THECA NEWS

Vol. 23, Part 2, May 2021

Price $4.00 ISSN: 1442-181X

The Hut Environmental and Community Association Inc.
THECA
We are a group of people who are interested in conserving and improving our environment.

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Front cover photo:

White-breasted Woodswallows, by Mandy Watson, taken on a trip to the Outback – Longreach and Winton.

E EDITOR'S PIECE
Margaret Palmer

Dear members

Welcome to THECA News. As you will know, THECA has held its 2021 AGM. The result is that we have the same committee and office holders as before, plus a new member: Greg Siepen as President, Justin Watson as Vice-President, Ian Ferguson as Treasurer, me as Secretary, with other committee members Charles Worringham, Christine Zupanc, Jocelyne Bridier and new and very welcome member Maria Miller. However we are always looking for more volunteers to be on the committee and to do other things. The President also thanked the many volunteers, some named in the next column, who had helped to make THECA a success in the last year, despite COVID.

The resolutions at the AGM also provided for the acceptance of the minutes of the 2020 AGM, the acceptance of the Treasurer's Report, audited financial statements and auditor's report, and the re-appointment of Arabon Audit and Assurance as auditors for the financial records for 2021. A short synopsis of the President's report follows in the next column.

Thanks so much to all the contributors to this newsletter: we have fascinating accounts of trips to the Outback and Hervey Bay by Mandy Watson, reports by Maria Miller of the excellent family activities she has organized (so significant in educating a younger generation and gaining new memberships), a report on the Tusked Frog by Justin Watson, reports by Greg Siepen of talks at the latest Brisbane Biodiversity Seminar, a book review of Bill Gates's *How to Avoid a Climate Disaster,* Bryan Hacker and Gillian Alfredson's delineation of a plant of Mt Coot-tha. Keep the contributions coming in!

President's report 2021 AGM

President Greg Siepen noted the disruption to the year by COVID-19, but said that we had achieved many things: holding our annual Environmental Art Show, organized by Christine Zupanc; producing the 2021 Wild West Calendar (thanks to Rachel and John Griffiths, Carolyn Nowicki and Andrew Taylor and all those who submitted photos); receiving the Brisbane City Council's 2020 Spirit of Brisbane Award, the only group to win an award; and maintaining a strong financial position, with grants of $8,800 for administration purposes and $4,500 for a COVID Response grant, used to undertake building and grounds works.

THECA also progressed a new CO2 monitoring project, run by Charles Worringham, with an assembly of computers and software completed; and Dawn Muir has continued to hold bird walks, and reports on these are building up our bird data. Greg Siepen has run the Evaluation of the Two Million Tree Plantings at Wacol; this Citizen Science Project finished in December 2020 and unspent funds have been allocated to a similar project at Griffith University Arboretum using refined methodologies.

Ian Ferguson coordinated repair work around the Hut, and Kay Smith and Jocelyne Bridier completed an extensive office refurbishment. Children's activities have been restarted by Maria Miller, supported by a strong group of volunteers; and the bushcare groups continue to weed around the Hut. Greg thanked Rachel and John Griffiths for their years of work, Ray Carman for running the library till now (Jocelyne Bridier to do so now), and the Brisbane City Council for its generous support.

THECA, with support from local environmental groups, Moggill Creek Catchment Group (MCCG) and the Rural Environment Planning Association (REPA), calls for photographic submissions for

Brisbane's Wild West Calendar 2022.

Since 2000, our calendar has featured the flora and fauna of Brisbane's western suburbs, and has showcased the work of many talented local photographers. Their generosity in sharing some stunning images is much appreciated.

Submissions are now invited and are due on
Monday 12 July 2021.

You can submit your images online at www.theca.asn.au. Please read the guidelines carefully before submitting photos.

We will keep members and photographers informed about process by email and on the THECA website and Facebook page. We look forward to the next calendar celebrating the remarkable biodiversity of our western suburbs.

Open Sundays Pop-up Again

By Maria Miller

After a year-long break, the Hut is once again open for curious walkers to pop-in and have a chat.

The informal nature of the morning means you can stay for as long as you like. Our theme on the 28th of February was all about the Magic of Soils. The trinocular microscope came in handy as we examined the detritivores from two local sites captured in a Berlese Funnel Trap (to be repeated on Sunday, April 18th). The delightful Indiana (*right*), a year 10 student at Brigidine, became adept at using the microscope and extracting wriggly critters from the soil and placing them in a petri dish for a closer examination. Time flies when you're having fun.

On March 21st, Jasmine Zelený and Matt Wright from Faunagraphic.com.au, helped us out with Feathers from the Forest. Nests, eggs, and feathers were just a few items on display with feather and egg structures examined using the microscope. Many stories of memorable bird encounters - cassowaries dominated - were shared as well as discussions about rodenticides and their impact on owls and other wildlife. https://www.healthywildlife.com.au/parasites-and-viruses/rodenticides-and-wildlife/#/

Pleased if members drift in as a detour on weekend circuit of Mt. Coot-tha. Rain or shine! (Check Covid-19 directives and fb for more info).

February 24 Talk
Dr Paul Campbell, a director of The Save the Bilby Fund

The Status of Bilbies in Queensland

By Margaret Palmer

Paul, a THECA member, gave an interesting insight into the Bilby and the work of the Fund. The Fund is an Australian Registered Environmental Charity established in 1999 by Frank Manthey OAM and scientist Peter McRae (The Bilby Brothers), to raise funds to construct a predator exclusion fence enclosing 25 square km in Currawinya National Park to support the recovery of the endangered Greater Bilby (*Macrotis lagotis*) in Qld.

Based in Charleville in South Western Queensland, the Save the Bilby Fund operates the Charleville Bilby Experience (CBE) at the historic Charleville Train Station and Australia's largest Intensive Bilby Breeding and Creching facility from within the Queensland Parks and Wildlife Headquarters.

The Save the Bilby Fund Chairs the Greater Bilby National Recovery Team and Greater Bilby Meta-population Management Program, co-ordinating national Bilby recovery efforts through multiple stakeholder groups and tenures. The Fund conducts formal and informal education and public awareness campaigns to highlight the plight of the Bilby and receives no recurrent government funding and relies on private funding to undertake its critical work to save the Bilby from extinction.

Bilbies are the largest member of the Bandicoot family. They can weigh up to 2.5 kg and be up to 55 cm in length, with an additional tail length of 29 cm. They will eat anything, from small mammals and lizards to tree roots and grass, and are extremely adaptable. The fastest reproducing Australian mammal, they may breed up to 4 times a year and bear up to 8 young each time. Before European settlement, Bilbies occupied around 70 percent of Australia (not Tasmania), with a particular concentration in more arid areas, and in north-west Australia. Since the late 1800s, they have lost about 80 percent of their range, with only a few pockets left in Queensland. Those areas where they are increasing are Aboriginal-tenured lands with conservation programs run by Aboriginal groups. These groups hunt cats and manage the landscape to make predation by cats more difficult. Perhaps surprisingly, Bilbies can co-exist with cattle, and are found on cattle properties around Birdsville and Bedourie.

Bilbies are ecosystem engineers. In foraging and digging activities, an adult male can shift over 3 tonnes of soil a year; this brings deep soil nutrients to the surface making them available to plants, aerates the soil, and mixes organic matter into the soil. Bilbies dig multiple spiralled burrows up to 3 metres deep, in which other animals live, taking advantage of the upper levels of the burrow. These include 22 species of bird, 16 of reptiles and 7 mammals.

Bilbies are now endangered. The Lesser Bilby is extinct, and the Greater Bilby faces three dangers: feral cats (descended largely from cats brought out with the First Fleet to combat rats and mice), foxes and land alienation (e.g. too frequent fires). Bilbies can co-exist (in very diminished numbers) with cats, but cannot co-exist with foxes. Their plight encouraged McRae and Manthey to build the predator-proof fence on Currawinya National Park. The fence, built by volunteers, was officially opened in 2003. Bilbies were released into the protected area in 2005 but died out. Cats had been penned in as well by the fence, and the 2010-11 floods weakened the fence and enabled cat numbers to explode. The fence has now been upgraded. A time bomb was the natural corrosion of galvanised wire at the bottom; plastic-coated wire is now

February 24 talk by Dr Paul Campbell (cont'd)

used instead. The fence is 2 metres high, is electrified (solar-powered) and has a floppy top to stop animals climbing over, but is hard to monitor continuously and is not entirely animal-proof: Paul showed us a photo of a section of the fence collapsed after an enthusiastic kangaroo had vaulted over the top.

