July 2021

Alice Springs Field Naturalists Club Newsletter

Out at Wigley waterhole with Meg Mooney. The dark rock is part of the dolerite dyke.
See more on page 3.
Photo by Marg Friedel

Meetings are held on the second Wednesday of the month (except December and January) at 7:00pm at the Olive Pink Botanic Garden.

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Postal Address: P.O. Box 8663 Alice Springs, Northern Territory 0871

Web site:
http://www.alicefieldnaturalists.org.au

Email:
contact@alicefieldnaturalists.org.au

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NEWSLETTER

The next newsletter will be August 2021

The deadline for the August newsletter will be 23 July.

Please send your contributions to Barb Gilfedder: bjfedders@gmail.com

ALICE SPRINGS FIELD NATURALISTS CLUB

Watch for more trip details that will be sent out just before the trips.

Please let leaders know if you are attending, so they can notify you if details change.

Saturday 10 July. Intertexta Forest wander with Connie and Barb. Meet opposite Old Timers at 9.00am.

Wednesday 14 July at 7.00pm
General Meeting at Olive Pink Botanic Garden. Steven Morton will be talking about a new book, soon to be launched "Australian Desert Life - a book by Steve Morton and Mike Gillam".

Sunday July 18 – Walk from Ellery Big Hole up to the saddle (8km return). Meet at Flynn's Grave at 9.00am and bring lunch. Expect to be back at 3.30pm. It may be cancelled if the temperature is over 22 degrees, so make sure you let Marg know if you are going. Leader Marg Friedel 0417 849 743

Saturday July 24 – Alice Springs Desert Park to see the annual wildflowers in the sand country habitat with Steven Priestley. Normal entry fees to ASDP apply. Meet at the entrance at 9.00am. Leader Barb Gilfedder

Wednesday August 11 – Alice Springs Field Naturalists Club **Annual General meeting** and **Members' Night**.
Please consider nominating for a Committee position, if you are able, otherwise just come and vote.

The AGM usually only lasts about half an hour and will be followed by a Members' Night. Please bring natural history items of interest to share, or a small collection of photos on a USB stick to show.

AUSTRALIAN PLANTS SOCIETY - ALICE SPRINGS

apsalicesprings@yahoo.com.au

There will be no APS AS General meeting in July.

July 30 – Aug 2 (long weekend) Proposed trip to Newhaven Wildlife Sanctuary. To be confirmed.
Camping costs $10 per person per night. Water, toilets and showers available at the campground. If you are interested in going on the trip to Newhaven, please register your interest by email to apsalicesprings@yahoo.com.au immediately, as numbers are limited.

Wednesday 4 August 2021, 7.30pm - General Meeting at Olive Pink Botanic Garden. Kate Stevens will be talking about Native Pasture Grasses.

ANNUAL GENERAL MEETING

ALICE SPRINGS FIELD NATURALISTS CLUB

Wednesday 11 August 2021
Olive Pink Botanic Garden
at 7.00pm.

Alice Springs Field Naturalists Club

Committee Members

President	Barb Gilfedder	8955 5452
Vice-President	Margaret Friedel	0417 849 743
Secretary	Connie Spencer	0429 966 592
Treasurer	Neil Woolcock	0428 521 598
Property Officer	Rosalie Breen	8952 3409
Member	Lee Ryall	0417 401 237
Public Officer	Anne Pye	0438 388 012

Other Club Responsibilities:

Newsletter – Barb Gilfedder bjfedders@gmail.com
Facebook Organiser – Meg Mooney moon3@iinet.net.au
Website - Robyn Grey-Gardner 8952 2207

Learning about rocks at and near Wigley waterhole

Report - Meg Mooney, Photos - Helen Miller

Above: Meg explaining about the formation of the Mylonite rock.

Below: A long view of the dyke. A section of the dark dyke rock is surrounded by sand in the centre foreground and more of the dyke can be seen close to the centre of the photo.

Bottom: A close–up of highly fractured Dolerite in the riverbed.

