

# SEGments

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# Scientific Expedition Group Inc.

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**Cover Photo**: . Bakara campsite at night. Photo Jeff Lewis

**Rear Cover Photo**: . Barn Owl *Tyto alba* Photo Duncan MacKenzie

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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# **SEGment** Volume 37 Number 4 March 2022

#### CONTENTS

Rainfall Records Tumble in January		
Graham Blair	Page 2	
SEG needs a new Treasurer	Page 4	
Wintinna Expedition Diary Alun Thomas	Page 5	
Our New Patron	Page 9	
Minnawarra Survey Report Spring 2021 Janet Furler Page 10		
Mallee Fowl Excursion Jeff Lewis	Page 11	
The 1860 Trigonometrical Survey of the Far		
Phil Cole	Page 12	

## **EDITORIAL**

Two recently released films I have seen have reinforced my opinion that too many people in powerful places are not taking climate change seriously.

The first film is entitled "Don't Look Up". Without giving too many spoilers the essential story is that a PhD astronomy student accidentally discovers a comet heading towards Earth. It is of such a size that in about six months it will annihilate the entire Earth. The student and her supervisor manage to get an interview with the US President who ignores them and is more concerned with an upcoming election. In their attempt to garner support and action the student and her supervisor get onto a morning television talk show. They are treated very shallowly with the talk show hosts being more concerned with the sex appeal of the supervisor and the unattractiveness of the student. Study of the comet shows that it is allegedly comprised of rare minerals and an entrepreneur offers to mine the comet and at the same time blow it off course. The film also looks at the naysayers. Those who automatically go against something without any science to back them, echoing a recent leader's manipulation of a large and uninformed group using social media.

This film is a metaphor for the dangers of climate change affecting the Earth and the fact that rather than

face a problem it is all too easy to ignore it and look the other way.

The second film I have seen was the worldwide premiere of the excellent virtual reality film "Thin Ice" shown at the South Australian Museum. This film shows a re-enactment in virtual reality of parts of the story of the sinking of Shackleton's ship Endurance crushed in pack ice in the Ross Sea and his subsequent leadership in saving all his men. After the ship sank they travelled across the pack ice dragging their lifeboats for some months. When they got to the edge of the pack ice they launched the lifeboats and Shackleton got his entire crew to Elephant Island. Shackleton then took a single boat and a small party to South Georgia. He and two others then crossed South Georgia to get to a whaling station to seek help to rescue the crew.

The film was narrated in part by South Australian adventurer Tim Jarvis who previously had made a replica lifeboat and undertook a re-enactment of the journey from Elephant Island to South Georgia and over the island to the whaling station. The part from this film which is relevant to climate change is that when Shackleton crossed that island his small party was able to slide down a long glacier to the fiord where the whaling station was situated. Nearly one hundred years later when Jarvis went there the glacier was gone. The party had to walk down to the whaling station and at the base of the glacier nearly 10 metres of ice had disappeared.

This film shows that climate change is really occurring. We can see it in changed weather patterns and what are called "natural" disasters.

Surely it is time for our decision makers to acknowledge that fossil fuels must be phased out urgently and there must be a substantial reduction in carbon dioxide in the atmosphere.

I am not saying that taking action on climate change is only the responsibility of political decision makers, we all have to do our part. It is, however, the political decision makers who set the direction in which a country goes and who are influenced by entrenched lobbies and short term electoral cycles.

Shackleton was a real leader intent on saving his crew. Many of our "leaders" are more intent on saving themselves.

The longer we take to make meaningful change the harder it will be to halt what appears now to be a runaway train.

Alun Thomas alunulna@gmail.com

# RAINFALL RECORDS TUMBLE IN JANUARY

## **Graham Blair**

Across South Australia during the second half of January, the sky opened, with much of the State receiving many times more than an average January rainfall.

During the following weeks, media attention was focused on the flooding across the Eyre Peninsula and along the Stuart Highway, reporting road and rail transport disruptions, townships such as Coober Pedy isolated and supply lines cut to APY Lands communities in the State's northwest. For more than two weeks after the event, all major tracks across the State's north remain closed.

The following map, courtesy of the Bureau of Meteorology, outlines January rainfall totals across the State, illustrating the distribution.

With South Australia spanning a large area yet with most



the State sparsely populated, the distribution of weather monitoring installations tends to be biased towards townships and along transport corridors. Although the limited distribution is sufficient to gain a broad-brush understanding of the extent and impact of significant rainfall events, very little localised, real-time weather data is available, particularly across arid areas.

Within the northern Flinders Ranges, the SEG Vulkathunha-Gammon Ranges Scientific Project (VGRaSP) provides a unique opportunity to observe such events in greater detail. The project was established in 1988 as a longterm study of hydrology in an arid area, investigating the impacts of seasonal variation on local habitats. Core to the project is a network of rain gauges located at a range of elevations along a 50 km swathe extending from North Moolooloo pastoral property near Leigh Creek in the west to the Gammon Plateau within the Vulkathunha-Gammon Ranges National Park in the east.

The primary aim of the VGRaSP rainfall monitoring is to establish a long-term dataset having sufficient resolution to detect variations across a range of elevations. In more recent years, however, the deployment of telemetry equipment at most sites has enabled an additional benefit to the community by providing a real-time stream of data to the Bureau of Meteorology (BOM) and the Department for Environment and Water (DEW) for purposes such as weather and flood reporting to the general public.

