

## Section 4 Natural values of Nitmiluk National Park

### In this section

Nitmiluk National Park is renowned for its natural beauty. Its dramatic sandstone gorges and refreshing waterholes are enjoyed by thousands of people each year. But Nitmiluk is more than a haven for people, it is also home to a variety of plants and animals.

This section shows how geology gives the land its shape and provides the foundation for Nitmiluk's landscapes and habitats, and how the climate maintains the variety of life in Nitmiluk:

- catchment
- climate
- geology
- landforms
- habitats, plants and animals
- plants of special interest
- animals of special interest
- Freshwater Crocodiles
- Fairy Martins
- studying plants and animals in Nitmiluk
- list of animals recorded in Nitmiluk National Park.

### What Nitmiluk tour guides need to know

What is the pattern of rainfall in the Top End?

What causes flooding in the Katherine area?

What is the Kombolgie formation and how did it develop?

According to geologists, how did the gorge form?

What is the source of 17 Mile Creek?

What is a habitat?

What are the landscape types in Nitmiluk National Park?

What makes it possible for rainforests to grow in sandstone gullies?

Why are bats and birds important to rainforests?

What are some of the animals in the Katherine River?

What birds do you see during a cruise on the River?

How is a riverine habitat different to a floodplain habitat?

How do you tell the difference between Freshwater and Estuarine (Saltwater) Crocodiles?

What do Freshwater Crocodiles eat?

Why do you see crocodiles more during the cold weather time than when it's hot?

When do Freshwater Crocodiles nest?

How does nest temperature influence crocodile eggs?

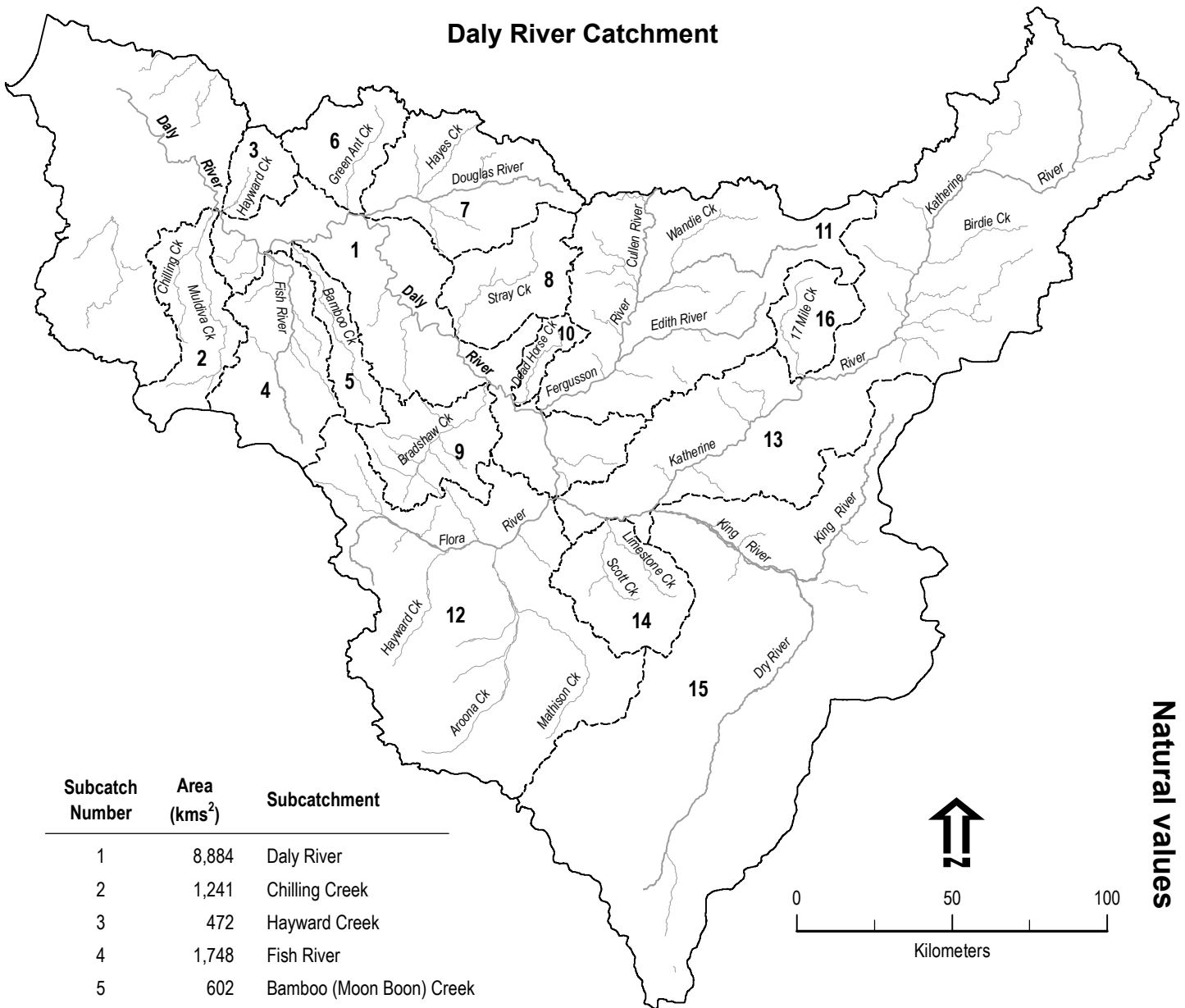
## Catchment

The Katherine River is a tributary of the Daly River and has a catchment of 9,569 km<sup>2</sup>. The total catchment of the Daly River is 52,500 km<sup>2</sup>.

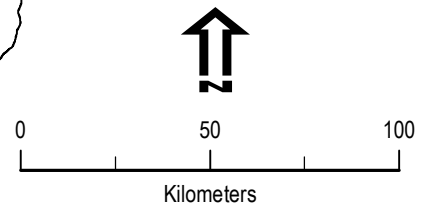
Four major watercourses run through Nitmiluk National Park. They are the Katherine River, Fergusson River, Edith River and King River. All begin on the Arnhem Land Plateau and drain in a south-westerly direction to the Daly River, which flows north-west to Anson Bay in the Timor Sea.

The rugged terrain and thin soils of the Arnhem Land Plateau drain fast, causing creeks and rivers to rise and fall quickly in times of rain.

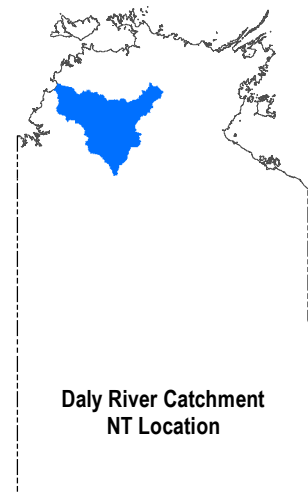
# Daly River Catchment



Subcatch Number	Area (kms <sup>2</sup> )	Subcatchment
1	8,884	Daly River
2	1,241	Chilling Creek
3	472	Hayward Creek
4	1,748	Fish River
5	602	Bamboo (Moon Boon) Creek
6	914	Green Ant Creek
7	1,964	Douglas River
8	1,216	Stray Creek
9	1,181	Bradshaw Creek
10	228	Dead Horse Creek
11	4,787	Fergusson River
12	6,737	Flora River
13	9,569	Katherine River
14	1,248	Limestone Creek
15	11,013	King and Dry Rivers
16	696	Seventeen Mile Creek
<b>Total Area</b>	<b>52,500</b>	<b>Daly River Catchment</b>



Natural values



**Data Source:**

Daly River Subcatchment Boundaries  
Faulks J.J. (1998)  
'Daly River Catchment - An Assessment of the Physical and Ecological Condition of the Daly River and its Major Tributaries',  
Tech Report No 36/2001  
Dept Lands, Planning and Environment, Katherine, NT.  
Rivers and creeks  
1:250,000 topography, Geoscience Australia

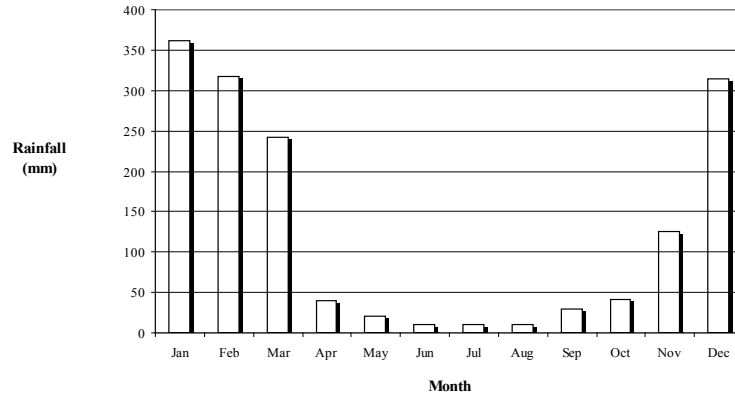
**DALY RIVER CATCHMENT**

**MAJOR SUBCATCMENTS**

## Climate

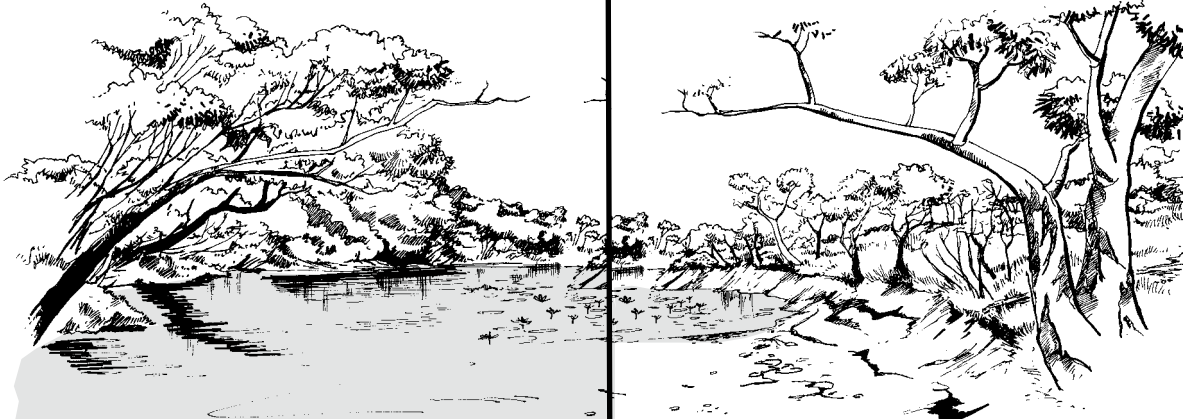
Nitmiluk has a monsoonal climate with distinct wet and dry seasons. Ninety percent of the 1000 mm annual rainfall comes in the wet season between December and March.

