected ecosystem, based on seagrasses and shellfish reefs, mud flats and native oysters (*Ostrea angasi*), with fringing mangroves and samphires, supporting local Kaurna communities. Middens on Torrens Island and at the site of Newport Quays, show the range of shellfish consumed.

Dredging, infill and development led to loss of habitat and drastic reductions in water quality. Now some major sources of pollution are gone, resulting in ongoing improvements in water quality and an improving aquatic environment.

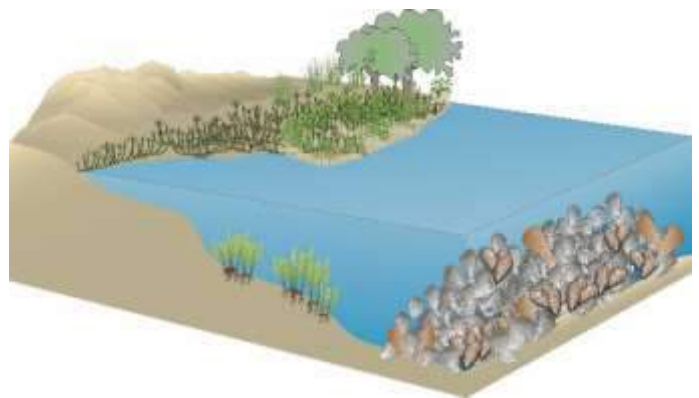
Concurrently with this heartening news, some new risks are arising. Port Adelaide is one of the most vulnerable areas in SA to inundation, given sea level rise, land subsidence and the prospect of increased rainfall intensity. The risks exist along the Port River and extend south into West Lakes.

AdaptWest, the regional climate adaptation plan, maps scenarios associated with those risks. Adverse weather events

too have highlighted the potential for property and environmental damage, with major flooding events in 2009, 2014 and 2016.

The impetus to form the Foundation came from the potential for nature-based solutions and the need for an organisation to trial such initiatives, as outlined below.

In mid-2015, as Chair of the Port Adelaide Environment Forum I sought the advice of Peri Coleman from Delta Environment Consulting about flooding risks along the Port River. Peri had recently undertaken a field trip with The Nature Conservancy in the USA examining Living Shorelines, and in June 2015, Peri addressed the Forum on this topic.



Drawing of a Living Shoreline showing mangroves, samphires, seagrasses and a shellfish reef. Peri Coleman 2015.

Peri suggested that Living Shorelines could be implemented along the Port River, in the Inner Harbour and West Lakes, and trialled at the Mutton Cove Conservation Reserve to support its failing seawall. (Mutton Cove is on the northern boundary of the Submarine Corporation.) Attendees were excited by these ideas and the possibility of restoring shellfish reefs to the Port River.

Tony Bazeley, a long-term member of the Port Adelaide Residents Protection Group (PAREPG) suggested a Foundation be formed to coordinate and resource such projects, and I embraced the role of founding the Estuary Care Foundation.

The key priorities of the Foundation have become

- Trials of Living Shorelines
- Shellfish reef restoration
- Seagrass restoration
- Community education and engagement

While it operates on a vastly greater scale, the Chesapeake Bay Foundation has provided an excellent model for the Foundation, especially in community engagement and education.

### Trials of Living Shorelines

Living Shorelines can be alternatives or additions to hard shoreline infrastructure such as seawalls. The NSW Office of Environment and Heritage promotes the same concept;



Mussels in Inner Harbour Nov 2015

providing guidelines for Environmentally Friendly Seawalls which seek to mimic natural foreshores and provide estuarine habitat.

Mangroves, samphires, seagrasses and shellfish are key elements of the Port River estuary habitat and they can all potentially be components of Living Shorelines.

Plans for the first proposed trial for a Living Shoreline at Mutton Cove were disrupted by a major storm in May 2016 that breached the seawall.

Since then the Foundation has focussed its efforts to trial Living Shorelines on an area adjoining public land just north of Snowden's Beach (at Largs North), and in the Inner Harbour. While an application (January 2017) to the National Disaster Resilience Program for trials at these sites was unsuccessful, other possibilities are being explored.

### **Shellfish Reef Restoration**

After Peri Coleman introduced the idea of shellfish reef restoration, local environmentalists looked at the Port River with this new perspective, finding thousands of molluscs and mussels on posts, bridges and pontoons. Later, masses of Pacific oysters were identified.

Coincidentally a local couple knew of the Billion Oyster Project (BOP) in the Hudson River and were keen, as public health practitioners, to see the Port River return to a swimmable river and to follow BOP's lead in engaging schools, communities and local businesses.