The following details summarise the rainfall distribution and the resultant runoff, using available real-time data collected during the unseasonably wet January of 2022. The map below shows how the VGRaSP rainfall monitoring is divided into two sub-areas and locates the telemetered raingauges within their associated catchments. The western sector (frequently referred to as "Station Country") focuses on the sub-catchments of Emu and Windy Creek, which feed Aroona Dam. The eastern sector is entirely located within the Vulkathunha-Gammon Ranges National Park and focuses on the Arcoona Creek catchment.

#### Station Country (Emu & Windy Catchments)

Three telemetered gauges are located within the rangelands east of Leigh Creek and measure rainfall in the Emu and Windy Creek catchments that provide the principal inflows to Aroona Dam. A fourth gauge, located at Aroona Dam, is operated by DEW, who also monitor the Dam levels. The predominant land use within the Emu and Windy catchments is grazing, where the terrain features open undulating plains with elevations ranging between 250 and 500 metres above sea level.

· Monthly rainfall totals from the telemetered gauges in the Aroona Dam catchment ranged between 3 and 6 times the January average.

· Rainfall totals showing an asterisk in the Table 1 below indicate sites where the January total was highest on record.

Site	January 2022 Rainfall (mm)	Rainfall Average for January
North Moolooloo	111.8 *	25 mm (from 34 years of data)
Pfitzner's Well	110.0 *	24 mm (from 35 years of data)
Maynard's Well	86.8	26 mm (from 35 years of data)
Aroona Dam (DEW gauge)	139.4 *	23 mm (from 36 years of data)

Table 1 Rainfall recordings in the Station Country

 $\cdot$  The most significant rain event commenced around 3:00 AM on the 22<sup>nd</sup> and continued for around 14 hours.

 $\cdot\,$  At the event's start, Aroona Dam was 76% full. Runoff from Emu and Windy Creek reached the Dam around 6:30 AM, which spilled around 2:00 PM.

• The flow over the spillway was the second-largest since 1978, when automated records commenced. The largest spill was recorded during 2010.

 $\cdot\,$  At peak spill, the flow rate was 675,000 litres per second.

• The total volume of water flowing into the Dam was approximately 16 Gigalitres. One Gigalitre is the same as 1 billion litres.

• After construction in 1957, the original capacity of the Dam was around 7.5 Gigalitres. After 65 years of service, siltation has reduced the storage volume to about 5 Gigalitres.

• Inflows from the January event would have filled the Dam to more than three times its capacity.

Aroona Dam has a catchment area of approximately
700 square kilometres.

• The spill from Aroona Dam flows into Lake Torrens.

#### Arcoona Creek - Gammon Ranges

Four telemetered rain gauges are located within the Vulkathunha-Gammon Ranges National Park, all within the Arcoona Creek catchment draining the park's western sector. Elevations of the gauges range between 560 to 920 metres above sea level. A streamflow gauging station at the park's western boundary records the flow resulting from runoff to Arcoona Creek within the National Park.

• Monthly rainfall totals from the telemetered gauges in the Vulkathunha-Gammon Ranges National Park ranged between 3.5 and 5 times the January average.

• Rainfall totals showing an asterisk in Table 2 over the page indicate sites where the January total was highest on record.

• Due to its elevation, the Plateau gauge typically receives the highest rainfall. Higher totals, however, occurred at the more westerly rain gauges during January. This pattern aligns with the contributing weather system where the intense moisture source was further west, tracking down the State's centre.

• Runoff from rainfall within the Arcoona Creek catchment is measured at the streamflow gauging station. The maximum flow rate of around 6,000 litres per second occurred near midnight on January 22<sup>nd</sup>. The total catchment yield for January was approximately 0.56 Gigalitres (or just over half a billion litres).

• The Arcoona Creek flow rate was modest in comparison with previous events. The lower flows can likely be attributed to drier preceding conditions in the catchment, with the



Telemetered Rainfall Monitoring in the Northern Flinders Ranges

4

# rainfall spread over a longer duration but lower intensity than previous higher flow events.

• The previous flow event was in January 2017, when the highest flow for the site was recorded at a rate of around 113,000 litres per second.

• Arcoona Creek is an upper tributary of Frome Creek, which channels water north towards Lake Eyre. However, water reaches the Lake very occasionally following exceptional rainfall events.

• The most significant rainfall occurred between January 21<sup>st</sup> and 22<sup>nd</sup>, with consistent heavy falls across all gauges. For the remainder of the month, follow up falls were less evenly distributed as unstable moisture cells produced high localised recordings. One notable event was on January 28<sup>th</sup>, where only three of the eight gauges (including those in the Station

Site

Arcoona Bluff

**Exclusion Zone** 

South Branch

Plateau

Country) recorded rain. During this intensely localised event lasting less than an hour, the two gauges with the closest proximity recorded markedly differing amounts. The Exclusion Zone gauge recorded 24.2 mm. In contrast, 1.5 kilometres away and at 220 metres higher elevation, Arcoona Bluff gauge recorded 13.4 mm.

**Rainfall Average for January** 

36 mm (from 19 years of data)

31 mm (from 31 years of data)

31 mm (from 25 years of data)

36 mm (from 34 years of data)

gblair@internode.on.net

Table 2 Rainfall in the Arcoona Creek—Gammon Ranges area

January 2022 Rainfall (mm)

160.8 \*

147.8 \*

134.0

123.8

# SCIENTIFIC EXPEDITION GROUP NEEDS A NEW TREASURER

Since the SEG Treasurer will be retiring from his role as Treasurer in June this year, SEG looking for a new Treasurer. Would you consider taking on this role, or do you know someone who might be interested?

The SEG accounts are recorded in a version of 'MYOB Accounts Right'. Some knowledge of the MYOB software would be handy, but is not essential. The current Treasurer will assist the new Treasurer you during the initial period. It would be ideal if the applicant was able to be available during the period April to June to sit with the Treasurer to gain knowledge of the requirements of the role. Included within the role is the management of the SEG bank accounts.

