



SEGments



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Cover Photo: Upper Photo: Part of Tony Robinson's property 'Wiluwilya', Kangaroo Island in November 2016.

Lower Photo: The same view in January 2020 after KI fires.

Rear Cover Photo: Regeneration on Tony Robinson's property, 'Wiluwilya', two months after the fires.

The Scientific Expedition Group is a not-for profit organisation which began in 1984. SEG undertakes several expeditions each year to record scientific information on wildlife and the environment in many parts of South Australia.

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

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

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

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EDITORIAL

I hope that 18th Century poet, Friedrich Holderlin's words are prophetic at this time of the Covid 19 pandemic: "Where there is danger, that which will save us also grows".

Professor Ervin Laszlo, of the Huffington Post, describing Iain McGilchrist's "The Master and his Emissary. The Divided Brain and the Making of the Western World", 2009 (Ref 1), says "McGilchrist argues that the left and right hemispheres have differing insights, values and priorities. Each has a distinct 'take' on the world -- most strikingly, the right hemisphere sees itself as connected to the world, whereas the left hemisphere stands aloof from it. This affects our understanding not just of language and reason, music and time, but of all living things: our bodies, ourselves and the world in which we live."

McGilchrist writes "According to Heidegger we have become caught up in a frenzy of forming projects, enclosures, frameworks, division, and structuring: destroying ourselves and environments and turning all into a 'resource', something to be merely exploited. Nature turned into 'one gigantic filling station'". We need both hemispheres, but McGilchrist argues that the left hemisphere has "become so far dominant that we are in danger of forgetting everything that makes us human".

In a strange way the Covid 19 lockdowns may be the catalyst for a shift in our global thinking from a left-brain 'stands aloof world', to a right-brain 'connection to the world'. Perhaps the danger we feel will lead to a paradigm shift. Will residents of Punjab State want to lose their view of snow-capped Himalayan Mountains from their rooftops; will polluted rivers be acceptable in the future?

In the 2019/20 bushfire season SE Australia was confronted with catastrophic, predicted bushfires while the world watched on. In South Australia as a result of the fires starting first in the Adelaide Hills and then on Kangaroo Island, the Department for Environment and Water (DEW) quickly redirected money to employ more environmental scientists and ecologists to assist the recovery, support wildlife and set up a Task Force to learn how to better manage and reduce impacts of bushfires in South Australia. The danger and consequences created a shift in DEW's budgeting strategy, and also within the community in attitudes towards Australian wildlife and biodiversity. Many commentators made a connection to climate change.

In his latest book "Super-Power. Australia's low-carbon Opportunity" (Ref 2), Ross Garnaut believes: "There is a chasm between a world that quickly breaks the link between modern economic growth and carbon emissions, and a world that fails to do so. The side of the chasm that we are now on is a dangerous place. It would be reckless beyond the normal human irrationality for us to stay where we are."

Some good news about greenhouse gas emissions: the International Energy Agency has forecast CO₂ emissions could fall by 8% in 2020 (amounting to 2,600 Mt) as a result of the Covid 19 response. Before the crisis global emissions were expected to increase by 1% (Carbon Brief, 2020). In China over Feb/March nitrogen dioxide (NO₂) emissions from car exhausts reduced by 30%. China has incentives for purchasing electric vehicles and perhaps these incentives will be strengthened further as a result of the environmental benefits of blue skies over Chinese cities. By 2018, China had an uptake of 5.8% electric cars, compared with a global uptake of 3.8%. Australia lags behind with just 0.2% electric cars. (Ref 2)

In an article in the RIAS Australian Science Channel, Tim Jarvis wrote that after the Global Financial Crisis there was a bounce-back in carbon emissions from the reductions experienced during the GFC. "This time might it be different? Certainly COVID-19 has shown us the extent of our global footprint and while lockdown-induced carbon reductions aren't cause for celebration, they do demonstrate how quickly we can turn the tap off if needs must." (Ref 3)

COVID 19 has taught us some interesting side lessons. Social distancing has clearly saved lives, but also the number of influenza cases this year is considerably down on last year. We have heard

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PART 1 - THE KANGAROO ISLAND FIRES, AN ECOLOGICAL CATASTROPHE

Dr Tony Robinson

I first visited Kangaroo Island in August 1964 at the age of 17. With a group of Scouts I walked about 75 miles over a week (we were not metric back then), from Kelly Hill Caves to Harveys Return through Kelly Hill Conservation Park and Flinders Chase National Park. From this first encounter I was hooked on the wild beauty of Flinders Chase National Park and it probably began my life-long love affair with island biology (Ref 1). After this first encounter, I went back many times, in particular, having a number of holidays staying in a shack right on the beach just East of Vivonne Bay. Whenever interstate or overseas visitors came to South Australia, we took them to Kangaroo Island and without exception everyone we introduced was captivated by the place.

Finally, in 1997 we purchased land on the western end of Kangaroo Island adjacent to the Gosse Lands section of Flinders Chase National Park. We called our property 'Wiluwilya' which means 'Home of the Stone Curlew' in the Kurna language. Together with the neighbouring property 'Wilderness Valley', our land included a half share in a 200 hectare block of Heritage Agreement native vegetation. This block, which also included some cleared land, covers 102 hectares and encloses much of the spring-fed headwaters of the North West River. It had not been burnt for over 50 years, making it by far the largest piece of long-unburnt natural vegetation on western Kangaroo Island.

We began a revegetation program on some of the cleared land on 'Wiluwilya' in 2004 and have continued this until just before the fire with planting in the final area to be re-vegetated taking place from February 2017 to mid 2020. As part of this program I set up a series of 7 biological monitoring sites, 3 in the Heritage Agreement bushland and four in the various stages of the re-vegetation, in order to follow progress using the native

bushland as my 'control area', to provide an idea of where I was aiming for with the revegetation.

In this article I will use the data from the 12 years of annual sampling of the seven biological monitoring sites, and I will extrapolate to represent the laterite plateau complex of ecosystems, which are representative of much of the high rainfall areas on western Kangaroo Island, including about two thirds of Flinders Chase National Park.

In a report 'After the catastrophe, a blueprint for conservation response to large-scale ecological disaster' (prepared by twelve of Australia's best conservation biologists who make up the Threatened Species Recovery Hub of the National Environmental Science Program), the biologists stated- 'Bad things happen. Sometimes they happen suddenly, at enormous scale, and without comparable precedent'. They go on to say 'Although consistent with general predictions from climate change models, and presaged (and catalysed) by extensive drought that affected much of Australia for several years, the pace and magnitude of these wildfires shocked Australian communities, fire ecologists and conservation biologists. Between September 2019 and January 2020, the wildfires burnt at least 10 million hectares in largely uncontrollable fires across all six Australian states. These wildfires occurred not only in mainland areas but also on a large island of outstanding conservation significance (Kangaroo Island)'.

The scale of the Kangaroo Island fires is unprecedented. Started by natural lightning events, beginning on 20 December 2019, a rolling suite of fires collectively known as the Ravine Complex burned about half of the Island. The fires were not finally contained until 21 January 2020. Community impact has been significant - with losses of property, livestock, fences, vehicles, 95 homes and tragically, the lives of two people. In



Map showing extent of the fires on Kangaroo Island. 'Wiluwilya' is marked by the red cross.



