

# SEGments

Journal of the Scientific Expedition Group Inc. Volume 34 No. 2 September 2018

# Scientific Expedition Group Inc.

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### Cover Photo:

Cooperconcha bunyerooana Bunyeroo Gorge Ikara Flinders Ranges National Park. Photo Tony Robinson

### **Rear Cover Photo:**

Black Backed Jackal in Etosha National Park, Namibia. Photo Alun Thomas The Scientific Expedition Group is a not-for profit organisation which began in 1984. SEG undertakes several expeditions each year to record scientific information on wildlife and the environment in many parts of South Australia.

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

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

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

### ISSN 2208-7443

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

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# SEGments



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### EDITORIAL

On a field geology trip to the Sir Richard Peninsula near Goolwa, I was struck by something that our leader Professor Bob Bourman said. Referring to the natural re -vegetation of the sand dunes, he said that change does not happen unless there is disturbance; but not a dramatic disturbance, rather a minimal disturbance. Stability does not cause change.

I am reading "The Call of the Reed Warbler. A New Agriculture. A New Earth", by Charles Massy (2017). Massy has visited 80 farms across 20 bioregions of Australia. The farmers all switched from old farming methods after their farms had become extremely degraded. All came to the decision that they had to try something new. Regenerative agriculture, which leads to active rebuilding of the landscape to full health was the answer.

Massy's story takes the reader to Zimbabwe, and to wildlife ecologist Allan Savory's revolutionary grazing management system that regenerates landscape functions and complex ecological systems – called Holistic Planned Grazing. This system and variations of it have helped restore millions of acres of the world's degraded landscapes to health.

As a ranger and game researcher in Northern Rhodesia in the 1960's, Savory noticed that game parks and grassland savannahs were rapidly deteriorating because of man-made desertification. He saw the causes as excess cattle and elephants. To his lifelong regret he had huge numbers of elephants killed, but later discovered his mistake and determined to dedicate his life to finding a solution to the desertification, and the subsequent increase in floods, because water that should have been soaking into the soil was running off.

Allan Savory observed on the grasslands and savannahs that whenever migrating herds moved off an area, lush growth followed. The herds moved often to escape predatory animals, but they left dung, urine and soil disturbance from cloven hooves during their short grazing period. The herds also pruned the tops of the vegetation mass thus promoting further growth and other benefits. As a result, water penetrated the soil, and seeds that were buried were able to germinate. The constant green cover on the soil was one of the key factors to Savory's revolutionary grazing management system. In an early International experiment run over 7 years (the Charter Trial), Savory proved by trialling short duration grazing with twice the number of cattle compared with traditional grazing, that it was inappropriate management, rather than too many animals that caused land degradation. The practice of grazing livestock continuously in a particular paddock, known as set-stock grazing, is the traditional approach used by pastoralists in Rhodesia, as well as in Australia.

Returning to Professor Bourman's words –Change happens with a minimal disturbance, not a dramatic disturbance. Stability does not cause change. Here I relate to an idea of Sir Albert Howard from the first half of the 20<sup>th</sup> century with the appearance of organic farming. "Mother earth never attempts **to farm without live stock**; she always raises mixed crops; great pains are taken to preserve the soil and to prevent erosion; the mixed vegetable and animal wastes are converted into humus; there is no waste; the processes of growth and the processes of decay balance one another; ample provision is made to maintain large reserves of fertility; the greatest care is taken to store the rainfall; both plants and animals are left to protect themselves against disease." ("An Agricultural Testament", page 4, first published 1940)

This sums up rather beautifully the general idea of Savory's holistic grazing. Although he proposes four ecosystem processes; any one of the four could be the starting point to drive the other three.

(1) Capture as much **solar energy** (sun) as possible, to fix as many sugars as possible via photosynthesis. This requires as much green surface cover from vegetation as possible.

(2) Maximize as much **water filtration**, storage and recycling in the soil as possible, to get roots, forbs, perennials and grasses growing.

(3) Assist **soils** to become **biologically active**. Plants get much of their nutrient from the huge mix of underground microorganisms that can weigh many more times than the plant bulk above ground. Microorganisms, especially bacteria and fungi feed off soil carbon and plant root material. Dr Christine Jones, who implemented the Australian Soil Carbon Accreditation Scheme (ASCAS) in 2007, reiterates "carbon is the driver for every aspect of soil health and function – the MASTER KEY to every door." She believes that "grassland, crop and pasture mismanagement … interferes in efficient photosynthesis: the source of living energy stored in molecular carbon bonds." Massy also believes we can reverse the "harmful carbon-emitting signature of industrial agriculture", by storing carbon in the soils, as is achieved with

# LAND SNAILS IN THE IKARA-FLINDERS RANGES NATIONAL PARK

# **Tony Robinson**

# INTRODUCTION

South Australia is now known to support at least 149 species of slugs and snails. One hundred and twenty five of these are native while 24 are introduced.

Most people will unfortunately only be familiar with our introduced species, many of which are garden pests and more importantly significant pests in agriculture. All 11 species of slug found in South Australia have been introduced from Europe. They made their way here either as eggs in soil or hidden in moist places on the cargoes of ships coming to this country.