The applicant would be required to attend committee meetings and to present a monthly financial report to the committee.

An annual Revenue & Expenses Statement is prepared and provided to the SEG Auditor.

Please notify the Secretary of your interest by email to scientificexpeditiongroup@gmail.com or contact the Treasurer, Graeme Oats on gdoats@bigpond.net.au .

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# WINTINNA EXPEDITION DIARY Alun Thomas

The Waterhouse Club of the South Australian Museum conducts bi-annual biological survey field trips to interesting parts of the state. In 2021 the trip was to Wintinna Station which is north of Coober Pedy.

The museum scientists on the survey were led by Cath Kemper surveying mammals, and also included Graham Carpenter surveying birds, Helen Owens led the identification and collection of reptiles and amphibians, and Remko Leijs, Matt Shaw and Ben Parslow collected invertebrates. The survey camp was set up and managed by Val and Mal Hansen with assistance from Sonya and Brett Arnott. Val and Mal have vast bush experience and have established and managed a number of expeditions for the Waterhouse Club. The outback meals provided by "Mal n Val" are legendary! The Camp Leaders were Alastair and Rose Dow.

Francesca Lumb and Jake Fennell are the leaseholders of Wintinna Station. Jake comes from a long line of far north cattle families, but Francesca is recently from Yorkshire. They have three young children. Francesca and Jake are part of a new entrepreneurial generation of cattle men and women. They are looking to diversify their business, and part of that is to build their understanding of the Wintinna environment. The survey report of the expedition is to be made available to them.

The survey started at Coober Pedy and my wife, Kathleen, and I took two days to drive to Coober Pedy and two to drive home. My diary of the trip is as follows.

THURSDAY 7 October 2021

We left Brighton after an early lunch and got to Port Augusta by 5 pm. We had dinner and stayed at Standpipe Motel.

#### FRIDAY 8 October 2021

We drove from Port Augusta to Coober Pedy. Left about 9:15. We had an uneventful trip with a stop for lunch at Glendambo. At Coober Pedy by 3:30. Dinner at Opal Inn with the Waterhouse group. The group numbered about 30 people. The support staff and scientists had gone a few days earlier to set up the camp and start to set up survey sites.

The survey area was essentially in one large paddock of approximately 20 km by 30 km on Wintinna station to the west side of the Stuart Highway.

SATURDAY 9 October 2021

Coober Pedy to camp. We were not wanted in camp early, so we visited Breakaways to the north east of Coober Pedy on the way and had a packed lunch there. Wintinna Camp is about 150 km north of Coober Pedy on Stuart Highway and then about 30 km SW on station roads. It had rained a little which mainly settled the dust. We saw quite a lot of lightning.



Pastoral Map of Wintinna Station. The Waterhouse Base Camp was where the black oval is.



Part of the Breakaways north east of Coober Pedy

We arrived at camp at about 4:15 pm but it was very windy and quite difficult to set up tents.

Rain had been threatening for most of the afternoon and it started about an hour after dinner and the rain continued on and off all night and into the morning. We got about 5 to 10 mm, but it might have been more. The station homestead about 40 km to east recorded 13 mm.

SUNDAY 10 October 2021

Expeditioners were free to select with which science



Our tent site at the Waterhouse Base Camp

team they wished to go out. I elected to do setting up further pitfall lines but it was put off until the afternoon in case the roads were too wet due to the rain.

In the morning I went out with Helen Owens to check Sites 1 and 2 which had been set up by the science team earlier. These were in sandhill country. The roads were not as wet as we expected. The ground is mainly sandy and the rain absorbed easily. We caught a desert mouse and a hopping mouse. Also got a black headed desert snake, a military dragon and a slider.

In the afternoon we went out with Cath Kemper to put out two lines on the northern boundary of the survey area. Sites 7 and 8. Site 8 was near a stand of native poplars and Site



Military dragon Ctenophorus fordi

7 was in tall mulga country. Site 7 was a very rocky site and crowbarring was needed for all holes.

MONDAY 11 October 2021

It was a cold start to the morning. 7 degrees when we got up.

Kathleen and I elected to do birds today. We went out with Graham Carpenter to do the standard bird surveys at Grevillea Site, Site 3 and the Claypan Site and Sand Dune Site, Sites 4 and 5. We saw a surprising number of birds.

- At Site 3 we saw:
- Variegated Fairy Wren
- Splendid Fairy Wren
- · Chestnut rumped thornbill,
- · Chiming wedgebill (with its very distinctive 4 note call)
- Rufus whistler

#### At Sites 4 and 5 we saw

- Bourke's parrot
- Little Eagle
- Zebra finches.
- Torresian Crow
- Blackfaced wood

swallow

- Mulga parrot
- Galah
- Willy wagtail
- Crested Bellbird
- Red capped Robin
- Plus both fairy Wrens

On the claypan there were areas of aboriginal chippings. One looked very like a spear head.

On the way back to camp for lunch we went to the two bores near camp, Middle Bore and Relief Bore, to check harp



Aboriginal chippings observed at the Claypan Site



Claypan at Sites 4 and 5

traps set to collect bats. Unfortunately, no bats were caught. It was probably too cold overnight.

By lunchtime it was quite warm. We were visited in camp by station owners Jake, Francesca and one of their children Honey Mae. They were interested to see what we were collecting and planned to come out with us in next few days to see how the collecting was done.

We went out in the afternoon to do the bird check at several other sites. Sites 7 and 8. Not so many birds. Saw a crimson chat we hadn't seen in morning. Otherwise much the same birds.

