

# NORTHERN TERRITORY LEGISLATIVE ASSEMBLY

## Parliament

### Northern Territory Parliament

<http://www.nt.gov.au/lant/parliament/nt.shtml>

## Historical Background

The first attempt at European settlement in northern Australia was made in 1824. In 1827 a portion of north Australia extending to the border of Western Australia was included in New South Wales. In 1863 the portion subsequently known as the Northern Territory was annexed by Letters Patent to the colony of South Australia. However, from January 1911, the Territory, with its adjacent islands, was transferred to the Commonwealth by the *Northern Territory Acceptance Act 1910*. One of the conditions of the transfer was that such of the laws of South Australia as were applicable to the Territory at the time of transfer were to continue in force until such time as they were altered or repealed by, or under, any law of the Commonwealth.

At the time of Federation, the Northern Territory was a part of South Australia and was then ceded to the Commonwealth as a Territory. The Commonwealth had responsibility for the administration of the Territory pursuant to the *Northern Territory (Administration) Act 1910* of the Commonwealth.

From 1911 to 1947 the laws of the Territory were made by the Commonwealth Government and Parliament.

In 1947 the *Northern Territory (Administration) Act* was amended to provide for a Territory legislature. The first Legislative Council for the Northern Territory assembled in Darwin in March 1948. It consisted of seven official members appointed by the Governor-General, six elected members and the Administrator as President of the Council.

Further amendments to the Act made the following changes to membership of the Legislative Council:

1959 - six official and three non-official members appointed by the Governor-General, eight elected members and the Administrator as President.

1965 - The Administrator was excluded from membership and the President elected from official and non-official members.

1969 - Non-official members were replaced by elected members.

In 1974 the Legislative Council was replaced by a fully elected Legislative Assembly with nineteen members.

In 1983 the membership of the Assembly was increased to twenty five.

## Self-Government

Self-government was conferred on the Northern Territory on 1 July 1978 by the *Northern Territory (Self-Government) Act 1978* of the Commonwealth.

This Act is effectively the Northern Territory's "constitution". As an Act of the Commonwealth Parliament it is entrenched and is subject to amendment or repeal by that Parliament.

The Northern Territory Parliament became responsible for most state-type functions during the second half of 1979 with the power to legislate for state-type functions except:

- a) matters relating to Aboriginal land;
- b) the mining of uranium;
- c) national parks; and
- d) most matters of industrial relations.

For inter-governmental financial purposes the Northern Territory has been regarded by the Commonwealth as a State since 1 July 1988.



Persons who, pursuant to the Commonwealth *Electoral Act* are qualified to vote at an election for one member to represent the Northern Territory in the House of Representatives of the Commonwealth, are qualified to vote at an election for the Legislative Assembly.

## **Legislative Assembly of the Northern Territory**

The first Legislative Assembly met in the Legislative Assembly Chamber at 2.00pm on Wednesday 20 November 1974 pursuant to a notice signed by the Administrator of the Northern Territory, John Norman Nelson, in exercise of his power conferred by the *Northern Territory (Administration) Act* 1910-1974. According to the notice, the Legislative Assembly was 'to assemble and beholden for the dispatch of diverse urgent and important affairs'.

The term of the Parliament is determined pursuant to section 17(2) of *Northern Territory (Self-Government) Act* 1978 of the Commonwealth which states:

*The period from the first meeting of the Legislative Assembly after a general election of members of the Assembly to the date of the next succeeding general election shall not be more than 4 years.*

## **History of the Site - Parliament House, Darwin**

<http://www.nt.gov.au/lant/parlhouse/history.shtml>

### **Early Settlement**

The site of the Northern Territory's Parliament House has a long history of occupation and development not only in terms relating to the Territory, but also to Australia as a whole.

In February 1869, George Goyder, Surveyor-General of the Colony of South Australia, landed at what is now Darwin Harbour close to the present site of Parliament House. His assignment from the South Australian administration was to establish a settlement to facilitate pastoral expansion for that colony. The group arrived in a coastal barque, the *Moonta*, and comprised 140 people. Mr Goyder named the new settlement "Palmerston", a name that remained until 1911.

The area on which Parliament House is now located was then occupied by approximately 500 Larrakia Aboriginal people.

Before 1863, the Northern Territory was part of the Colony of New South Wales, but in the 1850s when the South Australian Government realised that there was an urgent requirement to identify additional arable land, it was annexed to that Colony.

### **Port Darwin Post and Telegraph Office**

During the latter part of the 19<sup>th</sup> Century, all the Australian colonies agreed that the establishment of a communications system that would connect Australia and London should be accorded high priority. It was envisaged that the communications link would comprise an overland telegraph line from Adelaide which would then be joined to a submarine cable at Palmerston and connected to London.

In November 1871, the 1100 mile submarine cable between Darwin and Banjoewangie in Java was laid. This in turn was connected through Batavia (now Jakarta), Singapore, Europe and London.

At that time, colonial administrators also envisaged that the northern coast of the Northern Territory would be an ideal site to develop a trading point, which would later be connected to southern centres by rail.

The first substantive building in the new settlement of Palmerston was the Port Darwin Post and Telegraphic Office, which was built on this site from locally-quarried porcellanite stone. Around this time, the Government Residence was also constructed and the original section of that building now forms part of the Administrator's Residence, or Government House.

In 1872, the first official overseas telegram was transmitted from Sydney, via Melbourne and through to Adelaide. A courier then brought the telegram from Pine Creek, near Katherine, to the Palmerston Post Office and it was then transmitted to London by way of the submarine cable.



## **Port Darwin Astronomical Observation Pillar**

An event of significant scientific interest occurred in 1882 on the site of what is now "Liberty Square" within the Parliamentary precincts. A group of scientists returning from observation of the transit of Venus in the South Pacific stopped at Darwin with the necessary instruments to set the true longitude for Australian observatories, which resulted in being able to fix Australian Standard Time. It was set at eight hours, 43 minutes and 22.49 seconds from Greenwich. The British Australian Telegraph Company provided a stone plinth and plaque, which became known as the Port Darwin Astronomical Observation Pillar, to mark this important site. This pedestal was removed from its original position some time between the 1940s and the 1970s and could not be located.

In March 2000, Mr Speaker McCarthy hosted a ceremony to unveil a replica of the original plinth and plaque.

The scientists were led by Lieutenant Darwin who was a relative, most likely a nephew, of Charles Darwin in whose honour Darwin is named, although he did not personally visit the settlement.

## **Cyclone of 1897**

On 6 January 1897, Palmerston was ravaged by its first recorded cyclone. Although the Port Darwin Post and Telegraphic Office was not extensively damaged and was used as a shelter for other residents of the settlement, the severe winds and flooding caused a breakdown in communications. Postmaster General installations were badly damaged and the Overland Telegraph wire was down in a number of places.

Repairs were apparently instigated with due haste because, on 9 January 1897, the *Adelaide Register's* correspondent in Palmerston was able to transmit a telegram to his offices to advise of the extent of the damage and the numbers of people who were still unaccounted for.

## **Liberty Square**

Liberty Square was thus named during World War I as it was here that Australian Workers Union members conducted their meetings. Members of the Union protested over the perceived maladministration by the Commonwealth Government's agent in Darwin, Administrator Gilruth. The chief Union organiser was Harold Nelson, who became the first Northern Territory Member in the House of Representatives, as an Independent Member, in 1922.

In 1918, Vestey's Meatworks, the largest employer in the Northern Territory, was closed and this, together with the earlier nationalisation of hotels in Darwin, caused extreme agitation among Union members. The situation culminated on 17 December 1918 when several hundred Union members marched in protest through Darwin and went to Government House to demand the removal of Administrator Gilruth and an investigation into his administration. This event is known as the Darwin Rebellion.

The actions of the Union members resulted in Administrator Gilruth and his family being removed to Melbourne in February 1919.

Liberty Square again became a focal point in Darwin during the 1930s Depression when unemployed labourers gathered to seek work at union rates and protest over the discontinuance of the ration system.

## **World War II**

By the second half of the 1930s, the Darwin Post and Telegraphic Office had expanded and occupied almost an entire block between the new Hotel Darwin and Government House. It included the Post Office proper, the telegraph office, the telephone exchange, cable company offices, stores, staff residences and staff messes. In 1937 the Commonwealth assumed most of the British Australian Telegraph's land and buildings. This action was to facilitate a more efficient postal service that could now be effected through progress in aviation.

As the probability of a second world war became imminent due to Japan's invasion of China and Hitler's occupation of Austria and Czechoslovakia, the Lyons Commonwealth Government announced, in June 1938, that Darwin would be developed as a large military base that would be linked strategically to Singapore. In addition to these preparations for possible enemy attack, it was anticipated that Darwin Post and Telegraph Office would become a focal communications centre should conflict occur.

By the end of 1941, after the bombing of Pearl Harbour, the fall of Singapore and the occupation of Malaya, it seemed inevitable that Australia would be attacked and this would occur most likely from the north. In December 1941 and January 1942, evacuation of women and children to southern centres was undertaken and by February



1942, it was estimated that only about 60 civilian European women and children remained in Darwin. Important administration records and other materials were also relocated to southern centres.

On 19 February 1942, 188 Japanese aircraft were involved in an attack on Darwin, the prime targets being the Darwin Wharf, the naval vessels in Darwin Harbour and, as anticipated, the Darwin Post and Telegraph Office. The official death rate on that day was 243 people with many more being injured. Darwin was to undergo another 63 enemy bombing attacks during the following several months.

Ten people were killed at the Post Office during the first of the raids and the buildings were virtually razed. Those who lost their lives were the Postmaster, Mr Hurtle Bald; his wife, Mrs Alice Bald; their daughter, Miss Iris Bald; Mr Archibald Halls; Mr Arthur Wellington; Miss Jennie Stasinowsky; Misses Jean and Eileen Mullen; and Mrs Emily Young, all of whom were employees of the Postmaster General.

After this raid, the site was abandoned and telegraphic responsibilities were assumed by the Army from a site in Cavenagh Street. The less damaged building of the Post Office complex were used by Naval personnel between 1942 and 1945 and the gutted remains of the original Post Office were used as a temporary repair shop for Northern Territory Administration vehicles.

During the construction and fit-out of the Parliament building, the Speaker, Members and Clerks of the Legislative Assembly, were very conscious of the responsibility of commemorating those who were killed and maintaining and caretaking this significant historic site in the Northern Territory's history. A remnant of an original porcellanite wall of the Post Office was relocated to the historic lobby, the entry to the Northern Territory Library, together with a piece of shrapnel that was recovered from the ruins and a commemorative plaque was placed in the Main Reception Hall which is purported to be the exact location of where the bomb fell.

On 18 February 2000, the eve of the annual commemoration of the Bombing of Darwin, Mr Speaker McCarthy hosted a reception to unveil commemorative panels in the Main Reception Hall. The panels comprise of photographs and biographical information of the ten people who were killed in the first raid and photographs and information relating to the former Darwin Post Office. Surviving relatives of some of those victims travelled to Darwin for the event.

## **Legislative Council and Assembly**

The ruins of the Post Office buildings remained on this site until 1954 when they were cleared to construct a building to house the Legislative Council, which had not had permanent accommodation since its appointment in February 1948. An opening ceremony for that building was held on 25 March 1955 and was presided over by His Excellency the Governor-General, Sir William Slim and the Minister for Territories the Honourable Paul Hasluck. Meetings of the Legislative Council were conducted in this building between 1955 and 1974 and the fully-elected Legislative Assembly continued to occupy it from November 1974 to December 1989. The building was extensively damaged during Cyclone Tracy in December 1974 and extensive repairs were undertaken. However, by the late 1970s, it was evident that this building was inadequate for the purposes of the efficient operation of the Legislative Assembly.

Some are of the view that the impact of Cyclone Tracy was a catalyst for demands by Members for a new Parliament. After many impediments and delays, the decision to proceed with the construction of "State Square", to comprise a new Parliament House and Supreme Court, was announced in 1988.

Construction of both buildings extended over approximately six years and the new Parliament House was officially opened by the Honourable Bill Hayden AC, then Governor-General of Australia, on 18 August 1994.



## Darwin Air Raids

[http://www.awm.gov.au/encyclopedia/air\\_raids/darwin.htm](http://www.awm.gov.au/encyclopedia/air_raids/darwin.htm)

On 19 February 1942, 81 planes were launched against Darwin whose harbour was full of ships. Eight ships were sunk, two were beached and later refloated and many of the other 35 ships in the harbour were damaged by bomb or machine gun fire. Darwin town and the RAAF aerodrome were also heavily damaged by the raid. A second raid of 54 bombers was launched two hours later on the same day. The raids on 19 February were the first two of sixty-four raids against the Darwin area and its nearby airfields, which bore the brunt of Japanese attacks on mainland Australia.

In January 1943, No.1 Fighter Wing, RAF moved to the Darwin area with three Spitfire squadrons, No. 54 RAF at Darwin, No.452 RAAF at Strauss and No.457 RAAF at Livingstone. The Spitfires had major clashes with the Japanese on 2 and 15 March 1943. On 20 June 1943, the Spitfires intercepted the formation of 21 bombers and 21 fighters, shooting down nine bombers and five fighters. This was the most successful encounter by the RAAF over Darwin, during which the Group Captain Caldwell, an ace from the European theatre, shot down his fifth Japanese aircraft. The final air raid on Darwin took place on 12 November 1943.



Soldiers inspecting damage to defence buildings following a bombing raid.  
AWM 012699

### More About:

- Nominal roll of Darwin civilian casualties  
List of civilian casualties in air raids on 19 February 1942 to 26 February 1942 from the Official Record series: AWM 12, Item 6.
- Darwin air raids reading list  
A select reading list of sources available from the Australian War Memorial.
- Encyclopedia AWM: "Air raids on the Australian mainland"  
A link to a related entry in this encyclopedia.
- Air raids on Australia  
This web page contains items about Australia during the Second World War including a list of Japanese air raids on Australia.
- The bombing of Darwin, 19 February 1942  
Using documents and photographs from its collection and introduced by its historians, the Memorial remembers the bombing of Darwin.
- Fact Sheet 195 - The bombing of Darwin  
Japanese air raids on Darwin and northern Australia, 1942–43



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# The bombing of Darwin, 19 February 1942

<http://www.awm.gov.au/atwar/remembering1942/darwin/transcript.htm> Remembering 1942

Presented by Dr Peter Stanley, the Memorial's Principal Historian, on Tuesday 19 February 2002 beside the Roll of Honour at the Memorial.

## Transcript

Ladies and gentlemen. Welcome to the Memorial and to its Roll of Honour. My name is Peter Stanley and it's my privilege to be the Memorial's Principal Historian. This talk is part of a series of short addresses, called 'Roll of Honour talks', which are intended to help to explain what this long list of names is and what it means to us. Today, we gather to remember a very special event.

Sixty years ago today Australia was directly attacked for the first time by an external enemy. A few minutes before ten o'clock on 19 February 1942 a force of Japanese aircraft swept over Darwin to begin the first of two raids on that day.

### How did this happen?

The attacks on Darwin occurred as part of the Japanese conquest of south-east Asia. Japan had been fighting a brutal war of conquest in China since the early 1930s. It had occupied Indo-China and Thailand in 1941. In the two months since the outbreak of war against the European powers in Asia in December 1941 its forces had taken Hong Kong, Malaya, and the Australian territory of New Britain. Its forces were already advancing into the Netherlands East Indies. Four days before the attacks Japanese forces had captured Singapore.

While Australians looked apprehensively at maps in their daily newspapers which showed arrows moving toward northern Australia, Japan had no intention of actually landing in Australia. Rather, Japan's aim was to seize the raw materials and economic resources of south-east Asia, and to secure a defensible perimeter around the region to defend its gains from the counter-attacks which would follow.

Darwin was a major Allied base. Ships and planes based there were supporting the defenders of Timor, which was to fall within a week, and Java, which would be overwhelmed by the month's end. Darwin was attacked therefore not as the prelude to an invasion of Australia, but to support Japan's seizure of the Netherlands East Indies.

Japanese reconnaissance flights had flown over Darwin in the days before the attack. Their reports were passed to a naval task force based around four aircraft carriers (the same force under Vice-Admiral Nagumo Chuichi which had launched the attack on Pearl Harbour in December). The defenders rightly believed that attack was imminent, though when it came they were unready.

Early on the morning of 19 February 188 aircraft were sighted by observers on Bathurst and Melville islands to Darwin's north. Reports were radioed to Darwin but were not acted upon with urgency. The first signs of the attack came when Zero fighters began strafing an auxiliary minesweeper, HMAS *Gunbar*, as it passed through the boom protecting the entrance to Darwin harbour. Soon, ships in the harbour and buildings and installations ashore came under attack.

Bombs killed at least 21 wharf labourers, some trapped on the open wharf when a section was destroyed. A bomb which hit the main Darwin post office killed the post-master and his family and six young women telegraphists sheltering in a slit-trench outside. The Residence of the Administrator of the Northern Territory was hit, killing a young Aboriginal woman who worked for the Administrator's family.

For forty minutes the aircraft bombed and machine-gunned. They sank eight of the 47 ships in the harbour, including the motor vessel *Neptuna*. Its cargo included 200 depth charges which exploded as the ship lay beside the Darwin wharf. Darwin's defence was inadequate. The few anti-aircraft guns, though in constant action, were overwhelmed. Ten United States Kittyhawk fighters were all destroyed in the air or while taking off.

Eighty minutes later a second wave, this time of land-based bombers from Kendari in the Celebes, arrived to continue the attack, this time concentrating on the RAAF station inland. The raids cost the attackers no more than ten aircraft.



The two raids killed about 250 people in and around Darwin. The official historians, writing in the 1950s, went to some trouble to determine a firm figure. They concluded that 'about 243' had died. Later research has revised this figure upwards. No one can know the actual number because the crews of some of the merchant ships were not fully known. It was certainly not the 1,024 claimed recently in unsubstantiated reports.

Darwin is arguably Australia's most inclusive battle. Those who died that day included members of all three services, in rank ranging from a Wing Commander down to two cooks. They also included merchant seamen, postal workers and civilians who were just doing their jobs. They included men and women, black and white Australians, a teenage girl and a grandfather. It is important to recognise that the very first attack on Australia as a nation cost the lives of representatives of that nation.

Most of the names of those killed in Darwin on that day are in fact not recorded here on this Roll of Honour. The largest single group, were members of the United States Navy or Air Force, most members of the complement of the destroyer USS *Peary* which was sunk during the first raid. The sixteen Australian servicemen and one servicewoman killed in Darwin on 19 February 1942 appear on eight panels.

The four members of the army, one ordnance corps corporal and three members of the hospital ship *Manunda* (including a sister of the Australian Army Nursing Service) appear on panels 86 and 91. The six sailors, three from HMAS *Swan* and three from the shore establishment HMAS *Melville*, appear on panels 3, 4 and 7. The seven airmen were mostly members of the RAAF station headquarters. They are commemorated on panel 97.

Many of the dead were Australian civilians who through the operation of the Memorial's Act are regarded as ineligible for inclusion on the Roll of Honour. They are commemorated by name in Darwin, where most of them are buried.

The attacks on Darwin prompted understandable fears that the air attacks would soon be followed by an invasion force. Here begins the sorry story of the so-called 'Darwin panic' and the disorder which accompanied it. While men did abscond and loot in the chaotic days following the attacks, the stories have become folkloric. They need to be considered carefully. The historian of the Northern Territory's war, Prof. Alan Powell, has established that the reports of mass panic, of men riding bicycles to Alice Springs and hitching rides on night-soil carts to escape from the town have been greatly exaggerated. Prof. Powell's book *The Shadow's Edge* gives us a more accurate understanding of the attack and its aftermath.

It is also often forgotten that the 19 February attacks were only the first of 64 raids made on Darwin between February 1942 and November 1943. Here it is important to focus on what is significant. None of these raids was as heavy as the first, and most caused no damage or casualties at all. Their significance, however, is often missed. They were part of an air campaign fought across northern Australia during those years. This story of this campaign has been told by a former curator at the Memorial, Mark Clayton in the *Journal of the Australian War Memorial*,<sup>1</sup> and by my colleague Chris Coulthard-Clark in the January 2002 issue of the Memorial's magazine, *Wartime*.<sup>2</sup> They describe how Australian and American aircrew battled with their Japanese counterparts to establish dominance over the skies of tropical Australia. In these combats many more men would die, shot down over the Arafura Sea or the Gulf or over the bush of the Territory and Cape York. The names of the Australians killed in that neglected war are here too.

Darwin has attracted many myths, not the least being that news of it was suppressed. It was certainly diminished. The following day news reports put the death toll at 17, but word of the raids on Darwin was never suppressed, not least because it supported the Curtin government's desire to mobilize Australians into working, fighting or saving by frightening them about what could happen.

The Lowe Royal Commission investigated the raids in 1942, with some hearings held in the ruins of the town. Its report was released in 1945. Douglas Lockwood's book *Australia's Pearl Harbour* first told the story vividly in 1956, and they have been retailed, sometimes with more colour than clarity, by other journalists ever since. Australians will always remember the events of 19 February 1942 and those who died in them. Here, at the Roll of Honour of the nation's memorial, we remember them.

## Notes:

[1] Mark Clayton, "The north Australian air war 1942-44" *Journal of the Australian War Memorial*, 8 (1986)

[2] Chris Coulthard-Clark, "Air war over Australia", *Wartime*, 17, 2002



# Fact Sheet 195

## The bombing of Darwin

[http://www.naa.gov.au/Publications/fact\\_sheets/fs195.html](http://www.naa.gov.au/Publications/fact_sheets/fs195.html)

### Japanese air raids on Darwin and northern Australia, 1942–43

On 19 February 1942 mainland Australia came under attack for the first time when Japanese forces mounted two air raids on Darwin. The two attacks, which were planned and led by the commander responsible for the attack on Pearl Harbour ten weeks earlier, involved 54 land-based bombers and approximately 188 attack aircraft which were launched from four Japanese aircraft-carriers in the Timor Sea. In the first attack, which began just before 10.00 am, heavy bombers pattern-bombed the harbour and town; dive bombers escorted by Zero fighters then attacked shipping in the harbour, the military and civil aerodromes, and the hospital at Berrimah. The attack ceased after about 40 minutes. The second attack, which began an hour later, involved high altitude bombing of the Royal Australian Air Force base at Parap which lasted for 20–25 minutes. The two raids killed at least 243 people and between 300 and 400 were wounded. Twenty military aircraft were destroyed, eight ships at anchor in the harbour were sunk, and most civil and military facilities in Darwin were destroyed.

Contrary to widespread belief at the time, the attacks were not a precursor to an invasion. The Japanese were preparing to invade Timor, and anticipated that a disruptive air attack would hinder Darwin's potential as a base from which the Allies could launch a counter-offensive, and at the same time would damage Australian morale. With Singapore having fallen to the Japanese only days earlier, and concerned at the effect of the bombing on national morale, the government announced that only 17 people had been killed.

The air attacks on Darwin continued until November 1943, by which time the Japanese had bombed Darwin 64 times. During the war other towns in northern Australia were also the target of Japanese air attack, with bombs being dropped on Townsville, Katherine, Wyndham, Derby, Broome and Port Hedland.

### The response

In the hours following the air raids on 19 February, believing that an invasion was imminent, Darwin's population began to stream southwards, heading for Adelaide River and the train south. Approximately half Darwin's civilian population ultimately fled. The panic in the town was repeated at the RAAF base, where servicemen deserted their stations in great numbers. Three days after the attack 278 servicemen were still missing. The exodus south (which later became known as 'The Adelaide River stakes'), and the looting and disorder which subsequently occurred, led the government to hurriedly appoint a Commission of Inquiry led by Mr Justice Lowe which issued two reports, one on 27 March and the other on 9 April 1942.

### The records

The National Archives and the Australian War Memorial hold a wide range of records relating to the bombing of Darwin. A selection of these records is listed in the table below.

Records held by the National Archives and the Australian War Memorial

Title or description of records	Date	Series no.
The first bombings – 19 February 1942		
<b>National Archives, Canberra</b> Japanese air raid on Darwin – 19th February 1942	1942	<a href="#">A2684</a> , 872



Press reports of the bombing of Darwin – Advisory War Council agendum 2/1942*	1942	<a href="#">A5954</a> , 327/12
<b>National Archives, Melbourne</b> Darwin air raids – warning measures taken at sea	1942	<a href="#">B6121</a> , 159G
<b>Australian War Memorial</b> Official history (records of Paul Hasluck) – response of the nation to the threat to Australia and the bombing of Darwin	1941–42	<a href="#">AWM68</a> , 3DRL 8052/117B
Papers of Lt-Gen Sir Iven G Mackay – defence of Australia, including report on Darwin air raids	1941–42	<a href="#">AWM92</a> , 3DRL 6850/134
Air raids – enemy damage report on bombing in Darwin	1942	<a href="#">AWM54</a> , 812/3/16
The aftermath		
<b>National Archives, Canberra</b> List of Northern Territory evacuees	1942	<a href="#">A7029</a> , 1
Honours and awards – Darwin raid, February 1942	1942	<a href="#">A2124</a> , 1
Shipping wrecks, Darwin harbour*	1946	<a href="#">A432</a> , 1946/855
<b>National Archives, Melbourne</b> RAN personnel killed and injured in raid on Darwin	1942	<a href="#">MP151/1</a> , 429/201/399
Home Security report (includes photographs of the effects of bombing in the Darwin area)	1941–44	<a href="#">MP535/14</a> , unnumbered
Wrecks in Darwin harbour	1942	<a href="#">MP1049/5</a> , 1893/2/101
Compensation for departmental officers in Darwin air raid	1942–44	<a href="#">MP721/1</a> , W530
National Archives, Darwin		
Darwin raids – casualty lists and enquiries	1942–46	<a href="#">F1</a> , 1942/364
Later bombings		
<b>National Archives, Canberra</b> Darwin raid number 55 (includes plot of enemy aircraft)	1943	<a href="#">A9696</a> , 207
Intelligence – raid no 62 (night) Darwin, 15–16 September 1943	1943	<a href="#">A11231</a> , 5/81/INT
<b>National Archives, Melbourne</b> Report of air raid on Naval area Darwin, 19 March 1942	1942	<a href="#">MP1049/5</a> , 1806/2/23
<b>Australian War Memorial</b> Enemy air raid casualties – Darwin, Broome and Port Hedland	1942–45	<a href="#">AWM54</a> , 812/3/5
Bombing of Broome and Wyndham, March 1942	1942	<a href="#">AWM54</a> , 625/3/7
Darwin raid number 58, 6 July 1943 – narrative by Wing Commander C Caldwell	1943	<a href="#">AWM54</a> , 625/3/5
The Lowe Commission of Inquiry		
<b>National Archives, Canberra</b> Transcript of evidence, Darwin air raid inquiry*	1942	<a href="#">A816</a> , 37/301/293
Air raid on Darwin – final report of Commission of Inquiry*	1942	<a href="#">A816</a> , 37/301/310
Bombing of Darwin – report by Mr Justice Lowe*	1942–49	<a href="#">A431</a> , 1949/687
<b>National Archives, Melbourne</b> Darwin air raid inquiry before Lowe J as Commissioner	1942	<a href="#">MP401/1</a> , CL14687
Darwin air raids – report by Mr Justice Lowe	1942–45	<a href="#">MP1185/8</a> , 1806/2/31
Darwin air raid inquiry – exhibits (includes 7 photographs)	1942	<a href="#">MP401/1</a> , CL14687

\* Copies of these records are also held by the Archives' Darwin Office

For more information

You can obtain more information about the record series listed above (and the items within the series) from [RecordSearch](#), the Archives database. Follow the links in the series lists to go directly to information on that series. You can also use RecordSearch to find out about the agencies that created the records and to locate more



records on your subject. You might also explore [PhotoSearch](#) to find out if there are photos pertaining to your subject.

RecordSearch and PhotoSearch are available online or in all Archives reading rooms. Reference staff are available in the reading rooms to help you, or email [ref@naa.gov.au](mailto:ref@naa.gov.au).







### Brown's Mart

#### Location

Lot 6569(A) Town of Darwin,  
Wharf end of Smith Street, opposite the [Town Hall Ruins](#).



#### Gazettal Date

19 March 1996.  
Northern Territory Government Gazette No. S7.

#### Description

A simple rectangular stone (local porcellanite) building with corrugated galvanised iron hipped gabled roof. Note that the building was damaged in the cyclones of 1897 and 1974 and reconstructed/modified to accommodate the new theatre after the latter.

#### Statement of Heritage Value

Brown's Mart is a unique stone building with architectural, historic and social significance relating to the economic and social development of Darwin and is highly regarded as a landmark building in the city.

### Boab Tree, Cavenagh Street

#### Location

Lot 6415(A), Town of Darwin. In the GPO carpark.

#### Gazettal Date

16 March 1994.  
Northern Territory Government Gazette No. G11.

#### Description

The tree is an *Adansonia gregorii*, more commonly known as a boab or bottle tree. It is about 12 metres high, with a trunk circumference of 8.06 metres and a canopy spread of about 12 metres.



#### Statement of Heritage Value

The Boab tree, *Adansonia gregorii*, was planted in the late 1800s and is a fine example of this species. It marks the site of Darwin's first primary school and later the Darwin High School and the Adult Education Centre.

During the war a "Daisy Cutter" bomb lay unexploded within its shade for several days prior to discovery. Since the early 1960s it has been well known to the Darwin public as a shade tree in first the Woolworths carpark and, since 1991, the post office carpark.



## Administrator's Offices

### Location

Lot 6571(A), Town of Darwin. Corner of the Esplanade and Smith Street.

### Gazettal Date

19 March 1996.  
Northern Territory Government  
Gazette No. S7.

### Description

Porcellanite stone buildings with encircling verandahs to the former police station and courthouse. The buildings are typified by simple gable roofs with minimal overhang and encircled by wide split verandahs.



### Statement of Heritage Value

The Administrator's Offices served as the Court House from 1884 and were associated with the consolidation of settlement in Darwin during the South Australian period. The building was used by the Navy as the headquarters of HMAS Melville from 1942 until December 1974. The Administrator's Offices represent the continuing presence of the Crown in the settlement of the Northern Territory - first as the Court House and now as the office of the vice-regal representative.

## State Square Banyan Tree

### Location

Lot 6414(A), Town of Darwin.  
Next to the Supreme Court building, in  
State Square.

### Gazettal Date

16 March 1994.  
Northern Territory Government Gazette  
No. G11.

### Description

to be provided



### Statement of Heritage Value

The Banyan Tree in State Square is valued by the community as a remnant of the original Darwin foreshore vegetation. It is over 200 years old and was the congregation point for the Larakia youths prior to ceremonies which took place under the nearby Tamarind tree. It will remain a focus for landscaping associated with State Square.



## Old Admiralty House

### Location

Lot 6399(A), Town of Darwin.  
Corner of Knuckey Street and The Esplanade.



### Gazettal Date

2 February, 1994.  
Northern Territory Government Gazette No. G5.

### Description

to be provided

### Statement of Heritage Value

Old Admiralty House was originally built on Lots 655 and 656 which had been resumed by the Commonwealth in 1937. The residence for the district Naval Officer was completed by 24 November 1937. In September 1951 the house was moved to Lots 650 and 652. These Lots subsequently became Lot 2291.

Lots 650 and 651 were brought by Florenz August Carl Bleeser in 1931, a postal official and botanist of increasing renown. Bleeser erected his home on Lot 651, established a small museum on Lot 650 and designed and planted a garden with unusual trees, palms and orchids in a shadehouse. He died during World War II and the family did not return to Darwin. Bleeser's garden still existed when Old Admiralty House was moved to the site in 1951. The design, shadehouse and some of the original trees in the garden remain today.

The house continued as the home of the most senior naval officer in the north until 1983. The house suffered minor damage during Cyclone Tracy and was used as an art gallery and coffee shop until early 1993.

The house is a good example of an amended Burnett "B" type tropical house. It is one of only two "B" type houses remaining in the Central Business District of Darwin. The original detail of the house remains intact with only minor alterations. This type was the grandest of a series of tropical designs by B.C.G. Burnett. They are typified by their extensive use of asbestos cement, especially in the louvres. The original louvres have been replaced. Overall, Old Admiralty House has both social and architectural significance.



## Lyon's Cottage, or British Australian Telegraph Company

### Location

Lot 5189, Town of Darwin.  
Corner of Knuckey Street and The Esplanade.

### Gazettal Date

4 August 1993.  
Northern Territory Government  
Gazette No. G31.

### Description

to be provided



### Statement of Heritage Value

Lyons Cottage was built on prewar Lot 652 for the Eastern Extension Australasian and China Telegraph Company Ltd (the successor of the BAT from 1873) in 1925. It was the residence of the company engineer.

Built of "hammered stone" it was the first stone building constructed in Darwin for 30 years. Local stone was used to construct this unusual and unique domestic design reminiscent of English colonial models developed in India, Malay and Singapore. Typical is the low set heavy masonry/stone construction with a central open living space and separate servants quarters /kitchen connected to the main building by a covered walkway, an innovative response to the Australian climate. The building is a unique example of domestic construction within the inner city area of Darwin.

### Further Reading



## Darwin Cenotaph

### Location

Situated on Lot 5706,  
Town of Darwin.

### Gazettal Date

15 March 2000.  
Northern Territory Government Gazette G10.

### Description

The monument is comprised of a marble column surmounted on a square base weighing 7.65 tonne. It is 5.5 metres high surmounted by a marble ball. The ball was to be replaced by a bronze figure but this has never been undertaken. The base of the monument weighs over seven and a half tons.

### Statement of Heritage Value

Darwin Cenotaph was the first official memorial to be erected in the Northern Territory. Dedicated on 24 April 1921 it was unveiled by the Administrator F.C. Urquhardt at Liberty Square, the area in front of the Administrator's residence. It was erected to commemorate those who lost their lives in the First World War.

The cenotaph is a simple aesthetic design held in high esteem and highly valued by the community as a symbol of those who died in war overseas and on Australian soil in defence of their country. It represents part of the social fabric of a community and is the focal point at which the community congregates at times of Territory and National memorial in association with the defence forces. It is a focal point and a solemn reminder of the effects of major wars, which have affected the community.

Its importance to the community has been demonstrated through the efforts that have been taken to relocate it twice since its erection. In 1971 the monument was re-erected in the Civic Centre Gardens, as Liberty Square became too small to hold commemorative services. In 1989 a larger site was again required. In 1990 the monument was re-erected on the Esplanade. In 1999 it was again moved 5 metres along the esplanade to provide a better orientation for commemorative services and as part of a refurbishment programme.

The monument overlooks Darwin Harbour from which all men left during the First World War and would have been one of the last familiar sites the men would have seen as they sailed off to war. It overlooks the harbour where so many died during the Japanese air attack on 19 February 1942 and is located on the site where the guns of the 14th Anti-Aircraft Battery were positioned and which fired the first shots in defence of Australia on Australian soil during the Second World War.



## Pine Creek Railway Precinct

### **Location**

Lot 271(A), Town of Pine Creek.

### **Gazettal Date**

6 April 1994.

Northern Territory Government Gazette No. G14.

### **Description**

to be provided

### **Statement of Heritage Value**

Pine Creek Railway Precinct was the initial terminus of an uncompleted 19th Century trans-continental railway system. Its contribution to the development of the mining boom in the late 19th Century was profound, enabling companies to transport machinery and equipment with greater ease to the mine fields than had been possible previously. It was also a catalyst for the opening of new mines in the area. Its contribution to the development of Pine Creek and other towns along its route was also important.

Pine Creek maintained its importance after the railway was extended to Katherine and during World War 2 when it became one of the four dispersal bases on the North Australian Railway.

The area has high architectural and historical associations and remains a key feature in the township's heritage and streetscape.

The Miners Park is important in that it provides a visible link between the railway and the mining industry which it contributed so much to. Its significance also lies in the fact that it provides a place where mining machinery and technology from mines which are no longer operational or exist can be maintained to assist in the interpretation of the area's mining history.



## Blyth Homestead

### Location

Section 1894(A) Hundred of Blyth,  
Litchfield National Park.

### Gazettal Date

1 October, 1997.  
Northern Territory Government Gazette No.  
G39.



### Description

Blyth Homestead is located on a narrow alluvial flat at the base of two steep sandstone ridges. Four major elements are represented at the site: the homestead building itself which is a single room, cypress pine and corrugated iron structure encircled by verandahs; a flagstone floor; a scatter of corrugated iron, sandstone blocks and other metal objects; and a set of stockyards constructed using bush timber poles and barbed wire.

### Statement of Heritage Value

Blyth Homestead is of heritage significance to the Territory due to its architectural and social significance.

The homestead was built in 1929 to function as an outstation on Stapleton Station, then owned by Harry Sargeant and his family. It was constructed using bush timber (cypress pine) and iron in the form of a large central room that could be closed up with verandahs around the edges. Blyth Homestead is one of the few extant examples of this type of building which was formerly common on NT pastoral leases.

The Homestead site contains tangible and well-preserved remnants of both pastoral and mining activities. The isolated location necessitated the occupants to be virtually self-sufficient with a fruit and vegetable garden, milking cows and meat. A sawmilling plant was used to cut timber needed. Their income was supplemented by alluvial and reef tin mining to the east of the homestead, the products of which had to be carted by buckboard along a self-made track over the Finiss River.

The simple bush architecture of the homestead and the opportunistic nature of the mine workings illustrate the harsh conditions under which the Sargeant family lived.



## Bamboo Creek Tin Mine

### **Location**

Section 1892(A) Hundred of Hart,  
Litchfield National Park.

### **Gazettal Date**

10 September, 1997.  
Northern Territory Government Gazette No. G36.

### **Description**

The mine workings at Bamboo Creek are located on the northern slope and on the western end of a ridge. A tin processing mill and the associated domestic and industrial remains are located at the base of the ridge and on the adjacent alluvial flat.

### **Statement of Heritage Value**

Bamboo Creek Tin Mine has significance as an example of a small scale, labour intensive mine operated without the benefit of heavy earth machinery. It was typical of many of the mines in the Northern Territory which operated in the nineteenth and early twentieth centuries, particularly those operated by the Chinese. Some elements of its operation, notably the use of a jaw crusher rather than a stamp battery and the use of compressed air for mining, represent a transitional phase of mining in the Territory to the large scale operations of the 1950s.

Mining of tin at Bamboo Creek extended intermittently from its discovery in 1906 to the abandonment of the workings in 1955. The wide variety of remains which survive in good condition are notable in that they reflect the complete range of activities associated with underground mining. Artefacts relating to ore extraction, processing and transport are present as well as domestic remains and remnants of the explosives magazine.



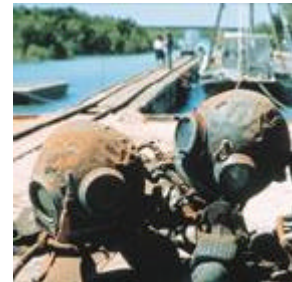
## THE AUSTRALIAN PEARL INDUSTRY

<http://www.costellos.com.au/pearls/>

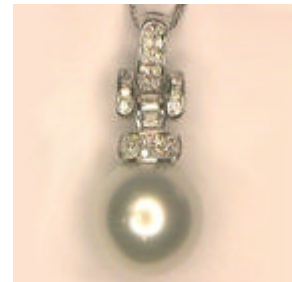
The Australian Cultured Pearl Industry has its roots in Broome, in the Kimberley region of North West Australia during the mid 1950s however, pearl oyster fishing had its origins here over a century ago. In this small and bustling town, the world's most sought after mother-of-pearl shell was sourced by the international market for its commercial use in button manufacture. If a pearl was found in the process it was considered a bonus, and indeed could change a man's destiny forever.



