



SEGments

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Scientific Expedition Group Inc.

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Cover Photo: One of the springs in the Ikara-Flinders Ranges National Park where fish were relocated. Photo A. Vincent

Rear Cover Photo: Arkaroola scenery on the Ridgetop Tour. Photo H. Johnson

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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EDITORIAL

As a Nation we have been asked to read the Uluru Statement from the Heart. Recognising the importance of this statement it is presented here.

Helen Johnson

ULURU STATEMENT FROM THE HEART

"We, gathered at the 2017 National Constitutional Convention, coming from all points of the southern sky, make this statement from the heart:

Our Aboriginal and Torres Strait Islander tribes were the first sovereign Nations of the Australian continent and its adjacent islands, and possessed it under our own laws and customs. This our ancestors did, according to the reckoning of our culture, from the Creation, according to the common law from 'time immemorial', and according to science more than 60,000 years ago.

This sovereignty is a spiritual notion: the ancestral tie between the land, or 'mother nature', and the Aboriginal and Torres Strait Islander peoples who were born therefrom, remain attached thereto, and must one day return thither to be united with our ancestors. This link is the basis of the ownership of the soil, or better, of sovereignty. It has never been ceded or extinguished, and co-exists with the sovereignty of the Crown.

How could it be otherwise? That peoples possessed a land for sixty millennia and this sacred link disappears from world history in merely the last two hundred years?

With substantive constitutional change and structural reform, we believe this ancient sovereignty can shine through as a fuller expression of Australia's nationhood.

Proportionally, we are the most incarcerated people on the planet. We are not an innately criminal people. Our children are alienated from their families at unprecedented rates. This cannot be because we have no love for them. And our youth languish in detention in obscene numbers. They should be our hope for the future.

These dimensions of our crisis tell plainly the structural nature of our problem. This is *the torment of our powerlessness*.

We seek constitutional reforms to empower our people and take a *rightful place* in our own country. When we have power over our destiny our children will flourish. They will walk in two worlds and their culture will be a gift to their country.

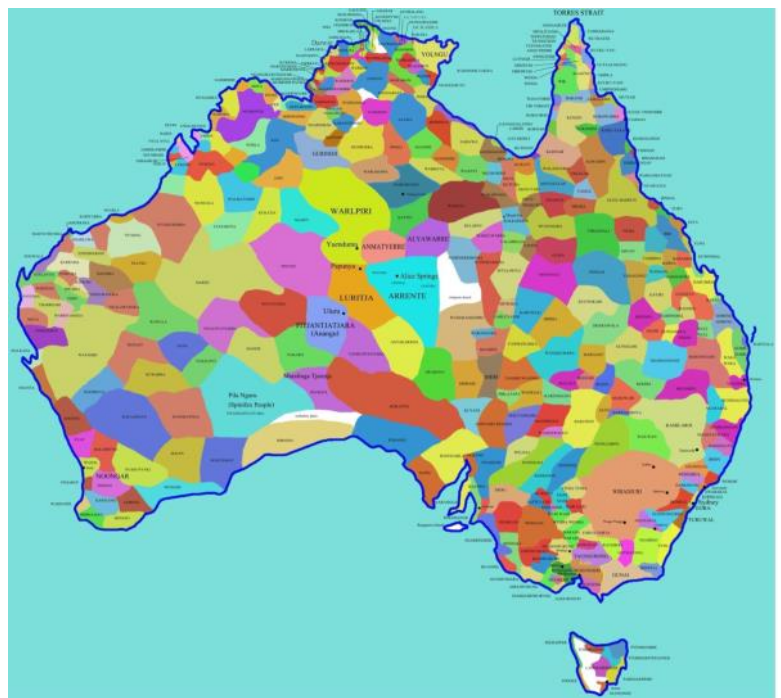
We call for the establishment of a First Nations Voice enshrined in the Constitution.

Makarrata is the culmination of our agenda: *the coming together after a struggle*. It captures our aspirations for a fair and truthful relationship with the people of Australia and a better future for our children based on justice and self-determination.

We seek a Makarrata Commission to supervise a process of agreement-making between governments and First Nations and truth-telling about our history.

In 1967 we were counted, in 2017 we seek to be heard. We leave base camp and start our trek across this vast country. We invite you to walk with us in a movement of the Australian people for a better future."

Map of Indigenous Tribal Regions of Australia



REDUCING THE RISK OF EXTINCTION FOR WIRTI UDLA VARRI, IDNYA AND KENNGOOR

Robert Brandle

Bounceback & Beyond through landscape-scale wildlife management

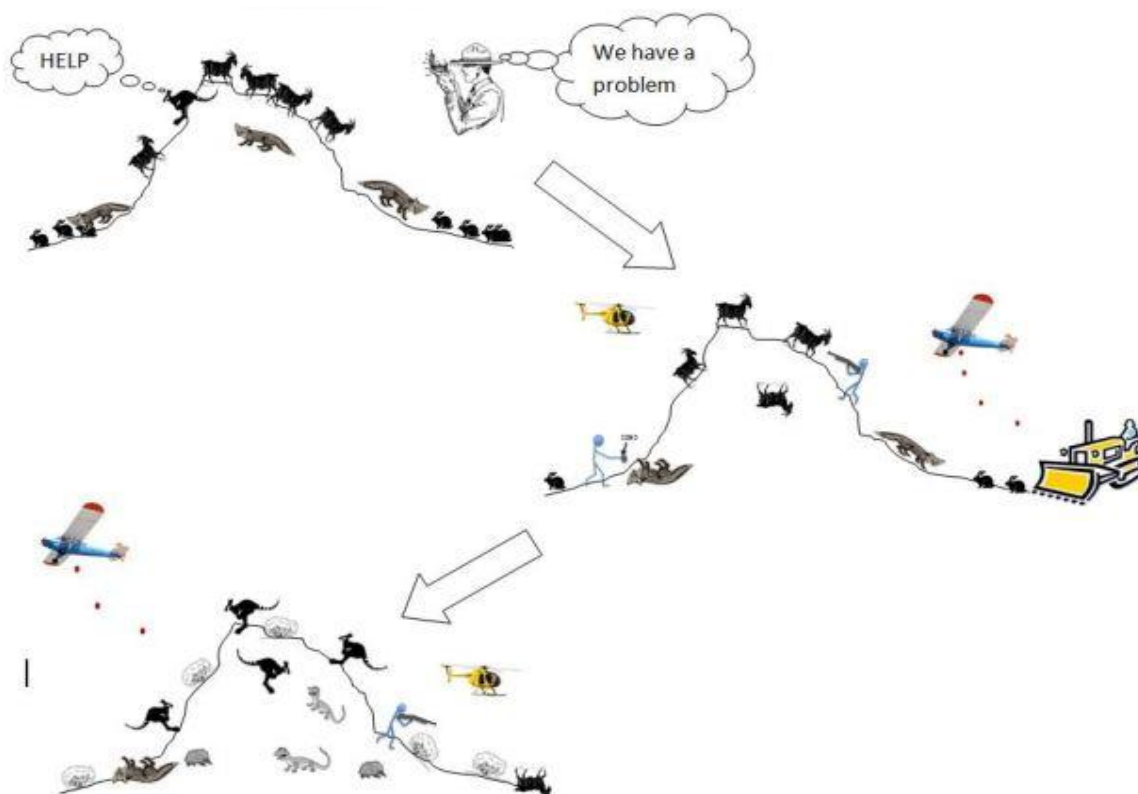
Bounceback began in 1992 as a concerted effort by National Parks and Wildlife staff in the Flinders Ranges National Park and Adelaide to improve the survival outlook for yellow-footed rock-wallaby populations by managing their introduced predators (mainly foxes) and feral competitors (goats and rabbits). Leaning on the cliché “a picture says a thousand words” I am using the picture below to explain the history of the Bounceback Program.

