Meetings are generally held on the second Wednesday of every month, commencing at 7:45 PM, in Blue 1.54 (Business Faculty Building) on the Casuarina Campus of Charles Darwin University.

Subscriptions are on a financial-year basis and are: Families/Institutional - $30; Singles - $25; Concessions - $15. Discounts are available for new members – please contact us.

Brahminy Kite *Haliastur indus* is seen from India (where it is considered as the contemporary representation of Garuda, the sacred bird of Vishnu!) through to the Solomons, including n. Australia. They are commonly seen around suburban Darwin. Our March guest speaker Will Riddell will give us an update on what these and some of our other Darwin suburban raptors get up to. Photo by Will Riddell.

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Club activities

March meeting.  Wednesday March 12, 7:45 PM.  Blue 1.54 (Business Bldg.), CDU Casuarina.

Darwin suburban Raptors

Presented by Will Riddell

Will Riddell works as an Environmental Scientists at EcOz Environmental Services consultancy. After completing his tertiary studies in Melbourne Will returned to the Northern Territory in 2008 where he landed a job working for a forestry company on the Tiwi Islands. This is where his general interest in wildlife turned into a full-blown passion for birds of prey. Part of Will’s job as an environmental officer on Melville Island involved monitoring of Red Goshawk and the Tiwi island subspecies of Masked Owl, and his interest in raptors has developed from there.

Since returning to full-time work in Darwin Will has substituted the thrill of monitoring Red Goshawks on the Tiwi Islands by watching raptors around Darwin. These observations have revealed a healthy breeding population of raptors in Darwin suburbia, including Brown Goshawk Accipiter fasciatus, Grey Goshawk Accipiter novae-hollandiae, Brahminy Kite Haliastur indus and Barking Owl Ninox connivens. Will’s observations in Darwin have resulted in five publications in Australian Field Ornithology, including one on double-brooding by Brown Goshawk and another on the juvenile plumage of Grey Goshawk in tropical Australia.

This presentation will look at aspects of breeding ecology of urban dwelling raptors within Darwin, including population sizes, inter-nest distances, nesting trees and prey items. Factors that contribute to the healthy raptor population in Darwin include extensive wildlife corridors that provide habitat connectivity, abundance of prey items and the prevalence of the introduced African Mahogany Khaya senegalensis tree, a favoured nest tree of several raptor species due to large size, shade and extensive branching. Understanding the factors that contribute to raptor breeding success can provide guidance to urban planners and managers on how to manage expansion in similar-sized cities in a manner sensitive to the habitat requirement of urban raptors.

Above: A typical suburban raptor scene – a Grey Goshawk sitting on a household TV antenna (Will Riddell)

March field trip: Sunday 16 - 8.15 AM
Holmes Jungle - exploring the Crocodylus Park end.

Holmes Jungle Nature Park is teeming with life at the moment, birds, insects and wild flowers. This is the perfect opportunity to explore the rarely visited Crocodylus Park side of the reserve. We’ll follow the fence line down to the headwaters of Palm Creek, flowing freely at this time of year and bordered by thick stands of rushes. Then we’ll continue along a scenic track tracing the edge of the monsoon forest before looping through a few more habitats on our way back. Please come suitably dressed for walking through small patches of spear grass that have over run sections of the path.

Meet at the big white gate where the park fence meets Crocodylus Park near the roundabout of Vanderlin Drive and McMillians Road. Access is via Vanderlin Drive - you will be able to pull off the road approximately two or three hundred metres north of the roundabout. Contact Tissa on 8921 8226 if you would like more information.
Club notices

Thank you: The previous issue was proof-read by Kim Rawsthorne and collated and mailed by Laurie Barrand. It was printed using equipment kindly made available by Delia Lawrie MLA at her Karama electoral office.

Welcome: The club welcomes new members Bernard Crow, Andrew & Helen Spiers, Kate Boyd & Ben Humphrey and Miguel Bedoya-Pérez.

Need a Club membership form? Go to: http://sites.google.com/site/ntfieldnaturalists/downloads.