The magic of the pearl enticed men from around the world to risk their lives and try their luck in an insatiable treasure hunt. Wooden luggers and hard hat divers have come to symbolise those often treacherous treasure hunts for the one perfect pearl that had the power to command a fortune.



Yet again the once sleepy town of Broome has transformed itself to become the hub of pearling activity. Just as it supplied the world market with the most extraordinary natural pearls over a century ago, the Australian pearling industry continues to produce the world's finest pearls. The industry generates exports valued at AUS\$200M annually and employs approximately 1000 people. The industry is a quota-based fishery, cooperatively managed by Government and Industry to maintain the resource. Twelve companies operate 16 licenses to fish for wild pearl oyster stocks for their shell supply. The total combined quota is 572,000 shell per annum. Individual company quotas range from 15,000 shells up to 330,000 shells.



Unlike coloured gemstones and other pearls, the Australian Pearl's beauty is there for all to behold the very moment it is delivered from the oyster. These high grade pearls are of such quality they do not require bleaching, tinting, dying or skinning. Australian Pearls are harvested by hand, cleansed of sea salt and organic residue and graded for marketing. The beauty of the Australian Pearl will never fade because they are pure, and can be passed down from generation to generation. Finding a home for these pearls has never been a problem.





The Australian Pearl Industry exports approximately 320 kan annually (3.75kg = 1 kan). Strong demand from markets in Japan, the USA, Hong Kong and Europe for pure, naturally cultivated Australian Pearls quickly absorbs the production.



## ABOUT PEARLS

Pearls have been a source of fascination for centuries. They have been considered the most magical and feminine of all gems and are the only one created by a living organism. Pearls emanate a certain warmth and glow not found in other gems, due to their unique beginnings.



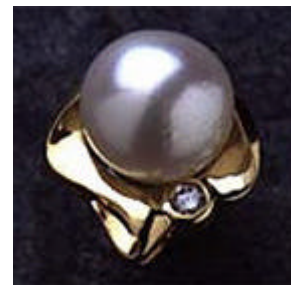
Pearls are found in pearl oysters. However, the origin of the pearl mystified humans for centuries. Many theories were put forward regarding the origin of pearls however, it wasn't until the turn of the twentieth century that the relationship between pearl oysters and parasites was discovered.



Pearls were created when a foreign body of some sort, such as a grain of sand or a parasite, found its way into a pearl oyster. The oyster reacted by coating the irritant with layer upon layer of the pearly substance known as 'nacre', that gives the pearl its unique appearance and iridescent beauty. This unique relationship gave birth to the natural pearl.



The cultured pearl was created as a way of guaranteeing a steady supply of pearls and satisfying the demands of the consumer. Cultured pearls are formed with a helping hand. In this case, humans rather than nature introduce the irritant: a bead or nucleus is inserted into the oyster by a technician to create a pearl which turns out every bit as natural as one that originated in the wild.





Due to the rarity and high price of natural pearls, cultured pearls feature predominantly in jewellery stores. Side by side, it is very difficult to tell the difference between a natural pearl and a high quality cultured pearl with the naked eye.

Pearls are composed of between 82-86% mineral (calcium carbonate), 10-14% organic binder and 2-4% water. They are very soft and can be chipped quite easily.



The name 'pearl' has various origins. The Teutonic derivation comes from the noun *beere*, meaning berry. Latin derivations are *pirium*, a sphere, and *pirula*, a pear. The Romans used the Greek word *margarita*, describing something of unique value, a cherished possession or a favourite child.



The pearl is the birthstone for June, and also the anniversary gem for the Third and Thirtieth Wedding Anniversaries. Recognised as the emblem of modesty, chastity and purity, pearls have also come to symbolise a happy marriage.



## HISTORY OF PEARLS

Pearls are amongst the oldest and most universal of all gems. They are the oldest jewels known to man, and the only gem made by a living animal. The oldest surviving pearl necklace is nearly 2000 years old and was found in the sarcophagus of a Persian Princess. In many countries pearls were worn as a declaration of wealth and power, and also used as a talisman to bring good fortune, to ward off evil spirits and to cure illnesses. Pearls were symbolic of purity, chastity and feminine charm.



Pearls were worn in civilised Middle East and Asian societies as early as 3500 BC., and continued to grow in popularity during Roman times when pearl fever reached its peak. A pearl earring reportedly paid for one Roman general's political campaign, and Roman women were richly covered in pearls. Pearls found a place in Julius Caesar's heart, and Cleopatra dissolved a pearl in wine and drank it to prove her love to Marc Antonius.





The dawn of the Christian era saw the continued popularity of pearls. The bible refers to pearls several times, and the value still placed on the gem. Following the sacking of Rome, Constantinople became the most important centre of wealth and, indeed, pearls because of its strategic position between the source and the consumers. Pearls continued to be featured in jewellery and clothes as well as art.



The early 1700s saw a decline in the demand for pearls. The discovery of diamonds in Brazil made diamonds for the first time more affordable and demand soared. Pearl supplies from traditional sources became unsteady, and cheap imitations appeared on the markets. All these factors led to a decline in the demand for pearls.



The late 1700s saw a reversal in fortunes. Good harvests from several established pearl sources and the discovery of new ones gave the pearl industry a much needed boost.



The early 1900s saw trade affected by a supply shortage and the appearance of cultured pearls on the market. Cultured pearls were not accepted immediately, it took several years for consumers and the industry to accept this new kind of pearl.

Since then, cultured pearls have replaced natural pearls and now many different countries participate in the cultured pearl industry.



## CULTURED PEARL SOURCES

Pearls are cultivated in areas which have the right water temperature, are clean and nutritious. The following are the locations where cultured pearls-both saltwater and freshwater-are recovered.

### Saltwater Pearls

#### Australia

Although originally a source of mother-of-pearl for many thousands of years, Australia is now a main producer of cultured South Sea pearls.

#### South Sea

The South Sea area is responsible for producing the world's largest and finest saltwater cultured



pearls. The area extends from Burma and the Gulf of Thailand through the Sulu Sea of the Philippines, Malaysia, the Indonesian Arafura Sea and north-west Australia. It continues into the Cook Islands, eastward through Tahiti to the Tuamotu Archipelago and the Gambier Islands in French Polynesia. The Philippines, Malaysia, Indonesia, Australia, Cook Islands and Tahiti produce the much sought after South Sea cultured pearls.



#### Japan

Japan has been a leading producer of cultured pearls for many years.

### Freshwater Pearls

#### China

An ancient source of freshwater pearls, China has grown to be one of the largest producers of cultured freshwater pearls.

#### Japan

Lake Biwa is the main source of cultured freshwater pearls.

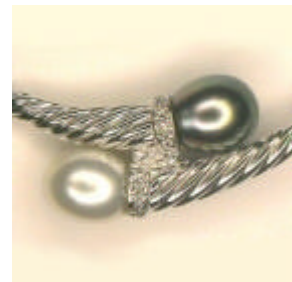
#### United States

A cultivation industry has been developed with production centres on the Mississippi River but supplies mainly the domestic market.

### PEARL CULTIVATION

The art of pearl cultivation is a long and delicate process. Man had been trying to unlock the secret of the pearl's beauty as far back as 1000 BC, but it wasn't until the early 1900's that Kokichi Mikimoto successfully grew a pearl. There are two main cultivation processes known Nucleated Cultivation and Non-Nucleated Cultivation, used for saltwater and freshwater pearls respectively.

The Nucleated Cultivation process is used in Australia. Australian pearls are formed in the following way.







### **The Gathering of the Oyster Shell**

The process of culturing pearls begins at sea. Australian oysters are not yet conceived on farms; young oysters must be found in the wild and collected by divers on the sea bottom off Australia's north west coast.



The oysters are gathered with the aid of the pearl boat, which serves as the divers' platform and transports several thousand live oysters in its holding tanks. There are two long booms (about 10 metres long) that extend out from the side of the boat, each holding towropes.



With the aid of the booms, as many as six divers can operate simultaneously on the bottom of the ocean floor at depths of seven to 20 metres and cover an area 20 metres across as the boat drifts along with the tide.



On board the pearl boat, the oysters are counted, cleaned and weighed, then placed in a window-sized metal frame between layers of nylon netting. The panels hold between six to nine shells. The oysters are then transported in a saltwater tank to a holding area, where the frames are attached to the sea bottom in order to recover from the stress of their capture.

### **The Seeding of the Oyster**

In a few months the panels are lifted back onto the boat where the oysters are opened and seeded by a technician. The technicians - predominantly Japanese - have honed the implantation process to a delicate art form.





The process involves inserting into the oyster a nucleus and a tiny piece of mantle cut from a nearby oyster; the nucleus is made with shell taken from a North American mussel and the mantle is the part of the fleshy oyster lip that secretes the nacre.



It has been found that the shell of the North American mussel is the best material for the pearl nuclei because it is least likely to be rejected by the oyster. However, due to the great demand within the industry for them, the mussel shells are very expensive.

Once the seeding process is completed, the oysters are quickly returned to the holding area in their panels for further convalescence. Several months later the shells are transported, sometimes up to 2,000 nautical miles away, to remote farming bases.



### **The Pearl Farm**

The pearl farms are best located in sheltered areas with active tides. The north coast of Western Australia has proved to be an ideal location: there is scarcely any water pollution, few people, and extremely good tides as high as 10 metres. The big tides feed the oyster a rich mixture of organic food.



These locations are also chosen for their geographical protection from cyclones which is a climate hazard of the north west.

Once here, the oyster shells are suspended from culture systems; the panels holding the shells are hung on long lines, like underwater clotheslines, supported by buoys. They are tended daily by farm workers who carry out the intensive husbandry required for the next 20 to 24 months. The oysters are cleaned to keep them free of marine growth and, occasionally, even hauled up for x-ray to assess their progress.



### **The Pearl Harvest**

The pearls are harvested during the months of June and September. Once the pearls have been taken out of the oysters, they are initially sorted, usually by shape and size. The oysters are seeded anew and the cycle begins again.

A healthy oyster can be reseeded as many as four times with a new nucleus. As the oyster grows, it can accommodate progressively bigger pearl nuclei. Therefore, the biggest pearls are most likely to come from the oldest oysters.



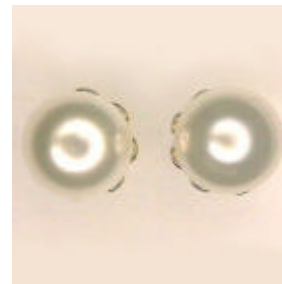
Unproductive oysters are still valuable: the nacre-covered inside is marketed as mother-of-pearl and its dried meat sold overseas in such



places as Hong Kong and Shanghai, where it is considered a delicacy.

The cultivation process for freshwater pearls is very similar with the following exceptions:

- Freshwater pearls are cultivated in mussels.
- Freshwater pearls are farmed in lakes and rivers, predominantly in Japan and China.
- During the implantation process, only mantle tissue is inserted into the mussel. In contrast to saltwater oysters, these mussels can produce 10 or more pearls at once by inserting the required number of mantle tissues.
- Freshwater mussels do not need to be cleaned at all once they are returned to the pearl farms.
- The harvesting period is shorter.
- Freshwater mussels are not reseeded as many times as saltwater oysters.



## VALUING PEARLS

The most important factors taken into consideration when valuing cultured pearls are lustre, colour, shape, surface and size.

### Lustre

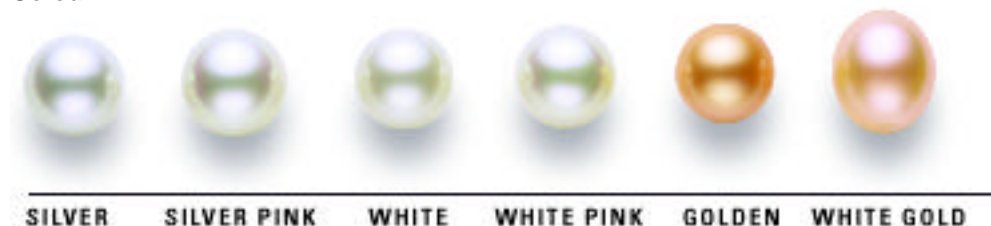


The most important indication of a pearl's quality is lustre. The lustre of a pearl refers to the glowing appearance of its surface, and is judged by its brilliance and ability to reflect light. A pearl with a high lustre will be very shiny and show reflections like a mirror while a pearl with poor lustre will appear very milky or chalky.

Lustre is determined by the quality of a pearl's nacre—its transparency, smoothness and overall thickness. Factors affecting the quality of the nacre include the cultivation place, the health of the mother oyster, the length of time spent in the oyster, pollution and the type of oyster used. Only strong layers of nacre can produce deep lustre.

It is better not to compromise on lustre as this feature cannot be hidden or enhanced by its jewellery mount.

### Colour

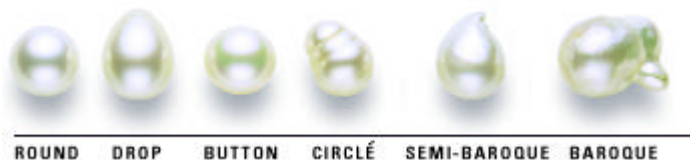




Pearls present a whole palette of colours to choose from. Light coloured pearls are produced in shades of white, pink, silver, gold and blue, while dark coloured pearls range from peacock green and aubergine purple to all the shades of grey.

Above all, a pearl's colour is a question of personal taste. Although some shades are especially rare or popular and therefore highly valued, such as rosy white, silvery white and pale gold, the colour of a pearl is certainly not an indication of its quality.

## Shape



The shape of a pearl plays a major role in determining its value. Pearls can be divided into four basic groups of shape. These are in order of value:

Round

Off-round

Slightly round or ovalish

Semi-baroque

Not round. Some examples are pear, drop, egg and button shapes.

Baroque

Very irregular in shape with a surface that is often very uneven, occasionally resembling teeth, cacti, tadpoles and mushrooms

Throughout history, the round pearl has been considered the most valuable and popular shape. However, most of the world's most famous and valuable pearls are often not symmetrical in shape, and that is because the other grading factors are also important.

Shape is a good category to compromise on if you need to cut down on price. Actually, baroque and circled pearls can make for very interesting jewellery pieces.

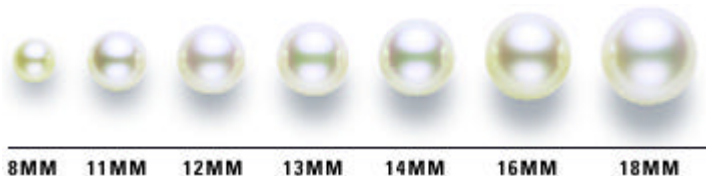
## Surface



The fewer the spots or blemishes a pearl has, the higher its value. But again flaws can also be positive features. They may serve as identifying marks that a pearl is yours and not somebody else's, and help prove that it is real and not imitation.

Flaws can also lower the price of a pearl without necessarily affecting its overall beauty.

## Size



The size of a pearl is expressed in terms of its diameter, which is measured in millimetres. Size has a significant impact on price. One millimetre's difference has been known to raise a price by between 100 and 200 per cent.

## GLOSSARY OF TECHNICAL TERMS

Abalone pearls:



are very unusual. They are readily identified by their hollow structure and highly iridescent nacre and are formed in abalone shells.

**Akoya pearls:**

are saltwater cultured pearls of Japanese origin and are formed by the Akoya oyster.

**Baroque pearls:**

are neither round nor symmetrical, but very distorted and irregular in shape. Often the surface is very uneven and they occasionally resemble such objects as teeth, cacti, tadpoles, mushrooms, or snails.

**Bib:**

is a pearl necklace with more than three strands.

**Biwa pearl:**

are cultured freshwater pearls grown in Lake Biwa in western Japan.

**Black-lip oysters:**

are found over a wide area stretching from the Cook Islands, eastward through Tahiti to the Tuamotu Archipelago and the Gambier Islands in French Polynesia. The black-lip oyster is responsible for producing the black pearl.

**Black pearls:**

are naturally-coloured dark pearls from the black-lip oyster. The colour is black or very dark grey, however dark blue, dark green and purple-grey coloured pearls also come under the title of black pearl. Black pearls are rare.

**Blemishes:**

are tiny surface irregularities that mar the uniformity of the exterior of the pearl.

**Blister pearls:**

are natural pearls caused by the chance intrusion of a parasite through the outer shell of an oyster. The mollusc secretes nacre over the irritant, cementing it to the shell itself. Blister pearls are frequently irregular in shape.

**Blue pearls:**

are dark-coloured pearls whose colour is derived from foreign contaminants in the nacre itself or between the nacre and the shell bead nucleus. Good examples of blue pearls are naturally-coloured, dark Akoya pearls, which may be blue, black, grey, or brown. Black and blue pearls may look similar but the difference is in the origin of their colour.

**Choker length:**

refers to a pearl necklace 14 - 16 inches (35 - 40 cm) in length.

**Clam pearls:**

have no nacre and are therefore limited in their commercial value.

**Colour:**

of pearls is usually influenced by the type of pearl oyster; an important factor in pearl selection.

**Conch pearls:**

are rare, non-nacreous pearls produced by the Queen conch and are characterised by a pink flame pattern with a porcelain-like surface. They are found in the Caribbean.

**Cultivation:**

refers to the process whereby an oyster or mussel is seeded, tended and harvested to produce a cultured pearl.

**Cultured pearls:**

are pearls formed by the insertion of a piece of mantle tissue, with or without a nucleus, into the mother oyster or mussel.

**Dog collar:**

refers to a multi-strand (as many as five) choker-length necklace, usually joined together with a single clasp.

**Freshwater pearls:**

are flesh-nucleated pearls from freshwater shellfish produced in various countries around the world, including Japan, China, and America.

**Gold-lip oysters:**

are found most commonly around countries such as Indonesia, Thailand and the Philippines. The oyster's inner shell edge is often golden yellow, and it usually produces yellowish or golden-coloured South Sea pearls.

**Graduated strand:**

refers to a single strand of pearls with small pearls at each end that increase in size toward the middle of the strand. The centre pearl is usually much larger than the two on either side.

**Grain:**

is a unit of measure for natural pearls; one grain equals 0.05 grams or ¼ carat.

**Half pearls:**

are whole pearls that have been ground or sawed on one side, usually to remove blemishes. If about three-quarters of the pearl remains, it is known as a three-quarter pearl. The term 'half pearl' is also used to refer to blister or mabe pearls.



Hank:

refers to the number of strands tied together at one end. These strands usually do not usually have clasps attached.

Imitation pearls:

are any pearls entirely manufactured to look like natural or cultured pearls. There are two types: one variety is composed of hollow or solid glass beads coated with essence d'orient, which is produced from the scales of certain types of fish. The other variety, known as "shell-based pearls", are imitation pearls coated with a substance like nail polish and then lacquered. There are also numerous plastic imitation pearls on the market. See Mallorca.

Iridescence:

refers to the optical effect whereby prismatic colours, similar to the ones seen on oil films, can be seen. Iridescence is the play of lustrous colours, which may be like those of the rainbow or a subtle combination of colours such as pink, blue, green, and silver.

Kan:

is a Japanese unit of weight equalling one thousand momme, or 3.75 kilograms.

Kasumiga pearls:

is a new type of Japanese cultured pearl from a lake north-east of Tokyo. The mussels are a crossbreed between Japanese and Chinese freshwater mussels, and are implanted with round or flat seeds. The resulting pearls are glowing in rosy hues from light to dark pink.

Keshi pearls:

are small, roundish natural pearls formed accidentally in the soft tissue of the mollusc during the cultivation process. In Japanese, keshi means "poppy seed". These pearls are formed when small chips of the mollusc's shell break off and fall inside the mollusc during the surgical insertion of the bead. The mollusc treats these pieces as irritants and coats them with nacre.

Knotting:

are small knots tied between each pearl in a strand to prevent the loss of pearls if the necklace breaks. Knotting usually adds from 2½ to 6cm to a necklace.

Lustre:

is the appearance of a pearl's surface judged by its brilliance and ability to reflect light. Also called "sheen" or "shimmer". See Orient.

Mabe pearls:

are formed when a half-bead is cemented to the mollusc's inner shell. The mollusc covers the half bead with nacre and when the shell is cut off, the bead is exposed at the back. The bead is removed, the pearl cleaned (to prevent deterioration) and the remaining hole filled with paste, wax or sometimes with another bead and then covered with a mother-of-pearl backing. Mabe pearls must only be used in closed-back settings. Also referred to as a half-pearl or cultured blister pearl.

Mantle:

is the part of an oyster's anatomy that secretes nacre. Tiny tissue fragments are used to stimulate pearl formation in pearl culturing.

Mallorca:

is a name for imitation pearls taken from the island off the Spanish coast. Also known as "Majorca".

Matinee length:

refers to a pearl necklace 20 - 26 inches (50 - 66 cm) long.

Mikimoto pearls:

are pearls produced and marketed by the Mikimoto Company.

Mollusc:

is any invertebrate having a soft body often protected by a shell. Includes the snail, bivalve (mollusc, clam, mussel), squid, and octopus.

Momme:

is an ancient Japanese unit of weight, still used for cultured pearls. One momme equals 3.75 grams.

Mother-of-pearl:

is the smooth, hard pearly lining on the interior of upper and lower shells of certain oysters and other molluscs, used to make decorative objects, buttons and beads.

Nacre (NAY-ker):

is the pearly substance secreted by the mantle of certain molluscs to form a pearl. Nacre also creates the beautiful mother-of-pearl coating found on the inside of pearl shells and several other varieties of shellfish.

Natural pearls:

are formed entirely by accident and without the intervention of man. Either a parasite or other foreign substance is covered by nacreous layers inside the oyster.

Non-nucleated pearls:

are formed by the insertion of tissue only. See Freshwater pearl.

Nucleus:



is inserted into a pearl-producing oyster to speed up the pearl growing process. The nuclei act as the irritant upon which nacre is deposited, and are usually made from the shell of North American freshwater mussels.

Off-round pearls:

are slightly flattened or ovalish in shape.

Opera length:

refers to a pearl necklace 28 - 36 inches (70 - 90 cm) in length.

Orient:

is the typical pearly lustre seen on pearls or mother-of-pearl shell. Also known as iridescence.

Oriental pearls:

are natural pearls found exclusively in the waters around Bahrain in the Persian Gulf. It is not a cultured pearl.

Pearl:

usually refers to a natural pearl when no qualifying adjective, such as cultured or imitation, precedes it. According to CIBJO regulations, pearls are "natural formations secreted accidentally and without the aid of any human agency". However, this regulation may not always be adhered to since natural pearls make up such a tiny proportion of the trade.

Princess length:

refers to a pearl necklace 16 - 20 inches (40 - 50 cm) in length.

Rope length:

refers to a pearl necklace longer than 40 inches (100 cm); also called 'lariat' or 'saupier'.

Round pearls:

are perfectly round in shape.

Seed pearls:

are very small roundish pearls that form in the mollusc, often in addition to a larger cultured or natural pearl. They measure about 2mm or less and are usually too small to be used for jewellery.

Semi-baroque pearls:

are not round in shape; examples are pear, drop, egg, and button shapes.

Shape:

is one of the most important criteria in pearl selection. Pearls can be divided into four basic shape categories: round, off-round, semi-baroque and baroque.

Silver-lip oysters:

are used mainly in Australia to cultivate South Sea pearls. This type of oyster produces silvery white pearls.

South Sea area:

stretches from Burma and the Gulf of Thailand through the Sulu Sea of the Philippines, Malaysia, the Indonesian Arafura Sea and north-west Australia. It continues into the Cook Islands, eastward through Tahiti to the Tuamotu Archipelago and the Gambier Islands in French Polynesia.

South Sea cultured pearls:

are produced in the saltwater areas of north-west Australia, Burma and some South Sea islands. The pearl-bearing molluscs found in this area are much larger than the Japanese variety and can accommodate a much larger nucleus. They also produce nacre at a greater rate, allowing the pearls to grow very quickly.

South Sea keshi pearls:

are formed in the South Sea areas, these keshi pearls are larger than the Japanese variety and are frequently baroque in shape.

Torsade:

is a multi-strand necklace formed by twisting strands around each other. A popular way to wear freshwater pearl strands.

Uniform strand:

is a strand whose pearls are all about the same size





## **Before Tracy:**

### **A brief background to the history of the Northern Territory and Darwin**

The creation and development of Darwin from 1869 was the tangible expression of South Australian hopes for development of a northern province, centred on a port and capital which would be a focus for hinterland settlement and a base for trade with Asia. In 1862 the explorer John McDouall Stuart had finally forced a passage through the unknown centre of the continent, from the settled south to the north coast. In 1863 the British colonial authorities created "The Northern Territory of South Australia", carving the new area out of the parent colony New South Wales, and vesting it in South Australia, which had itself only been established in 1836.

The South Australians had quickly found that nature had imposed tight limits on development in their own hinterland. Exploration of the north coast of the continent, and short lived military outposts there, had given them hope that settlement in the far north might offer opportunities denied to them at home. Stuart had shown that the north could be reached overland, and he had given substance to South Australian dreams for a telegraph and a railway across the continent, and for settlement of an area which presumably was tropically moist and fertile.

After one false start, Darwin had its modern beginnings on 5 February 1869 when South Australian Surveyor General George Goyder and about 120 men arrived to lay out a northern town and port, and to survey agricultural land in the hinterland.





Goyder's survey camp at Fort Hill, 1870

In 1869 there were probably about 700 Larrakia Aboriginal people inhabiting the Darwin harbour foreshores and hinterland. This was the country given to them by their Dreamtime spirit ancestors. The first white settlers described the Larrakia as "peaceful and useful people ... lithe, well made, with cheerful faces". In Darwin's early years there was close contact between the Larrakia and the white settlers. Today, there are probably about 1500 people of Larrakia descent in Darwin.



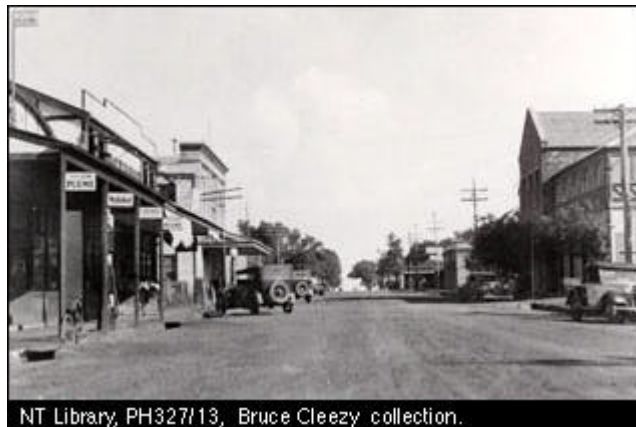
Larrakia people at Port Darwin in 1897

The ambitious South Australians hoped for rapid settlement, but few of the investors or speculators who bought land from Goyder's maps actually came to the Northern Territory. Instead, Darwin remained a small and isolated outpost. Only occasionally before 1946 was its population swollen to more than about 1500 people : during the gold rush prosperity of the 1870s and 1880s; when Vestey's built a large meatworks during 1914 - 1920; and again when defence preparations caused the town to boom in the late 1930s. Almost all Darwin civilians were evacuated in 1941 / 1942. Those who returned from 1945 found that they were refugees in a war torn town. Only from the 1950s did Darwin enjoy sustained development, and in 1959 it was formally declared a city.





A Darwin home in the late 1800s



Cavenagh St in the 1930s



Darwin 1959, near the corner of Mitchell and Knuckey Streets.

It then appeared that Darwin might at last achieve its destiny as Australia's northern capital, as the nation's gateway to Asia, and as proof of the success of white settlement in the tropics. Just as this destiny was about to be fulfilled, the northern city was devastated by Cyclone Tracy - a disaster of horrendous proportions.

## Previous cyclones in Darwin

Even before white settlement began in Darwin there was clear evidence of cyclonic activity. The soldiers at the British outposts had recorded "hurricanes" and earthquakes occurring during their brief stay, between 1824 and 1849.

The malevolence of natural forces was tragically demonstrated to Darwin's new settlers in 1875 when the ship Gothenburg, en route from Darwin to the east coast, sank off north Queensland during a cyclone. About one quarter of Darwin's tiny population was aboard the ship - many of them travelling south on their first furlough since



coming to the Territory. The Gothenburg wreck cost 102 lives, and the news of the disaster plunged the town into a deep gloom from which it only slowly recovered.

Destructive cyclonic storms were recorded in Darwin itself in 1878 and again in 1881, but these were mild events compared with the "great hurricane" which hit the town on 6 January 1897. This cyclone coincided with a high tide and caused a storm surge which hurled boats well ashore. Fifteen people died on the harbour. Eighteen of the twenty nine pearling luggers then based in Darwin were wrecked, as were the government steam launch and three sampans. It was "a night of terrifying destructiveness" which one preacher asserted was "a gentle reminder from Providence that we are a very sinful people."



Wesleyan Church completely destroyed by the 1897 cyclone

In 1917 and again in 1937 cyclones took lives and caused far-reaching damage in and around Darwin. Then, as though to prove that nature was not Darwin's only enemy, on 19 February 1942, the town suffered the first two of about sixty air raids which ceased only in November 1943. More than 240 people died in the first raids, and from 1946 civilians returning to war-torn Darwin found that they were refugees in their own land.



Damage to a house in the 1937 cyclone.



Damage resulting from Japanese air raids.

Through all these disasters there has been a consistent belief among many Larrakia Aboriginal people that the events have been caused by the actions of white settlers provoking the fury of Nungalinya (Old Man Rock - offshore from Casuarina beach). Nungalinya is said to be responsible for earthquakes, storms, and cyclones. In the



view of Aborigines, such events do not occur simply because of natural forces - the forces are provoked by human actions or failures. ([Cole, 184](#))

*(The persistent local mythology that many Darwin Aborigines believed, well before the cyclone actually arrived, that a major catastrophe was imminent and that they consequently left for safer places, is unsubstantiated.)*

## Response to previous disasters

Despite this strong historical evidence of natural and sometimes human hostility, Darwin regenerated after each disastrous episode. In the early years, rebuilding was sustained by faith in the future of northern development. By the end of the nineteenth century this faith had been dimmed by repeated failure, and South Australia had little will to restore Darwin after the 1897 cyclone. However, in 1911 the new Commonwealth Government had taken responsibility for the Northern Territory, and it quickly made good the damage caused by 1917 and 1937 disasters.

When war came to Darwin in 1942 the town was home to two distinct groups of people. The more visible and self-important group were the bureaucrats who came north for generally short terms to administer the Territory. The more committed group was made up of people who were comfortable with the Territory's cosmopolitan racial mix, and who felt that the place offered them social and economic opportunity which they could not find elsewhere. People from that second group were the first to come back to Darwin after the war, and they were to prove to be the most committed to the place after Tracy. On both occasions, it was their commitment which forced a (sometimes grudging) government commitment to the renewal of Darwin.

## Darwin and the Northern Territory in 1974

By 1974 Darwin was home to about 48,000 people (estimates vary), only slightly less than half the Territory's then total. Darwin was still very much a city dominated by the public service, but it seemed that it had achieved a critical mass which would support more balanced future development.

In the previous 20 years the city had expanded rapidly from its original town peninsula (1869 - 1914) and Stuart Park - Parap (1914 - 1946) into new areas such as Nightcliff and Winnellie (1946 - 1954). From 1956 new suburbs were created, from Fannie Bay to Rapid Creek (1960) and then spilling over Rapid Creek into Alawa and then into new areas in the northern suburbs. Darwin also acquired a rural residential fringe at Howard Springs and beyond.

Housing expansion had been rapid, and although building standards required some attention to the threat of cyclones, many new houses were, in practice, quite inadequately constructed to withstand the forces of high winds or flying debris.

There are conflicting estimates of Darwin's population on 24 December 1974. Useful figures, which are probably as accurate as any such figures can be, are given by Milliken. He estimates that Darwin's resident population on 24th December 1974 was 49,000; 5,500 of these people were away from the city (on recreation leave, etc) on that date, leaving 43,500 people physically present in Darwin on the eve of the cyclone.

This population was housed in approximately 12,000 dwellings. Unhappily, few residents realised that most of these dwellings would have little or no capacity to withstand cyclonic forces.

## Christmas Eve 1974 - the mood

As had been the case on the eve of the bombing of Darwin in February 1942, the pervasive mood in the town on Christmas Eve 1974 had been one of acceptance of the reality of danger, but the rejection of any suggestion that the threat of a cyclone should impinge on events of the day.

Earlier in December 1974 Cyclone Selma had hovered around Darwin before changing course and disappearing. There was a widespread belief that Tracy would behave similarly. Darwin residents for the most part went about the serious business of celebrating Christmas, and preparing for the holiday break.

However, it must be put on record that many individuals, businesses, and government departments prepared to meet the threat of Cyclone Tracy in exemplary fashion. Had they not done so, the impact of Tracy would have been even more severe, and the chaotic aftermath would have been even more difficult.



"Cyclone Tracy" formally came into existence at 10 AM on 21 December 1974, when it lay well to Darwin's north. On 24 December 1974 Tracy rounded Cape Fourcroy, Bathurst Island's western tip, and then moved along an east-south-easterly course toward Darwin.

### **The arrival, course and impact of the cyclone in Darwin**

By late afternoon on 24 December 1974 Darwin was cloaked by heavy and low cloud and it was experiencing ever stronger rain squalls and wind gusts. By about 10 PM the winds were causing physical damage. By midnight the damage was becoming serious, and it was apparent that Cyclone Tracy was about to pass across the city. Over the next six hours Tracy substantially destroyed Darwin and killed 65 people - 49 on land, and 16 at sea.

There are many varying accounts of how the news of the cyclone first reached the outside world from a Darwin which by daylight on Christmas morning had no internal or external communications. Gradually the news was emitted from several points of origin, by a series of improvisations. By lunch time on Christmas Day the broad details of the disaster were known to officials in Canberra; later that afternoon the Australian public had become aware that a cyclone had struck Darwin and that the city's plight was "grave".



# The Aftermath of Cyclone Tracy



## Response to Cyclone Tracy

### The national reaction

Immediately news of the cyclone reached the wider Australian community, fund raising and "in kind" help efforts began. Community groups of all kinds launched fund raising activities, and other initiatives designed to give practical help to cyclone victims - often by "adopting" members of kindred Darwin groups.

Within the Territory some of the first news of the disaster was conveyed by motorists driving away from Darwin - many in cars not really fit for travel beyond the suburbs. Every Stuart Highway community quickly organised itself to meet Darwin refugees, and to provide food, rest, mechanical aid, and fuel. At Adelaide River the small local population achieved the immense task of providing a hot meal for every person who stopped there.

Major reception centres were set up at Katherine, Tennant Creek, and Alice Springs. Accommodation was provided at Alice Springs, and arrangements were made for journeys to be completed by air, while cars were railed south. By late on Boxing Day, 26 December, the people of Alice Springs had raised over \$105,000 for immediate cash assistance for cyclone victims.

Beyond the Territory, even before news of the disaster was broadcast, radio and television programs were interrupted with announcements recalling armed services personnel from leave. This led to widespread concern that a war had broken out, and the concern was not allayed for several hours.

At each major airport refugees were greeted by Salvation Army and Red Cross workers. Clothing depots were improvised inside the airports, so that those who had flown out in pyjamas or without shoes were able to at least dress respectably before venturing further afield.

Information centres were set up in each state, with the Red Cross taking particular responsibility for maintaining lists of names of refugees and their temporary addresses. Newspapers were published for Darwin refugees, often containing reassuring personal news. Public housing waiting lists were waived so that Darwin families were given priority in allocation of accommodation.

One of the first interstate responses occurred at a Boxing Day test cricket match. During an adjournment in the game players from both teams moved around the boundaries, carrying buckets into which the crowd threw cash for the relief fund.

Support came from even further afield. Some of the world's poorest countries (e.g. Bangladesh, Lesotho) sent money and messages, as did Australia's traditional friends and allies.

Long term Darwin resident and psychologist Ted Milliken says that the overwhelmingly compassionate response of people and organisations throughout Australia "was important in minimising for all Darwin's people the stress of the circumstances of the days of their greatest need. Despair was not a necessary concomitant of devastation."

[\(Milliken\)](#)





NT Library, PH26/125, Karthuber collection.

## Immediate Health Concerns

Darwin's health services, and Darwin hospital in particular, were well prepared for the cyclone. Some months beforehand, "Emergency Procedures", which included a mass casualty plan and the establishment of a cyclone subcommittee, had been written. Cyclone Selma had induced a clean up of the hospital grounds, and on Christmas Eve additional precautions were taken. Normal preparations for the holiday period had included stocking with extra provisions and blood for transfusion. ([Gurd et al](#)).

Soon after dawn on Christmas Day casualties began to arrive at the hospital. During the day more than 500 patients were treated at the hospital, and many hundreds more were handled at peripheral first-aid centres. Most of those who reported to the hospital were suffering lacerations (usually caused by flying glass, iron, and other debris), while a few suffered fractures. 112 people were admitted to hospital, most suffering severe lacerations or blunt injuries caused by crushing, missiles, or falls. The two operating theatres were busy from 7.30 AM on Christmas morning until 1.30 AM on Boxing Day. Late on Christmas night two surgical teams arrived by air from Canberra, allowing local teams to be relieved. ([Gurd et al](#)).



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From Boxing Day a policy of evacuation of hospital cases was implemented. "Large numbers" ([Gurd et al](#)) were flown south. Evacuation was ordered in cases where a return to work within two weeks was judged unlikely. From thenceforth the hospital was able to keep its patient numbers as low as possible. Outpatients continued to report, many with injuries sustained to the feet during the searching and clearing of rubble.

On Christmas morning doctors, nurses and others quickly organised first aid posts at the approximately 20 congregation centres which became refuges for the homeless.

From 26 December additional doctors, nurses and health inspectors arrived from the south to help cope with the second phase of the disaster - the care of about 30,000 people crammed into emergency centres and makeshift housing, without water, electricity or sanitation.

From Christmas Day, trench latrines were dug by volunteers using back hoes and front-end loaders. Water supplies were delivered by tankers. Mass immunisation against tetanus and typhoid began. Daily health bulletins were broadcast once radio transmissions recommenced on 26 December - the bulletins were necessary to allay fears which resulted from false rumours of serious disease outbreaks. By 27 December it was judged that the immediate health emergency was under control.



Attention was now turned to broader environmental health issues. The Army was allocated the duty of clearing all rotting contents from freezers and refrigerators in 12,000 homes and many shops and commercial premises. The clearing was carried out within a week, by ten teams each of 20 men.

Refuse dumps worked continuously to receive garbage and debris. Twice weekly aerial spraying of the city with malathion, to control mosquitoes and other insect pests, was begun.