Many of the introduced snails, particularly the agricultural pest species' have the ability to secrete a waterproof membrane across the mouth of their shells and then 'glue' themselves to a flat surface. Once tucked away like this they can enter a state called aestivation where all their bodily processes slow down, and they can survive for many months in a sort of suspended animation. This is an adaptation to the dry summers of a typical Mediterranean climate and clearly works just as well in the very similar South Australian summers. Aestivating white snails can attach to railway trucks and heavy machinery and can be moved very long distances only to be 'woken up' by a shower of rain months later. The spread of many of these introduced species across the agricultural land of this State can be traced along roads and railway lines with a subsequent slow spread from these transport corridors. In the case of some of the species of introduced white snails, their distribution is still expanding and many thousands of dollars are spent annually on snail control measures, particularly by cereal growers.

Our native snails are much less obtrusive creatures than the introduced pests. Generally they live on dry vegetation and fungi, algae and lichen, whereas the pests eat green vegetation. They are much more restricted in their distribution preferring the small areas of moist forest in the Mt Lofty Ranges and the South East, and also rugged rocky areas such as the Flinders, Gawler and the North West Ranges where deep crevices allow them to aestivate as far from the hot summer sun as possible. There are also a range of species which survive in the coastal cliffs and sinkhole caves on the Nullarbor Plain. They certainly do not climb up on to posts above ground to aestivate as the pest snail species do, and so are very much harder to find as living animals. Their dead shells however can often be found in numbers on the surface around their preferred habitats, and it was these dead shells that attracted early scientific and amateur collectors, making

the native land snails one of the earliest elements of the Australian fauna to be collected and described.

### THE SPECIES

The Flinders Ranges in South Australia are one of the Australian native land snail 'biodiversity hotspots' with 34 species now known from there.

The Ikara-Flinders Ranges National Park (FRNP) and its immediate surrounds are known to support the following 20 species (three of which are introduced and are prefixed by an asterisk):

### Pupasnails

Gastrocopta margaretae (Cox, 1868) Margaret's Pupasnail (Fig. 1)

A tiny (to 3mm long) only known from Narrina in the Flinders Ranges, but may be found in leaf litter from beneath mallee or other eucalypt trees within FRNP

Pupoides adelaidae (Adams & Angas, 1864) Adelaide Pupasnail (Fig. 1)

A small (to 6mm long) snail known from throughout the Flinders Ranges. It is associated with limestone rocks and can be found aestivating on the underside of large rocks where it attaches to the rock surface. In FRNP it is recorded from Brachina and Bunyeroo Gorges.

# **Pinhead Snails**

Paralaoma caputspinulae (Reeve, 1851) Prickle Pinhead Snail (Fig. 1)

A tiny (to 2.5mm diameter) species which is generally collected by searching samples of leaf litter and soil, particularly from under river red gum trees on creek lines. It is known from scattered localities in the Flinders Ranges from Mt Remarkable to Arkaroola with a record from Arkaba Creek on Rawnsley Park being the nearest record to FRNP. It probably occurs on the larger creeks in the park.

# Paralaoma mucoides (Tenison-Woods 1879) Waxy Pinhead Snail (Fig. 1)

A tiny (to 2.5mm diameter) species found in a few localities from Mt Remarkable to N of Wilpena. Collected from under sandstone rocks and sorted from leaf litter samples. It probably prefers the wettest microhabits available and such areas in and around Wilpena Pound would be worth searching.



Figure 1. The smaller land snails and slugs present in the Ikara-Flinders Ranges National Park



Figure 2. The medium and larger land snails present in the Ikara-Flinders Ranges National Park











Glyptorhagada wilkawillana



Pleuroxia cyrtopleura







Sinumelon aversum















\*Cornu aspersum







\*Cernuella virgata

Figure 3. The larger land snails present in the Ikara-Flinders Ranges National Park

# **Pinwheel Snails**

Metaropa pulleinei (Tate, 1899) comb. nov. Pulleine's Pinwheel Snail (Fig. 1)

A tiny (to 4mm diameter) species collected from underside of logs and rocks in particularly damp areas. It occurs in both the Flinders and Olary Ranges and has been found in Bunyeroo Gorge and Sacred Canyon in and around FRNP

# **Orange-soled Slugs**

# \*Arion intermedius (Normand, 1852) Hedgehog Slug (Fig. 1)

A medium-sized (to 20mm length) slug and the only species so far collected from the vicinity FRNP, this introduced species was found near Willow Springs Homestead and was presumably introduced with garden plants or soil at some time in the past

# **Amber Snails**

# Austrosuccinea interioris (Tate, 1894) Red Centre Snail (Fig. 1)

A medium (to 12mm length) species which is closely related to the much more widespread and common species *A. australis* that occurs throughout southern Australia in salt marshes and on coastal cliffs. The few collections from the Flinders Ranges seem to be most similar to *A. interioris* which is more common in the central ranges of Australia. Both species can be found aestivating attached to the underside of limestone rocks.

# **Glass-snails and Semi-slugs**

*Echonitor albumenoidea* (Cox, 1868) Flinders Ranges Glasssnail (Fig. 2)

A small (to 7mm diameter) species found widely through the Flinders Ranges from Parachilna to Blinman. It is found under large rocks in the dampest areas. In and around FRNP it has been found in Sacred Canyon, Brachina and Wilkawillina Gorges and on the Bunkers and Elder Ranges

Periclocystis ardeni (Iredale, 1937) Arden's Glass-snail (Fig. 2)

A small (to 8mm diameter) species which is similar to *E*. *albuminoidea*, but can be distinguished by its flatter and dull rather than shiny shell. It is found under rocks. It is found scattered from Hawker to Blinman and within FRNP has been collected from the Heysen Range and Wilkawillina Gorge.