Back to camp at a about 5:30 and a chance to have a wash before dinner.



Mulla-mulla (Ptilotis exeltatus)

#### TUESDAY 12 October 2021

We went out with Remko Leijs looking at native bees. On the pre-trip reconnaissance earlier in the year Remko had

SEG is very grateful to our corporate sponsor Microchips Australia for its support to the

Minnawarra Project.

recorded about 65 species of native bees but in a different season he expected to record different bees. In fact, by the end of the survey he had caught about 60 further species of native bees. He was particularly interested in bees on flowering eucalypts. There are no eucalypts on Wintinna on the western side of the Stuart Highway in this area, so we had to go to the eastern side. That involved an about 100 km drive along the western, southern and eastern side of the survey area. On the way along the eastern boundary of the survey area we stopped at an area of mulla-mulla (fox tails or pussy tails) (*Ptilotis exeltatus*). Remko was interested in what native bees were on them as compared to areas nearby. We set a bee trap near the field of mulla-mulla and another 5 km away to see if there was any difference in bee numbers. These were checked later in the day.

Remko had an insect catching net mounted onto his vehicle which is the daughter of Priscilla, the net designed by Jan Forrest and used on the SEG Moonabie Expedition in 2005, Remko calls his insect catching net Annette. It is a large conical net on a square frame mounted on the roof rack. As the vehicle drives along flying insects are caught in it. It has a



Remko's vehicle with his Annette insect catching net set up on it.

trapping funnel so that when the vehicle stops insects cannot fly out which was a problem with Priscilla. Many insects were caught.

We then went via Cadney Roadhouse to Carmen Well at the southern end of Wintinna where there were the first eucalypt trees we had seen but only one was flowering. It had, however, lots of native bees so the trip wasn't wasted. We also got bees from several acacia trees. Remko had to call a stop we got so many.



Over 10 species were caught including:

- Blue banded bees
- 3 species of leaf cutter bees
- Checkered cuckoo bees
- Masked bees
- Silk bees
- Resin bees

After a picnic lunch in the eucalypt creek bed, we returned via another well but there were no suitable flowering trees. On the way we found a flowering mallee and it had many native bees of a number of a number species on it.

We got back onto the Stuart Highway but on leaving the highway to get back onto the west side of Wintinna there was a goods train parked across the crossing we were to use and blocking our way. It was at least 15 km back to the next crossing, so we were in a bit of a dilemma. Luckily after a few minutes the train started slowly moving off and we were able to cross.

We checked the traps set earlier but there was no essential difference between the catches at the two sites. We also did some hand netting around the mulla-mulla and got 4 or 5 species of native bee. We got so many blue banded bees that we had to release them.

Back to camp at 5:45 pm after a very long day and about 230 km of driving, mostly on bumpy dirt roads.

In the evening Kathleen & I went out to Relief Bore to see how Cath's bat trapping was going. It was a warm night, but nothing was caught in the harp trap or the mist nets.

Overnight we had several hours of very strong winds. We thought our tent would blow over and the flapping of the tent made it very difficult to sleep. By morning it was all calm again.

WEDNESDAY 13 October 2021

I went out with Cath to help start taking up the pitfall trap lines and Kathleen went out with Matt on insect collecting.

At the furthest away site, Site 1 we had a good collection of a hopping mouse, a desert mouse, a slider and various insects etc. We took up the trap line in quite good time and moved onto Site 2, but this took longer because we had caught a number of animals including 6 hopping mice, a dunnart and several lizards.

We then went and checked Site 3 and there caught a small blind snake. This site had problems with ants getting into the pitfalls and attacking the captured animals. Ant powder was put down.

After lunch I set up and had a very welcome solar shower set up in the bush about 100 m from out tent. The water heated to a very comfortable temperature in only about half an hour and it was good to be able to wash my hair.

Wind is coming up again this afternoon so I set up a few more guys to trees around the tent which will make walking around the tent more difficult but will, I hope, prevent the tent from blowing over.

In the evening was the Museum 165 birthday celebration with a roast dinner and amusing speeches.

THURSDAY 14 October 2021

Wind came up early in the morning and blew strongly from the south west and it stayed cool all day with a maximum of about 23 degrees.

Today was excursion day. Francesca came over and led a convoy to the east side of the Stuart Highway to see Wintinna Swamp. There was a dam in the swamp area which had a white necked heron on it and lots of zebra finches around it. Not full of water now but obviously has been. We also visited Marble Bore and Dead Finish Dam before going on to Wintinna Station for lunch. On Dead Finish Dam which Jake said never dries up, there were a number of water birds including little pied cormorant, hoary headed grebe, Australia grebe, grey teal, blue billed duck and hardhead (duck) and of course zebra finches.

Wintinna Station is a lovely oasis of green lawn and shady trees on a "very Flinders Ranges looking" Wintinna Creek. We took our own lunch of hot dogs. Part of the road we travelled on was the original unsealed Stuart Highway with some of the original road signs on it. Back to our camp after lunch arriving at about 4.00pm.

It is 50 km by road from the homestead to our campsite



Two types of grebe on Dead Finish Dam plus a grey teal

and we drove about 150 km in the day. FRIDAY 15 October 2021

This day is final trap pulling and packing day. I went out with Helen and Honey Mae and Kate, a nanny for the station children, who came out from the Station to see pitfall trapping and opportune searching. Honey Mae had great eyesight and was able to spot specimens we adults couldn't see when litter raking and looking under a junkyard around a bore. She actually saw one species of gecko that others had missed.

We pulled up Site 7 and then back to camp to clean and pack the trapping equipment.

After lunch we had a break in which Kathleen and I had solar showers. Very refreshing out in the open air and the water was nice and warm from the shower bags.