Some web searching revealed that trials of shellfish reef restoration, with native oysters (*Ostrea angasi*) were underway in Port Phillip Bay through The Nature Conservancy (TNC). Dr Chris Gillies, National Marine Manager of TNC Australia, encouraged me to think that shellfish reef restoration in the Port River was possible and linked me to the national Shellfish Reef Restoration Network.

Members of the Network including Chris Gillies and Dr Anita Nedosyko of TNC, Dr Heidi Alleway of PIRSA, Professor Sean Connell and Dr Dom McAfee, University of Adelaide and Dr Xiaoxu Li, SARDI have subsequently provided invaluable advice and support.

The Port River Shellfish Restoration Group began meeting in January 2016. Community members and members of PAREPG joined the initial project group, which now includes members

of the SA Malacological Society and the SA Marine Life Society. The group decided to document what we were learning and are developing a Volunteer Manual for the project, as a resource to share.

While our medium-term goal is to establish shellfish reefs, our more immediate focus has been to determine if native oysters (*Ostrea angasi*) could now survive in the Estuary and if their survival is possible both as adults and as spat. The Foundation secured a Community NRM grant in November 2016 that has enabled us to do this research.

With PIRSA approval, three hundred and twelve *Ostrea angasi* (approx. 60mm in size) went into sixteen oyster baskets across six sites on May 31<sup>st</sup>, 2017. They were first marked, weighed, measured (centre, 30 degrees left, 30 degrees right) and photographed to determine their shell area.

Six sites, owned/controlled by private businesses and government agencies, were secured with agreements about access.



Six Native Oyster trial sites in the Port River

Within two weeks it was a delight to see visible shell growth.

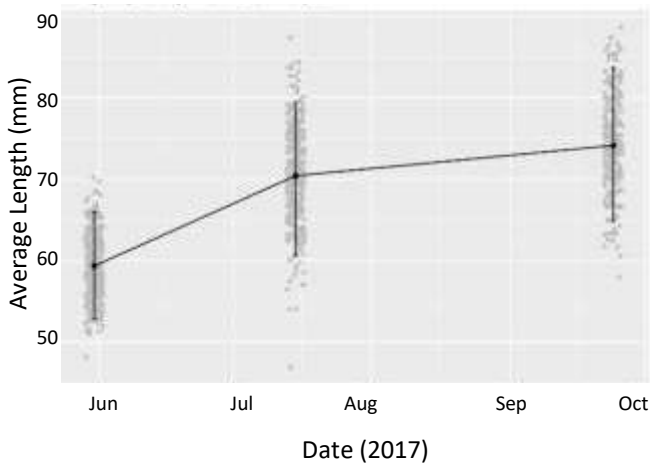
In late September 2017 weighing, measuring and photographing was repeated and Tony Bazeley has analysed the growth in weight and length. Since there are multiple oysters growing on some *angasi*, the weight is not a measure of growth of the individual oysters. The average increase in length seems more informative.



The project group has decided that we will repeat our measurements in early February 2018 and late May 2018, so that there is a year's worth of data.

Growth rates have varied across sites. There seem to be higher growth rates at the two Inner Harbour sites, which have a high nutrient load (e.g. as evidenced by jellyfish blooms) and are amongst the shallowest sites.

Shellfish reefs increase biodiversity and Foundation volunteers have observed this in the tiny habitat of the oyster baskets. Some of the marine organisms attracted within the baskets or on the oysters include: shrimps, tiny mussels, a seahorse, a cuttlefish, crabs, limpets and a pygmy squid.



Growth of Angasi Oysters between May 31<sup>st</sup> and late September 2017 using average length (solid line) as the measure. Prepared by Tony Bazeley

Short term plans include deploying bagged clean recycled shell as substrate for small scale reef restoration trials. Ocean Watch is undertaking small scale trials with bagged shell in Sydney Harbour, as mini Living Shorelines.

It remains to be seen whether *Ostrea angasi* can prevail on local reefs given the large number of hardier imports (blue mussels and Pacific oysters) present.

### Seagrass Restoration

The Estuary Care Foundation is especially interested in the intertidal and subtidal *Zostera* beds (seagrass) which would have previously occurred throughout the Port River and Barker Inlet.

Water quality improvements in the River have been linked in part to the closure of Penrice Soda Factory at Osborne in early 2014. Qualitative observations by Dr Jason Tanner, SARDI in early 2017 indicate that *Zostera* is returning to some areas along the south-western shore of Torrens Island, suggesting the water quality is adequate for seagrass restoration.

Key proposed projects are a monitoring program for *Zostera* along the west side of Torrens Island (hopefully commencing prior to proposed Flinders Ports dredging in 2018), and a seagrass restoration

trial, using bagged shell, along the shoreline north of Snowden's Beach.