Feral cats were eradicated between 2014-2018, with Bilbies being re-introduced in 2019. The Fund had taken over management of the fence in an MOU with government in 2015 and utilised a range of strategies to eliminate the cats - tracker dogs, professional trappers, baits (Kentucky Fried Chicken failed) and lures (the most successful - non-food items such as tinsel and small toys from Bunnings such as a battery-powered butterfly, which aroused cats' famed curiosity). Cats are persistent; they do not require free-standing water (there is no permanent water in the fenced area) and get their water from their prey. Rabbits, which compete for resources with Bilbies, also support cats. A new device being trialled is the 'Felixer'. This shoots gobs of poison at the coat of any animal assessed not to be a Bilby (e.g. cat, rabbit. The poison is only ingested when the animal grooms itself. No native animal grooms itself, so the device appears to be safe for these. There are also 80 cameras on Currawinya, disclosing the presence of pigs, kangaroos, goats and dingoes.

An interim Bilby Conservation Plan was implemented in 2015 and a Feral Cat Management Workshop held in 2018, with a Release Strategy for the Greater Bilby on Currawinya National Park signed in 2018. In 2020, a Recovery Plan for the Greater Bilby was submitted to the federal government. The public have also been engaged in the conservation effort, with the opening of the Charleville Bilby Experience and the commencement of Bilby Track citizen science trips in 2016.

Paul made the point that fences are not neutral: they keep animals in as well as out, leading to artificially high 'rogue' populations of echidnas and goannas. In the next 2-3 years, the carrying capacity of the Currawinya area will probably be exceeded, and then the Fund will move its efforts interstate. It is necessary to work out the factors which determine carrying capacity to avoid starvation in the population. Eventually, the Fund wants to re-introduce Bilbies to areas outside the fence; for this it needs to know where the wild Bilbies now are, so that their genes can mix with those of released populations. Fundraising efforts are now aimed at providing for a ten-year period in which trappers would be employed to hunt feral cats in those areas where it is hoped the Bilby can enjoy a new home.

March 24 talk by Dr Mark Blaskovich

Fighting Anti-Microbial resistance

By Margaret Palmer

Dr Blaskovich, a medicinal chemist and inventor from the Centre for Superbug Solutions, Institute for Molecular Bioscience, University of Queensland, has won over $10 million in grants for his subject area. His talk emphasised that bacteria are everywhere – in the soil, on any surface, in our bodies – and for the most part are beneficial, especially the biome in the gut, and bacteria in the soil which fix the plant food nitrogen. 'Bad' or pathogenic bacteria do not always harm: they need a chance to do so, and can be carried harmlessly on the skin until a cut or scrape allows them to enter the body. There are thus good reasons, for example, for wearing gardening gloves: the tetanus bacteria, *Clostridium tetani*, lives in the soil and in animal manure; sepsis, or an infection out of control, can be caused by *Escherichia coli*, *Salmonella enterica* and *Listeria monocytogenes* bacteria, which live in manures; *Legionella long-*

March 24 talk by Dr Mark Blaskovich (cont'd)

beachae bacteria live in soil, compost and potting mix (when using potting mix wear a dust mask) and cause Legionnaires' disease; Melioidosis is caused by the bacteria *Burkholderia pseudomallei* entering the skin through cuts and abrasions. It occurs mainly in Northern Australia. Most cases occur during the wet season, when the bacterium can be found in the surface layers and in muddy surface waters; finally, Sporotrichosis or Rose Gardener's Disease is caused by a fungus, *Sporothrix schenckii*, found in soil, wood, or grain. The omnipresence of bacteria is clear from the fact that the bacterial cells in the human body weigh 5-7 kg.

Antibiotic resistance has received much publicity in the last 10-15 years. The headlines are sensational, but reflect reality. We are heading towards a post-antibiotic era, in which minor injuries and infections can once again kill. A bacterial pandemic is possible, against which we will not be able to develop a vaccine quickly. Chemotherapy and operations which we take for granted, such as hip replacements, will not be possible, as these require antibiotics. Dr Blaskovich emphasised that it is the bacteria which develop resistance to antibiotics, not us. And resistance is nothing new: it has been going on since penicillin was invented. After 5-10 years of any antibiotic, resistance is noted, such is the capacity of bacteria to evolve. Resistance is ancient; DNA genes located in permafrost were found to have encoded resistance to competing organisms. But resistance is increasing rapidly due to the misuse of antibiotics. Seventy percent of antibiotics are used in animals rather than humans, as a food additive which encourages stock to grow fatter and faster.

The overuse of antibiotics has led to the re-emergence of Colistan, a last resort antibiotic, which is toxic but which has been used in China and India as a livestock feed. Resistance genes to Colistan have been found in chickens, and these genes are passed on to humans which consume the meat (Dr Blaskovich noted that the use of antibiotics in pigs and chickens in Australia is well-regulated, with Australia being one of the best countries in this respect). Genes are also passed on to humans from livestock when their waste contaminates drinking water, or when wastewater from antibiotic factories pollutes drinking water. Antibiotics used for citrus diseases in Florida orchards have leached into groundwater there.

Seventy percent of the antibiotics used in humans are prescribed inappropriately: for example, the prescription of antibiotics for colds, which are viral in origin. One in two Australians has had antibiotics in the last year. In the case of COVID-19, 90% of hospitalised patients get antibiotics because of the possibility of bacterial pneumonia. The children of women who take antibiotics during pregnancy are more likely to be hospitalised in the first 10 years of life.

New antibiotics are not being developed quickly enough to keep up with resistance. The golden age of the development of classes of antibiotics was in the 70s and 80s. Fewer have been discovered since. Economic factors underlie this diminution. The development pipeline is long and the attrition rate high. 3 stages of human trials are necessary and are very expensive. The process can't be speeded up – the rapid rate of COVID-19 vaccine development was possible because vaccines all begin from a common platform, whereas an antibiotic has to be developed from scratch for each bacterium. Resistance develops quickly, so that any given antibiotic has a short shelf-life. Many large pharmaceutical companies have exited the field because of economic factors, whereas many small biochemical firms go bankrupt

March 24 talk by Dr Mark Blaskovich (cont'd)

even when they get approval for their product. As an example, it is possible to charge only $1000 a day for an antibiotic treatment (which runs for a relatively short period), while a cancer treatment can net $375,000-$475,000 per treatment. There are currently 43 antibiotics being developed, in contrast to the 836 anti-cancer drugs in the pipeline. Two of the most successful antibiotics have made very little money in comparison to drugs such as Lyrica (used to treat nerve pain and seizures) and Januvia (for diabetes).

What to do? One possibility is to improve existing antibiotics and rediscover old antibiotics. This can lead to new antibiotics. New antibiotics include an alteration to the frontline antibiotic Vancomycin. We can also repurpose other drugs. New diversity of compounds utilising natural product diversity and synthetic chemical diversity hold out some hope as the basis for new drugs. Compounds such as resistance breakers, when used alongside antibiotics, can help breach bacterial resistance. There are also anti—virulence approaches which minimise the capacity, for example, of bacteria to stick to surfaces in the human body, or to exude toxins over their life cycle. Phage therapy is also emerging as a possible treatment. Phages are viruses which produce an enzyme, lysin, which kills specific bacteria (good diagnostics are required to identify these). The immune system can also be primed to kill bacteria, or dampened down to avoid the effect of bacterial infection such as inflammation.

Dr Blaskovich is engaged in a project, Soils for Science, which is an Australian -first citizen science program dedicated to finding new antibiotics needed in the fight against superbugs. It aims to identify new microbes from soil samples throughout Australia's biodiverse soils, which can be developed into the next generation of antibiotics. Bacteria in the soil fight each other for dominance, and the result can be new antibiotics. Kits are provided for citizen scientists to collect soil samples from diverse locations. Donors can see images of the bacteria identified in their soil sample in an online gallery. Over 100,000 samples have been collected, and over 3 million new bacteria will probably be identified. Dr Blaskovich emphasised the value of collaboration like this to achieve results. He is coordinator of the Community for Open Antimicrobial Drug Discovery (CO-ADD), an open global initiative for discovery and development of new drugs against superbugs. It is led by a group of scientific experts and industry leaders with experience in screening, medicinal chemistry, drug development and microbiology. 47 countries are involved with 304 research groups. The project is funded by the Wellcome Trust and by Queensland University.

