November 2011

Alice Springs Field Naturalists Club Newsletter

Photo by Barb Gilfedder

This pretty sedge, *Cyperus vaginatus* was growing in a small creek in Alice Valley.

Meetings are held on the second Wednesday of each month (except December & January) at 7:00 PM at Higher Education Building at Charles Darwin University. Visitors are welcome

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

The deadline for the next newsletter is **Friday 18 November 2011**. **This year we have an extra edition**.
Please send your contributions to Rhondda Tomlinson – rhondda.tomlinson@bigpond.com

MEETINGS.

Wed 9 Nov **ASFNC** - Meeting, 7:00pm at the lecture theatre in the Higher Education Building at Charles Darwin University. Speaker: **Anthony Molyneux "Two good seasons – Camel Treks to Eyre Creek (2009) and Ethabuka Reserve (2011)"**

Wed 2 Nov **APS** – Members' night. Jenny Purdie - pictures from a Beddome Ranges trip, Connie Spencer - plants of eastern Canada, Barb Gilfedder - pictures from a Kimberley trip, plus other members may bring photos.

FIELD TRIPS / ACTIVITIES.

Sun 6 Nov **ASFNC –** Trip to **Annas Reservoir.** It is located 160kms from Alice Springs and is a pretty place with historical interest too. 4WD recommended. We have permission from Gary Dann of Aileron Station. Meet at Sargent Street sign on north Stuart Highway at 7.00am. to avoid the worst of the heat. Leader Bob Read. Phone 8952 1935 rlread1@bigpond.net.au

Sat 19 Nov **ASFNC** – A short Walk from Flynns Grave part way up Mount Gillen to the fenceline. (Keen walkers can continue) followed by morning tea at Sue's. Contact Sue Fraser.

Sun 4 Dec **ASFNC** - End of year breakfast at Olive Pink Botanic Garden. More details to follow.

Atlas of Living Australia – from Bob Read

I am sure that some of our members have good photos of species for which the ALA has nothing to date, such as the two local burrowing frogs (*Limnodynastes spenceri* and *Cyclorana maini*). uploading images to this website is quite easy. Simply go to **Error! Hyperlink reference not valid.** , search for your species and click add a photo. Even if there is already an image for a species add yours if it is better, or shows an animal in some activity.

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Climate Change, a geologist's perspective

Presented by Mike Green at October meeting (reported by Bob Read)

Over the relatively short period since instrumental records began (about 100 years) there is a definite upward trend of mean annual temperature shown for Australia (Figure 1). Like all climate data these are noisy, but show a clear increase of about 1 degree per 100 years. Similar trends have been recorded worldwide, though as expected there is a lot of variation. Temperature over land has increased more, and more variably, than over oceans, reflecting the greater thermal mass of water.