### Community Education and Engagement

The Foundation aims to enhance people's understanding and appreciation of the Port River and the Estuary, and to increase their involvement with these.

Estuarine habitats, especially mangroves and samphires, are still derided as swamps and yet they are vital to our fishing industry. Mangroves, samphires, seagrasses and shellfish can all contribute to carbon sequestration and there is growing interest around the world in what is termed 'blue carbon'.

The ideas of estuary restoration and 'blue carbon' are relatively new to South Australia. The Foundation has sought to find common cause with other organisations; to progress project delivery; and to gradually seek exposure for key concepts and projects, beginning with potentially supportive audiences.

Presentations have been made to local organisations e.g. Rotary and U3A. The Shellfish Restoration Project exhibited at the 2017 World Environment Fair and at Science Alive.

In December 2016 the Foundation hosted a public meeting *Resilience of Gulfs, Coasts and Estuaries* with USA experts from The Nature Conservancy and on August 12<sup>th</sup>, 2017 another forum *Making a difference: Aquatic Habitat Restoration* with speaker Craig Copeland, the founder of OzFish Unlimited.

While the future is uncertain, there is hope in joining the many people around the world seeking more resilient environments and communities.

*Catherine McMahon was Chair of the Port Adelaide Environment Forum 2013-16 and is the founder and Hon Executive Officer of the Estuary Care Foundation SA Inc.*

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Zostera seagrass at Torrens Island Quarantine Station

# V-GRaSP REPORT SEPTEMBER-OCTOBER 2017

## Rainfall Monitoring and Data Recording

**Chris Wright, Graham Blair and Alex Cornish**

The Vulkathunha- Gammon Ranges rainfall monitoring project continues, and all nine rainfall stations and the Arcoona Creek Water Level station (stream gauge) are working correctly. Five rainfall sites (Maynards Well, Pfitzners Well, North Moolooloo, Arcoona Bluff and The Plateau) are reported to the Bureau of Meteorology web-page at:

[http://www.bom.gov.au/cgi-bin/wrap\\_fwo.pl?IDS60163.html](http://www.bom.gov.au/cgi-bin/wrap_fwo.pl?IDS60163.html)

In addition to these five sites, Arcoona South, The Enclosure, and Arcoona Creek Water Level can be accessed through the DEWNR WaterConnect site at:

<https://www.waterconnect.sa.gov.au/Systems/RTWD/Pages/Default.aspx>

The last two sites (SAMBOT and Mocatoona) are not online, however the data is recovered during site visits. A copy of all the data from the sites is held by DEWNR.

There has been a fault with one of the two data recorders at The Plateau. Graham Blair noticed it some time ago, and on the April visit efforts were made to fix it. On 1<sup>st</sup> to 3<sup>rd</sup> September 2017, Graham Blair (DEWNR) and Alex Cornish (BoM) made a special trip up to the Plateau to try to identify the problem and carry out repairs. They traced the fault to the micro-switch that records each rainfall tip, and spent several hours on site, doing adjustments and communicating with each other by whistle (as the logger box is 50m uphill from the rain gauge). They identified the fault as caused by the magnet on the switch being wrongly positioned, and believe that it is now fixed. This sort of work is normally done in the lab, and it is a credit to Graham and Alex that they were able, despite the elements to find what we hope is a successful solution. Graham and Alex saw two Yellow Footed Rock Wallabies close to the stream gauge site in Arcoona Creek.

The other project which is under consideration is locating a video camera at the stream-gauge site to actually record a flood in progress. The remarkable photo (from a video) provided by Duncan McKenzie of the brown snake trying to steal a Malleefowl egg, demonstrates what can be done. We would mount the camera up on the crag above the stream-gauge in Arcoona Creek. It would need to be capable of recording in the dark (infra-red?), and we are trying to work out how to trigger the recording to begin, as most of the time there is no flow in the creek. Data transfer from this location would be slow, so the camera may need a very large data storage. Any suggestions would be most welcome.

## Vegetation and Animal Monitoring

**Garry Trethewey**

Garry and Michelle Trethewey made the regular spring trip to Arcoona Creek to do photographic recording and the feral and native animal count.

The V-GRaSP photopoint trip is becoming very routine.

Before our trip to the Gammons we had been at Arkaroola where we had: repeated our yearly photopoint pix established on the 2009 and 2011 biosurveys (avail on request); spent a week with the Field Geology Club; found some echidna poos for DNA and hormone work at Adelaide Uni; and looked at Nepowie spring.