BCC Afternoon Tea

The Brisbane City Council held an afternoon tea in honour of the Environment Grant Recipients on Sunday 28 March 2021. The event was held in the Balmoral Room, Level 1, Brisbane City Hall, where Lord Mayor Adrian Schrinner gave an address thanking attendees, acknowledging their organisations' work in the community as recipients of funding under the Environment Grants Program. Margaret Palmer attended on behalf of THECA, which had recently received a generous grant of $8,800 from the BCC to offset the administrative costs of running the organization and its programs.

April 28 Talk by Dr Anna Florin

Pandanus nutshell generates a palaeoprecipitation record

By Margaret Palmer

Dr Anna Florin, an archaeobotanist (an archaeologist who studies plant foods) of the ARC Centre of Excellence for Australian Biodiversity and Heritage in Wollongong, gave a fascinating talk on her work linking analysis of archaeological food scraps – charred Pandanus endocarps or nutshells - with climate change in northern Australia.

She and her colleagues have developed an historical rainfall record, called a palaeo-precipitation proxy, using stable carbon isotope analysis of modern and archaeological Pandanus nutshells. This enabled them to document environmental change and resulting human mobility and settlement patterns from the earliest human arrival in the area (then called Sahul, the combined Pleistocene landmass of Australia, New Guinea and the Aru Islands) to the present. The key site was Madjedbebe, a rock shelter in the Alligator Rivers region of Kakadu, and Australia's oldest human archaeological site (at least 65,000 years). Inhabitants of this site had undergone several periods of substantial global climate change.

Pandanus nuts from *Pandanus spiralis* were found at almost all settlement times at Madjedbebe. They are favoured by Indigenous people for their high protein and fat content, tasting like a combination of coconut and almonds. However the hard shells are very difficult to remove, and had to be roasted over fire to gain access to the nuts. The resulting charcoal lumps are very long-lasting, and can be identified by their similarities to present day examples using high-resolution microscopy.

It seems that when condition are favourable (ie higher rainfall), plants pull in lighter carbon isotopes during photosynthesis, whereas under drier conditions heavier carbon isotopes are absorbed.

Dr Florin's team also carried out stable carbon isotope analysis on the shells of modern *P. spiralis* fruits from two areas: Mirarr country near Madjedbebe; and the edge of the Stuart Highway, in a 300 km transect between Darwin and Katherine. The former allowed for the analysis of variation in carbon isotope values of nutshells from environments local to Madjedbebe (floodplain fringe, seasonal floodways, and open forest and woodland environments). The latter allowed for the analysis of isotopic variation across different average annual rainfall zones, ranging from around 1,700 mm/year in Darwin to as low as 1,000 mm/year in Katherine.

The findings suggest that the Kakadu region wasn't as prone to dry spells as surrounding areas, and that it probably functioned as a place of refuge for early Indigenous Australians as they left harsh and arid conditions elsewhere, intensifying occupation of the region. This is confirmed by the correlation of periods of lower rainfall, including the earliest phase of occupation, with peaks in the number of exotic stone tools and artefacts at Madjedbebe, some of which came from over 200 km away.

The palaeoprecipitation proxy is a potential game-changer for palaeo-ecological and archaeological work in Australia, Melanesia and the Pacific. Dr Florin's study serves also as a warning to those living in present times, including the traditional owners: although the team identified drier periods during the last two glacial stages, the rainfall has never been lower than it is now.

THECA Birdwalk 27 February at Darra

By Margaret Palmer

Before writing about this walk, I had a look at what was written about the same walk in 2020. This time, although the walk, led by the knowledgeable Dawn Muir, was most enjoyable, we saw fewer bird species. The area (Edenbrooke Park and Ashridge Road Park) was lush after recent rains and the air was still, hot and humid, even at 7 am, with increasingly noisy cicadas. Tree plantings were doing well in the parks, and weeding has reduced some of the pest plant species. There was a significant algal bloom on the lagoon and in the creeks, the water turbid from recent rain.

We saw Australian White Ibis, Noisy Miners, Rainbow Lorikeets and Scaly-breasted Lorikeets in flowering Melaleucas, a baby Rainbow Lorikeet, a flock of Pale-headed Rosellas, Welcome Swallows, a female Figbird in what was probably a Moreton Bay Fig, Willy Wagtails, Magpie Larks, Grey Butcherbirds, Double-barred Finches (which seemed to be after the plentiful mature Cobblers Peg seeds), Currawongs, Crested Pigeons in Melaleucas, Superb Fairy Wrens, Brown Honeyeaters, Rock Doves, Magpies, Sulphur-crested Cockatoos, Spotted Doves, a family of Dusky Moorhens on the Lagoon with a nest on one of the platforms in the water, a flock of Blue-faced Honeyeaters, a Black Swan (*right*, which hurtled across the water expecting food and departed as rapidly when we obeyed signs directing walkers not to feed the wildlife), Little Pied Cormorant, a Great Egret, a Maned Duck (a single sighting and the only duck we saw), 3 Brush Turkeys and two mounds, a Little Black Cormorant, and Kookaburras.

We also saw many turtles in the lagoon (and a small one in the creek) with their shells encrusted with algae, plus an increased number of Grey-headed and Black Flying Foxes, hanging out in Melaleucas and Eucalypts surrounding the lagoon. Their constant raucous cries increased by several notches during our stay, as something (which we could not identify) spooked them. We did not see any of their typical predators such as White-bellied Sea Eagles, however. Brisbane City Council notices drew our attention to its Edenbrooke Flying Fox monitoring program.

We heard a Rainbow Bee-eater, Crows, Pied Butcherbirds, and a Striated Pardalote. Absent were the Black-faced Cuckoo Shrikes, Buff-banded Rails, Sacred Kingfishers, Pacific Black Ducks, Orioles, Lewin's Honeyeater, and Striped Honeyeaters which we saw last time. We also saw only one Figbird this time.

A walker whom we encountered told us that he had seen the Australian native water rat, Rakali or *Hydromys chrysogaster*, with its white-tipped tail and webbed back feet, in the park on several occasions. We also saw a one-metre eel in the creek along with blue waterlilies, native to Northern Australia. Touchingly, the Ring-tailed Possum was enjoying a snooze in the same makeshift home close to the ground in a paper-bark tree as it was last year. Dawn noted that the Cisticolas and Grassbirds had vanished with the mowing of the long grass, with only a remnant patch left. An interesting walk as always. We are resuming the morning teas which we had after each walk prior to COVID-19. So bring a flask and something to nibble, and come with us on the next fascinating ramble.

Bird walk Pullenvale Forest Park 27 March

By Margaret Palmer

This bird walk, taken in the cool of autumn, was rich in bird sightings and hearings following recent rains which had brought on the insect population. The day was beautiful, with clear skies, sun slanting through green blades of grass on the forest floor and highlighting trees which had put on a spurt of growth. At this time of year, the sun hits mainly the top of the trees, and most of the birds were to be found there, chasing the insects which also sought the sun. Many of the birds were breeding due to this increased insect population.

We saw and heard Magpies, Noisy Miners, Figbirds including a female, Rainbow Lorikeets, Scaly-breasted Lorikeets, Little Lorikeets, Pale-headed Rosellas, Kookaburras, a Spangled Drongo, a Brush Turkey, a Channel-billed Cuckoo, Noisy Friarbirds, Lewin's Honeyeaters, White-browed Scrubwren, Sulphur-crested Cockatoos, Brown Thornbills, Brown Quail, a pair of Eastern Yellow Robins who were probably breeding as they are normally solitary – these were engaged in courting behaviour including chasing each other), Rainbow Bee-eaters, Little Shrike-thrushes, a Varied Triller, Fantail Cuckoo, Double-barred Finches, a Leaden Flycatcher and a Spangled Drongo.

We heard many calls from Pied and Grey Butcherbirds and Eastern Whipbirds right throughout the walk, and also heard Crows, Masked Lapwing, King Parrots, Olive-backed Oriole, Striated Pardalote, White-throated Gerygone, Fairy Wrens (we could not be sure of which kind), a Pacific Bazza and a Cicada Bird.

We saw (though did not hear the calls of) the Common Bronzewing, Oriole (note that this bird can be confused with the Figbird. The Oriole is sleeker, its front has precise white stripes, and it is more likely to be alone. The Figbird is dumpier, and more likely to be in a flock), Red-browed Finches, a Willy Wagtail, a Spectacled Monarch, possibly a Rufous Fantail, a Varied Sitella, a Golden Whistler, possibly a Brown Gerygone, a Red-browed Finch, a Grey Shrike-thrush and a Little Shrike-thrush.