Newsletter contributions welcome: Sightings, reports, travelogues, reviews, photographs, sketches, news, comments, opinions, theories ....., anything relevant to natural history. Please forward material to Tissa at tissa@imprintdesign.com.au or the Club’s postal address, or contact him on 8921 8226.

Deadline for the April newsletter: Friday 21 March.

Club library: The Club’s journal and book collection is available to members. Lists of holdings can be found on our web-site: http://sites.google.com/site/ntfieldnaturalists/library. The library is housed in two sections:

Books, reports and CDs: can be accessed by contacting Peter Ebsworth on 0437 278 799.

Journals: in the office of Stuart Young at the Biodiversity Unit at Berrimah. These can be accessed by ringing Stuart on 8995 5026 (w).

Leanyer Ponds: Access to Leanyer Ponds is generally available after induction through PAWC. To commence the induction process go to www.rapidinduct.com.au/powerwater/waterservices. A key to the ponds may be obtained on payment of a $50 deposit. Only those who have undertaken the induction and signed an indemnity can enter Leanyer Ponds.

Note that the Leanyer Ponds are currently temporarily closed due to high rainfall.

Bryan Baker has keys for the Alice Springs Sewage Ponds, available for collection in Darwin by members before they head south. Bryan can be reached in Darwin on 8948 2196.

Northern Territory Naturalist: The Editorial Committee of the Club’s journal, the Northern Territory Naturalist, is moving through final editing of issue no. 25. The journal publishes works concerning any aspect of the natural history and ecology of the Northern Territory or adjacent northern Australia, and may include Reviews, Research Articles, Short Notes, Species Profiles and Book Reviews.

The Northern Territory Naturalist is a registered, peer-reviewed journal (ISSN 0155-4093). Author instructions may be downloaded from our web-site: http://sites.google.com/site/ntfieldnaturalists/journal.

If possible, manuscripts should be submitted in digital form by email to richard.willan@nt.gov.au. Manuscript editors are Drs Richard Willan, Anke Frank and Sean Bellairs. Louis Elliott is the production editor.

Originals are available of most back issues, some are available as photocopies only, and several recent issues are out-of-print but individual papers are available as pdfs. The journal page of the Club’s web-site has an order form for back issues. Free pdfs of papers from issue 18 (2005) onwards are available from the authors or by contacting Lou Elliott, email louis.elliott@nt.gov.au.

Top End Native Plant Society General meetings are held on the 3rd Thursday of the month at the Marrara Christian College, corner Amy Johnson Ave. and McMills Road, and commence at 7:30 PM (speaker at 8 PM). Visit http://www.topendnativeplants.org.au/index.php or contact Russell Dempster on 8983 2131.

Nature Territory, March 2014
Ian Morris gave a great talk showing the links between the flora and fauna in the lands surrounding the current Gulf of Carpentaria. Ian showed how many of the species we see today in Cape York, New Guinea and the Top End are the same or closely associated.

Between 12,000 and 55,000 years ago, the Gulf of Carpentaria was a large (~30,000km²) inland lake. With the Torres Strait islands above the water and forming a ridge of land between Cape York Peninsula and New Guinea; Lake Carpentaria was protected from the sea to the east and with sea levels 53m below present levels the lake would have provided a freshwater aquatic link via the many rivers flowing into it from all sides. Marine incursion started to occur around 11,000 years ago and the current Gulf environment was stable around 5,000 years ago.

Ian showed how much of the flora and fauna in the Top End and New Guinea are so very alike and often difficult to distinguish. Freshwater species which could not move between these areas in the current environment can be found all around the Gulf showing that there was a link between the freshwater rivers feeding into Lake Carpentaria and species moved between areas using these water courses. This could also explain the land dwellers which moved back onto the drier land as the lake was inundated by the sea’s incursion.

Mapping of the seabed of the Gulf of Carpentaria shows the old stream beds and depression of the lake.