**Average Rainfall**  
Nitmiluk National Park



During the wet season, rivers and creeks rise and flow rapidly and there are many spectacular waterfalls along the escarpment. Dry season conditions are typically very dry, with smaller creeks ceasing to flow and water becoming scarce as the season progresses.

Natural values

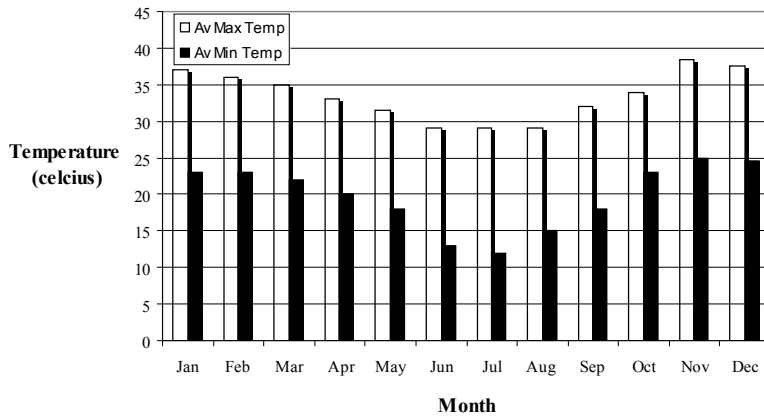


During the wet season rivers and creeks rise and flow.

During the dry season rivers and creeks cease to flow and may dry out.

During the wet season, temperatures climb over 35 °C during the day and rarely drop below 25 °C at night. During the dry season, daytime temperatures average just below 30 °C while they can drop under 10 °C at night.

### Average Temperature Nitmiluk National Park



### Flooding

In the average year, about 1000 mm of rain falls between December and March and this causes river levels to be higher during the wet season. Monsoon troughs also dump loads of rain over periods lasting a day to a week or more. Rivers rise dramatically during these rainfall events and drop quickly afterwards.

Katherine River levels are further influenced by its huge (9,569 km<sup>2</sup>) catchment as a massive amount of water drains from the stone country to the north-east into the river. Often there is no rain in sight at the Gorge or in Katherine when the river is rising.

### 1998 flood

In January 1998, the Katherine and Edith Rivers reached the highest levels recorded for the century in a one in 155 year flood event.

Good rainfall early in the wet season was followed by intense monsoon troughs dumping a lot of rain in a short period. With already high river levels and saturated ground, there was nowhere for the water to go when the monsoon troughs dumped more rain over the catchment.

### Flood warning

Two water level recording stations in the Park are maintained as part of an automated early warning system against flooding downstream in the Katherine River. These are on the Seventeen Mile Creek and at a site near the Nitmiluk Visitor Centre.

A separate system of gauges at the dock and boat ramp is manually read by Rangers and is used to guide river operations (swimming, canoeing, launch and power boat tours).

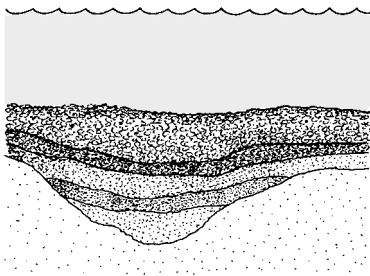
#### Interpreting the 1998 flood

How many visitors understand that dramatic river rises and falls are regular and natural events?

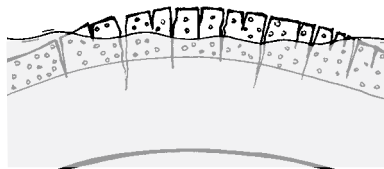
What caused the 1998 flood?

### Interpreting geology

What is the Kombolgie Formation?  
How did the Kombolgie Formation develop?  
How did the gorge system form?  
What causes the banding in the rocks you see along the Gorge?



The sediments making up the Kombolgie formation were deposited in a large river delta.



Lines of weakness, cracks and joints, appeared as the Kombolgie formation was exposed.

## Geology

Nitmiluk National Park has a long and complex geological history. Following is a summary of the development of the gorge system, just a small part of the geological story.

### Kombolgie Formation

Kombolgie Sandstone provides the geological base for Nitmiluk and Leliyn. It was laid down when there was a huge river delta in the area (where a big river met the sea) about 1650 million years ago.

Sand and rocks tumbled down the river. The heavy rocks fell to the bottom during the journey to the sea while the lighter sand was carried further. Over the years, layers of sediment (rocks, pebbles, sand and silt) accumulated. Old layers were compressed under new layers and they formed into hard sandstone and conglomerate - the Kombolgie Formation. The formation is up to 2000 m deep in places, but averages 900 m in thickness.

### Development of gorges

By about 120 million years ago the Kombolgie Formation was above sea level. Some of the present gorges started forming at this time, including the 13 km long gorge system now known as Katherine Gorge.

Rivers cut deeply through the sandstone between about 25 million years ago and one million years ago. Watercourses followed joints and faults, weathering and eroding stretches of straight gorges at angles to each other.

The Katherine River is believed to have established its present course through the Gorge in the last 20 million years.

## Horizontal layering

Horizontal bands that you can see in the rocks are due to the way the sediments were deposited – layer by layer. The action of the river has eroded weak areas along these lines, accentuating the banding in places, but the horizontal bands are the result of how the sandstone was laid down, not later weathering and erosion.

## Sandstone leaks and springs

During the average wet season, about 1000 mm of rain falls onto the stone country. Where water collects, it slowly soaks into and through the sandstone. Dunlop Swamp is a very large swamp on top of the plateau that slowly leaks through the sandstone following lines of weakness and, after time, coming out as groundwater, waterfalls and ‘raining rock’.

Springs are places where water wells up from underground. While there are springs in Nitmiluk, you cannot see any from the river. What you can see from the river is water seeping or leaking through the porous sandstone.

### Sandstone or conglomerate?

Sandstones are made up of evenly-sized grains, with the grains being up to 2 mm.

Conglomerates are made up of rounded or sub-rounded fragments, often a mixture of sizes.



A variety of water-loving plants grow where water leaks through the sandstone.

### Further reading about climate and geology

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## Landforms

Landforms are classified on the basis of a combination of soil, geology and vegetation. There are four major landforms in Nitmiluk National Park.

### Arnhem Land Plateau

Rocky hills and rugged, dissected plateaus with gorges, including Katherine Gorge, and scarps developed over the strongly jointed Kombolgie Formation.

### Uplands

Sharp ridges, hills, small tablelands, mesas and isolated rounded hills separated by narrow, flat valleys make up a relatively small area in the Park's southwest.

### Mixed Hills

Hills and plains on volcanic rocks and granite that make up a large area of the Seventeen Mile Valley.

### Elevated Laterite Residuals

Flat-topped tablelands bounded by steep, dissected slopes are found in sections of the Seventeen Mile Valley.



## Landscapes, plants and animals

The sandstone of the Arnhem Land Plateau between Katherine and the East Alligator River contains the greatest diversity of plants in the Northern Territory. Nitmiluk National Park is part of this area and current flora records from the Park include more than 750 plant species from over 115 families.

Despite being part of the same Kombolgie Formation, the number of species in Nitmiluk is less than in Kakadu National Park. This is probably because it is drier. Also, the sandstone in Nitmiluk is less rugged and so may have fewer habitats.

Animals recorded in Nitmiluk National Park are listed at the end of this section and include:

- 206 bird species
- 44 species of native mammals including 21 bat, 5 dasyurid, 7 macropod, 7 rodent, 1 monotreme, 1 canid and 2 possum species
- 78 species of reptiles, including 53 lizard, 22 snake and 3 turtle species
- 25 frog species
- 38 species of fish.

### Habitats and landscapes

A habitat is the natural home of a plant or animal. The term habitat is correctly used in the context of a particular animal or plant, for example, the habitat of the Gouldian Finch or Freshwater Crocodile habitat. The following landscapes are often referred to as habitats, but they are really ecosystems, or collections of habitats:

- Sandstone Plateau Heath
- Woodlands
- Open Forest
- Sandstone Monsoon Forest
- Riverine.

#### Interpreting landscapes

What landscapes do you see during your cruise?

Can you see changes within these landscapes which might be habitats for different species ?

### What is a genus?

**Genus** is part of the Linnaean classification system for plants and animals.

**Genera** is the plural of genus. Some plant genera that you will be familiar with include *Eucalyptus*, *Melaleuca*, *Grevillea* and *Banksia*.

Genus and species names are always written in *italics* (or underlined).