Western grey kangaroo killed by fire 5 Jan 2020. Photo: Michaela Haska

terms of environmental impact, fires have burned in Flinders Chase National Park, four Wilderness Areas and six Conservation Parks. In total the Ravine Fire Complex covers an area just over 200,000 hectares, which represents 47% of the

land surface, leaving about 230,000 hectares - the eastern half of the Island unaffected.

On Saturday 3 January, the 'Wiluwilya' and 'Wilderness Valley' properties were swept up in this uncontrollable fire roaring out of the surrounding plantations of Tasmanian Blue Gums, and leaving our beautiful heritage area bushland a blackened and smoking ruin along with our houses and everything else in the fires' path. The fire was so hot it turned the laterite gravel typical of these sorts of ecosystems on W Kangaroo Island from orange to black.

There were tens of thousands of immediate casualties of the fire. The roads and paddocks were littered with carcasses of the larger animals. Most hardly had their fur singed; they had just breathed in fire and dropped dead on the spot as the fire moved on. Small bush birds and insects were simply vaporised while those animals that died in the bush sometimes left a few bones behind, but were mostly completely consumed as the fire burnt down to the underlying mineral soil. Up to now we

Table 1: The 19 Australian Birds that have had at least half of their habitat affected by fire.

Kangaroo Island only	
Common Name	Scientific Name
Glossy black cockatoo	<i>Calytorhynchus lathami</i>
Kangaroo Island superb fairy-wren	<i>Malurus cyaneus ashbyi</i>
Kangaroo Island Southern emu-wren	<i>Stipiturus malachrurus halmaturinus</i>
Kangaroo Island red wattlebird	<i>Anthochaera carunculata clelandi</i>
Kangaroo Island little wattlebird	<i>Anthochaera chrysoptera halmaturina</i>
Kangaroo Island white-eared honeyeater	<i>Nesoptilotis leucotis thomasi</i>
Kangaroo Island brown-headed honeyeater	<i>Melithreptus brevirostris brevirostris</i>
Kangaroo Island New Holland honeyeater	<i>Phylidonyris novaehollandiae campbelli</i>
Kangaroo Island striated thornbill	<i>Acanthiza lineata whitei</i>
Kangaroo Island brown thornbill	<i>Acanthiza pusilla zietzi</i>
Kangaroo Island shy heathwren	<i>Calamanthus cautus halmaturinus</i>
Kangaroo Island spotted scrubwren	<i>Sericornis frontalis ashbyi</i>
Kangaroo Island western whipbird	<i>Psophodes nigrogularis lashmari</i>
Kangaroo Island grey currawong	<i>Strepera versicolor halmaturina</i>
Kangaroo Island crimson rosella	<i>Platycercus elegans fleurieuensis</i>
Elsewhere in Australia	
Common Name	Scientific Name
Central superb lyrebird	<i>Menura novaehollandiae novaehollandiae</i>
Northern superb lyrebird	<i>Menura novaehollandiae edwardae</i>
Southern rufous scrub-bird	<i>Atricornis rufescens ferrieri</i>
Rock warbler	<i>Origma solitaria</i>

have all been taught that 'the Australian bush is adapted to recovering from wildfires', and I say, not these sorts of fires.

Because birds are the group of Australian animals that is best known scientifically, the ornithological group 'Birds Australia' were quick to come up with an analysis of the impact of these fires Australia-wide on our birds, and their preliminary results, prepared by Dr Steven Garnett and others were released to the media on 24 January. They suggested that over 80 species across Australia have lost more than a third of their habitat, while 19 species had more than half of their former habitat seriously affected by fire. Of these 19, 15 are subspecies from Kangaroo Island. This assessment is based purely on overlaying the burnt area in early January across Australia over the distribution data in the 'Atlas of Living Australia'. As a first step in assessing the impact of such fires it is interesting, but the actual picture taking into account the ecology of each species on Kangaroo Island is much more complex. I will describe about 30 species of plants and animals that have been variously affected by the fires.



Gosse Lands Logania *Logania scabrella* Kelly Hill to Hansen Bay track



Kangaroo Island dunnart *Sminthopsis fuliginosus aitkeni*

Plants and animals that have been affected by the fire

1. Species possibly at **risk of extinction** on Kangaroo Island

Plants: Gosse Lands Logania and twining hand-flower.

Mammals: Kangaroo Island echidna, Kangaroo Island Dunnart, Little Pigmy Possum and Swamp Rat. **Birds:** glossy black cockatoo, Kangaroo Island southern emu wren, Kangaroo Island western whipbird and Kangaroo Island shy heathwren.

Gastropods: Kangaroo Island corrugated snail. While these 11 species have had much of their range within the fire footprint, they each have different ecological needs and occur in a range of different ecosystems.

The **Gosse Lands Logania**, *Logania scabrella* is a 1 metre tall understory shrub of the Kangaroo Island Mallee-ash low mallee community of the laterite plateau. Before the fire it had been recorded from only 11 localities, all within the fire footprint. At this stage we have no idea how much of the soil seed bank remains after this extremely hot fire. There are clearly no surviving adult plants. It is probably extinct.

The **twining hand-flower**, *Cheiranthra volubilis* is a spectacular climbing plant that is endemic to Kangaroo Island. While there are quite a large number of records, its main stronghold was within the fire footprint where it was associated with moister areas in the deep valleys on the laterite plateau. Like the Gosse Lands Logania we have no idea at this stage how the soil seed bank for this species fared during these fires and it may be extinct over more than half of its previously known range.

In 2016 the **Kangaroo Island dunnart subspecies** was identified as one of the 20 Australian mammals at greatest risk of extinction. The 'Wiluwilya' and Wilderness Valley Heritage Agreement bush supported the largest known remaining population. Twelve months of continuous camera trapping in this area had increased our understanding of this population of dunnarts significantly. They have now been recorded 35 times at four different trap sites with the majority of



Climbing hand flower *Cheiranthra volubilis*
Flinders Chase National Park

observations being in the summer months from October to February, with only a single record in May. Since their original discovery in 1969, when a dog caught two escaping from the base of a yacca during land clearing operations, very few additional populations have been discovered. The last major surveys in 2018 only recorded dunnarts from 11 separate locations, five in Flinders Chase National Park and four on privately-owned bushland. All these existing populations were on western Kangaroo Island within the fire footprint. They clearly need extensive areas of habitat to survive on Kangaroo Island and hence their progressive disappearance from the more fragmented areas of natural vegetation further east on the island since 1969.

Before the fire the species was classified as being 'critically endangered'. It has had two 'Recovery Plans' prepared for it, one by Jody Gates in 2011, and one in draft form prepared last year. Since the fire, camera traps have recorded some living dunnarts in the largest unburnt remnant on Flinders Chase National Park and on three separate areas of privately-owned bushland where small patches escaped the fire. One of these sites has been enclosed by a feral cat proof fence to protect it/ them from predation. The species is still here, but can now probably be considered 'functionally extinct'.



Little pygmy possum *Cercartetus lepidus*. Photo: P Aitken

Western pygmy possums are widespread and abundant across most remaining areas of natural vegetation on Kangaroo Island and although tens of thousands will have been killed in the fire footprint, they are not in nearly the serious trouble as their close relative the **little pygmy possum** appears to be in. Always much rarer than its relative, the 27 localities from which it has been recorded are all within the fire footprint. It may now be extinct on Kangaroo Island, but as populations are also known from the Australian mainland the possibility of a re-introduction could be considered. Any such plan depends critically on ongoing post-fire management in the natural vegetation areas of western Kangaroo Island to promote recovery of the nectar-producing plants, particularly Banksias,

on which both species of pygmy possum depend. I will have more to say about these complex ecological relationships when I discuss the plight of the green carpenter bee.