Due to time, we camped about 1km short of Vandenberg. Judging by the state of the bulldust holes in the road, it had rained around Mt Serle. Holes were firm and dust-free, but they got looser, deeper, and more powdery as we approached Owieandana. Lots of goats were seen from the road driving from Italowie Gap to Owieandana, but they were less visible in the scrub and there were not a lot seen.

There was no water in Wild Ass, Grandfield, or SAMBOT Waterholes. For the first time we saw bedrock at the bottom of SAMBOT, due to the scouring out in Jan 2017. However The Seeps and Woodcutter's Well had plenty of water.

The established vegetation looked happy, but there was no new germination. We did take some photos of one of Bob Henzell's old enclosures (fenced areas). Lots of grass (slightly green) seen inside the fence, but none outside the fence. Note that this is not the result of just one season; there will have been an accumulation of perennial grass biomass & seed over the years.

The burnt patch from fires of Dec 2015 is regrowing, but nicely; easy to walk on. The route changes caused by removal and piling up of vegetation along the creek mean easier walking after a little exploration. The slow decline in the volume and density of each bush also helps. Lots and lots of shin height *Eremophila undulata* on the burnt patch; more dispersed than our original finding and already flowering. Lots of baby mulgas from ankle height up, on creek flats east of 'the shortcut', some knocked back by goats, some untouched.

We saw an **actual** Yellow Footed Rock Wallaby on North Tusk, and lots of current poos. Over the years we've seen a bit of old poos, but assumed it to be from an animal just passing through. We saw another YFRW 200m east of the stream gauge in Arcoona Creek.

Various 'pix of interest' are available, as well as veg photopoints from 1988 to now.

The next V-GRaSP monitoring trip will probably be the ANZAC weekend in autumn 2018.

## Communication, representation, value, storage - then & now

**Garry Trethewey**

When I was a kid I remember traipsing all around Melbourne with my mother to pay bills. First the trip to the bank to line up in a queue, eventually to reach 'the lady' and get 'the moneys', which the lady recorded in two places - a 'bank book' that my mother kept, and her own book.

Then on the train and into town to the electricity company, to

give 'the man' some moneys, recorded in another book kept by the man and on a receipt kept by my mother, to be later copied into another book kept by my father. On the train again and a walk to the gas company, more man, more moneys, another book, another receipt. And on the way home walking up the lane, past the milkman's horse, in to pay for the milk, another book and receipt.

Different nowadays. Sitting on top of North Tusk in the Gammon Ranges, I thought I'd check the rainfall recorded by Plateau Pluvio, only a couple of kilometres away. So I looked at my phone and read that it last rained two weeks ago.

What the ...? How did that happen? I didn't even have to go over there and read a piece of paper. And even if I had, there is no piece of paper. How very zen!

I thought about the path and processes that data took between a raindrop and my phone. Not being a communications engineer, here's my very very short version of how I understand what talked to what, and how, and where the records were kept, and what they meant.

Rain falls into a funnel and is guided to a collector that seesaws once for every 0.2mm of rain. A small magnet is built in to the collector, so movement causes a signal to travel on

electric wiring to a data logger.

A few times a day DEWNR uses a Telstra 3G phone connection via Leigh Creek to request data from the data logger. That data is stored on a big computer owned by DEWNR.

Every day my Raspberry Pi (a tiny computer that looks like a LEGO block) uses the internet to request that data from DEWNR.

My Raspberry Pi collates and re-formats that data, and uses the internet to send it to a great big computer owned by Google, where it is stored.

My phone requests that data from the Google server, and the built-in MS Excel reader shows me the daily rainfall for Plateau Pluvio.

And I didn't even have to catch the train.

[http://www.communitywebs.org/ScientificExpeditionGroup/hydrology\\_data.php](http://www.communitywebs.org/ScientificExpeditionGroup/hydrology_data.php)

Garrytre@bigpond.com

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## SEG EXPEDITION 2018

Unfortunately due to circumstances beyond our control the proposed Expedition Eyre to Coffin Bay National Park in April 2018 will now not be going ahead.

Instead SEG is planning an alternative expedition. Full details are not yet available but as soon as possible, information will be sent out to all SEG members and friends.

The previously planned expedition was to be in April but it is now likely that the planned expedition will be held in September or October. Once again dates will be sent out as soon as possible.

## CONTRIBUTIONS TO SEGments

The editors welcome contributions for SEGments in relation to natural sciences, adventure and SEG activities.

For ease of publication we request that text is supplied in Microsoft Word or text format and that pictures and photographs are supplied separately in jpeg format. If desired captions for figures, tables and photographs can be placed in the text to indicate optimal position.