### Plant genera of the sandstone

*Verticordia*, *Calytrix*, *Leptospermum*, *Lithomyrtus*, *Baeckea*, *Grevillea*, *Boronia*, *Triodia*, *Eriachne*, *Micaira*, *Daviesia*, *Leptosema*, *Bossiaea*, *Hovea*, *Gompholobium*, *Jacksonia*, *Hibbertia*, *Pachynem*, *Stylidium*, *Callitris* and *Dapsilanthus*.

### What is a species?

**Species** is the most specific part of the Linnaean classification system for plants and animals.

Individuals of the same species are capable of breeding with each other and producing fertile offspring.

A species name is always written with its genus name in *italics*. For example, *Canis familiaris*.

## Sandstone Plateau Heath

This is an area of sandstone split by chasms and gorges. You glimpse it as you look up from the tour boat and the Southern Walks provide a close up experience of it.

Conditions on the sandstone are harsh with only coarse sand, leaf litter and very little soil for plants. Water is always scarce and it gets extremely hot on the sandstone, especially from October to December. Even during the wet season drainage is quick, so moisture is only available for a short time.

### Plants

Plants on the sandstone plateau are adapted to dryness. For example, some have small leaves that minimise water loss, while others drop leaves through the dry season to conserve water. Tall trees do not usually grow on the shallow sandstone soils, but medium-sized trees like the Scarlet Gum (*Eucalyptus phoenicea*) and Variable-barked Bloodwood (*Corymbia dichromophloia*) grow in areas where the soil is deep enough.

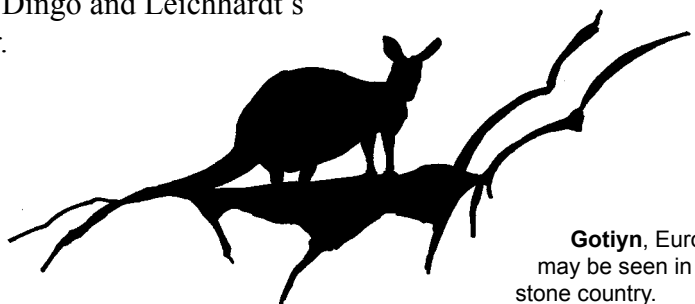
Sandstone plateau plants are generally more closely related to sandstone plants on the southwest and east coasts of Australia than they are to nearby savanna woodlands. However, some typical sandstone genera, like *Grevillea* and *Calytrix*, have species spread through the woodlands that originated in the sandstone.

Dissected sandstone landscapes offer protection from fire and therefore for fire-sensitive species such as *Pityrodia spp*, old growth spinifex (*Triodia spp*) and species that cannot tolerate frequent fires.

### Animals

The inhospitable hot, dry stone country is particularly rich in endemic species that are adapted to living in those harsh conditions. Stone country animals are seldom active during the day. They seek shelter in rocky cracks and crevices and in tree hollows during the heat of the day and come out during the cooler parts of the day and at night.

Animals that you may see on the sandstone plateau include the White-throated Grass-wren, Helmeted Friarbird, Antilopine Wallaroo, Euro, Sandstone Antechinus, Dingo and Leichhardt's Grasshopper.



**Gotiyn**, Euros, may be seen in the stone country.

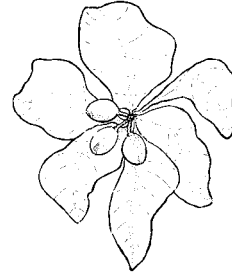
## Open Woodlands

Woodlands cover much of the lowlands of the Top End and host many different species, although this is not apparent to most people driving through them.

### Plants

Open Woodlands are dominated by trees spread thinly over tall annual grasses like spear grass (*Sorghum spp.*). Many woodland plants drop leaves late in the dry season, leaving the landscape looking transparent and parched.

Open Woodlands in Nitmiluk are dominated by the Bloodwoods (*Corymbia foelscheana*, *C. porrecta*, and *C. bleeseri*), Salmon Gum (*Eucalyptus tintinnans*), Ironwood (*Erythrophleum chlorostachys*), Billygoat Plum (*Terminalia ferdinandiana*) and Green Plum (*Buchanania obovata*). The Salmon Gum is an important habitat tree, especially for the Gouldian Finch that nest in them.



**Gurumal**, Green Plum, fruits early in the wet season.

### Animals

The Park's Woodlands and Open Forests are home to the greatest variety of species, including the Great Bowerbird, Blue-faced Honeyeater, Blue-winged Kookaburra, Red-collared Lorikeet, Northern Rosella, Red-winged Parrot, Hooded Parrot, Apostlebird, Black Flying-fox, Little Red Flying-fox, Dingo, Agile Wallaby, Gould's Sand Goanna and Tree Monitor.

## Open Forest

Open Forests are usually on high, level ridges with deep, sandy soil. The trees in this landscape grow taller and closer together than in the Open Woodlands.

### Plants

Open Forests are dominated by Stringybark (*Eucalyptus tetrodonta*) and Woollybutt (*E. miniata*), with occasional patches of Cypress Pine, (*Callitris intratropica*).



Low swampy areas in Open Forest are dominated by Fern-leaved Grevillea (*Grevillea pteridifolia*) and Broad-leaved Paperbark (*Melaleuca viridiflora*) with occasional patches of Swamp Banksia (*Banksia dentata*).

### Animals

You can expect to see the same animals in the Open Forests as in the Woodlands.

**Tettet**, Red-collared Lorikeets, are just one of the many birds that feed on the sweet nectar of **Yajja**, Fern-leaved Grevillea.

## Naming conventions

**sp.** refers to a species of the genus, for example *Callitris sp.* refers to the one species of the Cypress Pine.

**spp.** refers to more than one species of the genus, for example *Sorghum spp.* refers to several species of spear grass.

When naming more than one species in a genus, only the first letter of the genus name is used after the full name has been given once. For example, *Corymbia foelscheana*, *C. porrecta*.

## Corymbia or Eucalyptus?

Some of the trees you may know as eucalypts have been reclassified and now belong to the genus *Corymbia* instead of *Eucalyptus*. For example, the Bloodwoods are now *Corymbia spp.* instead of *Eucalyptus spp.*

## Endemic

A species that is found only in a certain area is endemic, or unique, to that area. For example, Australia's Freshwater Crocodile is endemic to Northern Australia – it is not found anywhere else in Australia or the world.

Many stone country species are found only on the Arnhem Land Plateau and so are endemic to the Plateau.

**Floodplain habitats**

Floodplains are rich habitats with Buffalo Grass, Water Lily, Water Chestnut and Wild Rice providing food and shelter for various animals, including millions of insects and thousands of water birds.

Wildlife, particularly birds and crocodiles, can be hard to find when floodplains are under water because they have either spread out with the abundant water, or are well hidden in the grasses.

As floodplains drain and dry, the wildlife follows the water, crowding the shrinking billabongs as the dry season progresses.

The clayey soils of floodplains crack as they dry out and the cracks provide shelter for various animals, including rats, snakes and lizards.



**Billabong habitats**

Billabongs are bodies of water that may become part of a flowing river during the wet season. They are often associated with floodplains and are rich in wildlife.

Billabongs have many of the species associated with floodplains, particularly in the dry season when they become refuges for wetland birds.

**Sandstone Monsoon Rainforest**

Small rainforest patches flourish in sandstone gorges where they are protected from fire and have access to permanent water seeping through the sandstone. Rainforest trees tend to be tall and provide almost complete shade for ferns and flowering shrubs like the Native Lassiantra, *Melastoma malabathricum*.

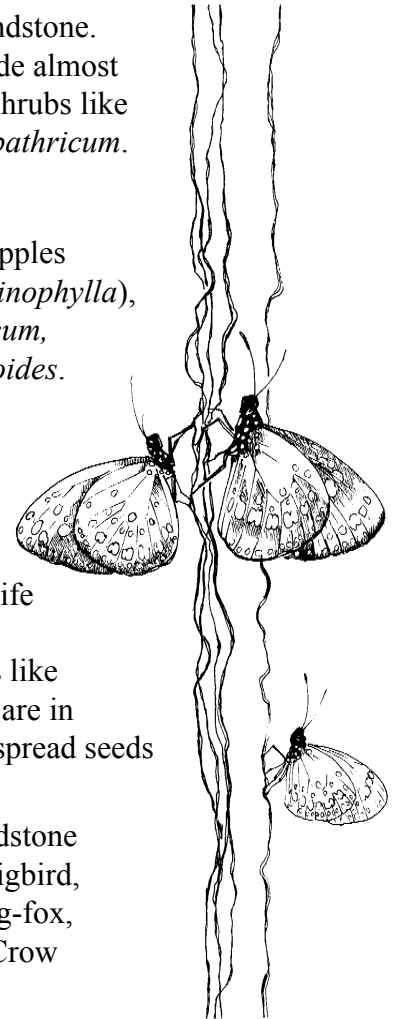
**Plants**

The rainforest canopy includes Native Apples (*Syzygium spp*), Milkwood (*Alstonia actinophylla*), *Terminalia spp*, *Lophopetalum arnhemicum*, *Melicope sp* and *Xanthostemon euclptooides*.

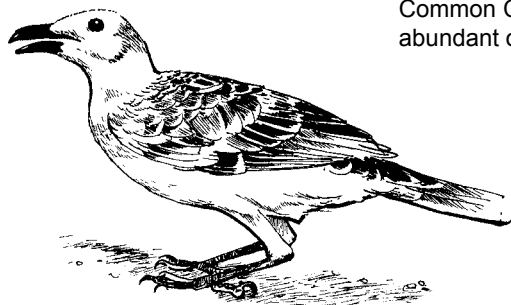
**Animals**

Fleshy rainforest fruits are important foods for birds such as the Torresian Imperial-pigeon and flying foxes. Rainforests also provide refuge for wildlife in the seasonally dry environment of the monsoon tropics. Highly mobile animals like fruit and blossom feeding bats and birds are in turn important to the rainforests as they spread seeds and pollinate flowers.