# Flat Snails (and Low-spired Snails)

Cooperconcha bunyerooana (Solem, 1992) Bunyeroo Gorge Flat Snail (Fig. 2)

A medium (to 16mm diameter) species which occurs from the Chace Range to Blinman. Live animals can be found under large rocks near creeks. In FRNP it has been recorded from Bunyeroo and Brachina Gorges and the St Mary Peak track.

# **Keeled Snails**

Pseudcupedora trezonana (Solem, 1992) Trezona Range Keeled Snail (Fig. 2)

A medium (to 15mm diameter) species which is very poorly known having only been collected from three loaclities in and around the Trezona Range. Within FRNP it has been found in crevices among boulders above Youncoona Waterhole.

# **Shrubland Snails**

Cupedora lorioliana (Crosse, 1863) Western Flinders Shrubland Snail (Fig. 2)

A large species (to 33mm diameter) found in and around the southern Flinders Ranges from Carrieton to Beltana. It lives in deep crevices in rock strata often in gorges and empty shells are often found in these areas. Within FRNP it has only been recorded from Youncoona Waterhole

# Cupedora meridionalis (Gude, 1903) Angular Shrubland Snail (Fig. 2)

A large flattened species (to 32mm diameter) it appears to have three widely separated populations, one around Parachilna and then within FRNP at Wilkawillina Gorge and in the Heysen Range. It lives deep within crevices and rock cracks and aestivates sealed to the rock surface.

# **Corrugated Snails**

*Glyptorhagada janaslini* (Solem, 1992) Jan Aslin's Corrugated Snail (Fig. 2)

A large (to 32mm diameter) species with a dull chalky shell. It is known from a few localities N and NE of Wilpena and another location further north on Mt Fitton Station. At one site live animals were found sealed to the underside of a large broken rocks piled together.

# *Glyptorhagada wilkawillina* (Solem, 1992) Knife-edge Corrugated Snail (Fig. 3)

A large (to 23mm diameter) highly sculptured species with scattered and largely isolated populations across the Flinders Ranges. It lives in deep crevices in rock faces in gorges. In FPNP it can be found in the type locality of Wilkawillina Gorge and in Brachina Gorge and on the Heysen Range

# **Sculptured Snails**

*Pleuroxia cytopleura* (Pfeiffer, 1862) South Flinders Sculptured Snail (Fig. 3)

A medium-sized (to 19mm diameter) found from the Chase Range to Blinman and Martins Well across the Flinders Ranges. It lives under large rocks and in cracks in outcrops. Within FRNP it has been recorded from Wilpena Pound Gap and the Heysen Range

# Dwarfmelons

Sinumelon aversum (Iredale, 1937) Central Flinders Dwarfmelon (Fig. 3)

A medium (to 19mm diameter) species which is widespread in the Flinders Ranges found from Depot Creek to Blinman, it is the most common dead shell found across FRNP. Live animals bury themselves up to 1m down in the earth at the base of shrubs where they aestivate by free-sealing the shell entrance

Sinumelon wilpenensis (Tate, 1894) Wilpena Pound Dwarfmelon (Fig. 3)

A medium (to 18mm diameter) species distinguished from *S. aversum* by the pronounced ridges on its shell. It also aestivates under leaf litter and in the soil by free-sealing the shell aperture. In the Flinders Ranges it is restricted to an area from around Hawker to N of Wilpena and on FRNP it can be found within Wilpena Pound and in Bunyeroo Gorge.

# **Introduced European Snails**

\**Cornu aspersum* (Müller, 1774) European Garden Snail (Fig. 3)

This large (to 40mm diameter) and familiar introduced species has not been recorded in the Flinders Ranges although it undoubtedly occurs in gardens around many of the houses and homesteads through this area. It appears to stay within the garden area and not spread far into natural areas except in parts of southern coastal South Australia. The only SA Museum record of this species from the arid zone is from Alice Springs so it would be interesting to know where else it occurs.

# Vinyard Snails & Allies

\*Cernuella virgata (Da Costa, 1778) Vineyard Snail (Fig. 3)

The medium (to 18mm diameter) abundant and obvious introduced Mediterranean snail is found across the agricultural areas of South Australia and can be banded, as shown in Fig. 3, or have a plain white shell. It still appears to be expanding its range and a small population was recently found in a parking bay beside the main road at the turnoff to Arkaroo Rock in FRNP. These snails had presumably been transported here with aggregate used to surface the parking bay and this seems to be the most northerly record for the species at the moment.

### DISCUSSION

We still know very little about the natural history of our native land snails, and there are probably more species still to be found in a 'hotspot' such as the Flinders Ranges. To get the most out of modern taxonomy it is very important to try and collect live specimens and preserve them appropriately for future DNA analysis. Collections of dead shells are also still very valuable as distribution records.