# 2017 MALLEEFOWL SURVEY

## Trent Porter

That time of year again and looking forward to some more galloping around the very well preserved mallee in the Bakara Conservation Park and Henry Short's property. These are both about 25-30km. East of the River Murray between Mannum and Blanchtown, and SEG have been doing the survey here for quite a few years ably co-ordinated by Dave Setchell (Mallee Services Contractor) and our own Stuart Pillman. Many volunteers have joined us regularly and all have enjoyed the opportunity to camp out on Henry's place and to walk through unspoiled mallee country observing malleefowl and other animals and birds doing their "thing"!

Unfortunately Henry had to sell his place last year in spite of his continuing interest in the malleefowl, but on the positive side it was taken over by Andrew Paske who is allowing us to continue the surveys and to camp in the usual spot during the survey.

This year we had lots of hunters keen to go and all seemed to be running smoothly although we were a little later in the season than usual, but the season was also a bit later and the extreme heat we feared wasn't in evidence.

THEN the news came that Dave Setchell was no longer doing the job and his replacement was not going to do the preparatory work that Dave had always performed, and so that job would fall to Stuart.

THEN the news came that Stuart had to go into hospital just before the trip for some surgical adjustments, and that he would not be allowed to hurtle through the mallee as usual.

THEN several other volunteers had to drop out for a variety of reasons and the whole project started to look a bit wobbly.

BUT fortunately we still had Bruce, Jill, the Davills (Phil and Janet), Graeme, Jeremy and me – just enough for two to a team and the ability to do three circuits of mounds in each of Bakara and Henry's property.

Saturday got off to a slow start 'cos the memory of how to operate the different GPS and recording devices had slid away in the intervening year, but fortunately all contributed their fragment of knowledge and we finally got underway.

All went according to plan, moving from pre-mapped mound to mound on the Bakara Conservation Park recording the condition of each. Some are obviously no longer used but most had been visited by the birds (tracks and some scratchings); several mounds had been worked to an advanced state; and several appeared to be active enough to contain eggs.

All groups had interesting bonus sightings along the way – we twice had a malleefowl walking along with us just ahead, clucking quietly either at us or to itself; another group came upon a black falcon nest with chicks in residence; and the third group were lucky enough to see a fowl actually working a mound.

We also had the task of swapping SD cards in some fixed 'stealth' cameras set up within the survey area with some interesting results.

Sunday's survey on Henry's was much smoother to the practiced hands and was finished quite early which enabled us to strike camp and get away in mid afternoon at the end of another successful survey. Thanks to all who made it so enjoyable and worthwhile!

Hope to see you again next year!

trentasaurus@bigpond.com



Malleefowl photographed by stealth camera



Fox photographed by stealth camera



Malleefowl on nest. Photograph Jill Tugwell

# MORELLA FAUNA SURVEY 23 – 28 OCTOBER 2107

## Bob Sharrad

This was a relatively small-scale operation carried out at the request of the private conservation group, Wetlands and Wildlife, to follow up on a previous SEG survey there in 2013 and a baseline survey in 2006.

Morella is a former pastoral property near Salt creek which had been largely cleared in the past of native vegetation. In 2005, 1200ha of the area was transferred to Wetlands and Wildlife which was obliged to undertake revegetation of the

land which is partly inundated by water from the Upper SE Drainage Scheme. At that time it was decided that vertebrate fauna should be monitored to show, it was hoped, a bounce back of native species following the revegetation.

Accordingly the aim of our survey was: To continue a monitoring program of birds, mammals, reptiles and frogs of the Morella basin.

**Table 1. Terrestrial Vertebrates Captured and Observed**

		1	2	3	4	5	6	Opp	Total
<b>Reptiles</b>									
<b>Common Name</b>	<b>Scientific Name</b>								
Lined Worm-lizard	<i>Aprasia striolata</i>						1		1
Eastern Bearded Dragon	<i>Pogona barbata</i>							1	1
Eastern Three-lined Skink	<i>Acritoscincus duperryi</i>			1					1
Eastern Striped Skink	<i>Ctenotus robustus</i>	1	1	4	5	1			12
Four-toed Earless Skink	<i>Hemiergis peronii</i>		1		1	3	3		8
Delicate Skink	<i>Lampropholis delicata</i>			1					2
Bougainville's Skink	<i>Lerista bougainvillii</i>	1			1		3		5
Mallee Snake-eye	<i>Morethia obscura</i>		3	1	2	1	3		9
Sleepy Lizard	<i>Tiliqua rugosa</i>				1			> 10	> 10
<b>Mammals</b>									
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>							**	**
Western Pygmy Possum	<i>Cercartetus concinnus</i>		1	2	2	2	6		13
Little Pygmy Possum	<i>Cercartetus lepidus</i>						2		2
Western Grey Kangaroo	<i>Macropus fuliginosus</i>							> 10	> 10
Red-necked Wallaby	<i>Macropus rufogriseus</i>							1	1
Common Wombat	<i>Vombatus ursinus</i>							1 **	1
Fox	<i>Vulpes vulpes</i>							1	1
Cat	<i>Felis catus</i>							1	1
Deer	<i>Cervus spp</i>							> 10	> 10
Cattle	<i>Bos taurus</i>							4	4
House Mouse	<i>Mus musculus</i>	1	6	2		4	1	**	14
Rabbit	<i>Oryctolagus cuniculus</i>							**	**

In the table above numbers in columns 1 to 6 show the numbers of individuals found at each of the six trapping sites.