Some of the animals you may see in sandstone rainforests include the Common Koel, Figbird, Bowerbird, Red Flying-fox, Black Flying-fox, Common Tree Snake and the Common Crow Butterfly.



**Merlemerle**, butterflies, give Nitmiluk's Butterfly Gorge its name. Common Crow Butterflies are abundant on cool, shady rock walls.



**Juwe**, Bower Birds, are seen in monsoon rainforests and other parts of Nitmiluk, including the picnic area.

## Riverine (gorge and river)

The sandstone plateau drains into the lowlands through watercourses such as Seventeen Mile Creek and the Katherine River. Riverine habitats are the waterways and lush bands of vegetation growing alongside them. Plants growing alongside rivers are also called riparian vegetation.

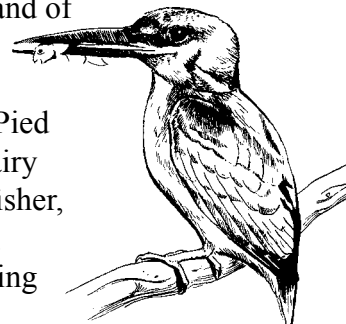
The lower reaches of rivers in the Top End are associated with floodplains and billabongs. Although there are no such wetland habitats in Nitmiluk, some wetland species like the Darter, cormorants, egrets and herons are seen here, but not in the large numbers that gather further downstream on the fertile Daly River floodplains.

### Plants

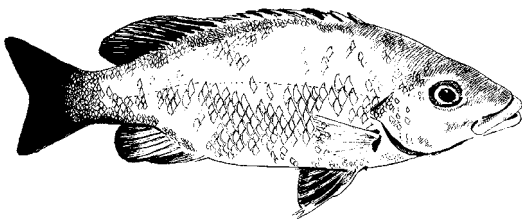
Typical species that grow along river banks include native apple trees including Chalky Apple (*Syzygium forte*), Leichhardt Tree (*Nauclea orientalis*), River Pandanus (*Pandanus aquaticus*), Northern Swamp Box (*Lophostemon grandiflorus*), Freshwater Mangrove (*Barringtonia acutangula*), Fishnet Vine (*Flagellaria indica*), introduced passionfruit (*Passiflora foetida*), native figs (*Ficus spp*) and paperbarks (*Melaleuca spp*).

### Animals

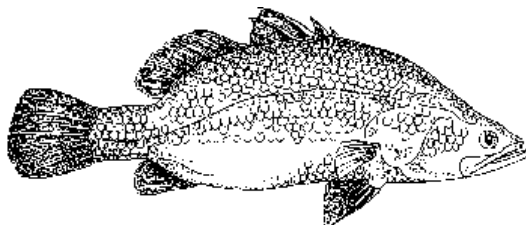
The Katherine River hosts a variety of animals that depend upon the river and the narrow, dense band of riverine vegetation lining it. During a river cruise you can see a variety of wildlife including the Darter, Little Pied Cormorant, Little Black Cormorant, Fairy Martin, Peregrine Falcon, Azure Kingfisher, Forest Kingfisher, various honeyeaters, Freshwater Crocodile, Northern Snapping Turtle, Northern Snake-necked Turtle, Pig-nose Turtle, Merten's Water Monitor, Barramundi and the Sooty Grunter.



**Pij**, the Azure Kingfisher sits on a branch above the water, then dives and snatches small fish swimming near the water's surface.



**Nakertmi**, Sooty Grunter, and **Martpiyn/Marayn**, Barramundi, are just two of 38 species of **kiyowk**, fish, found in the Katherine River.



### Interpreting habitats and animals

What animals have you seen during a cruise?

What else could you see in the trees if you had time to stop and look?

Why don't you see the same wildlife on a Nitmiluk cruise as a Yellow Water billabong cruise?

Visitors often ask "where are all the birds?" – what is your answer to that question?

How is a riverine habitat different to a floodplain habitat?

### Tip

When you tell your passengers the name of a plant or animal, also tell them something about it. For example, Jawoyn uses, feeding habits, habitat requirements.

**What is a family?**

Families are groups of genera in the scientific classification system for plants and animals.

A famous family in Nitmiluk is Myrtaceae. It includes *Eucalyptus*, *Melaleuca*, *Callistemon*, *Leptospermum*, *Calytrix*, *Xanthostemon*, *Syzygium* and many more Top End plants. The leaves of Myrtaceous plants tend to have a 'ti-tree oil' smell when crushed.

You may also know members of the Proteaceae family which includes *Banksia*, *Grevillea* and *Hakea*.

Grasses, including Bamboo and spear grass, are in the Poaceae family.

**Key to International Union for the Conservation of Nature (IUCN) categories**

CR, critically endangered – facing extremely high risk of extinction in the wild

EN, endangered – facing a very high risk of extinction in the wild

VU, vulnerable – facing a high risk of extinction in the wild

NT, near threatened – likely to become vulnerable in the near future

DD, data deficient - inadequate information to assess its risk of extinction

NE, not evaluated - has not yet been assessed against the IUCN criteria

Note: IUCN classifications in capital letters above indicate national significance. Lower case letters indicate that the IUCN conservation status applies only to the Northern Territory.

**Plants of special interest**

The Park is home to many species of conservation significance with over 30 species (listed below) marked on the NT herbarium database. The only plant species not recorded outside the Park is *Boronia tolerans*.

**Family Orchidaceae**

*Arthrochilus byrnesii*, DD

**Family Poaceae**

*Aristida utilis* var. *utilis*, nt

*Cymbopogon dependens*, dd

*Dimeria chloridiformis*, nt

*Micraira dentata*, DD

*Ectrosia lasioclada*, nt

**Family Podostemaceae**

*Tristicha trifaria*, dd

**Family Scrophulariaceae**

*Lindernia tectanthera*, dd

**Family Myrtaceae**

*Calytrix surdiviperana*, NT

**Family Cyperaceae**

*Baumea rubiginosa*, dd

*Fimbristylis* D138471 *minuta*, dd

*Bulbostylis* D143039 *Edith*, dd

*Isolepis* D17576 *Nourlangie*, ne

*Scleria* D6219 *Wilton River*, ne

*Scleria mikawana* *Makin*, DD

*S. peregracilis*, dd

*Cyperus* A40291 *Edith River*, DD

*Cyperus* 146628 *red base*, dd

**Family Amaranthaceae**

*Gomphrena floribunda*, NE

*G. involucrate*, DD

**Family Ophioglossaceae**

*Ophioglossum lusitanicum*, nt

*O. gramineum*, nt

**Family Rhamanaceae**

*Cryptandra* D19989 *Jabiru*, DD

**Family Rutaceae**

*Boronia tolerans* *Duretto*, V

*B. xanthastrum*, NT

*Drummondita calida*, nt

**Family Centrolepidaceae**

*Centrolepis curta*, dd

**Family Fabaceae**

*Desmodium rhytidophyllum*, nt

**Family Lentilbulariaceae**

*Utricularia circumvoluta*, nt

**Family Malvaceae**

*Hibiscus* D145288 *Nitmiluk*

*Heliotropium* sp *Nitmiluk*



**Pampul'pampul/Purrumpun,**  
*Gomphrena* sp.

Also of interest are stands of Lancewood, *Acacia shirleyi*, in the south east corner of Nitmiluk, and *Pityrodia* spp., which are the exclusive food of Leichhardt's Grasshoppers.

## Animals of special interest

Nitmiluk is home to various animals that are of special interest due to their conservation status or limited distribution. You are unlikely to see many of these species.

### Birds

#### Red Goshawk.

Vulnerable (nationally) due to habitat loss.

#### Northern (Crested)

**Shrike-tit.** Endangered in *The Action Plan for Australian Birds 2000*.

#### Partridge Pigeon.

Vulnerable.

#### Gouldian Finch.

Endangered (nationally) due to a combination of factors including a parasitic mite and late dry season wildfires reducing food (seed) stocks.

**Hooded Parrot.** Limited to an area ranging from Pine Creek across to Arnhem Land and south to Mataranka. Significant numbers occur and breed in Nitmiluk National Park.

**Chestnut-quilled Rock Pigeon.** Known only from a small area within Arnhem Land.

#### Helmeted Friarbird.

Populations in Nitmiluk are the furthest inland that the sandstone form of this bird is found.

### Invertebrates

#### Leichhardt's

**Grasshopper.** Listed as vulnerable in the NT due to changed fire regimes (late dry season wildfires).

### Mammals

**Ghost Bat.** Listed as near threatened in the *National Bat Action Plan*.

**Kakadu Dunnart.** Known for less than 20 years and was first recorded in Nitmiluk National Park in November 1998.

### Frogs

**Daly Waters Frog,**  
*Cyclorana maculosa.*  
Restricted in the NT.

**Water-holding Frog,**  
*Cyclorana platycephalus.*  
Restricted in the NT.

**Masked Rock-frog,**  
*Litoria personata.*  
Endemic to the Arnhem Land escarpment.

### Fish

**Midgley's Grunter,**  
*Pingalla midgleyi.*  
Restricted distribution, occurring only in the East Alligator, South Alligator and upper Katherine Rivers.

**Exquisite Rainbowfish,**  
*Melanotaenia exquisite.*  
Restricted to clear streams and small pools in high stone country areas of the South Alligator and Daly River systems.

**Katherine Gudgeon.** Known only from the Leliyn plunge pool and the upper Katherine River.

**Jatete/Japepe,**  
Leichhardt's Grasshopper



### Interpreting wildlife

When the Parks & Wildlife Service refers to 'wildlife', the term includes both plants and animals, not just animals.