Mylonite. Our first stop was just after the Charles River crossing on the old Stuart Highway, to look at a small cliff, about four metres high, of mylonite rock. This mylonite was formed by stretching and grinding of the rocks by movement along the Charles River Fault, 300 to 450 million years ago. The Wigley Block to the north moved upwards along the sloping fault plane relative to the Alice Springs Block to the south, so the rocks now exposed in the Wigley Block are older. The deformed mylonitic zone extends for up to 300 metres north of the approximately east-west Charles River Fault. You can see quartz grains pulled out into ribbons in this rock. The slight sheen on some exposed rock faces comes from fine-grained mica minerals, formed during the period of intense strain.

Gneiss. At Wigley waterhole, looking downstream towards the gorge, we could see that the rocks around the waterhole and those higher up forming the skyline were of contrasting colours: those below a pale grey and those above a rusty orange. It is in fact the same rock throughout, Charles River gneiss. The rusty orange weathering on the surface of the lower rocks has been bleached by periodic flooding of the river. Gneiss is a metamorphic rock (more about that later) with alternate layers of light-coloured minerals, mainly quartz and feldspar, and dark-coloured mica and other minerals.

Dolerite. At the waterhole at the southern end of Wigley Gorge we could clearly see a band, a metre or so wide, of dark rock, with pale gneiss on either side. This dolerite dyke formed from molten rock that intruded into a vertical crack while the rocks were still some distance below the surface. The dyke, made up mainly of pale feldspar and dark pyroxene minerals, is visible for several metres running in a north-south direction, as does the course of the river there. Dolerite dykes of what is called the Stuart Dyke Swarm are relatively common in the ancient rocks north of the Heavitree Range and are all oriented approximately north-south. They are up to four metres wide and several hundred metres long. You get a good view of a couple of dykes on the Simpsons Gap bike path.

Later, on our way around to the main waterhole, we stopped and looked at a weathered outcrop of dark-coloured rock. I thought it was another amphibolite lens but Megg Kelham suggested that, as it was in direct line with the dolerite dyke we'd look at just to the south, it was possibly an extension of that dyke. I think Megg was correct. The rocks we could see next to the path were a highly weathered and broken up side-on view, as opposed to the water-smoothed 'top' view we'd seen in the riverbed.

Epidote. At the contact zone between the dolerite and the gneiss in the river bed we saw green epidote streaks. During the Alice Springs Orogeny, a period of intense strain 300 to 450 million years ago, white feldspar minerals in the gneiss recrystallised to form green epidote. In some areas south of here, white feldspar in the Alice Spring Granite has been totally replaced by epidote, to form a rock of pink feldspar and green epidote called unakite.

Amphibolite. Twenty metres northwest of the dolerite dyke, on the other side of the river we looked at a lens of amphibolite in the gneiss. Amphibolite is a dark-coloured rock with a 'salt and pepper' appearance, caused by a mix of rectangular white feldspar and dark grey amphibole crystals. It is thought that the amphibolites in this region are metamorphosed igneous rocks, possibly originally vertical dykes or horizontal sills. Rocks like amphibolite and dolerite are dark, and heavier, because they have a high proportion of iron- and magnesium-rich minerals like amphibole and pyroxene.

Migmatite. We saw veins and blobs of light-coloured minerals, mainly quartz and feldspar, in the along major fault planes gneiss at Wigley. Migmatite is a mixture of metamorphic rock, in this case gneiss, and veins and blobs produced by melting out of granitic material because of intense heat deep underground. The migmatitic bands are sometimes highly contorted into 'gut-like' masses called ptygmatic folds. We saw good examples of these around at the main waterhole, up on the bank at the northern end of the waterhole.

Left: Contact between light grey Charles River gneiss on the left and dark grey dolerite on the right. Green mineral is epidote. Middle: Amphibolite with lighter feldspar crystals in a dark groundmass. Right: Migmatite

Geological history Meg gave an outline of the processes that formed the rocks we'd seen.
Two thousand million to 2,300 million years ago, 'Australia' looked very different to what it does today. The eastern part, roughly east of a line drawn north-south through Broken Hill, didn't exist yet and inlets of sea broke up parts of proto-Australia. Forces within the earth's crust formed an east-west trough, at least 800 kilometres long and 300 kilometres wide, in the region north of what is now Alice Springs. Over millions of years, seas and rivers deposited clays, silts, silty sands and lime muds in this basin, and intermittently lava flowed into it.