"The combination of measures adopted, powerfully assisted by the mammoth evacuation exercise, resulted in a high standard of environmental control, which, without question, contributed to the virtual absence of disease. ([Gurd et al](#)).

## Evacuation

### Initial evacuation response

At the first meeting of the emergency committee held in the early afternoon of Christmas Day it was concluded that Darwin had effectively ceased to exist as a city (at least for the moment) and that a massive evacuation was essential. ([Gurd et al](#) p. 643). This assessment was confirmed by Stretton when he arrived that evening to take charge of the emergency.

The scale of the evacuation has been questioned by many cyclone victims, and by subsequent observers. Within two days about 10,000 people had left, about half by road and half by air. It appears that after this initial outflow the desire to evacuate dissipated - there was a growing feeling that it was better to "stay and see it out". However, Stretton was committed to reducing the city's population to a "safe level" of 10,500, and he implemented a number of measures designed to make evacuation very attractive. ([Stretton](#), 107). Stretton was supported by the government, which promised full reimbursement of personal costs consequent on evacuation.



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The momentum of the evacuations was regained, and in the end 25,628 people were evacuated by air, and 7,234 left by road. By 31 December 1974 only 10,638 people remained in Darwin. ([Milliken](#), 199).

Given that he had assurances from the Director of Health that there were no serious health problems, and given that we now know that the adverse impacts of the cyclone were more serious among those who were evacuated, Stretton's judgment that the population of the town should be reduced to 10,500 could be questioned. However, it must be said that, in its context, the decision can be understood, even if it is called into question.

## National Disasters Organisation

### & Major General Stretton

The Role of the Director-General of the National Disasters Organisation (Major-General Stretton)

The Commonwealth government had taken steps to establish a National Disasters Organisation earlier in 1974, and Major-General Alan Stretton had been appointed its Director. However, when Tracy struck Darwin no legislation had been passed to vest special powers in the Director.



Reports of the cyclone reached the Canberra headquarters of the organisation at 6.20 AM (4.50 AM Darwin time) on Christmas morning, but there was no clear information until 12.25 PM Canberra time, when a message from the Secretary, Department of the Northern Territory in Darwin, was received, advising that 90% of the city had been destroyed, and asking for surgical assistance, a disaster assessment team, and urgent supplies.

At 10.20 PM Darwin time an aircraft carrying Stretton, Dr. Rex Patterson (Minister for the Northern Territory), a surgical team, and medical supplies landed in Darwin. While the aircraft was in flight Patterson received a message from the Acting Prime Minister, Dr. JF Cairns, directing that Stretton should take control of the disaster relief operations. It later became clear that there was little or no legal basis for this direction. Stretton was to infer that he possessed extraordinary powers, and this was to bring him into conflict with civil and judicial authorities in Darwin. (see [McLaren](#); [MacCallum](#))

Stretton carried out his counter-disaster activities through local liaison and action committees, coordinated by Ray McHenry, First Assistant Secretary of the Department of the Northern Territory. Priority was given to health issues, restoration of communication through the ABC radio station, restoration of water supplies, and evacuation.

In Canberra, "red tape" was slashed to permit purchases of emergency supplies and equipment and other mobilisation of resources with minimum delay.

Co-operative arrangements between government and private organisations were made to receive and accommodate evacuees. These organisations also co-ordinated the delivery of relief supplies.

"Normal administration" in Darwin was resumed at 1.00 PM on 31 December 1974, when Stretton "handed over" full administrative control to Ray McHenry, and recommended that normal civilian administration should resume. ([Stretton](#) ).

## The Role of the Armed Forces

The three branches of the defence forces played major role in the relief operations. The defence contribution was effectively deployed through liaison with the local committees.

Early on 26 December naval aircraft left southern bases for Darwin, with urgent supplies and personnel. Seven naval ships left Sydney at 11.30 AM on 26 December. The Navy was to play a special part in the clean-up of Darwin - difficult, distasteful and sometimes dangerous work.

The Army flew specialist personnel into Darwin. Through them, rations, stores, equipment, and specialist vehicles were supplied.

The entire RAAF transport fleet was involved in the airlift of supplies into Darwin, and the airlift out of 9,678 people who were evacuated by military aircraft.



NT Library, PH377/116, Karlhuber collection.

## Restoration of services

The primary responsibility for restoration of services rested with the Federal Department of Housing and Construction, which had been responsible for most of Darwin's infrastructure. On 25 December the Department established a special Operation Control Centre at its headquarters in Melbourne. Other centres were set up in regional offices throughout Australia.

Work to restore services began on Boxing Day when electricity generating sets and other materials were assembled and loaded on naval vessels in Sydney. An inventory of government hostel and other possible



emergency accommodation was compiled. Staff was rostered to arrange accommodation for evacuees and to arrange transport for men and materials bound for Darwin.

In Darwin, the Department's officers began clearing debris, and working to restore power and communications. Electricity Undertaking crews began removing fallen power lines and hooking up portable generators where these were available. Damaged and broken water hydrants were sealed off, and pumps were actuated to get the city's water and sewerage systems working again. Tarpaulins were placed over damaged roofs to create basic shelter.



## Social impact of the evacuations

Many studies on the social impacts of the cyclone and its aftermath have been published. The consensus is that, despite the vicissitudes of immediate post-cyclone Darwin, adult people who stayed in the city (were not evacuated) suffered less in terms of physical and mental health. The "stayers" were probably also less adversely affected in respect of such factors as housing and living environments, finance, personal networks, and general attitudes toward living in Darwin. Those who were evacuated but later returned suffered rather more; while those who were evacuated and never returned suffered most. Only among the evacuated non-returnees was there any significant evidence of reactive emotional disorders. ([Chamberlain et al](#); [Milne](#)).

Distress among evacuees was often aggravated by the physical break-up of families. ([Webber](#)). Webber also suggests that while the responses to Tracy were effective in terms of short and long term physical aid, there was a critical gap in the medium term, where problems were not dealt with effectively. In particular, Webber says, there was a failure to acknowledge that the disaster had emotional as well as physical consequences. The community had more social and physical resources than were at first apparent, but there was a failure to effectively utilise and reinforce these resources. ([Webber](#)).

Those who stayed or returned after evacuation generally had a more positive approach to Darwin's future; those who were evacuated and didn't return often "mourned" their alienation from a unique physical and social environment to which they had become comfortably adjusted. They had lost a distinctive physical environment and lifestyle, and social cohesiveness. ([Milne](#)).

The experience of Darwin's children mirrored that of their parents. There were many emotional casualties among the children, but the vast majority of disturbances were reactive, fear conditioned responses which faded over time. However, many evacuated children did have difficulty in adjusting to new schools. ([Milne](#))

There was a consensus that adverse social impacts on those who left after the cyclone were aggravated by the constraint (the permit system) on returning. Being in Darwin experiencing the "bad news" was not thought to be quite so bad as being away, sitting waiting for that news. ([Milliken](#)).

The scientific observers of the cyclone's social impacts all postulate that the "therapeutic community" (the post-disaster strengthening of community life) was a powerful factor which lessened the impacts on those who stayed or returned quickly. The Tracy experience suggested that "the extent to which disaster victims can cope and adapt may well be a function of their ability to remain inside the impacted community and be subject to its integrative and regenerative forces." ([Milne](#)).

## The permit system





Stretton, in an effort to minimise Darwin's population, had introduced a system whereunder all persons remaining in Darwin required a permit to do so. Permits were issued only to people judged to be essential to the relief or reconstruction effort. The permit system remained in force for several months, and was used to prevent early return by many evacuees. The legal basis of the permit system was extremely doubtful.

**Department of the Northern Territory**  
P.O. BOX 281, DARWIN, N.T. 8294.

Tel. address  
"Darwin"  
DARWIN

In reply please quote  
Telephone

**DARWIN ENTRY AUTHORITY**

The person(s) named below is/are authorised to enter the DARWIN CYCLONE DISASTER AREA.

Name(s) Rowland Harold Bell

.....

.....

.....

Conditions attached to this authority (if any)  
Manager - Engineering  
RETURNING TO WORK

.....

.....

.....

Signature(s) of Authority holder. [Signature]

Signature of person authorised to issue permit. [Signature]

This authority should be shown on request and/or surrendered to any Police Officer, airline employee or any other person checking entry into Darwin. It is not transferable.

This permit does not authorise the entry of a caravan into the Darwin Cyclone Disaster Area unless this is specifically endorsed on the permit.

## Return to Darwin - the commitment of people

By July 1975 the population of Darwin was estimated at 33,000 - many of them newcomers, and many living in damaged or improvised housing. There was a steady increase over the next two years as more housing became available. In early 1978 it was estimated that the city had regained the population level it had on 24 December 1974.

## Reconstruction

### Reconstruction - the political response

Tracy struck Darwin at a tempestuous time in national political affairs. The Whitlam led Labor government in Canberra was becoming increasingly unpopular, and the Opposition parties were signalling the refusal of Supply which eventually resulted in the dismissal of the Whitlam government in November 1975.



In this climate the government seized on the cyclone as a political circuit breaker. Prime Minister Whitlam interrupted an overseas trip to return to Australia to announce that the government would introduce special appropriation bills to cover the initial cost of rehabilitating Darwin and establishing a Darwin Reconstruction Commission.

The government also used Tracy to illustrate the need for a national approach to major crises, despite the nuances of the Australian federal system. Political leaders from both sides scrambled to visit Darwin and to be seen to be decisive in relief and reconstruction initiatives. ([MacCallum](#))

## **The Darwin Reconstruction Commission**

The Commission was the government's principal mechanism for implementing Prime Minister Whitlam's January 1975 pledge of "a determined and unremitting effort to rebuild your city and relieve suffering." Its mandate was to reconstruct Darwin within five years - in fact, it achieved the task ahead of schedule, in a little more than 3 years.

The Commission was established with cross-departmental and organisational membership, and it was soon supported by the legislative and financial resources needed to plan and implement the rebuilding of Darwin.

## **Rebuilding Darwin**

At first, the reconstruction effort was marked by what appeared to be indecision. It seemed that the Commission procrastinated while politicians and bureaucrats debated whether, where, and how Darwin might be rebuilt. There was undoubtedly a prevailing view that Darwin had been completely destroyed, physically and socially, and that all options were open in the reconstruction process.

"The near total destruction of the city caused by Cyclone Tracy prompted some planners and others to put forward radical proposals for the re-planning of the city." ([d'Rozario](#)). Some of these proposals included complete re-siting of the city; the abandonment of the northern suburbs; and the relocation of the airport. In the end, these radical proposals were frustrated by the political assurance that Darwin would be rebuilt on its existing site, and quickly. However, the proposals and the delays they caused created a great deal of uncertainty, and anxiety among evacuees.

Eventually, Darwin was rebuilt, substantially in the location and form it had pre-cyclone - and with the replication of pre-existing planning deficiencies.

## **Post-cyclone housing**

By 1 January 1975 Darwin's population was little more than 10,000. However, by May 1975 it had recovered to 30,000 - the influx being dominated by newcomers (especially construction workers) rather than returning evacuees.

The liner Patris was tied up at Darwin waterfront for nine months to provide emergency accommodation for up to 900 people; "Tracy Village" was set up for construction workers; 1700 demountable dwellings and caravans were brought to Darwin and located on house sites; hotels and hostels were fully utilised; and where possible short term repairs were undertaken to make damaged houses habitable. In May 1975 contracts were let to four firms to construct 2,000 homes.

However, by September 1975 not one new house had been completed. Stung by criticism of this situation, the Commission took a number of steps to eliminate delays. When it was wound up on 12 April 1978 the Commission had completed 3,000 new dwellings, mostly in the re-built northern suburbs. It had also assisted the repair of many damaged pre-existing homes.

Meanwhile, the NT Housing Commission and the private sector had also contributed to the redevelopment of the housing stock to the point where, by mid 1978, the city could again house its pre-Tracy numbers.

## **Cyclone Building Codes**

The early reaction to Tracy by building standards controllers was draconian, but a second post-cyclone building code achieved a reasonable balance between the need to assure the integrity of housing on the one hand and the need to enable new housing to be built with reasonable speed and at realistic cost.



Salient features of Darwin's post-cyclone building codes (now adopted nationally for cyclone prone areas) include requirements that buildings be clad to protect them against flying debris, and that their roofs be tied to the foundations.

## Darwin post Cyclone Tracy

### Darwin - Not the Same Since the Cyclone

A comparison of the 1974 and 1980 electoral rolls revealed that 60% of those who were enrolled to vote in 1974 were no longer in Darwin in 1980. ([Milliken](#)).

Subjective personal observation leads the writer to believe that the 40% of voters who were in Darwin in both 1974 and 1980 contained a high percentage of people who were already long term residents in 1974; and that the 60% who left comprised a high percentage of people who were less committed (cyclone or not) to remain in Darwin.

If this observation is well founded, then it can be said that there was in 1980 a significant "core" group of "old timers" who were committed to the place. Those people, and their families, are still strongly represented in Darwin in 1998, and their contribution to the "Darwin ethos" is a powerful one.

Again subjectively, the writer has observed that Darwin residents who lived in the city before Tracy, or who had strong and long term family connections with the place, are in now regarded as being "true Darwinites", while those who arrived later remain "transients" whose commitment to the place is untested. Tracy was in this sense a social watershed.

Before Tracy Darwin was a town dominated by public servants who were responsible to masters in Canberra. Few of them stayed in the place longer than the two or three years needed to get onto a fast track in the Commonwealth bureaucracy, and even in the private sector Darwin was regarded as a place for short term postings. For the majority, life in Darwin had a two year horizon.

To the old timers, these people were "long soxers" - people who weren't staying, and weren't responsive to Darwin's special qualities. They were blamed for everything that was wrong with Darwin, and for all the failures of the Northern Territory to achieve its mythological destiny of development of its supposedly boundless resources. Tiger Brennan, sometime miner, full time character, and Darwin's Mayor when Tracy struck, called them "those blinking bods from Canberra."

There was a form of local government, a Legislative Council with no real power and thus an excellent forum for verbal extravaganzas. Nothing was more extravagant and colourful than the bombast of Tiger Brennan and other Councillors who won popular adulation through the virulence of their attacks on Canberra and their clamour for local control of the Territory.

Brennan and his colleagues never thought that they would ever have to administer the self government, much less the statehood, which they argued was the right of all Territorians. Thus they were astonished in late 1975 when a tired and emotional Prime Minister Malcolm Fraser arrived to campaign for the Territory's one Federal seat - thought likely to be vital in the contest following the Whitlam dismissal.

Fraser thought that a promise of statehood in five years would be a certain vote winner in the Territory, and the promise was publicly made without local consultation. Fraser won, and there was more local surprise, and not a little dismay, when his government announced a timetable for self government as a transitional measure toward full statehood.

The election promise of eventual statehood might easily have been ignored, and few Territorians would have reminded Fraser of it, such was the lack of enthusiasm for local control once it became a real prospect rather than a mere debating ploy. However, this was the era of Fraser's "razor gang", and an at least superficial determination to cut direct Commonwealth expenditure.

One of the largest single line items in Commonwealth budgets had been the huge expenditure in the Northern Territory - a large figure at the best of times, but now swollen by enormous commitments to Darwin's reconstruction post Tracy. Fraser reasoned that the Commonwealth's accounts would appear far less profligate if this expenditure on the Territory could be shown as though it were in the nature of a grant to the States.



Hence the seemingly strange situation, as the self government timetable advanced, of a Commonwealth keen, even anxious, that the Territory should have self government, and an embryonic Territory government cautious, even reluctant, to accept the transition. It was a situation which the first Territory Chief Minister Paul Everingham and his advisers were able to skilfully exploit to win an extraordinarily generous financial agreement from Canberra to underwrite fiscal nirvana in the Territory for the first five years after self government.

Darwin had changed rapidly in the first three years after Tracy, but after self government in 1978 change was consolidated and accelerated. No longer was it possible to put the blame on Canberra for everything that went wrong (although attempts are still fashionable).

Tracy was thus the catalyst for "normalisation" of Darwin, and the Territory.







# ODYSSEY Tours & Safaris

## 7 DAY TOP END EXPLORER (A0E2)

Visiting the 3 main national parks of the Top End (Litchfield, Kakadu and Katherine Gorge) this "up market" safari explores the remote areas of Litchfield and Kakadu as well as offering a true cultural experience. Nights 2 & 3 are spent at Manyallaluk Aboriginal community, "the Dreaming Place" where the day is spent learning about Aboriginal lore, bush medicines and tucker. Camping in Litchfield and Kakadu is in our three permanent camps all equipped with our purpose built "Safari Tents". They are locally designed for our tropical climate. The walls are of canvas and the windows of insect screen. The floors are of wood and are raised above the ground. You'll enjoy the comfort of this spacious cool design. Each tent has 2 camp beds on to which is rolled a traditional Australian bushman's swag with high-density mattress, linen, blankets and pillow. Each camping area is serviced with hot showers and flush toilets.

### Day 1

We leave Darwin and head south across the Elizabeth and Finniss Rivers to Wangi Falls. From here we travel to our exclusive camp at "Minjungari" which gets its name from the beautiful blue water lilies on the billabong nearby. After lunch the 4WD vehicles are put to work as we venture further into the remote, less visited areas of this tropical wonderland. These falls cascade into beautiful plunge pools surrounded by tropical rainforests. Tonight, we camp at Minjungari, our exclusive base camp nestled amongst the eucalypt forest and paperbarks.

### Day 2

We break camp early this morning and travel to the town of Adelaide River. After a brief stop we travel to Pine Creek, scene of a major gold rush a century, then continue on to Manyallaluk, "The Dreaming Place", where we camp for the next two nights.

### Day 3

At Manyallaluk we meet some of the traditional owners of this area, who will share their knowledge of bush tucker and bush medicines and demonstrate their skills in craft work, collection of materials, woven baskets, mats and bark painting. A chance also to try your hand at spear throwing, didgeridoo playing or traditional fire making.

### Day 4

This morning we continue to the Nimiluk National Park where we enjoy a cruise on the majestic Katherine River. After the cruise we continue North into the stone country of southern Kakadu. The late afternoon is spent exploring the Gunlom Falls area and perhaps climbing to the escarpment top for spectacular views of the surrounding country. Overnight at Gunlom camp.

### Day 5

We continue our journey to the beautiful "Maguk", also known as Barramundi Gorge, where you have the chance for a refreshing swim after a short trek through the surrounding rainforest. From Maguk we travel to our base camp at Mardugal, then we visit the Warradjan Aboriginal Cultural Centre 'an impressive building built in the shape of the local freshwater turtle. Here you will learn about the traditional Aboriginal owners of the park, their culture, beliefs and lifestyles. Afterwards we enjoy an afternoon cruise on the world-renowned Yellow Water wetlands. Here we have a chance to see the teeming bird life and perhaps, the awesome saltwater crocodile.

### Day 6

Today we travel along the 4WD track to Jim Jim and Twin Falls. At Jim Jim, we can explore the gorge at the base of the tallest cascade in the Territory. Here we have the opportunity for a refreshing swim in the plunge pool. We also visit Twin Falls a little south of Jim Jim, where we travel by shuttle boat into the gorge, and then by the boardwalk to the base of the falls. Late in the afternoon we return to our camp at Mardugal.

### Day 7

After breaking camp we visit Nourlangie Rock, a large sandstone outlier towering more than 200 metres above the surrounding area, containing 20,000 years of Aboriginal culture depicted in art forms in many galleries. We turn for home along the old Jim Jim road, making a short stop at the Bark Hut Inn, then on to Darwin arriving in the late afternoon.



## TRIP NOTES

Thank you for choosing to travel with Odyssey Tours & Safaris. The following information will help you better prepare for your tour of the 7op End". Please read a and R you have any further questions please do not hesitate to contact us on the numbers listed.

Your tour is a "participative safari". Our usual staff: guest ratio is 1 :8 which means that 9 there are 8 or less of you there will only be one staff member, 9 there are 9 or more there will be two crew members. There is no hard work but the success of the tour depends on the participation of all passengers in general camp duties such as firewood collection, setting up and breaking of camp, and washing and drying dishes, etc. For practical reasons your guide will always light and tend the fire as well as do the cooking.

As with most motor vehicles, some seats are "beter" than others. We suggest that everyone rotate seats often to allow everyone an equal opportunity to have a window seat or a more comfortable seat. Swapping seats after each stop is the fairest way

## LITCHFIELD NATIONAL PARK

Litchfield National Park is located approximately 150 kilometres south of Darwin, the capital of the Northern Territory of Australia, and the main commercial centre for the region. There is a small township, Batchelor, about 40 km east of the park. The park covers an area of 146,XO hectares. Lying between the latitudes 12 degrees south to 13 degrees south it is subject to the North West monsoon which brings the majority of the rainfall in the months from December to March. The average daily maximum temperature varies from 31 degrees Celsius in July to around 35 C in the hotter months, October/December. Overnight minimums are around 15 C in July and 24 C in the hotter months.

The area was once inhabited by the Werat, Kungarakanj. Maranugu and Warai people who are the traditional owners of the area.

There is a central eroded sandstone (Middle Proterozoic) plateau from which a number of perennial waterfalls flow down into the major rivers, the Finniss and the Reynolds. These waterfalls offer refreshing swimming opportunities. The predominant flora is open Eucalypt forest but there are fascinating swamp areas and spectacular gully monsoonal rainforests along the perennial streams. A wide variety of native animals are present, the largest in the area being the Antelope Wallaroo and, in some waterways, the Estuarine Crocodile. The unique "Magnetic" Termite mounds are found here and are spectacular to see in light of dusk or dawn.

Odyssey's safari camp, Minjungari (meaning Blue Water Lily) is located in a remote part of the park near the Reynolds River.

Lachfield Park is a perfect year round destination, however we are unable to access overnight accommodation at Minjungari Camp once the monsoon flooding sets in - usually December to April.

## KATHERINE AND MANYALLALUK

Manyalialuk is a small Aboriginal settlement about an hour out of Katherine. You have the opportunity to spend the day with some of the local people, participating in their tour focussed on culture, bush foods and medicines, as well as traditional skills.

You will not be allowed to go to their private residential area and you must NOT bring any alcoholic drinks on to their land. To do so is a serious criminal offence under NT law.

Katherine is the 3rd largest town in the NT and is famous for the beautiful NRmiluk Gorges located where the Katherine River cuts through the sandstone escarpment upstream from the town. The township is the service centre for the many outlying cattle stations, agricultural farms as well as RAAF Base Tindal. Whilst you take a cruise here (on Day 4), your guide will obtain some fresh supplies in town. You will also have a brief stop in Katherine on Day 2.

## KAKADU NATIONAL PARK

Kakadu National Park is located approximat4 200 kilometres east of Darwin, the capital of the Northern Territory of Australia, and the main commercial centre for the region. The park covers an area of 19,757 square kilometres, about 200 km North to South and 100 km East to West. Lying between the latitudes---12degrees south to 14 degrees south. h is subject to the North West monsoon which brings the majority of the rainfall in the months from December to March.



A large part of the park is listed on the World Heritage list for both environmental and cultural significance. Much of the park is owned by the various aboriginal clan groups who are actively involved in managing their traditional lands.

The park covers a large variety of habitats from the hills and gorges such as Yurmikrnik and Gunlom in the Upper South Alligator valley, setting for the Jawoyn legend of Buile the creator; the sandstone plateau above the escarpment where Barrk, the Rock Wallaby lives; the monsoonal rainforest in the gorges such as Maguk (Barramundi Gorge); the freshwater wetlands, home to enormous diversity of birdlife ruled by MarawLdi, the Sea Eagle; the Eucalyptus woodlands which cover most of the dryer ground in the park to the coastal monsoon; and mangrove forest such as Mangerre, the East Alligator River.

**WEATHER CONDITIONS** The Aboriginal people recognise six seasons each characterised by distinctly different climate. These are:

January-February The monsoon time with heavy rains and flooding, waterfalls in full flow and a temperature range between 20C to 33C.

March-April Many plants are flowering & fruiting, South-easterly winds are drying out the land, 22C to 35C.

May-June Misty mornings and cool nights, The time of grass fires, 15C to 32C.

July-August The Top End's coldest time with "cold" nights, 12C to 31C (in the south-down to 5C), and warm dry days

September-October Hot days without rain, warm nights, animals congregate on the remaining waterholes - excellent bird watching, 20C to 36C.

November-December The storm season with spectacular thunderstorms and lightning displays, 20C to 42C.

There is no "best" time to visit - you choose your favourite from this array of tropical variety.

**BOOKING FORM** 9 you have not already completed this form please contact us or your agent as soon as possible. We need a to enable us to know of any special dietary requirements or medical conditions you have that we should be aware of.

**WHAT TO BRING** Please limit your luggage to one medium size soft bag. You should store any excess luggage at your hotel until your return. N your tour does not return to your your starting point, separate and prior arrangements should be made to forward it to your destination. This will assist with the smooth operation of your tour.

We do not provide alcoholic drinks on tour. 9 you wish to have wine or other drinks with your dinner (other than at Manyaliak & Nipbamjen, where it is banned) please purchase a and bring it with you. When selecting your drinks please bear in mind that we will have limitations on space in the ice box. You can also purchase supplies on Day 4 in Katherine.

**We recommend that you bring the following items:**

Wide brimmed hat.  
Sturdy and comfortable closed shoes for walking.  
Personal water bottle.  
Small day pack for your personal items.  
Clothing for hot days, eq. loose cotton clothing.  
Clothing for cool nights (May to August), eg. light jacket or jumper/sweater.  
Towel for after swimming.  
Swimming costume.

T-Shirt for swimming in. For environmental reasons we do not recommend the use of sunscreens when swimming in any waterways.

Torch/flashlight and batteries.

Sufficient film and camera batteries.

Adequate personal medications and toiletries.

Insect protection - "Rid" repellent works against mosquitoes. Long sleeved shirts and trousers or slacks are advisable in the evenings. Repellents in general do not repel flies, however, a fly net to hang off your wide brimmed hat will help keep flies off your face at times when the flies are about.

**SUGGESTED BACKGROUND READING & FIELD GUIDES**

Press, T, et al (1995) Kakadu, Natural and Cultural Heritage Management ANCA, NARLI, Australian National University, Darwin. N.T.

Spencer, W.B. (out of print) (1914) The Native Tribes of the Northern Territory of Australia, MacMillan, London.

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Brock, J. (1993) Top End Native Plants, CCNT, Winnellie, NT.

Miles, G. (1988) Wildlife of Kakadu, Barker, Alice Springs, NT.

Brennan. K. (1986) Wildflowers of Kakedu, Jabiru, NT.



Morris, I. (1999) Kakadu National Park Australia, Steve Parish Publishing, QLD

AGSO (2000) Kakadu and Nitmiluk (Katherine Gorge) National Parks, <[www.agso.gov.au](http://www.agso.gov.au)> Northern Territory. a guide to the rocks, landforms, plants, animals, Aboriginal culture, and human impact'

If you are unable to get any of these books you can try contacting our local book seller, "Bookworld" in Darwin by fax + +61 8 8941 1226. They take fax orders.



# Litchfield National Park



**Fact Sheet**

Litchfield National Park covers approximately 1500 sq km and is an integral part of the Northern Territory's network of conservation reserves. The Park contains representative examples of most of the Top End habitats. It features numerous waterfalls which cascade from a sandstone plateau named the Tabletop Range, intriguing magnetic termite mounds, historical sites and the weathered sandstone pillars of the Lost City.

Aboriginal people have lived in all the area for thousands of years. It is important to the Koongurrukun, Marranunggu, Werat and Waray Aboriginal people whose Ancestral Spirits formed the landscape, plants and animals and are still present in the landscape today.

## Access (see map)

Near Batchelor, 100 km south-west of Darwin, the Park is generally accessible all year (sealed roads) via Batchelor. In the dry season it is also possible to get to the Park via Cox Peninsula Road (some unsealed sections) and the Daly River Road (4WD).

## When to Visit

This Park is spectacular at any time, though most 4WD tracks are closed during the wet season. Some swimming areas, such as Wangi Falls, become unsafe after heavy rain and are closed for swimming (often till June), but kiosk and picnic facilities remain open. Fuel is not available in the Park.

## What to See and Do



**Camping** - is available at Wangi Falls, Buley Rockhole and Florence Falls. 4WD camping areas are (dry season only) at Tjaynera Falls (Sandy Creek), Surprise Creek Falls and downstream from Florence Falls. Caravan camping is restricted to Wangi Falls and no powered sites

are provided. Walk-in camping sites are available along Walker Creek (dry season only).

Most campgrounds are managed by concessionaires.

Camping fees apply. (A 'Park Fees' brochure is available).



**Accommodation and camping** - are available outside the Park at several commercial sites.



**Picnicking** - shady spots available at Florence Falls, Tabletop Swamp, Greenant Creek, Wangi Falls and Walker Creek.



**Kiosk** - located at Wangi Falls.



**Swimming** - many pleasant swimming spots are scattered throughout the Park.

Popular ones include Wangi, Florence and Tjaynera Falls and Buley Rockhole. Some areas can become unsafe after heavy rain and are closed for swimming - heed warnings.



**No swimming** - in the Reynolds River. Swim only in designated areas.



**Walking** - beautiful, quiet walks leave from most popular sites. Signs in the carparks and along the tracks will show you the way. They vary between short strolls and walks of 1 to 3 km.



**The Tabletop Track** is a 39km circuit bushwalk.

Overnight walkers are strongly recommended to register their route with the Overnight Walker Registration Scheme on 1300 650 730. Overnight walkers must camp in designated campgrounds.

You can access the track at Florence Falls, Greenant Creek, Wangi Falls and Walker Creek. Day use walkers are encouraged to advise someone of their intended route and expected return.

## Safety and Comfort

- Observe park safety signs.
- Note locations of Emergency Call Devices.
- Swim only where recommended, observe warning signs.
- Carry and drink plenty of water.
- Wear a shady hat, insect repellent and sunscreen.
- Scrub Typhus is transmitted by microscopic bush mites on grasses and bushes - avoid sitting on bare ground or grass, use a ground cover.
- Wear suitable clothing and footwear.
- Carry a first aid kit.
- Avoid strenuous activity during the heat of the day.
- Ensure your vehicle is well maintained and equipped.
- Beware of theft, lock vehicles and secure valuables.

## Please Remember

- Put your rubbish in the bin or take it away with you.
- Keep to designated roads and tracks.
- All cultural items and wildlife are protected.
- Pets are not permitted. Don't feed native animals.
- Nets, traps and firearms are not permitted.
- Take care with fire, light fires only in fireplaces provided. Fuel stoves are preferred at Walker Creek.
- Avoid using soaps and detergent in or near waterways.
- Camp only in designated camping areas.
- Collect firewood (fallen timber only) before arriving at your picnic or campsite.
- Generators are not permitted in this Park.
- Observe all fishing regulations.
- Check that your vehicle is not transporting pests like weeds and Cane Toads.

## Parks & Wildlife Commission of the Northern Territory

Batchelor Office  
Ph: (08) 8976 0282  
Fax: (08) 8976 0292  
www.nt.gov.au/ipe/pwcnt

Head Office - Goyder Centre  
25 Chung Wah Tee PALMERSTON NT 0830  
PO Box 496 PALMERSTON NT 0831  
Ph: (08) 8999 4555



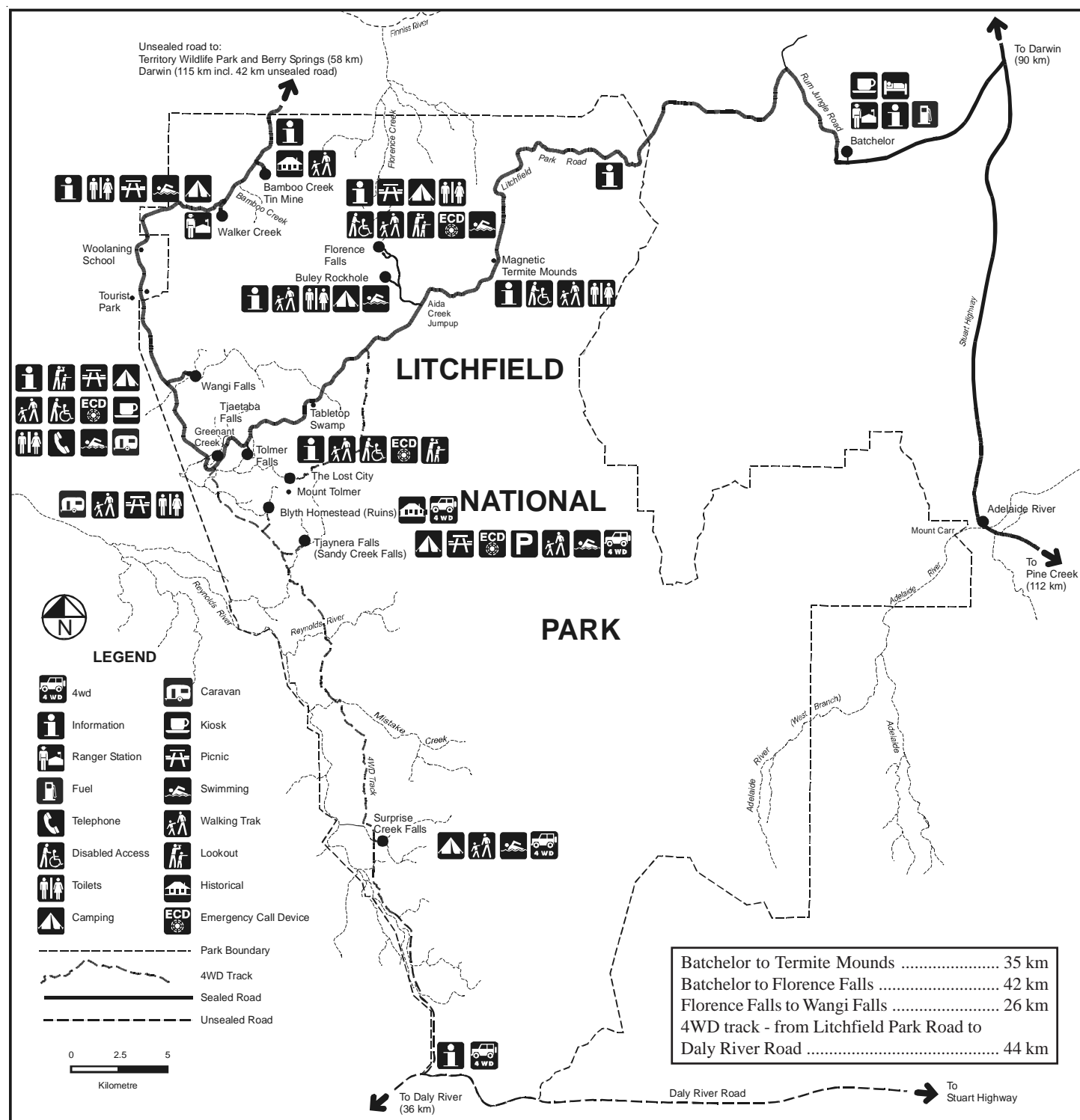
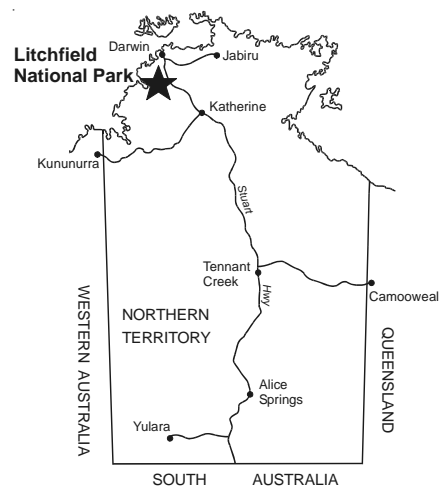
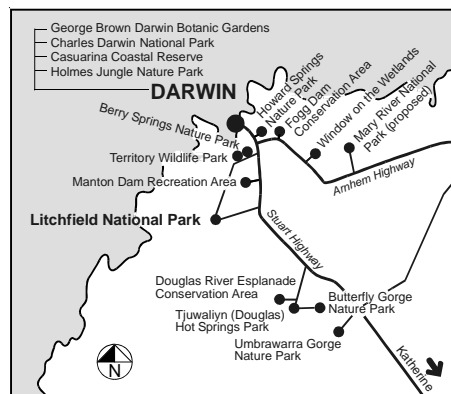
**Northern Territory Government**  
Department of Infrastructure, Planning and Environment





# Litchfield National Park

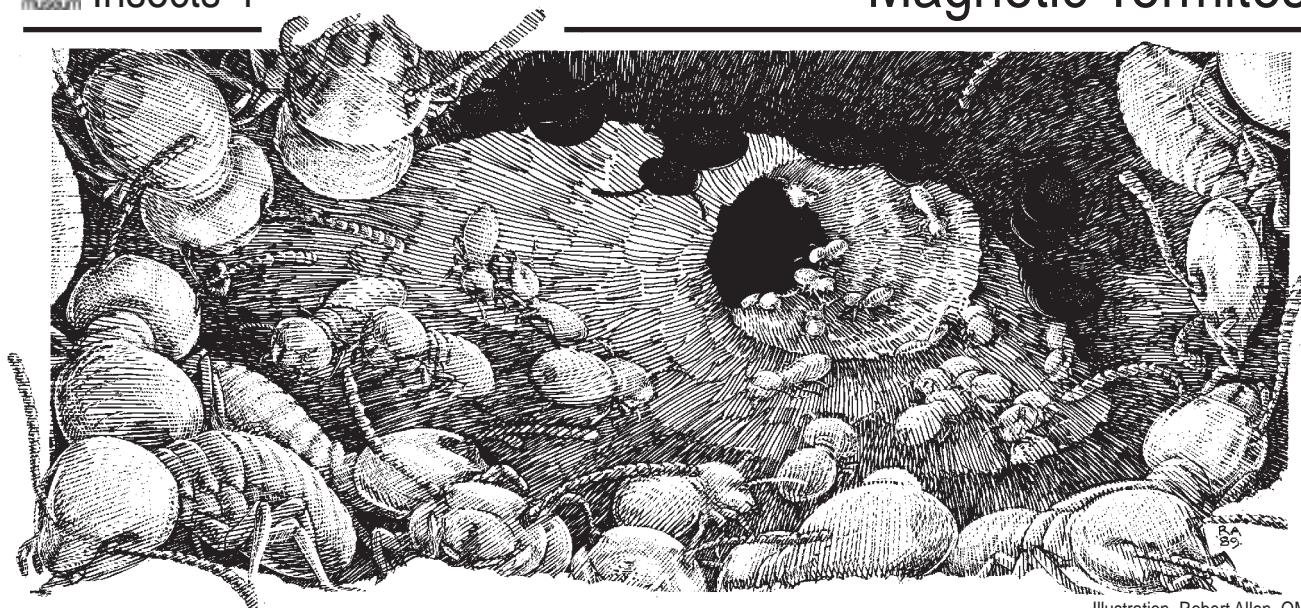
## Fact Sheet



For more information see our website: [www.nt.gov.au/ipe/pwcnt](http://www.nt.gov.au/ipe/pwcnt)

or contact Tourism Top End (08) 8936 2499 or 1300 138 886 [www.tourismtopend.com.au](http://www.tourismtopend.com.au)





Illustration, Robert Allen, QM

The 'magnetic' termite mounds of far northern Australia are imposing and spectacular. But what intrigues any observer is how these tall, thin mounds tend to align in the direction of north to south. Termites are found on all continents, but magnetic mounds are natural wonders of the tropical Australian landscape.