### Reptiles

**Freshwater Crocodile,**  
*Crocodylus johnstoni.*  
Endemic to northern Australia.

**Long-necked Turtle.** A species of *Chelodina* whose taxonomy and name is uncertain, but is possibly a species not collected since 1915.

**Tour Guides**

Please notify a Ranger if you see, or think you have seen, an Estuarine (Saltwater) Crocodile.

**Freshwater Crocodiles**

Many visitors hope to see crocodiles while they are in the Top End. Unlike the Estuarine (Saltwater) Crocodiles (*Crocodylus porosus*), which occur throughout the Pacific region, Freshwater Crocodiles (*C. johnstonii*) are endemic to Australia.

Freshwater Crocodiles do not usually grow longer than three metres. Males grow faster than females, especially after four years of age. They can live for 40 to 60 years.

While Freshwater Crocodiles are not as territorial as Estuarine (Saltwater) Crocodiles, the males do seem to be territorial to some extent. Populations in different areas vary in their territoriality.

Estuarine (Saltwater) Crocodiles generally live in the lower reaches of rivers where there are muddy banks to lie on and vegetation like Buffalo Grass (*Hymenachne acutigluma*) for nesting. They are also found further upstream in less suitable habitats.

Freshwater Crocodiles do occur in the muddy waters occupied by Estuarine (Saltwater) Crocodiles, but are more abundant in the upper reaches of rivers away from their more aggressive relatives and where they can find sandy banks for nesting.

**Identifying crocodiles**

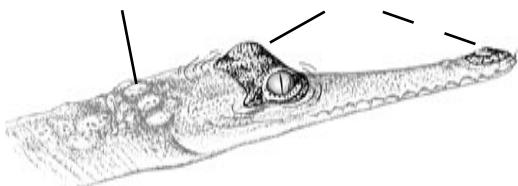
The heads of Freshwater Crocodiles and Estuarine (Saltwater) Crocodiles are quite different and a combination of shape and other features can be used to distinguish between the two.

A Freshwater Crocodile has a long thin snout whereas an Estuarine (Saltwater) Crocodile has a shorter, thicker snout.

**Goymarr,**  
Freshwater  
Crocodile

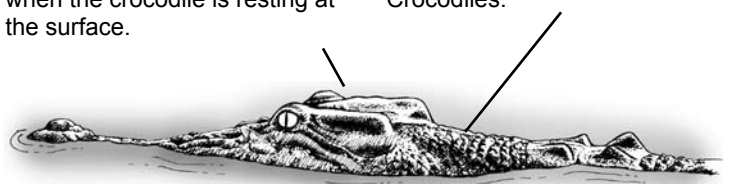
**Ginga,**  
Estuarine  
(Saltwater)  
Crocodile

Freshwater Crocodiles have a row of four osteoderms on the 'neck'. Only the eyes and snout of Freshwater Crocodiles can be seen when they are resting near the surface.



The Estuarine (Saltwater) Crocodile has a large cranial platform extending behind the eye, forming a very distinct square patch above the water when the crocodile is resting at the surface.

The Estuarine (Saltwater) Crocodile has a pronounced section of raised scales behind the neck that is not obvious in Freshwater Crocodiles.





## Seeing crocodiles

When it is cool in June-July, crocodiles may be seen basking in the sun, particularly in the early morning. During this cool time crocodiles will be in the water at night when the water is warmer than the air. As the weather gets warmer, crocodiles become difficult to see as they seek the shade or remain in the water during the day.

## Feeding

Freshwater Crocodiles sit and wait then snap sideways to grab prey as it passes. To a lesser extent they also stalk and hunt the way Estuarine (Saltwater) Crocodiles do. Generally crocodiles eat more in the wet season than they do in the dry season because the metabolism of these 'cold-blooded' animals slows down in the cooler weather.

Crocodiles usually have stones in their stomachs and this is believed to aid digestion and act as ballast.

## Diet

A Freshwater Crocodile's diet depends on what is available and this varies with the season. In general:

- insects form up to about 58% of their diet (beetles, bugs, dragonflies, grasshoppers, crickets, ants, butterflies and moths)
- fish are about 20% of their diet
- crustaceans (freshwater shrimps and crayfish) are also significant in their diet.

Other food found in the stomachs of Freshwater Crocodiles includes spiders, frogs, small goannas, file snakes, birds, rats and bats.

## Courtship and mating

It is thought that a drop in temperature may stimulate mating early in the dry season, about three to six weeks before egg-laying. Courtship can last from two to 26 minutes, but generally mating takes at least 10 minutes.

### Cold-blooded?

Crocodiles and other reptiles are ectothermic.

This means that they maintain their body temperature by absorbing heat from the surrounding environment. They cannot regulate their body temperature metabolically.

The term 'cold-blooded' is commonly used when referring to ectothermic animals. It does not mean that their blood is cold.

### Maintaining body temperature

Within the scales of a crocodile's skin are bits of bone called osteoderms.

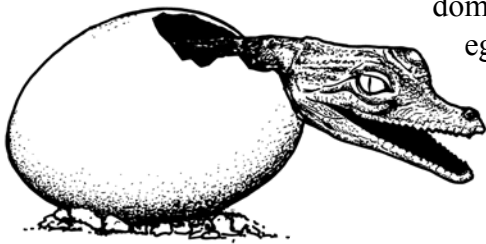
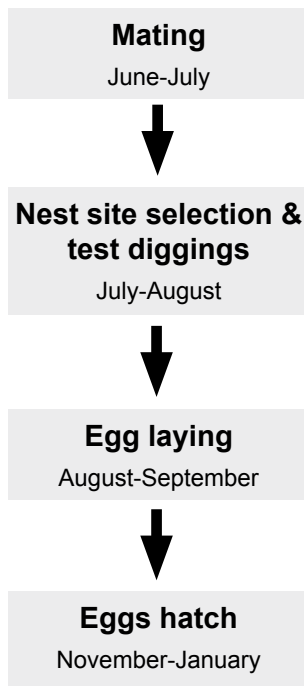
Osteoderms are most pronounced along the back and are responsible for the shape of the back scales.

The rich blood supply around osteoderms transfers heat from the skin to the body.

### Further reading about crocodiles

Webb, G & Manolis, C (1998) *Australian Crocodiles, A natural history*, Reed New Holland

Cogger, H (1992) *Reptiles and Amphibians of Australia*. Reed Books, Chatswood Sydney.



The eggs of **Goymarr**, Freshwater Crocodiles, hatch between November and January.

#### Tip

The principles of incubation are more important than the specific temperature details listed.

#### When crocodiles are nesting

Rangers place crocodile nesting signs in the Gorge system when the first signs of nesting are observed. To protect these sites, please keep well away from the signed river banks.

## Nesting

There are Freshwater Crocodile nesting sites throughout Nitmiluk National Park, including sandbanks seen during a two-hour cruise. Eggs are laid over four weeks, generally between August and September. A female usually lays her clutch in the same sand bank as she did the previous year, but if the river banks have changed she will choose a location nearby.

In hot years nesting is likely to be earlier while in cooler years nesting is likely to occur later.

Females start digging test holes about three weeks before egg-laying. She digs the nest hole deep enough to reach a layer damp enough to meet the moisture requirements of the eggs. They usually nest within 10 metres of the water's edge, but may nest up to 150 metres away.

In places where there are large numbers of female Freshwater Crocodiles, the dominant females (usually the largest) will nest early in the season and the least dominant individuals will nest later. This means that the eggs of the larger dominant females will hatch first.

Clutch sizes vary from 5 to 20 eggs with the total weight of the clutch being 4-5% of the female's body weight. Eggs are about the size of a chicken egg.

## Incubation

Nest temperature determines the incubation time and the sex of the hatchlings. In the wild, incubation time is about 75 days. Warmer nests will hatch earlier and have more male hatchlings.

- at 28°C, incubation time is 123 days
- at 34°C, incubation time is 64 days
- at 30°C or less, all of the hatchlings are female
- from 31-32°C, 70% are female and 30% are male
- over 32°C, all of the hatchlings are male.

## Parenting

The female Freshwater Crocodile does not defend the nest like her estuarine relative, but she does excavate the nest when she hears the hatchlings calling. She carries her young to the water in her mouth and they remain in a crèche with an attendant female for an unknown time. The female may be the mother, or at colonial nesting sites, the dominant female. Colonial nesting is less common where there are abundant sandy banks.

## Survival

About 4% of Freshwater Crocodile eggs may be infertile and early rains can cause water tables to rise and drown eggs, or the river to rise and flood nests. About 60% of eggs are lost to predators.

A Freshwater Crocodile's chances of survival improve with age:

- about 30% of eggs hatch
- 12% of hatchlings survive their first year
- 85% of Freshwater Crocodiles 1-10 years of age survive each year
- 95% of Freshwater Crocodiles 11-30 years of age survive each year.

### Interpreting crocodiles

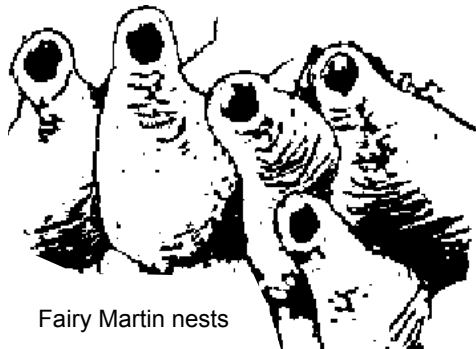
Most of the information provided here about Freshwater Crocodiles comes from studies of McKinlay River populations (north of Nitmiluk). While some details may vary from place to place, the basic principles of their ecology are the same.