If you are lucky enough to find living land snails it would also be really good to photograph them as living animals as this has been done for only a few of the Flinders Ranges species. For the best photographic record, Fig 4 shows the two views that best show the living animal. If aestivating specimens are found, these are best kept in a cool place and brought back alive to the SA Museum where they can be persuaded to come out and be photographed and then killed and preserved as museum specimens with samples taken for future DNA analysis.

For the very tiny species, collection of about half a plastic ziplock bag of litter and soil from the dampest and most sheltered places you can find, beneath trees or against rock faces, can also be brought back for sorting.

Sometimes in these arid environments you can be really lucky and experience the sort of heavy rain that will soak right into the soil and crevices where our native land snails are aestivating and they can become active, particularly at night and on overcast days. When this happens, you will be amazed by just how many snails live in these colonies around favoured aestivation sites.

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Figure 4 Two standard views of a live *Sinumelon wilpenensis* from Wilpena Pound, Flinders Ranges National Park

# ENTHUSING YOUNG PEOPLE ABOUT SCIENCE AND THE NATURAL WORLD

# Rona Sakko

I have been running science and nature clubs for 35 years. And was Holly Wheaton for her photo of new flowers on a what an amazing journey it has been! I did not set out to deliberately travel along the path of communicating science and the natural world – rather, I fell into it over time. Having a science background and a great love of nature, I found that my three children were to be the impetus for me to embark on a long and passionate commitment to promoting science and nature to young people and their families.

# **History of Junior Field Naturalists SA**

While seeking out science and nature-related activities for my children, I realised that there was little available at the time. I did, however, discover a small nature club but it struggled for numbers and met infrequently, eventually fading away.

Discussions with other parents at the local school pointed towards a strong interest in a nature-based club for children. With encouragement from a committed group of parents, I brought together a small steering group to look at the feasibility of re-establishing a junior field naturalists club in the Bellevue Heights area. After embarking on a publicity campaign, we held our first meeting in September 1983. We waited nervously at the door that night, fingers crossed that we would have at least a few families coming along – and we were inundated with over 80 children and 30 parents. We were on our way! Hans Mincham was our first guest speaker and his topic was "Insects".

# What do we do?

Our club holds monthly meetings with guest speakers, as well as field trips throughout the year.

The hundreds of speakers over the years have been leading experts in topics ranging from geology, marine biology and ecology to astronomy, fauna and flora, fossils, wetlands, and so much more. Some of our earliest presenters included such legends as Mike Tyler, Roger Seymour, Daryl Kraehenbuehl, Rod Wells, Russell Baudinette, Mike Bull and Hal Crouch.

# **Field Trips**

Typical field trips (led by scientists) have been to animal refuges, conservation parks, mangroves, and areas of geological significance. We also undertake annual fungal forays with Pam Catcheside and her Fungal Studies Group, and bird banding with renowned ornithologist Prof David Paton and his volunteers.

# **30 Year celebrations**

2013 was a year of celebrations to mark the significant milestone of our club's 30th birthday.

The 30<sup>th</sup> year anniversary talk was presented in September that year by patron, Prof Chris Daniels. His very relevant topic was: "Why Children Need Nature: The Gift of the Junior Field *Naturalists"*. The evening included many celebrations – as well as cakes with little chocolate echidnas on top.

As part of the 30-year celebrations, the Field Naturalists Society of SA sponsored a photography competition for club members. The entries were outstanding! The overall winner

Xanthorrhoea grass plant – complete with a hovering bee.



The local Bellevue Heights Primary School has been hugely supportive over all these years, offering the use of their school hall for meetings. The school principal, Mr Vince Mulkerin, - in congratulating our group on its achievement - said: "It is an amazing feat to have held the Junior Field Naturalists together over such a long time and to still be focussed and committed to a very worthy environmental program." Thank you, Bellevue Heights Primary School - the club couldn't have done it without your magnificent support.

# We're 35 Years old in 2018!

2018 brings up the 35th year of our club. There have been many highlights over all this time:

- The club's mascot is ERIC (Environment Rests In Conservation) the Echidna.
- Almost since its inception, our club has been sponsoring a Murray Tortoise at the Adelaide Zoo as a way of encouraging young people to take an interest in the preservation of our environment and the conservation of our animals.
- Our club was one of the first groups to tour what at the time was called the Zoo Agistment Area, later to be named Monarto Zoo. We also had a memorable tour of Warrawong Sanctuary with founder John Wamsley.

- More recently, the Club became incorporated, with a change of name to Junior Field Naturalists SA Inc and a view to establishing chapter groups throughout the state.
- In 2011, Prof Chris Daniels, currently the inaugural Director of Cleland Wildlife Park, was appointed the Patron of Junior Field Naturalists SA.
- A particular mention must be made of another wonderful supporter of our club for many, many years - Dr David Christophel. David was a well-respected paleobotanist and gifted academic, as well as the owner of the popular Blackwood Books store. David was an enormous asset to our club, enthusiastically sharing his expertise, helping to source guest speakers and filling in as a presenter when needed. He was also our Quiz Master at our traditional end -of-year quiz nights. He will be sadly missed following his sudden passing earlier this year. Thank you, David, for your enormous contribution to the success of Junior Field Naturalists SA.

# **Exciting Young People about STEM**

Having also coordinated science clubs in South Australia for 20 years, including CSIRO's Double Helix Science Club, I was able to offer year-round experiences to showcase science to the youth of South Australia.