Swamp rat *Rattus lutreolus*

Known only from five localities all within the fire footprint, **swamp rats** live in a specialised habitat which was not very widespread on western Kangaroo Island. They are associated with swampy areas along permanent river valleys and the margins of freshwater lagoons. Such areas produce dense stands of the native sedges that this species primarily feeds on. The much more common and widespread bush rat, like the more common of the pygmy possums discussed before undoubtedly has been very badly affected by the fires, but will still be present in many unburnt areas further east. Swamp rats are probably now extinct on Kangaroo Island but, like the little pygmy possum, still have an extensive distribution in mainland Australia and could be reintroduced if their specialised habitat regenerates some time post-fire.

The spectacular **Kangaroo Island Glossy black-cockatoo** is now only found on Kangaroo Island. It once also occurred on the southern Fleurieu and Eyre Peninsulas but is now extinct on the South Australian mainland with the last mainland record being in 1977 from southern Fleurieu Peninsula. The first



Glossy black-cockatoo *Calyptorhynchus lathami*. Church Road, Kangaroo Island. Photo: Peter Hammond

systematic population survey on Kangaroo Island was in 1982, when it was estimated that the population numbered at least 115 individuals and probably no more than 150. The number of breeding pairs was at least five but probably did not exceed thirty.

Clearly something had to be done to give these birds a helping hand and one of Australia's most successful threatened species recovery programs was begun on Kangaroo Island. Before the fire the birds had made a significant recovery with the highest population so far recorded in the annual winter count being 373 in 2016. There were many parts to this recovery program which were implemented after significant ecological research to identify threats to the population and to determine effective and practical measures that could be implemented in the field to minimise these threats. These included artificial nest hollows; protecting nesting trees from egg and chick predation by the very large Kangaroo Island population of brushtail possums, by installing "collars" around tree trunks; removing feral honey bees from nesting hollows; and undertaking an extensive program of planting stands of the bird's specialised food tree, the drooping sheoak, on both public and private land all over the island.

Before the fire we routinely saw flocks of 5-10 glossies in our heritage agreement bushland and at least one pair nested in a big hollow sugar gum beside the NW River. We have seen individual cockatoos over our property since the fire, so at least some have survived, but many areas of drooping sheoaks (including those on our property) planted as cockatoo habitat have been burnt and although a few burnt trees are re-sprouting, it is as yet unclear how many, even those 10 to 20 year old plantings will survive this fire, and many will probably have to be re-planted. A large proportion of the natural sheoak stands on the west and north coasts within the fire footprint were also severely burnt. In past fires these areas have regenerated but we do not know if this will happen this time. It takes about 10 years for a drooping sheoak regenerating from seed to produce fruits of its own and be available as a glossy feeding tree.

On KI, before the fire, the endemic sub-species of the delightful little southern emu-wren, the **Kangaroo Island southern emu-wren**, was considered the largest and most secure population of this species, which was doing it tough in tiny patches of suitable habitat remaining across the rest of its southern Australian mainland distribution. It has now lost around 50% of its former habitat of coastal mallee on limestone and Kangaroo Island mallee-ash low mallee on the laterite plateau on the western half of the island. These tiny birds are known to not fly significant distances to re-colonise other areas, and there is considerable experience within the Australian conservation management community of carrying out translocation programs to try and expand their mainland population size. Such programs take considerable time, money

and staff, and like all the rest of the species which will require such assistance it will all depend on how much of their former habitat regenerates from this fire and how long it will take to again be able to support populations of emu wrens

Much rarer than the southern emu wren, the **Kangaroo Island sub species of the western whipbird** has most of its known distribution in the coastal mallee on limestone habitat completely within the fire footprint. There will remain a small number of populations on the southern coast of the Dudley Peninsula, on the eastern end of Kangaroo Island, but we know very little about the dispersal ability of this elusive bird and, again, translocations may need to be considered. Like the emu wren, before the fire the Kangaroo Island populations of this species were considered the largest and most secure anywhere in southern Australia.

Almost all of the known records of the **Kangaroo Island sub species of the shy heathwren** are within the area of the fire footprint. The main habitat where this species was found was the Kangaroo Island mallee-ash low mallee of the laterite plateau of which very little escaped the fire. Heathwrens may now be in serious trouble on Kangaroo Island. As a small territorial bush bird with limited ability to colonise potential habitat, recovering post-fire may require a serious search for remaining populations (from their less favoured habitat of coastal mallee on limestone which has survived the fire further east) as possible sources for re-introduction once their more favoured habitat recovers.



KI corrugated snail *Glyptorhagada bordaensis* West Bay, Flinders Chase NP

Known only from coastal limestone habitats from Cape DuCouedic to Cape Borda on the far western coast of Kangaroo Island, the **Kangaroo Island corrugated snail** goes into aestivation at this time of the year sealed to the underside of limestone rocks right on the coastal clifftops. In spite of what the ALA map says, my understanding of this species very limited distribution means that it is very likely

now extinct with the possibility of survival in the small area of unburnt vegetation around Cape Du Couedic.

2. Species for which Kangaroo Island was a **significant stronghold**

Plants: two species of Hibbertia and the Kangaroo Island mallee-ash. **Mammals:** southern brown bandicoot and tamar wallaby. **Birds:** Bassian thrush and beautiful firetail. **Reptiles:** heath goanna and pygmy copperhead. **Insects:** the green carpenter bee.

Two sub species of Hibbertia may have been significantly affected by the fires. *Hibbertia empetrifolia ssp. radians* is a twining understorey shrub which lives beside the remaining natural river valleys on both Kangaroo Island and the Fleurieu Peninsula. Much of its distribution on Kangaroo Island is within the fire footprint. The second species *Hibbertia platyphylla ssp. halmaturina* is a shrub confined to Kangaroo Island. It is a relatively uncommon plant of the Kangaroo Island mallee-ash low mallee of the laterite plateau on western Kangaroo Island, all of which has been burnt. A second group of populations occurs in remnant areas of unburnt natural vegetation south of Kingscote and could provide a source of seed for re-introduction if the seed bank of this species has been destroyed by the fire.

Interestingly, Hibbertia species are, under 'previously normal wildfire conditions', considered as an early post-fire colonising species, so we should be able to make an assessment of the status of these two species within the next 12 months on the fire ground.

Endemic to Kangaroo Island, the **Kangaroo Island mallee-ash** is the predominant overstorey tree on much of the laterite plateau within the fire footprint. There are hundreds of thousands of trees in this area and many of them are already sending out epicormic shoots or are sprouting from their woody basal lignotubers (this after one month). Clearly they have survived even this fire storm. Their ecological importance lies in their very abundance; they provide a large proportion of the nectar, pollen and habitat which supports numerous insects as well as pygmy possum and honeyeaters. In 2004, most of the Gosse Lands section of Flinders Chase National Park was burnt in a relatively intense wildfire. All the mallee-ash trees sprouted immediately following the fire as they are doing this time. However, their first actual flowering season (16 years post fire) was this summer season, with this part of the park covered with gum blossoms from last December. Sixteen years is a long time in the life of most of the species of animals that intimately depend on this tree for a major part of their food supply.

