



SEGments



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Scientific Expedition Group Inc.

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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 for Environment and Water 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 mallee-fowl monitoring in the Murraylands.

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Cover Photo: Red-backed Kingfisher photographed

by Rebecca Greening on Koonamore

Rear Cover: Arkaroola Expedition 2024 Flyer



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I am also delighted to have reports from the students who were recipients of the Nature Foundation Scientific Expedition Foundation RL & GK Willing Grant.

In 2023 the grant recipient was Rebecca Greening. Rebecca's project studied the TGB Osborn Vegetation Reserve at Koonamore in the north east of South Australia to determine if spatial patterns of soil nutrient accumulation and microbial community compositions are different between 98 years of livestock grazing exclusion versus area grazed since the 1860's. See her report on pages 5 to 7.

In 2022 Chih-Yun Liu (Kantine Liu) did her project concerned conserving rock-hole biodiversity under climate change through microcosm experiments. Summary of her report is on page 14.

As mentioned in my March Editorial, SEG decided to offer internships to University of Adelaide students to assist with planning and running SEG projects and of course to give the students some experience in field surveys.

Jack Davey was awarded the internship and is working on his internship with the Minnowarra Project. I hope we can have a report from him in the next SEGments issue.

Jack was one of three applicants short listed for the internship and it is an indication of how great the need for such a program that the two unsuccessful applicants also joined the Minnowarra survey.

The University of Adelaide is currently advertising for an internship to assist with the upcoming expedition to Arkaroola.

Details of the Expedition Arkaroola 2024 survey are given on the back page of this issue. A limited amount of accommodation is available so we recommend early application.

Alun Thomas
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EDITORIAL

SEG is extremely fortunate to have had several new committee members in the last few months, particularly due to the hard work of Helen Owens. It seemed to me, therefore, that it would be useful to briefly introduce the full committee to members. See the article "Know Your Committee" on pages 11 to 13 of this issue.

KANGAROO ISLAND FERAL CAT ERADICATION PROGRAM ACHIEVEMENTS

2022-23

Paul Jennings

Funding received has formed an important component of the Kangaroo Island Landscape Board's Dudley Peninsula Feral Cat Eradication Program in 2022-23. This program is well underway to eradicating feral cats from 100% of the Dudley Peninsula. The program has employed a rolling eradication front starting at the most eastern point of the Peninsula and progressing west towards the feral cat exclusion fence across the narrowest point of the Pelican Lagoon isthmus. The program continually looks to improve practices through adaptive management, and trialling and incorporating new technology. This report summarises the achievements of the Dudley Peninsula Feral Cat Eradication Program from July 2022 -June 2023.

1. Feral cat control

Over the past 12 months this program controlled feral cats across 31,888 ha of the Dudley Peninsula. The eradication front progressed from covering 65% of the Dudley Peninsula to 85%. A suite of control tools were used:

- 205 feral cats were trapped with cage and soft-jaw foothold traps across 20,224 trap nights.
- 47 feral cats were targeted with Felixer™ Grooming Traps.
- 4,300 ha of woodlands across public and private lands were baited with Curiosity® poison bait.
- Over 400 cage and soft-jaw foothold traps were deployed across the Dudley Peninsula in 2022-23.

To date the number of traps used was limited by the time taken to physically access and check traps each morning. During 2022-23 the program began retrofitting traps with Celiium Trap Alert technology. This system notifies staff when a trap is closed, negating the need to check open traps, resulting in a reduction in staff workload of up to 60%. In 2022-23 70

traps were retrofitted with this technology, with an aim to retrofit all remaining traps as soon as possible.

2. Monitoring feral cats and their impact on native animals

An array of 200 4G-connected remote cameras have been installed across the Dudley Peninsula to monitor feral cats and native animals. Cameras send images to an AI-based image processing software package which has been trained in conjunction with Kangaroo Island Landscape Board staff to recognise feral cats and native animals in the photographs. The system can now identify specific animals from dark and blurry images, and images where only a small part of the animal is visible. A key piece of this work has been undertaking daily training of the system. To this end staff have improved the accuracy of the program, providing a valuable tool for research and control of feral cats. These refinements to the system are made available to all eVorta users and as such, will prove useful to any pest animal control programs going forward.

This network is used to provide real-time information on where feral cats are active. Camera information enables us to



A Felixer™ Grooming Trap



A feral cat in a cage trap



A feral cat photographed with a 4G-connected remote camera installed on the Dudley Peninsula used to monitor feral cats and native animals.

continually evaluate the likely success of capturing a feral cat in our trap network and to adjust the locations of our traps to better target specific individuals. We have been able to use this array to track the movements of individual feral cats behind the eradication front and target treatments to control them. This video gives a short demonstration of how we are able to follow feral cats using this technology:

https://www.youtube.com/watch?v=R2Uriq99_jM

The network covers public and private land and is also used to monitor the presence of native animals, including threatened species, such as the KI echidna, bush stone curlews, southern brown bandicoots and hooded plovers.

3. Community support

Community support is vital for the success of the Dudley Peninsula Feral Cat Eradication Program. The Dudley Peninsula community was engaged in a large scale trapping program (the Blitz) from 24 June until 4 July 2022. 31 landholders participated and 61 feral cats (35 females and 22 males) were caught over the 10 nights of the Blitz. The Kangaroo Island Landscape Board assisted a local landholder to build and install 12 owl nest boxes across the Dudley Peninsula. This was undertaken to address community concerns that removing feral cats would cause an increase in rodent numbers. Within two months barn owls

were recorded visiting over half of the nest boxes. Watch this video for more information:

<https://www.youtube.com/watch?v=plk5YJxiVK4>

In June 2023 an online survey was conducted to gauge the level of community support for the eradication of feral cats on the Dudley Peninsula and the whole of Kangaroo Island. 204 people completed the survey. The results showed there is still overwhelming community support for the project, with 96.57% (197 respondents) in favour of eradicating feral cats on the Dudley Peninsula and 96.08% (196 respondents) in favour of eradicating feral cats from Kangaroo Island as a whole.

The high level of support is mirrored by Kangaroo Island Landscape Board staff levels of access to properties on the Dudley Peninsula, with 94% of properties approached permitting access. The areas that we cannot access account for 2.31% of the land area and should not impact our ability to complete the program.