Two species of termites regularly build magnetic mounds. One of these is *Amitermes laurensis* from Cape York Peninsula and eastern Arnhem Land. It is named after the township of Laura, which is near the southern limit of magnetic mounds in Queensland. Curiously, south of this area *Amitermes laurensis* does not build magnetic mounds, but erects simple conical mounds. The other species that builds magnetic mounds is *Amitermes meridionalis* from near Darwin in the Northern Territory.

On Cape York Peninsula, magnetic mounds are found in two different situations. The first is on so-called 'graveyard flats', where a few to many hundreds of mounds occupy poorly drained, flat areas of one to three hectares. The other situation is on large, open grassy plains. These plains are usually located behind mangroves along stretches of low-lying coast. They may extend for several kilometres and there may be thousands of magnetic mounds. Both situations can be inundated for long periods during the wet season.

#### 'Magnetic' Mounds

Termite mounds house a colony and provide protection for the colony to breed, care for the young and store food. Individual termites are not all the same, but belong to different castes that have different roles. These castes include the winged 'reproductives' that are males and females capable of breeding; and sterile males and females that are divided into 'soldiers' and 'workers'. Reproductives that successfully mate are the founders of new colonies and become the king and queen. Usually there is only one queen in a colony, but *Amitermes laurensis* may have many queens in each mound.

Soldiers are specially modified to defend the colony. Workers perform special tasks such as food gathering, mound building and care of the young. The mounds are built from soil brought from beneath the ground. The soil is cemented together with the insects' saliva and excreta.

Magnetic mounds, besides being tall, thin and wedge-shaped with the longer axis orientated from north to south, differ from conventional mounds in several other ways:

#### Mound Growth

Magnetic mounds are enlarged by the termites adding thin layers of galleries on the surface around a central, almost solid core. In other species (for example, the rounded mounds of *Coptotermes*), the mound is enlarged by concentrated building in one part of the mound. This produces a 'budding' effect. These have thick outer walls and the galleries are internal.

#### Food Material

The termites that most people know feed on wood. These are often called 'white ants', but they are not related to ants at all. Where magnetic mounds abound there is a paucity of trees and wood, and the food of these termites is dead grass. The grass is harvested at night by the workers. They chew it into fine pellets that are then stored in great quantities in chambers in the mound. In many ways, these mounds act like great stationary herbivores feeding on Australia's grassy plains: our equivalent of the herds of mobile herbivorous mammals of the African plains.

#### Why Build 'Magnetic' Mounds

The awesome spectacle of plains populated by giant thin mounds all lined up parallel to one another has caused considerable puzzlement. Why do the termites build magnetic mounds? Many suggestions in the past have been largely speculative. Robert Logan Jack, an early Queensland Government Geologist who led many expeditions into Cape York Peninsula late last century, thought the shape of the mounds might be to promote rapid drying during nest construction. Certainly the large flat faces of the mound directly face the morning and afternoon sun. Eric Mjöberg, a Swedish biologist and anthropologist who visited Cape York Peninsula in 1912, suggested the elongated shape of the mounds was to avoid damage from winds. Modern theories explain the phenomenon as a means to protect the colony inside the mounds from extremes of temperature induced by the strong tropical sun. Protection is particularly needed in the hot summer months that coincide with rains. Other species of mound-building termites can retreat into cool, insulated underground galleries when temperatures in the mound are high. But northern Australia has heavy monsoonal rains and the areas where the mounds occur are inundated with water during the 'wet', so the termites cannot retreat underground and must survive the summer heat in the mound itself.

In the morning the sun shines full on the eastern face of a magnetic mound. At this stage the western face is not only in shade, but also insulated from the hot eastern face by the thick, solid core of the nest.

Temperature measurements show that there may be up to 8 °C difference in temperature between the two surfaces. In the afternoon the reverse happens and the western face becomes much hotter than the eastern. At midday, the hottest part of the day when no shade is cast, only the thin upper edge of the mound is presented to the sun so minimum heat is absorbed. It has been shown that more termites can be found in galleries on the western face in the morning and more on the eastern face in the afternoon - so there is obviously a pattern of migration to cooler parts of the nest during the course of the hot daylight hours.

Experimental rotation of mounds to an east-west orientation has been shown to upset the temperature pattern inside the mound



causing an overall rise of up to 6 °C internal temperature.

To build 'magnetic' mounds the termites must be able to sense the direction of the earth's magnetic field. It has been suggested that they do this by means of magnetite in their tissues, as has been shown in other animals, such as dolphins and pigeons, that orient themselves without access to visual guides.

Another problem of the internal environment of a mound, perhaps solved by the flat shape of the structure, is that of 'breathing'. Just like a grazing mammal, the collective members of a termite colony breathe oxygen from the atmosphere and give off carbon dioxide. These gases must permeate through the outer wall of the mound. During the wet season moisture reduces the permeability of the wall. The high ratio of surface area to volume of a flattened 'magnetic' mound increases the area over which this essential exchange of gases can take place. In other words, the whole mound acts like a 'terrestrial gill' for the colony. This idea is further supported by the frequent presence of thin side buttresses to the mounds of *Amitermes laurensis*. This further increases the surface through which gases can permeate.

#### Further Information

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**Author:** Geoff Monteith

**Illustrations:** Geoff Thompson

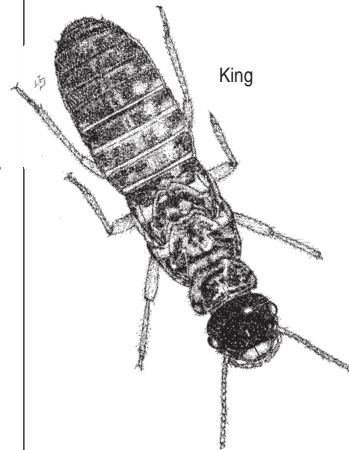
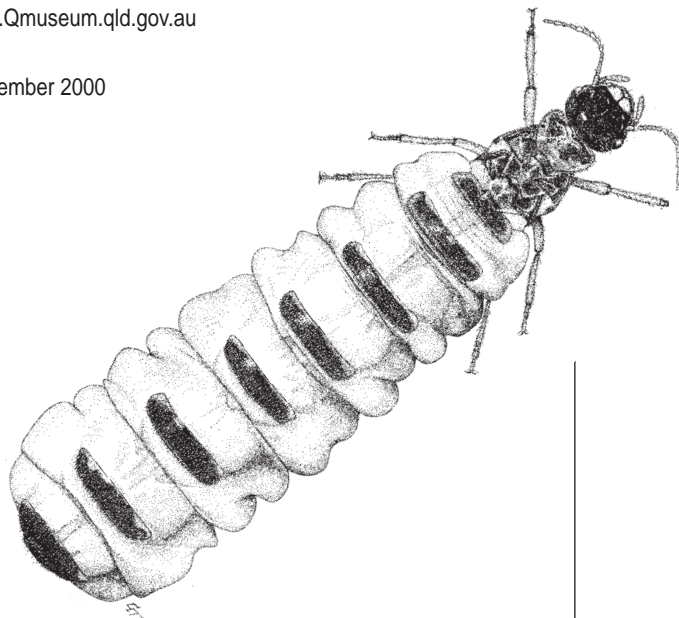
Queensland Museum

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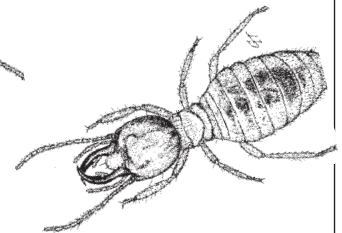
Phone (07) 3840 7555

[www.Qmuseum.qld.gov.au](http://www.Qmuseum.qld.gov.au)

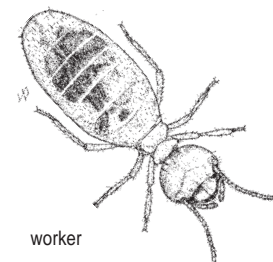
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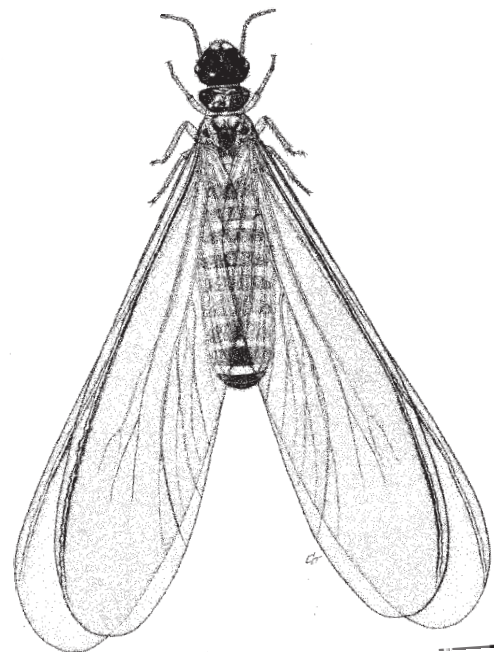
King



Soldier



worker



Reproductive



## **The Overland Telegraph**

### **One of the greatest engineering feats in the history of Australia**

Connecting Adelaide and the rest of Australia, through Darwin, with England by means of a single wire in 1872, was one of the greatest engineering achievements of the nineteenth century. It was completed by South Australians, under the direction of [Charles Todd](#), in less than two years. It turned out to be a top business deal and a political triumph. Today government inquiries, feasibility and Environmental Impact Studies would take twice that time before the job could even commence.



**The Overland Telegraph crossed Australia through mountains, flood-plains and deserts.**

**B**efore the completion of this line, Australians were fed on a diet of stale news, often months old. Charles Todd had already established a telegraph line from Port Augusta to Adelaide in 1865, connecting it with Victoria. A year later a telegraph station was completed at Melrose. Being well aware that a submarine cable from England reached as far as Java, it was planned to bring this cable to the nearest point of landfall, and Capital City, in Australia.

In 1870 the South Australian government, with the help and influence of Charles Todd, agreed to build a 3200 kilometre overland telegraph line connecting Darwin with Port Augusta, if the British-Australian Telegraph Company would lay a submarine cable from Java to Darwin. When completed in 1872 Australia could speak with the rest of the world.

Before it was completed though, John Ross, a Scottish born bushman in his fifties, had to mark out the trail which the line would follow. There had to be enough water and timber and no mountains. Ross followed John McDouall Stuart's tracks as close as possible but had deviate in the MacDonnell Ranges. It was during March 1871 that the Todd River was named and Simpson Gap and the Alice Springs were discovered by William Whitfield Mills, Sub-overseer of Sub-section C. On 11 March Mills wrote that he had found a dry riverbed, 'with numerous waterholes and springs, the principal of which is the Alice Spring, which I had the honour of naming after Mrs Todd'.

The task of constructing the line proved immense, involving the penetration into mercilessly cruel country of which little or nothing was known. Transport, of the 36,000 poles, many of them from the Wirrabara Forest, 36,000 insulators and pins plus the many tons of wire, had been one of the biggest problems. Todd bought horses from Beltana on his first trip north. As there was no refrigeration, fresh meat had to be transported alive, slaughtered and eaten when required. This herculean task through arid country of merciless heat, red sand dunes, little or no water but plenty of mosquitoes and flies was completed with the loss of only six men.

The completion of this exceptional feat, stimulating colonial pride, resulted in His Excellency the



Governor in Council to declare in November 1872, that 'Friday the 15th instant shall be observed as a Public Holiday, in celebration of the construction of the Overland Telegraph, which has brought Australia in telegraphic communication with Europe and other parts of the world'.

The building of this line opened up the Northern Territory, speeded up settlement, and the growth of pastoral and other industries. One of the side effects of the building of this line was the discovery of gold deposits at Yam Creek, Sandy Creek, Pine Creek and many other sites. This naturally gave rise to a gold rush, gold fever, speculation and the formation of hundreds of Gold Mining Companies, in particular during the early 1870s. Maintaining the line proved to be a major problem. Many times poles and lines would be washed away as a result of heavy rains and floods.

Within twelve months of its completion four expeditions had struck out to explore the west using the line as a starting point. Two expeditions were started by Ernest Giles, one by W.C. Gosse and another one by sixty-one year old Philip Egerton Warburton.

Another problem during its early days were attacks by Aborigines. A particular serious one occurred on 22 February 1874 at the Barrow Creek Repeater Station. This resulted in the death of James Stapleton and John Franks. A number of Aborigines were shot later by a party under the command of Samuel Gason.

During the summer of 1895 rain washed out the line, and railway, just north of Strangways Springs. The stationmaster wired to Charles Todd, 'Tried to get wire across but, when the blackboy was nearly over, the binding wire broke and he was washed down stream and lost the wire. I was unable to do anything till the binding wire arrived by special train from Hergott. This afternoon I got the assistance of a good swimmer and we worked hard till evening. The wire proved too heavy to swim with, so we passed over a strong wire with the binding wire attached. The line was finally joined on the other side in complete darkness. When we hauled the wire with blocks and tackle, and got it almost out of the water, it caught on a snag in the middle of the stream. If it doesn't break we will have it joined after daylight'. Forty-seven years later, news of the bombing of Darwin in 1942 was sent in Morse code down this line.

On 22 October 1999, a plaque was unveiled at the G.P.O. in Adelaide, commemorating the reception of the first messages from overseas via the new line in 1872. It reads:

**THE OVERLAND TELEGRAPH,  
ADELAIDE TO DARWIN, 1872.**

The 3178 kilometre line was built in less than two years and joined on 22 August 1872. It linked Australia to an undersea cable from Indonesia that came ashore at Port Darwin and made communication between Australia and the rest of the world possible in hours rather than weeks. The project was under the direction of Sir Charles Todd, KCMG, MA, FRS, FRAS, FRMS, FSTE, Superintendent of Post and Telegraphs. The first telegraph messages from overseas were received in Morse code in this building on 22 October 1872 via the Overland Telegraph Line.

Dedicated by  
The Institution of Engineers, Australia, 1999  
**Australia Post SA/NT**



## John McDouall Stuart

Today I find from my observations of the sun, that I am now camped in the Centre of Australia



**Stuart's Memorial Adelaide**

John McDouall Stuart, one of the most important people associated with South Australian exploration was born in Fife, Scotland, on 7 September 1815. He arrived in South Australia in 1838. He soon found work as a surveyor but within a short time bought his own instruments and horses and started out in business for himself. In 1843 he became a farmer but already was an excellent bushman and restless adventurer. After a year of farming he was glad to join Sturt's 1844 expedition. During this expedition they were stuck in the desert for six months. James Poole died and Stuart became second in command, drawing most of the maps as Sturt was almost blind. It was to be eighteen months later before they reached Adelaide again.

Later Stuart made several other expeditions before penetrating the desert areas beyond the salt lakes north of Port Augusta. During the 1850s there was a constant push for more discoveries to counteract the gold discoveries in Victoria which were draining South Australia of its male population. Not only did they search the Flinders Ranges for copper and gold, they were also looking for farming and grazing land and for several years the South Australian government kept men in the field for that purpose.

During these years Stuart was in the Northern Flinders Ranges surveying, prospecting and exploring, financed mainly by the

Chambers brothers and his friend William Finke. In May 1858 Stuart set out, with one assistant, Mr Forster, and an Aborigine, on one of the most remarkable journeys in the whole of Australian exploration. They travelled four months, covered more than 2000 kilometres, discovered huge tracks of good grazing land and had survived on rations which were supposed to have lasted for only six weeks before arriving at Streaky Bay. His last diary entry for that trip read, Saturday, 11 September. Arrived at Mr Thompson's station, Mount Arden. I cannot conclude this narrative without acknowledging that it was with the advice and assistance of my friend Mr Finke solely, that I undertook this exploration of the country.

He continued, I therefore look upon him as the original pioneer of all my subsequent expeditions, in which our friend Mr Chambers afterwards joined. Stuart gave his maps and diary to the government and in return received....nothing. The Royal Geographical Society of London rewarded him with a gold watch.

In April 1859 he went north again and it was on this trip that his assistant Hergott found artesian springs on 12 April and had them named after him. Many other springs were discovered on that trip which eventually led them to The Neale. Stuart's third expedition started on 4 November 1859 from Chambers Creek. His fourth expedition also started from Chambers Creek where they left on 2 March 1860, this time to find the centre of the continent. On 4 April the party crossed a very large creek 'with the finest gum trees we have yet seen. I have named it the Finke after William Finke. On 23 April 1860 he had reached the centre of Australia.

However Stuart's greatest achievement was the south-north crossing of the continent and back in 1861-62. The party, which included 19 year old Stephen King, left Adelaide on 26 October 1861 and reached the Indian Ocean on 24 July 1862. The next day the Union Jack, embroidered by Elizabeth Chambers with Stuart's name, was nailed on a tree, followed by three cheers for the Queen. On his return Kekwick, who had been again second in command, wrote to his brother from Mount Margaret Station on 30 November 1862, You will, I am sure, be very much pleased and gratified to hear of the safe arrival here of all our party and the unbounded success that has attended Mr Stuart's third attempt to reach the coast'.

He went on to say that they had been away from Mount Margaret for forty-four weeks. but would remain



at the station for some days to give the horses some time to recover before moving further south. As a result of this journey, the opening up of the Northern Territory was made possible, and a route discovered for an Overland Telegraph Line linking South Australia with England and the rest of the world in 1872.

In 1863 Britain added the whole of the Northern Territory to South Australia, a decision greeted with great enthusiasm by most South Australians. George Fife Angas though believed the new area to be too big a responsibility for South Australia.

As a result of the severe hardships he suffered on his expeditions, Stuart was in poor health and tried to settle down at Moolooloo. He returned to Scotland to live with his sister and later moved to London with her where he died on 4 June 1866 at the age of fifty. The name Alexandra Land which Stuart would have liked for the Northern Territory was never used. The transcontinental highway still bears his name. Stuart Terrace, Stuarts Well, Stuart Town, Stuart Park, Stuart Caravan Park and Central Mount Stuart are all named after John McDouall Stuart.

On his arrival back in Adelaide in 1862, Caroline Carleton, author of the Song of Australia, wrote,

Full many a weary league  
Of hunger, thirst, and pain  
Our brave explorer trod,  
And traversed o'er again,  
Before he reached the goal,  
And cooled his burning brow,  
And stayed his halting steps  
Where the northern waters flow.  
Grim silence reigned supreme,  
Save alligator's splash,  
Or sea-mew's shrilly scream,  
Or ocean's restless dash;  
Yet flashed that leader's eye,  
And triumph filled his soul  
As he heard the bird's discordant cry,  
And saw the waters roll.

Ten years later, to mark the tenth anniversary of Stuart's historic trip, Carleton added another two verses.

Methinks t'were worth a life  
To stand as there he stood-  
Forerunner of a dauntless race,  
Proud rulers of the flood.  
Across the desert waste  
He hears their hurrying feet;  
He sees the flashing wires  
That mighty empires greet.

His dream is all fulfilled,  
Responsive echoes ring  
Around the circling earth,  
Sped on the lightning's wing.  
And what hath he? - a distant grave;  
Unblazoned is his name;  
And what have we? - a beaten path  
To honour, wealth, and fame.



# Adelaide to Darwin Railway - History

## The World's First Railways

<http://www.aarc.com.au/aarc/info/history.html#transcontinental>  
AustralAsia Railway Corporation

It is hard to imagine the social and industrial change ushered in by the 19th century 'Golden Era of Steam'.

Trains replaced uncomfortable, expensive and time-consuming trips by camel, horse and bullock wagon, stage coach, ship and even dog sled, allowing people to travel for pleasure and live away from their work for the first time. Trains carried the mail, fish to London, cattle to port and troops to war. Trains even led to standardised time! In England, time between towns could vary by up to 14 minutes. The new telegraph network, usually located at train stations, allowed English towns to keep to 'train time', while the first trains from Darwin to Pine Creek ran to Overland Telegraph time.

Trains were built in the 14th century to cart material from European mines and connect mines with quays. They were drawn by horses or people (including women and children).

The first public goods train was the Surrey Iron Railway Co, a horse-drawn service which opened in 1803 and ran between Croydon and Wordsworth for 51 years. The first fare-paying passenger line was the Oystermouth Railway in Wales, worked by horses and opened in 1806. It was later called the Swansea and Mumbles Railway, converted to steam then electricity, and closed only in 1960.

However, it was the Industrial Revolution that brought railways into their own. Iron and steel were plentiful, and railways were built using cast iron rails and flanged iron wheels.

The first steam engine, George Stephenson's famous Locomotion, was little more than a boiler on four wheels. It was built in 1825 for £500 and operated on the Stockton to Darlington line in the north of England. It was replaced by the Rocket in 1829.

Within decades railways had spread across the world and English factories and foundries were turning out rail and rolling stock for export.

The first rail journey in Australia was an 11-kilometre horse-drawn tram between Goolwa and Port Elliott in South Australia, which opened in 1854. In the same year the first steam train ran three kilometres from Melbourne to Port Melbourne, followed shortly afterwards by a 23-kilometre line from Sydney to Parramatta. South Australia opened a 13-kilometre line to Adelaide in 1856 and by 1860 had a line to the Kapunda copper mine.

In 1855, the first NSW Railway Governor spoke of the time "when the whole country would be covered with a network of railways... to help develop the resources of the country and increase the value of the vast Territory now lying waste." By 1861 there were 390 kilometres of line in Australia, by 1871 there were 1657 kilometres, and by 1881 there were 6456 kilometres in six colonies.

In countries such as Canada and America, railway lines ran from coast to coast, linked isolated towns, fostered settlement, and were regarded as instruments of nation-building. In Australia, however, 'railway mania' was parochial and uncoordinated. Rather than linking isolated towns and seaboard, railway lines were built to link ports with local hinterlands, not city with city. Each colony jealously developed autonomous economies and railway systems, with different gauges and little thought of transcontinental travel. It was to be another 100 years before gauges on the national rail network were standardised.

Gradually, the era of steam passed. Although the ready availability of coal meant steam engines lasted for over 100 years, they were regarded as dirty, inefficient in their use of fuel, and the need for water boilers created supply problems. In the 1950s, steam was replaced by diesel.

These days, electric trains have become common, especially for services in built-up areas. But around the world, people still love their steam engines and museums such as the Ghan Preservation Society in Alice Springs have lovingly restored old trains as tourist attractions.



The Northern Territory's first engine, the Sandfly, a Baldwin shunter built in Philadelphia in 1886, worked in Darwin for 60 years. The restored shunter is now on the Keswick station platform in Adelaide where passengers embark on the Ghan passenger service for Alice Springs.

## Early Northern Territory Transport

When Australia's remote inland was settled, there were no trains to carry passengers and freight. Early explorers battled across the continent by foot, horseback or camel, many dying of thirst and starvation. The first settlers in Port Darwin faced an uncomfortable 5025 mile trip by steamer, running the gauntlet of reefs and storms off the Queensland and Victorian coasts.

Once they reached Port Darwin, adventurers and miners alike struggled inland on foot. Those with a little money could take a boat to the other side of the harbour to meet Haimes' Royal Mail Coach, which left Southport at 6 am on Sundays. However, the cost of taking freight across to the Southport jetty was twice the cost of bringing it from Adelaide and bullock wagons to the Pine Creek gold fields could take weeks in the Wet season. The flood of mostly Chinese miners arriving on the Territory gold fields in the 1870s couldn't afford the fares and generally carried provisions on their backs.

One of the Territory's first settlers, Harriet Daly, arrived in 1870 with her father, Bloomfield Douglas, the first Government Resident in Darwin. She paints a vivid picture of early Palmerston, as Darwin was then called.

After a three-month voyage on the Gulnare, their furniture following in a barque, the Douglas family was eagerly greeted by earlier settlers hungry for Adelaide gossip. They waited another three months for a ship to bring letters, books and supplies. Mrs Daly talks of the family sitting up all night to read 'sacks' of newspapers after a later shipment: "Can it be credited that the whole Franco-Prussian War had been fought, and the deadly struggle over, before we had even heard of there being a prospect of war?" she exclaims.

In 1872 the Overland Telegraph line was built between Darwin and Adelaide, connecting Australia with the rest of the world. This provided a major boost for farmers who, for the first time, could check daily wool and wheat prices on the London market instead of waiting months for the mail and European papers.

Building the line meant 15,000 telegraph poles across the continent. But first the telegraph teams had to land! Mrs Daly describes their arrival:

*'All the cargo had to be unloaded, and this was no easy matter, for there was no jetty, even of the rudest description, at which a boat, let alone a ship, could lie. The horses were landed first - hoisted in slings and lowered over the ship's side, and when once in the water, they were released and swam to land. Drays were floated ashore, their wheels following them in a boat, and a large telegraph camp was formed on the tableland overhead.'*

The telegraph teams then had to push inland in country described by Mrs Daly as:

*'... destitute, not only of any road, but absolutely devoid of any cleared track. As the line was surveyed - a sufficient length being first chained by a surveyor, who was followed by axemen - trees had to be felled and a certain width maintained, which was specified in the contract, for drays to follow... Everything for the use of the construction party had to be taken on the drays, for they were going into an absolutely desolate country, containing nothing that would sustain human life except the yams used by the natives. '*

During the Wet, travel became impossible, with horses having to pull drays "through a perfect quagmire of mud"

The story was similar for those travelling into the interior. Dorris Blackwell, whose father Thomas Bradshaw was one of the first telegraph masters in Alice Springs, talks of her first trip in 1899:

*'After reaching Terowie, about a hundred and fifty miles north of Adelaide, we were put aboard the narrow-gauge 'Ghan and remained in the same reserved carriage until Oodnadatta, where we arrived three days later... Even to a girl, there seemed to be something about a steam engine which is missing from the diesel and electric trains we have today...*

*'It hissed and snarled, grunted and whistled, and smoked like some monstrous human being. We came to regard ours as a friend almost as much as we did the driver and the firemen. These men,*



*in their blue overalls with big sweat rags of cotton waste, were friends indeed. They made the trip a joy for us all. When we wanted a cup of tea, for instance, we simply took a teapot along to the driver at one of the frequent stopping places. He pressed a button and, presto! We had a potful of boiling water. Nor were they ever in a hurry; they didn't mind stopping for a yarn with passers-by, or waiting patiently for passengers who wandered off. If some were more than usually slow in returning to the train the driver would blow his whistle peremptorily, but never did he threaten to leave anyone behind. He knew none were travelling north for pleasure.'*

From Oodnadatta, the family had a 300 mile trip to Alice Springs, which took 18 days of following the line of telegraph poles by horse-drawn buggy and buckboard. There was no protection from the weather as they travelled through gibber and sand, on iron-tyred wood wheels, cooking utensils and water bags hanging from the buckboard. Five horses were needed, with another 30 in reserve, but many had to be abandoned after the strenuous trip.

Once the family had arrived in Alice Springs, their only contact with the outside world was by telegraph, with medical consultations conducted in Morse code. Supplies arrived once a year with strings of camels, which had been brought to Australia for the Burke and Wills expedition, and their Afghan riders.

The cost of bringing building materials to Alice Springs was prohibitive, most early graziers living in primitive camps without their families. In 1929, when Alice Springs' 200 residents gathered to meet the first Ghan, which arrived over five hours late after boiler problems at Oodnadatta, the Northern Territory Times and Gazette predicted "striking developments in the pastoral and mining industries as a result of the line which should do much to make life in Central Australia more comfortable and less costly".

## **Start of the Transcontinental Line**

The first suggestion of a transcontinental line between Adelaide and the tropical north came from a Melbourne businessman, J. Roberston in 1858. This was four years before land speculators financed John McDouall Stuart's trip across the continent; five years before South Australia took control of the Northern Territory; and eight years before the settlement of Escape Cliffs (which moved to Palmerston in 1869). Not surprisingly, the South Australian Government rejected the offer.

However, the benefits of a transcontinental railway were a constant theme of South Australian Parliamentary debate for the next four decades.

The 19th century was Australia's pioneering era, with gold seekers, adventurers and pastoralists seeking new land and fortunes. In South Australia, farmers moved north across Goyder's 'drought line' in an attempt to find more arable land, good seasons giving them confidence in the quaint belief that 'the rain follows the plough'.

Railways were needed to bring wheat and mining produce to Port Augusta and Adelaide, but these early lines were seen as the start of a transcontinental line that would foster the development of mining, tropical agriculture and trade with Asia.

The problem for the small colony was how to pay for the lines. Canada's 3000 mile transcontinental railway was built by a Montreal syndicate and funded by granting large tracts of land to the developers. But South Australians were suspicious of overseas interests and determined to build their own railways, with loans from London, confident that the lines would quickly pay their way.

In the meantime, however, South Australia was more concerned with building the Overland Telegraph line through Stuart's newly surveyed country. Not only was this the largest infrastructure development in Australia of its era, but the role played by Darwin when the cable arrived from Java in 1872 symbolised the Top End's strategic importance to Australia.

By the time the telegraph line was completed, its costs had quadrupled and the South Australian Government was broke. A vote to build a railway line by land grant was narrowly defeated in 1872. In 1876, a Bill authorised a railway line from Port Augusta to Government Gums (later Farina), saying:

*'Trains carrying goods, or goods and passengers, shall not travel at a greater rate of speed than 14 miles an hour; and trains carrying passengers only shall not travel at a greater rate of speed than 20 miles an hour.'*



The £578,944 construction contract, the largest of its kind in Australia, was awarded to a South Australian firm, Barry Brookes and Fraser. The first sod was turned by Governor Sir William Jervois in January 1878 - two months after the first work gangs had actually left Port Augusta. As the newspapers of the time reported:

*'He believed it was Trollope who said that this railway was to go through a desert to nowhere. But he ventured to say that it did not go through a desert and that it went everywhere. If it only went to Port Darwin it would be worth constructing. But in going there it went to Java, India, Siam, China, and also shortened the communications with Europe and America. The line would ramify eventually to Queensland and New South Wales, and who could tell the full benefits which would accrue from connecting all these colonies with the iron band of a railway.'*

This Southern Line reached Oodnadatta in 1891, which remained the railhead until the line was extended to Alice Springs in 1929.

As late as the 1970s, Territorians have fond memories of the old Ghan crossing bad sections of the track at walking pace, or being held up for days at Flood-prone Finke. Former Territory policeman Tony Kelly recently recounted working at Finke in the 1950s for Citation, a magazine published by the NT Police Historical Society:

*'The main events of the week were the arrival of the Ghan, which stopped at the Finke to fill the depleted water tanks of the steam engine, and to refresh the passengers at the pub. When ready to leave, the train would blow its whistle to empty the hotel. Sometimes it would have to start up and move the carriages to convince the drinkers to leave. It was a hectic half - hour but never any trouble as the customers concentrated on drinking. The Ghan was not air conditioned - I don't think anything was - and at that time it did not have a Bar.'*

In 1980, a new standard gauge line opened from Tarcoola to Alice Springs along a less flood-prone route.

## The Northern Line

In 1883, the John Cox Bray Government introduced the Palmerston and Pine Creek Railway Bill. The £959,300 contract went to C & E Millar of Melbourne, while Mr Wishart won the £51,600 contract to build a jetty. The Millars proved efficient contractors and the Krupps lines and the bridges they built were still in use 80 years later.

In the north, unemployed miners from the Kimberleys, then thousands of Chinese and Indians did most of the back-breaking work. The Chinese for many years outnumbered the few Europeans living in the Northern Territory and, as miners, merchants and service providers, were essential to the Territory's early development.

As the railway grew, it replaced Charles Haimes' weekly passenger and mail coach from Southport (a town at the bottom of what is now Middle Arm). Southport closed but Rum Jungle, Adelaide River, Brock's Creek, and Burrundie grew.

The northern line was built primarily to take freight. But after opening on 30 September, 1888, it rarely ran at a profit. The gold rush died, cattle were not proving successful and were too far from the line, the Wet season caused derailments as embankments washed away, termites ate the wooden sleepers, and the Territory's population was in decline.

By 1891, South Australia had spent 10 million on railways, the colony's bonded debt was 21.5 million pounds, two million of which was incurred in the Territory, and the completion of the northern line coincided with growing disillusionment with its northern colony. In 1911, the Commonwealth took over the administration of the Territory.

Damage caused by a cyclone in 1897 took two years to repair. Meanwhile, the Government was faced with the cost of replacing the jetty, which was suffering from the effects of toredo bore worms and the weather.

As part of the new administration the first Superintendent of Railways and Harbour Master, H V Francis, was appointed by the Government Resident Gilruth in 1912. Francis' responsibilities included the Government owned steamer fleet, collecting lighthouse dues from visiting ships, maintenance of the Government's electric light and refrigeration plants, and care of the Resident's car.

Darwin was hardly a thriving tourist destination, but when steamers called, special trains met them at Port Darwin and took passengers to the Botanic Gardens, the town's sole tourist attraction, for a fare of two shillings.



By now, the total non-Aboriginal population was still only 3310 (1418 European, 1331 Chinese, 280 Aborigines of mixed race and 281 'others'). Poor economic conditions continued to plague the railway, with the failure of crops at Batchelor and the short-lived Vestey's Meatworks between 1914 and 1920, which at its peak used three trains a day and employed 460 men in Darwin.

At the end of the First World War work began on extending the line to Emungalen, on the banks of the Katherine River, so Vestey's could get cattle to the Darwin meatworks. The last section of this line pioneered the use of tractors and early model earth-moving equipment. The pressed steel sleepers were the first of their type made in Australia.

Labour was short, so Greeks, White Russians, and Patagonians were brought to Australia. A full-time doctor was appointed, the beginning of a Government medical service.

Local police soon came to know some of the 'wilder' elements of the railway gangs in Katherine. In one novel crime, thieves built a spur track into the bush, removed the goods in two vans, set the vans alight and covered their tracks by removing the rails.

Many of the workers settled in the Territory, lasting longer than Vestey's which closed in 1920, leaving the Government to meet the £500,000 cost of upgrading the line.

Despite this setback, a £94,000 bridge was finally built across the Katherine River, largely to relieve unemployment. The 213 metre bridge was based on the design of a bridge in Penrith, NSW. It consisted of seven 100-foot spans and was supported by reinforced concrete piers founded on cast-iron cylinders filled with concrete and resting on solid bedrock. Stone came from a new quarry at Edith River. It took a year to build and was used during floods for all traffic until a new high level bridge was built in 1976.

The first train crossed in 1926, Emungalen closed, and the town of Katherine grew on the new site across the river. The line was meant to continue on to Daly Waters, but when funds ran out in the Depression, it terminated at Birdum, 509 kilometres from Darwin. There was nothing at Birdum - except a buffer to indicate the end of the line.

The inefficiencies of rail at the time and the lack of a sealed road made Darwin dependent on shipping - until the Second World War when shipping became unsafe and troops moving to the north had a long and uncomfortable trip by land.

Darwin became a strategic defence post after 220 Darwin people were killed in the only major Japanese bombing raid on an Australian city. At the peak of defence activity in the north, there were 120,000 troops and, since shipping was no longer safe, the railway became essential for supplies. Unfortunately, the rail and rolling stock had run down and the first troops arrived in converted cattle trucks, dubbing their northward ride the 'Spirit of Protest'. A unique carriage was made for short trips by placing a Leyland truck chassis on rail wheels. The contraption looked odd, but necessity was the mother of a useful invention!

The need to move troops and supplies led to suggestions of closing the 1000 kilometre gap between Birdum, where the northern line had reached in 1929, and Alice Springs. In the end, the Stuart Highway was sealed between Alice Springs and Darwin, leaving the legacy of a major infrastructure project to the Territory.

Hundreds of volunteer firemen and train drivers came to work in the Territory during the war as Darwin's rolling stock received a massive boost. Not only did they work long hours in trying conditions, but considerable ingenuity was required in restoring damaged lines as there were no cranes or breakdown carriages. Because they lacked continuous brakes, the trains were difficult to control and there were many derailments.

After the war, the railway had mixed fortunes. Despite the introduction of diesel hydraulic rail cars with air-conditioning and reclining seats, the line was not well patronised and deteriorated. There was a boost in the 1960s with the opening of the Frances Creek iron ore mine, which closed in 1976 - the victim of damage from Cyclone Tracy in 1974, a crash caused by an out-of-control ore train in 1972, and declining iron ore sales.

Darwin people were upset at the loss of their line. As Harvey says in his book, *The Never Never Line*:

*'Profit-making had never been a high priority with the Never Never Line. Service had been its prime motivation over the years - not the blue ribbon service which panders to the upper circle but practical, down-to-earth, pioneering service proffered cheerfully within the limits of meagre*



*resources. Its trains had run whenever asked, despite enemy bombs, cyclones, floods, economic depressions and recessions, government and public indifference, and the inexorable delay caused by the tropical environment.'*

National Australia Rail became a freight agency for road trains and redundant staff were given priority for other jobs in the public service, including work as prison guards.

The rails were disposed of, at \$50 a tonne, to Queensland, and as reinforcing rods to Hong Kong, Taiwan and the Philippines. Sleepers were donated to Indonesia under the Colombo Plan. Wagons went to Port Augusta in South Australia. The old Larrimah school for the children of railway workers was moved to Berry Springs.

## Completing the Trade Link

*'Port Darwin is one of the finest harbours in Australia... So sure as to-morrow follows to-day this magnificent harbour will be the Singapore of Australia, provided, of course, certain works are under-taken and restrictions removed. The work I refer principally to is the trans-continent line, an undertaking which is bound to be carried out in time, and which will connect the two splendid ports of Augusta and Darwin.'*

As these comments from Sub-Collector of Customs, Alfred Searcy show, the vision of a railway linking with Darwin's deep natural port is hardly new. Searcy's comments were made in 1909, reflecting on his time in Darwin in the 1890s. They might just as well have been made in the 1990s!

Darwin has long looked to its north, beginning with visits by the Macassans to fish for trepang and trade with the Yolngu people of Arnhemland. The first British settlements in the north, at Fort Dundas (on Melville Island from 1824 to 1829), Fort Wellington (Raffles Bay from 1827 to 1829) and Port Essington (1838 to 1849) were established for both defence and trade.

When the Overland Telegraph was completed in 1872, it was Darwin where the cables carrying messages from across the world came on shore. In 1934 Imperial Airways, in conjunction with Qantas, began a regular mail and passenger service from London to Sydney, via Darwin.

Yet it is the dream of a transcontinental railway that has engaged South Australians and Territorians for 140 years.

The first promise to complete the line formed part of the 1910 Acceptance Act, when Prime Minister Alfred Deakin and South Australian Premier Tom Price agreed on the terms for the transfer of South Australia: that the Commonwealth would take over the State's £3 million debt, it would acquire the Port Augusta to Oodnadatta Railway, and it would complete a transcontinental line. In 1961, the South Australian Government took the Commonwealth to court to have the line completed - but the court ruled that no date was given in the 1910 Act, therefore the undertaking had not yet been breached!

In 1949, after a line was suggested from Townsville, the Commonwealth agreed to link Birdum with Alice Springs under the Railways Standardisation Agreement Act, which planned for the conversion of South Australia's narrow and broad gauge lines to standard gauge.