Over millions of years, these layers were buried and compacted to form shales, siltstones, sandstones and layers of igneous rock like basalt. Eventually these rocks were buried deeper and deeper and metamorphosed into rocks including schist, gneiss and amphibolite. Metamorphism means 'changed form' and involves change in the solid state, without the rock melting. Minerals recrystallise to form new minerals stable at the temperature and pressure at a particular depth and these new minerals align in relation to the direction of pressure. For example, clay minerals may recrystallise to form platy mica minerals aligned in layers in a rock called schist. At higher temperatures and pressures, the minerals can separate out into layers, for example dark-coloured layers of mica and garnet and lighter-coloured layers of quartz and feldspar make up a type of gneiss

All these rocks were subjected to several periods of intense compression causing folding and faulting and further metamorphism of the rocks. In one of these periods, around 1,000 to 1,100 million years ago, the migmatite was formed. The dolerite dykes were intruded into the gneiss around the same time, 1,070 million years ago. In the latest deformation event, called the Alice Springs Orogeny, 300 to 450 million years ago, the basement rocks, including the ones we were looking at, were lifted as much as 25 kilometres along major fault planes up to near the surface, where they have been exposed by erosion.
The rocks from the Heavitree Range southwards are much younger sedimentary rocks that were laid down in a basin on top of this basement, from around 850 to 300 million years ago.

Larapinta Trail
A potential Geotrail

June speaker - Anett Weisheit,
Report by Meg Mooney

Anett Weisheit told us how she grew up in Germany and came to Australia to do a Master of Science and then a PhD at Arkaroola in the Flinders Ranges.

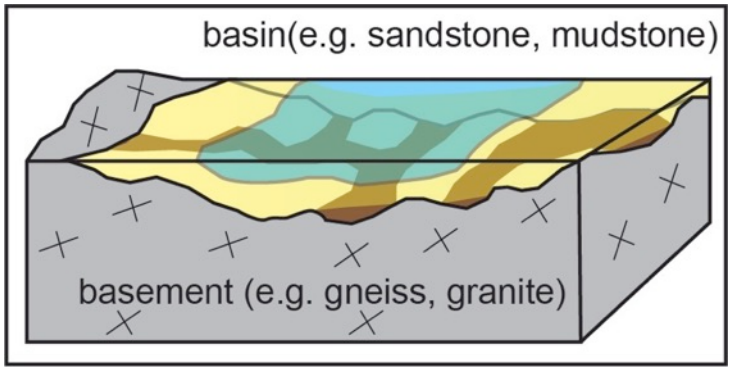
Anett has been working for the NT Geological Survey for a number of years and has developed a geological guide for the Larapinta Trail in her spare time. She talked to us about this guide and gave an overview of the geology along the trail. The guide consists of simplified maps based on the 1:250, 000 geology maps covering the trail area and 65 point of interest stops. For each of the stops, Anett has compiled an A4 page with photos, diagrams and text describing the rocks that can be seen there and significant relationships between them. Anett is currently looking for a publisher for the guide and hopes it will be printed by next year's walking season.

1:250,000 geological maps

Anett talked briefly about the geological maps, corresponding to the 1:250,000 topographical maps, which the NT Geological Survey (NTGS) has produced for this region. The geologists examine rocks in the field and collect and analyse samples to make these maps, which have explanatory notes (fairly technical) with information on sites of interest, geological and exploration history, soils and fossils. The maps and notes are available free of charge from the NTGS office at the Arid Zone Research Institute off the south Stuart Highway.

Regional geology

Anett then gave an overview of Australian and local geology. The oldest rocks in Australia (more than 2500 million years old) are in the Yilgarn (SW WA) and Pilbara regions of WA and Gawler Ranges region of South Australia. There are younger (2500 to 1500 million years old) cratons, areas of old stable crust, in the southern half of South Australia and in northern Australia. The eastern half of Australia is much younger.