4. Future plans

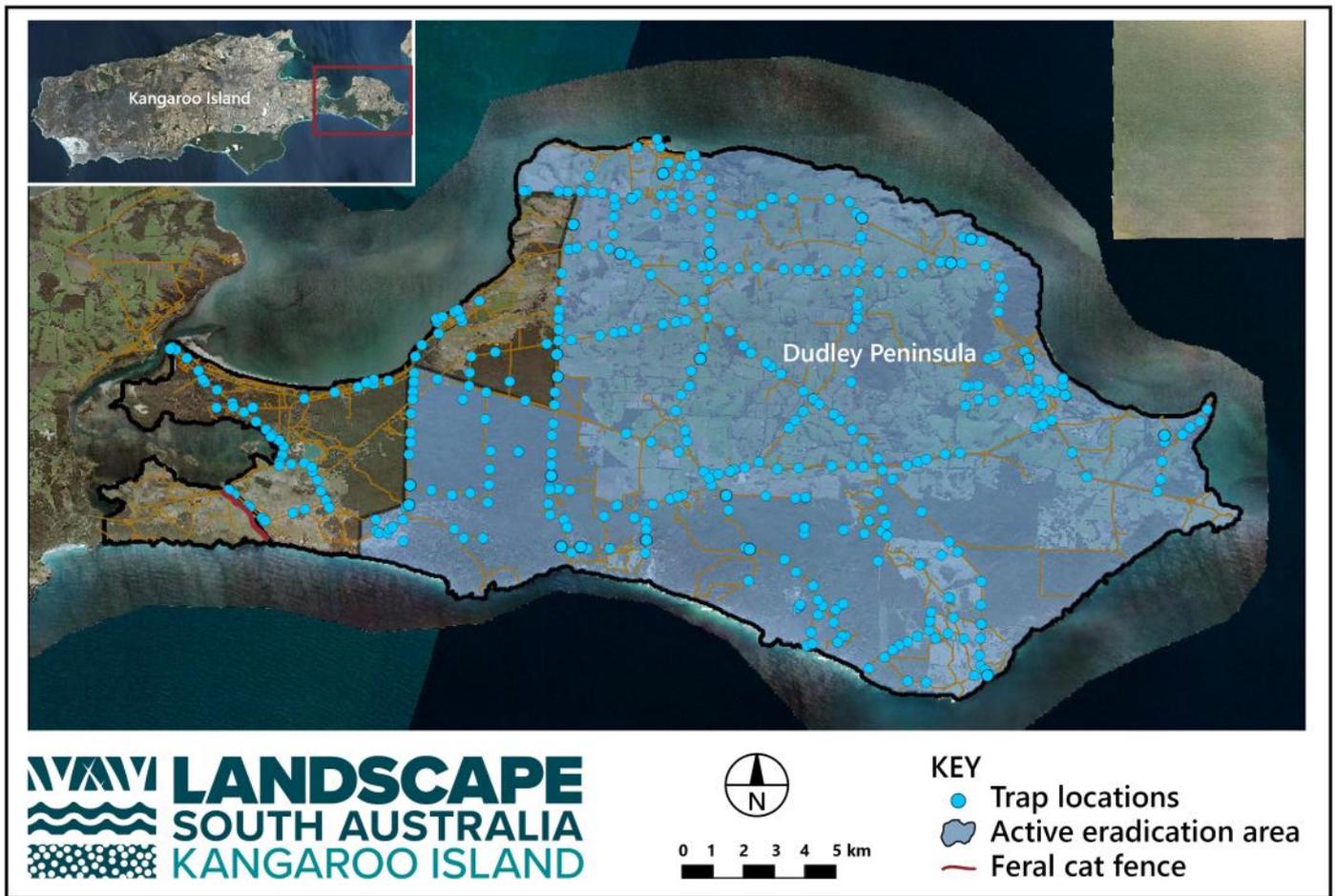
The eradication of feral cats from the Dudley Peninsula is now scheduled for completion in 2025, before the remainder of Kangaroo Island is attempted. Support is needed to continue this vital work, including for the following activities:

4.1 Conservation detector dog pilot project

Detector dogs (scent detector dogs) are increasingly being used to assist with conservation monitoring work. Their acute sense of smell provides an excellent means in detecting their target, in this case cats, and acts as a quality control on other monitoring methods. Detector dogs have been used successfully in eradication projects in Australia, including on Dirk Hartog, Tasman and Macquarie Islands, to confirm that



Setting a feral cat trap on Dudley Peninsula



Locations of feral cat traps on Dudley Peninsula as of December 2023

cats had been removed. Dogs are known to cover twice as much area when compared to humans and can search areas which are difficult to access or monitor using other techniques. A combination of monitoring techniques will be needed to provide a high level of confidence that the Dudley Peninsula on Kangaroo Island is cat-free. The project already has established a comprehensive camera monitoring array across the peninsula to detect and measure changes in cat densities as well as the response of native wildlife following cat removal and eradication. The detector dog pilot project will seek to complement the existing camera array and provide vital information to the program on ensuring no cats are missed. This provides a rigorous methodology to confirm proof of freedom to declare the eradication a success.

4.2 Support our team to continue to deliver critical on-ground management. On-going support for our field team to continue monitoring and managing feral cats across the Dudley Peninsula is required. This support will go towards funding, or part-funding, a staff member to manage our extensive camera monitoring array to detect remaining feral cats, or in active on-ground control.

4.3 Support to apply innovative control tools increasing the efficiency of operations The Felixer™ Grooming Trap is a recently registered tool for feral cat management. The Dudley Peninsula feral cat eradication program’s Felixer™ Grooming Traps were purchased more than five years ago and in this time there have been major upgrades in both the hardware

and software to increase target specificity and reliability in the field. To optimise control in remote and difficult to access areas on the Dudley Peninsula, new Felixer™ Grooming Traps are needed to replace our outdated machines which are nearing the end of their serviceable life. Support to purchase/ lease additional Felixer™ Grooming Traps will ensure the program is applying the most up to date, best practice management tools towards eradication of feral cats from the Dudley Peninsula.

For more information:

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and

<https://www.facebook.com/FeralFreeKI/>

Instagram: <https://www.instagram.com/kilandscapesa/>

Youtube: https://www.youtube.com/channel/UCdfEauH_fqWyJlvuAF0fD4w

COULD LIVESTOCK-ASSOCIATED SOIL MICROBES BE AFFECTING PLANT RECRUITMENT?