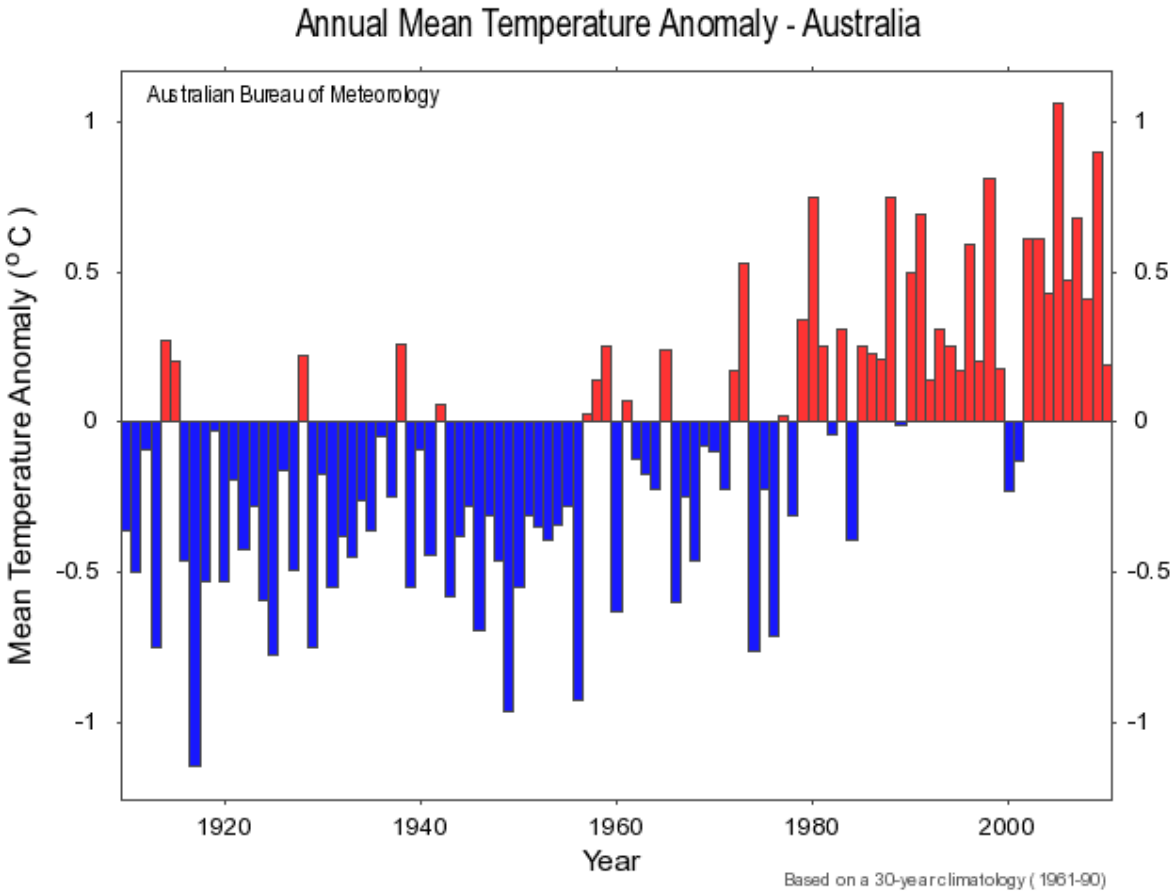

Figure 1 Annual mean temperature anomaly for Australia, from the BoM website

There is little doubt that this short term change is man made, but equally we know that geological processes contribute to climate change in the long term.

These are; the Sun, which is very dynamic.

Astronomical parameters:

Eccentricity of orbit. This shows 3 to 4 % variation on 100 and 400 kiloyear [1]cycles.

Obliquity of the Earth's axis to its orbit, which varies from 22.1 ° to 24.5 ° over a 41 kiloyear cycle.

Apsidal precession (the slow rotation of the ellipitical orbit changing the time of year at which the Earth is closest to the sun) with a 25 kiloyear cycle.

Axial precession with a 26 kiloyear cycle.

The above are named Milankovitch cycles after an unfortunate Serbian engineer and mathematician who worked on them while interned during WWI.

To study the temperature before instrumental records began it is necessary to use ^{18}O[2] as a proxy for temperature. For relatively recent (in geological terms) times this has been done with Antarctic ice cores (e.g., Vostok; EPICA Dome C) which have preserved a continuous record of frozen air since ~800 000 years ago (Fig. 2). These ice cores show

[1] A kiloyear is 1 000 years

[2] ^{18}O is a stable isotope of oxygen, that makes up about 0.2 % of naturally occurring oxygen.

the Milankovitch cycles nicely. Importantly, the rate of temperature change now being observed is common and suggests that the climate is quite sensitive.
However since the orbital parameters (Milankovitch cycles) indicate that the Earth should be going into another ice age this suggests strongly that the observed warming trend is man made.
The original paper is on the net at http://www.daycreek.com/dc/images/1999.pdf
Temperature records going back beyond the ice cores have been constructed using ^{18}O in fossils of bottom dwelling foraminifera (small oceanic test-forming protists). Again the record shows a lot of variation, with a general cooling over the last 5.5 million years.