Opp = opportunistic sighting - that is, not at a trapping site.

\*\* = traces (burrows and/or diggings).

For this survey the six sites sampled in 2013 were revisited. At each site there were six pitfalls, 15 Elliott traps, two funnel traps and two cage traps. All traps were open for four nights and were monitored each morning and evening. The sites were also searched for birds, and opportunistic observations were made of fauna during travel between sites. Invertebrates were not collected.

The standard “SA fauna survey for vertebrates” data sheets were used and no voucher specimens were collected.

The table below shows lists of species found. The most significant new finds were the pygmy possums. None had been captured there before! We also captured some reptile species not previously recorded there, but failed to find snakes and goannas found in 2103 – cooler weather is the probably reason for that.



Pygmy possum. Photograph Jill Tugwell

**Table 2 Terrestrial Vertebrates Captured and/or Observed in 2013 and 2017**

		2013	2017
<b>Reptiles</b>			
<b>Common Name</b>	<b>Scientific Name</b>		
Lined Worm-lizard	<i>Aprasia striolata</i>		Y
Eastern Bearded Dragon	<i>Pogona barbata</i>		Y
Eastern Three-lined Skink	<i>Acritoscincus duperryi</i>		Y
Eastern Striped Skink	<i>Ctenotus robustus</i>	Y	Y
Four-toed Earless Skink	<i>Hemiergis peronii</i>	Y	Y
Delicate Skink	<i>Lampropholis delicata</i>		Y
Bougainville’s Skink	<i>Lerista bougainvillii</i>	Y	Y
Adeliade Snake-eye	<i>Morethia adelaidensis</i>	Y	
Mallee Snake-eye	<i>Morethia obscura</i>	Y	Y
Sleepy Lizard	<i>Tiliqua rugosa</i>	Y	Y
Eastern Brown snake	<i>Pseudonaja textilis</i>	Y	
Heath Goanna	<i>Varanus rosenbergi</i>	Y	
<b>Mammals</b>			
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	Y	Y
Western Pygmy Possum	<i>Cercartetus concinnus</i>		Y
Little Pygmy Possum	<i>Cercartetus lepidus</i>		Y
Western Grey Kangaroo	<i>Macropus fuliginosus</i>	Y	Y
Red-necked Wallaby	<i>Macropus rufogriseus</i>	Y	Y
Common Wombat	<i>Vombatus ursinus</i>	Y	Y
Fox	<i>Vulpes vulpes</i>	Y	Y
Cat	<i>Felis catus</i>	Y	Y
Deer	<i>Cervus spp</i>	Y	Y
Cattle	<i>Bos taurus</i>	Y	Y
House Mouse	<i>Mus musculus</i>	Y	Y
Rabbit	<i>Oryctolagus cuniculus</i>	Y	Y
<b>Total Species</b>		18	21

# VOLUNTEERING AT MORELLA – OCTOBER 2017

## Charlini Blossom

### The Trip

We travelled to Morella in the truck, which picked us up from Eden Hills. The driver of the truck was Brian. It was a long trip. We went to Murray Bridge and we stopped there at the bakery where I got an ice block.

### Arriving at the Homestead

When we arrived at Morella I thought the homestead looked old fashioned. We had to unload the food truck and set up camp. I explored the whole place, and we set up our sleeping areas.

After setting up the camp, we went looking for site 1, and we used GPS to help find the site. We set up the pitfall traps. We had to do lots of digging and I helped with this. After this we put out the Elliot traps.



### Tuesday - Friday

Each day we woke up around 6.30 am and went to the kitchen for breakfast. After this we went to the sites to check if we had trapped any animals. There were six pitfall traps at each site. After the animals were trapped they were put into cloth bags and weighed. Some of the animals were taken back to the homestead so that they could be properly identified. These animals were taken back the next day and re-released into the environment that they came from (their habitat).

### Creatures that we found

Pygmy possums around seven, skinks around four, spiders, house mice around ten, native cockroach and two stumpies found on the track.

