ESSAY NO. 2

# NOTES FROM THE FIELD

**Fiona Gruber** 

Fiona Gruber follows Sonia Leber and David Chesworth on a journey of deep time investigation.

As they drive south from Darwin, geomorphologist Tim Cohen tells Sonia and David various facts. That the landscape they're looking at is much the same as it would have been one hundred and thirty thousand years ago. That, long before humans arrived over sixty-five thousand years ago, the continent's mountains were already worn down and much of the ancient soils were leached and parched. And that today these rocks and hills erode at a rate of one millimetre per thousand years, one of the slowest rates in the world.

Tim is the Australian Research Council Centre of Excellence for Australian Biodiversity and Heritage (CABAH) Climate Theme Leader. Researching deep time climate cycles can take you to some harsh environments.

The bitumen flies past at 140 kilometres per hour. It's a seven-hour journey, and the view grows increasingly arid. Tim explains that in the last Ice Age, during the glacial maximum about twenty thousand years ago, the mainland climate grew colder and drier and Australia was covered in giant sand dunes. The seas were 125 metres lower than today but, unlike in other parts of the world, there was never glaciation to shape the valleys and grind the rocks.

And that, because our soil is so inert, the single greatest source of erosion is ants and termites.

The trees are really spindly now and the earth more parched. Black kites patrol the sky.

Lake Woods, their destination, is 660 kilometres inland, near the small settlement of Elliot. But this isn't a lake in the conventional sense of the word.

Screen One:	An ancient escarpment thinly covered in
	sclerotic trees.
Screen Two:	Fissures in the rock. A voice tells us:
	'The sediment is waiting.'

Sometimes the two screens are in dialogue; sometimes they juxtapose disjunctions or uncanny connections.

Tim is researching the deep past of an ephemeral wetland with plenty of backstory. Lake Woods is a freshwater terminal system of Newcastle Waters Creek, with a long history of cyclical, hydraulic changes reaching back to the Pleistocene epoch, 2,580,000 to 11,700 years ago. Today its size rarely exceeds 500 square kilometres, but at various stages in the past it has been much bigger, a mega lake ten times as large. Even recently, in 1974, a spectacular rainy season filled the lake to 2,392 square kilometres.

But now it's dry. Bone dry.

Screen One:	Red-tailed black cockatoos watch from the
	treetops.
Screen Two:	Scientists, like industrious ants, excavate the
	soil of an ancient shoreline.

Both birds and diggers are listening, both are gathering information. Not all viewpoints are human, suggests the artwork. Humans may not be the top of the hierarchy. There may not be a hierarchy.

> The dryness is par for the course, explains Tim. There are very few permanent lakes in Australia; the rate of evaporation is usually higher than the rainfall, which is seasonal. At Lake Woods the rate is five parts evaporation to one part rainfall.

For many months of the year, or for years at a stretch, lakes are basins waiting to be filled.

The first thing Sonia and David notice is the unceasing aridity. It's something you feel on the skin, it's a lack of moisture that irritates the eyes and it's accompanied by the continuous presence of flies that drone in your ears, crawl up your nose, stick to your back.

But despite the dryness this is a place teeming with certain lifeforms. Plants push through the cracks, birds perch on dead tree branches, lizards flick among the rocks, those ants and termites move mountains.

Screen One: An aerial shot reveals scars on the earth's surface; these swirls and snaking incisions are environmental hieroglyphs. They are not dissimilar to a sand painting.
Screen Two: In the middle distance a man on a path, intoning. He is exhorting the spirits to keep faith with the land.

Different scales in time and in distance.

Marlinja man Ray Dimakarri Dixon walks among the desiccated trees. 'We have scientists working here on Country,' he tells the spirits. 'We want you spirits to stay and look after Country.'

He approaches one of the core sample pits, an incongruous rectangle in a land where everything curves.

Ray shows Sonia and David his Country. He's an artist himself, a creator of sand paintings and songs—he brought out a CD in 2019 songs about protecting this sacred place.