Rebecca Greening



Soils from Koonamore Station and from the 99-year livestock exclusion Reserve within suggest that livestock-associated soil microbes and nutrient levels may pose yet another challenge to native plant recruitment.

In South Australian arid lands, native perennial vegetation biodiversity is threatened by an absence of appreciable recruitment of palatable species. While the pervasive effect of livestock herbivory on native vegetation are well-documented, indirect effects on soil microbes and their crucial role in nutrient cycling and facilitating plant recruitment remain largely unexplored.

Within arid landscapes, perennial vegetation plays a crucial role, fostering multiple biotic and abiotic processes that result in accumulation of nutrients, increased microbial abundance, and enhanced growth of plants in the soil under the canopy.

Microbial activity is essential for ecosystem function as microbes cycle organic matter back into available forms for use by other organisms. Moreover, microbes provide ecosystem services by increasing the structural stability of soil through hyphae and exudates that enable increased water infiltration and retention, helping to prevent erosion.

Microbial communities within biological soil crusts are particularly susceptible to disturbance by livestock, resulting in reduced cover, changes in species

composition, and altered nutrient cycling capabilities. Despite the positive effects of perennial vegetation, microbial communities can also be adversely affected by livestock under the canopy, usually attributed to stress-like responses to direct herbivory.

My research focussed on soil in the open and under the canopy of an unpalatable perennial shrub, *Eremophila sturtii* (turpentine bush), to explore the knowledge gap of how livestock presence and indirect pathways can impact soil health.

Digging into how livestock impact soil under the canopy and in open spaces

This project was conducted at Koonamore, South Australia, in the TGB Osborn Vegetation Reserve, a 4km² vegetation monitoring site managed by the University of Adelaide. Established in 1925 with a stock and rabbit-proof fence, the complete exclusion of livestock for 99 years and controlled rabbit numbers for ~50 years have enabled natural regeneration of the previously overgrazed paddock.

The Reserve's location within Koonamore Station provides a unique opportunity to use the Reserve as an ecological baseline to study the impacts of livestock on arid systems.

Within an arid landscape, different areas across small scales, in addition to different species of plants, are

conductive to distinctive soil microbial communities.

My project took this into account by sampling soil from under the canopy of turpentine bush and in the open. Soil was sampled within the Reserve and across the fence on Koonamore Station in close patches to minimise the effects of soil spatial heterogeneity. The soil collected underwent nutrient tests and amplicon sequencing of fungi and bacteria. Additionally, the collected soil was used to fill pots which grew *Enchylaena tomentosa* (ruby saltbush) in a greenhouse experiment.

Key findings

- Plants grown in soil from grazed open spaces produced 60% less biomass.
- Plants grown in soil from under the canopy showed no difference between grazed vs Reserve.
- In grazed areas, NO₃-N, K, and S were higher under the canopy and P was lower in the open.
- Grazed areas foster unique soil microbial communities.

My research revealed that livestock have spatially distinct impacts on soil nutrient levels, soil microbes, and plant growth. In open spaces, the presence of livestock was associated with reduced fungal abundance, the number of biological soil crust- associated species, surface stability, phosphorus levels, and plant growth. However, under the canopy, livestock were associated with increased fungal abundance and increases in nitrate nitrogen, potassium, and sulphur. Overall patterns observed were that grazed areas had fewer species of sensitive fungi, more fast-growing fungi and bacteria, and higher relative abundances of bacteria.



Plants grown in soil from grazed areas, from the open (left) versus soil from 5 m away under the canopy (right).



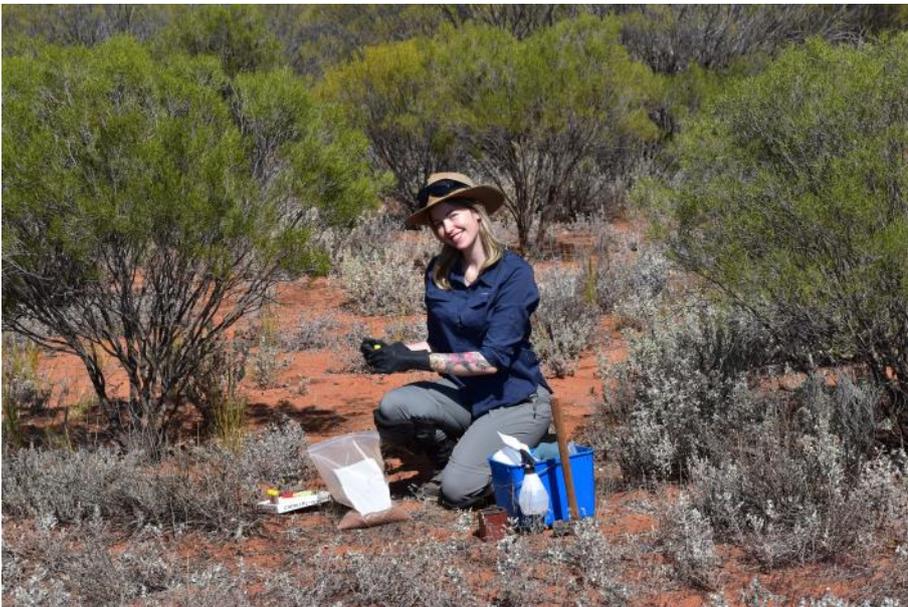
The TGB Osborn Vegetation Reserve, Koonamore Station, in December 2021.

Increased nutrients in grazed areas: Is it dung or something else?

The nutrient differences between the Reserve and grazed areas were interesting, with expected differences, such as an increase in organic carbon in the Reserve, not observed. I found around 10-20% increases in nitrate nitrogen, sulfur, and potassium in grazed canopy soils compared to Reserve canopy soils. The increases in nutrients in the grazed areas may be due to open space degradation and resource redistribution to under the canopy.

In well-studied mesic systems, dung is usually attributed as the primary source of nutrient enrichment in grazed areas. Erosion and subsequent deposition including sediment and dung may be the cause of the observed increase in grazed canopy soil nutrients, supported by my finding that there is decreased soil stability in grazed open spaces.