Through its focus on managing threats to wildlife and habitat at landscape-scales, Bounceback has been spectacularly successful in recovering yellow-footed rock-wallaby populations across its management footprint. The focus on broad-scale fox control has effectively removed foxes from more than 7500 sq km of the Flinders, Olary and Gawler Ranges, with goat populations consistently managed to low levels across the same area.

Fox control involves twice yearly aerial 1080 fox bait drops followed by complementary ground baiting along tracks and roads which are excluded from the aerial baiting. Goats are managed through a combination of mustering, followed by ground shooting by staff and volunteer hunting organisations, primarily the Conservation and Wildlife

Management Branch of the SA Branch of Sporting Shooters Australia Association. These shoots are followed by an annual helicopter goat cull to reduce numbers in the least accessible areas of the ranges. Cats, rabbits, cactus and kangaroos are also managed in areas where they pose significant conservation concern. On the map on the next page the orange areas are where the majority of ongoing management is focussed, the paler shading highlights areas identified as prime yellow-footed rock-wallaby habitat.

The results of monitoring the effectiveness of the management regimes show that foxes are very well controlled, goats significantly reduced, though there are always small flocks that escape our attempts to remove them. Rabbits have fluctuated, with early ripping being successful and then followed up even more successfully by the escape of calici virus which kept numbers low until the mid-2000s. Numbers have been building since with occasional knock downs by calici and our management in specific target areas. Cactus was similarly reduced in extent but has made a comeback in a few areas where current management activities are focussed. Cat control using cat specific 1080 baits has proved very successful in reducing numbers in a trial on Ikara-Flinders Ranges National Park (IFRNP) and Arkaba Station to protect the reintroduced western quoll population.



Conceptual diagram of the Bounceback Program

Whilst kangaroos grew to unmanageable levels from 2011-2019, three years of drought and culling activities on park have substantially reduced their numbers. Current kangaroo management that includes harvesting by an Adnyamathanha professional kangaroo shooter will hopefully prevent future over-population.

Management Outcomes

An observant visitor to any of the four large conservation reserves in the Bounceback footprints will note the difference between more trees and shrubs tasty to livestock and goats when compared to surrounding pastoral leases. The two pictures opposite illustrate this with bullock bush browsed up to about 2m on the left (Hiltaba just after Nature Foundation purchased the lease) compared with foliage to the ground and multiple young recruits on the right (IFRNP after 20 years of herbivore control).

Animal populations have also responded with big increases in number and distribution across the landscape. Aerial survey counts conducted along transects from Dutchman's Stern Conservation Park to Arkaroola and across the Olary Ranges show two stories, a positive one for Bounceback managed areas and a negative one in other areas.

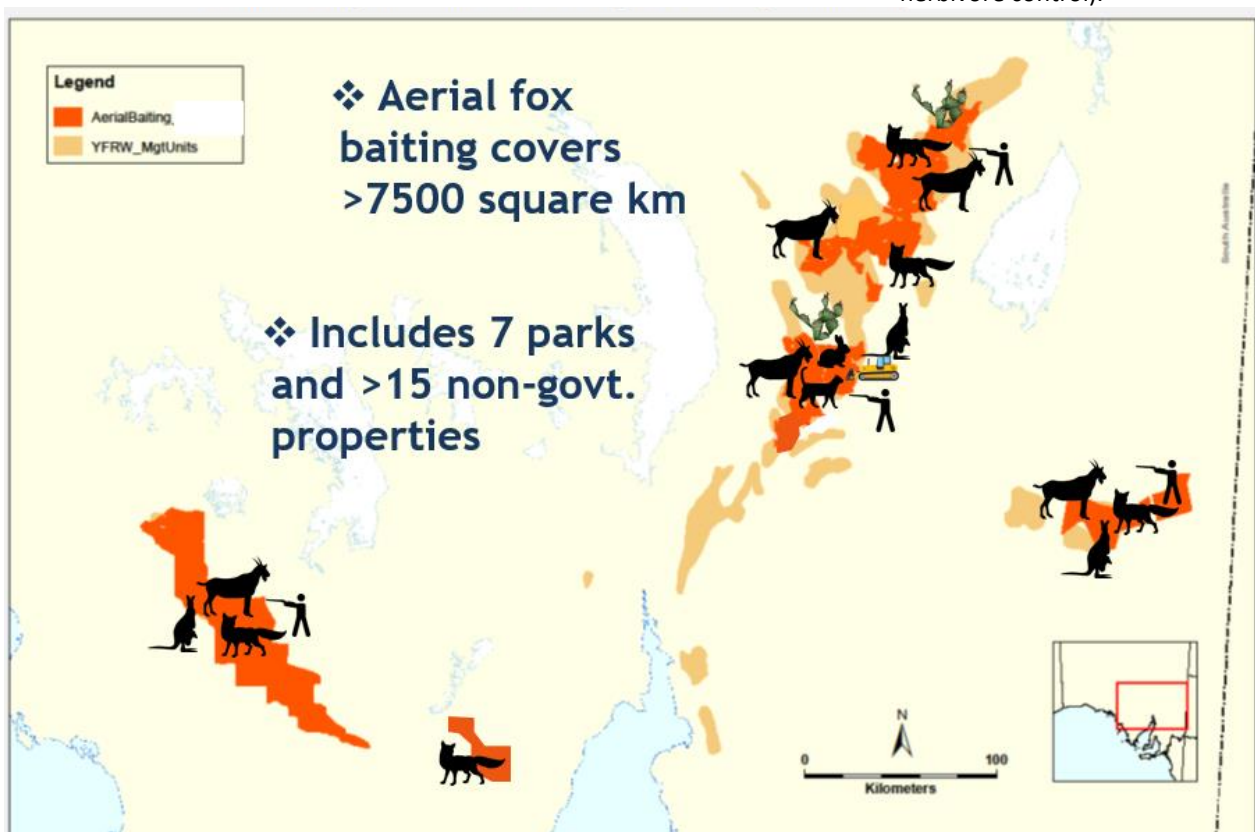
Camera monitoring across Bounceback managed areas and surrounding properties have shown higher detections of echidnas and larger reptiles such as sand goannas within fox managed areas.