Even before the fire, the distinctive **long-spined sub species of echidna endemic to Kangaroo Island** was classified as endangered on Kangaroo Island. This classification was largely

based on the size of Kangaroo Island, meaning that the sub species had a relatively small 'area of occupancy'. In addition, there was evidence that echidna numbers have declined and that road kill was a major and ongoing threat to the population. Now that half of their distribution on the island is within the fire footprint they are clearly going to be severely impacted. Some at least survived the fire and have been seen since. Unlike many birds, small mammals and reptiles which feed on invertebrates in the air and on the vegetation, and where any post-fire survivors may well starve to death, echidnas feed on ants, termites, earthworms and insect larvae that they dig up, and so will have food available for some time. These underground food resources however have to feed on green vegetation and their surviving post-fire populations will undoubtedly be reduced. The surviving echidnas will have a tough time for a couple of years, but they have been around in pretty much this well-tried design since the time of the dinosaurs, so they have probably survived such challenges many times in the past. They will be OK.

Kangaroo Island was a major stronghold for **southern brown bandicoots** in South Australia. They always seem to have had a patchy distribution in a range of habitats across the island. About half of their previously known distribution is in the fire footprint. They shelter in nests made in a scrape on the surface tucked in under bushes, and it is unlikely that any would not have been killed immediately in these fires. As omnivores with a preference for eating ground-dwelling insects, it is anybody's guess when the burnt area will again provide any suitable bandicoot habitat.

Like the mallee-ash there are hundreds of thousands of **tamar wallabies** on Kangaroo Island, and many in the farming community regard them as serious agricultural pests. They occur in virtually all the range of habitats across the island, but critically depend on the presence of large areas of thick natural vegetation to provide a daytime refuge safe from predators such as eagles and feral cats. Although huge numbers were killed directly by the fire there are survivors even in the heart of the burnt area on our heritage agreement bush. There are already green shoots of grass appearing following the recent rain and there is ample drinking water in the spring-fed pools of the NW River, so there is a good chance for a slow recovery across the fire ground. This is important as tamar wallabies have been extinct on the mainland of South Australia since the 1950's, and although the re-introduced population in a fox-controlled area of Innes National Park seems to be establishing well, the population on fox-free Kangaroo Island is critical for the long-term survival of this species.

The deep gullies of western Kangaroo Island were one of the strongholds of the **Bassian thrush** in South Australia as the populations in the Mt Lofty Ranges are in serious decline. All

Table 2: Kangaroo Island bird species on the original Birds Australia list as having at least half of their habitat affected by the fires, but considered likely to survive on the island after the fires.

Common Name	Scientific Name
Kangaroo Island superb fairy-wren	<i>Malurus cyaneus ashbyi</i>
Kangaroo Island red wattlebird	<i>Anthochaera carunculata clelandi</i>
Kangaroo Island little wattlebird	<i>Anthochaera chrysoptera halmaturina</i>
Kangaroo Island white-eared honeyeater	<i>Nesoptilotis leucotis thomasi</i>
Kangaroo Island brown-headed honeyeater	<i>Melithreptus brevirostris brevirostris</i>
Kangaroo Island New Holland honeyeater	<i>Phylidonyris novaehollandiae campbelli</i>
Kangaroo Island striated thornbill	<i>Acanthiza lineata whitei</i>
Kangaroo Island brown thornbill	<i>Acanthiza pusilla zietzi</i>
Kangaroo Island spotted scrubwren	<i>Sericornis frontalis ashbyi</i>
Kangaroo Island grey currawong	<i>Strepera versicolor halmaturina</i>
Kangaroo Island crimson rosella	<i>Platycercus elegans fleurieuensis</i>

the known island populations were within the fire footprint and the species may well now be extinct there. There are still mainland Australian populations outside of South Australia which could potentially provide a source of birds for re-introduction, but it is doubtful if they could be sourced from the nearest populations in the Adelaide hills.

Although there are lots of records of **beautiful firetails** from across Kangaroo Island, their strongholds were areas near to water on the laterite plateau all within the fire footprint. When these habitats recover to a point where they can again support these little flocks of seed-eaters it may be that there will be re-colonisation from unburnt areas further east. Like the Bassian thrush, beautiful firetail populations in the Mt Lofty Ranges are in a serious state of decline.

The South Australian stronghold for the **heath goanna** has been Kangaroo Island where as the top terrestrial predator (except for feral cats) they seem to be very common right across the island. Unfortunately, those living near roads frequently scavenge road-killed animals and often end up dead as well. Some goannas have survived the fire on our heritage agreement bushland and undoubtedly in other areas of the fire footprint as well. They have plenty of dead animals to eat at the moment, but once they have to revert to their normal insect food may find longer-term survival in this area a bit tougher. They also require termite mounds in which to lay their eggs and we do not as yet know how the millions of termite mounds in the fire ground survived.

The **pygmy copperhead** is a small snake which often goes unnoticed on both Kangaroo Island and the south Mt. Lofty Ranges, which constitutes its total distribution. It is found right across the island and, like the black tiger snake, which is already known to have a few survivors in the fire footprint it

may be able to persist in places on western Kangaroo Island and then spread out as the habitat recovers and its potential insect, frog and small mammal food re-establish.

The **green carpenter bee** is a spectacular iridescent green native bee slightly larger than an introduced honey bee. The story of the decline of this bee across south eastern Australia is a very sad indictment of a failure of conservation management; a situation that is probably all too common among other species of native Australian insects. The green carpenter bee was originally distributed from northern NSW along the coast and ranges into Victoria, the Mt Lofty Ranges and on Kangaroo Island. Although still present in parts of its range in NSW, the species has not been recorded from the mainland of South Australia since 1902, and Victoria since 1938.

Insects often develop complex and obligatory ecological relationships with the ecosystems that they evolve in, and I



Green carpenter bee *Xylocopa aeratus*

will briefly describe the story of the green carpenter bee. Unlike honey bees, green carpenter bees are solitary. They are also buzz pollinators, which many Australian plants depend on, rather than just the simple pollen transfer service provided by honey bees.

Found in open scrub and forest, this bee seems to be at least partly dependant on periodic and small scale bushfires, due to its preference for nesting in decayed trunks of Banksia and sometimes Hakea, that become available after some cooler fires. Also used are old flower stems of yaccas, which mass-flower after a burn and become suitable as an abundant nesting substrate 3-7 years later. Hot wild fires however kill all adult Banksias, and there is intensive regeneration from seed dropped from the seed capsules into the ash bed following the fire. The new Banksias take at least 20 years for the trunks to reach a size and condition suitable for carpenter bee nesting.

Two South Australian biologists, Remko Leijs and Katja Hogendoorn have been working to save the Kangaroo Island populations of this species for the last 10 years, and have come up with some ingenious and practical ways of helping to sustain these populations. In response to the 2004 and 2007 Flinders Chase National Park fires which produced lots of yacca stalks but killed virtually all the Banksia shrubs, Remko and Katya have developed an artificial nesting substrate (nesting stalks) which the bees have readily accepted and used. This should have carried the population through the serious limitation in nesting substrate across the whole national park between when all the yacca stems fall over and the regenerating Banksias are old enough to provide nesting substrate. It is likely that most of the 440 nesting stalks for the green carpenter bee, set out at various locations in the park by Remko and Katya have been lost. This includes the approximately 140 occupied nests, which would have contained mature brood at this stage.