### Salt Creek

We went for a drive to Salt Creek to have a look around. When we went for a walk, we saw lots of grasses and shrubs, but only one tree. The tide was out so the ground was very wet. We found lots of bones. We found a fresh bit of ribs and next to it we found fox poo. This led us to believe that a fox had recently attacked and killed an animal – probably a feral goat or sheep.

### Saturday - packing up to leave

We went out to the sites and collected all of the Elliot traps, and then we had to wash them, which took a while. After we had cleaned the traps I started to sweep and help clean up the homestead.

### Favourite things about trip

My favourite part of the trip was getting to see the pygmy possums up close and handling the different animals that we trapped. Holding the skink I named Naomi was also one of my favourite things. The sunsets were amazing. The weather was mainly fine and warm. It was a bit rainy and cold at times.



### Difficult Parts



The most difficult part was digging up the traps at the start of the week. At the end of the week we had to fill these pitfall traps back in. It is a strict rule that pitfall traps must be filled back in at the end of the science expedition.

Site 6 was the most difficult site because it was covered in bush and there was so many mosquitos. It was very hard to get in and out of site 6, as there were no paths, only bush.



### Conclusion

I really enjoyed seeing the animals, spending time out in nature. I loved the fresh air. I loved learning how to hold the animals. I learned how to collect information about the animals (e.g. weight, description, habitat). I really loved helping in the kitchen. I also really loved the time I spent painting with Andrew Barr. I did one painting of the Coorong with the sand dunes in the background which was our view from the homestead.



# MEMORIES

## John Love

Thinking of your own life, how far back can you remember?

SEG can remember the day it was born: 'Minutes of the inaugural meeting of the Scientific Expedition Group, held 21<sup>st</sup> Aug. 1984, at 20 Sutton Tce Marleston, at 7.30 pm. Item 1: The Hon. Convenor, C. Putt, welcomed the gathering of about fifty people.' In fact, SEG's memory goes further back through two meetings of a steering committee which worked on a 'Discussion Paper on the formation of the SCIENTIFIC EXPEDITION GROUP of SOUTH AUSTRALIA', prepared by Rob Easter in April 1984. This in turn arose out of a desire to continue the work done by the South Australian branch of the Australian and New Zealand Scientific Exploration Society, which had just expired. These bare bones are fleshed out by Richard Willing's reminiscences in our book, *Thirty Years of Science and Adventure*, published in 2014.

We have a complete set of committee and general meeting minutes from the beginning to the present. To maintain the anatomical metaphor, these minutes form the back-bone of a group of records created in the course of SEG's activities over thirty-three years and still growing. Close to the back-bone is a series of secretary's correspondence, not complete but enough to show the interface between the committee and the rest of the world.

Potentially the most useful to the rest of the world are substantial reports recording the science and the fun in expeditions. These reports have been digitally scanned with the intention of putting them on the SEG website when technical difficulties have been overcome. Botanical and human impact monitoring as part of the Vulkathunha-Gammon Ranges Scientific Project has produced hundreds of photographs, originally on 35mm slides, now digital. All the slides have been scanned and are available, with those born digital, for use on application to the secretary. For some expeditions there are no reports but, at least in recent years, the information gathered has been sent to the South Australian Biological Data Base, the State Herbarium or the Bureau of Meteorology.

Keeping us all informed is SEGments. This began as a very modest and at times irregular little periodical produced by enthusiastic amateurs. It has grown into a high quality glossy magazine – still produced by enthusiastic amateurs. Of course there are other records, relating to administration, the society's constitution, publicity and so on. Recruiting expeditioners and leaders; planning the transport, food and daily activities for 30 or 40 people for two weeks; involves a lot of paperwork. Most of this paper has been discarded but a

few typical examples, from different years, have been preserved.

Among them are two files relating to SEG's first two expeditions: to Chowilla in 1985 and the 'Freeling Plateau' (now Mawson Plateau) in the Northern Flinders Ranges in 1986. There are some interesting comparisons with today's practices. An A4 page leaflet was prepared: 'Scientific Expedition Group invites you to join EXPEDITION CHOWILLA 85 May 21 – 31, ten days of adventure, exploration, field research for young people age 15 – 20 ...cost \$120 all inclusive', with a photo of canoeists negotiating a backwater. It appears that this was sent to all the secondary schools in South Australia, to the Scout Shop (where it was pinned on a notice board) and possibly to other organisations. An advertisement was placed in the *South Australian Teachers Journal*. A circular letter from the SEG secretary, Jocelyn Preece, dated 17 April 1985, says 'For the first time in our experience of running this type of expedition we are facing a shortage of young expeditioners.' Eventually 15 students and seven leaders (including a canoe expert) made a successful expedition. The students came from Port Pirie, Loxton, Victor Harbor, Oakbank, Unley, Whyalla, Port Lincoln, Norwood, Glossop, Adelaide High School, Reynella, Blackwood and Immanuel College. For both Chowilla and Freeling Plateau, advertisements invited applications for leadership positions. In 1986 there were three times as many applicants as leadership positions.