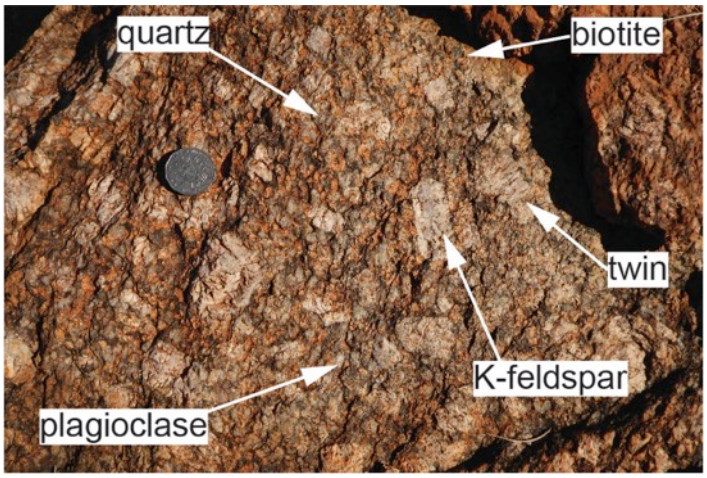


In central Australia, the rocks form three east-west belts, with the Aileron and Warumpi Provinces to the north, the Amadeus Basin in the middle and the Musgrave Province to the south. The Musgrave, Aileron and Warumpi Provinces are old compared to the basin and are made up of metamorphic and igneous rocks, for example, gneiss and granite. These rocks are called the basement because they underlie much younger sandstones, siltstones, carbonates (from microbial mats) and other rocks of the Amadeus Basin. This basin (around the size of the Mediterranean) was formed possibly around 830 million years ago as a result of the crust subsiding, and sediments were deposited in it until 360 million years ago.

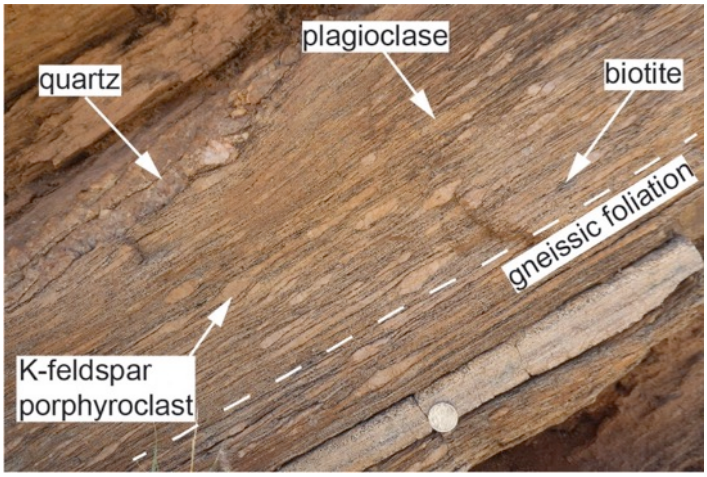
The Larapinta Trail passes through Aileron and Warumpi basement rocks for all except the five westernmost sections. These basement rocks on the Trail are about 1600 to 1800 million years old. Some of these rocks were originally muds, silts and sands which were buried and compacted to form mudstone, siltstone and sandstone. At high temperatures and pressures, 10 kilometres or more depth, these rocks were metamorphosed (see explanation of metamorphism in the Wigley report) to, for example, schist and quartzite. These rocks were folded (at great depth) and cracked (shallower depths) during various compression events.

The last 5 sections of the Larapinta Trail pass through Amadeus Basin rocks. These rocks were folded and faulted mainly during the Alice Springs Orogeny, 300 to 450 million years ago. The rocks along the Trail have been pushed up so the layers are almost vertical. The Trail only crosses the two lower layers of the Amadeus Basin sequence. The bottom layer is the Heavitree Formation, which used to be called the Heavitree Quartzite but is now considered to be mainly a sandstone. Dolomites and siltstones of the Bitter Springs Group make up the next layer. The Heavitree Formation is around 830 million years old and was deposited on gneisses and schists of the basement rocks; the Bitter Springs is 800 million years old.