The author having a refreshing solar shower in the bush

We helped with packing up the science tent and did a bit of tidying up our tent, ready for leaving in the morning.

SATURDAY 16 October 2021

Leaving day. Tidied up tent, had breakfast and then took the tent down and packed the car. There seemed to be more in it than when we came. Also helped tidying up around the kitchen tent.

Most of us set off in convoy to Cadney Roadhouse at about 9:30 am. From there some expeditioners took a longer route via the Painted Desert but we drove straight to Coober Pedy and arrived there in time for lunch. In the afternoon we

cleaned the outside of the car at a convenient car wash and filled with petrol ready for our next step to Port Pirie.

Dinner was a final celebration with brief reports from the scientists and thanks to Mal & Val and Alastair and Rose.

SUNDAY 17 October 2021

After an early light breakfast, we were on the road for Glendambo by 7.45 am. Morning tea at Glendambo and lunch at Port Augusta. Got to Port Pirie at 3:00pm.

We had decided to stay in Port Pirie to break the trip home and to see if there was any history in the museum of my great grandfather G D Delprat there from the time when he was general manager of BHP at Broken Hill and used to travel down to Port Pirie.

We had booked at Ellen Hotel near the railway station. Turns out that their restaurant does not open on Sunday and they don't do breakfasts.

Went to National Trust Museum at the old Railway Station but as they were shutting soon we decided to return in the morning.

Wandered around town to find somewhere open to have an evening meal. Settled on Caffe Primo.

MONDAY 18 October 2021

We visited the National Trust Museum in the old Railway Station and with some help from the volunteers there found some interesting information on Delprat.

In the afternoon we set off for home and got there quite uneventfully.

alunulna@gmail.com

### **OUR NEW PATRON**

Following the retirement of our previous Patron, Mr Hieu Canberra, commenced a Van Le, SEG approached the Government House for Vice-Regal second career as a Patronage and we have been honoured to have Mr Rod Bunten appointed as our Patron. Mr Bunten is the partner of the Governor, Her Excellency the Honourable Frances Adamson, and Government House has decided that she and Rod Bunten will share Patronage duties.

Government House has provided the following details about Mr Bunten:

Mr Bunten grew up in Cornwall and Gloucestershire. He studied Physics as an undergraduate and postgraduate at the University of Oxford.

In 1984, he joined the British Foreign and Commonwealth Office and began a successful career as a diplomat, undertaking postings in New York, Taiwan and Canberra. He met Her Excellency the Governor, then an Australian diplomat, while they were both posted in Hong Kong.

In 2009 Mr Bunten left the FCO and, after completing a Graduate Diploma in Secondary Education at the University of forward to inviting him to some of our activities.

secondary school teacher of physics and mathematics.

For the next decade he taught at Melba Copland Secondary School, pausing from 2012-2015 when he accompanied Her Excellency to China, where she was Australian Ambassador.

Mr Bunten has also been a tutor to students at the Australian Defence Force Academy and Canberra University.

Mr Bunten is father to four adult children.



Mr Rod Bunten

We look forward to working with Mr Bunten and I look

# MINNAWARRA SURVEY REPORT SPRING 2021 THURSDAY 30<sup>TH</sup> SEPTEMBER TO MONDAY 4<sup>TH</sup> OCTOBER

## Janet Furler

The survey of Spring 2021 was one of our more soggy ones. We started on Thursday 30<sup>th</sup> September in fog and drizzle, and decided not to open traps as we set them up, but open them in the afternoon, when it had cleared up. We opened them anyway, as it decided to keep being damp all day. It remained wet overnight, but not too cold, at 10°. The fog the next morning was quite impressive but cleared to a sunny 12° max. It stayed dry all the next day, an 18° scorcher, then returned to fog and patchy drizzle on the 3<sup>rd</sup> October. The last round was due to be on the morning of 4<sup>th</sup> October. Due to a severe weather warning overnight and forecast rain all morning (12mm fell) we shut our traps on the evening of the 3<sup>rd</sup>. While the main concern was small animals in metal boxes getting cold and wet, there was relief from the crew that we didn't have to have another battle keeping the paperwork dry.

We were also mindful of the challenge of getting to and, more importantly, back from the steeper sites. We had been juggling vehicles on some of the damper rounds, with the best chunky tyres being the first priority. Unfortunately the one with the most grip has 2 seats and no doors! By Day 4, with 4 trips per day along our tracks, with multiple vehicles sometimes, some bits were getting cut up. And some of the hills are steeper than some of us are happy to climb. The 2 seater then did an excellent job of ferrying people up to the cars left at the top of the hill.

We caught 88 native mammals, of which 44 were recaptures, appearing altogether 142 times. One house mouse was the only feral mammal caught. A male fallow deer was seen, but not caught!

2 Crinea signifera were found in pits, 1 pobblebonk (*Limnodynastes dumerilii*) was heard. 2 skinks *Lampropholis guichenoti* and *Hemiergis decresiensis* were in pits.

11 of the native mammals were Antechinus flavipes, 48 were bush rats (Rattus fuscipes) and 29 were swamp rats (Rattus lutreolus).

Site 1 again had no Antechinus, 2 R fuscipes and 10 R lutreolus (swamp rats). The swamp rats are increasingly predominant. A then NRM Fleurieu Swamps expert visited in 2019 and commented that the swamp immediately adjacent to Site 1 is senescent and could do with breaks in the very dense reed and sedge cover to allow for other species to grow. This could be done with cattle, if they could be contained, and got out again!

- So, my questions to the experts out there are:
  - How does this thought stack up in regard to swamp management?
  - How does this thought stack up in regard to Survey data and site changes?