## Fairy Martins

The Fairy Martin, *Hirundo ariel*, is a partly migratory bird. Eastern populations shift north in Autumn and south in Spring. In the Northern Territory the Fairy Martin, breeds in the dry season.

Fairy Martins are sometimes called Bottle Swallows because of the shape of their nests, but Swallows have long, forked tails while the Martins have shorter, squarer tails.

Fairy Martin nesting in Katherine Gorge usually starts around May. They build rows of mud nests under overhangs, including the large overhang in the Second Gorge. Visitors may have seen their nests elsewhere under the eaves of buildings.



The core of each colony returns to the same site to breed each year. While several birds may build or repair one nest, they will fight over whose it is when it is finished.

Positioning the nests under overhangs allows for easy landing, with the Fairy Martins able to fly straight into the nest opening. For take-off they simply fall into the air.

Fairy Martins make their nests by collecting small amounts of mud in their beaks from nearby damp locations, then building their nests bit by bit. The finishing touch is a lining of grass and small feathers.

The martins feed mainly on flying insects and catch them in flight.

**Further reading about plants**

Brock, J (1993) *Top End Native Plants, A comprehensive guide to the trees and shrubs of the Top End of the Northern Territory.*

Moore, P (2005), *A guide to plants of inland Australia*, Reed New Holland.

Wijnjorrotj, P, Flora, S (dec.), Brown, ND (dec.), Jatbula, P (dec.) Galmur, J, Katherine, M, Merland, F and Wightman, G (2005) *Jawoyn plants and animals, Aboriginal flora and fauna knowledge from Nitmiluk National Park and the Katherine area, northern Australia.*

**Studying plants and animals in Nitmiluk**

There is still much to learn about the plants and animals in Nitmiluk National Park. Scientists and PWSNT conduct various environmental and fauna monitoring projects in Nitmiluk National Park. Ongoing research includes:

- crocodile population monitoring in the Gorge and at Leliyn plunge pool
- monitoring of Cypress Pine, *Callitris intratropica*, communities
- monitoring of Gouldian Finch populations and habitat
- Leichhardt’s Grasshopper surveys
- monitoring of the rare plant, *Boronia tolerans*
- monitoring vegetation and communities for fire impact
- conducting formal and informal surveys to record baseline information on species.

**List of animals recorded in Nitmiluk**

**Birds**

**Family Casuariidae**

Emu

**Family Podicipedidae**

Australian Grebe

**Family Pelecandiae**

Australasian Pelican

**Family Anhingidae**

Australian Darter

**Family Phalacrocoracidae**

- Great Cormorant
- Pied Cormorant
- Little Black Cormorant
- Little Pied Cormorant

**Family Ardeidae**

- White-necked Heron
- Great-billed Heron
- White-faced Heron

Pied Heron

Great Egret

Little Egret

Intermediate Egret

Cattle Egret

Nankeen Night Heron

Black Bittern

**Family Ciconiidae**

Black-necked Stork (Jabiru)

**Family Threskiornithidae**

- Glossy Ibis
- Australian white Ibis
- Straw-necked Ibis
- Royal Spoonbill
- Yellow-billed Spoonbill

**Family Anseranatidae**

Magpie Goose



Barakbarrak, Darter

**Family Anatidae**

Wandering Whistling Duck  
 Plumed Whistling Duck  
 Radjah Shelduck  
 Grey Teal  
 Pacific Black Duck  
 Green Pygmy Goose

**Family Accipitridae**

Osprey  
 Pacific Baza  
 Black Kite  
 Whistling Kite  
 Square-tailed Kite  
 Black-shouldered Kite  
 Black-breasted Buzzard  
 Collared Sparrowhawk  
 Grey Goshawk  
 Brown Goshawk  
 Red Goshawk  
 White-breasted Sea Eagle  
 Wedge-tailed Eagle  
 Little Eagle  
 Spotted Harrier

**Family Falconidae**

Black Falcon  
 Peregrine Falcon  
 Australian Hobby  
 Brown Falcon  
 Grey Falcon  
 Nankeen Kestrel

**Family Phasianidae**

Brown Quail  
 Stubble Quail  
 Red-backed Button-quail  
 Little Button-quail  
 Chestnut-backed Button-quail

**Family Rallidae**

Eurasian Coot  
 Purple Swamphen

**Family Otidae**

Australian Bustard

**Family Gruidae**

Brolga

**Family Jacanidae**

Comb-crested Jacana

**Family Burhinidae**

Bush Stone-curlew

**Family Charadriidae**

Masked Lapwing  
 Black-fronted Dotterel  
 Oriental Plover  
 Red-kneed Dotterel

**Family Recurvirostridae**

Black-winged Stilt  
 Red-necked Avocet

**Family Scolopacidae**

Common Sandpiper  
 Common Greenshank  
 Swinhoe's Snipe  
 Sharp-tailed Sandpiper

**Family Glareolidae**

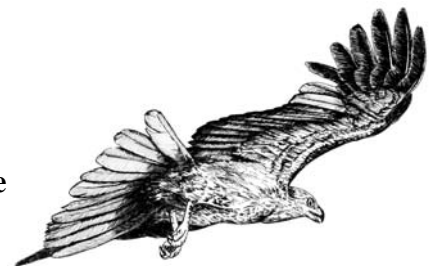
Australian Pratincole  
 Oriental Pratincole

**Family Laridae**

Silver Gull  
 Whiskered Tern

**Family Columbidae**

Torresian Imperial Pigeon  
 Peaceful Dove  
 Diamond Dove  
 Bar-shouldered Dove  
 Common Bronzewing



Marram, Whistling Kite

**Further reading about animals**

Webb, G & Manolis, C (1998) *Australian Crocodiles, A natural history*, Reed New Holland.

Readers Digest (1993) *The Complete Book of Australian Birds*. Readers Digest Pty Ltd, Sydney.

Strahan, R (1995) *The Mammals of Australia*, Reed Books, Chatswood, Sydney.

Cogger, H (1992) *Reptiles and Amphibians of Australia*. Reed Books, Chatswood Sydney.

**Scientific classification of a bird (Red-tailed Black Cockatoo)**

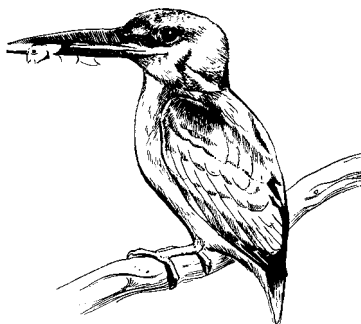
Kingdom Animalia  
 Phylum Chordata  
 Class Aves (birds)  
 Order Psittaciformes  
 Family Cacatuidae  
 Genus *Calyptorhynchus*  
 Species  
*Calyptorhynchus banksii*



**Garrak**, Red-tailed Black Cockatoo



**Tettet**, Rainbow Lorikeet



**Pij**, Azure Kingfisher

- Crested Pigeon
- Partridge Pigeon
- Chestnut-quilled Rock-pigeon
- Family Cacatuidae**
- Red-tailed Black Cockatoo
- Galah
- Little Corella
- Sulphur-crested Cockatoo

- Family Psittacidae**
- Rainbow Lorikeet
- Varied Lorikeet
- Red-winged Parrot
- Budgerigar
- Cockatiel
- Northern Rosella
- Hooded Parrot

- Family Cuculidae**
- Pallid Cuckoo
- Brush Cuckoo
- Oriental Cuckoo
- Black-eared Cuckoo
- Horsfield's Bronze Cuckoo
- Little Bronze Cuckoo
- Common Koel
- Channel-billed Cuckoo

- Family Centropodidae**
- Pheasant Coucal

- Family Strigidae**
- Rufous Owl
- Southern Boobook
- Barking Owl

- Family Tytonidae**
- Masked Owl
- Barn Owl

- Family Podargidae**
- Tawny Frogmouth

- Family Aegothelidae**
- Australian Owlet-nightjar

- Family Caprimulgidae**
- Spotted Nightjar

- Family Apodidae**
- Fork-tailed Swift

- Family Alcedinidae**
- Azure Kingfisher
- Little Kingfisher

- Family Halcyonidae**
- Blue-winged Kookaburra
- Forest Kingfisher
- Red-backed Kingfisher
- Sacred Kingfisher

- Family Meropidae**
- Rainbow Bee-eater

- Family Coraciidae**
- Dollarbird

- Family Alaudidae**
- Singing Bushlark

- Family Hirundinidae**
- Tree Martin
- Fairy Martin

- Family Campephagidae**
- Black-faced Cuckoo-shrike
- White-bellied Cuckoo-shrike
- Cicadabird
- White-winged Triller
- Varied Triller

- Family Campephagidae**
- Hooded Robin
- Lemon-bellied Flycatcher
- Jacky Winter
- White-browed Robin

**Family Pachycephalidae**

Crested Shrike-tit  
Rufous Whistler  
Sandstone Shrike-thrush  
Grey Shrike-thrush

**Family Dicruridae**

Leaden Flycatcher  
Shining Flycatcher  
Restless Flycatcher  
Rufous Fantail  
Grey Fantail  
Northern Fantail  
Willie Wagtail

**Family**

**Pomatostomatidae**

Grey-crowned Babbler

**Family Sylviidae**

Golden-headed Cisticola  
Rufous Songlark

**Family Maluridae**

Variiegated Fairy-wren  
Red-backed Fairy-wren  
White-throated  
Grasswren

**Family Pardalotidae**

Weebill  
Green-backed Gerygone  
White-throated Gerygone  
Striated Pardalote  
Red-browed Pardalote