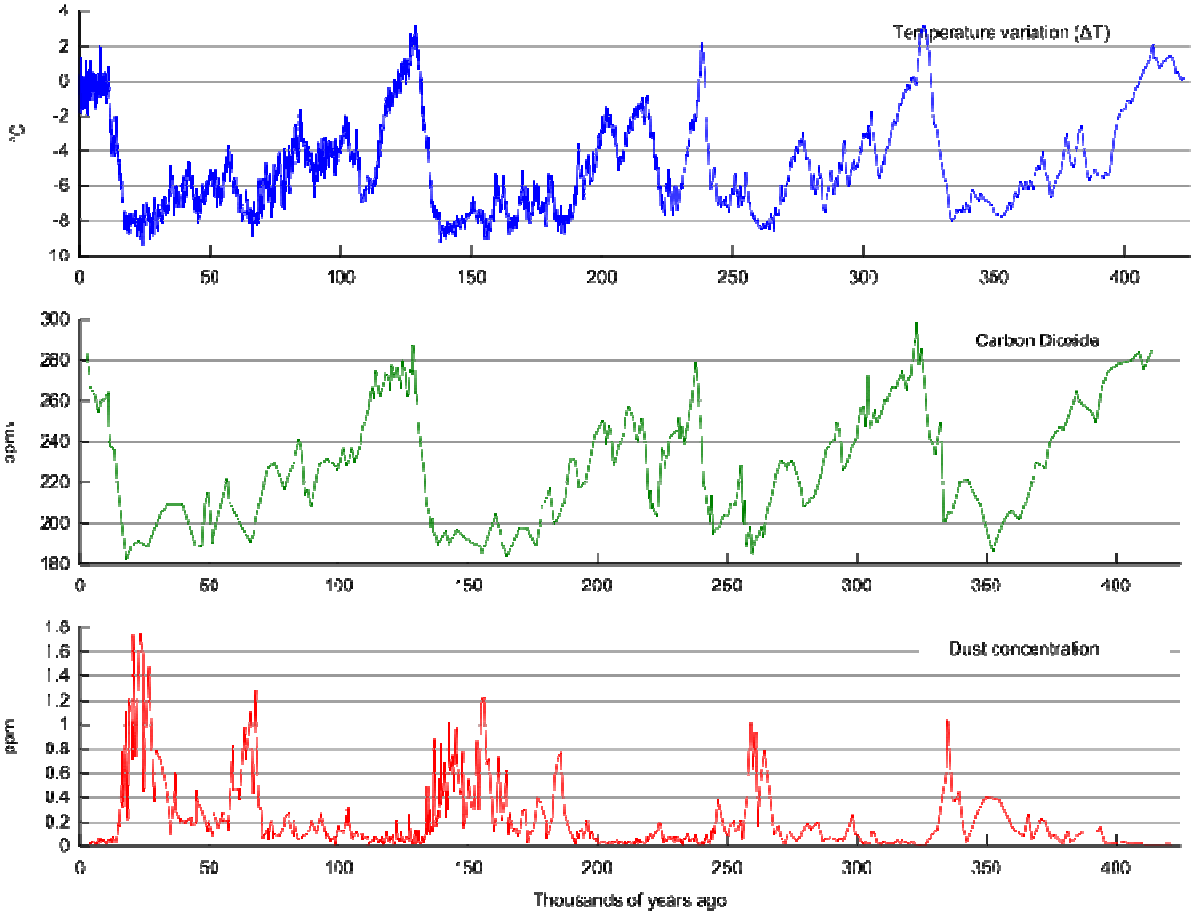

Figure 2 Vostok ice core data

Tectonic movements can affect the global climate.
Pushing up of huge mountain ranges such as the Himalayas restricts atmospheric circulation. Motion of continental plates can stop ocean circulation. An example of this is the geologically recent closing of the Panama channel (before humans dug a new one) that linked the Atlantic and Pacific Oceans.
The formation of ice-caps locks up water.
The Earth contributes carbon dioxide by volcanism and takes it out of circulation by weathering of rocks and the burial of organic matter.
In summary climate change is a natural process, but whether what we are seeing now is natural is another matter.
Of interest is the mid-Eocene when carbon dioxide levels were at 2 000 ppm, compared with the current near 400 ppm and rising. This would not have been a pleasant time for us. The Earth was hot and steamy and it appears that the tropics may have been too hot for most plants to survive.