Bouncing Back & Beyond through translocations and reintroductions of extinct fauna

Re-introductions within the Bounceback area have met with varying success. The first serious attempts involved



Bullock bush browsed up to about 2m in the top photo (Hiltaba just after Nature Foundation purchased the lease) compared with foliage to the ground and multiple young recruits in the bottom photo (IFRNP after 20 years of herbivore control).



Bounceback Program aerial fox baiting for biodiversity conservation

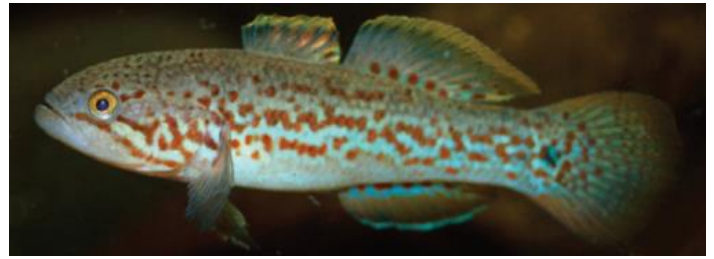
brushtail bettongs (woylies) which were trialled during 1999 and 2000 in the north-east of the IFRNP and in Wilpena Pound. Unfortunately, our fox and cat control methods at that time did not reduce predator populations to a low enough level for the released animals to successfully breed and survive beyond six months.

We waited another 14 years before trialling another species, this time the carnivorous western quoll - *Idnya* which was released over three years (2014-2016), however there is a need for a stronger focus on cat control to be successful. During the same period but starting in 2015 the arboreal brushtail possum was also released. Both species weathered three years of intensive drought remarkably well and since 2020 have significantly expanded their populations beyond release areas.

This success has inspired expanding the western quoll population and reintroducing the red-tailed phascogale - Kenngoor to the Vulkathunha-Gammon Ranges National Park (VGRNP) over the next three years. The Flinders and Outback Region of the National Parks and Wildlife Service are collaborating with the South Australian Arid Lands Landscape Board to deliver the Bounceback program beyond the public managed conservation reserves through the Bounceback and Beyond Project, which is funded by the Australian Government National Landcare Program. This funding is supporting cat management and reintroduced species monitoring work and will continue to support reintroduction related management and monitoring in VGRNP. The new reintroductions will also be supported with funding from the Foundation for Australia's Most Endangered Species Inc (FAME), raised through sponsorship campaigns to the Australian community.

Whilst the cute and cuddly mammals have dominated the stage, a slow burning campaign to reduce the risk of extinction to one of South Australia's most vulnerable fish species Flinders Ranges purple-spotted gudgeon (*Mogurnda clivicola*), Wirti Udla Varri in language, has quietly burbled along like a Flinders Ranges spring. An Honours project investigating habitat parameters in 2016 helped to secure the funding required to support the translocation work through the Bounceback and Beyond Project. The work of the Friends of Vulkathunha-Gammon Ranges National Park (FoVGRNP) in monitoring water quality and fish occupancy at the only springs at which the Flinders Ranges purple-spotted gudgeon is known to occur have provided time series data on how these systems behave, useful for comparison with the springs to which 600 fish have now been transported.

Pre-translocation assessment work included genetic analyses from fish taken from Weetootla and Nepouie Springs. The results showed very low levels of genetic diversity indicating that the population has suffered some severe declines with only a small number of fish surviving to repopulate the streams. It was also evident that the Nepouie population was a recent offshoot from the lower pools at



Three species targeted by the Bounceback Program, Wirti Udla Varri (Flinders Ranges purple-spotted gudgeon), *Idnya* (western quoll) and Kenngoor (red-tailed phascogale)



Aerated fish carrier in a cradle to be lifted by helicopter. The cradle includes stabilising fins to prevent it spinning while being transported. Photo A. Vincent

Weetootla, supporting unconfirmed suggestions that the fish had been translocated to Nepouie during the early 1970s. However, the Nepouie population was more numerous than evident at Weetootla and showed a higher level of genetic fitness. For these reasons the translocation took 420 fish from Nepouie and the remaining 180 from the more divergent upper pools at Weetootla. The release sites received 300 each with even proportions from both source springs being released at each of the new population springs.

At the time that I presented this talk to the AGM of the FoVGRNP, we were still planning the translocation and the role that the Friends Group members could play in the translocation and subsequent monitoring. The professional translocation team were very impressed and grateful for the enthusiasm and skill that the FoVGRNP brought to collecting the fish for transport by helicopter to their new habitat in Ikara-Flinders Ranges National Park (IFRNP) and Yappala Indigenous Protected Area. For a more detailed description of the event read: https://www.landscape.sa.gov.au/saal/news-resources/media-releases/Flying_fish_in_the_Flinders_Ranges or <https://www.abc.net.au/news/2021-06-11/fish-helicopter-flinders-ranges-purple-gudgeon/100208078>

To date monitoring has been observational, with mostly ranger staff recording numbers and sizes seen during a 15-minute period, plus any dead fish observed. We now have an honours student interested in taking on the analyses for monitoring the fish using a go-pro style video camera fixed to a baited monitoring platform. I would like this system to be used at Weetootla and Nepouie for comparison with the results for the new populations. Success with these translocations will be when the fish have successfully bred and inhabit all suitable pools between and beyond the three release pools at both IFRNP and Yappala.

Key elements for reducing the risk of extinctions that have ensured the ongoing success of Bounceback.

- Commitment to ongoing strategic threat management.
- Seizing opportunities when they arise.
- Involving others with an interest.
- Questioning the efficacy of activities with research.
- Being open to new ideas.

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Robert Brandle is the Senior Conservation Ecologist based in Port Augusta since 2012, working for both the Department for Environment and Water and the South Australian Arid Lands Landscape Board. He has more than thirty years experience working with threatened species, ecological survey and land condition research throughout South Australia. Rob's experience in species-specific studies include: threatened mammals, birds and plants, and also re-introductions. Projects include the following: Malleefowl in



Looking down on one of the purple spotted gudgeon release sites in springs in Yappala Indigenous Protected Area.