We also saw numerous different kinds of nest boxes (example *above*), some designed for birds, others for possums or gliders. We capped off the morning with a cup of tea and chat at one of the Park picnic tables. Thanks to walk leader Dawn Muir for a fascinating morning.

Birdwalk Oxley Creek Common 24 April 2021

By Margaret Palmer

The weather was much cooler than when we last did this walk, with heavy dew on the grass. Green Panic was tall over the vast area encircled by the track, and we saw and heard many small birds as well as larger ones. At the carpark before starting the walk, we saw and heard many Welcome Swallows, Rainbow Bee-eaters, Crows, Noisy Miners, Blue-faced Honeyeaters, Masked Lapwings and Magpies with a juvenile. We heard a call possibly that of a Drongo.

On the walk, we both saw and heard Grey Butcherbirds, Tawny Grassbirds, a Striated Pardalote, Brown Honeyeater, Rainbow Lorikeets, Pale-headed Rosellas, many Red-backed Fairy Wrens over the entire length of the walk, especially in the Green Panic grass and on fencing wire, Willy Wagtails displaying their distinctive white eyebrow, Lewin's Honeyeaters, a female Mistletoe Bird, a White-throated Gerygone and a Magpie Lark.

We saw Galahs, a White Ibis, Spotted Doves, female Rufous Whistler, Grey Fantails, Chestnut-breasted Mannikin, a Brown Quail (a real find, this), a male Golden Whistler, Double-barred Finches (these were breakfasting in bed, having learnt to reach down from their perches on low branches to eat the seeds from tall grass stems, which would fall over if the birds perched on them); once at the lagoon area of the Common, we saw a male Superb Fairy Wren in the trees lining the water, a Tree Martin, a Brown Goshawk (the only raptor we saw) and Purple Swamphens. Unfortunately, the entire water body was choked with Water Hyacinth (*above*).

We also heard a Grey Shrike-thrush, a Bar-shouldered Dove, a Black-faced Cuckoo-shrike, Sulphur-crested Cockatoos, White-browed Scrubwrens, a Striped Honeyeater and a Scarlet Honeyeater.

The Oxley Creek area is prone to flooding: in 1974, the flood level reached up to the level of the old drum caught in a fork of the tree at *right*.

Interlude as an Impromptu Extra – ABC Gardening Australia Featuring Brisbane's Big Butterfly Count*

By Maria Miller

My agent and Project lead, Jutta Godwin, could only give us short notice for the shoot on March 19th. Location: Sutling Street in the Cubberla Creek Reserve, the heart of the suburb, nets supplied, come as you are (no make-artist on duty). The six extras showed up to spend an entire morning filming for what is likely to be a short, colourful segment (*right*, photo by Jerry Coleby-Williams). After a rainy week, the weather co-operated, and we had several hours chasing butterflies and doing interviews. The five seasoned Gardening Australia (GA) crew put everyone at ease. Jerry Coleby-Williams was extremely approachable and interested in all sorts of things, not just butterflies! The Montezuma cypress (*Taxodium mucronatum* -a conifer sacred to the native peoples of Mexico, and Mexico's national tree) on the Akuna Street side of the creek certainly caught his attention. He deemed them noteworthy despite being exotic – go see them near the bike path and ponder who brought them here.

GA crew plus Trevor Lambkin (in red shirt) showing Jerry Coleby-Williams (in yellow shirt) an Evening Brown (*Melanitis leda*): photo by Maria Miller.

*Brisbane's Big Butterfly Count was launched back on October 11th 2020 by Brisbane Catchments Network http://brisbanecatchments.org.au/ at the CWCN centre. It has been an engaging Citizen Science activity adopted across the city. Butterflies are indicators of environmental health. THECA's Hilltopping Bushcare site and Merri Bushcare (Greenford Street Cubberla Creek) have been active in the surveys from the beginning, recording 30+ species at those locations. There have been workshops, field training, radio interviews,

Interlude as an Impromptu Extra – ABC Gardening Australia Featuring Brisbane's Big Butterfly Count* (cont'd)

transect surveys and TV spots (GA and ABC Kids "Behind the News"). All records are uploaded to the Atlas of Living Australia (BioCollect). The survey recording side of the project is winding down now (end of March, winter approaching) but results yet to be shared. Seventy-nine records have been uploaded to:

https://biocollect.ala.org.au/acsa/project/index/aa5b05c5-041e-4e7d-9f6c-60feee565dfb

P.S. April is Global Citizen Science month! Why not get involved? See:

https://www.chiefscientist.qld.gov.au/__data/assets/pdf_file/0026/49913/citizen-science-projects-list.pdf.

Right: Evening Brown released (caught and photographed by Maria Miller)

Culture Weave Activity

On 14 April, Nadine Foley of Culture Weave hosted a workshop on the ancient Indigenous art of weaving on the Hut verandah. This was a beautiful cross-cultural experience with the weaving providing a safe yarning space for participants of several generations, as the photos by Maria Miller indicate. At *left*, Megha Chopra displays the basket she made. Many thanks to Maria for organizing and facilitating this activity and to Amanda Thyer for assisting.

A RARE FROG IN OUR LOCAL WATERWAYS AND GARDENS

By Justin Watson

The Tusked Frog (*Adelotus brevis*) is listed as vulnerable under the Queensland Nature Conservation Act 1992 and we are fortunate to have this species in our local (Western Suburbs) waterways, gardens and parks.

The call is a "soft musical double click" or 'pluck', 'p-tuk' or 'p-t-t-tuk', not to be confused with the more common striped marsh frog (*Limnodynastes peronii*) which has the repetitive 'tok'……'tok….

This is a medium-sized frog (reaching 50mm in length) with a dark brown/grey back, a black and white mottled belly and bright red patches on the thighs and lower legs (see photos by Mandy Watson, *left* and *below*). Males have two large protrusions resembling tusks on their lower jaw, hence the name. Don't mistake this little frog for a juvenile cane toad (*Rhinella marinus*) as there is a superficial resemblance at a quick glance.

The Tusked Frog is found from the mid north coast of NSW to Eungella (Mackay) mostly along the coast and extending inland to the ranges. This species inhabits (as per the literature) wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams. In the western suburbs, we have found them in the local creeks (including Moggill, Gold and Cubberla and around the Hut), in dense native gardens, ponds, stormwater drains and rehabilitated wetland/soaks. They are foam-nest builders, laying eggs as a foamy mass on the surface of permanent ponds, stream pools or other water-filled habitats. While they are reported to breed in spring and summer, we can hear them all year in the local area, mostly during warmer conditions and/or following some rain.

We are fortunate to have a vulnerable species in our suburbs and enjoying the local creeks. Let's not take this for granted. Protection of waterways, rehabilitation of riparian areas and creating frog habitat will help this and other species. A few years ago we rehabilitated a small low-lying area that occasionally filled with water after rain and have since recorded several frogs, including the Tusked Frog. If you are thinking about a frog garden, some examples of suitable plants (source: Mid-Autumn 2021 Queensland Frog Society Frog Sheet) are provided in the plant species list.

The Tusked Frog is not easy to find as it hides beneath rocks and leaf litter, and stops calling when you get close, but keep an eye (and more importantly an ear) open for it when you next walk the neighbourhood, parks and creeks.

Humpback Whale Encounter – Hervey Bay

By Mandy Watson

I have seen the breach of distant whales or their blow (spray) many times while sitting on the beach or viewing from a look out. Each sighting evokes thoughts of how vast the ocean surrounding us is and how much life it supports, including these massive marine mammals.

Last year we decided to do a whale watching tour off Hervey Bay. As with all wildlife tours, there wasn't any guarantee of seeing the animals, so we were brimming with hope and excitement as the boat left the harbour. All eyes were peeled as we travelled further and further off-shore; the anticipation was palpable. Then, in the distance, a splash – a fin slap! My heart was in my throat and my camera was ready. I was hoping that the whale would stay long enough for the boat to get close enough so I could get some sort of record of my sighting. Boats can't approach the whales closer than 300 metres. I was happy with that. I had my bird photography lens on, and a whale is a big animal, so 300m in my opinion was good. The whale hung around, and we got to our 300m limit and stopped. I was so excited, so happy that I was actually managing to photograph this amazing animal's fin and tail as it dived. The whale moved on and so did we, on the hunt for more of these ocean giants. It wasn't long before we saw more splashes – more whales. This time there were two. Whales are inquisitive, which is fortunate, because the rules allow whales to come as close to the boat as they wish. This time both whales came very close – many fin slaps, tail slaps and breaching. Such an experience, one I'll never forget. Then, just when I thought it couldn't get any better, both animals came up right next to the boat. I could clearly photograph their blowholes opening and closing! Now when I see these magnificent animals in the distance off our coast, I will forever remember the day when I saw them so close that I could have touched them.