Incorporated into the programs were events revolving around STEM (Science, Technology, Engineering and Mathematics). Activities ranged from behind the scenes tours, science shows, field trips, industry tours and talks by scientists, to laboratory visits, astronomy sessions and many, many more fun, stimulating and educational activities throughout each year. The aim was to give Club members an insight into "real science" as well as the excitement of the huge variety of hands -on workshops such as electronics, growing crystals, robotics and forensic science. The natural world also featured strongly in events and activities to ensure young people and their families are aware of the vital need to protect our environment.



# Four events stand out as particular highlights

# Sailing the One and All

Launched in 1985, this tall ship's design is based on the original rig of an 1850s brigantine. Children and their parents learnt line handling, climbed out on to the bow net, toured the

ship and - above all - were learning about the marine and coastal environment and eco-systems. The dolphins swimming alongside the ship were a bonus!

# **Kangaroo Island Field Trips**

Each January, for many years, a bus load of members would head off on a 5-day field trip to Kangaroo Island. Experienced naturalists would take us around the island to Remarkable Rocks, Kelly Hills Caves, Admirals Arch, wildlife parks, Seal Bay and even a honey farm. Our many bush walks enlightened us about the plight of the koala populations on the island.

# Woomera Rocket Range - Science is a blast!

Another long-standing field trip was to the Woomera Rocket Range for 4 days each October. A bus load of CSIRO's Double Helix Science Club members and parents would set off for an amazing adventure at Woomera. The main purpose of the field trip was to view rocket launches by ASRI (Australian Space Research Institute). We also toured restricted areas of the Woomera Rocket Range and checked out the payloads before the rockets were fired from the launch pad.

Other highlights of each trip included:

- The Cangaroo Gamma Ray Telescope Array
- The Woomera Observatory *wow!* There are so many more stars in Woomera than we have in the city!
- The Woomera Bureau of Meteorology this was the first time any of the group had seen a weather balloon being released.
- Exploring the Heritage Centre, Museum and Rocket Park to learn about the famous rockets that were launched from the Woomera Rocket Range, including WRESAT 1 (Australia's first satellite), Black Arrow, Skylark and Jindivik (a remote-piloted aerial vehicle).
- Touring the Woomera fire, ambulance and emergency services facility
- And an added bonus was a tour of the huge zinc smelter at Port Pirie on our way to Woomera.

The young people also took the opportunity to make and launch their own little model rockets. Our club had its own launcher so – after returning from a full day on the Range – we would launch the rockets at a nearby park. It always capped off a spectacular tour!

# Hawaii Space Tour

By far the biggest adventure was taking a specially-selected group of 12 members on a once-in-a-lifetime space science excursion to Hawaii. We checked out nature reserves and coral reefs, lava tubes and volcanic steam bluffs, planetariums and museums, and the Pearl Harbor memorials.

A particular highlight was reaching the summit of Mauna Kea, a dormant volcano on the island. Its peak is over 4,000m above sea level, making it the highest point in the state of Hawaii and the second-highest point above sea level of any island on Earth. Most of the mountain is under water; when measured from its oceanic base, Mauna Kea is over 10,000m tall and is the tallest mountain on Earth. Mauna Kea's summit is home to the world's largest observatory for optical, infrared and submillimeter astronomy. Research teams from eleven different countries operate 13 telescopes atop Mauna Kea.

It was an uncanny experience to be on top of the mountain and looking *down* at the clouds!

# **Typical Feedback from Families over the Year**

"Our family has thoroughly enjoyed the many sessions that we have attended. Our children are now enthusiastic amateur geologists, biologists, palaeontologists, chemists, physicists and astronomers, and have a passion for all things science in general."

"The Junior Field Naturalists is such a special group to us all. We first came to the group in 2004/2005 when our oldest son was in Primary School and now our second son is thoroughly enjoying coming along with his friends each month. It has opened up many wonderful opportunities for us all and encouraged our children's interest in many different areas of science and nature."

"Thank you so much for helping my son to learn about and enjoy science. There's no doubt in my mind that all the positive experiences he's had at the events he's attended have planted a seed that has grown into a love for science."

"My daughter's love of astronomy, my son's love of engineering, and me never saying no to seeing Australia or learning about its history, meant the trip to Woomera was bound to be a great one. We are firm believers in the handson approach to learning, and for science in particular. This trip was another great example of this in action."

# **Success of Science and Nature Clubs**

Over the years I have built up an enormous range of contacts in science-related areas, linking in with other programs, developing partnerships with a diverse range of organisations and showcasing the work of hundreds of scientists. These scientists have been generous with their time and expertise, helping to enthuse children and their families about nature and science. Without them, there simply wouldn't be science and nature clubs.

The success of the clubs has been seen in the number of families whose children have gone on to pursue their love of nature and science. There have even been members returning years later as parents themselves and bringing along their own children - parents who were influenced by the clubs when they themselves were young.

Children have a natural curiosity and enthusiasm for learning and this needs to be nurtured from a young age. They should have a connection to nature so they can understand the importance of protecting our environment and our precious native wildlife. They also need an appreciation of science to be able to make informed decisions in the future and to better understand the remarkable and precious world in which we live.

# **National Science Week**

Another way for young people and their families to interact with science is during National Science Week, held throughout the country each August.