Anett pointed out that along Larapinta Drive you can see more of the Amadeus Basin rocks, up to the Pacoota Sandstone, 480 million years old, which forms the ridge just south of Glen Helen Lodge.



Above: Close-up showing granite crystals.
Below: Close-up showing gneiss crystals



Types of rocks

Anett talked about the different types of rocks you can see on the Larapinta Trail. The granite near the Alice Springs Telegraph Station is an igneous rock which crystallised from molten rock, called magma, under the ground. You can see quartz, feldspar (plagioclase and potassium feldspar) and biotite mica crystals in this granite. Every mineral has its own crystal shape. For example, mica has platy crystals and feldspars have blocky ones.

White pegmatite and dark dolerite are common igneous rocks seen on the Larapinta Trail. Dolerite is made up of pyroxene, olivine and feldspar and is usually in dykes, intruded into vertical cracks. Pegmatite has large crystals of quartz and feldspar and minor mica. When molten granite intrudes into large fractures in rock under the ground, some of the melt can penetrate along narrow cracks and crystallise as pegmatite sills (in horizontal cracks) and dykes.

The metamorphic rock gneiss has the same composition as granite but has dark and light stripes, formed when the rock was stretched when it was deep underground. Gneiss can form from granite or sedimentary rocks, for example, shale. Good examples outcrop at ANZAC Hill or along Alice Valley at new Section 7.

Sandstone metamorphoses into quartzite, with interlocking quartz crystals. You can see the original layers or beds of the sandstone in the Chewings Range Quartzite on the Larapinta Trail.

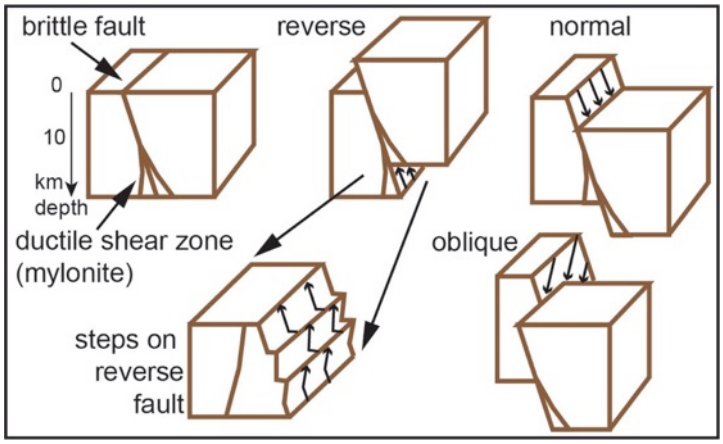
Siltstone metamorphoses to mica schist, a flaky rock made up mostly of platy mica crystals: silvery muscovite and black biotite.

In some places along the trail, for instance at Count's Point, sandstones have ripple marks, preserved from when this rock was sand on a beach. Geologists can work out the direction of ancient currents from ripple marks.

Some of the carbonate rocks in the Bitter Springs Group are formed from stromatolites, the oldest surviving life forms. These cyanobacteria have been around since 3,700 million years ago. They form microbial mats which grow upwards towards the sun and extract carbonate from sea water. The layers of carbonate form domes, from a few centimetres to metres wide, and up to a metre or more tall. Stromatolites still live in very salty water in a few places in the world, including Shark Bay in Western Australia.