They conclude that ‘the green carpenter bee may now be critically endangered, as most of its remaining habitat in NSW has burnt as well. It will be a while still before we will be allowed into the areas to assess the impact of the fires, but we will certainly do this as soon as possible. In addition, both on Kangaroo Island and around Sydney, there are still areas with unburnt habitat where the bee occurs. We will keep on trying to protect this species in these areas, and encourage recovery. On Kangaroo Island, we hope that nature will help by providing a large amount of yacca stalks which should become available to the bees for nesting in three to seven years from now. We will set out new nesting substrate at various locations every winter and monitor its usage’.

As stated previously, 11 of the 15 endemic Kangaroo Island bird species listed on the ‘Birds Australia’ list of species most threatened by the Australia’s recent fires (Table 1), have not been dealt with yet under the two categories discussed so far. There is no doubt that many hundreds of thousands of individual birds of these remaining species will have perished in these fires, but all have lots of records in the unburnt eastern half of the island, and all of these species have much less specialized habitat requirements than the birds we have already considered. These species are shown in Table 2 on page 8.

After all this doom and gloom, there are three huge opportunities provided by fires of this intensity and magnitude to significantly improve the long-term conservation value of



Green Carpenter Bee artificial nest in yacca stalks on 'Wiluwilya'



Green Carpenter Bee artificial nest label

the island. These opportunities are discussed in Part 2 on page 12 below.

Reference 1: “South Australia's Offshore Islands”, Tony Robinson, Peter Canty, Trish Mooney and Penny Rudduck, Department of Environment and Natural Resources, South Australia, 1996.

Acknowledgement: This article, printed in two parts, originated as a talk to the Field Naturalists Society of South Australia, 12 February 2020. An article based on Tony’s talk was first published in “Tandanya”, the Adelaide Bushwalkers magazine. A revised version has been reprinted here, with kind permission of the Editor.

As Manager of the South Australian Biological Survey and Research Group within the Department for Environment and Heritage, Tony Robinson was responsible for the management

of a team of 15 plus biologists carrying out the Biological Survey of South Australia with assistance from a large number of volunteer biologists. Over ninety separate areas covering two thirds of the State have been systematically surveyed for vascular plants and vertebrate fauna since the program began in 1984. The databases developed as part of the Biological Survey of South Australia now contain over 6000 separate sets of site-based plant and vertebrate records, a huge resource for environmental planning and future biological monitoring across the State. Total State-wide coverage for the Biological Survey of South Australia was scheduled for 2015, but shortly after Tony retired in 2006, the program was wound up.

Photographs by Dr Tony Robinson unless otherwise indicated.

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MINNAWARRA BIODIVERSITY SURVEY – AUTUMN 2020

Janet Furler

Background

The original idea of the Minnowarra Biodiversity Survey was to record changes in populations of mammals, birds, reptiles and frogs in scrub once it was fenced off from domestic grazing animals (sheep and cattle).

It came about by a happy combination of circumstances – Richard Willing (then Chairman of SEG) wanted to protect the scrub on his farming property at Myponga; SEG was thinking it would be good to have activities close to Adelaide to provide different opportunities for educating people about nature and surveys. So as the scrub was being fenced in 2000 the Project was being set up.

Eight sites were chosen in different vegetation habitats and a (then) standard biological survey was established at each site. This requires 6 pitfall traps evenly spread along a 60m drift fence, 15 Elliott traps laid out each side of the pit line and two cage traps, one at each end of the pit line. Apart from one change in the first few years we have used the same sites for the whole time.

The pit traps are PVC pipe, 500cm long, dug vertically into the ground. The drift fence is about 20cm high, dug into the ground and runs across the middle of the 6 pit traps. The idea is that critters will run into the fence, turn and run along the fence and fall into the pits. We then check and empty the pits twice each day. The Elliott traps are metal boxes about 30cm long and 15 cm square. They are baited with a mix of peanut paste and oats which entices small animals in, then traps them safely until we come and let them out on our twice-daily

checks. The cage traps are larger wire traps working the same way with the bait.

Bird surveys have been done at the same time for most surveys in the last 20 years. Bat catching has been done when the weather was right over the last ten years.

The standard time for a survey to run is over four nights. This gives us seven or eight chances to see what we have caught as all the traps get checked morning and afternoon. For the mammals we collect data on species, age, sex, weight and whether we have caught them before, then let them go. For eight years we have been microchipping to keep track of who is who. The skinks and frogs are recorded but not marked, and then released.

Currently we are running two rounds, each visiting four sites, twice a day. This gives interested people the chance to come and see what we do, for about three hours each morning and/or afternoon.

Autumn Survey

Our autumn biodiversity survey was scheduled to run from April 10th, Good Friday, to Tuesday April 14th. As March progressed it became clear that activities involving many different people swapping cars and huddling together to look at little animals were way outside the Coronavirus social isolation rules being brought in. Our first response was to get sad and cancel the survey completely, until we realised that, with modification, we could get most of our expected data and keep the 20 years of data rolling on.

The biggest challenge was how to survey with a very small team, while also doing the farm work, including daily checks of the calving cows. We were able to manage with 5 Willing/ Furler family and one friend. We only opened the Elliott traps, leaving the cage traps and pit lines closed. That made opening sites very quick! We only had two or three sites open at one time, which cut down the time needed at the start and end of each day. It did mean the survey took 11 days. Fortunately, the weather was stable until the last evening, when forecast rain caused us to pack up two sites one night early, missing one round. The end result was an almost complete collection of data for the Elliotts, which provide over 90% of our information. Success!

So, what did we find?

Overall, we caught 98 mammals, 16 from previous surveys, and they turned up 194 times. The breakdown was 37 *Antechinus flavipes*, 30 *Rattus fuscipes* (bush rat), 25 *Rattus lutreolus* (swamp rat), two feral *Rattus rattus* and four feral *Mus musculus* (house mice).

There was a population explosion of *Rattus lutreolus* (swamp rats) at Site 1. We've noticed numbers increasing over the years but this is the largest yet. Of the 23 mammals we caught, 3 were *Antechinus flavipes*, 3 were bush rats and 17 were swamp rats. This site is next to a very thick growth of reeds and rushes which has thickened up without cattle tromping through. The visiting swamp specialist commented that it was a fairly static plant population, not very diverse, and possibly could benefit from some disruption. The challenges of keeping the cows from going all the way down the creek beyond the swamp, and then trying to interpret the data after the vegetation has changed, have made me unwilling to do anything about it at the moment.

Over the road is Site 2 next to a swamp with a more diverse plant population, which caused the specialist to grin and exclaim in delight. Of the 19

animals we caught 8 were *A flavipes*, 7 were bush rats and 4 were swamp rats. This is a more balanced population of animals, and is similar to what we used to catch at Site 1.

We are hoping the spring survey will be back to normal, or approaching previous levels of activity. However, at least we know we can still keep the data coming in. Fingers crossed!

thefurlers@gmail.com



SEG President Richard Willing in a Heritage Block on Minnowarra

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Microchips Australia for its support to the
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For further information and registration forms, contact:

Janet Furler on 0419 842 667 or thefurlers@gmail.com

Richard Willing on 0408 807 517 or rwilling01@gmail.com

PART 2: KANGAROO ISLAND - OPPORTUNITIES FOR LONG-TERM CONSERVATION

Dr Tony Robinson

As stated in Part 1 there are three huge opportunities provided by fires of this intensity and magnitude to significantly improve the long-term conservation value of the island.