Some Humpback fast facts:

- Humpbacks can grow to 18 metres long and can weigh up to 40 tonnes (about half the size of a blue whale). Their pectoral fins are 5m long – the longest pectoral fins in the world.

Humpback Whale Encounter – Hervey Bay (cont'd)

- Like most whales, females are larger than males.
- When travelling, humpbacks move between 5 – 15 km/hour. They can reach speeds of 25 km/hour.
- Humpbacks are baleen whales, which means they have a specialized feeding filter system, made up of fringed brushes, inside their mouths.
- Baleen whales have 2 blowholes, whereas toothed whales have a single blowhole.
- They mainly feed on krill, as well as other small crustaceans and fish.
- It's difficult to estimate humpbacks' age because they don't have teeth. Some scientists estimate that humpbacks live to approximately 50 years, while others estimate 80 years.
- Their gestation period is close to 12 months, and the calf will stay with its mum for about a year after it's born.
- They have a worldwide distribution which involves 2 broad groups (northern hemisphere and southern hemisphere), which don't appear to mix.
- They migrate between the cold water feeding areas and the warm water calving areas.
- Most humpbacks in Australian waters migrate north from June to August and back to the food-rich waters of Antarctica from September to November.

Dead in the Water

From a post by David Salt of ANU (publisher of the newsletter Dbytes), 14 April 2021.

Salt writes about the fiasco of the Murray-Darling Basin Plan, noting that the causes of its failure 'are complex and involve multiple layers of government, countless players and many vested interests'. He notes that 'in an effort to uncover the truth behind this mess, the South Australian State Government set up a Royal Commission in 2018 to examine the effectiveness of the $13 billion Basin Plan, supposedly a blue print for saving the mighty Murray Darling River system'. Richard Beasley, Senior Counsel Assisting at the Murray-Darling Royal Commission, has now published a book, *Dead in the Water*, on what the Royal Commission, led by Commissioner Bret Walker, found. Beasley subtitled his work 'A very angry book'.

Salt says that 'Walker handed down a damning report at the beginning of 2019. Among other things, he found that Commonwealth officials had committed gross maladministration, negligence and unlawful actions in drawing up the multibillion-dollar deal to save Australia's largest river system; that the Plan ignored potentially "catastrophic" risks of climate change and failed to make use of the best science available. Walker concluded that the Basin Plan needed a complete overhaul including reallocating more water from irrigation to the environment'. Further, 'When Walker submitted his 746-page report (containing 111 findings and 44 recommendations) they were warmly welcomed by the SA Government and then politely ignored'. And Commonwealth government tactics at the Royal Commission do not come out looking good in Beasley's book. So if you want a bit of angry bed-time reading, and very little sleep that night, look no further. Salt says that the book is witty as well as caustic.

Forest Therapy or Shinrin-yoku

By Maria Miller

Eclosion (the act of emerging from the pupal case); newly emerged male

Forest Therapy or Shinrin-yoku has gained traction globally and certainly in our neck of the woods. Mt. Coot-tha Forest Reserve has been a haven since March 2020, with trails teeming with hikers and bikers of all fitness levels enjoying the freedom of "forest bathing". It is easy to be immersed in the soft green blur and make discoveries every time you explore the local area. Despite the dry conditions, nature still offers us delightful encounters.

From early May 2020, I have been monitoring the numbers of *Cressida cressida (*aka Big Greasy) chrysalises along the Jacksonia Track. It all started with one I photographed on the underside of a handrail back in mid-May, without a clue of the butterfly which might emerge. I did not have much hope for that creature, which I later found out would be a Big Greasy – surely a hiker would accidentally dislodge it from the handrail? I continued walking uphill oblivious to all the others secreted in the native grasses along the track, as they were well camouflaged. Following a conversation with Don Sands however, I went back several times to have a closer look along the trail edges.

In August 2020, an estimated 212 chrysalises were counted! The food source for the caterpillar, Forest Aristolochia or *Aristolochia meridionalis*, was spotted; such a delicate, scrambler clinging to the dry hillside, peeking out from leaf litter. How does the female know that where she lays her eggs will provide enough biomass for the caterpillars? Wandering down on the vernal equinox, 22 September, about a dozen butterflies were seen with many still to emerge. Two weeks later another stroll revealed 20 butterflies gliding in the breeze, estimated equal numbers of females and males. I am still grappling with the clever concept of a diapause (are we in a similar state due to the pandemic?): a period of suspended or arrested development during an insect's life cycle. Apparently, an insect diapause is usually triggered by environmental cues, such as changes in daylight, temperature, or food sources, and is useful even over Queensland's mild winter. Perhaps the lesson is to work with nature? March 2021 update after a rainy spell: Forest Aristolochia still present and about a dozen Cressida Cressida flitting about. One egg and no chrysalises observed along the trail edge. No doubt there will be more therapy sessions in the bush over winter 2021. Photos: Charles Worringham.

Cressidas mating

March 2021 finds along the Jacksonia Trail (Forest Aristolochia – seed pod and flower, Lydia Lichen Moth, Snail-eating Carabid beetle, chain fruit with face, 'shroom)

Lungfish HABITAT Rehabilitation in Brisbane River: Report of a BCC Biodiversity Presentation by Mark Waud from Healthy Land and Water (HL&W)

By Greg Siepen

Mark and his team have started a program to rehabilitate a section of the Brisbane River between Wivenhoe Spillway and Burton's Bridge, after the 2011 and 2013 floods ripped out from the bottom sediments vegetation vital to the survival of the Lungfish. For millions of years Lungfish only occurred in the Mary and Burnett Rivers, but some individuals were translocated in the early 1900s to the Brisbane River, North Pine River, Condamine River and Enoggera Reservoir, where they have survived ever since.

They are very special animals in that they have a lung and protuberances on their fins to help them 'walk'. Having a lung means that they can tolerate water containing very low levels of oxygen, which is an increasing trend in many rivers due to climate change and more frequent droughts occurring.

After surveying one section of the Brisbane River, Mark's team found that Ribbon plant, *Vallisneria* sp. had almost disappeared. Lungfish lay their eggs on this plant and also eat parts of it. Adult lungfish were still sighted but there appeared to be no juveniles to carry on the population, suggesting that few eggs were hatching. Mark helped design a project to replace this plant by growing small pieces of *Vallisneria* plucked from the river on 30 cm X 30 cm coir (coconut fibre) mats in children's plastic swimming pools before transplanting the mats and plants to sites in the river.

One unexpected result was that many of the replanted *Vallisneria* were eaten by Lungfish, indicating their main food supply is still in short supply, years after the floods. The next issue to face was how to monitor all the re-planted *Vallisneria* plants. This was solved by trialling drones using cameras. After refinements to compensate for cloudy days, high water turbidity and high reflection rates, the drones can produce high quality composite photos showing the replanted *Vallisneria* plants, other waterweeds and general water quality in each season. This will guide future management and replanting strategies.

The value of looking after lungfish and their habitats in the Brisbane River is that in many of the other rivers in which lungfish live, their refuge pools dry up during drought periods, while there is a constant water flow in the Brisbane River. The Burnett River seems the most vulnerable to climate change and the drying up of refuge pools. *Vallisneria* propagules will probably be washed downstream to help replenish and create more lungfish habitats, further extending potential lungfish habitat.

Having lungfish spread across several rivers may help conserve their populations. A future project could identify the whole population genome or establish if sub-species are developing in the different rivers.

Editor note

For more on the lungfish, visit http://annekempslungfish.com.au/ or read Anne's book The World of Lungfish: a Personal Perspective. There is a copy in the Hut library. Anne has been a guest speaker at a monthly meeting, as well as at *THECA Forum 2016: Barriers to Biodiversity Conservation*.

Platypus, Platypus, Where are You? Report on BCC Biodiversity Presentation by Tameille Brunt, PhD UQ candidate, Tuesday 9 March 2021

By Greg Siepen

Tameille Brunt presented a comprehensive analysis of the conservation status of Platypus in the greater Brisbane area. After briefly giving an historical perspective, Tameille discussed the biology of this beautiful egg-laying mammal; that it occurs between Cooktown (FNQ) down to Tasmania and west to the Victorian/South Australian border, with some translocated to Kangaroo Island. It is one of Australia's two semi-aquatic mammals, the other being Rikali, the water rat.