Photo A. Vincent

the Murray Mallee, Little Penguins in the Encounter Bay area, Greater Stick-nest Rat monitoring on Reevesby and Franklin Islands and their translocation to St Peter Island, ecology of Plains Mouse, Dusky Hopping Mouse and Kowari in northern South Australia, and Desert Mouse in Southern Ikara Flinders Ranges, New Zealand Fur Seal off the South Australian Coast, Antarctic and Sub-Antarctic Fur Seals on Macquarie Island, Northern Fur Seal on the Pribilof Islands off Alaska, and translocations of Western Quoll, Brushtail Possum and Flinders Ranges Purple-spotted Gudgeon into the Ikara Flinders Ranges.



The Editors thank the Friends of the Vulkathunha-Gammon Ranges National Park Inc. for permission to reprint this article.



**National Parks
and Wildlife Service**
South Australia





SOUTH AUSTRALIA IS A WORLD LEADER IN RENEWABLE ENERGY GENERATION FROM WIND AND SOLAR POWER

Helen Johnson

Introduction

Less than two decades ago 100% of South Australia's electricity was generated from fossil fuels and to meet the electricity demand the State imported 30% of its power from Victorian coal-fired plants. Yet astonishingly, **by 2020** renewable energy was providing a **whopping 60 per cent** of South Australia's electricity when the wind blew and the sun shone, and the remaining 40% was generated within the state by gas and diesel power plants.¹

The speed of this transition to renewable electricity is the fastest seen anywhere in the world, with South Australia being the 2nd jurisdiction in the world to Denmark in terms of variable renewable energy penetration. South Australia has also committed to 100% renewable energy by 2030 and is on track to achieve it.² This remarkable progress has been made whilst the Federal government's climate policy has for years been gripped by paralysis, and wind and solar provided just over 14% of Australia's electricity by 2019, although hydroelectricity added nearly 5.5% to the country's renewable energy sources.³

South Australia has some of the highest household uptake of solar panels (solar photovoltaic) not only in Australia but globally. By October 2020 more than a third (33%) of South Australian homes had solar panels, providing a capacity of more than 1kW per person. On 11th October 2020 around 1pm the state reached a major milestone for one hour, becoming the first city in the world to generate 100% of its electricity from solar panels (almost 1.3 GW was generated).⁴ The Australian Energy Market Operator (AEMO) chief executive Audrey Zibelman said "This is truly a phenomenon in the global energy landscape".⁵

For that one hour period, rooftop solar provided 77% of the state's electricity and utility-scale solar farms like the ones operating at Tailem Bend and Pt. Augusta provided 23%. In that period excess electrical power generated by gas-fired

power stations and wind farms was exported to Victoria and stored in the state's batteries.

The state also generated 100% of its electricity from wind power for a short time on 15th October 2020, but this was not the first time this milestone had been reached. So on two days of one week in October 2020 South Australia's generated 100% of its electricity from two different renewable energy sources, solar and wind.⁴

How did South Australia address the risks of climate change in the early 2000s?

In 2002 Mike Rann became the Premier of South Australia within a minority Labor government. In 2003 he outlined an ambitious plan to the visiting Canadian environmentalist, David Suzuki "to address climate change by aggressively moving South Australia into renewable energy. Wind and solar were the obvious opportunities, but he was also enthusiastic about "hot rocks", superheated pockets that could create steam to drive turbines for electricity." This last technology did not meet its promise.⁶

In a speech to the Australian Wind Alliance and the University of Melbourne's Energy Transition Hub in October 2018, former Labor State Premier Jay Weatherall (who replaced Mike Rann as Premier in 2012) stated: "South Australia is an unusual place in a way. It's really a slither [sic] of a population perched on the edge of a desert and climate change represents particular risks to us. This isn't an academic exercise for us. Climate change and the way in which our climates will alter fundamentally changes the capacity for South Australia to be liveable and certainly for us to replicate the economy we once understood and had. We also took the view that this represented an opportunity, because we were abundant in the renewable natural resources, wind and solar, and we believed that they could be harnessed to give us a competitive advantage, and a way in which we could turn what has been a traditional source of disadvantage for us, the lack of being blessed with an abundant source of fossil fuels,

into an advantage by pursuing a renewable energy future, and we did that in a range of ways.”⁷

South Australia in 2002 often paid the highest wholesale prices for electricity in the country. Hot summers in South Australia lead to peaks in electricity demand (with sometimes skyrocketing costs) but demand at other times of the year is much reduced.⁷ However, by **late 2019** the national grid audit found that South Australia consistently had lower wholesale prices for electricity than Victoria, NSW, Qld and Tasmania.

In 2002, South Australia’s electricity consumption was exceptionally high and rising at a rate of 3 to 4 % a year although the population was stable and economic growth was declining. The Rann government sought to make South Australia a more sustainable state and Adelaide a more sustainable city, seeking expert help from Herbert Giradet, Adelaide’s first ‘Thinker in Residence’. Giradet’s report “Creating a Sustainable Adelaide” explored wind and solar power amongst other sustainability initiatives.⁸ Later, Professor Ross Garnaut advised the Rann and Weatherill governments on transitioning to renewable energy.

Going early with solar photovoltaic (panels) was an economic risk to the state, as the cost of solar PV was very high when SA began its solar transition in the first decade of the 21st century. AEMO consistently overestimated the cost of solar PV, but those predicted costs would have been used in SA’s plans to move rapidly to solar energy. Even in 2012, AEMO predicted by 2018 a cost of around \$425.00 per MWh (in 2019 dollars) falling to \$325 by 2030. The cost per MWh in 2018 was actually between \$50.00 and \$70.00! These costs are average costs per MWh over the lifetime of the generating plant. For wind energy, in 2011 AEMO predicted the cost in 2018 would be around \$190 per MWh, whereas the actual cost was between \$50.00 and \$60.00.⁹

In the early 2000s South Australia had two coal-fired power stations at Port Augusta; Playford and Northern. Torrens Island, near Adelaide, had an ageing natural gas-fired power station, the largest in Australia. There were other smaller gas and diesel-fired power stations dotted around the state. The only coal mine in South Australia was at Leigh Creek, north of Port Augusta and it supplied the Port Augusta generators with sub-bituminous (brown) coal.

When transitioning to renewable energy to reduce greenhouse gases there are competing requirements, but providing **affordable and reliable** electricity for house-holds and industry was the prime consideration for the SA government. In a paper published in 2021 in the journal ‘Energy Policy’, initiatives and policies were investigated into how South Australia achieved a sustainability transition “that saw the privately owned and operated electricity system change from 100% fossil fuel generation to a position where 50% was generated by wind and solar in 16 years.” Actually 53% renewable wind and solar was achieved in 2018.⁷

The ‘Energy Policy’ report highlights that:

The transition used a diversity of proactive and reactive policy levers.