However, my study revealed no reduction in nutrients in open soil from grazed areas compared to the Reserve, except for phosphorus, which was 8% lower overall and not found to be higher under the canopy. It is possible that, on a greater scale, deposition of nutrient-rich sediment occurs under the canopy in grazed areas, associated with the reduction in soil stability and erosion in rangelands. This would explain why I did not see a reduction of nutrient levels in open spaces on small scales. In contrast, a previous study conducted in the Reserve on the ability for fallen logs to form areas of higher fertility soils demonstrated that logs accumulated more nutrients inside the Reserve than in grazed areas.



Rebecca doing her fieldwork at Koonamore

Small but mighty: Microbes may be why

While the observed patterns of increased nutrients in grazed canopy soils may be attributed to depositional processes, the findings of this study revealed that livestock grazing was also associated with changes in the relative abundance and community composition of microbes between canopy and open areas. Aligning with other studies, I found bacterial and fungal communities are correlated with essential soil nutrients. This correlation can be due to specific microbial species having specific requirements and as such, have unique responses to environmental conditions. Altered microbial communities can also shift the available or unavailable nutrient forms in the soil, forming the association directly.

While my study revealed altered microbial communities as well as altered nutrient levels, determining causation for either was beyond the scope of this research due to their interconnected relationship. What I have established, however, is multiple lines of evidence for the presence of livestock altering the way arid ecosystems function, through specific changes in the microbial taxa present, and particularly through the reduction of growth response evident in my greenhouse experiment.

Could livestock-associated soil microbes be reducing plant growth?

Despite anticipating the differences in soil nutrients to be implicated in the growth response observed, the only soil nutrient related to the growth response was organic carbon, which was also correlated with differences in microbial communities. Additionally, despite the canopy soil from grazed areas being higher in nutrients than the Reserve canopy soil, there was no difference in growth response between the two.

In general, despite arid soils being nutrient limited,

the greenhouse experiment only ran for three months, meaning it was unlikely that plant growth was limited by nutrients. The lack of difference between the growth response of all other treatments except for the grazed canopy soils suggests that plant-microbial interactions are the cause of reduced growth.

As the main difference in grazed open soils was a significant reduction in fungal abundance and a large change in the fungal taxa present, I hypothesise that the fungal abundance and community composition play a primary role in promoting and inhibiting plant growth, resulting in the observed

growth response in grazed canopy soils.

More questions than answers, but the importance of perennial shrubs shines

While the findings of this project highlight the potential negative impacts of livestock grazing, they also emphasise the restorative potential of turpentine bush. Despite being impacted by livestock and despite its unpalatability, evident in altered microbiomes, these shrubs protect and stabilise soil, resulting in soil stability under the canopy in grazed areas being the same as ungrazed areas. In grazed areas, turpentine bush promotes a soil environment that enhances new growth by 60% compared to soil from open areas.

Although unpalatable shrubs may be looked upon unfavourably, my research highlights the important role these shrubs have in maintaining the health of rangelands.

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Rebecca Greening



25TH ANNIVERSARY OF NANTAWARRINA INDIGENOUS PROTECTED AREA

Helen Johnson

Earlier in the year the Friends of Vulkathunha Gammons Ranges National Park (FVGRNP) were invited by Gerry Butler, Event Facilitator from the Landcare Association South Australia (LASA), to assist with the 25th Anniversary celebrations of the Nantawarrina Indigenous Protected Area (IPA). The 4WD Adventurers Club of South Australia also assisted with the celebrations. Graeme Oats liaised with Gerry Butler to guide the Friends' involvement.

The Friends' duties were to prepare and serve an evening BBQ for up to 100 guests on Friday 1st and a smaller number on Saturday 2nd September 2023 and to prepare breakfast on Saturday and Sunday mornings. Our assigned location was the Community Centre at Nipapanha (formerly Nepabunna). The 4WD group prepared the BBQs, breakfasts and packed lunches at the Nantawarrina Plaque Campground, catering for campers and people attending cultural tours on Saturday and Sunday.

Six hundred kilometres north of Adelaide, the 58,000 ha Nantawarrina IPA lies at the heart of the traditional Adnyamathanha lands on the southern boundary of the Vulkathunha Gammon Ranges National Park, and on the outskirts of Nipapanha. On 2nd September 2023 the IPA celebrated its 25th anniversary with over 150 visitors to the Nantawarrina Plaque Campground where the first ceremony establishing the IPA took place on 26th August 1998. Community and Government leaders took part in the moving ceremony.

In 1995 the Adnyamathanha community at Nepabunna pioneered the idea of an indigenous protected area on their

country. They led the way in what became an internationally recognized revolution, seeking Federal and State government support for a protected area on Indigenous land where First People's knowledge and skills could be used to protect Country and culturally significant sites.

At the first ceremony in 1998 Adnyamathanha Traditional Owner Gertrude Johnson proclaimed the "First Indigenous Protected Area in Australia". Pivotal to the start-up were the Aboriginal Lands Trust and Indigenous Land Management organizations supporting the Adnyamathanha community to achieve the first Indigenous Protected Area of its type in the world.

The Nipapanha Community Aboriginal Corporation (NCAC) established in 2009 manages the IPA and guides a team of full-time Rangers (currently 8) to deliver the requirements of a Plan of Management. The Ranger teams have developed relationships with Aboriginal Lands Trust, Bush Heritage, Pew Charitable Trust, UniSA and other organizations to share their knowledge and learn new ways of improving their country. Rangers improve their skills through targeted training including Certificate level training in Conservation and Land Management and Indigenous Land Management.

Nantawarrina is highly regarded as an example of how land can and must be rejuvenated and protected for future generations. Under the Federal Government's Working on Country Program, employment and training opportunities are provided for up to 10 full time Rangers.



Big Moro Gorge. Photo Greg Cramond

Once a severely degraded pastoral property heavily grazed by animals, the removal of sheep, donkeys, rabbits, 20,000 goats and weed management has allowed natural regeneration of native vegetation. The country in spring looked beautiful. However, goat control continues since goats freely enter from the National Park.

Over the past 25 years the Rangers have replanted native vegetation helping to conserve biodiversity and support the Andu - yellow-footed rock wallaby. Populations of Andu have doubled since monitoring began in 2000. Bird surveys and wildlife monitoring using cameras and radio tracking also support biodiversity.