If you have seen a platypus, you will know how small it really is. They are 40-50 cm long, with the adult males having a spur on their hind leg. The heat protection of their fur is equal to a 3mm neoprene wetsuit, with 600-900 hairs/sq. mm, similar to otters. Mating occurs in July (Qld) and three eggs, covered by parchment-like shells, are incubated for approximately 10 days. Young feed on milk produced by the mother, licking it off the underside skin. After 4 months the young are almost fully grown and emerge from the burrows. Platypus can tolerate a range of water environments, but require stable creek-banks to retain their burrows. They like a 1-5m depth of water and a coarse bottom substrate in which to find their food of insect larvae, molluscs, fish eggs, and micro-invertebrates. Their bill is surprisingly soft and pliable around the edges. It contains hundreds of tiny pores containing electro-receptors, which they use to locate their prey through the detection of tiny electric currents produced by the muscles of their prey species. They don't have teeth but a horny mound on which they grind up their food, after storing it in their cheek pouches while diving. Platypus are important ecosystem managers through their mixing of the substrate when foraging for food.

Platypus are NOT under threat in Qld, but there is a lack of knowledge to predict population trends and future management. The main threats come from the effects of increasing urbanisation. That is, from the creation of impervious water structures (e.g. water drains), stormwater run-off, and pollution (chemicals, plastics and other materials). Other factors include habitat degradation mainly from bank erosion and climate change through increasing water temperatures and higher frequency of droughts, which dry up platypus refuge pools.

Platypus can be preyed upon by raptors, dingoes (and wild dogs), pythons and crocodiles (in Far North Queensland). They can also be caught in opera house nets when they become attracted to the bait. Tameille has started research to establish the current numbers of Platypus in the Brisbane area, by measuring environmental DNA and instigating a capture and tagging program. Sampling environmental DNA from shed hairs, skin and faeces in the soil, water and sediment indicates the presence of at least one animal. This DNA only lasts a few days. So, it is a reliable measure of platypus existence, but it costs $200 to analyse each sample! Tagging individuals is very time consuming but gives accurate results of numbers, ages, sex and health. Tameille collects the environmental DNA sampling first. If a positive result occurs, she then sets netting corrals to trap and then tag animals. She is in the early stages of her research and will know more by the end of the year. One major dilemma faced by catchment groups is the effect of exotic Chinese elm trees that grow along the watercourses. Should they be removed (because they are considered weeds) or should they be kept because they stabilise the creek-banks and platypus burrows can be dug among their roots? If you want to see Platypus locally, keep an eye out for the Moggill Creek Catchment Group's Platypus Survey which has been running for 16 years (see MCCG website at https://www.moggillcreek.org.au/).

BOOK REVIEW: 'How to Avoid a Climate Disaster' by Bill Gates

By Linda Cartmill

This book provides a big-picture review of a range of solutions to the problem areas confronting the countries of the world in their effort to achieve a 2050 Net Zero Carbon Emissions Target. This target represents achieving a balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere. Examining these varied solutions is a huge undertaking, and reading the book in its entirety is highly recommended.

Background: In December 2015, the 'Paris Agreement' arose from the Paris Climate Conference. Climate scientists from the Intergovernmental Panel on Climate Change (IPCC) have stated that the world will face catastrophic problems if temperatures are allowed to continue rising due to the increasing volume of CO2 and several other greenhouse gases in the environment. In 2015, 195 countries participated and made commitments to lower emissions. These commitments are due to be reviewed every five years.

Australian governments of both persuasions have battled with this issue for years due to Australia's very particular circumstances. As a county, we are hugely dependent on income from industries responsible for high CO2 emissions: coal and iron ore exports. As well, our large beef and dairy herds emit significant greenhouse gases through methane 'burps'. In January 2021, Australia maintained a controversial 2030 interim target and has refused to make a formal commitment to zero emissions by 2050. However, the Morrison government has stated it will look to finding technological solutions to Australia's emissions.

Bill Gates, entrepreneur and co-founder of Microsoft Corp., has built huge personal wealth. He and wife Melinda have established the Bill and Melinda Gates Foundation, a philanthropic organisation dedicated to improving the health and education of the world's poorest countries. With his business and technological background, travel associated with his Foundation and a huge network of the world's movers and shakers, Gates has had innumerable opportunities to consider the issue of climate change. In this book he considers pathways to overcoming the obstacles to progress towards nett zero carbon emissions. Perhaps controversially, Gates states that advanced technology nuclear reactors are vital as part of the mix for providing low-carbon electricity 24/7. He starts with the figure of 51 billion tons of carbon. This is the amount of greenhouse gases the world adds to the atmosphere annually. He then shows what proportions of that figure are created by 'the things we do':

Making things (cement, steel plastic)	31%	
Plugging in (electricity)	27%	
Growing things (plants and animals)	19%	
Getting around (planes, trucks, cargo ships)	16%	
Keeping warm or cool (heating, cooling, refrigeration).		7%

Below is a summary of his proposed actions the world must take to avoid a climate disaster.

World-wide Solutions:

- Help farmers in poor countries grow more crops better able to cope with a worsening climate

- Ensure women in poor countries have equal access to resources
- Ensure cities plan for increasing heat and rising sea levels
- Improve and protect drinking water.

Government Policies must:

- Work in tandem with private companies to screen projects for climate risk; both need to invest money to mitigate long-term risk as individuals can't afford this
- Support development of improved batteries for storing electricity
- Encourage companies to increase research and development (R&D) in order to achieve zero-carbon technologies
- Implement policies to encourage people to upgrade buildings/appliances/cars for carbon efficiency
- Invest in R&D when companies do not
- Make carbon-free items cheaper and emission-expensive items dearer, e.g. by a carbon tax or a cap and trade system
- Ensure policies re building standards reflect latest technology e.g. type of concrete used
- Help to transition those states/regions whose old industries must go e.g. oil, coal, high intensity animal production
- Incentivise private companies to 'go green'
- Ensure alignment of policy, markets and technology
- Endorse development of advanced nuclear reactors for 24/7 carbon-free electricity
- Support development of cheap, clean hydrogen production as a fuel
- Sponsor development of zero-carbon plastics
- Realise that gas-fired power stations are not a solution to achieving zero emissions by 2050 as they must operate for many decades to recoup their cost
- Promote development of meat alternatives
- Buy 'green' products/services for government purchases
- Develop clean energy standards for electricity companies that allow a wide range of energy sources (including nuclear)
- Develop clean fuel standards for vehicles, buildings etc.
- Mandate all products be labelled as to how 'clean' they are - including imported goods.

At a Personal Level:

- Keep climate change before local politicians' eyes
- Write letters; call local politicians to promote clean energy R&D / clean energy standards / a price for carbon; contact your State MP holding the energy portfolio
- Check to see if your energy company has a facility to pay extra for 'clean energy'
- Try plant-based meat substitute.

As a Shareholder:

- Pressure companies to use clean fuel/energy
- Support company motions for R&D to find ways to improve/design green technology.

A Trip into the Outback – Longreach and Winton

By Mandy Watson

I can't think of any trips that Justin and I have undertaken that haven't involved a search for some flora or fauna species, and this trip was no exception. Leading up to the trip, we had done our research and had a list of things we both wanted to do and see. Any visitor to Longreach and Winton would want to see the major attractions such as The Stockman's Hall of Fame, The Qantas Founders Museum and the Dinosaur Stampede. Our combined list had those as well as a whole lot more that often didn't come with guarantees of sighting. For instance: Grey Falcon, Rufous-crowned Emu-wren, Spinifex Pigeon (*right*), Spinifexbird, Australian Bustard and Hall's Babbler. In addition, I was particularly excited about the potential for magnificent sunrises and sunsets, and the varied and interesting landscapes that arid regions provide.

We had originally planned our trip for September last year (ideal time for some of the species we were targeting), however due to work constraints we had to delay it by a month. Unfortunately, this meant that the mercury had started to rise. We had many days when temperatures were over 40 degrees. We were so excited to be there that we made the most of it by planning our days. Where we could we spent time outdoors in the relatively cooler mornings and evenings and sought indoor activities, where practicable, in the middle of the day.