Photos from southern New Guinea compared with Arnhem Land are difficult to tell apart in the look and plants found in both areas. Some examples of similar or the same species to be found are the *Cycas papuana* and our *Cycas armstrongii*; *Eucalyptus confertiflora* found in PNG and NT; *Pandanus spiralis*; *Neptunia sp.*; the Pig Nosed Turtle found in the Daly and Fly Rivers; the *Varanus similis*; *Litoria nasuta*; *Litoria rubella*; Macleay’s Glassfish (*Ambassis macleayi*) and of course the friendly saltie. This talk showed the importance of taking a longer view and the value in not just seeing the forests from the trees but the history that allowed that growth to occur.

Images: Top – the paleogeography of Lake Carpentaria showing land/sea/lake borders old and new; left – a cycad comparison showing NT and PNG species; above – Pig-nosed turtles exist on both sides of the current Gulf of Carpentaria. Images all courtesy of Ian Morris
Excursion to East Point Reserve  
Trip report 16 February 2014  
by John Rawstorne

On Sunday 16 February a healthy-sized group of Field Natters met at Peewees to explore East Point Reserve. This reserve has had a long and varied history, including military base, golf course and now regenerating suburban wildlife mecca. See Don Franklin and colleagues’ excellent article in NT Naturalist 2010 edition for more detail of the history of this peninsula.

The particular focus of the February walk was to explore the monsoon forest areas of the reserve, including an area that has never been cleared and other areas that have regenerated from scratch over the last 40 years.

Different members of the group had different expertise and interests, and so moved at different speeds through the walk, and I must admit to losing touch with the group for the last half of the walk, so engrossed was I in the birds and bird photography.

However based on the photos that emerged, it appears that the bulk of the group managed to dodge the hordes of orienteers and mountain bikers and had a lovely time examining fungi, insects and plants and generally enjoying the wonderfully varied (and well patronised) place that is East Point Reserve.

Images: Above and left - An array of plants, fungi, insects and birds on show at East Point. Why do birds always show their left side in photos? Bird images John Rawstorne; other images Natalie Davis.

Below – a typical old-growth monsoon forest scene, with leaf litter base, open understory and closed canopy; image via NTFN facebook
Birds and fire in the tropical savanna


Reviewed by Don Franklin

We all know that something’s going sadly wrong with our savanna management – and that fire is a key part of the story. But what is wrong? Too much fire? Too little? Wrong timing and intensity? Wrong spatial scale? And how should we correct it? These questions have challenged and perplexed field naturalists, researchers and land managers for decades. That perplexity isn’t about to disappear anytime soon, but this major review by John Woinarski and Sarah Legge should help focus our thinking, our management and our research. It is a key contribution to the topic.

From the very first sentence, the authors make it clear that they’re addressing the perceived problem of too much fire. Their conclusions and recommendations are clearly directed to this end. The review purports to address the entire tropical savanna region, whereas the earliest and most severe biodiversity declines in northern Australia have occurred in areas from which fire has long been largely excluded by pastoral management – but that is another (complicated!) story. The issues at stake within the more restricted context are real and serious, but the distinction between frequently and infrequently burnt regions is not clearly spelt out and is potentially misleading.

A major part of our perplexity over the impacts of fire arises because the avifauna (and vegetation) has a long history, extending to evolutionary time scales, of living with fire, so the impacts of one fire regime compared to another may accrete slowly or even be not at all evident until a threshold is crossed. The authors illustrate this with the species that has been best studied to identify some of the subtleties – the Red-backed Fairy-wren. Most fairy-wrens survive fires, even severe fires. For the remainder of the dry season, they spend a lot of time in remaining unburnt areas. If a fire is intense and extensive, parties may have to move long distances and perhaps compete for remaining unburnt habitat. Parties subject to late dry season fires produced fewer young in the following breeding season than those subject to early dry season fires. Of course, it isn’t one fire that the fairy-wrens have to live with nor its impact on a single party that ultimately matters, but a regime of fires over years that has a cumulative impact on a population. It isn’t so hard to imagine a threshold to fire frequency/extent/intensity below which the population may thrive but above which it may be restrained and even pushed to local extinction.

The issue comes into sharper focus when one appraises the nature of threats to the listed threatened birds of northern Australia (Table 1 in the review). For most such species, current fire regimes are evaluated as threatening, often severely so, and for most of these the issue is that fire is too frequent, too intense or at too coarse a scale of patchiness (the Golden-shouldered Parrot of Cape York Peninsula is an exception; threatened by too little fire ± fire at the wrong time of year).