Structures

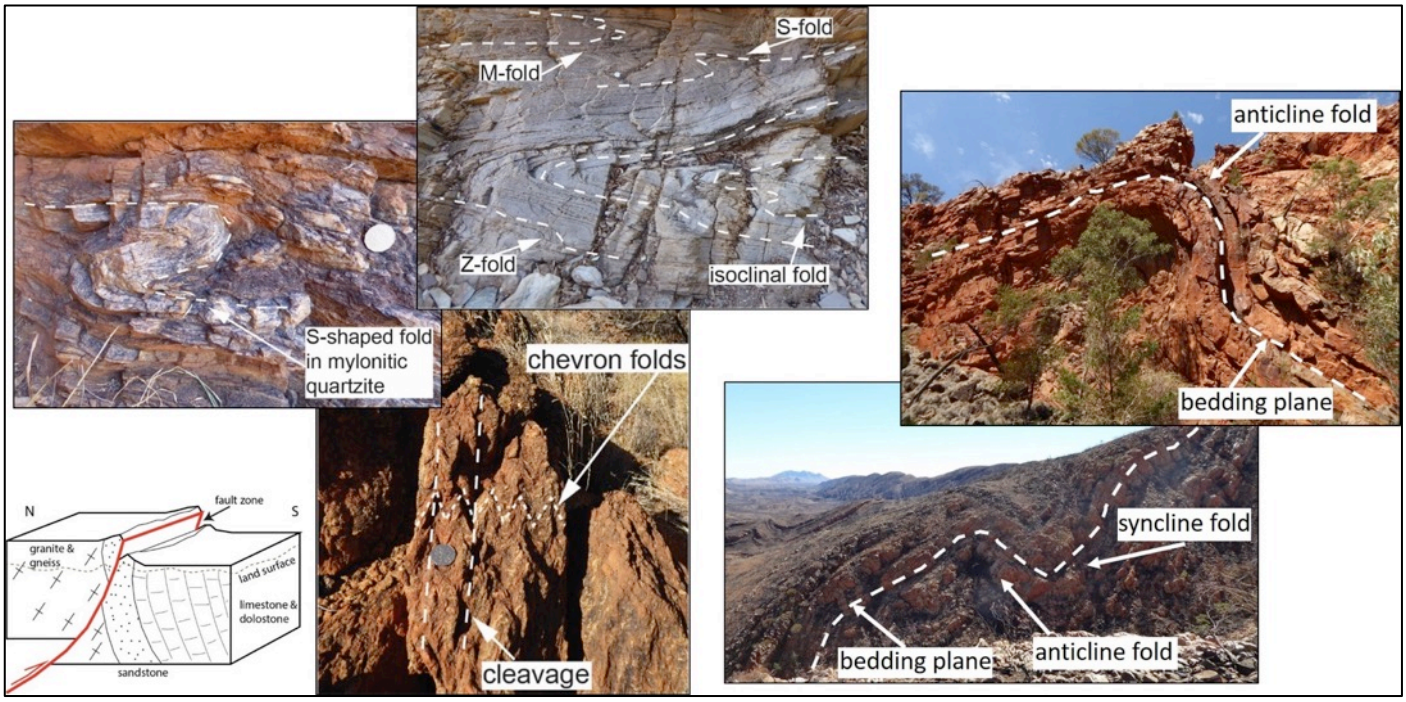
Anett showed us examples of faults and folds in the rocks along the Larapinta Trail. See diagrams on the right, and photos on the next page.



Intense compression causes faults and folds to form in rocks deep in the earth's crust.

Faults are planar breaks in rocks along which offset, sometimes tens of kilometres, has occurred. Closer to the surface, the rocks are more brittle and break along a fault or fracture zone (eg north of Standley Chasm). At depth exceeding 10 kilometres, rocks are soft (ductile) and stretch rather than break forming a shear zone (eg at Razorback Ridge). Folds can vary in scale from a centimetre to a kilometre or more.

Anett is happy for anyone to contact her if they have any queries. Her email is aweisheit@gmx.de



Different types of folds seen along the Larapinta Trail.

Many thanks Anett for such an interesting talk!

Trip to Conlon's lagoon - 20 June 2021

Barb Gilfedder

This trip took a while to organise because I was keen to go there after rain so that small claypan plants were growing but when there was not too much water and mud to prevent us from getting near them. Thanks to SSAA and ASSC for facilitating access.

In 2011, Chris Watson, who was keen local birder, was impressed with the number of bird species he had seen in the area of Coolabahs on the opposite side of the claypan from where we reached it. I suggested to this year's contingent that it might be a good place to go if they were keen to see birds, and about half the party crunched off across the dried and curling claypan surface to check it out.