A Personal Note (from Bob)

I have little doubt that the observed temperature rise over the last century is man made. With something as erratic as weather there should be a lot of noise in the data. We know that the warming is not due to changes of solar radiation, and orbital parameter indicate that the Earth should be cooling into another ice age. This is not full scientific proof, but it is as good as you can expect for management purposes. Given the typical slow rates of political and technical change by the time this conundrum is resolved it will be far too late. Of necessity we make decisions on buying houses and superannuation on the basis of reasonable probability.

As for the doom predicted by those opposing any action to reduce carbon dioxide emissions, I have heard it all before. Remember when the phasing out of CFCs was going to make our fridges more expensive and less efficient? When emission controls for cars were going to make them unreliable and thirsty. In each case technical innovation offset the predicted penalties.
The movie "Made in Dagenham" reminded me that faced with women workers' demands for equal pay the Ford Motor Company replied that they would have to move their plant offshore.
Over the centuries there have been battles over slavery, child labour and equal pay for women with the recurring themes from opponents of impending economic disaster and job losses.
There must have been a lot of smokers who wished (if only they were alive) that they had acted on the strongly suggestive evidence >50 years ago instead of being confused by the tobacco sellers demand for proof.

Alice Valley behind Ellery Creek Big Hole

Saturday 8th October 2011

Lee Ryall - Time Travelling in Alice Valley. The trip began in earnest when we turned off the bitumen along a track which curled back to eight mile gap in the Macdonnell Ranges. From our first stop at the gate, we could look back at the lines of young hills across the highway, but our attention was elsewhere.
The gentle folds of the near vertical Heavitree Quartzite towered above us in that first rise into the gap, and the track was littered with shards of this beautiful clean stone formed from the sands of Amadeus Basin waters. The gap itself was high ground, prompting speculation about river capture- when, and where and by exactly which marauding waterway? We moved on after the excitement of the Brown Goshawk on Jocelyn's car; the glowing psammite surroundings were giving way to altogether different and older rocks.
So we descended into a valley possibly worn by the same rapacious river which carried off the stream from the gap and gave ourselves over to the ancient basement rock from a time when the only life was microscopic, when there were no soft-voiced doves or sinuous long-fingered grevilleas (or even hakeas).

Grasses, both native and pestiferous buffel and were unimagined then, but the earth heaved and buckled, and the overheated rocks recrystallized as schist and gneiss.
So we, crawling across debris from its millennia of weathering, could have shining mica faces lining the road between jagged protrusions of foliated rock. Intrusions from the deep past, giant granites that once oozed their way up towards the light were now reduced to soft rounded boulders. Fire-blackening hid their rusty weathering, but exposed the shape of the country we bumped along.
Further down the trail we were treated to soaring flat planes of quartzite at the back of Ellery Creek and past Ellery Gap itself we headed north to gaze at the weather-worn lumps and bumps of the Chewings Range, feeling the call of a sandstone carrying not a mere 850 million years in its history, but twice that span. We paused at the cattle yards at the eastern end of yet another of the ranges that litter this countryside, admired birds and trees and debated how long it would take to reach the fabled objective, a tiny blue patch staring arrogantly out of the map from 'just' the other side of the Range. Our valley meanderings ended up leading us up by the foothills, where the creek threw in an oasis, a warm brown pool of elusive fish and weeds and water boatmen. Before the cries of delight and energetic net-swishing faded it was time to turn back.
We stopped at the yards again, to look back at the tantalising range behind, now glaring distantly in the flat reds and pinks of afternoon light. Ellery Gap demanded our attention, and we walked over for a closer look. Gneiss was poking out of the hill, and a shattered quartz vein. The line of trees that means a creek curled past the bottom. Green spikes competed to reclaim patches of blackened soil, their rush to repopulate contrasting with the slow wearing down of the hills on all sides. The car ambled along the track, crossing ancient rocks, modern gullies and rivers of sand to the gate. Here, the chance to weigh a last piece of 850 million year old lake bed in the hand and we were suddenly travelling on bitumen, heading back to town by the ephemeral light from the west.