Longreach is an interesting place with much history. I didn't realise that it lies on the Tropic of Capricorn – the same latitude as Rockhampton. It's the largest town in Central Queensland with a population of around 3500 people. It was gazetted as a town in 1887, and by 1893 when the first school opened, it already had 3 hotels, a police station and a post office. Qantas was set up on 16 November 1920, the same year as the town saw a boom because of the success of wool. Both Qantas and the stockmen are given recognition of their significant contribution to the town's history and development by the two major attractions in Longreach: The Founder's Museum and The Stockman's Hall of Fame. Both are a must to visit, although the Hall of Fame was undergoing renovations when we were there, so we didn't get the full experience.

Longreach was given its name after the "long reach" of the Thomson River on which it is situated. The Thomson River starts in the Alma Range (western part of the Great Dividing Range) as the Torrens Creek, inland from Charters Towers. It extends for 350km down towards Lake Eyre. Most years the waters completely evaporate along the way; it's only in exceptionally wet years that the waters actually reach Lake Eyre.

One not so well publicized attraction in Longreach is the Botanical Walk. We loved this. Along the well-used footpath, many native species are planted, with names and some information for those that might be interested. This is not only a good way of utilizing space, and providing information on native species so interested people may incorporate these into their personal green space, but it also provides a food source for local fauna, attracting them into the area.

Longreach is built on flat land. The highest vantage point is 50km from town - Captain Starlight's Lookout. From the Lookout one has uninterrupted 360 degree views of the

surrounding landscape. It's a popular destination for sunsets. We, too, packed our picnic basket, took the drive out to the Lookout, and clambered up the steep incline to enjoy our refreshments and take a few photographs of the setting sun.

There is one place in Longreach that I'm convinced many tourists would never frequent, and that's the sewage works. Birds love sewage works, hence bird enthusiasts love sewage works. I can't recall how many different "poo farms" we've visited, often multiple times. Longreach was no exception. Most trips there weren't too bad; the soil was dry around the ponds, and the smell was tolerable. However, the day we visited it had rained the previous day and night, and it was a completely different story. There we were, Justin with his binoculars and me with my camera, walking very carefully around the ponds. The soil was wet and slippery. Longreach has cracking clay soil (blacksoils), which becomes very sticky when wet, which means that with every step our shoes got more and more caked with mud and became heavier and more slippery. As if that wasn't enough, the rain had somehow caused the smells around the ponds to become more exaggerated. There was no way to escape the smell quickly, one just had to keep putting one foot slowly in front of the other, while trying to ignore the intense odour that seemed to be clinging to our clothes and the back of our throats. This trip had rewards though - we got to see a Latham's Snipe. As a result of our trips to the sewage works in both Longreach and Winton, we saw 12 more bird species that we wouldn't otherwise have seen.

We saw a fair amount of wildlife around Longreach: Brolgas (*right*), Emu, Australian Bustard (*below right*), Yellow-throated Miner, Apostlebirds (*above left*), Bearded Dragon (*left*), many Galahs, and Grey and Red Kangaroos. We also witnessed some spectacular sunrises and sunsets.

Winton is about 180km northwest from Longreach. The town is small compared to Longreach and has a population of only 875. Winton is probably most famous for being the home of bush poetry. It's the town where "Waltzing Matilda" was penned. The popular tourist attraction – The Waltzing Matilda Centre - can be found in the main street. For those of you who loved the TV series "Total Control", the main street of Winton will seem very familiar, although

they've had some really attractive updates done to their landscaping on the central road island since filming took place.

The natural landscape around Winton is spectacular: red soil, jump-ups, ghost gums and spinifex (*right*). I was spoilt for choice for landscape photography. There were two major highlights around the Winton area: Bladensburg National Park and Lark Quarry.

Bladensburg National Park

This park is only 20 km from Winton. The area has some spectacular landforms – worth the trip just for those. However, the park offers so much more. Tragic history occurred at Skull Hole (one of the water holes in the park) – the Bladensburg Massacre, where more than 200 Indigenous people were massacred around 1872. This history is included in the displays in the information centre located within the park. The information centre building is also a part of history; it's the original Bladensburg homestead which was probably transported to the site in the 1910s. The park also has basic camping facilities and both Justin and I would love to camp in the park should we be fortunate enough to visit the area again. Our fauna spotting at the park was very productive. There are plenty of macropods: Grey Kangaroos, Red Kangaroos and Wallaroos. It was interesting to note that they weren't nearly as skittish as those we saw in the Longreach area. We suspect that perhaps near Longreach they have learned that human interaction could potentially be dangerous?

Lark Quarry

Lark Quarry is 110km from Winton. We thought we'd only have one day there, so we left early in the morning to catch the sunrise on our way there. Driving is slow going in the darker hours because there are so many kangaroos along the side of the road. They have no vehicle sense and sporadically jump in front of the vehicle. We went to Lark Quarry for a number of reasons, the first being the dinosaur stampede. Seeing it is awe-inspiring. The thought that these long extinct animals left their footprints after a stampede so long ago is mind-blowing! The information centre is rather a surprise as it's an interesting building built into the remote, red-soil, spinifex laden landscape. There are walks within the quarry grounds, which are worth doing as they offer views of the landscape that one wouldn't otherwise see. The second (real) reason we went out to Lark Quarry was to find four species in particular: Grey Falcon, Purple-crowned Fairy-wren, Hall's Babbler and Spinifexbird. Our first trip out there proved unsuccessful, even although we had good information regarding the possible location of these species. Our day out there was long and very hot and so it was doubly disappointing not to find what we had come for. We were so close. So we decided to forgo seeing the dinosaur museum just outside of Winton and make the journey back to Lark Quarry the following day and try again. A decision, I'm happy to report, we didn't regret. We saw three rare Grey Falcons and got a fleeting glimpse of a Purple-crowned Fairy-wren and a Hall's Babbler. The Spinifexbird still remained elusive – next time……

For those that are yet to explore this area, I highly recommend doing so. It is an area of interesting landforms, abundant fauna and flora and a rich history. Something for everyone.

Motherboards as Mother Lode

(The following is from an article in the CSIRO publication ECOS (Issue 276 - *From waste to Wealth*), by Mary-Lou Considine, on March 17th, 2021)

Did you know there is up to 100 times more gold in a tonne of mobile phones than in a tonne of gold ore? Microbes could underpin a new urban biomining industry, where gold, silver, copper and other e-waste metals are extracted more cleanly and more economically than through conventional mining. Thanks to digitisation and our insatiable demand for new mobile phones, computers, flat-screen TVs and other electronic goods, electronic waste – or e-waste – has become one of the world's fastest growing waste streams.

The United Nations estimated that, in 2019, a record 54 million metric tonnes of e-waste was generated globally, of which only 17 per cent was recycled. The UN also found that e-waste volumes are rising three times faster than the world's population. E-waste contains widely used metals like copper and iron, but is also rich in precious metals like gold, silver and platinum. Yet currently, with much of the world's e-waste ending up in landfill – contaminating soil, groundwater and waterways – only a fraction of these metals are recovered. In Australia, e-waste is growing three times faster than any other municipal waste stream, with most going to landfill – apart from 40 per cent of computers and TVs, items specifically covered under the 2011 National Television and Computer Recycling Scheme (NTCRS).

Finding the best 'brews' and flows

CSIRO's Dr Anna Kaksonen says that, apart from its volume, e-waste poses a major recycling challenge due to its complex nature – a hard-to-separate tangle of plastics, glass and ceramics, as well as an array of metals that includes mercury and lead. She sees great environmental and economic benefit in applying biomining, a relatively new area of mining research, to e-waste recycling. Broadly, biomining refers to the use of microbes like bacteria and fungi to extract and recover metals through processes such as bioleaching and bioprecipitation. "Biomining is already used at a large scale for extracting base metals from low-grade sulfide ores and biooxidising refractory sulfidic gold concentrates before cyanidation," says Dr Kaksonen. "About 10–15 per cent of the world's copper and about 5 per cent of the world's gold is mined this way."

In a recently published research paper, a team of Australian scientists, including Dr Kaksonen, investigated the potential of using *Acidithiobacillus ferrooxidans,* a naturally occurring, hardy bacterial species able to live in acid mining waste, to extract base metals from Australia's e-waste. The scientists were particularly interested in the prospect of bioleaching metals from printed circuit boards (PCBs). PCBs contain a mix of plastics, ceramics and metals like gold, silver, copper, zinc, aluminium and nickel.

Thanks to a recent grant from the Western Australian Government's New Industries Fund, Dr Kaksonen and a CSIRO team are now embarking on lab-scale research to identify an effective sequence of biological unit processes to enable bacterial leaching of both base and precious metals from ground PCBs.