One of the major reasons that Kangaroo Island is so important for wildlife conservation in southern Australia is that it has remained free of foxes and rabbits which are such important predators of and competitors with wildlife on the Australian mainland, and now on Tasmania since foxes were introduced there a few years ago.

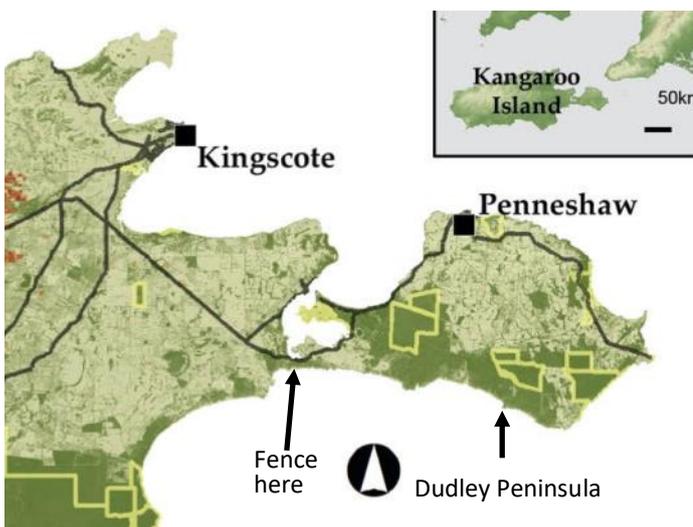
Kangaroo Island does however support significant populations of feral cats, feral pigs and introduced koalas. For about the last five years, the Federal Government has been funding three feral cat eradication programs across Australia. One of these is on Kangaroo Island. This has advanced to a stage where a cat-proof fence is in the process of being erected across the narrowest part of the island and the original plan was to refine techniques for feral cat eradication on the Dudley Peninsula and then extend to the much more complex task of attempted eradication across the remainder of the island.

The fires should have changed the focus and most effort over the next few years needs to be directed towards cat control around all the few unburnt remnants of natural vegetation within the fire footprint to give any surviving animal populations using these habitats the best chance of survival. Cat control also needs to be implemented immediately at all the Kangaroo Island dunnart populations known before the fire on the off chance that some individuals may have survived there against all the odds.

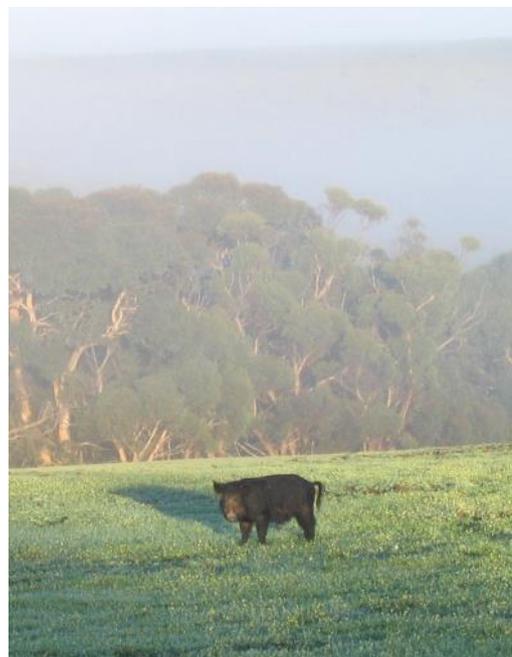
The overall Kangaroo island feral cat eradication program is seriously under-funded and under-staffed at present and it would be a great pity if all the work done to date was wasted for lack of proper funding.

After the 2007 fires that burnt over 90% of Flinders Chase National Park the opportunity was taken to eradicate the small population of feral goats from within the park, through a combination of helicopter-based shooting while the goats were easily visible in the burnt vegetation and a follow-up ground shooting and a 'judas goat' program to find and kill the last remaining goat. This program was successfully completed due very largely to one National Parks & Wildlife rangers' dedication to track down the last remaining goat.

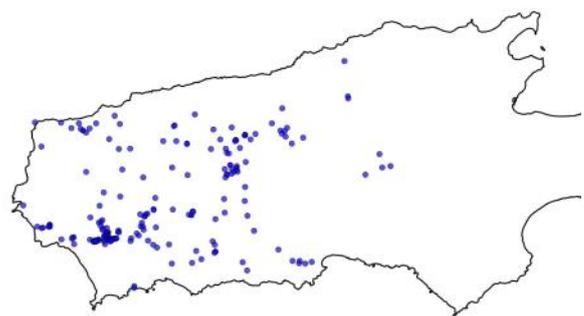
Feral pigs are a whole different issue; they are solitary unlike goats which are social herd animals. Their preferred habitat is beside the rivers in the deep largely inaccessible valleys across the laterite plateau on western Kangaroo Island. Also, as you can see from the distribution map, they are not just confined



Dudley Peninsula from Sentinel 2 spacecraft showing the position of the cat-proof fence



Feral pig *Sus scroffa* early morning Church Road



ALA Distribution map of *Sus scroffa*/pig on Kangaroo Island

to Flinders Chase National Park as the feral goats were but are found extensively on privately-owned land as well. Some helicopter-based shooting has already begun on the park to take advantage of the brief window where pigs can be seen before the post-fire growth obscures their deep valley habitat from the air. This initiative needs some serious funding and staffing commitment immediately and must be coordinated to cover all of the range of the pig population regardless of land tenure. We are rapidly running out of time to make eradication a serious option.

Finally, the 'big one'. Koalas were introduced in good faith to Kangaroo Island in 1923 and 1925 when there was a fear (later shown to be unfounded) that the extensive fur trade operating throughout the koala's natural range in Eastern Australia was driving them to extinction. The introduced Koala population on Kangaroo Island has now been shown to have severely degraded many areas of natural vegetation, particularly the riverine systems through uncontrolled population expansion and over-browsing to the point of killing tens of thousands of their food trees. Against the best biological advice at the time in 1997, the 'Koala Management Program' was begun. This involved catching koalas, surgically sterilizing them and releasing them back at their site of capture.



Koala Phascolarctos cinereus

An island-wide survey in 2001 estimated a total population of 27,000 koalas on the island and the sterilization program was intensified. The extensive plantations of Tasmanian blue gums planted across the western end of the island since the mid 2000's however greatly increased koala habitat and food trees, and in 2017 in the latest census, it was estimated that there are about 25,000 koalas in native vegetation and another 24,000 koalas in the Island's commercial blue gum plantations. In 2017, the last year of the management program 474 koalas were sterilized. Discontinued in 2018 there is now no koala management occurring on Kangaroo Island.

The politics surrounding any suggestion of removing koalas from Kangaroo Island are exactly the same as they were when

the sterilisation program was introduced in 1997, but the fires on Australia's east coast could potentially be a 'game changer'. Even before the fires koalas in parts of the Queensland, NSW and, to a lesser extent, the eastern Victorian coast, were genuinely threatened by loss of habitat through the ever-expanding urban development. Since huge amounts of additional koala habitat have been burnt across a large part of the koalas' natural Australian range in eastern Australia, this has, for the first time, provided an opportunity to transfer Kangaroo Island koalas 'back home'. Clearly this needs to be carried out over many years as the eastern Australian habitat recovers to a point where it is again suitable for koalas, but all the participating conservation agencies should begin the planning now. Again it will take significant money and staff to achieve in a publicly acceptable way.