In 1977 the Bureau of Transport Economics investigated the potential of the north-south line and recommended instead that the highway be upgraded. A new standard gauge line, along a less flood-prone route, was completed between Tarcoola and Alice Springs in 1980 and the Commonwealth Government pledged \$10 million for preliminary work and design for the last section to Darwin.

In 1980, Chief Minister Paul Everingham complained bitterly of the 'missing link':

*'We see it as the greatest single need in the evolution of the Northern Territory. We see it as fundamental to the continued growth and development of the Northern Territory and to a great extent to continued progress of Australia as a whole.'*

The Northern Territory Government developed a "National Act of Faith" slogan, gave a 1988 deadline, and even held a name the train competition.



In 1983, Prime Minister Malcolm Fraser announced that the rail would be built by 1988. Chief Minister Paul Everingham sent him a crate of champagne, prematurely as it turned out, as Fraser lost the 1983 election and the new Hawke Government said the size of the deficit ruled out a railway. David Hill, then Chief Executive of NSW Rail, conducted a study on the costs and benefits of completing the line by 1992. He concluded:

*'Even by adopting an optimistic view of the future growth in the Northern Territory, the Inquiry found that investment in the railway between Alice Springs and Darwin cannot be justified and would constitute a major misallocation of the nation's resources.'*

In 1994 the Wran (Committee on Darwin) report determined that the railway would be viable by the turn of the century. A Northern Territory Department of Transport and Works study found that the Wran committee had underestimated the freight likely to be carried and subsequent reports commissioned by the Northern Territory Government, including one by the Canadian Pacific Railway consultancy, have supported the viability of the project.

Since Self-government in 1978, the Territory has been visionary and proactive in determining its place in the region. In fact, much of the transformation began four years earlier, after Cyclone Tracy devastated Darwin in 1974. Territorians bounced back and, since 1974, Darwin's population has grown from 40,000 to 100,000 and new towns, such as Jabiru, have appeared on the map. The Government has sealed the Stuart Highway, provided good infrastructure for the road train industry, built new airports in Darwin, Alice Springs and Yulara, and boosted tourism by sealing the road to Yulara. The Alice Springs to Darwin gas pipeline has been built and communications upgraded.

Just as significantly, the Northern Territory has pioneered the establishment of good relationships with our neighbours in the Asia-Pacific region and was the first overseas Government to sign a Memorandum of Understanding with Indonesia, followed by several other regional agreements. In 1995, the Government signed a Memorandum of Understanding with South Australia, a partnership providing the basis for the joint South Australia/Northern Territory approach to making the AustralAsia railway a reality.

In 1997 the AustralAsia Railway Corporation was established by the South Australian and Northern Territory governments and tenders were called to build the railway as a BOOT operation: which stands for Built Own Operate and Transfer back. This is part of a growing trend in Australia to private construction and building of railways, which are recognised as an important part of a competitive transport industry.

In June 1999, it was announced that the Asia Pacific Transport Consortium had been selected as the preferred bidder to build and operate the railway. In October, 2000, the first of the 300 project documents were signed, followed by financial close in April 2001. Prime Minister John Howard, South Australian Premier John Olsen and Northern Territory Chief Minister Denis Burke turned the first sod for the project at a ceremony in Alice Springs in July 2001.

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<http://www.southaustralianhistory.com.au/pinecreek.htm>

## Pine Creek NT

The Pine Creek area first came to prominence during the building of the Overland Telegraph Line. John McDouall Stuart had suggested possible gold discoveries in the Northern Territory in 1862 when he noted the May River 'as a likely place to find gold'. The first actual discovery of gold in the Northern Territory was made by H.F. Litchfield on the south side of the Finniss River in 1865. Four years later, members of Goyder's survey party found more gold at Tumbling Waters. During the construction of the Overland Telegraph Line posthole diggers made new gold discoveries at Yam Creek in December 1870.

When the line was completed, it meant very little to the few locals but the possibility of finding gold attracted thousands of prospectors, both from the southern colonies and China. The gold mining industry at Pine Creek was slow to develop, even though good alluvial gold had been located at Yam Creek, Cullen River and Gandy's Gully as early as 1871. The first major reef was discovered in 1872 and named the Priscilla. Since that time many small workings were developed, mostly by Chinese workers under tribute to European owners.

Mining was not a healthy occupation at that time. William Thomas died on 2 August 1873 and John White died on 5 September 1873, from fever and exhaustion at Pine Creek. Both were in the service of the Telegraph Gold Mining Company.

Pastoralists, who had taken up leases did much better. One of the first among them was Dr W.J. Browne at Bonrook. Although he, and several others, first started with sheep, they soon found that the climate was too hot and too humid for these animals. Slowly one after the other changed to cattle and horses.



In 1883, the John Cox Bray Government introduced the Palmerston and Pine Creek Railway Bill. The £959,300 contract went to C & E Millar of Melbourne and the line reached Pine Creek in 1888. It was officially opened on 30 September 1889. Some 3000 Chinese labourers worked on this part of the line. Many different proposals have been made since to join Pine Creek with Oodnadatta. When the Commonwealth Government took control in 1926 it extended the line from Oodnadatta to Alice Springs and from Pine Creek to Birdum. Both places were reached during 1929. During the Second World War Larrimah, nine kilometres north of Birdum, became the effective railhead. The thousand or so kilometres between Birdum and Alice Springs were never completed. Originally the terminus of the railway - 'the line to nowhere' Larrimah is now just another stopover point on the Stuart Highway with an outback pub, the Larrimah Hotel, which was actually the pub at Birdum until it was moved to Larrimah in 1952. The line was closed in 1976.

Soon there were other gold discoveries and by 1874 there were enough people in the area to support the opening of a telegraph office. Although there was a large concentration of miners, the town of Pine Creek was not surveyed until 1888 during the building of the railway from Palmerston to Pine Creek which was opened a year later. Two of the best producing mines during these years were the Kohinoor and Eleanor mines on the Eleanor Reef, discovered by John Lewis in 1872 and named after his sister. In 1881 Olaf Jensen bought both the lease and machinery of the Kohinoor mine and later added many other leases to his name, including the Eleanor from which he got 1652 ounces in 1887. In 1892 Jensen floated his mines into the Jensen Gold Mining Company.



Gold production declined during the 1890s but there were still twenty-seven stamp batteries at fifteen mines in the area. By 1907 most of the gold mining was replaced by tin and wolfram. By 1915 about 75,000 ounces of gold had been recovered from the area. It was not until the 1950s that Pine Creek enjoyed a revival of its mining industry. This time it was uranium and iron ore which provided the much needed employment opportunities. During the 1960s and 1970s about five hundred people were serviced by the towns stores and other facilities. However by the 1970s mining faded away and when in June 1976 the North Australia Railway closed it seemed that it was the end of the line for Pine Creek in more than one way.

By 1985 though matters had improved substantially. In February of that year Pine Creek Goldfields Limited was established and started mining from its open cut in October, once again providing employment for many of the local residents.

The railway at Pine Creek shows a very similar history. Started during the late 1880s it reached Pine Creek in 1889. It has seen many ups and downs. Even so many enterprising men and families settled in the new town and tried to make a living. Tom Pearce, previously from Katherine opened a store in 1893. Tom O'Shea, originally from Queensland took part in the short lived 1909 gold rush and was able to buy the Railway hotel at Katherine.

Pine Creek's bussiest time was during the Second World War when as many as 247 trains came trough in one week in 1944. After its demise in 1976 it took ten years before the first promise was made by the NT government that the Alice Springs-Darwin line would be constructed in late 1987. As was the case in South Australia, many times were these promises renewed, particularly before elections. However after all these years it has eventuated. It is a reality, the line is there and ends will joined this year!!!!



Imported from Philadelphia in 1886 by the contractors for the Palmerston-Pine Creek section of the North Australia Railway. It served faithfully under several government owners until officially retired in 1950.



## Katherine NT

On Tuesday 8 July 1862, during his successful attempt to cross Australia from South to North, John McDouall Stuart came across a large creek and wrote in his diary, This I have named the Fanny in honour of Miss Fanny Chambers, eldest daughter of John Chambers. Later that day his party discovered yet another river. This time he named it the Katherine River, after the second daughter of James Chambers who had contributed a good deal of money to the expedition. They stayed the night at the Katherine, crossing it the next morning.

During the construction of the Overland Telegraph Line, eight years later, the first white people came to the area to work and live. As it was the wet season, the river was flooded and William Frevett Dalwood and Joseph Darwent were marooned with their workers on the riverbanks for about six weeks. Edward Powell died during this time.



After completion of the line on 22 August 1872, a four roomed telegraph station was built at Katherine with J.L. Stapleton in charge. He was later killed by Aborigines at Barrow Creek. Among some of the earliest visitors to call at the station were, Dr Harris Browne, Alfred Giles and Robert McKellar Murray. Murray later became station master, replacing C.H. Johnston in 1875. When Murray married, his wife Jane Louisa became the first white woman to live at Katherine.

Robert McKellar Murray arrived in May 1875. At the age of ten he had started working for the New South Wales postal services as a messenger boy, working his way up to Telegraph Station Master. When twenty-one he married nineteen year old Jane Louisa Hammond in June 1871. Three years later he was appointed Station Master at Port Darwin and transferred to the Katherine in 1875. He died on February 1893, only forty-three years old.

As a result of the early gold discoveries along the line, C.R. McMinn explored the country around Katherine for gold in 1876 as far as the Flora and Daly Rivers. Very little gold was found but more important was the fact that rich pastoral country was discovered. Another early visitor was Nathaniel Buchanan while droving cattle from Queensland to Glencoe Station. With more and more people settling in the area a Post Office was opened in 1883. The first Adelaide mail arrived on 5 April and was delivered by Charlie Clark.

In 1888 Bernard Murphy received permission from Charles Todd to build his Sportman's Hotel and Pioneer Cash store on the Telegraph Reserve for a rental of twelve pounds per year. When a year later, in October the Darwin - Pine Creek railway was completed, travelling in the Top End was made much easier. However the line stopped at Pine Creek for the time being and Bernard Murphy sold his interests to P.R. Allen, who appointed Tom Pearce as manager, and moved to Pine Creek.



Tom Pearce became secretary of the Katherine Turf Club in 1895 and William James Henderson was appointed Postmaster and Station Master. Both stayed for a long time at the Katherine. The Sportman's hotel also had many interesting visitors, among them Aeneas and Jeannie Gunn who were on their way to Elsey Station. Tom Pearce married Mary Jennings in 1903 and bought Willeroo Station to breed racing horses. He sold the



station in 1915 to Vestey's, who already owned Wave Hill cattle station. The Sportman's hotel was run for several years by ex-Mounted Constable Michael John Kingston and his wife Elizabeth.

Tom Pearce, born at Mount Eba Station in South Australia, was well liked and respected in Katherine. During his fifteen years in town he became known as 'Mine Host' in recognition by the locals for the hospitality and assistance they received from him. In 1917 he moved back to South Australia. He died on 9 January 1952 and his ashes were interred at Elsey Station.

Ever since the railway had arrived at Pine Creek, locals and most other Territorians, had pushed for the line to continue further south to Katherine. Finally in July 1913 Alfred Giles was asked to be a guide for the Northern Territory railway Commission who were to examine the country for the railway extension. Work was started later that year and completed in 1917 when it had reached the terminus at Emungalan, north of the Katherine River. It was here that Horace Coc, the first station master took up residence. He soon had some company when K.R. Gillard opened up a store. Tom O'Shea built a house, billiard saloon and dining room next to it and Bill Lucy opened a blacksmith shop. Many other families, including several Chinese, also settled at the railway siding.

In 1923 a start was made with the building of a bridge across the river. When this was completed the line was extended further south. It meant the end of the short lived excitement at Emungalan as all store keepers moved to the other side of the river. This now became the permanent town and Katherine grew rapidly until 1930 when as a result of the depression railway building was halted.

Although connected by railway, the Katherine area was in many ways still isolated from many services. Dr Clyde Fenton who had his practise at Katherine became one of the first Flying Doctors in Australia when he raised £500 to buy a plane for his medical run. He soon earned himself the name of 'Speed Gordon of the Territory Skies'. He later crashed one of his planes at Victoria River Downs Station but walked away from it without a scratch.

In May 1969 the Katherine Meatworks burned down, a major setback to its employees and the surrounding pastoral stations. It was rebuild at a cost of \$650,000 and has performed even better than before.



Bats hanging from the trees in Katherine National Park, proclaimed on 8 November 1962.

This is hundred years after Stuart passed through the area without seeing the waterfalls.



# MANYALLALUK ABORIGINAL COMMUNITY

## INTRODUCTION

Welcome to the Manyallaluk website!

<http://www.krol.com.au/wizusers/krol/m/manyallaluk/page1.html>

Please browse through our site to learn more about our Aboriginal culture tours and the Aboriginal art that is available at our Art and Craft Centre.

Manyallaluk Aboriginal community, located on Jawoyn land 110 kilometres from Katherine, NT, is home to about 150 Indigenous people of Jawoyn, Mayali, Dalabon and Rembarnga language groups. The name Manyallaluk (Manyalla-look) means Frog Dreaming and refers to a traditional fertility site to the east of the community.

Manyallaluk covers 3,000 square kilometres of land, much of it rugged and remote. Bordered by Arnhem Land and Nitmuluk and Kakadu National Parks, the area is home to abundant Top End flora and fauna.

Formerly known as Eva Valley Station, Manyallaluk has preserved several of the picturesque old station buildings. Many of our people were born here when the station was still in operation. We have an intimate knowledge of our country, the local history and our culture. When you visit Manyallaluk, you have the unique opportunity to share with us in our environment.

Manyallaluk community is working hard to create an independent and sustainable lifestyle for our people. Many of our people are involved in our two community-owned businesses, Manyallaluk Tours and Manyallaluk Art and Craft Centre. We have about fifteen experienced tour guides who will introduce you to Aboriginal culture. Most of our tour guides are also artists. They make didgeridoos, woven baskets, and paintings on canvas and stringy bark. If you are interested in Aboriginal art, you can visit Manyallaluk Art and Craft Centre and be assured that all the artwork is authentic Aboriginal art made by an artist from this community.

The Manyallaluk tour experience is interactive and hands-on. All of our tours are designed for you to become involved and have a go yourself. Try your hand at basket weaving, spear throwing or lighting fires with sticks in the traditional way. Most of all, we hope you come and enjoy yourself.



**Tour guides welcome you to Manyallaluk**



**One of the old Eva Valley homestead buildings at Manyallaluk.**



You will remember your visit to Manyallaluk for a long time. It is a unique experience you are unlikely to get anywhere else.

Come and share our culture!

For information about Manyallaluk tours, visit the 'Tour Itineraries' page.

Check out the 'Art and Craft Centre' page for a preview of Manyallaluk artefacts.

Click on 'Contact Details' for Manyallaluk phone and fax numbers and for email and postal addresses.



**Basket weaving. Photo courtesy of Helene and Regis Hennion.**

## **MANYALLALUK ART AND CRAFT CENTRE**

Located 110 kilometres from Katherine at the Manyallaluk community, the Art and Craft Centre is a community-owned enterprise that features artefacts made by local Aboriginal artists.

Artists paint on canvas and stringy bark, using handmade ochre pigment or acrylics in the four traditional colours (red and yellow ochre, black and white).

Paintings abound with images of animal life, bush tucker and stories of cultural significance.

Small sculptural pieces, didgeridoos, jewellery and weavings are also available.

Manyallaluk Art and Craft Centre, pictured on the right, is open for business weekdays during normal working hours and other times by special appointment.

### **BARK PAINTINGS**

Bark from the Stringy Bark tree (Eucalyptus Tetradonta) can only be harvested during the Wet Season. From about January through March the artists collect bark for artefacts. They prepare it by skinning off the rough outer layer and then tying the smooth bark onto wooden cross pieces, which prevent warping. The bark then dries to form a flat smooth painting surface. Some of the elders paint with natural ochre pigment but most of the artists





prefer working with acrylic paint.

Many Manyallaluk artists utilise a criss-cross sort of pattern that is typical of the cross-hatching found in traditional Arnhem Land painting. Each artist tends to develop his/her own individualised approach to the use of cross-hatching in the design.

This bark painting of the Rainbow Serpent (Bolung) was painted by Manyallaluk artist, John Dewar. The Rainbow Serpent is the mother of all creation. Here she is depicted with a crocodile head and surrounded by mussels.

## **PAINTINGS ON CANVAS**

Many of the artists prefer to paint with acrylics on canvas. With canvas there are no seasonal restrictions and it is possible to work on larger pieces than with bark. Whether painting with natural ochre or acrylic, on canvas or bark, Manyallaluk artists prefer to stick to traditional colours in their artwork.

People at Manyallaluk still gather bush tucker, catch fish and turtle in the local streams, and hunt for game. Not surprisingly, the subject matter of the artwork includes images of the abundant sources of food found in the area. Artists also paint their dreamings and well-known dreamtime stories. Human figures, Mimis, and other spirit beings also appear in paintings.

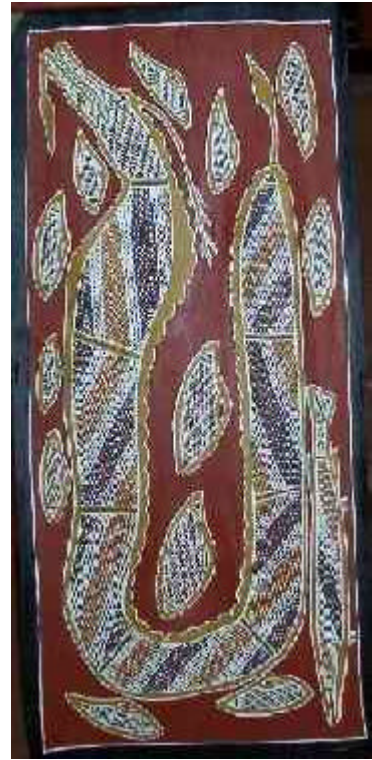
The larger, more elaborate works usually have a story that is associated with the picture. This canvas of Bolung was painted by Manyallaluk artist, Manuel Pamkal. Here she is shown with horns and a kangaroo head. She is mother of all creatures but has a special connection to the Flying Fox. The relationship of Bolung, Flying Fox and the Katherine River is an important story for the Aboriginal people of this area.

## **DIDGERIDOOS**

Didgeridoos are harvested from several eucalypts in the surrounding savannah woodlands. The Golden Bark Eucalypt (*Eucalyptus Phoenicia*), found mainly in the stony country not too far from Manyallaluk, is the tree of choice, because it produces long, straight branches. However, Darwin Woolly Butt (*Eucalyptus Miniata*) and other eucalypts are also used.

Branches that have been hollowed by termite action are cut and brought back to the community for further preparation. Artists first strip the bark, sand the wood smooth, and then paint their designs. Native beeswax (sugar bag wax) is used for the mouthpiece.

Didgeridoos are painted in traditional colours, usually with acrylic paint but sometimes with natural ochres. Typically the imagery is of animal life and bush tucker.





This is a selection of didgeridoos made by Manyallaluk artists, John Dewar, Richard Miller and Roland Ashley.

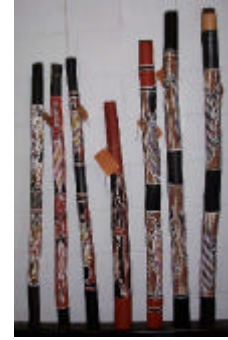
## WEAVINGS

Colourful baskets, mats and string bags are crafted by the women using natural fibres and dyes found in the area. Baskets are woven from *Pandanus Spiralis* fronds. *Pandanus* grows in and around the local springs and is harvested from the tops of the tree where new tender leaves have just sprouted. The palm leaves are then stripped and prepared for dyeing.

The two main dyes are red colour and yellow colour, which come from *Hemadornum* (Mulubirtidi) and Corkwood (Gumurduk) respectively. The bulbous *Hemadornum* roots can be harvested year-round for a reddish-brown dye. When the plant comes into flower about January, the women gather the new seeds which are used to make a deep purplish-red dye. The yellow dye is produced from the Corkwood tree rhizome, which is dug up and chopped off the root system. The raw materials are mashed to a pulp and boiled in a billycan to create the dyes. Then the fibres are soaked in the dye until the desired colour is achieved.

In addition to *Pandanus* baskets, the women also make *Pandanus* mats and Kurrajong (Butbut) and Sand Palm (Anjarnkelhe) string bags. They also produce jewellery from seeds and gum nuts.

The baskets in the photo were made by basket weavers, Anna Bolgi, Carol Pamkal and Jessica Pamkal.





# The Yeuralba Mines – Eva Creek Station





# Life at the Yeuralba Mines.

Due to isolation, and extreme climatic conditions, the miners relied on their immediate environment for their accommodation needs.

The miners and their Aboriginal workers started work at sunrise and continued until near sunset with a 2 to 3 hour break during the hottest part of the afternoon for lunch and a sleep.

Aboriginal workers worked 5 days a week and had the weekends off to go hunting, often hunting kangaroo for Cookie's pot! The miner also gave them time off to go to ceremony business, and gave them extra food to take with them to ceremonies.



The impact of mining on the Aborigines in the Yeuralba area was far less than that experienced by Aborigines in other mining areas. The white population remained small and didn't affect their source of bush tucker and other requirements.

The introduction of European food, attitudes and technology to the area slowly encouraged a more sedentary life-style.

The miners provided accommodation and food for their Aboriginal workers and their families which was supplemented by bush tucker.

The men were paid 5 shillings (50 cents) each and the women were paid 3 shillings (30 cents) each per week and were given weekly rations which included 1 stick of niki-niki (chewing tobacco), tea, sugar, flour, and baking powder.

All the workers including the women wore khaki clothes which were issued by the mine. The men were issued caps and boots. Only those men who worked down the mine-shafts were given hard-hats.

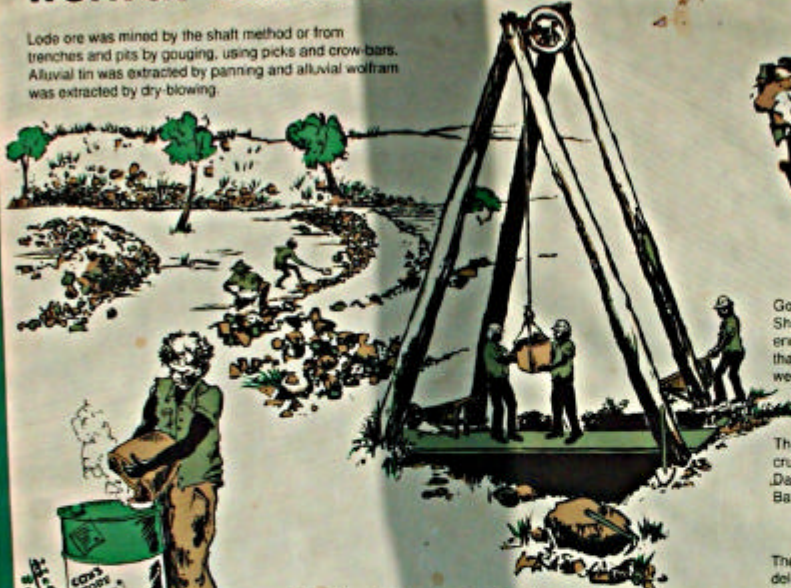
The state of health at the mine fields varied according to the quality of food available, mining accidents and malaria outbreaks. Some of the miners and their workers suffered severe headaches and depression as a consequence of wiping their brows with hands contaminated with gelsinite paste.





# Mining Processes and Mining work at Yeuralba Mineral Fields.

Lode ore was mined by the shaft method or from trenches and pits by gouging, using picks and crow-bars. Alluvial tin was extracted by panning and alluvial wolfram was extracted by dry-blowing.



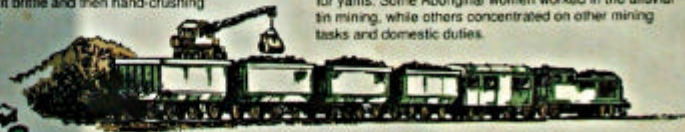
Gouging and alluvial mining continued all year round. Shaft mining was only carried out in the Dry Season and ended in 1947 when, for safety reasons, it became law that Aboriginals were forbidden to work in mines which were deeper than the height of their heads.

The ore was transported to Maranboy Battery for crushing. Then it went by train from Maranboy Siding To Darwin Port to be loaded onto ships. The Maranboy Battery closed in 1962.

The processed wolfram and the alluvial tin were then delivered in 44 gallon drums to Cox's Store in Katherine (now the Woolworths car park), and then by train to Darwin.

A few Aboriginal men learnt to drive 7 ton Blitz Army trucks and delivered truck loads of ore to the Maranboy Siding or 44 gallon drums filled with tin to Cox's Store in Katherine. In return they brought back fuel and rations for the mine.

Sometimes the wolfram ore was processed on site by burning the ore to make it brittle and then hand-crushing it in a cast-iron dolly-pot.

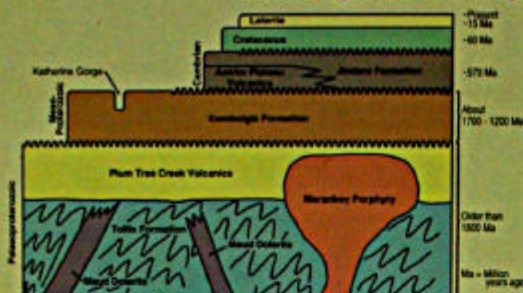


Most labour was carried out by Aboriginal men. Sometimes Aboriginal women prospected for minerals using crow-bars or wooden digging-sticks while searching for yams. Some Aboriginal women worked in the alluvial tin mining, while others concentrated on other mining tasks and domestic duties.





## Geological History of the Manyallaluk Region



Sandstone and siltstone, of a geological rock unit called the Tullis Formation, are the oldest rocks in the Manyallaluk area that come to surface. They were covered in places by what are now hard indurated rocks belonging to the Plum Tree Creek Volcanics but which were some 1800 million years ago extensive outpourings of volcanic ash. Forces in the crust of the earth folded these rocks which at the time were intruded by the Maranboy Porphyry and by sheet-like rock bodies of Maud Dolerite, as well as by granite. All this happened in an elongated downwarped part of the crust called the Pine Creek Geosyncline during a geological time span called the Palaeoproterozoic (the Proterozoic Era lasted from 2500 to 570 million years ago and the term means: 'before the dawn of life').

Over millions and millions of years a succession of alternating periods of erosion and deposition followed. The red-brown sandstone of the Kombolgie Formation, so impressively exposed in escarpments and in the vertical cliffs of the Katherine Gorge, was deposited for example over eroded Palaeoproterozoic rocks whilst it is itself covered, in places, by much younger quite extensively deposited siltstone and sandstone of Cretaceous age (Cretaceous Period lasted from 185 to 65 million years ago.) After the Proterozoic Era a depositional basin, the Daly Basin, developed along the southern margin of the Pine Creek Geosyncline. Large volumes of flood basalts (Arctim Plateau Volcanics) and some sandstone (Jindare Sandstone) were deposited at the base of the sedimentary sequence of the basin and some of these rocks are exposed in the Manyallaluk area.

Weathering processes at the surface have in some areas more recently also developed 'coffee-rock' (in more scientific terms known as laterite) essentially consisting of a mass of iron-oxide pellets. Some Proterozoic rocks contain at some localities tin, tungsten, and copper minerals in commercial quantities.

### Copper Mineralisation in Eva Valley

Minor copper occurrences are known from the Eva Valley area, about 10 km north of Manyallaluk. Secondary copper minerals have been found in ironstone, volcanic interbeds, and in quartz-filled fractures of the Tullis Formation. Some copper mineralisation occurs in shears in the Maud Dolerite and a few exploration companies have reported associated increased gold values obtained in these shear zones. Exploration has shown that the copper concentration diminishes with depth and is present in quantities that are currently uneconomic to mine. About 2 tonnes of copper have been so far extracted from this area.

### Geology of The Eva Valley Area



### Yeurolba Mineral Field



### History of The Yeurolba Mineral Field

The exact date minerals were discovered for the first time in the Yeurolba Mineral Field is unknown but small scale tungsten and tin mining dates back to at least 1924. Early miners extracted rich ore by hand-picking and transported it to a government battery in Maranboy for processing.

Later ore was extracted through the use of mechanised equipment. Some tungsten ore (wolframite) obtained from loose eluvial material was sold directly to dealers in Katherine. High cost of transport and poor tungsten recovery (the plant was designed for treatment of tin ore) rendered the operation uneconomic and mining ceased in 1954.

The field contains 17 known mineralised occurrences but only some of them were developed. Total production from the field consisted of 19.6 tonnes of tungsten, 8.2 tonnes of tin, and 110 grams of gold. The field still contains reserves of about 3 950 tonnes of tungsten (1 000 000 tonnes of ore grading 0.5% WO<sub>3</sub>).

### Schematic Cross-section





# Katherine School of the Air

<http://www.schools.nt.edu.au/ksa/>

## THE BEGINNING

Katherine School of the Air began operating on 12 September 1966. Not only was this the first School of the Air service to students in the Top End of the Northern Territory but it was the first broadcast of a School of the Air made independently of other services (such as the Royal Flying Doctor Service in Australia). Radio lessons for the Katherine School of the Air at that time were supplementary to correspondence courses supplied by the South Australian Correspondence School.



In 1973 the Australian Government took over responsibility for the education of all pupils in the Northern Territory. Katherine School of the Air took over control of the correspondence program for primary students utilising sets of materials from the South Australian Correspondence School.



This change heralded a new era in the education of isolated children. For the first time in the world a dual correspondence and radio program was being offered by the one school.

In 1978 a new school building encompassing teachers areas, two studios, recording facilities and a printery were completed on the banks of the Katherine River. The buildings were subsequently modified to include a video studio and technical repairs facilities and library.



## CHANGES

In 1996, a demountable or relocatable classroom (named "White Gum Manor") was located next to the school and used as an additional teaching area due to lack of space in the building. In 1997 the school library was moved next door to Clyde Fenton Primary School to accommodate the increased number of teachers required to teach a growing enrollment. Plans were made by the Department to extend the building. "White Gum Manor" was damaged and removed after the flood in 1998.



## THE FLOOD

On Australia Day the 26th January 1998 just before the first day of the school year, the Katherine River broke its banks and flooded the town.



The School building was inundated to a height of one metre. When the water receded, the cleanup began.

Students were unable to





receive lessons in the usual way for the first few weeks of the school year. While staff were cleaning the school, home tutors were relied upon to keep the home classroom operating. Fortunately correspondence materials for the first terms work are sent out in the last term of the previous year.



All of the staff pitched in to clean up, even those newly recruited and eager to start the new school year. It was extremely hot and humid, there was no running water or power and therefore no air conditioning. The windows were fixed and could not be opened. Everything in the building up to one meter high was covered in mud. There were also hygiene and health risks from mosquitos and melioidosis. About half of the staff's own residences were flooded, so the first priority was for everyone to help clean them.

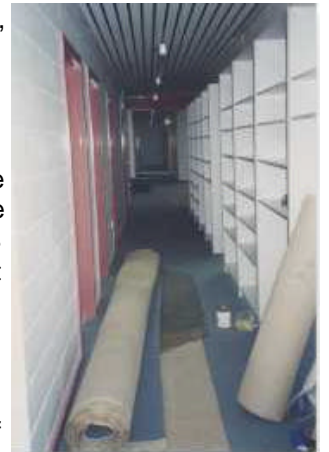


Everything in the school, all the computers, photocopiers, furniture, paper based materials, books and resources had to be cleaned out so that the carpets, furniture and fittings could be replaced and the school repainted.



A record was kept of all materials and equipment removed from the school. Some of the correspondence materials stored on shelves above the water level were salvageable, most were not. The equipment, including the computers, were packed into a shipping container and taken to Darwin.

While the refitting of the school was taking place staff volunteered their homes as a base for teachers, so for awhile teachers were operating from homes, planning student work and contacting home tutors and students by phone. Radio lessons were broadcast from the transmitter site located on the Stuart Highway 15 kilometers north of Katherine. In April when the school was ready to move back into, everyone was relieved. The official reopening was held on 25th May 1998.



Now the work of replacing all the lost printed materials, purchasing new computers and photocopiers and catching up began. The school did not fully recover from the effects of the flood until the year 2000.

Credit to all of the staff, with the support of students and their families, home tutors, volunteers from Darwin and the NT Department of Education, who pulled together at this difficult time to get our school operating again.

## EXTENSIONS

In 1999, to accommodate our growing needs, the school building was modified and a new section was built. The new building was built-up

one metre in case of another flood, and the existing building was modified and extended. The new building now houses the library, the mail room, the printery, the staff room and a conference room. The old building has additional space for teaching areas and the storage of materials and resources.





## **TECHNOLOGIES**

The use of correspondence materials has been the basis for delivery of learning to the remote students of Katherine School of the Air since it began in 1966 and still continues as the back-bone of course delivery to this day. Technologies have been used to enhance the delivery of lessons. In most cases power is essential to run technical equipment and most remote families have power but some don't or have limited power provided by a generator which is turned on for only a few hours each day. It is not always 100% reliable and repairs and maintenance are a concern but the use technology to deliver lessons brings another dimension to distance learning.

### **Radio (1966 -**

High Frequency (HF) Radio was in use when Katherine School of the Air began and is still being used today. The teacher delivers a lesson at a set time from a studio to a class using HF Radio. Students can hear their teacher and can respond, they are able to participate in a class situation. The radios are run off batteries which must be charged and an antenna must be positioned to receive and transmit sound. Radios are loaned to families by the school. The school is fortunate to have a full time technician who has been here for many years to maintain the radios. The term "School of the Air" refers to the use of HF radio "air waves" to deliver lessons.

### **Telephone (1966 -**

One of our main forms of communication is the telephone. Teachers spend a hours on the telephone each day liaising with Home Tutors and teaching students individually. The phone is useful for the teachers to listen too and assess a students reading and comprehension ability.

### **Television and Video (1986 - 1997)**

Although our remote students did not have television reception, the introduction of the VCR enabled the taping of educational television programs and the production of our own programs at the school. The school had a bank of VCRs that could mass copy tapes which were then mailed to students who played them on a televisions and VCRs loaned to them by the school. The school phased out the television and VCR loan scheme when most families purchased their own equipment and satellite television became available to remote users.

### **Computers (1993 -**

When the personal computer (PC) came into use in homes and schools, the challenge of access for our students arose. The school purchased a number of Apple Macintosh computers and printers which were loaned to students with Hypercard and ClarisWorks Office software installed on them. An educational software bank with software related to curriculum areas such as spelling, maths, science, etc. was set up at the school so that teachers could send them to Home Tutors and students for loan. Operating the computer is not taught as a separate subject, their use is integrated with the teaching of curriculum areas. A computer co-ordinator/technician loads, packs and tests computers for loan. Home Tutors and students are inserviced on how to use their computer by their teacher. Technical difficulties with software and hardware are first reported to the teacher then passed onto the computer co-ordinator/technician. The school is at present phasing out the loan of Apple computers to students as many families now have their own computer, and the IDL project has brought with it a Windows PC package for loan to students participating in the IDL trial.

### **The Internet (1997 -**

The Internet began to make itself known to Katherine School of the Air in 1996, by this time it was well entrenched in the cities of Australia and was filtering its way into rural areas. The school could see the huge potential of being able to connect to the Internet for it's students, they would have access to a world of information and could communicate instantly with each other people all over the world. There were a great deal of teething problems in trying to provide Internet access to remote locations in the Top End. Our overseas and travelling students fared better when it came to Internet connection as they often lived in areas close to towns and cities where the telephone line infrastructure could cope with data transmission. In the bush the telephone infrastructure was built to transmit voice only some lines could only transmit data at 2400bps, when a modem was connected data transmission was very slow and the connection often failed making internet usage very frustrating. Add to this the task of teaching and supporting remote Home Tutors and students as well as teachers who had little knowledge of how the internet operates. Katherine School of the Air loaned computers and modems already set up for families to connect to the Internet. Their service provider was initially located at Katherine High School operating as a secondary provider to a local supplier. Internet connection was provided free of charge to our families. Katherine



High School ceased its service provision in 1999 and Katherine School of the Air took over the task of service provider and continued until 2001. In 2001 Telstra offered a two-way satellite Internet connection package to remote sites at no cost except for a monthly service charge. Many remote families took up this offer and purchased their own computer to take advantage of the roll-out of the two-way satellite connection which gave them an extremely fast broadband connection. In 2003 as part of the IDL project Optus rolled out its two-way satellite dishes to families participating in the IDL trial giving them a broadband Internet connection as well.

### **Elearning (2002 -**

Elearning involves the creation of an on-line learning environment using web browser technology. Courses are written and organised using an Australian developed software package called 'Janison Solution' which was chosen and is supported by DEET. The courses are easily accessible at anytime from a PC connected to the Internet using a browser. To be able to log on to a course the participant must be given permission by the school and must enter a user name and password to access the course. In this secure environment students have access to courses written by teachers of Katherine School of the Air which can include information, links to other sites on the Internet and interactive features such as chat rooms, forums, tests, quizzes, email and instant messages, files can also be uploaded for others to see. The introduction of broadband Internet access to the bush and the roll-out of new computers to families as part of IDL has accelerated the use and number of students able to access elearning. Teachers involved in developing courses for elearning are learning and expanding their skills to accommodate this new mode of delivery.

### **Interactive Distance Learning (IDL) 2003 -**

The IDL trial commenced in 2003 and will run for three years. IDL uses Internet technologies to transmit video and audio from a teacher in a studio to the students who hear and see their teacher on a PC in their home classroom. It is a little like radio in that a group of students tune in at a set time to participate in a lesson delivered by a teacher in the studio. The difference is that the student can see as well as hear the teacher clearly and the teacher has the ability to use an interactive white board with the student or share a word processing document. A presentation program is used as an aid and interactive quizzes can be inserted into the presentation. The teacher can call on students to hear their questions and answers but the teacher is unable to see the student. With the IDL project came two-way satellite dishes for Internet connection and PC workstations rolled out to the 42 Katherine School of the Air families participating in the trial, this roll-out supports not only IDL lessons but has increased the accessibility of students to the Internet for research, email, communication and elearning purposes.



## ***Katherine floods, January 1998***

<http://www.bom.gov.au/lam/climate/levelthree/c20thc/flood6.htm>

Some of the heaviest rainfall and worst flooding over northern Australia occurs when a tropical cyclone crosses the coast and moves inland. Deprived of the energy it derives from warm tropical waters, the cyclone weakens and eventually dissipates - but as it weakens, the storm can drop prodigious quantities of water.

Early on 24 January 1998, Tropical Cyclone "Les" developed over the Gulf of Carpentaria, then moved westward, accompanied by winds gusting to 170km/h. As it made landfall, it weakened into a rain depression, which drifted west towards Katherine on 25-26 January. Rain began to fall in Katherine on the afternoon of the 25th, settled into a steady and heavy downpour, and continued virtually without a break until the early afternoon of the 27th. In three days (up to the 28th), about 400-500mm of rain drenched significant areas of the Katherine, Roper and Daly River catchments.