I would welcome thoughts please!

thefurlers@gmail.com

# MINNAWARRA BIODIVERSITY SURVEY DATES 2022 Autumn Thursday April 21st to Monday 25th Spring Thursday September 29th to Monday October 3rd



Anthea Habel acting as the scribe at Minnawarra Site 1 and needing two raincoats to keep dry while doing it

## MALLEE FOWL EXCURSION

## **Jeff Lewis**

I have been a zookeeper for 8 years but have always had a passion for ecology and *in-situ* conservation, that being the focus of my degree. I have involved myself in fieldwork wherever possible, including Yellow-eyed penguin foraging ecology, mark-recapture of Maud Island Frogs, and translocations of African ungulates. So, when the opportunity to join the Science Expedition Group came up through a friend and current member, I jumped at it and was enthusiastic to join the Mallee fowl mound and camera survey at Bakara Conservation Park.

I traveled up from Monarto on the Saturday morning with my friend for a 9:30 start. We organized our equipment and split into teams to each navigate by GPS to and check mounds for activity and reset camera traps. My team comprised Phil, Janet, Annette, and myself; I was the rookie in this environment but learnt quickly from the veteran surveyors. I navigated to our 15 locations and then recorded the measurement and activity data in an app while handwritten records were also taken. We swapped over a few SD cards on camera traps and were finished in a timely fashion, arriving back at camp after a leisurely wander through the mallee at about 3:00pm. We were the second group back and the few others steadily rolled in, some having had GPS troubles and a much slower day. Unfortunately, limited activity was seen during the actual survey, but we did identify the occasional Mallee fowl scat, print, or disturbance. Signs of other native life were observed including from goanna, kangaroo, and echidna, and some indication of pest species in the area such as foxes and cats.

Before setting up for dinner, I went for a walk with my camera to do a little more birding. A couple of emus were out as well as wrens and pardalotes, and a family of feral goats. Back at camp once everyone had cooked a meal, we all sat around chatting and getting to know one another over a few drinks. It had been a windy, slightly overcast but warm day, but on dark the skies cleared, and the Milky Way vividly arced above the campsite. I set up my camera, tripod, and wideangle lens down the track a bit to minimize the light from camp to capture the intensity of stars but just enough to achieve some context and atmosphere with the glow of camp lights on people and vehicles. It was a beautiful, crisp, cold night with great company and interesting stories to be shared.

The next morning, we slowly packed up camp, had our final chats, and said goodbye. My friend and I went for a last wildlife spotting walk, seeing more splendid fairy wrens and striated pardalotes, and even a few mulga parrots. On our drive out of the park, we were lucky to see mallee ringnecks and there were plenty of shinglebacks to be moved off the dirt

roads heading towards the Murray, back to Nildottie. A very encouraging and exciting sighting was that of a mallee fowl by two other volunteers as they left Bakara.

This was a brilliant short trip for a worthwhile cause. I thoroughly enjoyed seeing a beautiful, new part of South Australia for me, meeting passionate like-minded people, and contributing to the conservation of a unique species. The Scientific Expedition Group is an excellent initiative and very easy to join. I would recommend supporting SEG to anyone and am looking forward to assisting further in the future, hopefully on longer trips to see the diversity South Australia has to offer.

Jeff.lewis@hotmail.co.nz



Mallee ringneck on Bakara



Feral goats on Bakara



#### Background

The late 1850's saw keen interest in expanding pastoralism into the north of South Australia. The Surveyor-General Arthur Freeling from around 1851 engaged surveyors (including HW Rawnsley and GM Painter) to undertake trigonometrical surveys north from the then occupied lands so that the position of pastoral leases could be fixed, and the land could be surveyed into blocks for sale or lease.

These early surveyors constructed stone cairns as permanent survey marks and for the purposes of observation for trigonometrical surveys. They chose high points on the



Parry's cairn (named Pollux) at Hookina Creek (S31.73999° E138.33272°). Constructed in April 1858 and marks the eastern end of a survey baseline from which Parry continued triangulation northwards. Photo August 2015.

highest peaks or ranges for the cairns. For trigonometrical surveys observation points needed to be set out an interlaced geometrical pattern of triangles of 15 to 50 kilometre sides, commencing from an accurately measured base of about 6 to 12 kilometres in length, or greater depending on the location and topography. A survey could be expanded in a series of triangles for some 300 to 500 kilometres, where another base was set for further extension of the survey.

The observation points were usually marked by a large, suitably marked stone over which a tall pole was erected and a cairn constructed to support the pole and assist in sighting the point from the distance. Under good conditions they could be seen in the late afternoon 80 or more kilometres away through theodolites and where visibility was poor fires could be lit and angles read to these fires at night. Their positions could be recorded with great accuracy.

Where a survey line or base needed to be marked on the ground, posts would be erected where necessary to assist sighting along the alignment– such as where the line crossed ridges or valleys, and at accurately measured (chained) points along the line, and marked with lockspits<sup>1</sup>.

In 1857 Assistant Surveyor-General George Woodroffe Goyder was sent to survey in the region around Mt Serle in the northern Flinders Ranges and once this task had been completed investigated reports of fresh water lakes in the north and found 'Lake Torrens'<sup>2</sup> (actually Lake Blanche) filled and fresh. The discovery prompted Surveyor-General Freeling to lead a party to investigate further, and his equipment included two boats. This expedition found the waters that had



The author at Goyder's 1 mile post and the line of stones forming the lockspit. Termination Hill is the highest point on the skyline. The original wooden post placed in 1860 remains in place, presumably then cut from a nearby tree. Photo April 2017.

who had previously worked on the ordnance survey of Great Britain, was engaged to extend the trigonometrical survey north along the western side of the Flinders Ranges, from Hookina (near Hawker) to Termination Hill.