Connie Spencer – Facets of the plant world that caught my attention on the Alice Valley trip
A little creek crossing with water still flowing brought the cameras out. It was a delightful area with an upper storey of Gum Trees, a middle storey of Inland Teatree (*Melaleuca glomerata)* and an under storey of Sticky Blue-rod (*Stemodia viscosa)*, Water Pimpernel *(Samolus eremaeus)* and *Schenkia australis*– sorry, no common name.

Yellow Billybuttons (*Calocephalus platycephalus)* were out in force. Young Ironwoods *(Acacia estrophiolata)* tricked me at first glance with their abundant fresh new growth giving them a soft, green, weeping appearance. A burnt area showed the tenacity and resilience of many of our desert plants with the Corkwoods, Eucalypts, Sennas and some Acacias resprouting with fresh green growth at their bases. It was a stark but encouraging picture

Jenny Purdie - It is difficult to pick an outstanding feature out of a great trip but perhaps the thing that stands out most in my mind was the amazing amount of fruit on some shrubs in some areas; perhaps this is because of the almost record-breaking amount of rain we received last year.
The main species involved were *Acacia melleodora* (Waxy Wattle), *A kempeana* (Witchetty Bush), *A aneura* (Mulga) and *Eucalyptus sessilis* (Finke River Mallee).

Rosalie Breen - Bugs and Beetles - On the trip exploring Alice Valley where we stopped at the waterhole in the river for a relax, paddle etc, with the help of Harrison and Kingsley I collected some macro-invertebrates from the water. Beetles were the most numerous. There were three different species of small diving beetles belonging to the family *Ditiscidae* . The adults are air breathers and you can see them rise up to the surface their abdomen piercing the surface to trap a bubble of air under the elytra, and then diving down again to the depths. A stream lined body aids swimming as do their hind limbs which are often hairy. The larvae stage of their life cycle are carnivores too, called "water tigers", with sickle shaped mandibles, and in some species a spade shaped head. We only found the adults.
There were also many bugs called "back swimmers". As the name indicates they swim upside down, with their long back legs fringed with hairs moving together like rowing with oars, sometimes called water boatmen. Another feature is their very large eyes. They too collect a bubble of air on the abdomen. Unlike the beetles their life cycle involves a series of nymph stages, not complete metamorphosis as with beetles.
The easiest way to differentiate between bugs (Order *Hemiptera*) and beetles (Order *Coleoptera*) is to look at the wings. Beetles have hardened forewings, elytra, which form a cover for the membranous hind wings which are used for flight. The forewings of bugs are leathery towards the tip only and overlap when folded.

Kingsley Green - I liked playing cricket. I was in for a lot of time. I liked swimming under the trees. We catched waterboatmen for Rosalie. I was a cow in the yards.

Michael Green - Despite it being the day of the Central Australian twitchathon, the 'field natters' headed west to explore Alice Valley. Between the McDonnell and Giles Ranges, Alice Valley comprises rough scrubby country cut by creeks lined by River Red Gums. Recent fires have broken up the vegetation, although many unburnt remnants remain. Such mosaic burning should assist future regeneration. A lot of driving, albeit slowly, was the order of the day and so most birdwatching was vehicle based. Nevertheless, and in typical 'natter. fashion, there were many unscheduled stops

to identify birds and plants. The avian highlight of the day was the Brown Goshawk that perched on Jocelyn's roof rack while we opened the 8-Mile gate. The following 33 species were seen from the time we left Namatjira Drive to when we returned.

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Zebra Finch	Rufous Songlark	Yellow-throated Miner
Hooded Robin	Crested Pigeon	Weebill
Willie Wagtail	Nankeen Kestrel	Red-browed Pardolote
Black-faced Woodswallow	Blackfronted Dotteral	Torresian Crow
Little Woodswallow	Rufous Whistler	Sacred Kingfisher
Brown Goshawk	Brown Honeyeater	Brown Quail
Diamond Dove	Mistletoebird	Bronzewing Pigeon
Magpie Lark	Grey Fantail	Pied Butherbird
Spiny-cheeked Honeyeater	Australian Ringneck Parrot	Major Mitchell's Cockatoo
Wedge-tailed Eagle	White-winged Triller	Mulga Parrot
Red-backed Kingfisher	White-plumed Honeyeater	Spinifexbird