**Family Neosittidae**

Varied Sittella

**Family Climacteridae**

Black-tailed Treecreeper

**Family Meliphagidae**

Helmeted Friarbird  
Silver-crowned Friarbird

Little Friarbird  
Blue-faced Honeyeater  
Yellow-throated Minor  
Singing Honeyeater  
White-gaped Honeyeater  
Grey-headed Honeyeater  
Yellow-tinted Honeyeater  
White-throated  
Honeyeater  
Black-chinned  
Honeyeater  
Brown Honeyeater  
Bar-breasted Honeyeater  
Rufous-banded  
Honeyeater  
Rufous-throated  
Honeyeater  
Banded Honeyeater  
Dusky Honeyeater

**Family Dicaeidae**

Mistletoebird

**Family Passeridae**

Star Finch  
Crimson Finch  
Painted Firetail  
Zebra Finch  
Double-barred Finch  
Masked Finch  
Long-tailed Finch  
Gouldian Finch  
Pictorella Mannikin  
Chestnut-breasted  
Mannikin  
Yellow-rumped Mannikin

**Family Oriolidae**

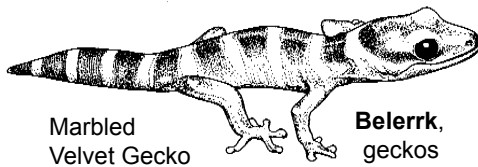
Yellow Oriole  
Olive-backed Oriole  
Figbird



**Yey'yey,**  
Blue-faced Honeyeater

**Scientific classification of a gecko (Marbled Velvet Gecko)**

Kingdom Animalia  
 Phylum Chordata  
 Class Reptilia (reptiles)  
 Order Squamata  
 Sub order Sauria (lizards)  
 Family Gekkonidae (geckos)  
 Genus *Oedura*  
 Species *Oedura marmorata*



**Family Dicruridae**  
 Spangled Drongo

**Family Ptilonorhynchidae**  
 Great Bowerbird

**Family Corcoracidae**  
 Apostlebird

**Family Dicruridae**  
 Magpie-lark (Peewee)

**Family Artamidae**  
 White-breasted Woodswallow  
 Black-faced Woodswallow  
 Little Woodswallow  
 Masked Woodswallow

White-browed Woodswallow  
 Grey Butcherbird  
 Pied Butcherbird

**Family Corvidae**  
 Torresian Crow  
 Little Crow

**Reptiles**

**Family Crocodylidae**  
 Freshwater Crocodile *Crocodylus johnstoni*  
 Estuarine (Saltwater) Crocodile *Crocodylus porosus*

**Family Chelidae**  
 Northern Snake-necked Turtle *Chelodina rugosa*  
 Northern Snapping Turtle *Elseya dentata*  
 Northern Red-faced Turtle *Emydura victoriae*

**Family Gekkonidae (Geckos)**

Spiny-tailed Gecko *Diplodactylus ciliaris*  
 Fat-tailed Gecko *Diplodactylus conspicillatus*  
 Crowned Gecko *Diplodactylus stenodactylus*  
 Northern Dtella or House Gecko *Gehyra australis*  
 Arnhem Land Spotted Gecko *Gehyra nana*  
 Tree Dtella *Gehyra pamela*  
 Asian House Gecko *Gehyra variegata*

Gecko *Hemidactylus frenatus*  
 Bynoe's or Prickly Gecko *Heteronotia binoei*  
 Knob-tailed Gecko *Nephrurus asper*  
 Marbled Velvet Gecko *Oedura marmorata*  
 Zig Zag Gecko *Oedura rhombifer*

Beaked Gecko *Rynchoedura ornata*

**Family Pygopodidae (Legless Lizards)**

*Delma borea*  
*Delma tincta*  
 Burton's Snake Lizard *Lialis burtonis*  
 Hooded Scaly-foot *Pygopus nigriceps*

**Family Agamidae (Dragon Lizards)**

Chameleon Dragon *Chelosania brunnea*



Frilled Lizard  
*Chlamydosaurus kingii*

Ring-tailed Dragon  
*Ctenophorus caudicinctus*

White-lipped Dragon  
*Diporiphora albilabris*  
*Diporiphora benettii*

Two-lined Dragon  
*Diporiphora bilineata*  
*Diporiphora magna*

Gilbert's Dragon  
*Lophognathus gilberti*

Northern Water Dragon  
*Lophognathus temporalis*

**Family Varandiae  
(Monitor Lizards)**

Ridge-tailed Monitor  
*Varanus acanthurus*

Long-tailed Rock Monitor  
*Varanus glebopalma*

Sand Goanna  
*Varanus gouldii*

Merten's Water Monitor  
*Varanus mertensi*

Mitchell's Water Monitor  
*Varanus mitchelli*

Spotted Tree Monitor  
*Varanus timorensis*

Floodplain Goanna  
*Varanus tristis*  
*Varanus panoptes*

Spotted Tree Monitor  
*Varanus scalaris*

**Family Scincidae (Skinks)**

Two-spined Rainbow  
Skink *Carlia amax*

Striped Rainbow Skink  
*Carlia munda*



Jujja/Limpirri, water monitor

Three-spined Rainbow  
Skink *Carlia triacantha*

Slender Rainbow Skink  
*Carlia gracilis*

Arboreal Snake-eyed  
Skink *Cryptoblepharus  
plagiocephalus*

Caranby's Snake-eyed  
Skink  
*Cryptoblepharus carnabyi*

Cogger's Ctenotus  
*Ctenotus coggeri*

Plain Ctenotus  
*Ctenotus inornatus*

Robust Ctenotus  
*Ctenotus robustus*

Spalding's Ctenotus  
*Ctenotus spaldingi*

Scant-stripte Ctenotus  
*Ctenotus vertebralis*  
*Glaphyromophus isolepis*

Main's Menetia  
*Menetia greyii*

Red-tailed Snake-eyed  
Skink *Morethia ruficauda*

Storr's Snake-eyed Skink  
*Morethia storri*

Ornate Snake-eyed Skink  
*Notoscincus ornatus*

Slender Snake-eyed Skink  
*Probalepharus tenuis*

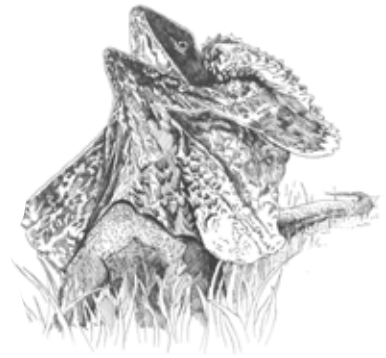
Kinghorn's Snake-eyed  
Skink  
*Probalepharus kinghorni*

Darwin Skink  
*Sphenomorphus  
darwiniensis*

Douglas Skink  
*Sphenomorphus douglasi*

Smooth-tailed Skink  
*Sphenomorphus isolepis*

Northern Blue-tongued  
Lizard *Tiliqua scincoides  
intermedia*



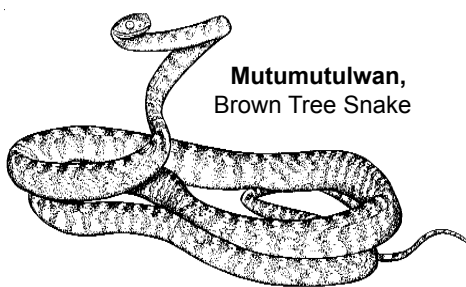
Bemang,  
Frilled Lizard



Loklok, skink

**Scientific classification of a snake (Brown Tree Snake)**

Kingdom Animalia  
 Phylum Chordata  
 Class Reptilia (reptiles)  
 Order Squamata  
 Family Elapidae  
 Genus *Boiga*  
 Species *Boiga irregularis*