2018 has marked the 21st birthday of National Science Week which has become one of Australia's largest festivals. It is the annual opportunity for Australians from all walks of life to meet scientists, do science, discuss the hot topics and celebrate discoveries.

In South Australia we feature a huge range of events catering for all ages, with everything from science festivals, chemistry shows, astronomy evenings and expert panel discussions to interactive hands-on displays, open days and online activities.

Our premier event each year is Science Alive! This had its humble beginnings some years ago when our Science Week committee was brain-storming ways to make science more accessible to families who would not otherwise engage in Science Week activities. The concept of a large festival-style event at a central location was born.

In its first year it was a one-day event in a small pavilion at the Adelaide Showground and attracted around 5,000 attendees. As word spread, the event stretched to 2 days. Then it moved to a larger pavilion. This still wasn't enough for the evergrowing and enthusiastic crowds! The event expanded into both the huge Goyder and Jubilee Pavilions and a Careers Day on the Friday was added to cater for high school students, showcasing an exciting and diverse range of science study and career options.

Eventually the event became so large that our committee made the decision to hand it over to the Adelaide Showground, which has owned and managed the event since mid-2015, with this year marking the 13th edition of the Science Alive! Attendances are now up to an impressive 30,000 attendees over the 3 days.

Science Alive! has become the largest science expo in the country, with over 70 science-related organisations offering a huge range of engaging hands-on fun for the whole family, as well as spectacular science shows, native animals, Daleks and even a massive walk-through brain.

For further information:

Rona Sakko, President and Founder, Junior Field Naturalists SA and Chair, National Science Week SA Coordinating Committee 0419 827 723 or rona.sakko@gmail.com or jfnsa.com.au

# Editor's Note

JFNSA usually meet on the last Thursday of the month from 7pm to 8.15pm at the Bellevue Heights Primary School. Our meetings for the rest of 2018 are listed in the table below.



30 August	Cameron McDonald: Wastewater Treatment
27 September	Danielle Clode: <b>Prehistoric Marine</b> Life
25 October	Speaker tba
29 November	Annual Quiz Night

# FLINDERS RANGES REINTRODUCTION PROJECT

# **Katherine Moseby**

The Flinders Ranges has been the focus of conservation efforts southern Flinders Ranges where they are threatened by fox for many decades through the SA Dept for Environment and Water's (DEW) Operation Bounceback. This program has successfully controlled foxes within the Ikara-Flinders Ranges National Park and has seen the recovery of the iconic Yellow footed Rock Wallaby. This initial success led to a conservation partnership between FAME and DEW focussed on reintroducing two locally extinct species, the western quoll and the brushtail possum.

The western quoll (locally known as Idnya) is an important totem animal for the local Adnyamathanha people who tell the story of how the quoll became spotted. The quoll and the goanna were in love but were not allowed to marry so they eloped. The elders chased them and eventually caught up with them and speared the quoll. The spear marks became the quoll's spots.

Western guolls were formerly present and widespread in South Australia but were last recorded in the 1930's from the far North West of South Australia. Their decline has been attributed to predation by cats and foxes, habitat degradation and perhaps disease. Brushtail possums, although still common in some areas of South Australia have disappeared from the South Australian arid zone and are declining in many other regions. Brushtail possums were formerly common in the Flinders Ranges and were an important food for local aborigines. They were hunted on moonlit nights and the meat was said to be delicious. Possums are still found in the

predation.

Between 2014 and 2016, 93 quolls were translocated from the wild in Western Australia and released into the Ikara-Flinders Ranges National Park. A small number of individuals were released from the Alice Springs Desert Park (4 individuals). The quolls quickly settled into their new home and began breeding. Quolls are seasonal breeders, mating in April and May, producing pouch young soon after and then denning the young at around 60 days. The young are denned just as their spots start to appear and while they are still unfurred. After approximately 5 and a half months they are weaned and disperse in late November and December. Quolls usually raise 5 or 6 young and are more fecund in their first year of breeding. Quolls are nocturnal but will come out during the day during the breeding season when males become quite bold and seek out females. All released quolls were radiocollared and monitored intensively after release. The quolls used a wide variety of shelter sites after release including rabbit warrens, rock crevices and tree hollows. They have a varied and opportunistic diet and scat analysis indicated they were feeding on rabbits, house mice, reptiles, birds and even bats!

After release we lost approximately one third of our quolls to cat predation in the first 3 months. Research showed that large male cats were killing quolls and often learned to hunt them efficiently. Intensive cat control was implemented



Male quoll – photo Katherine Moseby

including shooting, poison baiting and trapping. Predation rates were reduced but cats continue to pose a threat to quoll establishment.

Brushtail possums were also killed by feral cats after release. We released possums from Yookamurra Sanctuary, Southern Flinders Ranges and Kangaroo Island. In total, 199 were released between 2015 and 2018 and possums bred continuously after release. About 20% of adult possums died after release with the majority from cat predation. Possums preferred to shelter in River Red Gum and *Eucalyptus intertexta* tree hollows during the day and often foraged on the ground at night time.