The transition occurred despite indifference and hostility at the national level.

The transition occurred in a privatized market-based system.

Momentum was retained despite rising costs, reliability issues and political change.

SA’s renewable energy penetration exceeds 50% in 16 years

At a time when succeeding Federal governments with the overarching regulatory power over the national energy market had weak and inconsistent energy and climate change policies, South Australia enjoyed a **stable political climate**. From 2007 to 2018 the Federal parliament rotated through seven prime ministers and five opposition leaders. The questioning of the science of climate change was and is still at the heart of this policy instability.

Of significance, in South Australia there was little opposition from a coal mining lobby, whereas most other states in Australia (excluding Tasmania which generated most of its electricity from hydroelectric power) relied heavily on generating electricity from multiple coal-fired power stations, and most states had large coal mining operations which were a source of many jobs. The fossil fuel industry was also supported by some very powerful people in Australia who had political influence **and used it**. Some USA blow-ins were pushing the climate sceptics’ agenda and coaching conservative politicians, especially politicians in the Coalition both in opposition and in government. Parts of the Australian media and various right-wing think tanks in Australia kept the issue of jobs and the economy versus reducing emissions (from the use of fossil fuels) very much alive. Federal Labor in government and in opposition found itself in a no-win situation on emissions reduction policies.¹⁰

The Rann/Weatherill governments were in office from 2002 to 2018 and over that period gained enough political capital to push through changes to introduce renewable energy and generally carry the South Australian public with them, although rising prices were always a serious issue in the state. However, there is a misconception that renewable energy was causing the high electricity prices that South Australians paid. In fact, the transmission and distribution network costs make up more than half of the electricity bill, and still do today.⁹

The uptake of renewable energy in Europe led by Germany and followed by China has greatly benefitted Australia, so that low emissions electricity has now become cost-competitive with electricity generated from fossil fuels. Since 2010, the cost per MWh of solar energy has fallen by more than 80%, with 2/3rds of that decrease occurring in the period 2017 to 2020. The cost of solar panels continues to fall dramatically as the worldwide uptake of solar power grows

exponentially. Similarly, but at a lower rate, the cost of wind energy has reduced by about 40% since 2010.^{9,3}

The high cost of electricity and generous feed-in tariffs (early) made solar panels attractive to South Australians, along with a Federal government program 'solar financial incentive' to help offset upfront costs of installing household solar panels. In the early 2000s an SA government home subsidy was provided on solar hot water units; solar panels were installed on 250 South Australian schools and Government buildings, including Parliament House; and in South Australia from July 2006 five-star energy ratings were mandated on all new homes.

Over the past decade South Australians have taken advantage of reducing financial returns from low interest rates and the reducing costs of home solar power systems. The state's renewable energy target of 50% by 2025 exceeded that in 2018, seven years earlier than planned. In fact 53% was achieved in just 16 years (by 2018) which is a world first, and SA is now a net exporter of electricity to the National Energy Market.⁷

However, in the South Australian Strategic Plan 2004, the initial renewable energy target was 15% by 2014, and 26% by 2020. These early targets were viewed as highly ambitious at the time, since "the state government had little control over a completely privatised local network operating in a national market-based system where the primary responsibility for regulation was invested in a national body overseen by combined federal and state governments."⁷

In 2002, South Australian's per capita carbon footprint was 22.7 tonnes/annum CO₂ equivalent, unusually high by international standard and 3.6 times the world average, although South Australia did have a substantial manufacturing sector at that time based on electricity supplied by fossil fuels.⁸ By 2018 the state's per capita footprint was 14 t/a CO₂ equivalent (2.2 times the world average) a reduction of over 38% and it undoubtedly has continued to fall in the last three years. In 2020 SA's carbon footprint was the third lowest of the states and territories, with only Tasmania (with a majority of its power coming from hydroelectricity) and the ACT being lower.¹¹

In South Australia, the change of government in early 2018 to a Liberal Coalition government led by Premier Steven

Marshall has not created instability, instead the Premier's policies have continued the positive support for energy transition, with financial support to households for small-scale batteries, and securing approval from the Australian Energy Regulator for a crucial 900 km power transmission line called Project EnergyConnect, linking Robertstown in SA to Wagga Wagga in NSW, with a spur line to Red Cliffs in Victoria. Construction of the line is planned to begin later this year and operations should begin in 2023.^{9, 12}

The transition has used a diversity of proactive and reactive policy levers

Early in the Rann government's first term, the state was comprehensively mapped for both wind and solar resources.¹³ The maps showed that South Australia was well endowed with both high quality onshore and offshore wind resources as well as the land resources for solar. In fact, some of the best onshore wind resources were situated close to existing high voltage transmission lines running 300 km from the Port Augusta power stations to Adelaide. "This meant one of the largest obstacles to renewable transition, the proximity of resources to transmission infrastructure, was not a concern".⁷ In South Australia from the mid-2000s there was a burgeoning wind power industry. Firstly wind farms and later solar farms were built.

In 2001, John Howard's Liberal Coalition government introduced a target to produce 2% of Australia's electricity from renewable energy by 2010. In 2009, under the Rudd Labor government the renewable energy target (RET) was strengthened to 20% by 2020, an amount which was more than double South Australia's energy consumption.⁷ The RET operates in two parts, a Large-scale Renewable Energy Target that creates a financial incentive to establish and expand renewable power stations such as solar farms, wind farms and hydro-electric power stations designed to deliver the majority of the 2020 target, and a Small-scale Renewable Energy Target that creates a financial incentive to install solar panels, wind and hydro systems, solar water heaters and air source heat pumps.

As stated in the article in the journal 'Energy Policy' published in January 2021 "the national RET meant the South Australian government did not have to offer its own incentives to meet its more ambitious renewable target. Instead it just

SEG is very grateful to our corporate sponsor Microchips Australia for its invaluable support to the Minnowarra Project.



needed to be more attractive to investors motivated by the RET than other states. This proved relatively easy in the first decade of the 21st century because other states were comparatively slow to move.”⁷

By 2012, the Playford coal-fired power station was moth-balled, but for some time had been running only during summer months, and by 2016 the Northern power station was running for just 6 months of the year. Alinta Energy, owner of both the Port Augusta power stations and the Leigh Creek coal mine (550 km north of Adelaide) found the operations becoming non-viable, as renewable energy costs outcompeted electricity generated from fossil fuels. By May 2016 the Northern generator was closed and later demolished. To replace the Northern generator capacity, natural gas-fired electricity rose from 37% to 52% of the state’s annual output.