Nayinyi kirda Nyaunya kirda Bali kurdij kayna Bali kurdij yangala Nginyaka ngurra ...

My father your mother My ancestors your ancestors They have stood together As one for their land ...<sup>1</sup>

The land is not timeless. Cattle hooves churn its fossil soils. Commercial fracking explorations could disturb the precious aquifers. Climate change affects rainfall and salinity.

'Sense the signal.'

The disembodied and ambiguous voice urges us to both feel and to investigate, and to imbue investigation with feeling. What is this voice? It observes, it exhorts, but it doesn't explain. Is it even human? It's a provocation.

The metallic clicks and whining hums could be the machine talking to the earth, the dreams of ants, the chinking cadence of the coring tube being hammered through the red soil.

It's about sensing the world in a non-human way.

If you are human, how you read signs depends on your cultural framework, and what you're looking for. For Tim and his team, it's evidence of ancient climate changes that will inform the present and future.

For Ray and other Indigenous Traditional Owners, the land tells the story of a creation that is still going on and supports a community that has been here, as far as they are concerned, forever.

For Sonia and David, this is a story about the human desire to understand the world, to go into the environment, to experience it, to get to know it through various means. They are part of the story, as with all their work. It's participant observation, one where you land lightly, with a

<sup>1.</sup> Ray Dimakarri Dixon, 'Barlawa Kurdij Karrdi' in *Standing Strong: Mudburra Man* (CD: Finucane & Smith, 2019).

camera, some sound equipment and a couple of laptops. Modern tools for an ancient story. Screen One: The stone-cutting tool, known as a Leilira blade, lies on the quarry floor. Local woman Claudette Albert indicates other blades, scraping tools, grinding stones and offcuts, which litter the ground.

'Quarry, tools, resources,' intones the voice.

For Claudette and her community, this has been a hardware store going back thousands of years. How old are they? So hard to say when they litter the surface. And as Tim observes, the termites and ants mess up the strata. It's a problem as much for archaeologists as it is for those Earth scientists trying to establish the far greater cycles of wet and dry.

## 'Digging. Measuring. Uncover the layer.'

Further north, CABAH's scientists take horizontal cores from the towering banks of Nitmiluk, also known as Katherine Gorge.

This river system has its headwaters in the Arnhem Land Plateau, and the 15-kilometre-long gorge is a corridor of glowing red sandstone with walls 60 to 90 metres high.

Here, scientists can measure both palaeohydrological events and the impact of an annual monsoon cycle that lifts the water levels by 18 metres and turns the river into a roaring torrent.

But now it's the dry season and the river is placid.

Screen One: The towering walls of the gorge. Vision is in dialogue with sound. The rocks fizz, there's an electromagnetic hum, a deep pulse. This is a landscape used to drama.

# 'There they are. Finding locations.'

Finding locations is the hardest part. The ancient soils, the monsoonal north, the evaporation; finding a location with continuous sediment record of climate and environment going back thousands of years is laborious and usually disappointing.

It took two full field seasons in the Northern Territory for CABAH Landscapes Theme Leader Michael Bird to find the Girraween Lagoon. And in the end fieldwork didn't come into it; a friend, flying into Darwin, spotted it from the air—a former sinkhole that had formed about two hundred thousand years ago and filled with water. An expanse of water 1.5 kilometres across, with layers of sediment going down 18 metres from the bed of the lake. 'That's the height of a six-storey building,' says Michael, 'preserved and ready to be analysed.'

Screen One:	A microphone slips through the surface of the
	lagoon.
Screen Two:	A closeup of lily pads and reeds.

The sounds of water are soothing, hopeful. There are many ways of listening, both with technology and with an open mind, the work suggests.

Placid nature turns to human activity. We see a raft assembled in the middle of the blue expanse. Winches, ropes, metal tubes.

Larrakia Ranger Kyle Hunt-Lew Fatt is part of the team assembling the coring mechanism. He grew up in Darwin divorced from traditional lore and customs and joined the Rangers in an attempt to learn about his Country.