Common Blue-tongued Lizard *Tiliqua scincoides*

Centralian Blue-tongued Lizard  
*Tiliqua multifasciata*

**Family Typhlopidae (Blind Snakes)**

*Ramphotyphlops diversus*

*Ramphotyphlops guentheri*

*Ramphotyphlops ligatus*

**Family Boidae (Pythons)**

Black-headed Python  
*Aspidites melanocephalus*

Children's Python  
*Bothrochilus childreni*

Water Python  
*Bothrochilus fuscus*

Olive Python  
*Bothrochilus olivaceus*

**Family Colubridae (Colubrid Snakes)**

Keelback or Freshwater Snake  
*Tropidonophis mairii*

Brown Tree Snake  
*Boiga irregularis*

Green Tree Snake  
*Dendrelaphis punctulata*

**Family Elapidae (Elapid Snakes)**

Northern Death Adder  
*Acanthophis praelongus*

Northern Small-eyed Snake  
*Rhinoplocephalus pallidiceps*

Black Whip Snake  
*Demansia atra*

Olive Whip Snake  
*Demansia olivacea*

Papuan Whip Snake  
*Demansia papuensis*

Little Spotted Snake  
*Suta punctata*

Orange-naped Snake  
*Furina ornata*

Mulga or King Brown Snake  
*Pseudechis australis*

Gwardar or Western Brown Snake  
*Pseudonaja nuchalis*

Half-girdled Snake  
*Simoselaps semifasciatus*

Northern Bandy Bandy  
*Vermicella multifasciata*

Bandy Bandy  
*Vermicella annulata*

**Mammals**

**Family Tachyglossidae**

Short-beaked Echidna  
*Tachyglossus aculeatus*

**Family Dasyuridae**

Sandstone Antechinus  
*Parantechinus bilarni*

Northern Quoll  
*Dasyurus hallucatus*

Common Planigale  
*Plangale maculata*

Kakadu Dunnart  
*Sminthopsis bindi*

Red-cheeked Dunnart  
*Sminthopsis virginiae*

**Family Peramelidae**

Northern Brown Bandicoot  
*Isodon macrourus*

**Family Phalangeridae**

Common Brushtail Possum  
*Trichosurus vulpecula*

**Family Petauridae**

Rock Ringtail Possum  
*Pseudocheirus dahli*

Sugar Glider

*Petaurus breviceps*

**Family Macropodidae**

Agile Wallaby

*Macropus agilis*

Euro *Macropus robustus*

Antilopine Wallaroo

*Macropus antilopinus*

Black Wallaroo

*Macropus bernardus*

Spectacled Hare-wallaby

*Lagorchestes*

*conspicillatus*

Short-eared Rock-wallaby

*Petrogale brachyotis*

Northern Nailtail Wallaby

*Onychogalea unguifera*

**Family Vespertilionidae**

Eastern Forest Bat

*Vespadelus pumilus*

Little Cave Eptesicus

*Eptesicus pumilus*

Common Bent-wing Bat

*Miniopterus schreibersii*

Pigmy Long-eared Bat

*Nyctophilus walkeri*

Little Broad-nosed Bat

*Scotorepens greyi*

Western Cave Eptesicus

*Vespadelus caurinus*

Large Footed Myotis

*Myotis moluccarum*

Lesser Long-eared Bat

*Nyctophilus geoffroyi*

Hoary Wattled Bat

*Chalinolobus nigrogriseus*

Gould's Wattled Bat

*Chalinolobus gouldii*

Arnhem Land Long-eared  
Bat

*Nyctophilus arnhemensis*

Eastern Long-eared Bat

*Nyctophilus bifax*

**Family Pteropodidae**

Black Flying-fox

*Pteropus alecto*

Little Red Flying-fox

*Pteropus scapulatus*

**Family Megadermatidae**

Ghost Bat

*Macroderma gigas*

**Family Hipposideridae**

Dusty Horseshoe Bat

*Rhinonicteris aurantius*

Orange Leaf-nosed Bat

**Family Emballonuridae**

Common Sheath-tail Bat

*Taphozous georgianus*

Yellow-bellied Sheathtail

Bat *Saccolaimus*

*flaviventris*

**Family Molossidae**

Northern Free-tailed Bat

*Chaerophon jobensis*

Beccaris's Free-tailed Bat

*Mormopterus beccarii*

**Family Canidae**

Dingo *Canis familiaris*

**Family Muridae**

Water Rat

*Hydromys chrysogaster*

Forrest's Mouse

*Leggadina forresti*

Common Rock Rat

*Zyzomys argurus*

Grassland Melomys

*Melomys burtoni*

House Mouse

*Mus musculus*

Delicate Mouse

*Pseudomys delicatulus*

Western Chestnut Mouse

*Pseudomys nanus*

**Scientific classification of a placental mammal (Black Flying-fox)**

Kingdom Animalia

Phylum Chordata

Class Mamalia (mammals)

Subclass Eutheria

Order Chiroptera (bats)

Family Pteropodidae

Genus *Pteropus*

Species *Pteropus alecto*

**Scientific classification of a marsupial mammal (Agile Wallaby)**

Kingdom Animalia

Phylum Chordata

Class Mamalia (mammals)

Subclass Marsupialia

Order Diprotodontia (koala, wombats, possums and macropods)

Family Macropodidae (wallabies, kangaroos and tree-kangaroos)

Genus *Macropus*

Species *Macropus agilis*



Nakorlk, Agile Wallaby

**Scientific classification of a frog (Green Tree Frog)**

Kingdom Animalia  
Phylum Chordata  
Class Amphibia (amphibia)  
Order Anura (frogs)  
Family Hylidae  
Genus *Litoria*  
Species *Litoria caerulea*



**Belkkang'mi,**  
Green Tree Frog

**Frogs**

**Family Hylidae**

Daly Waters Frog  
*Cyclorana maculosa*  
Water-holding Frog  
*Cyclorana platycephala*  
Giant Frog  
*Cyclorana australis*  
Long footed Frog  
*Cyclorana longipes*  
Northern Dwarf Tree-frog  
*Litoria bicolor*  
Green Tree-frog  
*Litoria caerulea*  
Copland's Rock Frog  
*Litoria coplandi*  
Peter's Frog  
*Litoria inermis*  
Rockhole Frog  
*Litoria meiriana*  
Javelin Frog  
*Litoria microbelos*  
Rocket Frog  
*Litoria nasuta*  
Pale Frog *Litoria pallida*  
Masked Rock Frog  
*Litoria personata*  
Roth's Tree Frog  
*Litoria rothii*  
Red Tree Frog  
*Litoria rubella*  
Tornier's Frog  
*Litoria tornieri*  
Wotjulum Frog  
*Litoria wotjulumensis*

**Family Myobatrachidae**

Marbled Frog  
*Limnodynastes convexiusculus*  
Desert Frog  
*Crinia deserticola*

Ornate Burrowing Frog  
*Limnodynastes ornatus*  
Northern Spadefoot Frog  
*Notaden melanoscaphus*

Jabiru Toadlet  
*Uperoleia arenicola*  
Floodplain Toadlet  
*Uperoleia inundata*  
Stonemason Toadlet  
*Uperoleia lithomoda*  
Bilingual Froglet  
*Crinia bilinguala*

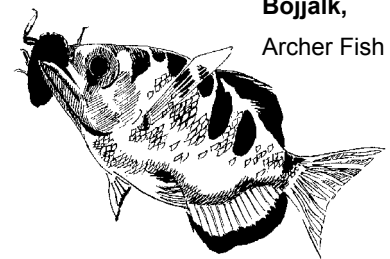
**Fish**

Ox-eye Herring  
*Megalops cyprinoide*  
Bony Bream  
*Nematolosa erebi*  
Blue Catfish  
*Arius graeffei*  
Salmon Catfish  
*Arius leptaspis*  
Midgley's Catfish  
*Arius midgleyi*  
Toothless Catfish  
*Anodontiglanis dahli*  
Black Catfish  
*Neosilurus ater*  
Hyrtl's Catfish  
*Neosilurus hyrtlii*  
Obbes' Catfish  
*Porochilus obbesi*  
Freshwater Longtom  
*Strongylura krefftii*  
Exquisite Rainbowfish  
*Melanotaenia exquisita*  
Black-striped Rainbowfish  
*Melanotaenia nigrans*  
Red-tailed Rainbowfish  
*Melanotaenia splendida australis*  
Chequered Rainbowfish  
*Melanotaenia spendida*

*inornata*  
 Spotted Blue-eye  
*Pseudomugil gertrudae*  
 Fly-specked Hardyhead  
*Craterocephalus stercusmuscarum*  
 Strawman  
*Craterocephalus stramineus*  
 Single-gilled Eel  
*Ophisternon gutturale*  
 Sail-fin Glassfish  
*Ambassis agrammus*  
 Reticulated Glassfish  
*Ambassis macleayi*  
 Muller's Glassfish  
*Ambassis mulleri*  
 Sooty Grunter  
*Hephaestus fuliginosus*  
 Spangled Grunter  
*Leiopotherapon unicolor*  
 Midgley's Grunter  
*Pingalla midgleyi*  
 Sharp-nosed Grunter  
*Syncomistes butleri*  
 Mouth Almighty  
*Glossamia aprion*  
 Common Archerfish  
*Toxotes chatareu*  
 Primitive Archerfish  
*Toxotes lorentzi*  
 Spotted Scat  
*Scatophagus argus*  
 Striped Scat  
*Selenotoca multifasciata*  
 Diamond Mullet  
*Liza alata*  
 Five-fingered Threadfin  
*Polydactylus sheridani*

Nurseryfish  
*Kurtus gulliveri*  
 Golden Goby  
*Glossogobius aureus*  
 Empire Gudgeon  
*Hypseleotris compressa*  
 Katherine Gudgeon  
*Hypseleotris sp.*  
 Purple-spotted Gudgeon  
*Mogurnda mogurnda*  
 Sleepy Cod  
*Oxyeleotris lineolatus*  
 Black-banded Gudgeon  
*Oxyeleotris selheimi*  
 Small-eyed Gudgeon  
*Prionobutis microps*  
 Tailed Sole  
*Aseraggodes klunzingeri*  
 Selheim's Sole  
*Brachirus selheimi*  
 Banded Grunter  
*Amniataba percooides*  
 Barramundi  
*Lates calcarifer*  
 Pennyfish  
*Denariusus bandata*

**Scientific classification of a fish (Common Archerfish)**  
 Kingdom Animalia  
 Phylum Chordata  
 Class Osteichthys (bony fish)  
 Order Perciformes  
 Family Toxotidae  
 Genus *Toxotes*  
 Species *Toxotes chatareu*



**Bojjalk,**  
 Archer Fish

Natural values

## Section 4 Assessment questions

You must answer all of the questions at the end of each section of this handbook and complete a practical assessment before you can conduct launch (boat) tours on Katherine Gorge.

Following are the questions that you must answer as part of your assessment for this section.

**Please write your answers on the form in Section 9 of this handbook.**

1. What is the pattern of rainfall in the Top End?
2. What causes flooding in the Katherine area?
3. What is the Kombolgie Formation and how did it develop?
4. According to geologists, how did the Gorge form?
5. What is the source of 17 Mile Creek?
6. What is a habitat?
7. What are the broad landscape types in Nitmiluk National Park?
8. What makes it possible for rainforests to grow in sandstone gullies?
9. Why are bats and birds important to rainforests?
10. What are some of the animals in the Katherine River?
11. What birds do you see during a cruise on the River?
12. How is a riverine habitat different to a floodplain habitat?
13. How do you tell the difference between Freshwater and Estuarine (Saltwater) Crocodiles?
14. What do Freshwater Crocodiles eat?
15. Why do you see crocodiles more during the cold weather time than when it's hot?
16. When do Freshwater Crocodiles nest?
17. How does nest temperature influence crocodile eggs?