However, a government needs to manage the energy market when a coal plant closes (usually earlier than predicted) to prevent and respond to major disruptions in energy supply. There is also disruption to labour markets when workers lose jobs and towns lose people as a result. In the Upper Spencer Gulf region which includes Pt Augusta, the planning for the transition occurred early, and well before the power stations closed. The region has become a major centre for renewable energy projects - which is a story for a future article. The health benefits of the power station closing are also worth noting.

The transition occurred despite indifference and hostility at the national level

The issue of South Australia's transition to renewable energy was elevated to national and international attention on 28th September 2016. A series of one-in-one hundred year storms accompanied by a super-cell of thunderstorms including micro-tornadoes and wind gusts to 260 kph, uprooted trees, tossed farm sheds around paddocks and damaged and toppled steel pylons holding up long-distance transmission lines. Surges in faults currents caused the Victorian-South Australian interconnector to shut down which resulted in more faults currents, and a number of wind farms exposed to the surges shut down. The gas generators were not brought on-line by the company owners’ and the South Australian network collapsed causing a state-wide blackout for a number of hours, but for eleven days on the Eyre Peninsula. Another blackout in early 2017 occurred during unusually hot weather.^{7,3} Reaction to the blackouts from the Federal government, state opposition and some political commentators and media outlets was “vitriolic and blamed without evidence on the state's sustainable energy transition. At no stage did the Federal government offer the South Australian Government any assistance.”¹⁰

The problem causing the blackout was not the amount of renewable energy in the state; the problem was the generator connection rules and the operational management of the electricity system. The National Energy Market operation and design was at fault and this is the responsibility of the Federal

government. A week after the 2016 blackout the Federal Energy Minister asked Professor Alan Finkel to Chair a Review of the National Energy Market. The NEM was also in need of modernizing to take into account the differences between wind generators (asynchronous) and conventional synchronous generators. After the Finkel Review was commissioned, New York-based Audrey Zibelman was appointed the new head of AEMO, and she later commented that implementing the recommendations of the Finkel Review led to a much more stable energy network.³

The political response from the Weatherill government to the blackouts and accompanying attacks was the release in 2017 of *Our Energy Plan*, which mapped out a revised policy direction for the energy market in the state and emphasized “self-reliance not reliance on the national market”.

The Weatherill government began talks with Elon Musk, head of the Tesla Electric car, battery and solar power business. Musk offered to build for the state in 100 days a 100MW lithium-ion grid-level battery (129 MWh) that could run for 1¼ hours at full power. The next biggest grid-level battery world-wide was 30 MW. If the project failed to deliver on time Musk said the state would be gifted the battery. The timeline was met and by December 2017 South Australia had an important element in the effort to stabilize the power network and to help prevent load-shedding blackouts.⁷

South Australia has now become possibly the most secure region in the National Energy Market with the installation of the Musk Neon-Tesla battery at Hornsdale near Jamestown in the state’s mid-north (now expanded to 150MW), other commercial batteries and the 270MW state-owned gas turbine generator at Pelican Point, Outer Harbor.

AGL intends to retire the ageing gas generator on Torrens Island, replacing it with a 250MW battery which will eventually operate at full power for four hours (1000MWh stored energy). The high power and long duration of the battery will make it competitive with gas generators to meet electricity demands in peak times.³

Because of publicity received following the 2016 blackout and by selling itself, Adelaide and South Australia was viewed nationally and internationally as a national and global leader in transitioning to renewable energy, and therefore had no difficulty in luring overseas investors to its renewable energy projects.²

The transition occurred in a privatized market-based system

The difficulty of permitting new competitors into the grid was not a problem in SA, as the electricity sector privatization in the 1990s separated transmission network ownership from generator ownership allowing new private sector generators to connect into the existing transmission network.

Despite the high cost of renewable energy, especially at the time when South Australia moved aggressively into wind and solar in the first decade and a half of the 21st century, the transition to renewable energy in the state was helped by the

rapid fall in solar PV and less dramatically in wind and battery storage costs. These falling prices are a “triumph for climate policy and the modern global economy.”⁹ In the last few years 99% of all new electricity generation in Australia has been solar photovoltaic and wind.³

In his book ‘Reset. Restoring Australia after the Pandemic Recession’ Ross Garnaut says: “South Australia has gone further in the use of solar and wind resources than any other state. It is the most advanced in building the security and reliability of a power system based on low-cost intermittent renewables through support for battery and pumped hydro storage and demand management. The state has made itself a favourable and well-known focus for investment in a wide range of zero-emissions industrial and other economic activities.”¹⁴

I have not discussed pumped hydro storage as a renewable energy source in the South Australian Plan, because the Federal government has stalled on issuing finance under the Coalition’s Underwriting New Generation Investment program (UNGI). For over 2 years proposals for three South Australian pumped hydro storage projects have been waiting for ARENA, Australia’s Renewable Energy Agency, to nominate its preferred South Australian option to receive a \$40m grant from the Coalition’s UNGI program.¹⁵

Conclusion

Momentum in moving South Australia to 60% renewable energy by 2020 was retained despite rising costs, reliability issues and the change to a Liberal government.

South Australia has shown how good public policy can enable dramatic reductions in greenhouse gas emissions even in a privately owned electricity system. The state’s actions provide incontrovertible evidence of a successful transition to a reliable renewable energy sector and a transition pathway for other Australian states and countries to follow.¹

References

1. “Against the odds, South Australia is a renewable energy powerhouse. So how did they do it?” Michael McGreevy and Fran Baum.’ The Conversation’, 26 Feb 2021

2. BBC Radio 4 “The South Australian Miracle”, Peter Hadfield, Costing the Earth - The South Australian Miracle - BBC Sounds, 4 May 2021

3. “Getting to Net Zero”, Alan Finkel, Quarterly Essay. Issue 81, 2021

4. “South Australian Clean Energy Transformation”. Nick Smith, Department of Energy and Mining, 2020

5. “All of South Australia’s power comes from solar panels in world first for major jurisdiction”. Richard Davies, ABC News, 25 October 2020

6. “South Australia blazes trail for renewable energy.” David Suzuki ‘The Commonsense Canadian’, June 2016

7. “Expediting a renewable energy transition in a privatised market via public policy: The case of South Australia 2004-18”, ‘Energy Policy’ Volume 148, Part A, January 2021

8. “Creating a Sustainable Adelaide” Herbert Giradet, 2004

9. “Super-Power. Australia’s low-carbon opportunity”. Ross Garnaut, La Trobe University Press, 2019

10. “The Carbon Club.” Marian Wilkinson. Allen and Unwin, 2020

11. “Directions for a Climate Smart South Australia”, Department for Environment and Water, 2020

12. Report: “FINAL DECISION TransGrid Contingent Project. Project EnergyConnect”, Australian Energy Regulator, May 2021

13. “Renewable Energy Atlas”, Department of Premier and Cabinet, Government of South Australia, 2019

14. “Reset. Restoring Australia after the Pandemic Recession”. Ross Garnaut. La Trobe University Press, 2021

15. “Pumped hydro projects left high and dry, still waiting for funding news”. Giles Parkinson, Renew Economy, 1 September 2020

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GEEGEELA TRIP DIARY: MAY 2021

Andrew Barr

Sunday 2nd May

I left home at 9am to drive to Bordertown where I was to meet the other members of the Scientific Expedition Group's scientists and volunteers. We were going to help the Nature Glenelg Trust (NGT) with a biological survey on a property owned by Nature Foundation SA. It was an easy trip on the highway. I met the SEG crew at about 1 pm and we drove about 40 km south to the Geegeela Nature Reserve.