"The research will help us identify which of the metals present in e-waste are the most feasible to mine," adds Kaksonen. The two key processes in biomining are dis-

solving the metals into solution, then recovering the target metals out of solution. "Microbes can be used for both processes, but the current project will focus on the first one," says Dr Kaksonen.

"At the moment, the first step is usually done using conventional hydrometallurgy, which uses strong chemical acids, or cyanide in the case of gold, but this results in a toxic waste-stream."

Pyrometallurgy – using the high temperatures in smelters to recover metals from PCBs – is another approach to metals recovery from PCBs that is widely used overseas. However, smelters require significant capital investment and continuous, high-volume feedstock. This makes them economically viable in countries like Japan or in Europe, but not Australia. Pyrometallurgy is also energy-intensive and produces toxic emissions such as dioxin.

Sourcing the e-waste 'ore'

CSIRO's commercial partner in the research is Total Green Recycling (TGR), established in 2008 in Perth by brothers James and Michael Coghill. James Coghill says while TGR always encourages 'second-life' reuse of electronic equipment (his company offers data-scrubbing services to customers), it has also developed a production line of manual and automated processes for sorting and separating e-waste into component materials for decontamination, onselling to manufacturers, or further processing. TGR was also awarded a New Industries Fund grant to create a mobile e-waste recovery centre in a shipping container, which could be moved between different municipalities and events – further lowering the recycling barrier, says Mr Coghill, for people and businesses wanting to dispose of unwanted technology conveniently, securely and cleanly.

TGR is supplying the CSIRO researchers with shredded, size-reduced PCBs, which will be used to bioleach metals with bacterial catalysts. "So the innovation will be in identifying the most effective microbes, solutions and flow-sheet of unit processes that give the best result," says Dr Kaksonen.

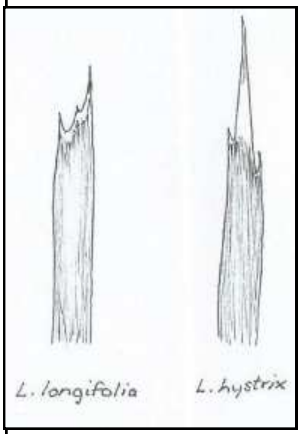
Scalability and the prospect of urban mining

The CSIRO research will run for a year, and Dr Kaksonen hopes a successful outcome will lead to a subsequent project to scale-up and assess the economic feasibility of the process, in terms of cost versus the value of metals recovered. "The e-waste flows in Australia are comparatively small by volume," she says. "So the question is, will biomining PCBs be economical in Australia, with its smaller-scale waste recycling sector? The concentration of metals in e-waste can be higher than in ore bodies. For example, there is up to 100 times more gold in a tonne of mobile phones than in a tonne of gold ore. That's why some people refer to biomining e-waste as 'urban mining'."

Mr Coghill thinks a local e-waste biomining would give Australia "more capability and create more jobs". "We would be more resilient as a country, should supply chains be disrupted as they were during COVID."

Mat rushes – Lomandra spp.

There are five species of Lomandra listed as occurring on Mt Coot-tha, *L. confertifolia* (pale mat rush), *L. filiformis* (wattle mat rush), *L. gracilis* (a mat rush), *L. longifolia* (longleaf mat rush) and *L. multiflora* (many flowered mat rush). Best known of these is the longleaf mat rush, which lives up to its name, with leaves up to 130 cm long, other species mostly having much shorter leaves. I was surprised to find that my list for Mt Coot-tha (published by BCC 2003) did not include *Lomandra hystrix*, commonly found along creeks in the vicinity of Mt Coot-tha. In the book 'Mangroves to Mountains', it has the common name creek mat rush. It can only be assumed that the upper creek systems of Mt Coot-tha are too dry for *L. hystrix*, although the species thrives downstream. Superficially *L. longifolia* and *L. hystrix* are quite similar, although, as shown in Gillian's drawing (left), the former has truncate leaf tips whereas in the latter, which has leaves to 150 cm long, the leaf tip is extended into a longish point, generally with a small tooth on either side. There are differences in branching patterns in the flower heads, too. Gillian's other drawing (right) shows a fruiting head of long leaf mat rush.



All the mat rushes have male and female plants, which are not markedly different in the creek and longleaf mat rush. My copy of 'Flora of South-eastern Queensland, Vol 3' published 1989 and the Mt Coot-tha Forest Management Plan (BCC 2003), include the genus in the family Xanthorrhoeaceae, along with grass trees, but in more recent publications the genus has been transferred to the Laxmanniaceae. Long leaf mat rush is widely distributed in eastern Australia from northern Cape York to southern Tasmania and creek mat rush from NEQ to central coastal and subcoastal districts of NSW.

THECA DIARY DATES

May 2021 — July 2021

(for further information on THECA activities ring 3878 5088 or visit www.theca.asn.au or our Facebook page)

MAY 2021

Saturday 1	**Mother-of-Millions Club** at The Hut, 8.30am. Contact Margaret on 0409 012 082
Sunday 2	**Hilltopping Bushcare and Butterfly Survey** - Reservoir Trail, Mt Coot-tha, 8.30am. Contact Justin on 0423 105 284 prior to attending.
Wednesday 26	**THECA monthly meeting** at The Hut 7.30. Talk by David Viano, CSIRO, on hydrogen fuel
Saturday 29	**Birdwalk** - Anstead Reserve, Hawkesbury Road, Anstead, (UBD 195 P4) at 7.30 am. Contact is Dawn on 3870 8076 or 0438 708 076. No bookings required. Ring if weather bad.

JUNE 2021

Saturday 5	Mother-of-Millions Club at The Hut, 8.30am. Contact Margaret on 0409 012 082
Sunday 6	**Hilltopping Bushcare and Butterfly Survey** - Reservoir Trail, Mt Coot-tha, 8.30am. Contact Justin on 0423 105 284 prior to attending.
Wednesday 23	**THECA monthly meeting** at The Hut 7.30. Talk by Alan Tonks on Mt Coot-tha WW2 Heritage
Saturday 26	**Birdwalk Gold Creek Reservoir, end of Gold Creek Road, Brookfield (UBD 136 L14)** at **7.30 am**. Contact is Dawn on 3870 8076 or 0438 708 076. No bookings required. Ring if weather bad.

JULY 2021

Saturday 3	**Mother-of-Millions Club** at The Hut, 8.30am. Contact Margaret on 0409 012 082
Sunday 4	**Hilltopping Bushcare and Butterfly Survey** - Reservoir Trail, Mt Coot-tha, 8.30am. Contact Justin on 0423 105 284 prior to attending.
Saturday 24	**Birdwalk** Mt Ommaney Boardwalk (enter from the Westlake Drive end, cnr Summit Place) (UBD 197 G4) Contact Dawn 3870 8076 or 0438 708 076. No bookings required. Ring if weather bad.
Wednesday 28	**THECA monthly meeting** at The Hut 7.30. Talk by Justin Watson (tbc)

The **Wandering Weeders** meet every Monday and Wednesday morning at the Hut. Phone 3378 3763 for details.

The **Australian Native Bee Association, Brisbane Branch** meets on the first Sunday of every month except January from 1-3 pm at the Hut. Contact Tim Heard on tim@sugarbag.net, 0434 416 053. No need to book.

THECA: The Hut Environmental and Community Association Inc.
THECA news: Vol. 23, Part 2 May 2021

THECA welcomes new members. Fees are: Individual - $25; Concession - $20; Family - $40.

THECA Management Committee

President	Greg Siepen
Vice-President	Justin Watson
Secretary	Margaret Palmer
Treasurer	Ian Ferguson
Jocelyne Bridier	Christine Zupanc
Charles Worringham	Maria Miller

Management Committee meetings are held on the second Wednesday of each month. Please contact the President or Secretary if you have any issues or items you wish the committee to discuss.

BRISBANE CITY

Dedicated to a better Brisbane

This project is proudly supported by the Brisbane City Council.

Please send contributions to the next issue of this newsletter to:
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Kenmore, 4069.
Email: info@theca.asn.au or margaretpalmer8@bigpond.com

Copy date for next issue is Wednesday 7 July 2021

This newsletter is printed on 100% recycled paper by
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COMMUNITY HALL FOR HIRE

The Hut at 47 Fleming Road, Chapel Hill is available for workshops, lectures and classes held by community groups. Facilities include off-street parking, seating capacity of 40, modern kitchen with hot water, fridge and microwave, attractive open veranda, toilets and wheelchair accessibility. For bookings please phone THECA on 3878 5088 or email info@theca.asn.au.