Before the trip I had distributed a list of plant species seen there previously. The list started with the herbarium list that only contained 13 species. I had then added another forty-two species that had been seen or photographed there, fairly reliably (but not collected) on previous Field Naturalists trips there. People interested in plants regarded this as a bit of a challenge.
Rosalie Breen and Margaret Friedel wandered along slowly towards the lake, looking at the native grasses and Chenopods that they were both interested in.

Calotis porphyroglossa.

They eventually reached another group of us who had walked faster to the edge of the claypan and were getting excited by small green, lush plants in this area.

The most stunning, from my point of view, was a patch of mauve daisies. Suzanne Lollback and I had quite a discussion about the identification. Firstly whether it was in the *Brachyscombe* or *Calotis* genus. We did finally agree on *Calotis*, because of the shape of the tiny seeds, hardly mature enough to examine, but were unsure of the species.
Peter Jobson later identified it for us as *Calotis porphyroglossa,* Channel Burr-daisy.

See Margaret Friedel's lovely picture of the spread of this plant on the edge of the claypan, on page 8.

Other plants of interest in this area (all pictured below) were two Carpet-weeds. *Glinus lotoides* and *Glinus orygioides* in the Molluginaceae family, and a third with plant with tiny pink flowers, that completely mystified us. Peter Jobson again to the rescue with *Lythrum wilsonii,* which although it has been collected in all Australian mainland states, is never a common plant.

My plant list for Conlon's Lagoon has now extended to 88 species sighted there. If anyone is interested in this updated list, let me know and I will send it separately.

Plant species present on approach to Conlon's Lagoon, and not on existing list. Sighted on 20 June 2021 by Rosalie Breen and Marg Friedel

? *Amaranthus* sp.
Cheilanthes lasiophylla (Woolly Cloak Fern)
Convolvulus clementii syn. *erubescens* (Australian Bindweed)
Cullen cinereum (Annual Verbine)
Dactyloctenium radulans (Button Grass)
Dysphania melanocarpa (Black Crumbweed – smelly!)
Enneapogon avenaceus (Native Oat-grass)
Enneapogon cylindricus (Limestone Oat-grass)
Enneapogon polyphyllus (Woolly Oat-grass)
Eragrostis eriopoda (Woollybutt)
Euphorbia tannensis (Caustic Bush)
Fimbristylis dichotoma (Eight Day Grass)
Maireana georgei (Satiny Bluebush)
Maireana triptera (Three-wing Bluebush)
Malvastrum americanum (Malvastrum)
Portulaca filifolia (Slender Pigweed)
Ptilotus polystachyus (Long Pussy-tails)
Ptilotus xerophilus (Green Pussy-tails)
Rhodanthe floribunda (White Paper Daisy)
Sclerolaena cuneata (Succulent Copper Burr)
Sporobolus actinocladus (Katoora)
Sporobolus australasicus (Australian Dropseed/Fairy Grass)
Sporobolus blakei
Sporobolus caroli (Fairy Grass/Yakka Grass)
? *Swainsona* sp
Tragus australianus (Sock Grass!)
Tribulus terrestris (Caltrop)
Tripogon loliiformis (Five-minute Grass)
Triraphis mollis (Purple Plume Grass)

Jocelyn Davies.
Thanks for leading the trip, Barb. It was lovely.
I really enjoyed the cane grass across the middle of the claypan, the tidelines around the edges, the many scatters of stone tools and pieces of grindstone from Aboriginal camps, and the (mostly) healthy strong trees, old and young, around the waterline. It is such a contrast to the nearby Ilparpa claypans where most of these things have disappeared or become degraded under the pressure of people and their vehicles.
I loved the very shiny crazed upper surface of the dried mud, curling up. It shows how the very finest clay particles stay in suspension until the very last of the water dries, then form such a shiny surface layer, the same colour and texture as a chocolate easter egg!