The Rangers have restored cultural sites, maintained waterholes, built bores and water tanks and laid out irrigation pipes. They have greatly improved infrastructure for tourists at Big Moro Gorge where there are three spring-fed waterholes, and restored and protected a heritage homestead called Irish Well Hut. A campsite has been established for tourists at the Plaque Campground, and camping is permitted in several other areas with toilets provided. Roads, facilities and signage are continually maintained and improved.

IPAs offer commercial opportunities to build cultural and nature-based tourism, providing local employment and building cultural understanding. The Nantawarrina website and the Nantawarrina brochure available from the Nipapanha Information Centre provide information for people wishing to visit.

At the IPA ceremony held at the Plaque Campground on Saturday we were welcomed to Country by Gertrude Johnson's son Adnyamathanha Elder and Traditional Owner Uncle Kelvin Johnson (sadly recently passed) and Adnyamathanha Elder and Traditional Owner Uncle Noel Wilton. The Honorable Susan Close, Deputy Premier South

Australia and Minister for the Environment and Water and the Honourable Geoff Brock MP, SA Minister for Local Government and State Member for Stuart gave speeches and they acknowledged the hard work over the past 25 years of all the past and present Nipapanha community members who have worked on and supported Nantawarrina.

In her message read at the Plaque ceremony the Honourable Tanya Plibersek, Federal Minister for the Environment and Water said "the first IPA began with a simple idea: that if we listened to First Nation's people and we valued First Nation's expertise, and if we empowered First Nations communities on the ground, we could protect Australia's environment, while supporting local jobs and economic development". Minister Plibersek also said that 25 years ago the Adnyamathanha people "started a movement which has spread across this continent like a brilliant, unstoppable flame".

The Honourable Linda Burney, Federal Minister for Aboriginal Affairs in her message congratulated the Indigenous Rangers who are using their knowledge and skill to protect Adnyamathanha lands and for leading the way for others to follow. The Honourable Rowan Ramsey MP, Federal Member for Grey wrote "Australia's Indigenous Protected Areas have become the preferred model in Australia to manage our vast National Reserve areas."

In 2023 IPAs make up over half of Australia's National Reserve System and include some of Australia's most rare and fragile environments. Eighty two dedicated IPAs cover 87million ha of land and 5million ha of sea country. Indigenous Protected Areas are similar to other reserves or national parks but are owned and controlled by local Aboriginal or Torres Strait Islander communities. The Federal Government is currently adding ten new IPAs and planning to

double the number of Indigenous Rangers by the end of the decade.

In 2000 the Nantawarrina IPA received international recognition from the United Nations Environment Program, joining the Global 500 Roll of Honour for Environmental Achievement. The UN Secretary General visited Nepabunna when Prime Minister John Howard and Minister for the Environment the Honourable Robert Hill made a presentation on the IPA to the United Nations International Union for Conservation of Nature and Natural Resources (IUCN). In 2003 the Nantawarrina IPA programs were showcased in a presentation to the 5th Congress of the IUCN in Durban, South Africa.

On Friday 1st September Annette Vincent and I drove to Nipapanha from Arkaroola where we had been staying. We arrived as the school children from Leigh Creek School were receiving their bright red Nantawarrina T-shirts and gift bags. We were greeted by the Acting CEO Nipapanha Community Aboriginal Corporation (NCAC) and people from Landcare SA and invited to join the children in tree planting.

The One Tree Per Child project started by Olivia Newton-John and John Dee aims to have every child planting at least one tree in their primary school years. Annette and I planted a tree each and assisted some of the children to plant theirs. On Friday night Susan Close and Geoff Brock each planted a tree before attending the BBQ.

All visitors were included in the cultural tours on Saturday and Sunday. We drove in convoy to the Big Moro Gorge on Saturday afternoon. Moro Gorge is one of the most important Adnyamathanha cultural sites where Akurra the giant serpent leaves the ranges. Adnyamathanha Elder and Traditional Owner Uncle Vince Coulthard told us the story of

two brothers who came down from the sky at Paralana to teach people how to live and behave well, what animals they could eat and how to kill and prepare them. The brothers travelled from Paralana down through Munyalinna, Nepouie, Italowie and Big Moro Creeks. They left the ranges and went south to Chambers Gorge and then to Mt Hack finally rising in the smoke and wind of a big fire they had lit ascending into the sky as two black holes in the Milky Way. The Yura Muda – story, is described in Terrence and Josie Coulthard’s wonderful book;

“Adnyamathanha. A Cultural Guide and Language Book” 2020.

On Sunday we visited Irish Well Hut which has been beautifully restored and has storyboards placed on the outside walls with a large sculpture of a young aboriginal boy shearing a sheep which looks so life-like it is startling. The hut, which is very cool inside, has been enclosed by a wide verandah protected with fly screening. We then drove through some kilometres of bull dust to Waukla Woodna Gorge where Uncle Kelvin explained the story of the wildu - eagle, and his nephews, the wakarla - crow and the urrakurli – magpie, that were disrespectful to their uncle. The moral of the story is to be respectful to your elders. We enjoyed our lunch whilst Uncle Noel sang songs about the wildu story, a song called “Imagine” about children’s love of living at Nepabunna, and a song he had written. We walked up the Gorge and then drove in convoy back to Nipapanha.

The cultural tours were enlightening and we felt privileged to be part of three days of anniversary celebrations - meeting Rangers, community members from Nipapanha, LASA members and working alongside our ‘Friends’. That night Annette and I enjoyed kangaroo tail and damper for our tea at ‘Angepena’ where we stayed with other volunteers. On Monday 4th September Annette and I visited the Copley nursery (with which FOVGR have an association) and met Ron Johnston who created and runs the nursery. Annette and I then enjoyed some peaceful days at Balcanoona before the Friends’ water monitoring team arrived on the Thursday 7th September. A number of FVGRNP members are also members of the Scientific Expedition Group.

The recent FVGRNP Newsletter 27 has an article on the water monitoring trip <https://friendsofgammons.org.au/>. The Friends group has produced a very high quality and informative bird brochure of the Arkaroola and Northern Flinders Ranges region, available on the website.