Such rainfall amounts falling over catchments already saturated from heavy rain earlier in the month had a dramatic impact. By the 27th the Katherine River had risen to more than 20 metres - the largest flood in Katherine's history, eclipsing the previous record (set in 1957) by 0.7 metres. Two metres of muddy water covered the main street, and the whole central business district was inundated. Some 2,000 people had to abandon their homes and most of their possessions to the swirling waters; many lost everything. In many cases, evacuations were a "last minute" exercise - partly due to complacency but, in at least some cases, people put off leaving for fear of looters. Electronic communications were badly disrupted, and the Katherine telephone exchange was only saved through sandbagging by the military. Damage to roads and other transport links was extensive, and took many days to repair. Three bodies were recovered from the muddy wreckage.



*Flooding in the streets of Katherine, N.T. due to torrential rains caused by ex-cyclone "Les", 28 January 1998 (photo courtesy of the Northern Territory News)*

Katherine was by no means the only place to suffer. Downstream, the entire community of Daly River - more than 400 people - was evacuated, and every building inundated. Local rain first flooded properties and communities on 28 January; two days later, floodwaters from the Fergusson River arrived; and finally the Katherine River flood peak struck on 3 February. Various other communities in the Roper and Moyle River catchments were severely affected, involving hundreds of evacuations in some cases.

The Katherine flood was but one of a number of exceptionally heavy rain events in the Australian tropics during the 1997/98 Wet season. The 1990s were exceptionally wet over the northwestern Australian tropics: in this time, Darwin endured four of its five wettest Wet seasons (October to April) for the Century.







# Nitmiluk National Park

## Fact Sheet



### The Park

The deep gorge carved through sandstone by the Katherine River is the central attraction of this 292,008 hectare National Park.

Upstream, the gorge widens into a broader valley which forms the southernmost portion of the Arnhem Land plateau. Swamplands cover the plateau and are surrounded by dry sandy woodland.

During the "dry season" (April-Sept) the Katherine River flows quietly in sections separated by rocks and boulders, while in the "wet season" floodwaters surge through the gorge.

### When to Visit

The most comfortable months to visit the Park are from May to September. The wet season causes flooding of the Katherine River and restrictions on some of the activities available. The access road may be cut off for short periods during peak flooding times.

### Access

The main entrance is located 30 kms north-east of the township of Katherine. Access is by sealed road.

### Boat Tours

Nitmiluk Tours operate a variety of boat tours in the Gorge system ranging from the popular two hour cruise, to a half day safari which includes the third gorge and a full day safari which incorporates five gorges. Make sure you take a shady hat and check whether there is an opportunity to swim. Booking offices are located within the Gorge Tourist Precinct and all tours depart from the boat ramp.

### Flying

A helicopter ride is one of the most exciting ways to see the gorge system. A 12 minute flight will take you as far as the sixth gorge where you can experience a magnificent view of the Arnhem Land Plateau. Flights of 25 minutes include the whole of the gorge system. The helicopter takes three passengers at a time with a minimum of two people.

### Walking

There are numerous walking tracks in the Park offering a variety of experiences, ranging from strolls along the riverbanks, overnight walks and a five day walk from Katherine Gorge to Edith Falls. The geology of the area is fascinating with the formation of the gorge from the surrounding sandstone-conglomerate plateau making an intriguing study.

Aboriginal art can be seen along the base of the sandstone escarpment as you travel the Katherine River. Other evidence of Jawoyn activities are located throughout the Park.

More detailed information can be found in the Visitor Centre or in the *Guide to Nitmiluk (Katherine Gorge) National Park Walking Map*

### Canoeing

Canoes can be hired at the Gorge by the hour, half day, full day or overnight. You may put your own canoe on the river but you must register at the Visitor Centre first. A fee will be charged. The upper gorges are accessible to canoes but portage can be quite strenuous, especially when the river is low. Canoes and gear have to be carried over the crossovers between the various gorges.

There are several designated camping areas along the river but numbers are restricted, so be sure to allow plenty of time to register.

### Accommodation and Camping

There are two types of camping in the Park. You can stay at the permanent campgrounds at the Gorge or Edith Falls where there is plenty of car parking, tent and caravan sites. Powered (Gorge only) and unpowered sites are available.

Elsewhere in the Park, bush camping areas have been established for walkers and canoeists who intend to stay overnight. Toilets are provided at some camping areas and a source of water is almost always available nearby. Check at the Visitor Centre first.

Parks & Wildlife Commission of the NT

PO Box 344, KATHERINE NT 0851 AUSTRALIA

Phone : (08) 89 738888 Fax : (08) 89 738899



Northern Territory Government





Fires are allowed at the established camping areas on the walking track system. However, fires are not allowed at the camping areas in the gorge system and campers must supply their own cooking gear and fuel.

A small fee is charged for bush camping. Check at the Visitor Centre for availability of sites and to ensure that water is still available.

#### Boating

Private vessels are prohibited from the gorge system during the peak visitor period from 1 June to 31 August each year.

At other times, unless the river is closed due to the wet season, private vessels are restricted to the first gorge, due to the rock bars that occur between the gorges.

Vessels must be under four metres in length and are limited to 10 hp motors and the speed limit is seven nautical miles per hour. Waterway rules apply and rock hazards can be a problem to boaters. All private vessels must be registered at the Visitor Centre prior to launching.

#### Fishing

Fishing is a popular pastime with many visitors in the Gorge. Barramundi fishing controls apply within the Park. Traps, cast nets or drag nets are prohibited. There is **No fishing permitted at Edith Falls**.

#### Visitor Facilities

The picnic area provides gas barbecues, picnic furniture and toilet facilities. The launch tour boat jetty and canoe hire are located adjacent to the boat ramp. A public swimming area is provided in the picnic area. Information on the flora, fauna, geology, walks, activities and other points of interest can be found in the Information Centre at Katherine Gorge.

#### Edith Falls

Edith Falls is located on the western boundary of the Park. This picturesque waterhole is a favoured stopping point for visitors travelling northwards.

Edith Falls can be reached by travelling the Stuart Highway northwards from Katherine for 40 kms and then following a bitumen road for 20 kms.

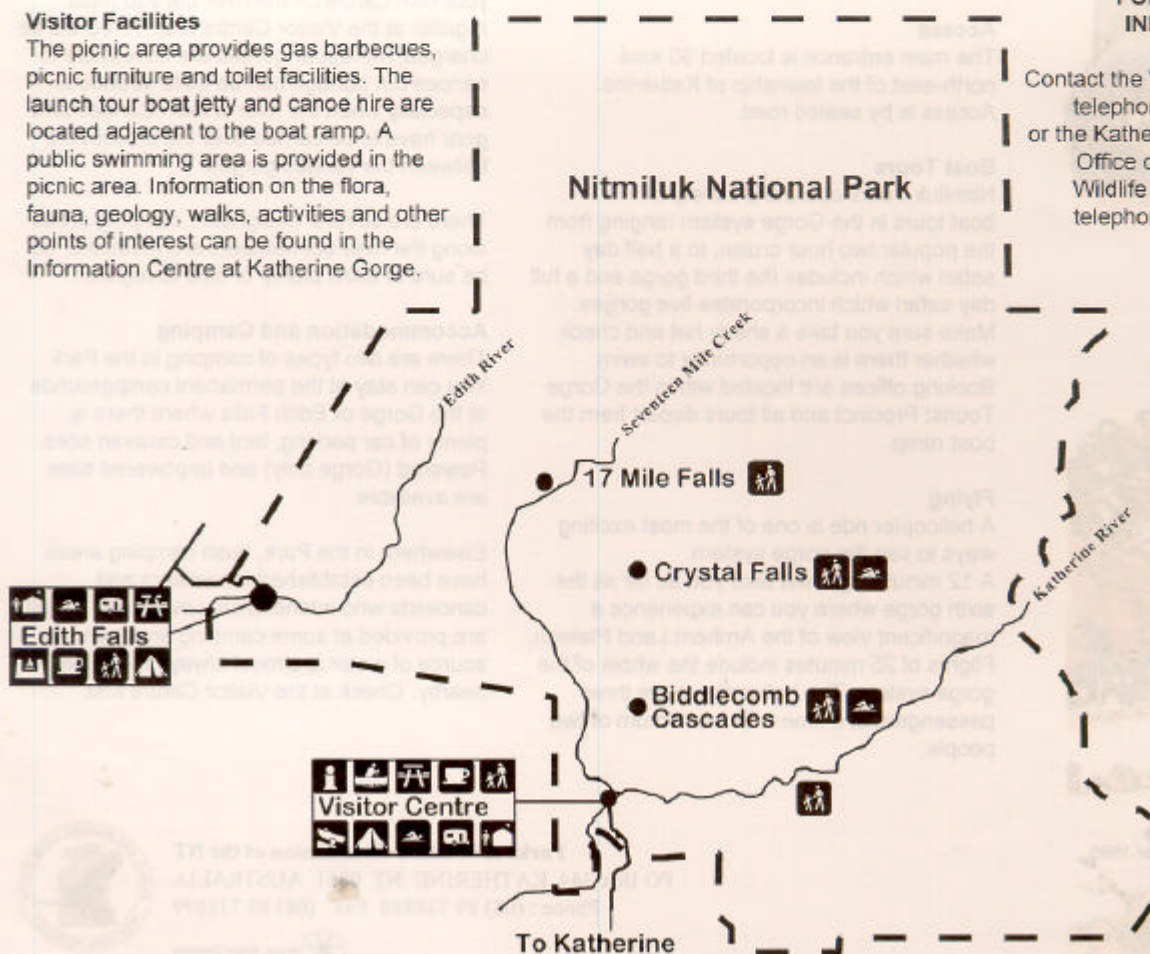
Facilities include an ablution block with toilet and shower facilities, basic park furniture of wood barbecues and tables. Please collect your firewood before entering the Park. The campground at Edith Falls has unpowered sites only.

#### PROTECTING OUR HERITAGE

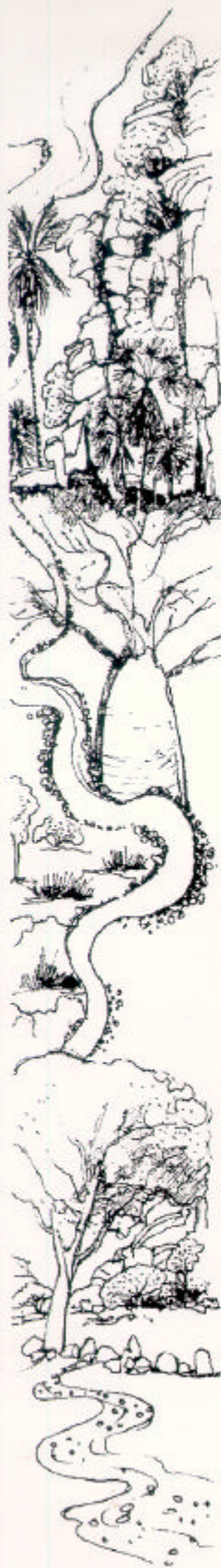
- All native plants and animals in the Park are protected.
- Please respect Aboriginal art sites and do not touch the paintings.
- Take care with fire - light fires only in areas provided.
- Avoid using soaps or detergents in the waterways as they pollute the streams and harm aquatic life.
- Please take all of your litter with you and dispose of it properly.
- Cats and dogs are banned from the park.

#### FOR FURTHER INFORMATION

Contact the Visitor Centre telephone 89721886, or the Katherine Regional Office of the Parks & Wildlife Commission, telephone 89738888.







# Nitmiluk National Park

## Park Ownership and Management



Information Sheet

Following a land claim lodged in the late 1970's, the Jawoyn Aborigines were given ownership to land in 1989 which included the Katherine Gorge National Park. The Jawoyn Aboriginal Land Trust and the N.T. Conservation Land Corporation have signed a lease for the management of Nitmiluk (Katherine Gorge) National Park. The park is managed on a day-to-day basis by the Parks & Wildlife Commission of the Northern Territory.

The lease to the N.T. Conservation Land Corporation is for a 99 year period. The lease guarantees Jawoyn people traditional rights over the area, for hunting, food gathering, ceremonial and religious practices and allows for living areas specified in the Plan of Management.

The Land Corporation and Parks and Wildlife Commission of the NT are to promote Aboriginal culture and tradition, protect sacred sites and take steps to educate park visitors and

local residents. The lease also allows for conventional park management for the protection of flora and fauna and the natural environment.

Jawoyn people themselves are heavily involved in the management of the park. There is a Jawoyn majority on the Park's Board of Management and the lease guarantees Aboriginal employment and training in the Park. The Parks and Wildlife Commission of the NT is required to consult closely with Jawoyn land owners regarding park management. In particular Jawoyn input is essential to appropriate management of the Park's cultural resources. Aboriginal business and commercial initiatives in the Park are encouraged.

Nitmiluk National Park has a significant Aboriginal presence and involvement. Management recognise and respect Aboriginal traditional ownership, cultural practices and environmental

protection and the role tourism plays within one of the best known regional National Parks in the Territory.

The Park is to be managed in accordance with the Nitmiluk Plan of Management. Jawoyn people have played an important role in developing the first plan of management for the Park. Jawoyn participation has ensured that not only western park management principles have been considered but also the requirements of traditional Aboriginal Law are embodied in the plan.

The following Information sheets about the Jawoyn are available from the Parks & Wildlife Commission: -

- Contemporary Jawoyn History
- Jawoyn Country and Law.

### Parks & Wildlife Commission of the Northern Territory

Nitmiluk National Park  
Ph: (08) 89721 886  
Fax: (08) 89710 702

Katherine Regional Office  
32 Giles St  
PO Box 344 KATHERINE NT 0851











# Nitmiluk National Park

Information Sheet

## Contemporary Jawoyn History

For thousands of years prior to European occupation Jawoyn moved freely about their country hunting, gathering and performing ceremonies on their lands including what is now Nitmiluk National Park.

The abundance of resources at specific localities at different times of the year defined seasonal or shorter-term rounds of movement for Jawoyn in and through their lands. For example, in the immediate Katherine area, certain localities along the river north of the township were traditionally favoured as dry-season camps (as they are today) while, during the wet, people were able to move around the high, broken tableland which runs from Katherine towards Leliyn (Edith Falls) and over towards Yulawem (Seventeen Mile Creek). In parts of this higher country Jawoyn hunted gowarrang (echidna), nagorlk (wallabies) and other small game which inhabited this area in abundance.

John McDouall Stuart's expedition in 1862 provided favourable reports on the pastoral potential of country north of the Roper River. This report led to the annexation of the Northern Territory in 1863 by South Australia and to a period in Jawoyn history characterised by violence and dispossession of their lands at the hands of pastoral developers who by 1883 had taken up 478 000 square miles of the 520 000 square miles of the Northern Territory.

The Eastern and African Cold Storage Co. Ltd. for example, is known to have engaged in systematic hunting out of 'wild' Aborigines who had not come in to pastoral properties. The effect of such practices was a reduction in the Aboriginal population to an extent which cannot be readily calculated along with increasing sedentarization of those remaining.

Older Jawoyn today speak of the terror and the need, at that time, to move to 'safe', more populated places, away from some cattle stations where they feared for their lives. It is an understatement to say that the establishment of major pastoral properties in the Katherine-Pine Creek region had far reaching effects on Jawoyn demography and lifestyle.

Gold was discovered at Pine Creek in 1871 and by August 1872 there were about 40 miners in the gold field and thus it was that both pastoralism and mining began to have a vast and dramatic effect on Jawoyn lives as their traditional lands rapidly became populated by strangers and their waterholes fouled by cattle.

Tin was found at a locality which was named Maranboy, at the headwaters of the present Maranboy and Beswick Creeks, and by 1915 a government battery was operating there. The Maranboy tin field is significant in the Aboriginal history of the region and resulted in large encampments of Aborigines of the southern Arnhem Land area around the tin field for lengths of time unprecedented in precontact history.

Some of the oldest Jawoyn now living saw Europeans for the first time at Maranboy. Reports of the mining encampment spread among Jawoyn and other Aboriginal groups along with accounts of commodities which could be obtained which served as inducements to remain and work there. It is clear also that Aborigines moved into Maranboy to avoid being killed on the pastoral properties. A six acre Aboriginal reserve was declared at Maranboy in 1923.

'Traditional life', the socio-economic basis of Jawoyn existence, had been a full time occupation for Jawoyn prior to pastoral and mining invasion of their lands. The steady

### Parks & Wildlife Commission of the Northern Territory

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Ph: (08) 8973 8888  
Fax: (09) 8973 8899



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undermining of 'traditional lifestyle' gathered pace with the construction of the Pine Creek to Katherine railway line in 1926 and the granting of leases on the Katherine River for agricultural development. These areas had been dry season camping areas favoured by the Jawoyn.

There are many sites of significance along the river including a number of ceremonial localities, former burial sites and areas of spiritual significance.

The taking up of agricultural leases on the Katherine River was one factor which altered both dry and wet season movement by Jawoyn in the area.

The Jawoyn were no longer able to use certain riverine localities as before and campsites further back from the river, often on the fringes of European development, came into use. The apparent earlier seasonality of occupation was also altered as Jawoyn remained for longer periods in European employ and within range of European commodities. Many Jawoyn worked in peanut and other farming enterprises in the Katherine area.

Occupation in pastoral, agricultural and mining industries largely determined the residential patterns of today's middle-aged and older Jawoyn for much of their lives. The Yeuralba mineral field located on the present day Eva Valley Station has had little mention in official mining histories. This field however, was worked for tungsten, tin and copper from 1924 to 1952. A Patrol Report by W.E. Harney in 1943 indicated that there were at least 50 Aborigines working and residing at this field.

World War II had a major impact on the Jawoyn. From August 1942 Aborigines were officially prohibited from remaining north of Edith River. The same administrative order made provision for the establishment of Aboriginal compounds at localities near Mataranka and Katherine. 'Native Control Camps' were also established at this time and one such 'control camp' was formed at Maranboy. This meant that Aborigines from different areas were brought into unprecedented prolonged contact with each other resulting in significant cultural exchange and the forging of long term relationships.

Native Affairs Branch surveillance of the 'Native Control Camps' was intensified during the war years, particularly at mining locations such as Maranboy. Various aspects of the relations between miners and Aborigines were deemed unsatisfactory and it was recommended that all Aboriginal women be transferred from Maranboy to the farm of Joe Israelson, seven miles from Maranboy at the head of the Roper Creek. After the transfer of women to the 'Joe's Garden' compound in May 1943, Aboriginal male workers also left the tin fields.

Army control camps were abandoned in 1946 and the inhabitants were moved to a number of camps which were then later abandoned for reasons such as poor drinking water. Many Jawoyn continued to move around for ceremonies and Native Affairs officers were often frustrated by the elusiveness of the people they were trying to control.

In 1951 Aborigines were moved to a new welfare settlement at Bamyili (now Barunga). Rigid discipline

was maintained at locations such as this in an attempt to make Aboriginal people live like Europeans; the government policy of the day was known as 'assimilation'.

In Katherine, Jawoyn people continued to camp at sites associated with places of employment such as the Government Research Station, butchery and cordial factory (among others).

In 1962, Katherine Gorge was proclaimed a National Park. The constant presence of visitors, both townspeople and tourists even before this time, had forced Jawoyn to distance themselves from the Gorge. The Bolung (Rainbow Serpent) had been disturbed, food sources had been depleted and the Jawoyn were generally wary of associating with non-Aborigines.

A combination of the granting of Award wages in 1968 for Aboriginal people employed in the pastoral industry and the introduction of new technologies such as helicopter mustering and road transport set in train a decline in Aboriginal employment on the cattle stations. By the early 1970's, a larger, more mixed and transient Aboriginal population had become evident in Katherine, Pine Creek and Bamyili.

In 1974 the Kalano Association was established as an Aboriginal resource centre and began to address security of tenure for Aborigines in Katherine, along with housing, transport and health issues. Until this time no land had been properly secured for town camps and old camping areas had been slowly but surely lost as Katherine expanded and Aboriginal people became more marginalised. Today, Jawoyn live in town camps at Jodetluk, a camp on the Gorge Road close to the entrance to the Park, at Rockhole on the Katherine River west of town and at the Mayali-Brumby camp next to the Stuart Highway north of the Katherine River Bridge. Many other Jawoyn are to be found scattered throughout Katherine Township. A large number of Jawoyn also live at Barunga and Beswick which were scheduled as Aboriginal Land under provisions in the *Aboriginal Land Rights (Northern Territory) Act 1976*.

Although a mobile life-style for Jawoyn had been replaced by a more sedentary one involving occasional longer bush trips, there remained and remains today a continuing use of country from established camps and settlements. Jawoyn continue to frequent areas around Barunga, Maranboy and Beswick, along the King River, in the southern and eastern portions of Nitmiluk (Katherine Gorge) National Park, north of the Katherine River and north of Pine Creek. Jawoyn hunt and fish on their lands in areas both inside and outside the Park. During their visits to country, fish, turtles, goanna and wallabies are a regular part of the diet. Temporary camping places throughout Jawoyn territory, along the King River, upper Maude Creek, in Eva Valley and in the high tableland north of Katherine running toward Edith Falls attest to an unbroken and undaunted tradition of knowledge and use of country, however much altered by European contact.

Jawoyn people today may wear European clothes, they may drive cars and hunt with guns but they continue to live according to Jawoyn tribal law in the tradition of their ancestors.





# Nitmiluk National Park

## Walking in the Park



Information Sheet

The best way to see large areas of the Park and to experience its true diversity and grandeur is on foot.

Nitmiluk National Park has approximately 100km of walking tracks, ranging in distance from 400metres to 66km one way. The majority of walks commence from Katherine Gorge. If you intend to walk to Leliyn-Edith Falls (on the Jatbula Trail), please note that it is a one way walking experience.

***You can not walk from Edith Falls to Katherine Gorge. This walk is ONE WAY ONLY.***

Two walks are available at Edith Falls, the Leliyn Walk and the Sweetwater Pool walk.

When walking in the park remember that overheating and dehydration can occur.

### Registration of walkers

Let someone responsible know where you are going and when you'll be back. If you wish to, you can register with the Rangers at the Nitmiluk Centre.

Walkers intending on completing the Sweetwater Pool walk or Leliyn Walk can register at the Edith Falls kiosk or with the Rangers.

### Walking tracks & overnight camping

Persons attempting the longer overnight walks are charged a refundable deposit and camping fees for each person per night apply. Deposits are refunded upon deregistration.

Nitmiluk National Park camping grounds are located at the Gorge and at Edith Falls.

Persons intending to walk to Edith Falls are charged a refundable deposit of \$50.00 per permit, refunded upon de-registration. Camping fees for each person per night apply. A minimum of two persons are required to undertake the Jatbula Trail to Edith Falls, no solo walkers are permitted.

Camping permits are issued between 7.00am and 3.00pm to ensure walkers are able to reach the designated camp sites.

Camping is restricted to designated camping areas except in the wilderness zones of the Park where bush camping is allowed.

### Safety and Comfort

- Observe park safety signs
- Carry and drink plenty of water
- Wear a shady hat, sunscreen and insect repellent
- Wear suitable clothing

### Please Remember

- Put your rubbish in the bin or take it away with you
- All cultural items and wildlife are protected
- Nets, traps and firearms are not permitted
- Take care with fire light fires only in fireplaces provided
- Avoid using soaps and detergent in or near waterways
- Camp only in designated camping areas

Car parking is available for overnight walkers, check at the Nitmiluk Centre for details.

**This information should be used as a general guide only.** Intending walkers should purchase the Guide to Nitmiluk National Park which has detailed walk information including a topographical map.

The Guide is available from the Nitmiluk Centre and other retail outlets in the Northern Territory.

### Parks & Wildlife Commission of the Northern Territory

Nitmiluk National Park  
Ph: (08) 89721 886  
Fax: (08) 89710 702

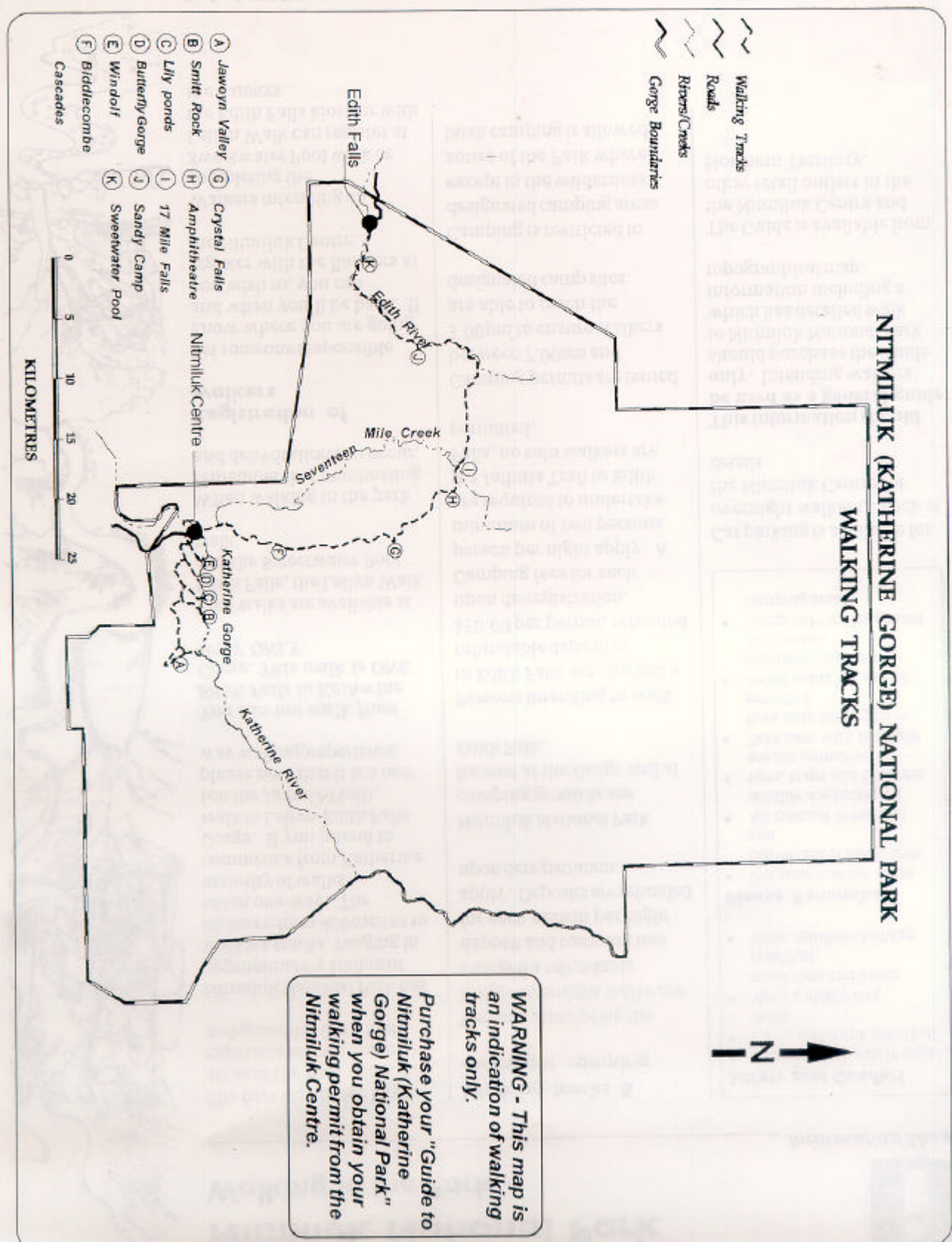
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32 Giles St  
PO Box 344 KATHERINE NT 0851





# Nitmiluk National Park

Information Sheet



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Ask at Katherine Region Tourism Association (08) 8972 2650 for more general publications about parks - Great Outdoors, NT Touring Guide, Touring the Great Outdoors.



# Nitmiluk National Park

## Flora, Fauna and Geology



Information Sheet

### Flora

There are eighteen separate vegetation communities identified within Nitmiluk National Park. These are contained within five basic landscapes.

#### Sandstone Plateau Scrub

This is an area of greatly dissected sandstone with a complex of chasms and gorges. Massive expanses of undulating sandstone pavement divide one chasm from the next. Conditions are extremely harsh and plants grow in coarse sand and leaf litter. There is almost no soil. Temperatures are extreme, especially during the "build up". Water is always at a premium. Even during the wet season, drainage is very quick in these areas and moisture is only available to plants for a short while. Plants with reduced, scale-like leaves are common in this landscape as are the wiry grasses like *Triodia* and *Plectrachne* collectively known as spinifex. Sparse medium sized trees cope in areas where soil depth permits. Scarlet Gum (*Eucalyptus phoenicia*) and Variable-barked Bloodwood (*E. dichromophloia*) are common. Many of the hardier shrubs like *Acacia*, *Grevillea* and *Boronia* abound here. The Lookout and Windolf Walks provide good examples of this landscape. The Wet season months of December to March see a profusion of flowers in many plants in this landscape.

#### Open Woodlands

Viewed from the air this landscape which covers much of the lowlands of the Top End, seemingly goes on forever, only interrupted here and there by freshwater streams. Although seemingly monotonous these areas are botanically very rich. As with most Australian Woodland it is dominated by Eucalypts. Bloodwoods (*E. foelscheana*, *E. bleeseri* and *E. porrecta*) are common as is the Ironwood (*Erythrophloeum chlorostachys*). The Woodland is very open with few shrubs, but annual tall grasses like spear grass (*Sorghum* spp.) fill the void between trees. Smaller trees like the native plums (*Terminalia ferdinandiana*) and *Buchanania obovata* are scattered throughout, while the Salmon Gum (*E. tintinnans*) provides some colour contrast. These woodlands are distinct deciduous in nature during the late dry season months of September, October and November.

**Open Forest** - Usually on high level ridges with deep sandy soil, the trees here grow taller and closer together. Eucalypts again dominate, Darwin Woollybutt (*Eucalyptus miniata*) and Darwin Stringybark (*E. tetradonta*) being most common. Low swampy areas in this forest are almost devoid of Eucalyptus. Here the Fern-leafed *Grevillea* (*Grevillea pteridifolia*), Swamp Banksia (*Banksia dentata*) and Green Paperbark (*Melaleuca viridiflora*) are the dominant species.

#### Sandstone Monsoon Rainforest Pockets

This community is found adjacent to permanent water, usually in gorges where sandstone plateau streams discharge into the low lands. Canopy species like *Syzygium*, *Terminalia*, *Alstonia* and *Evodia* provide almost complete shade for the numerous ferns and showy flowering shrubs such as *Melastoma polyanthum*. These pockets are considered relic communities from the era when most of Northern Australia was covered with rainforest.

**Riverine** - Where the sandstone plateau streams discharge onto the lowland plains, streams like the Katherine River and Seventeen Mile Creek form. These streams become swollen and flooded during the Wet season and slow to a trickle by August each year. The vegetation here is composed mainly of Paperbark trees (*Melaleuca* spp.) and River Pandanus (*Pandanus aquaticus*). Freshwater Mangrove (*Barringtonia acutangula*), is dispersed among native Apple Trees (*Syzygium* spp.), Leichhardt Trees (*Nauclea orientalis*) and Northern Swamp Box (*Lophostemon grandiflorus*). Native passionfruit (*Passiflora foetida*) and fishnet vine (*Flagellaria indica*) cover trees, in some places almost completely.

Although many of the fruits on trees and shrubs in the Park are edible and have been eaten for centuries by Aboriginal people, many need to be eaten at the correct time or need special treatment before being eaten.

#### Parks & Wildlife Commission of the Northern Territory

Nitmiluk National Park  
Ph: (08) 89721 886  
Fax: (08) 89710 702

Katherine Regional Office  
32 Giles St  
PO Box 344 KATHERINE NT 0851





## Fauna

### Birds

Birds constitute a major and often easily seen part of the fauna of Nitmiluk National Park. One hundred and sixty-eight species have been recorded in the Park and a list, which includes the Jawoyn name for each species, is available (phone (08) 89721886). The waterways of the Park are home for many diving bird species including the Darter, Little Pied Cormorant and Little Black Cormorant.

The high escarpment walls provide homes for Fairy Martins and Peregrine Falcons. Within the picnic grounds some of the more commonly seen birds include the Great Bowerbird, Crimson Finch and the Blue-winged Kookaburra.

The more colourful species to be seen on the Park include the Red-collared

Lorikeet, Red-winged Parrot, Northern Rosella, Red-tailed Black Cockatoos and the Hooded Parrot. The Rainbow Bee-eater is a colourful migratory species which is often seen during the dry season.

Storm birds such as Dollarbirds, Common Koel and Channel-billed cuckoos arrive at the start of the wet season.

### Mammals

The most commonly seen mammals around the Park include the Agile Wallaby, the Black Flying-Fox and the Little Red Flying-Fox. The Dingo may also be occasionally observed. Other mammals known to inhabit the Park include the Antilopine Wallaroo, Euro, the Northern Nail-tailed Wallaby and the Common Sheath-tailed Bat.

### Reptiles

A small permanent population of Fresh-water Crocodiles inhabits the waterways of Katherine Gorge. These may be seen sunning themselves on rocks, fallen logs or on the river bank, especially during the cooler months. The main diet of these timid reptiles is fish, insects and crustaceans.

Generally they are considered to be harmless but will bite to protect themselves. Other reptiles include Goulds Sand Goanna (often seen in the picnic area), Mertens Water Monitor, turtles, fast moving skinks and, at night, geckos. Snakes are present but rarely seen.



## Geology

A large portion of the Nitmiluk National Park area is comprised of the Kombolgie formation. This formation is an arenite or sandstone which was deposited by braided streams over a vast area. The development of the Kombolgie sandstone probably occurred about 1370 million years ago, give or take 30 million years. The Kombolgie formation is approximately 80% arenite or sandstone, the remainder being made up of volcanic emplacements.

There were two major volcanic interruptions which contributed to the laying down of the sandstone. Younger rocks of the Cretaceous period are found in remnants as a thin veneer over older rocks of the Kombolgie formation. These rocks originally covered large areas of the

entire region. This original Cretaceous capping is now almost completely eroded and in many areas only exists as weathered piles of rubble on valley floors. The Gorge system now known as Nitmiluk probably began forming in joints in the Cretaceous rocks overlying the Kombolgie formation.

Aerial views of the Park show large areas of incredibly intricate jointing. These joints are the result of lateral and tensile stresses caused by slight uplifting of the Kombolgie formation. All of these joints have been subjected to severe weathering over millions of years as can be appreciated when travelling up the Katherine Gorge.

No mineral deposits have been recorded in the Park but numerous

economic and subeconomic deposits have been discovered and developed nearby since 1878. These minerals are the result of the volcanic events in the region and include gold, silver, tin, wolfram, copper, lead, zinc, uranium, molybdenum and bismuth. Three main areas near the Park have been developed; the Cullen Mineral Field north west of the Park; the Maud Creek - Carpentaria Mineral Field south of the Park, and the Maranboy - Yeuralba Mineral Fields to the east and south-east of the Park.

Gold was first discovered at Driffield Creek about 15 km north of Edith Falls in 1878. Later discoveries in 1887 (Maud Creek and surrounds) resulted in the establishment of a battery at Maud Creek in 1888.





# Nitmiluk National Park

Information Sheet

## Fire Management

Management of fire within Nitmiluk National Park is very important to enable the survival of the Park's natural resources. These include rainforest pockets as well as many threatened and endangered species of flora and fauna.

Historically, large tracts of land were regularly burned, preventing the spread of wild fire during the dry season. Today a fire management strategy has been developed for the Park which is consistent with traditional Aboriginal practices.

Smaller areas of land are burned throughout the year creating a mosaic patchwork effect. This technique serves the purpose of preventing wildfires, allows for regeneration of plant species and minimises the effects of soil erosion which occurs when there is no ground cover to protect the soils from our torrential wet season rains.

### Fire Sensitive Plants

Many Australian plants require fire in order to germinate, however some plants are fire sensitive and survive only in the absence of fire. The fire sensitive White Cypress Pine (*Callitris intratropica*) is the subject of an ongoing monitoring program to record changes in the population, and the effects of fire. Once widespread over the park, frequent fires have reduced them to small pockets. Intense heat from fires will kill this tree.

Other species unable to regenerate after fire include rainforest species such as *Syzygium* sp., *Lophopetalum arnhemicum* and *Lophostemon* sp. Another is *Acacia helicophylla* which is endemic to the rocky slopes of the Arnhem Land Plateau and is registered as an endangered species.

## Weeds Management

The area known as Nitmiluk National Park was once a cattle station lease. For many years domestic stock roamed into most areas of the Park carrying with them seeds of many weeds. The seeds from these weeds may have been introduced in hay or by motor vehicles. The seeds were either transported in their fur or their digestive system. Once pockets of weeds were established, they were spread further with the aid of rainfall from each wet season.

Park weeds include *Hyptis suaveolens* (Hyptis), *Sida rhombifolia*, *Sida cordifolia*, *Sida acuta* (Sida), *Senna occidentalis* (Coffee senna), *Alternanthera pogens* (Khaki burr) and *Tribulus terrestris* (Caltrop bindii).

As most of these weeds are either annuals or perennials, their growth is mainly within the build up period (November - December).

### Control of Weeds

The control of these weeds is achieved using a number of management options, depending on the weed variety.

- **Feral animal control** to reduce the spread of certain weeds.
- **Use of herbicide**
- **Late wet season burns** Low intensity burns destroy the newly developed seed heads.
- **Biological control agent** Such as a type of beetle which specifically eats the weed *Sida acuta*.

For more information on fire or weed management contact Park staff at Nitmiluk National Park.

Parks & Wildlife Commission of the Northern Territory

PO Box 344, KATHERINE NT 0851 AUSTRALIA  
Ph: (08) 8973 8888  
Fax: (09) 8973 8899



Northern Territory Government



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## Feral Animal Control

### What is a Feral Animal ?

The term feral animal applies to introduced animals that have established breeding populations in the wild. They are generally regarded as pests or vermin. Feral animals include small mammals like cats and rats as well as the larger more conspicuous mammals such as donkey's, horses, cattle and pigs.

### Why is Control Necessary ?

Feral animals pose a threat to both Australian native flora and fauna and to domestic pastoral livestock. Some species compete directly with native animals for food and shelter, others prey directly upon our wildlife. Feral animals change the ecology of most habitats, which in turn has an impact on native flora and fauna. Feral animals compete with domestic livestock for food and can carry exotic diseases, which is of major concern to the pastoral industry.

### Feral Animals of Nitmiluk National Park.

Species of feral animals found within the Park include the buffalo, cattle, donkey, horses, pigs and cats. Of these pigs, buffalo and cattle pose the greatest environmental threat, especially to wetland areas and monsoonal rainforest pockets where soil and vegetation is damaged and even lost. Feral cats are extremely adaptable and efficient predators, rarely seen but found in every habitat of the Park with obvious consequences to our smaller native animals.

### Control of Feral Animals.

The Parks & Wildlife Commission aims to protect the ecology of the Park for the benefit of the native species. The aim is to eradicate or reduce the number of feral animals to a point where control is achievable and the amount of environmental damage is minimal. This can be achieved through ongoing removal programs to keep numbers low and in check. If left unchecked, numbers can rise dramatically resulting in long term damage to fragile areas.