Tales of an inland sea by Meg Mooney – Geology Trip with Michael Green

Stop at lookout on the way to Ellery
As well as looking at the rocks of the Amadeus Basin, Michael pointed out pebbly mesas of 'soft' rock in the valley. These were probably deposited during the Miocene, 45-55 Ma (geology speak for 45-55 million years ago), when sea level was much higher than it is now, because the Earth's climate was hotter and the Antarctic ice cap was yet to form. Because the sea was just down the road, so to speak, rock fragments eroding from the ranges could not travel far and so were left in the valleys beside the ranges.

From around 34 Ma Australia started to dry out as the Australian continent travelled north and the Antarctic ice cap started to grow. Since about 14 Ma the current series of ice ages began, with long, drier, icy times between short wetter, warmer periods. With the global fall in sea level the cobble beds in the valleys around Central Australia began eroding with material heading south towards Lake Eyre.

The Amadeus Basin
Around 900 Ma, large downwarps or basins formed in the precursor of the current Australian continent (supercontinent Rodinia). Rises in sea level inundated these basins, which are now fragmented in central, South and Western Australia. One of these basins, of a similar scale to the Mediterranean, was the Amadeus Basin. The preserved extent of the Amadeus Basin stretches from Alice Springs to Kulgera and the WA-NT border to 300 km east of Alice Springs. Several kilometres of sediments were deposited in the basin as the sea advanced and retreated and land moved up and down over a period of about 550 million years.

Over this time several events warped the basin rocks, which had formed from buried and compacted sand, silt, mud and salt. The last and most significant was the Alice Springs Orogeny, around 350 Ma, which created the present day MacDonnell Ranges. The leading edge of the impact was at the northern boundary of the basin, where the Heavitree Quartzite was pushed 25 kilometres north.

The bottom of the sea
You can see this impact at Ellery Creek waterhole, in the folds in the Heavitree Quartzite, the bottom layer of rock in the basin, ie, the bottom sediment deposited in the Amadeus Sea. Ripples preserved in some layers of this quartzite tell us that it was once a sediment at the bottom of a shallow sea. You can tell water speed and depth by the grain size of the sandstone and the wavelength of the ripples, which also indicate the direction the water was flowing.

The shallow-water sands at the bottom of the Amadeus Basin were eventually buried so deep that the silica grains were welded together to form a very hard rock called quartzite. Being mostly silica, there are not any chemicals in the Heavitree Quartzite that can be used to date it. However, we know its approximate age because it sits on top of a dolerite dated at 1070 Ma and there are volcanic rocks above it that have been dated at 830 Ma. The rocks under the Amadeus Basin, which formed the shore of the Amadeus Sea, are much older, around 1600-1800 Ma.

A Dead Sea Phase
Above the Heavitree Quartzite is the Bitter Springs Formation, with lower and upper units called the Gillen and Loves Creek Members, respectively. The Bitter Springs Formation is not strong compared to the Heavitree Quartzite and so it got very crumpled during the Alice Springs Orogeny. Some of these folds are clearly visible in the Gillen Member just west of Ellery Creek. To the south, the Bitter Springs and subsequent layers mainly dip steeply to the south, being part of the limb of a large fold. So as you walk south from Ellery waterhole, the rocks get younger and younger.

The main rocks of the Bitter Springs Formation are magnesium limestones called dolostones and pink to brick-red siltstones. The buff-grey dolostones were evaporites which formed when lime salts were precipitated out of very shallow and salty water in a restricted basin like the current day Shark Bay, Coorong or Dead Sea.

The siltstones come from periods when the Amadeus Basin had deep water, either because of downwarping of the land with tectonic movement, or sea level going up due to climatic factors. Sea level goes up when the earth is warmer and its ice melts. Limestone and dolostone are relatively hard rocks and siltstone is relatively soft, so in the Bitter Springs rock package the dolostones outcrop as ridges and the siltstones are worn away to gullies between the ridges. The regularity of the ridges and troughs at Ellery Creek may reflect climate (sea-level) cycles.