The review begins with extensive background material: the nature of our savannas and of our birds and bird assemblages; fire including its nature, it’s regional history and its interaction with other processes; and the paradigms (ways of thinking about the problem) through which we view it. The available paradigms are contradictory, contested and none is strongly supported by an evidence base. The authors list eight such paradigms, here paraphrased and somewhat re-organised:

- different species need different fire regimes so we should provide a diversity of fire regimes to cater for all; as a specific variation, species prefer vegetation of particular age since fire;
- fire inhibits vegetation types other than savanna that are important for biodiversity (e.g. monsoon rainforest), so we should release pressure on those types;
- the landscapes of northern Australia have been managed skillfully for 50 000 years by Indigenous fire management so any current biodiversity decline may be best addressed by reversion to such practice;
the abundance of annual spear-grass is an ecological trap generated by the cessation of Indigenous fire management which requires extensive wet-season burning to correct;

fire in this landscape is pervasive and natural, and thus biodiversity elements in general are immune to its consequences (and don’t bother trying to exclude fire as this allows fuels to accumulate so fires will then be more severe); and

if we manage for focal species that are threatened or are important for ecosystem maintenance, other species will be fine.

Which one (or more) do you subscribe to?

The authors then proceed to review impacts of fire on birds, first setting a framework of time-scales: surviving the fire, surviving (or taking advantage of) the aftermath, and medium-term (c. 2-10 years) and long-term responses of populations to fire regimes. They then review the nature of research to address impacts, pointing out its considerable limitations as well as its key findings; this includes a list (Table 3) of all relevant studies of bird assemblages in the savannas of northern Australia and their findings. Perhaps unsurprisingly, the impact of fire on bird assemblages is that there are winners and losers. The nature of the losers is key and evaluated in a review of studies of individual species: grass-dwellers, seed-eaters, hollow-nesters, fruit-eaters and shrub-dwellers. Further context is provided by review of in impact of fire on birds in tropical savannas overseas, on birds elsewhere in Australia, and on other fauna in our tropical savannas.

The key conclusion is that most of the species that are adversely affected by frequent, extensive or high-intensity fires “have specific habitat requirements that are subverted by prevailing fire regimes”. These habitat needs include:

- burnt (in some cases, long-unburnt) vegetation (e.g. grass-wrens);
- fire-sensitive vegetation (e.g. Purple-crowned Fairy-wren, frugivorous birds);
- a variety of grasses in a spectrum of ages (e.g. Gouldian Finch); and
- tree hollows for nesting (e.g. Black Treecreeper),

the authors emphasizing that the area, scale of patchiness and connectivity of these requirements needs to be sufficient to support species, not just individuals, and to enable individuals of mobile species to connect between patches.

The authors then propose a series of monitorable management targets that relate to retention of unburnt areas, the size of individual fires, and the retention of understory shrubs, fire-sensitive vegetation and populations of select hollow-nesting, ground-nesting and granivorous birds. Finally, the authors suggest how further research may be focussed to facilitate better management.

Can we manage fire in our savannas better? I hope so; this review provides a focus for possibilities.

**Literature reviews cont. from p11**

**Past and future monsoon**

Zhang *et al.* (2013) have modelled the summer monsoon which starts in the tropical region of south Sumatra and Java in late November and approaches northern Australian in December. The ‘Australian summer monsoon’ brings much of our wet season rain and so it is of interest to know what the effect of global warming might be, and various models have been used to estimate how this weather system will respond. Based on their ‘CMIP3’ analysis, Zhang *et al.* (2013) suggest that in the Top End there will be a delayed monsoon onset and shortened duration of the monsoon by c.10 days. For inland areas there was less congruence in the models, and the time of monsoon retreat was also not consistent. As noted by Reeves *et al.* (2013), ‘The tropics are the major source of heat and moisture for the Australasian region’, so that the summer monsoon influences the climate of the northern arid zone, but also the entire continent. These authors examined climate in tropical Australia during the past 30 000 years, based on ice-core, marine and terrestrial climate proxy data. The period extends from the drier Last Glacial Maximum, through the age of rising sea levels and flooding of the Sunda Shelf, to the relatively wet period of today with the variability imposed by the El Niño-Southern Oscillation (ENSO).
Scientists funded by the National Environmental Research Program are attempting to quantify the role of feral cats in the decline of native animals across northern Australia.