Eaglehawk Waterhole where we camped

Our first priority was to set up the cooking and science tents. We also had to set up our own accommodation. I had bought a swag which was to be a new and interesting experience for me. I had been asked to cook the evening meals, which is something I have done before on many SEG surveys.

Monday 3rd May

I woke up early to a misty morning as the temperature had dropped to 2° C overnight. After a hasty breakfast, our priority for the day was to set up five traplines. The leader of the Nature Glenelg Trust, Bryan Haywood had chosen different habitats around the Geegeela Nature Reserve for the traplines.



Annette Vincent, Jill Tugwell, Brian Swan and Graham Medlin setting up a trapline.

Most of the soil in this area is sandy and so digging the pitfalls and erecting the fence line along the pitfalls to form a trapline was not difficult. Since we were an experienced crew we were able to prepare all five sites on the first the day of the survey.

At the first site I was shown some native orchids by the botanists who were working with SEG.



Cooking tent at Geegeela campsite

Tuesday 4th May

The science crew left early to check the traplines for the overnight captures. I had a free day until I needed to cook dinner. Annette Vincent and I went to Site 1 to sketch and paint. Annette wanted to sketch each site and use the images in her Geegeela Report of the invertebrate captures. I took my art set up and painted with acrylic paint on an 8x10 canvas board. Over the week I photographed each of the sites for future reference. I will paint the sites in oils when I am back in my studio. It is a challenge to paint what you see, but I wanted to observe the shapes in front of me and to mix the colours accurately. After 2 hours we returned to camp for lunch, and in the afternoon we painted and sketched at Site 5.

Site 5 is an area where a fire had burnt the scrub in early 2018. I was surprised at the regeneration that was already visible. The tall stringy bark trees were covered with fresh green regrowth. Small banksia plants dotted the landscape: their seeds germinate after fire. The native fuchsias with delicate red and yellow flowers were my favourite.

Trent Porter had set up two camp ovens to cook pizzas and I prepared a variety of ingredients that the crew could place on the pizza bases and bring to the ovens. It seemed that 5 to 8 minutes produced a well-cooked pizza. All the crew was happy with the results. We then sat around the campfire telling stories over a glass of red wine. I was in my swag by 9pm.



Banksia



Correa



My swag

Wednesday 5th May

When I awoke the inside of my swag was damp with condensation. It seems that my exhaled breath was the cause as the temperature had dropped to 1° C overnight. As I opened the swag the outside air was very foggy. We all huddled around the stoked-up campfire to have our breakfast.

In the morning I checked traplines with the science crew. All we caught was one house mouse, since it was too cold for reptile captures. I had a discussion with another member about killing the mouse since it is a feral animal. His point was that because of the bush fire there was little prey for the resident owls, and so we let the mouse go.

Three members of the Nature Foundation SA and a Park Ranger arrived in time to have dinner with the group. Our leader took them on a quick tour to show them one of our traplines.

Active revegetation can be seen around the property from plantings done by volunteers under the National Landcare Program.

Thursday 6th May

Another chilly morning around the campfire but the sun came out as we headed out to check the traplines. All we caught were two house mice that were sexed and weighed before being released. It was a quiet day. The rest of my day was spent sketching some plants, helping to organize food and preparing dinner.

Annette and I went to Site 4 to paint and sketch again in the warm afternoon. Site 4 is another burnt site, and our mood was rather sombre, but there is a lot of re-growth. I was happier with my sketch today as this is the fourth one. We also took photographs of the two of us working in the field.

Tomorrow we shall have to take up all the traplines.



Our campsite on a chilly morning



Artist in the bush



A quick sketch

Friday 7th May

The whole crew took up the trap lines after they were checked for captures. Two house mice again were in pitfalls and one was a recapture. Lucy from the Nature Foundation came with us to see how the operation worked. Because we are an experienced group, we had all the sites packed up by noon. Annette Vincent had to dismantle her ant traps and will study and report the results of her captures in the coming months. After lunch we had to dismantle the science and cooking tents and pack the trailer for our journey back to Adelaide the next morning.

Around the campfire we had many pleasant evenings talking to our friends whom most of us had known for ten years or more. Although we did not catch many specimens due to the cold weather, it was a privilege for me at 82 years to still be involved with SEG and go to a new wilderness area of South Australia.

All photographs Andrew Barr

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SCIENTIFIC EXPEDITION GROUP INC. NOTICE OF ANNUAL GENERAL MEETING

The 37th Annual General Meeting will be held on

FRIDAY 29th October 2021 @ 7.30 pm

PARKVIEW ROOM FULLARTON PARK COMMUNITY CENTRE

411 Fullarton Road Fullarton SA 5063

GUEST SPEAKER

Dr Mark N. Hutchinson (BSc, PhD)

“Discovering species - where they lurk and how to find them.”

Mark is an Honorary Researcher at the South Australian Museum, an Affiliate Senior Lecturer, Biological Sciences, University of Adelaide, and an Adjunct Associate Professor, Science and Engineering, Flinders University.

ALL WELCOME



View from Coultard's Lookout

ARKARoola AND A BUSH TUCKER WALK

Helen Johnson

With 2020 Covid restrictions lifted on 8th June, Annette Vincent and I set off early on Tuesday 9th June to join the Friends of Vulkathunha Gammons National Park team at Balcanoona. After 6 days with the Friends project we drove to Arkaroola for three days: art for Annette, exploration for me, and a wonderful Bush Tucker Walk for both of us.

Arkaroola 15th– 18th June 2020

Arkaroola had very few visitors in mid-June because the SA borders to other states and territories were closed. The weather at Arkaroola is perfect in June, with clear skies and comfortably warm days.