For more information on feral animals and their control, contact Park staff at Nitmiluk National Park.





# Nitmiluk National Park

## Bird List



Information Sheet



### English Name

Emu  
Australasian Grebe  
Australian Pelican  
Darter  
Great Cormorant  
Little Pied Cormorant  
Pied Cormorant  
Great-billed Heron  
Pacific Heron  
White-faced Heron  
Cattle Egret  
Great Egret  
Little Egret  
Rufous Night Heron  
Black Bittern  
Jabiru (Black-necked Stork)  
Sacred Ibis  
Straw-necked Ibis  
Glossy Ibis  
Royal Spoonbill  
Yellow-billed Spoonbill  
Osprey  
Pacific Baza  
Black-shouldered Kite  
Letter-winged Kite  
Black Kite  
Square-tailed Kite  
Black-breasted Buzzard  
Whistling Kite  
Brown Goshawk  
Grey Goshawk  
Collared Sparrowhawk  
Red Goshawk  
White-breasted Sea-eagle  
Wedge-tailed Eagle  
Little Eagle  
Black Falcon  
Peregrine Falcon  
Australian Hobby  
Brown Falcon  
Australian Kestrel  
Black Falcon  
Magpie Goose  
Green Pygmy-Goose  
Plumed Whistling-Duck  
Black Swan  
Radjah Shelduck  
Pacific Black Duck  
Grey Teal  
Red-backed Button-quail  
Chestnut-backed Button-quail  
Red-chested Button-quail

### Jawoyn Name

durrk  
-  
baya  
barrakbarrak  
-  
jawirlwirl  
jawirlwirl  
gomung  
mirnibalmart  
-  
-  
yay  
bartgaraya  
marrgawkmi  
gomung  
jarnarran  
gernalk  
gernalk  
gernalk  
gemu'mu  
gemu'mu  
garlkgarl  
-  
-  
marram  
garrkayn  
-  
-  
gortol  
-  
yeriyn  
garrkayn  
ngertmo  
jarlmaykan  
-  
garrkayn  
ngalmirlamirla  
-  
bidjurniyu  
-  
-  
bamurru  
jurrwuyuk  
-  
-  
nabambirriwiyak  
jurwuyuk  
-  
jirrirti  
jirrirti  
jirrirti

### Scientific Name

*Dromaius novaehollandiae*  
*Tachybaptus novaehollandiae*  
*Pelecanus conspicillatus*  
*Anhinga melanogaster*  
*Phalacrocorax carbo*  
*Phalacrocorax melanoleucos*  
*Phalacrocorax varius*  
*Ardea sumatrana*  
*Ardea pacifica*  
*Ardea novaehollandiae*  
*Ardea ibis*  
*Ardea alba*  
*Ardea garzetta*  
*Nycticorax caladonicus*  
*Ixobrychus flavicollis*  
*Ephippicrychus asiaticus*  
*Threskiornis aethiopicus*  
*Threskiornis spinicollis*  
*Plegadis falcinellus*  
*Platalea regia*  
*Platalea flavipes*  
*Pandion haliaetus*  
*Aviceda subcristata*  
*Elanus notatus*  
*Elanus scriptus*  
*Milvus migrans*  
*Lophoictinia isura*  
*Hamptrostra melanosternon*  
*Milvus sphenurus*  
*Accipiter fasciatus*  
*Accipiter novaehollandiae*  
*Accipiter cirrhocephalus*  
*Erythrotriorchis radiatus*  
*Haliaeetus leucogaster*  
*Aquila audax*  
*Hierapetus morphnoides*  
*Falco subniger*  
*Falco peregrinus*  
*Falco longipennis*  
*Falco berigora*  
*Falco cenchroides*  
*Falco subniger*  
*Anseranas semipalmata*  
*Nettion pulchellus*  
*Dendrocygna eytoni*  
*Cygnus atratus*  
*Tadorna radjah*  
*Anas superciliosa*  
*Anas gibberifrons*  
*Turnix maculosa*  
*Turnix castanota*  
*Turnix pyrrhorostrax*

\* Note that some bird species are not recognised in Jawoyn language

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Nitmiluk National Park  
Ph: (08) 89721 886  
Fax: (08) 89710 702

Katherine Regional Office  
32 Giles St  
PO Box 344 KATHERINE NT 0851





# Nitmiluk National Park



## Information Sheet



### Common Name

Singing Bushlark  
Tree Martin  
Fairy Martin  
Richard's Pipit  
Black-faced Cuckoo-Shrike  
White-bellied Cuckoo-Shrike  
Cicadabird  
White-winged Triller  
Varied Triller  
Hooded Robin  
Jacky Winter  
White-browed Robin  
Rufous Whistler  
Sandstone Shrike-thrush  
Grey Shrike-thrush  
Lemon-bellied Flycatcher  
Leadon Flycatcher  
Shining Flycatcher  
Restless Flycatcher  
Rufous Fantail  
Grey Fantail  
Northern Fantail  
Willie Wagtail  
Grey-crowned Babbler  
Golden-headed Cisticola  
Rufous Songlark  
Variegated Fairy-wren  
Red-backed Fairy-wren  
Weebill  
Green-backed Cerygone  
White-throated Cerygone  
Varied Sittella  
Black-tailed Treecreeper  
Silver-crowned Friarbird  
Little Friarbird  
Blue-faced Honeyeater  
Yellow-throated Miner  
Singing Honeyeater  
White-gaped Honeyeater  
Grey-headed Honeyeater  
White-throated Honeyeater  
Brown Honeyeater  
Bar-breasted Honeyeater  
Rufous-throated Honeyeater  
Banded Honeyeater  
Dusky Honeyeater  
Yellow-tinted Honeyeater  
Red-browed Pardalote  
Striated Pardalote  
Star Finch  
Crimson Finch  
Zebra Finch  
Double-barred Finch  
Masked Finch

### Jawoyn Name

walmjirrkjirrk  
-  
galkwirtwirt  
-  
jawayakwayak  
wirriwirriyak  
jawayakwayak  
nyuritj  
-  
jopo  
nyuritj  
jiwortbort  
nyuritj  
nyuritj  
jawayakwayak  
-  
nyuritj  
-  
-  
walirjirrkjirrk  
walirjirrkjirrk  
jikirditjikirditj  
ngakngak  
-  
walinjirrkjirrk  
wirrmi  
milyblyn  
jirrbok  
gilg gilg  
barnawurrbarr  
wik wik  
marawk  
marawk  
yey'yey  
witjwitj  
-  
mardawk  
-  
yarralinyin  
markawk  
-  
barnawurrbarra  
yarralinyin  
-  
birn'birndok  
birn'birndok  
-  
bitj  
nin  
nin  
-

### Scientific Name

*Mirafra javanica*  
*Hirundo nigricans*  
*Hirundo ariel*  
*Anthus novaeseelandiae*  
*Coracina novaehollandiae*  
*Coracina papuensis*  
*Coracina tenuirostris*  
*Lalage tricolor*  
*Lalage leucomela*  
*Melanodryas cucullata*  
*Microeca leucophaea*  
*Poecilodryas superciliosa*  
*Pachycephala rufiventris*  
*Colluricincla woodwardi*  
*Colluricincla harmonica*  
*Microeca flavigaster*  
-  
*Myiagra rubecula*  
*Myiagra alecto*  
*Myiagra inquieta*  
*Rhipidura rufifrons*  
*Rhipidura fuliginosa*  
*Rhipidura rufiventris*  
*Rhipidura leucophrys*  
*Pomatostomus temporalis*  
*Cisticola exilis*  
*Cinchorhamphus mathewsi*  
*Malurus lamberti*  
*Malurus melanocephalus*  
*Smicronis brevirostris*  
*Gerygone chloronota*  
*Gerygone olivacea*  
*Daphoenositta chrysoptera*  
*Climacteris melanura*  
*Philemon argenticeps*  
*Philemon citreogularis*  
*Entomyzon cyanotis*  
*Manorina flavigula*  
*Lichenostomus virescens*  
*Lichenostomus unicolor*  
*Lichenostomus keartlandi*  
*Melithreptus albogularis*  
*Lichmera indistincta*  
*Ramsayornis fasciatus*  
*Conopophila rufogularis*  
*Certhionyx pectoralis*  
*Myzomela obscura*  
*Lichenostomus flavescens*  
*Pardalotus rubricatus*  
*Pardalotus striatus*  
*Neochmia ruficauda*  
*Neochmia phaeton*  
*Taeniopygia guttata*  
*Taeniopygia bichenovii*  
*Peophila personata*

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Nitmiluk National Park  
Ph: (08) 89721 886  
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Katherine Regional Office  
32 Giles St  
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## Common Name

## Jawoyn Name

## Scientific Name

Purple swamphen	-	<i>Porphyrio porphyrio</i>
Australian Bustard	benuk	<i>Ardeotis kori</i>
Brolga	bornorrang	<i>Grus rubicundus</i>
Comb-crested Jacana	betelerreleerre	<i>Irediparra gallinacea</i>
Black-winged Stilt	-	<i>Himantopus himantopus</i>
Red-necked Avocet	-	<i>Recurvirostra novaehollandiae</i>
Bush Stone-curlew	guluwurr	<i>Burhinus grallarius</i>
Oriental Pratincole	-	<i>Glareola maldivarum</i>
Australian Pratincole	-	<i>Stiltia isabella</i>
Masked Lapwing	-	<i>Vanellus miles</i>
Red-kneed Dotterel	-	<i>Erythronyx cinctus</i>
Black-fronted Dotterel	-	<i>Elseyornis melanops</i>
Oriental Plover	-	<i>Charadrius veredus</i>
Little Curlew	-	<i>Numenius minutus</i>
Greenshank	-	<i>Tringa nebularia</i>
Common Sandpiper	-	<i>Actitis hypoleucos</i>
Sharp-tailed Sandpiper	-	<i>Calidris acuminata</i>
Swinhoe's Snipe	-	<i>Gallinago megala</i>
Silver Gull	-	<i>Larus novaehollandiae</i>
Whiskered Tern	-	<i>Chlidonias hybrida</i>
Torres Strait Imperial-Pigeon	gulmutu	<i>Ducula bicolor</i>
Peaceful Dove	godowgodowk	<i>Geopelia placida</i>
Diamond Dove	golobok	<i>Geopelia cuneata</i>
Bar-shouldered Dove	golododok	<i>Geopelia humeralis</i>
Common Bronzewing	lawul	<i>Phaps chalcoptera</i>
Flock Bronzewing	gorrwelak	<i>Phaps histrionica</i>
Crested Pigeon	-	<i>Geophaps loquax</i>
Partridge Pigeon	-	<i>Geophaps smithii</i>
Chestnut-quilled Rock-Pigeon	gorrwelak	<i>Petrophassa rufipennis</i>
Red-tailed Black-Cockatoo	garraak	<i>Calyptorhynchus banksii</i>
Galah	bilkbilk	<i>Cacatua roseicapilla</i>
Sulphur-crested Cockatoo	ngarratj	<i>Cacatua galerita</i>
Little Corella	ngalelek	<i>Cacatua pastinator</i>
Red-winged Parrot	weley	<i>Aprosmictus erythropterus</i>
Hooded Parrot	jikilmitj	<i>Psephotus dissimilis</i>
Rainbow Lorikeet	detdet	<i>Trichoglossus haematodus</i>
Varied Lorikeet	jurri	<i>Psittaculirostris versicolor</i>
Cockatiel	bannguluwirtwurt	<i>Leptolophus hollandicus</i>
Budgerigar	jukilmitj	<i>Melopsittacus undulatus</i>
White-cheeked Rosella	jatbetjbetj	<i>Platycercus eximius</i>
Oriental Cuckoo	-	<i>Cuculus saturatus</i>
Pallid Cuckoo	-	<i>Cuculus pallidus</i>
Brush Cuckoo	-	<i>Cacomantis variolosus</i>
Common Koel	jowok	<i>Eudynamis scolopacea</i>
Channel-billed Cuckoo	gurrakban	<i>Scythrops novae-hollandiae</i>
Pheasant Coucal	buk buk	<i>Centropus phasianinus</i>
Rufous Owl	muk muk	<i>Ninox rufa</i>
Southern Boobook	gortol	<i>Ninox boobook</i>
Barn Owl	yerlyn	<i>Tyto alba</i>
Tawny Frogmouth	jawarl	<i>Podargus stigidoides</i>
Australian Owllet-nightjar	morok	<i>Aegotheles cristatus</i>
Spotted Nightjar	barna	<i>Caprimulgus argus</i>
Fork-tailed Swift	lenyjelerr	<i>Apus pacificus</i>
Azure Kingfisher	bitj	<i>Alcedo azurea</i>
Blue-winged Kookaburra	barraya	<i>Dacelo leachii</i>
Forest Kingfisher	boy'mi	<i>Todiramphus macleayi</i>
Red-backed Kingfisher	boy'mi	<i>Todiramphus pyrrhopygius</i>
Sacred Kingfisher	boy'mi	<i>Todiramphus sanctus</i>
Rainbow Bee-eater	wirritwirrit	<i>Merops ornatus</i>
Dollarbird	dewdew	<i>Eurystomus orientalis</i>



## COMMON NAME

## JAWOYN NAME

## SCIENTIFIC NAME

Long-tailed Finch	-
Pictorella Mannikin	-
Chestnut-breasted Mannikin	jeye
Yellow-rumped Mannikin	-
Gouldian Finch	ngalmaygorlo
Figbird	-
Yellow Oriole	birlo'birlorlomi
Olive-backed Oriole	juwe
Spangled Drongo	-
Great Bowerbird	juwe
Apostlebird	-
Maggie-Lark	gorindim
White-breasted Woodswallow	galkwirtwirt
Masked Woodswallow	-
Black-faced Woodswallow	jawayakwayak
Little Woodswallow	-
White-browed Woodswallow	-
Grey Butcherbird	warrkjirt
Pied Butcherbird	warrkjirt
Little Crow	-
Torresian Crow	wak wak

<i>Peophila acuticauda</i>
<i>Heteromurra pectoralis</i>
<i>Lonchura castaneothorax</i>
<i>Lonchura flaviprymna</i>
<i>Erythrura gouldiae</i>
<i>Sphecotheres viridis</i>
<i>Oriolus flavocinctus</i>
<i>Oriolus sagittatus</i>
<i>Dicurus bracteatus</i>
<i>Chlamdera nuchalis</i>
<i>Struthidea cinerea</i>
<i>Grallina cyanoleuca</i>
<i>Artamus leucorhynchus</i>
<i>Artamus personatus</i>
<i>Artamus cinereus</i>
<i>Artamus minor</i>
<i>Artamus superciliosus</i>
<i>Cracticus torquatus</i>
<i>Cracticus nigrogularis</i>
<i>Corvus bennetti</i>
<i>Corvus orru</i>

To record additional sightings or for more information contact the Parks and Wildlife Commission of the Northern Territory - Nitmiluk Centre. Phone (08) 89721 886 or Fax (08) 89710 702



# Kakadu National Park

<http://www.savannah-guides.com.au/page2-13.html>

Listed as a World Heritage area since 1984 because of its environmental and cultural significance, the park occupies 19,757km<sup>2</sup>. It extends about 200km from north to south and 100km from east to west, making it the largest National Park in Australia.

Kakadu National Park is located:

- 257km east of Darwin
- 296km north of Katherine.

## Population

- Jabiru - 1731
- South Alligator - 1600

## Economy

The key industries in the region are tourism and mining.

## Climate

Lying between the latitudes 12 degrees south to 14 degrees south, the climate here is monsoonal with two distinct seasons:

Dry/Winter (April to September):

- Little rainfall with mild to warm conditions
- Average temperatures are maximum 32°C, minimum 20°C
- Humidity levels are low, averaging between 55% - 65%

Wet/Summer (January to March):

- Heaviest rain falling from January onwards, average 320mm in January.
- Average temperatures are maximum 34°C, minimum 25°C
- Humidity levels average between 80% - 90%

October to December is the build-up to the wet season. Rising temperatures and humidity levels are accompanied by spectacular storms.

## Environment

Kakadu National Park protects the entire catchment of a large tropical river, the South Alligator, and examples of most of Australia's Top End habitats. It is home to a rich diversity of plants, and animals in abundance. Kakadu's habitats include:

- **Savannah woodlands** - nearly 80% of the park
- **Monsoon forests** - moist isolated pockets
- **Southern hills and ridges** - highly eroded landscape with unique flora and fauna
- **Stone country** - the imposing escarpment of the Arnhem Land Plateau
- **Floodplains and billabongs** - seasonal flooding influences animal movement
- **Tidal flats and coast** - mangrove forests and significant bird sites

Humans have been a part of these environments for many thousands of years. Traditional Aboriginal burning practices are being used to shape Kakadu's fire management program. Regular patchwork burning reduces the risk of destructive wildfires at the end of the dry season. Native flora and fauna can then utilise the adaptations developed over thousands of years to thrive in their natural environment.



## Geology

Kakadu's geological history began over 2,000 million years ago with the deposition of sand sediments and mud. The deposits were hardened by heat and pressure into quartzite, sandstone and conglomerates. Granite intrusions pushed their way to the earth's surface some 1,400 million years ago. These rocks form the 'stone country' of the Arnhem Land escarpment.

Accumulations of alluvial soil and sand were deposited in the last 60 million years, and a laterite cap formed over these layers, manipulating the relentless forces of erosion so evident in the landscape as spectacular waterfalls, billabongs and gorges.

Uranium mined in this region is 1,800 million years old in layers near the base of the Arnhem Land plateau.

The changing sea levels during the last 100,000 years has moved the coastline over 300km, with consequent changes to the environments of many plants, animals and indigenous people.

## Fauna

The birds of Kakadu are a major attraction for many visitors. Hundreds of thousands of magpie geese nest here, along with rare species such as the lavender-flanked wren, rainbow pitta, golden-shouldered parrot and yellow chat. The elegant jabiru, Australia's only stork, is common, along with the comb-crested jacana and a range of birds of prey.

The most notable mammals in Kakadu are the agile wallabies, while the estuarine crocodile tops the reptile list. Since crocodiles became protected in the Northern Territory in 1972 their numbers have returned to natural levels. Over 10,000 species of insects have been recorded in Kakadu including several exquisite dragonflies and damselflies, and the brightly coloured Leichhardt's grasshopper. In one small tributary of Deaf Adder Creek there are over 40 species of fish.

## Flora

Kakadu provides a diversity of habitats which are home to over 1200 different species of plants:

- **Savannah woodlands:** Covering much of the National Park. Eucalypts are the dominant species of tree in the woodlands. Look out for the salmon gum, with its beautiful pink bark. Other eucalypts commonly found include the Darwin woollybutt and the Darwin stringybark.
- **Stone country:** Home to the rare sandstone pandanus. This pandanus is only found in Kakadu and Arnhemland.
- **Seasonal floodplains:** Home to paperbarks, pandanus, and many species of water-lily.
- **Tidal flats and coast:** Where over two-thirds of all of the Northern Territory's mangrove species are found.

## Indigenous Culture

For at least 50,000 years, Aboriginal people have continuously lived in the area now defined by the National Park, leaving behind shelters, stone tools, grindstones and ochre for ceremonial painting.

The name 'Kakadu' comes from 'Gagudju' - the main Aboriginal language used in the Northern part of the area at the start of the 20th century. Today, three major languages are spoken within the park:

- Gundjeihmi/Mayali
- Kunwinjku
- Jawoyn

The parts of the Aboriginal legacy most visitors come to see are the famous Ubirr and Nourlangie Rock, where Dreamtime legend and day-to-day living are presented side-by-side.

The rock art galleries reveal sprayed hand stencils, hunters carrying barbed spears, and creation beings Namarrgon the Lightning Man and Ngalyod the Rainbow Serpent.

Fish, birds and animals are presented x-ray style, revealing internal organs and bone structures.

## Things To See And Do

- **Bowali Visitors Centre**, 5km from Jabiru. The centre contains a wealth of information regarding Kakadu. Information staff, displays and a library are all available to help you plan your visit.

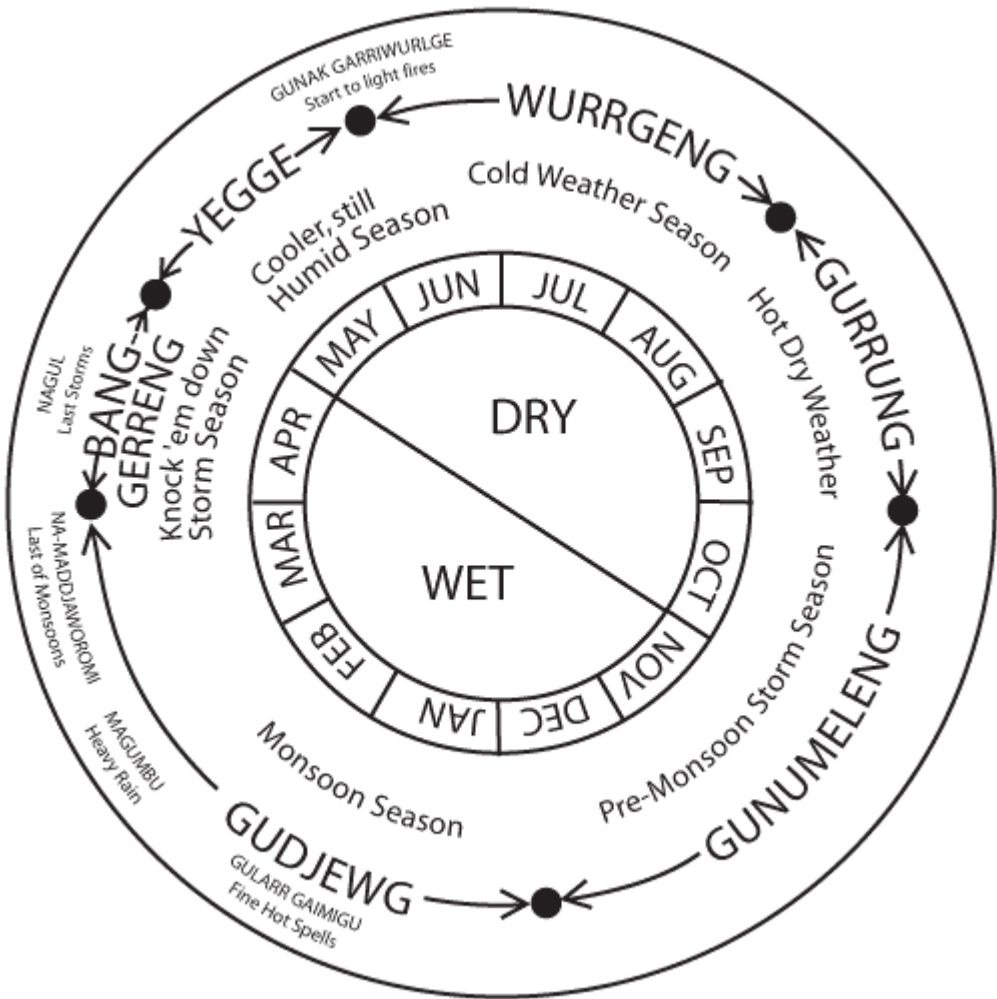


- **Ubirr and Nourlangie Rock** are two major public sites featuring rock art and living shelters and there are as many as 5,000 other recorded sites scattered throughout the Park.
- South Alligator Area **Mamukala Wetlands**: On the Arnhem Highway 29km from Jabiru, Mamukala is beautiful all year round but is at its most dramatic in the late Dry Season, when thousands of Magpie Geese congregate to feed.
- **East Alligator River**: An attractive stretch of tidal river that forms the boundary between Kakadu and Arnhem Land. Commercial boat cruises are available, and boat ramps are located both upstream and downstream of Cahills Crossing. Photo of East Alligator River
- **Yellow Water Billabong**: 6.5km off the Kakadu Highway near Cooida. A pristine environment, which supports a wonderful variety of plants, birds and animals. Boardwalks and cruises provide great views of the abounding wildlife.
- **Warradjan Aboriginal Cultural Centre**: 4.5km off Kakadu Highway near Cooida, this centre displays the creation era as interpreted by the Bininj people.
- **Mary River Area Gunlom (Waterfall)**: 37km from Southern Entry Ranger Station, Gunlom has the magical combination of waterfall and serene plunge pool, with shady gums cooling the picnic areas.
- **Maguk (Waterfall)**: 12km off Kakadu Highway, a 2km return walk through beautiful monsoon forest leads you to a small waterfall and clear plunge pool that is a great place to cool off after your walk.
- **Jim Jim Falls Area (Dry Season 4WD Only)** Only 60km off the Kakadu Highway, the trip in to the Falls takes 2 hours. After the rains, when water flows from the soaring sandstone escarpment, it's an awe-inspiring sight. During the Dry Season, the rock pool with its white sandy beach is permanent.
- **Twin Falls**: 70km off the Kakadu Highway, the bumpy ride to Twin Falls is rewarded with crystalline sandy beaches, dense surrounding forest and two waterfalls that plunge into the cool, crystal clear pool.
- **Koolpin Gorge**: 46km from Kakadu Highway. Open for 4WD access only from May to November, permit required. A beautiful gorge, access is restricted to keep it in its pristine state. A permit and entry key must be organised in advance.



# An Aboriginal calendar for the Kakadu region showing that lighting fires is part of the yearly cycle.

<http://www.abc.net.au/science/features/indigenous/firecalendar.htm>



(Pic. ©Alderson,Gangali and Haynes (1979))



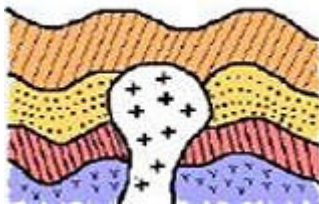
# Geology of the Kakadu Region

<http://www.deh.gov.au/parks/kakadu/plantsanimalsland/geology.html>

Geologists consider that Kakadu's landscape reflects the geological history of the region. Rocks of different types and ages determine topographical and soil characteristics.

## Northern Kakadu

The oldest rock formations in the Park are a mixture of sedimentary rock, laid down in a large geological depression called the Pine Creek Geosyncline, and igneous or volcanic rocks. They date from about 2500 million years ago, about half the age of the earth. The layered sequence of sedimentary and volcanic rock was changed under conditions of extreme heat and pressure into schist, gneiss, quartzite and marble. This was part of a major mountain building event, the Top End Orogeny, about 1800 million years ago. These ancient rocks contain the uranium-bearing bed referred to as the Cahill Formation, source of the Ranger, Koongarra and Jabiluka deposits.



### 2,500 million years ago:

The oldest known rocks of Kakadu formed as granite intrusions in the earth's crust

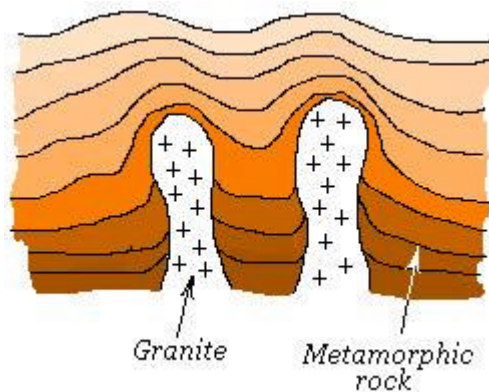
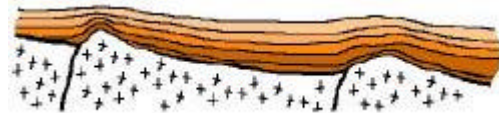


### 2,000 million years ago:

Erosion of crust exposes granite. Faulting forms wide shallow depression or "geosyncline"

### 1,870 - 2,000 million years ago:

The Oxygenated Atmosphere evolves. High areas eroded and deposited as sediments in geosyncline. Faults "sag" and Basin receives 10km thickness of sediments



### 1,860 million years ago:

Weight of sediments destabilises earth's lower crust and mantle, leading to mountain building - pressure and heat fold and metamorphose sediments to gneiss and schist. New granite intrusions occur.



### **1,800 million years ago:**

Long erosion period in arid climate produces flat desert-like landscapes with scattered low ridges and hills. Rocks are deeply leached.



The mountains formed during the Top End Orogeny would have once been several thousand metres high but were eroded over 100 million years to form a wide plain. The ancient rocks can be seen near the base of the escarpment. In the dry, monsoonal climate of that time, the rocks and soil were deeply leached as rainwater percolated down and evaporated from the ground surface, leaving behind iron and other minerals dissolved in the water to form a hard brown crust, or laterite. These deeply weathered rocks underlie the lowlands of Kakadu and are now covered by geologically recent deposits of sand and gravel. They can be seen in road cuttings along the Kakadu Highway, between Coinda and the Bowali Visitor Centre. They look like blocks of dark brown laterite, usually with worm-like tubes on the surface. The colour of the laterite varies from brown on the surface to orange-brown and mottled orange-white lower down. The changing colours reflect the greater degree of leaching, or loss of iron and other minerals, during weathering.

About 1650 million years ago a huge river system, perhaps associated with a climatic change, spread over the plain, eroding much of the weak, crumbly rock on the surface. Life had not yet evolved on earth, so there was no vegetation to hold the soil and rocks together, which may be why the sediments deposited during this time were in very thick layers. Quartz sandstone up to 1000 metres thick was deposited across the entire region.



**1,650 million years ago:** Large braided rivers spread 1000m thickness of sand during flash floods from unknown source to north west

Ripple marks in the rock show that these sediments came from the north-west and tell scientists about the environment when the sediments were deposited. Flash floods caused beds of sand up to 10 metres thick and several kilometres across to be dumped very suddenly; in the long, quiet periods between these floods thinly bedded sections of the sandstone were deposited.



Ripple marks are commonly preserved in the Kombolgie Formation sandstone and are further evidence of its fluvial and shallow-water deposition

This sandstone is called the Kombolgie Formation; it forms the escarpment and outlier country and can be easily seen at Nourlangie. Look for polished pebbles set in the smaller sandstone matrix and imagine the force of the river that carried them there.

The next 1500 million years were geologically stable and the sandstone layers consolidated. During this time the first land plants appeared.

About 140 million years ago, during the Mesozoic era, a shallow sea spread across most of Kakadu from the north. The escarpment and outliers were sea cliffs at the edge of a vast, shallow sea. About 100 million years ago the seas receded.



### **140 million years ago:**

Mesozoic seas spread across the area, eroding older sandstone, into sea cliffs (Arnhem Lands escarpment) and islands (outliers). Fossiliferous sandstone and siltstone deposited over lowlands.



### **100 Million years ago:**

Mesozoic Seas recede and most of their fossiliferous sediments are eroded away. The major escarpments of today's landscape are now apparent



The rate of retreat of the escarpment at its weakest points has been estimated at about 1 metre every 1000 years. At places such as Jim Jim Falls the face of the sandstone is strongly armoured by a layer of iron and silica. As water seeps through the rock the water 'takes' these minerals with it and then deposits them on the surface of the rock, forming a tougher rock face. Where this occurs the rate of retreat of the escarpment is much slower.

### **50 Million Years ago:**

Ancient Faults in southern Kakadu move once more to form local depressions. Swampy sediments with fossil tree palm spores are laid down and preserved.



The landscape as it appears today



The Kombolgie Formation is remarkable in that it has remained relatively stable over such an extraordinary length of time. There has been no significant folding of the sediments since formation and exposed faces can be viewed in almost the same condition as they were when deposited. Countless gorges in the plateau have formed along joints and cracks and have eroded into a criss-cross pattern of deep cracks that look like knife cuts from the air.

In an area to the west of West Alligator Head it is possible to see beach ridges dating from about 8000 years ago, when sea levels were about 10 metres higher than they are today. Also during this period mud deposits containing many marine animals accumulated on the estuarine plains. As the sea retreated, rivers cut down into the mud deposits and in some places fossils of mud lobsters, snails, bivalve shellfish and wood fragments were preserved in the mud.

## **Southern Kakadu**

The geological history of Southern Kakadu is very different from that of northern Kakadu. The overall geological evolution is the same, but the period between the deep weathering of the ancient land surface (the Pine Creek Geosyncline) and the deposition of the Kombolgie Formation sandstone was marked by intense faulting, granite intrusion and volcanic activity.

1860 million years ago a rift valley was formed by faulting along a major fracture in the earth's crust. This valley was about 25 kilometres wide and at least 120 kilometres long and ran parallel to the current South Alligator River valley. The faults allowed lava to reach the surface and erupt as a chain of volcanoes. Rivers running through this newly evolving terrain eroded the volcanic rocks and redeposited them as gravel. They also eroded much older



rocks brought to the surface by the faulting, to form unusual conglomerates with a pebbly mixture of many different types of rocks. Eventually the valley filled up with sediments, which were subsequently folded, and the 'softer' rocks eroded into a low but fairly rugged landscape with jagged upturned ridges. Later, the Kombolgie Formation sandstone was deposited over them, forming a huge sedimentary plain



**1,800 - 1,860 million years ago:**

Faults open up rift valleys in southern Kakadu and volcanoes fill them with lava.

Very rapid erosion occurs by high energy rivers.

Sediments deposited under the Mesozoic sea, 140 million years ago, are well preserved in the south of the Park as densely wooded tablelands. They are easily seen south of the Kakadu Highway near the Mary River ranger station. In some places the eroded cliffs are up to 30 metres high and composed of white or brown sandstone or siltstone. They are strongly weathered and commonly capped with laterite. The rocks contain rare fossils mixed with wood and plant fragments.

50 million years ago, during the Eocene epoch, further movement along the ancient faults in southern Kakadu formed local depressions and shallow freshwater swamps. Rocks developed under these conditions formed outcrops near the headwaters of the South Alligator River. Rocks of this age are uncommon in northern Australia, and this small area is of some scientific interest. Drilling has revealed the siltstone sediments to be about 70 metres deep and to contain fossilised spores from the palm trees that once grew there.



The map illustrates the Warradjan Aboriginal Cultural Centre and its surrounding area. Key features include:

- Yellow Water:** Located at the top left, with a 'Yellow Water Walk' indicated.
- Warradjan Aboriginal Cultural Centre:** The main hub, featuring a 'Gagadju Crocodile Lodge' and an 'Airstrip'.
- Trails and Walks:**
  - Goose garden walk:** A dashed line leading from the center towards the bottom right.
  - Mardugal Billabong Walk:** A solid line leading from the center towards the bottom left.
  - Goose garden walk:** A dashed line leading from the center towards the bottom right.
- Waterways:**
  - Yarradjan Billabong:** A large body of water on the left side.
  - Yarradjan Creek:** A waterway flowing from the top left towards the bottom left.
  - Yarradjan Creek:** A waterway flowing from the top right towards the bottom right.
- Other Landmarks:**
  - Jack Boyd Square 95km (4000 95km):** A point of interest on the right side.
  - Ranger Station (Emergency Information Only):** A point of interest on the right side.
  - Jim Jim Hillbong:** A point of interest at the bottom right.
  - Jim Jim Creek:** A waterway at the bottom right.
- Navigation:**
  - North Arrow:** Indicated by an 'N' with an upward arrow.
  - Scale:** A scale bar is provided at the top left.



## The Concept

*It came from Aboriginal people*

The Aboriginal traditional land owners (**Bininj/Mungguy**) of Kakadu National Park have wanted to tell the story about their culture for a long time. The people from **Murumburr, Mirrar Gundjeihmi, Badmardi, Bunitj, Wurrkbarbar, Mardin, Bolmo, Girrimbitjba, Manilagarr, Worgol** and other clans, have contributed to the project.

The **Warradjan** Aboriginal Cultural Centre lies within the boundaries of the **Murumburr** clan estate where **Gun-djeihmi** language is commonly spoken. **Gun-djeihmi** is the main Aboriginal language used in the Centre, although **Jawoyn** and **Gagudju** also appear.

It is hoped that you find visiting the **Warradjan** Aboriginal Cultural Centre an exciting and memorable experience. Through the displays and exhibitions you can gain an understanding of the relationship **Bininj/Mungguy** have with their families and their land. **Bininj/Mungguy** and their country are inseparable.

## The Building

*Sitting in circles*

In the early stages of the project, **Bininj/Mungguy** came together to discuss the building design, its role and its facilities.

At most **Bininj/Mungguy** gatherings, people sit in circles. During an early meeting **Bininj/Mungguy** decided that a circular building would reflect the way they communicate with each other. It was decided that the Cultural Centre needed to be round like people sitting together.

This gave the architects (Australian Construction Services) a basic shape to work with. They provided a range of model buildings incorporating a display area, art and craft gallery, theatrette and places where people can gather.

At later meetings **Bininj/Mungguy** saw the round shape as being like a **warradjan** (pig-nosed turtle). So the building design developed into the **Warradjan** Aboriginal Cultural Centre.

## The Display

**Bininj/Mungguy**, Environment Australia staff and the display designers (David Lancashire Design) worked closely together to determine exactly what **Bininj/Mungguy** wanted to say and how they wanted to display their story.

Mandy Muir made a key statement during the process "Our land is our life," which became the theme of the display. It all began to take shape after many drawings, plans, models and drafts of the text were considered.

In the **Warradjan** Aboriginal Cultural Centre **Bininj/Mungguy** have displayed many of their important stories, especially those from the creation era when the **Nayuhyunggi** (first people) created the land, plants and animals and gave people laws to live by.

**Culture can't wash away.  
It can carry on,  
just pass it on.**

**Nawagadj Nabadmardi  
Badmardi clan**



Signs invite visitors to move through the display as a Rainbow Serpent (creation ancestor) moves through the country. First through the lowlands during the dry season and then the stone country during the wet season.

All the artefacts that you see have been made by **Bininj/Mungguy**. Great care has been taken in collecting and constructing display features such as the goose hunting platform, dilly bags, pandanus baskets and paintings.

Some displays may contain labels that cover the name/s and images of people who have passed away.

In **Bininj/Mungguy** culture, it is often not appropriate to display the names or images of deceased people. Please respect the wishes of Traditional Owners and leave the names and images covered. These protocols can vary from area to area and family to family. In some cases family members may provide permission for the names and images of the deceased to be displayed after a period of time.

**Bininj/Mungguy** - please be aware that the Cultural Centre may contain names or images of deceased people, with permission from the family.

**Gamuk** (thank you)

As you leave the display you pass messages from many **Bininj/Mungguy** including:

**Gamuk, ngurrdi-nang ngardberre culture.  
Wanjih ngardberre gun-bolk ngarrdinahna.**

It's good, you looked and felt our culture.  
Look after our country.

Discussions about the design commenced in 1989, with specific planning beginning in 1992. The display was completed in 1995.

**Bininj** (pronounced bin-ing) is a Kunwinjku and Gun-djeihmi word, **Mungguy** (pronounced mung-goy) is a Jawoyn word. Both are similar to the English word man and depending on the context can mean man, male, person or Aboriginal people.

## Warradjan Gallery

### *Local art and craft on display*

After you have journeyed through the display and explored the many facets of **Bininj/Mungguy** culture, you can browse through a gallery where art and craft from Kakadu, Arnhem Land and Katherine regions are displayed for sale. The fittings in the gallery were made by Ironwood Furniture and have been inspired by weathered and sculptured ironwood trees of the Northern Territory.