Two sites, each roughly the size of 50 football fields (64 hectares), have been fenced off in Kakadu National Park near Kapalga to test whether native numbers bounce back when cats are excluded. The fences have specially designed floppy tops to keep cats out, and an array of motion sensor cameras to monitor the perimeter and native animals inside the exclosures.

Northern Territory Government scientist Graeme Gillespie said the opening of the experiment marked a historic moment in the battle to protect Australia’s native species, many of which are in the midst of an extinction crisis.

“A 2012 assessment lists 17 mammal species extinct in the wild in the Northern Territory and a further 100 animal species as threatened,” Dr Gillespie said.

“We know that feral cats are highly effective hunters that eat a very wide range of prey including insects, reptiles, birds and mammals. Stomach content analysis has revealed a feral cat can eat up to 30 animals in one night.”

Volunteers from the NT Field Naturalists and Charles Darwin University joined Dr Gillespie and his team, Parks Australia staff and Traditional Owners in Kakadu on December 5 last year to herd larger animals out of the site and seal off the fence. The sites and camera data are now being regularly checked.

*Pics: Remote monitoring shows up a cat (top) and a Northern Bandicoot (bottom), images courtesy Northern Australian Hub - NERP.*
Left: Volunteers for the wallaby drive set off on a cool early wet season morning. Below: the cleared fence line. The design of the fence can be seen in the two images: about 2m high rigid chicken wire fencing with a curled over “floppy top” stayed by heavy gauge wire to stop animals climbing in (the floppy top hangs towards the outside of the enclosure). The base of the fence has a mesh floor on both sides to stop the more determined diggers. The chicken wire allows smaller mammals to move in and out of the exclosure, but larger critters, and in particular cats, cannot pass through. Images top Northern Australian Hub – NERP; bottom John Rawsthorne.

Charles Darwin University hosts the Northern Australia hub of the National Environmental Research Program, which has secured $14.7m from the Australian Government and nearly $16m from partner organisations over four years. The hub is led by Professor Michael Douglas and aims to improve biodiversity conservation across northern Australia.

For more information about the hub’s 16 research projects, go to www.nerpnorthern.edu.au

Literature reviews cont. from p11

**Arafura Sea sediment**

According to Alongi et al. (2013) 'The Arafura and Timor Seas are a crucial link between the Indian and Pacific Oceans and play a vital role in global ocean circulation and climate.' Four countries border these seas: Indonesia, Timor-Leste (East Timor, Timor-Lorosa’e), Papua New Guinea and Australia. The seas mostly overlie shallow continental shelf, so that the waters are generally less than 200 m deep, although the Timor Trough (between Australia and Timor) drops to a depth of 3 000 metres. Rivers transport sediment (and associated nutrients and pollutants) from the land to the ocean, and the authors found that ‘The edge of the Australian continental shelf and slope receives riverine sediment from Asia as isotopes suggest a mixing of sediment sources, with some overlap between the Australian and non-Australian material, including evidence of significant input of volcanic material from Indonesia.’ Much of the sediment comes from northern Australia but over half is from New Guinea. Although a fairly minor contribution, the rate of sediment transport from the island of Timor is relatively high due to ‘very high rates of deforestation and land degradation’ compared to the sparsely populated Top End.
Interesting bird sightings

22 January to 28 February 2014

Compiled by Micha Jackson and Peter Kyne

Sightings are as reported (unvetted, unconfirmed) and have been compiled from emails sent to the NT Birds forum (http://groups.yahoo.com/group/ntbirds) moderated by Niven McCrie, postings on Birdline Northern Territory (http://www.eremaea.com/) and from correspondences with birdwatchers. Bird names follow the IOC world checklist.