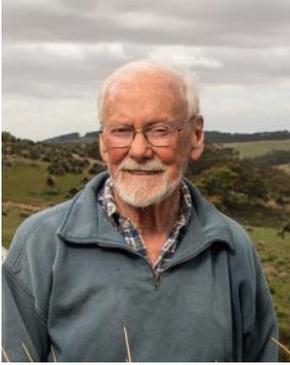
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Members of the Nipapanha Community L-R: Bruce Wilton, Kelvin Johnson, John Chester, Cameron Johnson, Phil Wright, Ian Johnson Jr, Jason Downs, Kimberley Steele, Greg Cramond, Thomas Wilton, Ian Johnson Snr.

KNOW YOUR COMMITTEE

President Emeritus - Richard Willing



Richard worked as a Medical Officer at Mawson Station in Antarctica and at Woomera rocket range and did post-graduate studies in UK. Back in Adelaide he worked as a specialist for many years. Richard and the late Warren Bonython formed SEG in 1984. He was Chairman for many years and upon Warren's retirement he was elected President and more

recently President Emeritus. Richard was a general practitioner and surgeon. Richard has been awarded an Order of Australia Medal for his environmental work.

President - Alun Thomas



Alun is a foundation member of SEG and has variously held the positions of Editor, Administration Officer, Chairman and is currently President. He has been leader on a number of major expeditions. In real life Alun was an industrial chemist and patent attorney.

Chairman - Robert Sharrad



Dr Bob Sharrad AM is a field biologist and naturalist who has spent much of his life teaching trainee teachers and rangers, conducting wildlife surveys or doing field ecological research. Bob has full academic status at the Flinders University of SA but spent most of his teaching career at

UniSA. A significant proportion of his time has been spent studying wildlife in the field, often in remote sites in Australia and overseas, and it is this experience that makes him committed to the conservation of nature.

Vice-Chairman - Duncan McKenzie



Duncan recently retired as Chairman of BirdLife Australia Gluepot Reserve (23 years) and as a Board member of Birdlife Australia – he is a life member of BirdLife Australia. He is the President of SA Friends of Parks Inc. and is Chairman of the Adelaide International Bird

Sanctuary. Duncan is a member of the South Australian Parks and Wilderness Council and a member of the Volunteering SA/NT Strategy Working Group. In January 2020, Duncan was appointed to the Wildlife, Ecosystems and Habitat Recovery Task Force to assist SA in planning and instituting, long-term fire recovery and the DEW Nature Based Tourism Reference Group.

Treasurer - Peter Whitehead



Peter developed a love of things natural when his father used to bring home injured magpies and other animals which were looked after as pets.

(Probably illegal now but things were different in the 1960s). He lived on the outer fringe of the city in the foothills, and spent

holidays and many weekends lifting up rocks etc looking for reptiles. Peter graduated from Adelaide University in 1972 in Economics and since then has worked as a Chartered Accountant which has taken me him over the State and beyond. He has been the Honorary Treasurer of SA Herpetology Group for over 20 years and only 18 months ago became the Treasurer of SEG. He says "I am looking forward to participating in future expeditions, especially when I hang up my accounting boots".

Secretary - Sarah Telfer

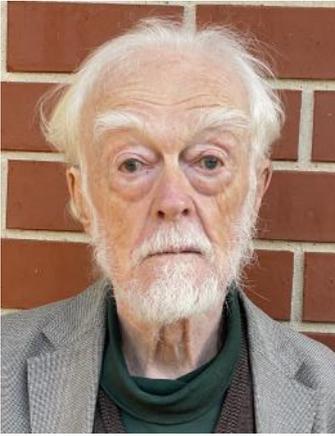


Sarah has been a member of SEG since the beginning and was an expeditioner on the "inaugural" expedition to Coffin Bay in 1984. She is a retired ecologist and has undertaken vegetation surveys, assessments and monitoring in many parts of South Australia. As well as being SEG's secretary, she volunteers at Ferguson

Conservation Park and enjoy weeding and restoration work in this small but important patch of remnant vegetation in metropolitan Adelaide.

John Love

In 1995 John Hayes, who was then vice-chairman of SEG, invited John Love to join a SEG expedition to the Gawler Ranges. He had such a good time that he decided he should



put something back into SEG. He soon found himself as Secretary. He is not quite sure how that happened but he continued in that office for about twelve years and he has been a member of the committee ever since. John is a stalwart of the VGRaSP Project having been on many expeditions and being a packhorse carrying huge loads

of equipment into the site.



Trent Porter

One evening in 1991 Richard Willing gave a short talk on ABC Radio to advertise an Expedition to Lake Newland on the West Coast by a mob called Scientific Expedition Group. Sounded very interesting so Trent went along. It WAS very interesting and he was hooked but being very busy with work at the time could not join in again 'till 1996 when his son, Mark, came home from Uni.

one day and told of another SEG trip to Arcoona Creek which they joined. This really set the hook! He then became involved in the Committee and along with Paul Wainwright organised all the catering of food and equipment for Expedition Gluepot soon after the Reserve's inception. This led to Trent being branded "Quartermaster" and organising all the food, cooking gear, transport, SEG vehicles, etc for all the Expeditions since. Around 22 in all. He had a bit of a break during COVID and is now starting again.



Jill Tugwell

Jill simply joined SEG due to Richard Willing. She was working for him as his assistant nurse approximately 25 years ago. She originally joined because she was interested in bush walking with scouts and wanted to be able to answer kid's questions on

what animals and plants they were walking by. She says that

she has had the privilege to meet some extraordinarily knowledgeable and fun people, and has been able to learn, explore and walk places. Jill has been a member of the committee for a number of years.

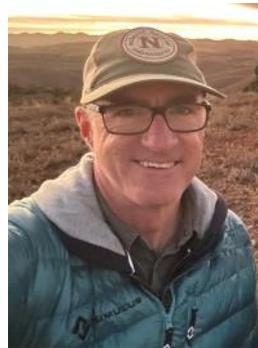
Helen Owens



Helen grew up in Broken Hill. She graduated with an Applied Science degree in 1989. She has worked with NCSSA, South Australian Museum, Western Mining Company (now BHP) and for many years, the Department of Environment and Water. In DEW she has worked in several areas including biological survey, threatened species,

research permitting and biological data management. Helen has been involved with citizen science groups throughout her whole career. She loves her work especially mammals and herpetology. Helen has been on the SEG committee for 6 years.