Stromatolites and drill holes
The Gillen Member has more dolostones and also lots of stromatolite fossils: dome or 'egg-carton' structures formed from layers of algal mats. Shark Bay is one of the few places in the world with live stromatolite mounds. The stromatolite domes in the Bitter Springs Formation can vary from a few centimetres to hundreds of metres across.

Small drill holes in the Bitter Springs Formation at Ellery Creek show where scientists have taken samples for carbon, oxygen, hydrogen and sulphur isotopes. Carbon and oxygen isotopes can tell scientists the amount of carbon dioxide in the water from which the dolostone was formed, and this is an indication of the water temperature at the time. (Less carbon dioxide can dissolve in hotter water.) Sulphur and hydrogen isotopes can provide constraints on the metabolism of life in the shallow ocean (e.g., photosynthesis, sulphur reduction).

Mike also told us how scientists take samples of iron crystals from iron-rich rocks, because these crystals line up parallel to the earth's magnetic field at the time a rock is formed, and so indicate where the rock was on the earth's surface at that time.

A volcanic basalt layer near the top of the Bitter Springs Formation east of Alice Springs has been dated at 830 Ma, and has been interpreted to be associated with the rifting of the super-continent Rodinia.

An ice age
The next outcrop we visited was conglomerate with fragments of Heavitree Quartzite, Bitter Springs dolostone, and granite and banded gneiss from the very old rocks beneath the Heavitree Quartzite. As well as rounded pebbles, this Areyonga Formation conglomerate has angular fragments with parallel scratches. (Most of these have been taken from this area by collectors, so we didn't see any.) These striations, formed when rocks at the bottom of a glacier are scraped over the rocks of a valley floor; the angular fragments; and occasional large boulders, called erratics, dropped by glaciers as they retreat, show that part of the Areyonga Formation is glacial in origin. (Any rock fragments carried along by rivers are quite quickly rounded into pebbles.)

This conglomerate was deposited by glaciers and their melt waters around 660 Ma. Hence, there is a 170 million year gap in the rock record. Gross cycles within the Areyonga Formation (layers with lots of rock fragments and layers with few) suggest times when the glaciers were releasing water (warmer) or retaining water (cooler) and so have recorded climate changes at the time.

Snowball earth
Of great importance is that similar glacial sediments were deposited around the same time all over Earth. This has led to the hypothesis of the 'Snowball Earth'; a theory that the whole earth was frozen at this time. Such dramatic cooling of the earth may have been caused by a combination of orbital wobble, solar cycles and that major landmasses were close to the poles.

A possible consequence of the Snowball Earth is that these ice ages may have somehow kick-started multicellular life on Earth. The first multicellular animals appear in rocks as the glaciers melted around 635 Ma. The most famous of these fossils are from the Flinders Ranges; the Ediacara fossils of jellyfish, worms and other animals. At Ellery Creek, no similar fossils are known, but the melting of the glaciers is recorded as the deepening waters deposited the fine-grained sediments of the Pertatataka Formation. We saw the red and green shales of this Formation as we followed a tributary back to Ellery Creek.

Ellery Creek Big Hole (16 October) 34 species. Highlights were nesting (and glaring!) Hobby and flushed Nankeen Night Heron

Australian Grebe
Little Black Cormorant
Little Pied Cormorant
Willie Wagtail
Spinifex Pigeon
Major Mitchell's Cockatoo
Torresian Crow
Black-faced Cuckoo-shrike
Australian Ringneck Parrot
Pacific Black Duck
Grey Teal
Nankeen Night Heron
White-necked Heron
White-faced Heron
Intermediate Egret
Black-fronted Dotterel
Australian Hobby (nesting)
Nankeen Kestrel
Magpie Lark
Sacred Kingfisher
Crested Bellbird
Weebill
Australian Reed-Warbler
Mistletoebird
Red-browed Pardalote
Brown Honeyeater
Singing Honeyeater
White-plumed Honeyeater
Yellow-throated Miner
Spiny-cheeked Honeyeater
Zebra Finch
Western Bowerbird
Pied Butcherbird
Australian Magpie

Sue Fraser's Back Yard Visitor

Bob Read confirmed that it is a Spiny-tailed Goanna (or Ridge-tailed monitor) *Varanus acantharus*. This Lizard lives in rocky regions in arid country. When threatened it hides in rock crevices using the spines on its tail to wedge itself in and making it difficult for a predator to dislodge. Its distribution is across the top half of Western Australia, most of the Northern Territory and into south west Queensland. It hunts small mammals, lizards and larger invertebrates.