The structure of the expeditions consisted of two parts: a 'base camp phase': four or five days when the students learnt the basics of the science work they were going to do and went on short practice walks; and a 'scientific phase': several days walking (canoeing at Chowilla) carrying their own gear and gathering information as they went. They did not set trap lines but mist nets for birds and harp traps for bats were used at Chowilla. Each expedition produced an illustrated report of about 50 pages that would be useful to the relevant government authorities in drawing up management plans for the areas visited.

The whole body of SEG archives, filling about 2.5 metres of shelving, has been arranged and listed. It will be offered to the State Library, where, if accepted, it will be available for public use.

[jhlove@internode.on.net](mailto:jhlove@internode.on.net)





# MINNAWARRA BIODIVERSITY PROJECT - SPRING 2017

Janet Furler

The latest survey was held from 30<sup>th</sup> September to 4<sup>th</sup> October, with reasonable weather throughout. We had 39 people visiting, joining in 147 rounds, needing 2,352 feet to be sprayed.

Overall we caught 17 *Antechinus flavipes*, 14 of which were from previous surveys; 63 *Rattus fuscipes*, with 41 previously caught; and 29 *Rattus lutreolus*, with 12 previously caught. The trend seems to be more new animals caught and chipped in autumn, probably because the spring babies are all up and running around by then. The rats seem to have enjoyed the seasonal conditions.

Site 1 has changed again. Previously the *Antechinus* and Bush rats (*R fuscipes*) vied for the most common species. This time the Swamp rats (*R lutreolus*) won by the proverbial country mile – 3 *Antechinus*, 5 Bush rats and 16 Swamp rats, 10 of whom were new.

Site 9 was quieter than usual with only 4 individuals, (1 *Antechinus*, 3 Bush rats) all recaptures, caught 13 times.

For the third spring in a row we caught a bandicoot – a new young male in an Elliott trap. I still got laughed at for getting quite excited.

It was warm enough this time to catch skinks – 7 Garden skinks (*Lampropholis guichenoti* aka Lamborghini), one Southern Grass skink (*Pseudomoia entrecasteauxii*) and one Three Toed Earless skink (*Hemiergis decresiensis*). These are great for pointing out the differences between the skinks which run over the leaf litter, and those that burrow under, as shown by the small limbs with three (not five) toes.

We've also managed to get some publicity for Minnowarra Biodiversity Project and SEG. The Channel Ten children's show Totally Wild has filmed a segment about the Project, with the emphasis on participation of young people as the target audience for the show is 10 – 16 years. It took three hours to film the 3 ½ minute segment and was an education for Zac and Harriet, the young stars. I will be told when it will be aired, and will make sure I pass the information on. It will also be on Tenplay (their catchup site) for a couple of years, so I was told.

PS. It intrigues me that the *Antechinus* and the Bandicoot heads look similar despite the difference in size!



Young bandicoot caught at Site 9



Hmm - let me see. Recording the catch. Photo M. Wilson



Young male antechinus

## NEW BOOK

### GRASSWRENS

#### AUSTRALIAN OUTBACK IDENTITIES

**Andrew Black and Peter Gower**

The book is 153 pages and gives a full account of all varieties of grasswrens (11 species, 25 subspecies) and has over 100 outstanding photos, of all extant forms and their habitats. It is fully referenced and has a comprehensive bibliography.

Copies can be bought at Nature Foundation SA and several Adelaide bookshops or through [gowerphotos@gmail.com](mailto:gowerphotos@gmail.com)



### MINNAWARRA WEEDING GROUP

You have an opportunity to see other parts of the Minnowarra scrub if you join the Bush For Life weeding group. We meet each month on the 3<sup>rd</sup> Sunday, 10.00 to 1.00, morning tea (mostly fresh baked) provided.

Janet can give details – 0419 842 667.

### MINNAWARRA BIODIVERSITY SURVEY DATES 2018

**Autumn - Thursday 12 April to Monday 16 April**

**Spring - Thursday 27 September to Monday 1st October**

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

Minnowarra is situated on the southern Fleurieu Peninsula

For further information and registration forms, contact:

Janet Furler Janet 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 2017 —18**

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**

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.....

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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

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

**PLEASE NOTIFY ANY CHANGE OF POSTAL OR ELECTRONIC ADDRESS**



Visit SEG's website: <http://www.communitywebs.org/ScientificExpeditionGroup>