<table>
<thead>
<tr>
<th>Species</th>
<th>Date</th>
<th>Location</th>
<th>Observer/s</th>
<th>Numbers/comments</th>
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<tbody>
<tr>
<td>Bridled Tern</td>
<td>4/2/14</td>
<td>Stokes Hill Wharf, Darwin</td>
<td>Marc Gardner</td>
<td>14</td>
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<tr>
<td>Bridled Tern</td>
<td>6/2/14</td>
<td>Nightcliff</td>
<td>John Rawsthorne</td>
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<td>Broad-billed Sandpiper</td>
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<td>Leanyer Sewage Ponds</td>
<td>Amanda Lilleyman</td>
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<td>Brown Noddy</td>
<td>1/2/14</td>
<td>CDU, Casuarina</td>
<td>Micha Jackson</td>
<td>1; taken into care</td>
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<td>Christmas Frigatebird</td>
<td>31/1/14</td>
<td>Nightcliff</td>
<td>Tom McCrie</td>
<td>1 juvenile; 2nd NT record</td>
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<tr>
<td>Christmas Frigatebird</td>
<td>6/2/14</td>
<td>Nightcliff</td>
<td>Tom Raynor</td>
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<td>Mick Jerram</td>
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<td>Fiona Douglas</td>
<td>30+; &amp; subsequent dates</td>
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<td>South Alligator River ranger stn</td>
<td>Peter Kyne</td>
<td>1 male</td>
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<td>South Alligator R. boat ramp</td>
<td>Peter Kyne</td>
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<td>Red Phalarope</td>
<td>22/1/14</td>
<td>Leanyer Sewage Ponds</td>
<td>Many observers</td>
<td>1st NT record; first found 21/01; last seen 10/02</td>
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<td>5/2/14</td>
<td>Leanyer Sewage Ponds</td>
<td>Andrew Bell &amp; Clive Curson</td>
<td>7; 11 on 7/2; 16 on 8/2; 5th NT record</td>
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<td>6/2/14</td>
<td>Galiwinku, Elcho Island</td>
<td>Tim Wethers</td>
<td>2nd Aust rec.; 1st NT rec.</td>
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<td>Amanda Lilleyman et al.</td>
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<td>Mike Jarvis et al.</td>
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<td>Buff-sided Robin</td>
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<td>Rocky Ck boat ramp, Borroloola</td>
<td>Marc Gardner</td>
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Above: Lovely day for a chat; excursionistas enjoying the sun at East Point during the February walk. Photo by Laurie Barrand

Nature Territory, March 2014
Geology & geomorphology


Hydrology


Palaeoclimate


Reeves JM, Bostock HC, *et al*. 2013. Palaeoenvironmental change in tropical Australasia over the last 30,000 years – a synthesis by the OZ-INTIMATE group. *Quaternary Science Reviews* 74: 97-114. [ITCZ & sea surface temperatures]


Monsoon


Sea level rise

Australia is relatively tectonically stable (few earthquakes and no volcanos), hence the coastal margins are fairly constant and are thus good places to look for evidence of eustatic (sea level) changes without the confusing influence of changes in the height of the land surface. Evidence for sea level change since the Last Glacial Maximum (LGM) comes from a variety of sources, including erosional features along the coast, drowned coral reefs, coral microatolls, underwaet ‘stratigraphical sequences of sedimentary facies’, mangrove deposits and beachrock. Lewis et al. (2013) combine the evidence to generate curves of sea-level change over the past 17 000 years. At the lowest point sea levels were about 120 metres below present, so you could have walked out to Melville Island instead of taking the ferry, and Darwin Harbour would have been Darwin River. According to the various models there was a steep rise in sea level from 15 000 to 7 000 years ago, when it reached a similar level to today (it may have been slightly higher for a while). Recent invasion of the sea along the coastline around Darwin due to onshore winds combined with high tides indicate the kinds of erosional changes that can happen. It must have been a strange sight 10 000 years ago as sea levels rose and invaded the terrestrial environment. However, it might not have been particularly noticeable in the span of a human lifetime, as by my calculation the rise would have been over 1 cm per year. Estimates of current sea level rise are about 2 mm per year.