Jocelyn's bird list. Others saw Rufous Whistler, Red-backed Kingfisher and White-winged Triller, I didn't. I only caught a glimpse of the Major Mitchell cockatoos (in list below). They were near the hill, north of the cars. Before I saw them I had identified them from their call, so am reasonably confident.

Zebra Finch – 50 (approx. number of individuals)
Mistletoebird – 8 (biggest number I've ever seen together, quite near the cars)
Variegated Fairy-wren – 30 (north-east end of swamp)
Crimson Chat – 20
Little Button-quail – 3
Budgerigar – 250
Galah – 2
Ringneck – 20
Brown Falcon – 1
Wedge-tailed Eagle – 1
Striated Pardalote – 1
Willie Wagtail – 5
Singing Honeyeater – 2
Red-tailed Black Cockatoo – 8
Major Mitchell – 2
Grey-crowned Babbler – 4
Black-faced Cuckoo-shrike – 6
Black-faced Woodswallow – 6
Pied Butcherbird 1
Chestnut-rumped Thornbill - 5

Jane Bannister
The only plant I am confident of identifying, not on your list: *Marsdenia australis* – Bush banana
What a delightful afternoon. Quite a group of us, and each enjoying their particular interest, whether birds, plants, grasses, landscape. I had never been to Conlon's Lagoon before, so it was a great joy to explore a new place so close to home and I look forward to seeing it when there is water in the clay pan. Some beautiful stands of old Coolibahs, being much enjoyed by many Budgerigars, some gorgeous Bloodwoods, and some large *Capparis mitchelli* trees. There was a huge variety of ground covers and other low plants and herbs, which the experts all had fun identifying and discussing. My two favourites of the trip, both new to me, and now learnt, were *Dissocarpus paradoxus* and *Heliotropium supinum.*

Jane's Bird List
Budgerigar
Weebill
Black-faced Cuckoo-shrike
Crested Bellbird (heard only)
Australian Ringneck
Red-backed Kingfisher
Masked Woodswallow
Crimson Chat
Singing Honeyeater
Zebra Finch
Willie Wagtail

It was quite obvious that everyone in the group had enjoyed the afternoon very much, everybody involved and enthusiastic, and many, many thanks to Barb for organising the trip, which I know took a lot of organising.

Gordon Roberts

This was my first trip to Conlon's Lagoon. From a birding point of view it was quite active with about 25 bird species spotted between a number of us. There was the ever present Willie Wagtails and Budgerigars. These were plentiful. They make for great photography and are cute little birds. There were also a number of Crimson Chats, Black-faced Cuckoo-shrikes, and one of my favourites, Black-Faced Woodswallows. There were fleeting views of Cockatiels, Singing Honeyeaters and Diamond Doves.

Female Budgerigar emerging from its nesting hole – Gordon Roberts

Wendy Mactaggart

The dried surface of Conlon's Lagoon resembled a huge block of milk chocolate. Rather than chocolate squares the dried mud blocks were very roughly hexagonal and approximately 5" or 7" diameter and separated by fissures. In some places the thinner mud had dried to curls, perhaps indicating different drying stages and/or thinner mud.

I didn't see any evidence of aquatic life on the surface but I imagine the hard mud layer offers protection for anything underneath awaiting the next rain event while also protecting the underlying soil from erosion or any hard-hoofed animal. The fissures would allow any intermittent moisture to penetrate.

Terrestrial prints left in the drying mud and on the sandy beach at the lakes edge included dog (dingo?), cat, macropod, and many birds.

The lowering sun turned the lagoon surface into a glistening mirage and indicated time to return to the prearranged meeting place.

Megg Kelham

Two things I loved about Sunday's excursion.

1. Listening to the soft sound of dried mud crunchy beneath my feet as I walked across the newly dried lagoon.
2. Margaret Friedel showing us the remains of a grinding stone, recognisable from its deliberately pitted surface which would have aided the grinding process.

Above: the remains of a grinding stone - Megg Kelham (foot for size comparison)

Left and below: The cracking, curling mud and tide lines; the mud surface of the claypan reflecting the light as sunset approached - Wendy Mactaggart