Piers Brissenden



Piers has been a member of SEG since March 2022 and is passionate about the environment and relishes the chance to get out and about in nature. He has years of experience working in natural resource management within the university sector and in the public service. This has included managing SA National Parks, the State

Herbarium and Biological Survey Unit and the state-wide Crown Land program. Piers currently contributes to several non-government science and conservation organisations and when not out exploring the bush also guides the occasional e-bike tour around the Mount Lofty Ranges and greater metropolitan Adelaide.

Julie Schofield

Julie is passionate about conservation and has worked in the environmental field for over 20 years. She completed her

ADVANCE NOTICE Keep the date

Sunday 20th October 2024 Belair National Park

Combined SEG 40th Birthday Celebrations, AGM, BBQ Picnic and Talk



PhD on the threatened Pygmy bluetongue lizard as well as working on threatened ecological communities. She has a broad knowledge of south Australia's plants and animals and loves exploring the natural environment and discovering the critters that live there. She also enjoys

helping others learn about nature. She will often be found with a camera in hand or her head in a bush stalking small animals.

Vivian Passos

Vivian is dedicated to environmental preservation. She is a passionate biologist pursuing a Master of Science in

Environmental Science. Her expertise lies in animal behaviour and conservation. She has made substantial contributions to scientific data management and the conservation of



threatened fauna species. She is always seeking opportunities to enhance her skills and contribute to meaningful projects. She recently joined the SEG committee and will assist with its social media management.

SEG RECEIVES A CERTIFICATE OF APPRECIATION



SEG has been awarded a Certificate of Appreciation from Green Adelaide for 40 years of contribution to conservation in the Adelaide Region.



The Certificate was presented to SEG President Alun Thomas by Professor Chris Daniels, Presiding Member of the Green Adelaide Board. Photo: Graeme Oats

MINNAWARRA SPRING BIODIVERSITY SURVEY 2024

Spring Survey Saturday 28 September to 2 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 thefurlers@gmail.com

CONSERVING ROCK-HOLE BIODIVERSITY UNDER CLIMATE CHANGE THROUGH MICROCOSM EXPERIMENTS

Kantine Liu

Ephemeral freshwater rock-hole ecosystems in arid and semi-arid regions of Australia support a unique diversity of aquatic invertebrates and provide an important seasonal water source for local wildlife. They are also of strong cultural importance to local traditional custodians. My project aimed to understand how a warmer and drier environment under future climate change will affect aquatic invertebrates living in rock-holes. To do this, I used hydrological models to simulate climatic conditions under different emission scenarios in the future. I then applied these climate scenarios on rock-hole invertebrates via a climate scenario microcosm experiment to assess future climatic impacts on rock-hole biodiversity.

The results of the hydrological models confirmed that future climate change will alter hydrological regimes of rock-holes at my study site, Hiltaba Nature Reserve on the Eyre Peninsula. Without effective reduction of greenhouse gas emissions over the coming decades, rock-holes at the reserve will likely experience much higher water temperatures and shorter inundation periods during Autumn-Winter rainy seasons. This poses a significant threat to aquatic invertebrates living in these rock-holes. In my experiment, I found that clam shrimp (*Heterocypris* sp.) is particularly sensitive to a warmer and drier future with their population growth and abundance being negatively affected by climate change under higher emission climate scenarios. However, not all rock-hole invertebrates responded in the same way. For example, water flea (*Daphnia carinata*) is able to adjust their timing of hatching and reproduction to offset the potential adverse climatic impacts on their population abundance, making them less vulnerable to climate change.

The most interesting points about my work.

1. My work provides some of the first evidence that hydrological regimes of rock-holes in arid and semi-arid Australia are likely to change under future climate change.
 2. My work is also the first to experimentally demonstrate that future climate change will have both positive and negative impacts on rock-hole invertebrate species in arid and semi-arid Australia.
 3. Rock-hole invertebrate species respond to future climate change differently, which means that conservation of rock-hole biodiversity needs to take species-level responses into account while preserving the ecosystem as a whole.
 4. Constructing hydrological models using field-collected data and regional weather data in my work shows rainfall in arid and semi-arid regions can be highly localised. Thus, the use of a site-specific weather station can be very helpful to inform future climate change research in these regions.
 5. To obtain population abundance through time for each rock-hole invertebrate species in my experiment, I made nearly 60,000 individual counts. These invertebrates are tiny and tend to form clusters when swimming in water, so it was quite challenging but also interesting to count them accurately.
- Through the use of hydrological modelling and climate scenario microcosm experiment I was able to assess future climatic impacts on rock-hole biodiversity. This helps identify rock-hole invertebrate species that are potentially more vulnerable to climate change and inform management strategies on future conservation of rock-hole biodiversity.

chih-yun.liu@adelaide.edu.au



Chih-Yun Liu (left) with her supervisor Brock Adam Hedges (right) examining the geomorphology of rock-holes at Hiltaba Nature Reserve for constructing hydrological models to project future hydrology of these rock-holes. Photo Patrick Graham Hedges

REVEGETATING THE ENTRANCE TO BALCANOONA HEADQUARTERS IN THE VULKATHUNHA-GAMMON RANGES NATIONAL PARK.

Marg Easson and Richard Smith

In 1982, the lease of Balcanoona sheep station (part of the Arid Rangelands Public Estate), was purchased by National Parks and Wildlife, South Australia. This area added significantly to the Gammon Ranges National Park which was proclaimed in 1970.

The station environment had been seriously degraded by land clearing and historic grazing and the Park staff set about controlling feral animals and over time, began the process of revegetating the area around the new Park headquarters.

STEEPED IN HISTORY

Balcanoona headquarters comprises a cluster of historic stone buildings including the original homestead which has been beautifully restored as has the shearing shed and wool press. A bygone era is recorded in a self-guided trail with signage that includes historical photographs and stories from Uncle Gil Coulthard, the first indigenous Park ranger in SA. Forty years on, senior ranger Sian Johnson shares her rich Adnyamathanha cultural and environmental knowledge with visitors.

PRESERVING CULTURE

Dreamtime stories that abound in the surrounding red rock walls, gorges and open plains are recorded on plaques at the headquarters car park. Likewise, settler bush mythology is steeped in the mulga, gum-barked coolabah, black oak and river red gum country.