On our first full day at Arkaroola, Annette walked across Acacia Ridge stopping to sketch as she went, while I enjoyed the Ridgetop Tour, sitting in relative comfort next to Richard our knowledgeable guide and driver. With very few passengers, people in the back of the vehicle were being tossed around rather uncomfortably. At Siller's Lookout we enjoyed a cuppa and a muffin, rather than the usual lamington. With only 70 mm of rain four months earlier the landscape was very dry with stressed vegetation. Dead native pines (*Callitris glaucophylla*) and slender bellfruit trees (*Cardonocarpus pyramidalis*) were visible on the hill slopes and tops, with a few isolated specimens hanging on.

A highlight of our visit was the **Yata Nukuntha** Experience - the Bush Tucker Walk along the Mawson Trail to Indian Head with Adnyamathanha Elder Sharpy Coulthard, learning fascinating facts about plants that many SEG members are familiar with. Over morning tea, Sharpy told us the Creation Story – **Muda** history. Also learning how ochre was traded to different parts of Australia and South Australia was astonishing.

Plants that we learned about:

- Mistletoe, **Vatapi**, both narrow leaf (flowering) and broad leaf. Can eat the berries.
- Curly mallee (*Eucalyptus gillii*), **Mundawarra**.
- *Acacia tetragonafila*, **Vada**.
- *Acacia aneura*, mulga, **Mulka**. Used for walking sticks and 'not come back' boomerangs, firewood and fence posts that termites can't chew through. It is also known as a 'Dingo' tree - 'no bark tree'.
- **Vada** and **Mulka** grow on rocky, dark, shady sides of hills.
- *Acacia ligulata*, leaves were chewed for pain relief (narcotic and opiates).
- *Alectryon oleifolius*, bullock bush, rosewood, **Minera**. Seeds are ground for damper. Cattle and other animals graze plants. Cattle were removed from Arkaroola in the 60s and sheep and goats were removed early 70s.
- *Acacia rivalis*, river acacia, **Nguri**. Bush sap, bush lolly.
- *Melaleuca glomerata* grows in creeks on the Mawson Trail. Any titree/paper bark species is known as **Aluda**.
- *Eremophila longifolia*, emu bush, **Yumburra**, sandalwood, scented.
- *Eremophila freelingii*, **Alda**. 'Emu' oil.
- *Eucalyptus camaldulensis*, river red gum, **Wida**.
- *Ptilotus obovatus*, **Mulla mulla**.
- *Austrodanthonia caespitosa*, wallaby grass, **Tamada**.
- *Acacia victoriae*, **Minga**. The seeds when ground into flour are used to make wattle-seed bread. A wool pack of seeds costs \$3000 - \$4000.
- *Capparis mitchellii*, native orange, **Iga**. The **Iga** tree needs both male and female caper butterflies for pollination. The ripe fruit smells like mango, and the flesh is eaten, however you don't bite into the seeds as they are very hot. The seeds are sterilized to turn into a

condiment like pepper. It is a tropical tree, originally from the Gulf of Carpentaria. Sharpy said the debris was carried south when the inland sea receded.

Propagating lga seeds: the dried up fruit is broken open and the seeds removed. Put them in the palm of your hand and gently clean off the husk until the seeds look like shiny beans. Rubbing between palms continues for two days! Propagate in a mix of perlite and potting mix. However the seeds must not be pressed into the mix, but placed on the top of the soil. Keep the pot moist and protect the seeds from being eaten. When the seed starts to develop roots it will drag itself down into the potting mix and then not be visible. No wonder the Balcanoona re-veg team have been finding it hard to propagate **lga** seeds. Well done Martin who managed to grow two plants!

All native seeds can germinate after 20 to 30 years following a long sharp rain. Rob Brandle has observed this. Interestingly we didn't see any quandong trees (*Santalum acuminatum*) on our Bush Tucker Walk although there are plenty of them on Arkaroola. There is a quandong growing next to Mawson Lodge that is quite productive.

Over morning tea near Sitting Bull, Sharpy told us **Muda** history of the northern Flinders Ranges. As **Akurra udna** moved from Lake Callabonna and Lake Frome drinking the water, the lakes dried and the Serpent grew lengthways and sideways as it moved through the northern Flinders Ranges,

through Arkaroola Creek, urinating at Paralana Springs and Arkaroola Springs. The Serpent created uranium at Mt Painter. As **Akurra** moved through the southern part of Arkaroola it defecated, creating The Pinnacles and Indian Head. Tremors in Yacki Waterhole in the Vulkathunha-Gammon Ranges are caused by the Serpent's belly rumbling.

Arkaroola is very rich in red ochre and people from there traded it. Wilpena Pound has red ochre which has mercury in it. Sharpy said it was good for people and the Macassans from Makassar on Indonesia's Sulawesi Island used it.

At the start of summer old fellas would gather the young 12 year old boys for initiation. Then the boys would have to go on a journey to the Kimberleys taking red ochre to trade for opium. They would also walk via Cooper Creek to Cape York trading red ochre for granite stones used for chisels. Other journeys were to the Coorong and to Mt Kosciusko trading red ochre for reeds for baskets and dilly bags. While young boys were preparing for their initiation, they grew their hair very long. The red ochre was piled on their heads and the hair wound around to keep it secure. Opium was carried that way on their return from the Kimberleys.

Trading routes led from springs and water holes to the next spring or waterhole, and different tribes no doubt described the ongoing journey through their country to the boys. If you look at the map of Aboriginal tribal groups, the



Stubbs Waterhole

boys would have passed through the country of many tribes to reach Cape York. See page 1.

Australia-Aboriginal-Tribes-Map.jpg (2432×2217) (mappery.com)

In Aboriginal life, learning is oral and children start very young learning about the world around them and how to observe and remember what they see. The ancient trading routes that criss-cross the whole of Australia joined communities of Aboriginal people with their knowledge of country and their creation stories. Songlines are the Aboriginal walking routes that cross the country, linking important sites and locations, features and directions which travellers sing as they move across the country.

One night Annette and I joined Doug Sprigg for his Astronomy tour. Because of Covid restrictions the viewing was inside the Ningana Visitor Information Centre. The night sky images were shown on two large computer screens from the Celestron telescope which is just outside the Visitor Centre. The images of nebulae and stars were wondrous. However, one night in the early hours I opened the curtain of the motel room to look at the night sky. The view was breathtaking! I have never seen so many stars with the naked eye. It almost rivalled the astronomy show. The air is particularly free of dust in June.

This was my fifth visit to Arkaroola and I have had new experiences on every visit. I have seen Arkaroola from the air a number of times, from both light planes and a helicopter. Such



Ochre wall at Arkaroola

amazing country - a jewel in the crown of the South Australian outback!

Annette and I had a pleasant drive home stopping at the Australian Arid Lands Botanic Garden to buy plants. Annette kept a diary of our trip, and her notes have been very helpful in preparing this article.

All photographs Helen Johnson

kdolphin@internode.on.net



Split Rock on Ridgetop tour

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