Both reintroduced species are still present in the park and maintaining their population size. The challenge now is to increase their number and facilitate their spread throughout the park and beyond. This is being achieved through a number of initiatives including aerial cat baiting, spotlight shooting and herbivore control. Encouragingly, no quolls or possums were killed by foxes after release suggesting the Bounceback fox control program is successful. However, years of overgrazing by kangaroos and rabbits has reduced ground cover which is likely to make quolls and possums more susceptible to cat predation. It does however make them easier to spot at night so if you drive around after dark you



Juvenile quoll - photo Pat Hodgens

may be rewarded with a glimpse of these beautiful native creatures.

Katherine Moseby



Pouch young soon to be denned.

# SEG at SCIENCE ALIVE! Friday 3rd to Sunday 5th August, 2018 John Love

SEG participated in this year's Science Alive! event at the Adelaide Showground: a three-day opportunity for universities, societies and other organisations directly involved in science to advertise themselves. Friday was exclusively for secondary school students. 5,500 students from 80 schools attended. The other two days were open to families, and 20,000 people turned up. There were 65 Science related- organisations with displays, with a large presence from Defence Industries, including Lockheed-Martin, one of two prime contractors for the future submarines to be built in Adelaide.

The co-joined Jubilee/Goyder Pavilion in the Showground at Keswick is like a large hangar, well lit, air conditioned, carpeted and very noisy. SEG was allotted ample space, with a power point and two long tables backed by a high, Velcrofriendly screen. Our four vertical banners were supplemented with photos of SEG's activities and some large ant diagrams supplied by Annette Vincent. Annette, with her

binocular microscope and ants mounted for viewing, was the star attraction on Friday when swarms of students swirled around. She was very good at catching and holding their interest. However, she and her microscope could only be there for the student day. Bob Sharrad was our representative ready to talk to students who might be looking for a career in science.

Nearly all the people who stopped at our stall on Saturday were mums with young children. A model pitfall trap made by Alun Thomas was the attraction. Kids were invited to get small plastic animals (dinosaurs!) out of the trap with long tongs. Some of them lectured us on dinosaurs. The Minnawarra project, family friendly, close to Adelaide, is the most appropriate SEG activity for them. Jill Tugwell was particularly good at explaining how to handle animals caught in the pits and Elliott trap. She also brought a soft toy more or less resembling a Tasmanian devil to occupy the cage trap.

The average age of the kids on Sunday was a little higher but the procedures at our stall were much the same. Quite a few adults showed interest in SEG and all were given our brochure. The two tables were mostly covered with back issues of SEGments which visitors were invited to take. We



sold two copies of our book Thirty Years of Science and Adventure, three copies of Wildlife of Greater Adelaide and one or two of Annette's book The Art of the Ant.

A laptop was used for showing a podcast of activities at Minnawarra, filmed as a segment of the television series "Totally Wild", Season 25, Episode 52. Several other exhibitors had well patronised activities for young children. The most successful exhibits had animals or other moving objects and/or things for people to do. On Saturday and Sunday hardly any teenagers actively participated anywhere.

Popular with children and their parents were 30 minute shows held on two stages. Rob (Morrison) and Dean re-created the Curiosity Show, very popular with mums and dads, but widely approved of by the young audience seated on the floor in front of the stage. Other shows which caused loud oohs and ahs from behind the screened-off stage were the Bubble Show and Animals Anonymous.

Preparation for all this took many weeks. Congratulations to Helen Johnson for her lively and capable organising of SEG's exhibit. Thanks to Andrew Barr, who with Helen's assistance, was responsible for the design of the four vertical banners describing SEG's Projects. SEG members who took turns staffing the exhibit were Graeme Oats, Bob Sharrad, Richard Willing, Annette Vincent, Greg Johnston, Sarah Telfer, Jill Tugwell, Alun Thomas, John Love and Helen Johnson.

Being at Science Alive! provided SEG with a forum to advertise our activities to younger people. We have had several enquiries since Science Alive!, and have signed up a few new members.



Jill Tugwell explaining an Elliot trap to students at Science Alive

jhlove@internode.on.net

# SEG WELCOMES MICROCHIPS AUSTRALIA AS NEW SPONSOR

It is with great pleasure that we welcome Microchips Australia distributors of Trovan products in Australia, and already aboard as a corporate sponsor. The company has agreed to provide microchips for the Minnawarra Biodiversity Surveys. While chipping of pets and livestock is well established its use in wildlife animal research is perhaps not so well known. For the past few years we have been chipping native rats, female antechinus and bandicoots, and it has had a huge impact on how we handle recaptures. They are rapidly identified with a hand held reader, with little stress to the animal.

In the past we have funded microchipping with various grants, but in the present economic climate these have dried up, so Microchips Australia's sponsorship is very welcome. They are



sponsor other wildlife projects in Africa and Borneo. SEG is honoured to be an Australian project that they are sponsoring.



# FRIENDS of VULKATHUNHA-GAMMON RANGES NATIONAL PARK WORKING BEES

# **Graeme Oats and Ray Hickman**

The Friends group have continued with their refurbishment of Oocaboolina Outstation, and their environmental monitoring of the Weetootla Gorge spring during the winter. More information at http://www.rayh.id.vulkathunha/index.html.

# Oocaboolina Hut

Seventeen volunteers continued their work on Oocaboolina Hut over five days in early July. The refurbishment work was begun during a trip in April.