A REQUEST FROM THE DISTRICT RANGER

Although some planting and irrigation had previously been undertaken by Park rangers, in 2017 Friends of Vulkathunha-Gammon Ranges National Park (FoV-GRNP) were

asked by the district ranger to revegetate the entry to the Park headquarters, hence making it more attractive to visitors (see figs 1a and 1b).

ROLLING OUT THE IRRIGATION

Led by Roger Mathers, the Friends group mapped out four areas and soon had a new irrigation system in progress. Over time, a series of taps were installed to improve water delivery. Salinity build up that blocked water flow to the drippers was overcome by flushing the lines regularly and clearing drippers. We were rescued from our early attempts at digging the necessary holes in parched clay using picks and shovels, by Sian and her backhoe.

SEEDS TO SEEDLINGS

From 2017 to now, a core group of members of the FoV-GRNP have planted around 650 seedlings supported by guards, mulch mats, fertiliser, mounding and irrigation.

In 2019 Friends were granted a permit to collect seed from across the National Park and since then most plants have been propagated by Friends from seed collected by Sian and Friends members. More recently, we have also received support from Ron Johnson at the Copley Community Garden with collaborative propagation, seed sharing and donations of seedlings.

Some of us had no propagation experience, but guided by one of the Revegetation team's botanical advisers, Nicki De Preu and the Trees for Life propagation manual, were soon contributing seedlings to the twice-yearly planting expeditions.

ADNYAMATHANHA names and plant labels.



Aerial view of Balcanoona headquarters from February 2017



Aerial view of Balcanoona in April 2023 showing the new plantings as dots on either side of the entrance road

With the support of the VGRNP Co-management Board and with Sian's guidance, we are developing an approach to labelling plants of interest at the headquarters. This will complement interpretive signage already in place in Weetootla Gorge.

Each label will identify plant species firstly by its Adnyamathanha name followed by common and then scientific name. The Revegetation group of VGRNP now makes a point of referring to plants using Adnyamathanha names. We are particularly pleased with our propagation efforts with Iga (native orange), Uti (quandong) and Narapana (Sturt's desert pea) as well as our most prolific propagation species, the beautiful grey heart shape leaved Manduwarra (curly mallee).

GRANTS

From time to time, the Friends group has been successful in securing DEW (Department of Environment and Water) grants necessary to cover costs associated with our revegetation work.

DROUGHT

In 2018, the harsh drought decimated the native flora and native fauna relying on it. With irrigation and guarding in place, the survival rate of Friends plants was impressive. Seven years on, the entrance to the park headquarters is populated with endemic species of a variety of Eucalypts, Acacias, Callitris, Eremophilas, Sennas and other plant groups that are advancing well. The Park entrance also has an area of new bush tucker plants including Matu (native apricot), Manawarra (bush plum), Uti (quandong), Iga (native orange) and Mayaka (native pear).

SPIN OFF

There are signs that the evolving arid garden is increasing the habitat for a variety of native creatures including a community of zebra finches. Friends' member Chris Kirby has recorded photographically the rich bird life of Balcanoona and the wider Park in a beautiful new brochure that is accessible on the FoV-GRNP website. There are also signs of regeneration of native plants in areas around the revegetation plantings that will support future recovery of previously degraded vegetation (see Figs 2a and 2b).

Chris and the Friends' committee are also developing a plant identification brochure to increase knowledge of the

diverse range of native plants that occur across the northern Flinders Ranges.

NEW WALK

Sian has created a new walk taking visitors past a concrete slab, the remnant floor of the original shearing shed where former Labor MP Clyde Cameron once sheared. The trail then meanders through new plantings and up to a nearby range which affords breathtaking views over Balcanoona Gorge. Graeme Oats of the Friends group, has instigated, in cooperation with Parks, a directional dial to be installed in 2024. As well as the 360° scenic views, the dial will reward those who make it to the hilltop.

WANT TO KNOW MORE?

To learn more about these and other initiatives undertaken by the Friends group or to make contact, go to the Friends of Vulkathunha-Gammon Ranges National Park website <https://friendsofgammons.org.au/>



The view from the entrance to the Shearer's Quarters carpark before 2019



The view from the entrance to the Shearer's Quarters carpark after 2022

SCIENTIFIC EXPEDITION GROUP INC.

APPLICATION FOR MEMBERSHIP AND MEMBERSHIP

RENEWAL for 2023 — 24

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 ----- \$40.00

Concession cards/ student ----- \$20.00

Family or Corporate membership ---- \$50.00

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

Name

Address

.

Telephone (H) (W)

E-mail

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

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ELECTRONIC PAYMENT

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

Acc Name: Scientific Expedition Group Inc.

BSB: 105-086 Acc No.: 330629440

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

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

The Secretary

Scientific Expedition Group Inc.

111 Franklin St,

Adelaide, SA 5000.

PLEASE NOTIFY ANY CHANGE OF POSTAL OR ELECTRONIC ADDRESS



You are invited to join us on an expedition to the Arkaroola Wilderness Sanctuary in the northern Flinders Ranges of South Australia. This area has been subject to major geological activity over the last billion years or so, resulting in a great variety of soil types and land forms which have a large influence on the flora and fauna to be found. The purpose of the expedition is to conduct a biodiversity survey of life forms of the area and will include invertebrates, reptiles, mammals (including bats at night) and birds.

Standard biological survey methods will be used to identify, measure, document and release animals caught.

This is a great opportunity for people of all ages and expertise to observe and participate in professionally conducted field survey work with experienced biologists and natural historians.

You won't need any special scientific skills - just a love of exploring the bush and learning about its many inhabitants and seeing some amazing country along the way.

Dates:- The expedition departs early on the morning of Sunday 15th. September 2024 and returns on Saturday 24th. September 2024.

Accommodation:- On this survey, we will be based in the Greenwood Lodge, with sleeping and bathing facilities included.
For those most happy under canvas there are also plenty of camping spots. BYO tents etc.

Costs:- The total cost for each expeditioner is only \$600 which covers transport, food and participation in all activities.

Numbers are strictly limited on this survey due to logistical and movement requirements particularly on the Ridgetop track so register your interest now!! Please phone Trent Porter on 0438827890 or email on trentasaurus@bigpond.com

BE QUICK - SPACES REALLY ARE STRICTLY LIMITED

STOP PRESS : Student concessions *may* be available, subject to grant approval.