At the starting point for his survey Parry established a survey baseline between two cairns on opposite sides of a broad valley (Porter (1990)). One of these cairns (on a small hill named Pollux) is visible from the Hawker – Parachilna road, two kilometres north of Hookina Creek. The second cairn, on Castor, is about seven kilometres to the south-west. Working north, Parry erected a number of cairns between the baseline and his northernmost point, Termination Hill, from which he surveyed south-east to Mount Serle in the northern Flinders Ranges. Parry's instructions then required him to recommence his survey northwards from Termination Hill. Instead, it seems he became disillusioned with his opportunity in South Australia having by then spent 18 months in the north (understandably, perhaps he wished to avoid a second summer in the northern regions) and resigned to move to Bendigo from where he applied to be leader of the ill-fated Victorian Exploring Expedition, the role going to Robert O'Hara Burke. He subsequently became a private surveyor in Victoria.

The following year, over October- December 1859, the State Governor, Sir Richard MacDonnell, visited a number of mines in the north of the State and travelled as far north as present day William Creek - a major exercise of over 2800 km on horseback, and

been so generously described by Goyder to be receding and ephemeral.

With continued interest in the pastoral and mining opportunities in the north, in 1858 Surveyor Samuel Parry,



Goyder's 2 mile post and lockspit, on the steep eastern slope of the Termination Range. Photo September 2018.



Parry's cairn on Termination Hill (S30.25438° E138.04799°). Originally constructed by Parry in 1858, reconstructed by Goyder in 1860 to refix the marker point beneath the cairn, and reconstructed in 1954 (Australian Geodetic Survey) to refix the marker point and to place a new marker pole with vanes (since lost) to assist sighting. The original marker pole lies against the cairn. Site visitation should only be in consultation with the Traditional Owners as the location has cultural significance. Photo July 2015.



Goyder's 20 mile end of line post and lockspit, near the summit of Twenty Mile Hill. The cairn is at the summit, about 200 metres to the northwest of this point. Termination Hill can be seen twenty miles to the south. Photo May 2016.

dependent on locating sufficient water for the men and horses. The pastoralists were at that time pushing north with cattle - MacDonnell noting 800 head of cattle watering on Lake Weatherstone<sup>3</sup>, located at the eastern base of Termination Hill, and cattle on other waterholes further north. This major expedition by the Governor must have been in response to the political interests of the Government in promoting confidence in mining and pastoralism in the north.

In late 1859 Assistant Surveyor-General Goyder was again sent north to further extend the trigonometrical survey, from Parry's survey that previously reached Termination Hill (Porter (1990). The Surveyor-General issued him with instructions to continue the triangulation of the north, into country recently 'discovered' by Stuart and Warburton near Mt Margaret<sup>4</sup> and Lake Eyre. Important discoveries, such as water, were to be kept secret with the potential for land division and sale a major objective. The construction of wells to provide water for travelers and stock was an additional objective, as there were few water resources north of Termination Hill to Hergott Springs, and for this purpose Goyder's team of around ten men included well sinkers.

Goyder's initial task was to set out a new baseline, from Termination Hill to a point 20 miles north (Twenty Mile Hill) to provide a reference from which to extend the trigonometrical survey north and west. The baseline survey was carried out in the heat of February 1860. Conditions must have been unbearable, the men on foot dragging a surveyors 100 link chain the entire length of the baseline. Water was difficult to find and needed to be brought in across this largely uninhabited area by horse and cart. The baseline survey took about two weeks and with this initial task completed, Goyder went on to explore and survey northwards.

The exploration and survey of the north was keenly followed by the public in Adelaide. A report from Goyder, sent while he continued on the survey, was published in *The South*  Australian Register newspaper in April 1860 and an extract follows:

from: SURVEY OF THE NORTHERN COUNTRY - MR GOYDER'S REPORT.

Wellsinkers' Camp, March 16, 1860.

"Sir-I have the honor to forward herewith a diagram and field-notes of the line run 20 miles true north of Termination Hill, and a copy of my working sketch of the country between the springs on the River Mundy and those surrounding the Hermit Hill of Major Warburton, upon which I found a pile of stones, placed there, I believe, by Mr. Stuart.

The 20-mile line has been penetrated and trenched throughout, the pickets being rarely more than 10 chains apart, and the miles marked by posts about 18 inches above the ground, with the number of miles true north of Termination Hill branded thereon. At each picket two trenches have been cut in the direction of the line, each trench 3 feet long, 15 inches wide, and 12 inches deep. This line was indispensable, the distance to existing trigonometrical stations being too great to be seen clearly from the ranges to the northward; and the hills to the north, when seen from the superior elevation of Termination Hill, being in most cases merged in the plain beyond. At the termination of the line the highest hill of the Alromba Range, almost intersecting the line, was chosen as the station to form the base of further triangulation, and named Twenty-mile Hill. The creeks of any note cut on the way have been named according to their respective distances from the point of commencement, viz., Twelve-mile, Thirteen-mile, Sixteen<sup>5</sup> and Eighteen mile Creeks. Means have been taken to ascertain the elevation of the different hills, and barometrical observations carefully noted along the entire line, so that I may be enabled to prepare when leisure allows, and work of more importance cannot be attended to, a section of the country showing the altitudes of the various hills, valleys, and plains during the entire progress of the work."<sup>6</sup>



Goyder's 19 mile lockspit. The mile post was not found. Termination Hill in distance. Photo April 2015.



Goyder's 1860 cairn on Twenty Mile Hill (S29.96523° E138.04642°). Constructed by Goyder February 1860. Photo May 2016.