With the use of a fire truck and personnel donated by the Nepabunna Community, some members of the group progressively burned and buried the ash of the feral Athel Pine that had previously been chopped down and poisoned. Other projects that were undertaken included: the rebuilding of the long drop toilet (by digging out the hole, refitting a new seat, new door and new roof); replacing over 200 metres of fence on the Copley-Balcanoona Road; installing a new chain gate; dismantling a garage riddled with rotten timbers; cleaning some of the interior walls, ready for painting; installing some of the internal door frames; repairing concrete edges of the verandah; and painting all the fascia and roof gutters.

The group is indebted to Arthur Coulthard, Senior Ranger, Adnyamanthana for his help in procuring and delivering the building materials and tools. Arthur also spent an evening with us during which he told us one of the dreaming stories, played his guitar while singing a few songs about his native country.



A working bee is planned for 20 - 25<sup>th</sup> October this year. Should you be interested in helping us continue with this project please contact Graeme Oats at gdoats@bigpond.net.au

# Weetootla Gorge spring environmental monitoring

Water quality measurements: pH, conductivity, dissolved oxygen, turbidity and water hardness values are being determined at spring heads and downstream.

**Fish observations:** estimates are being made of the proportions of fish (Flinders Ranges gudgeon, *Mogurnda clivicola*) of different lengths.



Burning of the Athel pine with help of Nepabunna staff

Weed containment/eradication: horehound and tobacco bush infestations are being dealt with by a combination of physical and chemical means, in consultation with arid lands ecologist Robert Brandle.

Yellow-foot rock-wallabies: sightings and habitat assessment information is being recorded.

# Balcanoona work

This is a recent addition to the monitoring activity that takes place in the park, and on the nearby Wooltana pastoral property. It involves improvements to the existing extensive irrigation system, installing plant guards and new plantings adjacent to Park Headquarters at Balcanoona. If you are interested in either the monitoring work at Weetootla Gorge or the Balcanoona work (or both), contact Roger Mathers at roger\_mathers@yahoo.com or Ray Hickman at raywen@bigpond.net.au.



Greeneklee family after rebuilding the long drop loo

# MINNAWARRA BIODIVERSITY SPRING SURVEY 2018

# Thursday 27<sup>th</sup> September to Monday 1<sup>st</sup> October

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 <u>thefurlers@gmail.com</u> Richard Willing on 0408 807 517 or <u>rwilling01@gmail.com</u>



# **SEG MALLEEFOWL SURVEY 2018**

SEG will conduct its annual Malleefowl survey in the Murrylands on the weekend of 24 and 25th November 2018.

Please register your interest with Stuart Pillman *aspillman237@gmail.com* so that he can send details.

# SEG HAS A FACEBOOK PAGE

SEG has now joined the world of social networking. We now have a Facebook page, along with our long established website. To find our page search for "Scientific Expedition Group" from within Facebook.

Editorial continued from page 1

regenerative agriculture. Christine Jones says that soil will retain the equivalent of an extra 2 buckets of water for every 1% increase in carbon in each 1 sq metre of soil.

(4) Encourage maximum **biodiversity** and health of integrated dynamic ecosystems at all levels.

A radical idea might be to try an experiment on Nature Foundation SA's Witchelina. The Biological Survey Report from the 2016 SEG biodiversity survey has now been published (see SEG's Community Webs website); to my mind the floral regeneration seen over 17 years is low, with native grasses being very scarce. Perhaps reintroduce sheep in small sized paddocks with water supplies, and move them every few days, leaving long rest periods for each paddock. Lots of small paddocks would be needed for the holistic grazing program to achieve regeneration.

Dr Jones' and native plant botanist Judi Earl's research led them to understand that "the true causes of degradation of landscape function were not cloven hooves but the mouths of livestock: that is overgrazing and/or over-resting". This grazing of pastures for too long and eating vegetation too low, leads to a cascading effect of destroying too many green leaves, thereby starving the energy production system, and killing too many roots. This degrades the water cycle infiltration and storage- with associated destruction of soil life and the collapse of nutrient cycling. "Grasslands are distinctive in that they require active management. To not act is to fail." (Massy, Chapter 4)

I urge ecologists, farmers, agriculturists and foresters to read this seminal book, "The Call of the Reed Warbler".

Helen Johnson

kdolphin@internode.on.net



# SCIENTIFIC EXPEDITION GROUP INC. APPLICATION FOR MEMBERSHIP AND MEMBERSHIP RENEWAL for 2018 – 19

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

\* The promotion and running of expeditions of a scientific, cultural and adventurous nature.

\* The furthering of knowledge, understanding and appreciation of the natural environment.

\* Promotion of the values and philosophy of wilderness.

\* Enabling people to learn the skills required for planning and running expeditions, and to develop sound field techniques

# SUBSCRIPTION RATES

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

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

Name	
Address	
Telephone (H)	. (W)
E-mail	

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

.....

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# **ELECTRONIC PAYMENT**

If you have access to the internet, payment can be made using SEG's bank account at Bank of South Australia, details as follows:

Acc Name: Scientific Expedition Group Inc. BSB: 105-086 Acc No.: 330629440

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

# PLEASE NOTIFY ANY CHANGE OF POSTAL OR ELECTRONIC ADDRESS

Or send a cheque payable to Scientific Expedition Group Inc. with a photocopy of this page to: The Secretary Scientific Expedition Group Inc. P.O. Box 501 Unley S.A. 5061