Free to anyone with a use:

Rollei 35 mm projector
Sigma 75 - 300 zoom, Canon mount
Bellows for close up photograph, Canon mount
Li-lo type air-mattresses, (2 single, 1 double), good for floating over waterholes.

Call Bob 89521935

ALICE SPRINGS FIELD NATURALISTS CLUB INCORPORATED

Minutes of general meeting at Higher Education Building, Charles Darwin University
Wednesday 12 October 2011.

Vice -President Sue Fraser declared meeting open following Michael Green's presentation on Geology and Climate change.

Present: Members and visitors as per attendance book.
Apologies : As per attendance book

Thankyou to Bob Read for taking notes and Rosalie Breen for supper.

Previous minutes – accepted by Rosalie Breen, seconded by Connie Spencer.

Business arising from the minutes:
Barb purchased a gift for Robbie and Emily's new baby, Archer Ben Henderson a beautiful animal book with textured/fluffy inserts, flaps and slides – very strongly made, a fluffy toy and a small book for big brother Fynn

Correspondence in:
- NT Nature Territory (July edition)
- WA The Naturalist News (August)
- Permit from Central Land Council to drive through aboriginal land to visit Alice Valley on 9th October.

Correspondence out:
- Thank you card to Stuart Traynor for his talk at the last meeting
- Thank you card and a copy of Chris Watson's notes to Wendy Kittle for allowing the club to visit Conlons Lagoon.
- Thank you card /copy of Oct. newsletter to Bill Hayes of Deep Well Station - permission to visit Ooraminna Rockhole.

Treasurer's Report: Opening Balance $2470.88 Closing balance $2697.87 Most income from membership subsciptions

General business:
Sewage Ponds – Birder-watchers' upgrade Only 3 people at meeting at sewage ponds on 24 Sept, including Barb.
- Restoration of old bird hide – PRIORITY
- Screening in various places, both wooden panelling and shrubby plantings (which would also help prevent bank erosion)
- New bird hide situated at corner of EP7 and EP7a (where stone seat is now). This would look out over both these ponds in 3 directions – usually a prime site for waders.
- Board walk along joining of EP7 and EP7b.
- Board walk around overflow area behind EP10
- Seats in strategic spots possibly with shade and removable cover to protect from bird droppings. It may be possible to get individuals to sponsor seats.
- ASFNC will cover accounts presented to us up to $500 for materials as passed at Sept meeting.

Margaret McDonald from Australian Plant Society is going to have more available time at Olive Pink to reorganise library.

Activities/Trips:
- 15 October - Field trip with Michael Green to Ellery Big Hole on Sunday. Meet 7.30am at Flynns Grave.
- 22 October – Walk from Jessie Gap to Emily Gap along the top. Contact Chris Watson.
- 23 – 26 October – Land for Wildlife biodiversity surveys. Contact Chris or Jesse. Setting up traplines and checking them.
- 29 October – Shore bird survey at sewage ponds (Barb Gilfedder)
- 30 October – Pound walk to be led by Pam Keil
- 19 November – Short walk up Mt Gillen from Flynns Grave. (Sue Fraser)
- 4 December – End of year breakfast at Olive Pink

Sightings:
- Gecko, probably Bynoes Gecko, sighted by Cecily Sutton at her work.
- Spiny-tailed Goanna (or Ridge-tailed Monitor) *Varanus acantharus* sighted by Sue Fraser
- Buff-banded Rails, Crakes – Neil Woolcock at Trephina Creek

Next meeting: 9 November - Speaker – Anthony Molyneux**;** Supper – Connie Spencer**;** Note taker – Rosalie Breen.