**Culture is important because it keeps us in touch with our country and other Aboriginal people throughout the region.**

*Sandra McGregor*



## Credits

### Architects

Australian Construction Services, Darwin

### Builder

Eylandt Construction and Engineering

### Display

#### Design

David Lancashire Design, Melbourne

#### Research and Copy

Bininj/Mungguy, Kakadu

Environment Australia staff, Kakadu

Dianne Lancashire, Melbourne

George Chaloupka, Darwin

David Webster, Melbourne

#### Contractors

Execon Pty Ltd, Melbourne

Environmental Design and Construction Pty  
Ltd, Brisbane

Fox Fire Designs, Darwin

Archerfish Art and Scientific Illustration,  
Darwin

Integrated Media, Darwin

Optima Lighting Design Consultants,  
Melbourne

AAV Business Communications,  
Melbourne

Ewin Wood

The Big Plot

### Gallery/Shop

#### Design

David Lancashire Design, Melbourne

#### Furnishings

Ironwood Furniture, Rex Maxwell

#### Managers

Gagudju Association

#### Installation

Paul Jennings Troppo, Darwin

### Signage

#### Design

David Lancashire Design, Melbourne

#### Contractors

Execon Pty Ltd, Melbourne

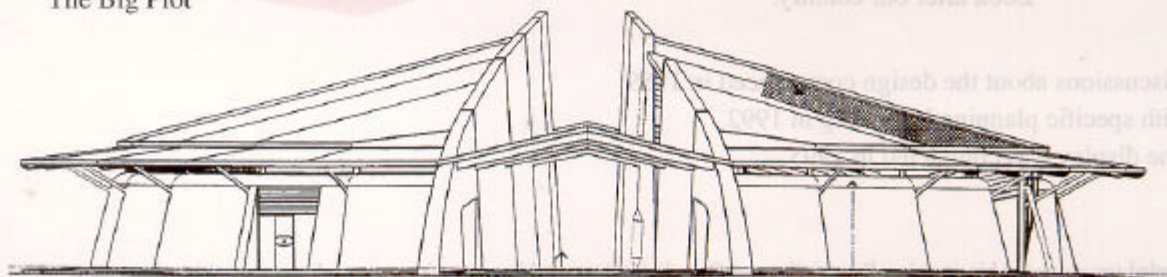
### Landscaping

#### Design

Environment Australia

#### Contractors

Djabulukgu Association



NM 7/02 10000



# Park Notes



## Aboriginal Languages

### Aboriginal Languages Australia Wide

Contrary to popular belief that there was only one Aboriginal language in Australia, studies have shown that there were about two hundred Aboriginal languages in Australia at the time Europeans arrived. These were distinct languages as different from each other as English and Bengali. These languages have extensive vocabularies and complex grammars. Today about one hundred languages are still spoken to some extent with fifty languages having a significant number of speakers.

Language is the life blood of culture. The cultural identity and unique world view of each people is carried in their language. English versions of Aboriginal concepts such as the Dreamtime can only give a watered-down and somewhat misleading view of the original idea. For this reason Aboriginal communities are keen to see their languages survive in a living and dynamic form.

### Languages in Kakadu National Park

The linguistic diversity of Aboriginal Australia is demonstrated locally in microcosm. The map on the back page shows the main languages of the Park.

#### Languages of the Escarpment

The languages still actively spoken in the Park are Gun-djeihmi (also called Mayali), Kun-winku and Jawoyn. These languages were all spoken in or adjacent to the Arnhem Land escarpment. People talking Gun-djeihmi and Kun-winku can understand one another and therefore they are regarded as dialects of the one language. Jawoyn is a separate language.

These languages share very similar structure and grammar. For this reason these languages, together with others in the region, are grouped together into a large language family called the Kunwinjku language family. The details of one of these languages, Gun-djeihmi, are outlined over the page.



## Gun-djeihmi ... A Living Language

Gun-djeihmi is the language spoken in the central Park area and is used here to show some of the characteristics of Aboriginal languages.

**Sounds** and their nearest English equivalents.

### Vowels

- a - as in father or the u in but
- e - as in bed or the ai in air
- i - as the ee in feet
- o - like or said quickly
- u - as in push

### Diphthongs

- ai - like eye
- au - like house
- ayi - at the end of words, eye-cc
- ei - like they
- eu - like air-oo said very quickly
- eyi - at the end of words, as in payee
- iu - like ee-yoo said quickly, or the eau in beaut
- oi - as in poise
- ou - like low
- ui - like goey said quickly

### Long Consonants

bb, dd, djdj

like long English pp, tt, tch

### Consonants

- b - bank
- d - dog
- dj - jump
- g - gun
- h - like the Cockney tt in bottle - bo'tle, or like oh-oh
- k - cake
- l - lift
- m - mad
- n - nose
- ng - sing
- nj - canyon, or like boyn if at the end of word, eg bonj
- r - rice, carry
- rd - as in harder with an American accent
- rl - as in curl with an American accent
- rn - as in burn with an American accent
- rr - like the tt in butt<sup>er</sup> said very quickly so it is trilled
- w - wait
- y - yell

### Ng at the start of words:

Say the word 'singalong', then practice dropping the start of the word, so it becomes 'ingalong' and then 'ngalong'. The 'ng' sound is sometimes said very faintly in Gun-djeihmi so that the word would sound more like 'along' with just a hint of the 'ng' at the start.

### Structure

Gun-djeihmi is a polysynthetic language. That is, it can express in a single complex word an idea that takes a whole sentence in English. For example abanmarneyawoihiyukyirumdeng can be broken into the following parts.

a	I
ban	then
marne	for
yawoih	again
yiuk	honey
yi	with
rumde	return
ng	non-past tense

In English we would use eight words to express this as "I bring the honey back for them again".





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### *Local art and craft on display*

After you have journeyed through the display and explored the many facets of **Bininj/Mungguy** culture, you can browse through a gallery where art and craft from Kakadu, Arnhem Land and Katherine regions are displayed for sale. The fittings in the gallery were made by Ironwood Furniture and have been inspired by weathered and sculptured ironwood trees of the Northern Territory.

**Culture is important because it keeps us in touch with our country and other Aboriginal people throughout the region.**

*Sandra McGregor*



## Credits

### Architects

Australian Construction Services, Darwin

### Builder

Eylandt Construction and Engineering

### Display

#### Design

David Lancashire Design, Melbourne

#### Research and Copy

Bininj/Mungguy, Kakadu

Environment Australia staff, Kakadu

Dianne Lancashire, Melbourne

George Chaloupka, Darwin

David Webster, Melbourne

#### Contractors

Execon Pty Ltd, Melbourne

Environmental Design and Construction Pty  
Ltd, Brisbane

Fox Fire Designs, Darwin

Archerfish Art and Scientific Illustration,  
Darwin

Integrated Media, Darwin

Optima Lighting Design Consultants,  
Melbourne

AAV Business Communications,  
Melbourne

Ewin Wood

The Big Plot

### Gallery/Shop

#### Design

David Lancashire Design, Melbourne

#### Furnishings

Ironwood Furniture, Rex Maxwell

#### Managers

Gagudju Association

#### Installation

Paul Jennings Troppo, Darwin

### Signage

#### Design

David Lancashire Design, Melbourne

#### Contractors

Execon Pty Ltd, Melbourne

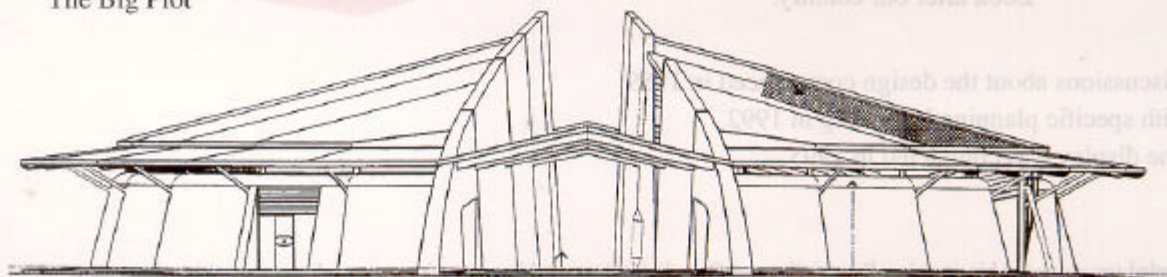
### Landscaping

#### Design

Environment Australia

#### Contractors

Djabulukgu Association



NM 7/02 10000



# Aboriginal Art

<http://www.deh.gov.au/parks/kakadu/artculture/art/index.html>

Rock Art shows our life

Rock art is an important part of Aboriginal people's lives. Mimi spirits were the first of the Creation Ancestors to paint on rock. They taught some Aboriginal people how to paint and other Aboriginal people learned by copying Mimi art.

At the end of their journeys, some Creation Ancestors put themselves on rock walls as paintings and became djang (Dreaming places). Some of these paintings are andjamun (sacred and dangerous) and can be seen only by senior men or women; others can be seen by all people.

--Warradjan Aboriginal Cultural Centre

Aboriginal people in the Kakadu area paint rock images rarely now. Among the reasons for this are the fact that Aboriginal people no longer live in rock shelters and there are fewer people with the necessary knowledge to allow them to paint at certain sites. Nevertheless, Aboriginal artists continue to paint on bark, paper and other materials. In recent years printing traditional designs onto fabric has become a popular art form, particularly among women.

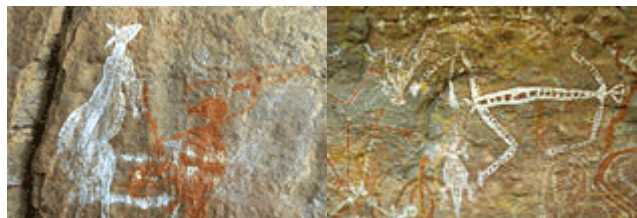
In spite of this, rock art remains relevant to Bininj/Mungguy: the works depict objects still used, animals still hunted, and activities people still do. The rock art in Kakadu was painted for a number of reasons:

*hunting* - animals were often painted to increase their abundance and to ensure a successful hunt by placing people in touch with the spirit of the animal;

*religious significance* - at some sites paintings depict aspects of particular ceremonies;

*stories and learning* - stories associated with the Creation Ancestors, who gave shape to the world were painted;

*sorcery and magic* - paintings could be used to manipulate events and influence people's lives; fun-for play and practice.



Some sites and paintings could be painted only by people with the requisite knowledge. Sorcery paintings could be painted only by the holder of magic knowledge, for instance. Other paintings, particularly at sites depicting stories of Creation Ancestors, were often repainted: again, only people with knowledge of the stories could repaint them. The act of painting put artists in touch with their Creation Ancestors-a powerful experience.

In Dreaming painting,  
use special paint, ochre, blood.  
Come back with that feeling.  
Ceremony painting is not for everyone to see.  
Top business you can't see it.  
Go through your body  
and give you knowledge, Dreaming.  
You might dream.

Good one.

--Bill Neidjie, Bunidj clan, Warradjan Aboriginal Cultural Centre

Generally, the act of painting was more important than the painting itself. At many sites in Kakadu images have been painted over each other: the artist was not concerned about preserving an image for posterity but simply wanted to paint to tell a story.



The stories and knowledge associated with many paintings often have a number of levels. Younger people and non-Aboriginal people are told the first level, known as the 'public story'. Access to the 'full story' depends on an individual's progression through ceremonial life, their interest, and their willingness to take on the responsibilities that go with that knowledge.

## Dating Rock Art

<http://www.deh.gov.au/parks/kakadu/artculture/art/dating.html>

Rock Art featuring a thylacine (Tasmanian Tiger) which became extinct on the Australian Mainland at least 2000 years ago.

Dating rock art It is difficult to accurately assess the age of rock art. The thermoluminescence dating technique has been used in Kakadu to date the sand surrounding pieces of ground ochre to 50 000 years ago. Used pieces of ochre provide good evidence that there was artistic expression of some sort at this early date, although not necessarily rock art. Carbon-dating techniques require the presence of carbon-bearing organic materials, which are generally not used in the mineral paints of the Kakadu region. Carbon dating has, however, been used to date bees-wax paintings, the oldest of which was found to be about 4000 years old.



By studying the subjects and art styles and then comparing them with climatic, geological and archaeological evidence, researchers have been able to estimate the age of a number of paintings. Paintings of animals now extinct on the Australian mainland can be assumed to have been done before, or shortly after, these animals disappeared: the long-beaked echidna is thought to have become extinct 15 000 years ago; the thylacine and Tasmanian devil became extinct more recently, probably about 2000 to 3000 years ago. Paintings of other animals are linked to specific environmental conditions: estuarine conditions are thought to have begun about 6000 years ago, so paintings of estuarine fish are probably less than 6000 years old; the freshwater floodplains developed more recently, so paintings of freshwater birds such as magpie geese are probably less than 1500 years old.

## Mineral paints

<http://www.deh.gov.au/parks/kakadu/artculture/art/paints.html>

Several naturally occurring minerals are used to make the basic colours common in rock paintings:

haematite - an iron-rich rock used to make red pigment; limonite and goethite - used to make yellow/orange pigment; ochre - an iron-stained clay that is used to make red, orange and yellow and can be made darker by baking it in a fire before grinding; kaolin, or pipeclay, and huntite - used to make white pigment; manganese oxide and charcoal - used to make black colour, although charcoal is not a mineral and does not last long.



Of all the pigments, haematite lasts longest. Over time it penetrates and bonds with the rock surface. As a result, the majority of old paintings visible today are completely red. The other white and yellow pigments commonly used in X-ray paintings form a layer on the surface of the rock; they are very vulnerable to damage by wind, water, animals and humans, so many recent paintings are deteriorating rapidly.

Pigments are crushed on a stone palette and mixed with water to form a paste. Paint is applied using brushes made from human hair, chewed sticks, reeds and feathers. Wet pigments are also blown from the mouth around objects to create stencils, the hand stencil being the most common; examples of hand stencils can be seen at Ubirr and Nanguluwurr.



# Art Styles

<http://www.deh.gov.au/parks/kakadu/artculture/art/styles.html>



As with European art, different Aboriginal art styles have developed over time. Researchers have identified about 11 main artistic styles of rock art in Kakadu. At many sites paintings are layered on top of each other, often in a number of different styles. 'Art on art' sites are used to determine which styles came first. It is important to remember that style itself is not enough to determine the age of a painting, since styles were not necessarily exclusive to one period; some styles developed a long time ago are still used today.

The 11 main art styles are spread across three environmental periods. The table below shows a suggested chronology of these art styles, based on work of George Chaloupka.

Approximate years before the present	Period	Key style
50 000 years	Pre-estuarine	Object prints
20 000 years		Large naturalistic figures Dynamic figures Post-dynamic figures
15 000 years		Simple figures with boomerangs Mountford figures (northern running figures) Yam figures
8 000 years	Estuarine	Early estuarine paintings
4 000 years		Bees-wax art X-ray descriptive
1 500 years	Freshwater	X-ray decorative
300 years		Contact art

## The pre-estuarine period

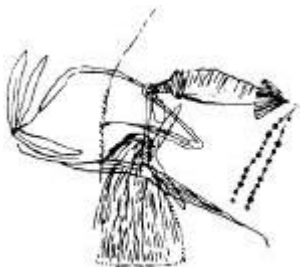
During the pre-estuarine period, from about 50 000 to 8000 years ago, the sea level was much lower and the climate was much drier. This early art is represented by a number of styles: object prints; large naturalistic animals and humans; dynamic figures; post-dynamic figures; simple figures with boomerangs; Mountford figures (northern running figures); and yam figures.

Object prints are made as positive imprints. A hand or object can be placed in wet paint and pressed directly onto the rock or paint-covered items such as grass and string can be thrown against a rock. Imprints of thrown objects are generally found on ceilings or overhangs or on out-of-reach walls. These object prints are probably the earliest style of rock art found in Kakadu.





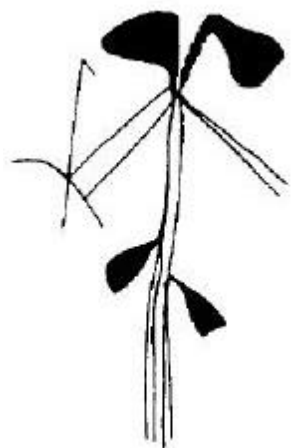
Large naturalistic animals and humans are the earliest drawn images found in the region. The animals are usually drawn in outline and filled in with contour lines, stipples, patches, and occasionally an ochre wash. They are often larger than life. Wallabies and kangaroos are the most common images, but other animals such as freshwater crocodiles and extinct mainland species such as the long-beaked echidna, thylacine and Tasmanian devil are also painted in this style. An example of a thylacine can be seen at Ubirr.



The dynamic figures are small, exquisitely drawn humans, animals and part-humans. The human figures are drawn in action, with their legs widespread and their bodies thrust forward. Generally the male figures wear an elaborate head-dress and a belt from which one or two skirts are suspended. Necklaces, pendants and armlets are also worn. Weapons such as barbed spears, boomerangs, clubs, stone axes and sticks are also shown. Figures with the head of an animal and the body of a human are usually depicted with the humans and are involved in a variety of hunting activities. The animals portrayed are usually kangaroos or wallabies, although some birds and freshwater fish are also painted in this style.

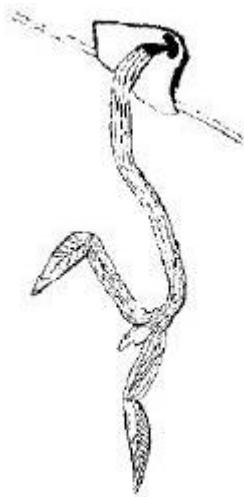


The post-dynamic figures are similar to the dynamic figures but are usually drawn in silhouette, appear static, and lack the animation of the dynamic figures. They are somewhat stylised.



The simple figures with boomerangs are highly stylised figures drawn in one thick line. They appear similar to stick figures and commonly wear head-dresses and skirts and carry boomerangs and hooked sticks.





Mountford figures (northern running figures) are found in the north of the Park and often appear to be running at full speed. The paintings generally portray human figures with sensuously curved, elongated S-shaped bodies.



The yam figures consist of yam images transposed onto human and animal forms. Usually, the head is depicted as a yam and the body is that of a human or animal. The yams painted are mainly identified as the water yam, although other species such as the long yam are also painted. The Rainbow Serpent first appears in paintings of this style.

## The estuarine period

The estuarine period, from about 8000 to 1500 years ago, began with the flooding of river valleys and the formation of mangrove swamps. Animals such as barramundi, mullet and estuarine crocodiles migrated into the newly formed estuaries and appear for the first time in rock art. This period is represented by three art styles: early estuarine paintings; bees-wax art; and the X-ray descriptive style.

The early estuarine paintings feature fish such as barramundi, mullet and catfish, estuarine crocodiles, and human figures with a variety of spear throwers. The paintings are naturalistic in style.

Bees-wax art features simple designs and human figures applied in bees-wax obtained from native bees.

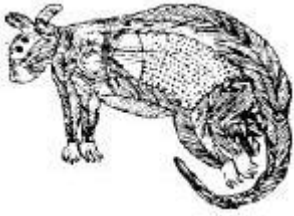
The X-ray descriptive style depicts the external shape and internal structures of humans, animals and objects.



## The freshwater period

During the freshwater period, less than 1500 years ago, freshwater billabongs and paperbark swamps replaced saltwater systems. The freshwater wetlands brought new food resources to the area and the paintings reflect these changes, showing waterlilies and magpie geese, humans carrying goose spears, goose-wing fans, complex spear throwers and didgeridoos. There are two art styles: the X-ray decorative style and contact art.





The X-ray decorative style developed from the X-ray descriptive style. Some artists lost interest in the anatomical detail of internal organs and subdivided the body for purely decorative purposes. Both the descriptive and decorative forms of X-ray art continue to be used today in contemporary bark and paper paintings. The Lightning Man begins to occur in paintings during this phase.



Contact art records the arrival and activities of people from Macassan, Chinese and European cultures. The two-masted boat depicted at the Nanguluwur Gallery and the rifles at Nourlangie and Ubirr are good examples of contact art.



# Nourlangie art site

<http://www.deh.gov.au/parks/kakadu/artculture/art/nourlangie.html>

The name 'Nourlangie' is an anglicised version of Nawurlandja, the name of a larger area that includes an outlier to the west of Nourlangie. The upper part of Nourlangie Rock is known as Burrunggui; the lower areas are known as Anbangbang.

The area was formed when two Creation Ancestors in the form of short-eared rock wallabies travelled through from east to west. They moved past Nourlangie Rock, across Anbangbang billabong, and up into the rocks at Nawurlandja, where they cut two crevices in the rock as they passed. These crevices are visible today and rock wallabies are often seen there in the early morning and at dusk.

There are three main sites at Burrunggui: a rock shelter (Anbangbang shelter); several rock art sites, including the Lightning Man rock art site (Anbangbang gallery); and Gun-warddehwardde lookout. These sites can be reached by following a 1.5-kilometre circular walking track from the car park. The walk takes about an hour. The Lightning Man art site can be reached by wheelchair.

Nourlangie is open from 7.00 am until sunset all year.

## Anbangbang rock shelter

That's a place where people sheltered  
from the rain in Gudjewg (monsoon season).  
A place for making tools, telling stories,  
doing string games while the tucker is cooking.  
Go hunting down the river, when the water goes down a bit.  
Hunting yams, kangaroos, sugar bag.  
Waiting around until the dry season comes.  
Today we got house and cook galawan (sand goanna) in the oven,  
but tastes better cooked on the coals of an open fire.  
- Violet Lawson, Murumburr clan  
Warradjan Aboriginal Cultural Centre

An archaeological dig at Anbangbang rock shelter in the early 1980s revealed that Aboriginal people have been using the shelter for at least 20 000 years. Excavated layers of soil contained a variety of stone artefacts and implements that had been discarded over time. By examining the number of artefacts in each layer, researchers concluded that the shelter was used occasionally from about 20 000 to 6000 years ago. It appears to have been used more frequently after this, probably as the area became estuarine and more food was available.



The Anbangbang rock shelter is found on the southern side of Nourlangie Rock

Organic materials, such as bones, string, shells and plant material were found only in the top layers of soil. Generally, organic material deteriorates quickly in tropical climates, but the organic materials found here were relatively well preserved. The materials found suggest that the shelter was probably used by a family group as a base camp in the wet and early dry seasons. The large rock overhang would have provided protection against both rain and sun. Animal and plant remains such as fish, magpie geese, freshwater mussels, water lilies, fruits, wallabies, goannas, flying foxes, echidnas and crocodile eggs illustrate the range of past meals. Pieces of string and spear-points of wood, bone and stone cast light on the manufacturing methods used at the time.

According to Aboriginal people, Anbangbang rock shelter was used primarily by the Warramal clan, who were traditional owners of the area, and by the neighbouring Badmardi clan, who moved down from the stone country to take advantage of lowland foods from the surrounding woodlands, creeks and billabongs. The Warramal clan





has since died out and responsibility for the area has passed to Aboriginal traditional owners from surrounding areas.

## The Main (Anbangbang) Gallery

An understanding of art usually comes from interpreting it through things we are familiar with. For example, when we look at a painting of a Western-style wedding such things as the minister, the church doorway, the church windows, the guests and the wedding dress help us to identify it as a wedding. Much of the information in the painting is specific to a Western-style culture. Someone from a different culture would perhaps not realise they were looking at a depiction of a religious ceremony because they would be unfamiliar with the symbols used.

Similarly, Aboriginal art makes sense only to those with sufficient knowledge of the culture to recognise the information the art conveys. Although there are explanations of the paintings at the Lightning Man rock art site, the explanations are incomplete: non-Aboriginal people are not entitled to know the full story.

A number of figures at the Lightning Man rock art site were repainted by Nayambolmi, or Najombolmi, in 1963 and 1964. Repainting was part of the rock art tradition, although not all rock art was repainted. Only people who were 'authorised' or recognised as artists were allowed to repaint. Nayambolmi, probably born around 1895, was from the Badmardi clan and was highly respected as an artist. He was also a good hunter and angler-hence his 'white fella' name, 'Barramundi Charlie'. Nayambolmi worked for non-Aboriginal people for many years, but he visited his country and painted in shelters throughout his life. One of the last prolific rock art painters in the area, he died around 1967.

### *Namondjok*

Aboriginal people from different clan groups have different stories associated with Namondjok (pronounced nar-mon-jock).

For some, he is a Creation Ancestor who now lives in the sky and can be seen only at night, when he appears as a dark spot in the Milky Way.

For others, he is a Creation Ancestor who broke the kinship laws. The story goes that Namondjok travelled through the Burrunggui (Nourlangie Rock) area and broke the kinship laws with his 'sister'. (Some Aboriginal people attribute this story to Nabilil rather than Namondjok.)

[Kinship laws dictate who Aboriginal people may and may not marry-Aboriginal people have a much broader and more complex kinship system than do people of European descent. An Aboriginal person's 'sister' also includes their mother's sisters' children and their father's brothers' children (cousins). Just as marriage between brother and sister is unacceptable in non-Aboriginal society, so it is in Aboriginal society].



A solitary boulder on Burrunggui is a feather taken from Namondjok's head-dress by his 'sister', after they had broken the kinship laws. The boulder is visible from Gunwarddehwardde lookout.

### *Namarrgon*

To the right of Namondjok is Namarrgon, the Lightning Man. Namarrgon (pronounced narm-arr-gon) is an important Creation Ancestor who is still active today. He is responsible for the violent lightning storms that occur every wet season. The band around him from his left ankle, joining his hands and head, and down to his right ankle represents the lightning he creates.

He uses the axes on his head, elbows and feet to split the dark clouds and make lightning and thunder.

Namarrgon's story in this area is part of a longer story, covering a journey beginning on the coastline of the Coburg Peninsula and ending in a rock shelter in the sandstone country of the Arnhem Land plateau, where he remains today. During his travels he left his power behind at many places. On his last journey, when he approached the escarpment from the east, he looked over the sheer wall, then took out an eye and placed it high on the cliff at Namarrgondjahdjam (Lightning Dreaming), where it sits, waiting for the storm season. Lightning Dreaming can be seen from Gunwarddehwardde lookout.

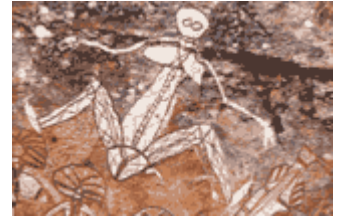


## ***Barrginj, Namarrgon's wife***



The female figure is Barrginj (pronounced barr-jeen), Namarrgon's wife.

Their children are the Alyurr (Leichhardt's grasshoppers), who are very important to local Aboriginal people because they gave them their language, beliefs, values and the structure of their society during the Creation Time.



Alyurr, striking blue and orange grasshoppers that live on a particular plant, *Pityrodia jamesii*, that grows in the stoney country, are quite rare. The first specimens were collected by J.E. Dring, purser on HMS Beagle during surveys of the northern Australian coast, probably around 1839. The next specimens were collected by Ludwig Leichhardt on his journey through the region in 1845. Alyurr were not rediscovered by non-Aboriginal people until the 1970s. They are generally seen just before the wet season, when they come out and call to their father to bring on the wet-season storms.

## ***Family group***



Beneath these three Creation Ancestors is a large group of men and women. Their elaborate dress suggests they are probably on their way to a ceremony. You may notice that a couple of the women have dashes painted on their breasts; this shows that they are breast feeding.

## ***Nabulwinjbulwinj***

The single male figure on the side gallery to the left of the main frieze is Nabulwinjbulwinj (pronounced nar-bull-win-bull-win). He is a dangerous spirit who eats females after killing them by striking them with a yam.









# Aboriginal Art

<http://australia.jrn.msu.edu/2002/work/aboriginal/index.html>



Kakadu National Park is located south east of Darwin and covers about 20,000 square kilometers. Presently, there are approximately 300 Aboriginal people who reside at 10 locations in the park. Kakadu was named from an Aboriginal language called Gagudju.

On June 26, 2002, our Study Abroad group consisting of 18 students and two instructors departed Darwin and headed for Kakadu National Park. It took us about three hours to reach there. In our three days at the Kakadu National Park, we visited two of the most famous art sites. They are Ubirr and Nourlangie Rock.

Ubirr and Nourlangie rock are galleries for Aboriginal rock art and also places where "Dreaming" was born as Aboriginal cultural lore. Currently, approximately 5,000 art sites have been recorded and another 10,000 sites are believed to exist.

We were amazed and impressed by the creativity and imagination of the Aboriginal rock art we saw. They painted various themes on rocks, including spiritual Mimis, dancing ceremony, or creation ancestors.

From an archaeologist's point of view, the story of rock art indicates changes in Aboriginal society and in environment over many thousands of years. For Aboriginal people, the paintings serve as both culture and country. At many spots, storyboards are displayed next to the art sites, to offer an explanation about the story and the interpretation of the painting. This gives visitors plenty of background information about the paintings.



# Namarrgon

Namarrgon is a fascinating, lanky, horseshoe-shaped character painted on the rock. His colors are fairly simple; he was probably painted with some sort of makeshift paintbrush, possibly a crushed stick dipped in some iron-based paint most likely made from the crushed ochre rock. He is mostly white with the exception of some reds on the right side of his thunder. We could not tell, however, if the red coloration was rock bleed or intentional coloring. This piece of rock art was painted by Nayombolmi (Barramundi Charlie).



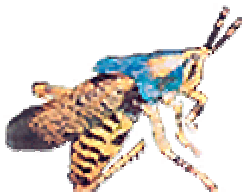
Namarrgon

*photo: Christina Bakalis*



Barrinj

*photo: Christina Bakalis*



*Petasida Ephiphigera*

*photo: Rachel Distler*

## LIGHTNING DREAMING:

Namarrgon, commonly known as the "lightning man," is responsible for the violent electrical storms which occur on the Arnhem plateau. According to Aboriginal Dreamtime explanation of this work, Namarrgon and his family came from the sea and traveled Australia for many years. He uses the stone axes that are mounted on his head, elbows and knees to split the dark clouds and strike the ground, creating lightning and thunder. In addition to his axes, he also has a band wrapped around his body. This band belongs to thunder and works side by side with the axes to shake the earth and the heaven.

## NAMARRGON'S FAMILY:

- Barrinj, his wife, is also mother to the grasshoppers.
- His children are the bright orange and blue grasshoppers, *Petasida Ephiphigera*. They come out early in the storm or wet season to look for their father.

"When I first read the story that was beside this eye-grabbing piece of art I was equally taken by the Dreamtime story. The story sticks with me. I could not help but picture my own version of this spirit floating high up in the heavens, racing through space and time, axes cocked back ready to shred the clouds, pummel the ground, and shake the heavens. Mischievously slicing, ripping and pounding at his own leisure like the villain of the Aboriginal skies."

--- Group member, David Keating.



## DREAMTIME:

**The Dreamtime** is the period of creation in Aboriginal culture. It is the beginning of knowledge and it is when the laws which guide Aboriginal life today were created. The natural elements, the landscape, the plants, and the animals were also created by the first ancestors. It is the basis of Aboriginal religion and culture.

**Dreaming** is the term used for an Aboriginal group's beliefs. Different groups have different animals that figure prominently in the stories and serve to explain their beliefs. One area of land might have "Long Necked Turtle Dreaming" while another section belongs to "Caterpillar Dreaming." The area around Nourlangie Rock is "Lightning Dreaming."

# Namanjolg

As we walk up the trail leading to Nourlangie Rock, an enormous boulder rising from the dry earth becomes visible. Our first lesson of the day will come from this rock we see before us. To those uneducated in Aboriginal culture, the rock does not appear to be anything particularly special. Our tour guide, Rick, informs us, however, of its importance in Aboriginal culture. From the perspective of the Aboriginals, the rock is not just any ordinary rock, rather it is a sacred site depicting their history and culture. The rock, named Dove Rock, or Feather Rock, represents the story of a man named Namanjolg.



Feather Rock -photo: Christina Bakalis

## THE STORY:

The story of Namanjolg is one of incest. It is said that Namanjolg and his sister had sex and later eloped. Ashamed of what they did, Namanjolg's sister told their family. Upon hearing of their sin, Namanjolg's family sought him out to punish him. When they found him, he was on top of what is now known as Feather Rock, dancing around a fire. A member of his family then pushed him into the fire. Namanjolg, covered in ash, dove into a nearby billabong and became a crocodile. Namanjolg's sister took a feather from his headdress and placed it at the site to remind others of the Aboriginal laws regarding incest which she had broken with her brother. Namanjolg's sister later becomes the Rainbow Serpent, Ngalyod, the subject of many Aboriginal stories from the Dreaming lore.



## COMMUNICATION:

As with many other Aboriginal stories or rock art sites, the site of Feather Rock serves to educate and remind people of Aboriginal laws:

- Namanjolg teaches that incest is wrong
- The Corroborree teaches the importance of ceremonial law
- Mabuyu teaches not to steal

Namanjolg is a perfect example of how Aboriginal people use rock art to inform and instruct. When laws are broken, there are always consequences. The Aboriginal people never developed a written language and spoken languages between different Aboriginal clans vary greatly. They see the rock art as the most effective and universal form of communication between groups. It is also the most effective way to instruct successive generations on their law, culture, and history.



Namanjolg -photo: Christina Bakalis

# Corroboree

To reach the Barrunguy gallery, we followed a trail winding up the face of a hill. The vegetation that grows here is mostly grasses, with only a few sparse trees. These are Savannah plains which have two seasons: the dry season and the wet season. During the wet season, it rains heavily for several months. The Barrunguy gallery wraps around a large boulder where we see many caves and ledges that extend beyond the edge of the art site like a roof, protecting all below from the sun and rain. Similar to other sites where rock paintings are, this one would have provided shelter from the elements to the people who passed through this area. Depicted at this site are many figures that appear to be dancing.

## THE STORY:

This artwork depicts a story of a broken tribal law. The red figures are women and the white figures are men.



This depicts young men's coming-of-age ceremony. Women are strictly forbidden from witnessing this ceremony.

The women are camped some distance away from men during the ceremony. They become threatened, however, by one of the spirits, the Lightning Man. Out of fear, they run into the men's camp where the ceremony is taking place.

By doing so, the women violated an important Aboriginal law. As a result, one of the women has her legs broken.



The Corroboree -photo: Cheng-se Hsu

## TECHNIQUES:

There are two colors used in many of these art works, red and white. The figures in red are smaller and some appear to have round stomachs. We can tell by the line work and details in this painting that it was done using a brush, which would have been made out of a stick -frayed to various degrees or not at all - or a feather. Crushing certain minerals into a powder and then mixing them with a fluid, usually water, but perhaps animal blood or resin, makes the paints for the two colors. The fluid binds the ground mineral together into the paint. The red color was made using hematite ore, and the white is made out of one or more of three possible materials: pipeclay, kaolin, or gypsum. Pipeclay was common in other works, and so was probably used in this instance as well.

## THE PAINTS:

- Red = Hematite
- White = Pipeclay, Kaolin, or Gypsum
- Yellow = Limonite
- Black = Charcoal or Manganese Oxide

## PRESERVATION:

Preserving rock art is difficult, especially at sites such as the Barrunguy Gallery, where the artwork is under an overhang, but not completely blocked from the elements that cause deterioration. On the rock lip above the work, a silicon drip line has been applied to deflect the water that drips down the rock face away from the painting. It still faces the threat of deterioration, though:

- Dust on the ground or on surrounding plants can react with the paint and cause deterioration
- Insects can build their homes on the rock face
- Animals or people can brush up against the rock
- Water and rain can erode the rock or wash away paint
- Plants can grow on the rock art or near the rock

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[University of New South Wales](#)  
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# The diet of Aboriginal people before European contact

[http://www.nt.gov.au/health/healthdev/health\\_promotion/bushbook/volume2/chap3/before.html](http://www.nt.gov.au/health/healthdev/health_promotion/bushbook/volume2/chap3/before.html)

## Hunter-gatherer lifestyle

Before European settlement Aboriginal people led a nomadic hunter-gatherer lifestyle. Traditional Aboriginal groups had deep knowledge of their land, sources of water, and the affects of seasonal cycles on plant foods and game. Early explorers observed that people were lean and healthy.



## Dietary diversity

The Aboriginal diet was varied and rich in nutrients. The diversity of food supply was affected by geographical landform, climate and season. Most early observers described a variety and abundance of both animal and plant foods, even in the arid zone.

## Division of labour

Foraging parties gathered enough food for their immediate needs and food was not often stored. Both men and women played an important role. Women hunted and gathered in groups (with the children) and provided highly reliable foods such as: small marsupials, shellfish, reptiles, insects, honey, eggs and plant foods. Men mainly hunted alone or in pairs for larger animals such as mammals, birds, reptiles and fish.

## Meat in the diet

There is increasing evidence that in tropical, savanna, coastal and desert areas diets were meat orientated. Besides those foods mentioned above, other important animal sources such as eggs, frogs, honey ants and some grubs have also been recorded.

## Plant foods

Vegetable foods provided an important supplement rather than an alternative to animal foods. Proportions changed throughout the seasons.

A few plant staples were eaten often. These included yams, bush tomatoes, fig and quandong fruits, corms of bush onion, wild orange truffles, gall nuts of the mulga apple or bloodwood apple and the seeds from some grasses.

Bush vegetables, seeds and fruits are very rich in vitamins and minerals. The green plum, for instance, has the highest concentration of ascorbic acid (vitamin C) of any known plant (1 000-5 300mg/100g). Seeds of acacia species are high in the essential oils, linoleic and oleic acids.



## Meal Patterns

The quality and quantity of food consumed varied greatly from day to day. People generally subsisted and the diet was supplemented when larger animals were killed. Larger animals were shared among group members. During times when a lot of meat was available people ate large quantities at one time. It has been argued that these 'feasts' provided excess energy which was stored as fatty tissue to cover periods of relative shortage of food.

Children were breast fed until approximately three years of age. The age of weaning depended on the birth of the next child. Solids were introduced when the baby had teeth.

## Food Preparation

There was minimal processing and storage of food, no overcooking, and no leaching of vitamins and minerals in cooking water. Many plant foods were eaten raw. Fruits, bulbs, nectar and gums were often eaten straight after picking. Some vegetables were cooked to make them taste better. Tree, grass and waterlily seeds were often made into a damper which was baked in hot sand and ashes.

Traditional law often influenced the way that animals were cooked. Meat was eaten rare, usually at one sitting and there was little wastage. Smaller animals were baked in hot sand and ashes, either directly or wrapped in bark and leaves. Large bones were broken and marrow extracted. Smaller bones were chewed or even pounded and eaten.

## Food distribution

Foods were proportioned and distributed according to traditional law. Strict cultural practices were determined by kin obligations. Sharing food had a social purpose and was important to the strengthening of relationships. Distribution was also associated with ceremonies or 'righting a wrong'. In some areas older men received the choice cuts of meat and the remainder of an animal was distributed according to age and status.

## Fat

The prime time for hunting or collecting was when animals were 'fat'. Although some animals such as witchetty grubs and green ants have a relatively high fat content, most land animals are very lean. Native animals have a much lower fat content than domesticated animals. The small, fatty deposits that were found in some parts of an animal were shared between many people.

## Delicacies

Traditional diet was low in sugars. Honey ants, sugar-bag, other nectars and honey were considered delicacies and were highly prized.