A detailed knowledge of this work of Goyder slipped away over the following years. Around 1982 the South Australian Division of the Institution of Surveyors, Australia (ISA) undertook some investigations on the work of the early surveyor-explorers (Porter (1990)) with a view to more detailed investigations under projects supported by the South Australian Jubilee 150 Board. Subsequently the ISA in 1984 conducted expeditions to relocate survey marks left by Parry in 1858 and Goyder in 1860. Apart from the report from these expeditions (Gilliland and Connelly (1987), Porter (1990)), there seem to be few recorded observations of this significant remnant of early South Australian archeological history.

Goyder's field books and correspondence from his work are held by State Archives and can be viewed, while the ISA relocated a number of Goyder's survey marks and these locations are described in Gilliland and Connelly (1987). These important archeological records of early European activity in the region are at risk of being damaged or lost unless recorded.

Relocating the survey marks

Goyder's "20-mile line" lies on land now within the Witchelina Nature Reserve, formerly the pastoral lease known as Witchelina Station. The organisation Nature Foundation owns and manages the Nature Reserve.

Since 2015 Witchelina Nature Reserve property managers and volunteers have been relocating and recording some of the survey marks left by Parry and Goyder, using the above mentioned references, as a starting point. While many of Goyder's survey marks (lockspits) from Termination Hill to Twenty Mile Hill, and particularly those in sandy ground, have disappeared over time and others have been damaged or destroyed inadvertently by human activity, others on harder ground have survived. Goyder marked each mile point, and points intermediate particularly where the line crossed low stony ridges. These intermediate points were placed in order for the north - south alignment of the baseline to be accurately maintained.

The survey marks placed by Goyder were relocated by several techniques. The cairns are evident. The mile markers along the 20-mile baseline were located by estimating their location on a digital map, generating a waypoint at the location and thus the relevant coordinates, and then searching at the waypoint for the survey marks using a hand held GPS device for guidance. To date the 1, 2, 19 mile and 20 mile survey markers have been found. It is probable all others are lost. In addition, in rocky or harder ground a number of the intermediate markers have been found, sometimes with the original 1860 timber post still present. These were located either by reference to Gilliland and Connelly (1987), or simply by walking along the survey line and searching at each rise or ridgeline. At some lockspits there is a more recent peg, assumed to have been placed by the 1984 ISA expedition team. All survey points located have been photographed and their location recorded by GPS.

Other cairns constructed by Goyder on the higher points in the region in 1860 included South Hill (S30.06751° E137.96790°, now collapsed), Mount Nor'West (S29.96336° E137.70487°, shown on page 12), and Willouran Hill (S29.83921° E137.97463°). The triangulation necessary for the survey could be accurately laid out by sighting back to these points, a number of which continue to be utilised for survey purposes.



Approximately ten lockspits and sighting posts have been located on ridges along the survey line, such as this one (S30.04946° E138.02860°). Post in foreground presumed to be from 1984 ISA expedition. Another survey marker (S30.01712° E138.04753°) is located just north of the Witchelina woolshed and can be readily viewed by the public. Twenty Mile Hill in range on skyline. Photo February 2015. By September Goyder had completed his work and prepared a map and report for the Surveyor-General, writing this at his camp at Chambers (now Stuart) Creek. Goyder had surveyed 9000 square miles of land in the region, much of which was leased for pastoral use from around 1873.

While working on the survey, Goyder learnt that Surveyor-General Freeling had made it known that he intended to retire and return to England. Goyder wrote to Freeling in August 1860 making his interest in the soon to be vacant position known. He returned to Adelaide in October, having been in the north for nearly a year. In February 1861 Goyder was formally appointed Surveyor-General, a position he held until his retirement in 1894.

#### Further reading

Gilliland, JR and Connelly PD (1987) Resurvey of Goyder's Baseline. The Australian Surveyor 33(6) pp 503-510

Porter, John R (1990) The Jubilee 150 Surveyor-Explorer Expeditions. South Australian Geographical Journal 90 pp 32-49

Newspaper articles of 1857-1860, accessed through the National Library of Australia (Trove)

Goyder's correspondence and field books, which can be accessed at the South Australian State Archives

All photos Phil Cole. phil.cole2@bigpond.com

#### Endnotes

1. A lockspit being a dug trench or raised line of stones in the alignment of the line, of about 10 links (2 m) each side of the post.

2. In 1840 Edward John Eyre explored northwards along the western side of the Flinders Ranges, reaching the southern shores of Lake Eyre. Eyre, with other early explorers, believed Lake Torrens and Lake Eyre were a contiguous 'horseshoe' lake or inland sea that formed a barrier to the north so Goyder would have assumed the lake he found was Lake Torrens.

3. Now called Lake Watherston, but originally named Weatherstone after a local landholder John Weatherstone

 Mt Margaret is in the Denison Range, north of present day William Creek.
Witchelina Homestead is located on Sixteen Mile Creek, now known as Station Creek.

6. Goyder prepared monthly reports which were carried to Adelaide by a horseman, the journey taking two weeks. These were retained on file and can be viewed at State Archives. The journey was then repeated, bringing new correspondence, instructions and the like.



This commemorative plaque, and a replica milepost and lockspit, were placed by the South Australian Division of the Institution of Surveyors Australia, near the original (lost) site of Goyder's 16 mile post, and are readily accessible by the public being near Witchelina homestead. The date on the plaque should read 1860 and not 1858.

# SCIENTIFIC EXPEDITION GROUP INC. APPLICATION FOR MEMBERSHIP AND MEMBERSHIP RENEWAL for 2021 — 22

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