'Bush tucker, native animals, native plants, the shoreline. It feels good looking after the country,' he explains. The Rangers conduct

scientific surveys, rid the land of introduced weeds, manage the savannah. He's learning about the traditional Gulumoerrgin (Larrakia) calendar, divided into seven seasons that respond to changes in the weather and plant and animal activity. This traditional cycle is helpful, too, in the analysis of sediment.

Girraween Lagoon is on Larrakia land but it's been part of the European pastoral landscape for decades and Indigenous associations have been erased. The terrain hasn't yielded any archaeological finds yet, though this must have been a highly significant spot for food and for materials to weave baskets and make shelters. A sacred spot, too.

Does deep time ecology evoke awe akin to religiosity? Sonia and David's work frequently hints at the metaphysical.

Today, the lagoon is a place of quotidian adventures, an attraction for weekend fishermen and boaters and, more recently, real estate developers. Its biggest claim to fame is as one of the locations for the 1986 film *Crocodile Dundee*.

Michael points out that in the past thirty years the lagoon has seen far greater change than in the previous two hundred thousand combined.

Screen One:A scientist leans over a microscope examining a<br/>core sample.Screen Two:A heron stretches its elegant neck to inspect the<br/>water's edge.

Both investigating.

Cassandra (Cassie) Rowe is a palaeoecologist, specialising in using pollen and charcoal to reconstruct past environments. Her field

notes list the trees and plants found in the woods and grasslands surrounding the lagoon: Eucalyptus tetradonta, Eucalyptus miniata, Erythrophleum chlorostachys, Melaleuca symphyocarpa, Pandanus spiralis, Banksia dentate, Nymphaea.

Over the past two hundred thousand years the area has cycled through woodland, grassland and forest, depending on rainfall. Much the same flora, in different combinations. And in all that time pollen has been silently falling on the water and sinking to the bottom of the lake.

- Screen One: The coring mechanism on the raft. Metallic, powerful. Scientist Michael Brand steadies the core as it pushes into the deep matter beneath the lakebed. Kyle assists.
- Screen Two: Core samples are lined up in the lab, long segments of sediment, a spectrum of shades from pale beige to black.

Back at the lab, after a four-day drive to Cairns, it's time to crack open the core. 'It's always a time of great anticipation,' says Cassie.

Everything is reflected in this deposition, every variation in monsoon, temperature, bushfires, the era when humans first appeared. Pale means the water level was low, dark means lots of vegetation. At the height of the last glacial maximum the lagoon was 300 kilometres inland. It's currently 30 kilometres from the shore. Each deposition gives tantalising clues to climate cycles over tens of thousands of years, and enables a better reading of more recent climate changes.

Measuring, dating, analysing and imagining. Alongside the instruments and methodology used to build a picture of Lake Woods, Nitmiluk, Girraween Lagoon and other sites,

imagination is a very important tool. It's vital for telling a story rich in detail but maybe not big on drama.

'My big response to the lake and its environment is admiration,' says Cassie. 'All these trials and tests over two hundred thousand years. I admire the savannah's resilience.'

Final screens: The lake from above, a dark blue circle that holds the story of a continent.

Microscope slides, ancient pollen; fire crackling in the trees; hand-drawn pollen charts; ants scurrying across rocks; scientists picking at the soil; sticks casting shadows; shadows lengthening across the vast red plains.

The sediment is waiting.

Fiona Gruber is a journalist, essayist, broadcaster and radio producer who writes and makes documentaries across the arts and sciences. She's written on the arts for many of the major Australian and British newspapers and art journals including *The Australian, Art World Australia, The Guardian* and *The Times Literary Supplement,* and has been a regular contributor to *Cosmos Magazine*. Her work for the Australian Broadcasting Corporation's Radio National includes the ten-part series *Australian Portraits,* profiles of major artists including Sonia Leber and David Chesworth and science documentaries including the 2019 radio feature 'Searching for Doggerland'.