I have outlined some of the catastrophic biological impact of these unprecedented wildfires and made a few tentative suggestions on a way forward for some of the affected wildlife.

It is my firm belief however that the way forward to post-fire recovery on all of Kangaroo Island is fundamentally based on conservation of the natural environment. You cannot run an apiary industry without large areas of flowering native vegetation to overwinter your hives. You cannot have a 'Clean Green' agricultural sector without nature conservation being the basic support. You cannot go fishing without a basic network of Marine Protected Areas to re-plenish stocks of Southern Rock Lobster and the whiting so beloved of the recreational and small commercial fishing sector.

Of course it should go without saying that no tourist comes to Kangaroo Island without wanting to experience the large tracts of 'natural wilderness', particularly coastal wilderness. They might drink some nice wine and do a bit of fishing, but that is NOT why they choose to come in the first place. This applies equally to both overseas and Australian tourists.

I am only able to provide this perspective on the biological effects of the Kangaroo Island fires because of 150 years of scientific research in Flinders Chase National Park and elsewhere on Kangaroo Island. For most of those 150 years, Flinders Chase was well managed and encouraged scientific research projects and, because it was the largest area of natural vegetation remaining in southern South Australia, it was assumed that it was a large enough area to allow ecosystem functions to continue in their natural way.

Since the early 1990's as politicians all over Australia decided that 'green votes' were no longer important, funding to the country's conservation agencies have been reduced every year and scientific and management staff numbers have been slashed as a consequence. On Kangaroo Island this has meant (at least before the fires) we had 50% less management staff than at the 'high point' in the late 1980's while the same reduction has happened in scientific support staff based in the

National Parks & Wildlife Service in Adelaide. The staff which remains are now really struggling to meet the demands placed on them by this catastrophic bushfire event and need all the support we can give them.

If this article achieves nothing else, I would hope that it might impress on a few of the current generation of politicians that the second oldest, but arguably the most significant conservation area in South Australia, the whole of Kangaroo Island, and Flinders Chase National Park in particular needs a massive injection of State and Federal taxpayer funding and at least a trebling of full-time management and scientific staff in the Department for Environment and Water.

Coming back to the report called 'After the Catastrophe' mentioned in Part 1 of this article, the authors state that: 'The wildfires were beyond anything anticipated in conservation planning and management for Australian biodiversity. Fires of such scale had not been factored into recovery plans for threatened species. Fires burnt through much of the conservation reserve network – the bulwark of conservation in Australia – in eastern and south-western Australia and Kangaroo Island. In many cases, the recent recovery or stabilisation of threatened species hard won from the dedicated and strategic conservation efforts of many government agencies, conservation NGOs and researchers over many decades was subverted in a matter of weeks'.

The authors also provided a series of detailed responses on where conservation research and management needs to go from here to systematically respond to and recover from where we are now, and prepare for the inevitable return of such intense and uncontrollable fires in the future.

1. Rapid assessment of biodiversity loss
2. Identifying and responding to compounding threats
3. Locating and protecting key refuge areas
4. Communications
5. Coordination, continuity and resourcing
6. Monitoring
7. Prioritisation of species, sites and actions for response
8. Implementation of priority responses
9. Linkages with socioeconomic responses
10. Caring for the carers
11. Rapid assessment and re-assessment of the conservation status of affected species and ecological communities; and associated policy response
12. Research into ecological shifts and transitions; and impacts on ecological processes
13. After-emergency management responses
14. Review and inquiry
15. A changed landscape for conservation
16. Preparation for the next catastrophe

Let's hope that the people who can make this happen are listening.

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DEW Citizen Science Bushfire Recovery Project for Kangaroo Island Wildlife

Become a citizen scientist and spot animals in photographs captured by automated cameras in burnt areas. With your help researchers can better understand the impact of fire on our biodiversity and ecosystems. An article in the Department for Environment and Water newsletter 'DEW weekly' can be accessed via the link.

<https://www.environment.sa.gov.au/the-weekly/articles/new-interactive-ki-bushfire-storytelling-tool>



DEW has set up a citizen science bushfire recovery project. One of these is the KI Dunnart project. Wildlife Spotter APP

The tool displays remote camera images from the KI Dunnart Recovery sites and gets participants to assign species identifications. There are some training

tools provided and a record does not get accepted until 4 participants have agreed on the identification. You will need to login to Atlas of Living Australia. If you don't already have an account, create one via the link.

<https://auth.ala.org.au/userdetails/registration/createAccount>

SEG EXPEDITION 2020

Owing to the ongoing Coronavirus restrictions the SEG Committee has decided that there will be no major expedition in 2020. Various alternatives are being investigated for 2021.

FROM THE ARCHIVES 25 YEARS AGO: SEGments VOL 10, NOS 3 AND 4, 1994-5

Richard Willing

This time of lock-down for the Covid 19 pandemic has been a time of clearing out cupboards which have not seen the light of day for long periods. While doing this some interesting early history of SEG turned up, including two editions of SEGments (December 1994 and March 1995).

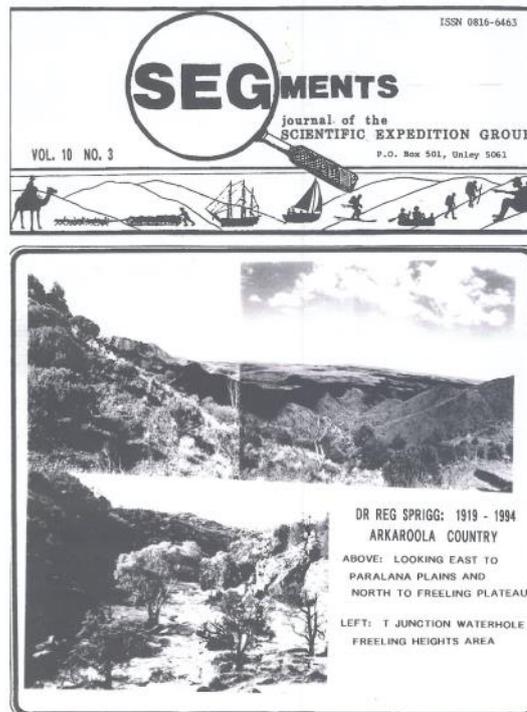
SEG was 10 years old. The editor of No. 3 was Bobbie Rice, well known oceanographer, also then a member of the management committee. The president was Warren Bonython AO, and patron Dame Roma Michell AC DBE, the Governor of South Australia. There was an obituary for Reg Sprigg AO who died in December 1994. Reg

found the Pre-Cambrian fossils in the Ediacara Hills, and established Arkaroola as a sanctuary and tourist destination.

Next was a report of a cross-over Gammon Ranges trip in September 1994. Two teams started at opposite ends of the track, the South group starting at Arcoona Creek, the North Group driving through Yankaninna Station to Snake Gully Bore, west of Mainwater Pound. The groups carried repair and maintenance of the pluviometers and stream gauge recorder, recorded the spring botany in flower, noted fauna and visited some of the more inaccessible parts of the ranges. Two aboriginal students and a staff member from an environmental course were in the group and were most enthusiastic about their experience.

Then there was the second part of Bobbie's account of an ocean voyage in 1982 with a friend in a sail boat from Hawaii to Seattle. This was a season of El Nino, and for more than half of their time they were becalmed in the centre of high pressure systems, finally reaching their destination more than two weeks overdue, but still with memories for a lifetime.

The SEG expedition planned and advertised was to Serpentine Lakes, close to the WA border in the Great Victoria Desert. Difficult to access because of its remoteness we were unable to raise enough sponsorship to come close to making it run. The next edition of SEGments (relief editor Graeme Oats) Vol 10 No 4 starts with bad news and good news – Serpentine Lakes postponed, but Expedition Gawler Ranges calling for expeditioners, with John Hayes as Chief Leader. (This occurred in July 1995, was very successful and included a trip to Lake Acraman, site of an ancient meteor impact which left signs in the Adelaide Geosyncline profile.) Then followed more news



about V-Grasp, which had been running for 6 years, news that the Scientific Expedition Foundation had received approval for donations to be tax-deductible. Then a well-documented bus trip and walk from Balcanoona to Arkaroola via Grindells Hut by Lawrence Johnson and Ray Hickman.

A decade of SEG was celebrated at Arbury Park Outdoor School on the weekend of 6th-7th August 1994 combining scientific talks, outdoor activities and a splendid dinner.

Dormitory accommodation for those who stayed the night was basic but adequate.

Graham Medlin gave a talk on minute bones found in a sink hole at Venus Bay, and bones in owl pellets which gave an indication of their feeding habits. Next

Kingsley Turner talked about the development of the present geomorphology of Venus Bay and the vast quantities of sand that would have been moved to achieve it. The AGM followed, then everyone spruced up for the Saturday night dinner. This was provided by a 10 person group of volunteers who volunteered to help when caterers were too expensive. Between courses selected speakers gave concise and witty addresses. Warren Bonython spoke about 10 years of SEG; Cathy Chesson gave a young person's view and Jim Frost a mature expeditioner's view. Guest speaker Prof. Mike Tyler spoke about his life as a "Frogophile" to extended applause.

It was too cold to set Elliott traps overnight, so overnight stayers had a bird-netting exercise before breakfast. Later John Buttrose spoke about expeditions to Kangaroo Island in 1992-3 documenting regeneration in different plant species after their bushfires. Chris Wright and Paul Harvey gave an interesting account of the 6 years of the Gammon Ranges Project (now V-Grasp), illustrating the remarkable scenery and the extremes of climate on the plateau (40+ deg C to snow). Jim Puckridge completed the program with a talk about the Ecology of Coopers Creek, part of the Lake Eyre Basin. The intermittent flooding of the Cooper and Diamantina Rivers is the basis of the unique flora and fauna of the area.

Why has this not been repeated? The volunteers were worn out. As they grew older they said "Never again."

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THE SAGA OF THE FIRST BLUE STREAK LAUNCH

Richard Willing

Helen's editorial about the Space industry in Australia in the last issue of SEGments brought back many memories of yester-year, in particular the launch of the first Blue Streak rocket.

I went to work at Woomera in December 1961, driving with wife and 6 week-old baby from Adelaide in an early model Holden that survived many similar trips on the deeply corrugated dirt road from Port Augusta to Woomera. The town supported workers at the very active rocket testing range a few miles away, and firings occurred on most weather friendly days. Blue Streak was planned to be the first stage of putting a European satellite into orbit, the second and third stages proposed to be French and German, if I remember rightly.

Blue Streak was in the early stages of being built when I first encountered it, with plans to do a test firing on completion, in a couple of years. I had a high enough security clearance to make frequent visits to watch its construction. The launch site was at the southern shore of Lake Hart where a launch pad was constructed on the cliffs with a J-shaped fire brick tunnel which allowed exhaust gases to be expelled over the dry salt pan. The rocket was built in a narrow multi-storey galv shed 30 metres high about 50 metres back from the lake edge with a rail track leading to the launch pad. Moving at a speed of only a few cm per minute it took a long time to get into position for firing.

The Woomera launch of the Blue Streak took place in June 1964. Such was British concern about safety that I was invited to be in a helicopter hovering a little way from the launch pad with a grandstand view. The launch was successful, but thrust was terminated 6 seconds earlier than planned, for reasons not discussed here. The rocket fell to earth about 500 km short of its anticipated impact point of

1500 km up range. There it lay for 16 years, lost to the many people searching for it until 1980.

Meanwhile, I had left Woomera, lived and worked overseas for a few years, returned to Adelaide and done all that I had to do. I had also taken an interest in geology by joining the Field Geology Club, whose chairman Bob Major (a former SEG expedition leader) had organized a trip for a busload of amateur geologists to visit places of geological interest in the northwest of South Australia. Gwen and I came in our 4wd to provide support of the larger buses. All went well until the day we were to climb Mt Davies. This is a significant site to some indigenous communities, and it appears that the wrong community had given us permission to climb it, a permission revoked after we had left Adelaide. The first sign of trouble was three utes loaded with armed aborigines coming upon the rear of a long column of geologists walking toward Mt Davies. I was last in this line staying behind to help a member with an ankle injury. When challenged I said that the people they wanted to talk to were about one mile ahead. "You go and stop them." "No, you give us a ride." "OK hop up." Two of us joined a grinning, giggling bunch of indigenous people hoping that their firearms were not loaded. The climb was aborted, we were expelled from South Australia and escorted across the border into WA about 50 km away.

The bonus and good ending to the story was that we went north to Giles weather station, and there outside the front door was the engine of the Blue Streak rocket, not too far from where it had landed. For me it was like meeting an old friend after a long absence! We went to Alice Springs via the Olgas and successfully re-entered SA down a more usual track.

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Editorial continued from Page 1

that gastrointestinal cases are also considerably lower because people are practicing added and better hand washing. Have we learned lessons from this pandemic and will we continue to practice them in the future?

The environment has however suffered during the pandemic from the enormous increase in waste generated by take-away food containers, coffee cups, medical waste and toxic chemical waste from strengthened disinfectant routines.

In his most recent book Ross Garnaut has provided a step-by-step blueprint showing Australians and especially our political leaders the way ahead to a better, even extraordinary future in a zero-emissions world. Perhaps the National Cabinet, established to deal with the COVID 19 crisis (which has since provided a forum for a dialogue tackling the problem of mental health in Australia) will be the means of 'expert-led'

progress towards Australia's future in a low-carbon world. As Tim Jarvis says, "The one thing that we all agree on is the fact that what governments and economies do next in terms of investment will be crucial."

Let us be hopeful that in our new world we can glean the wisdom of Holderin's words "Where there is danger, that which will save us also grows", and act accordingly.

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Ref 2. Ross Garnaut "Super-Power. Australia's low-carbon Opportunity", 2019

Ref 3. "The COVID-19 pandemic is a huge opportunity for the environment". Tim Jarvis, RIAS Australian Science Channel, 25 May 2020

Helen Johnson kdolphin@internode.on.net



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- * The promotion and running of expeditions of a scientific, cultural and adventurous nature.
- * The furthering of knowledge, understanding and appreciation of the natural environment.
- * Promotion of the values and philosophy of wilderness.
- * Enabling people to learn the skills required for planning and running expeditions, and to develop sound field techniques

SUBSCRIPTION RATES

Adult member ----- \$35.00
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Details of scientific, cultural, and adventuring or other relevant skill or interests you may be prepared to share with the group:

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