# Crocodilians

## (Order Crocodilia)

### Family Crocodylidae

#### Crocodiles genus *Crocodylus* Laurenti, 1768

Crocodilians first appeared 95 million years ago and are an order of predominantly large, semi-aquatic, predatory reptiles divided into three ancient families – Alligatoridae (alligators and caimans), Gavialidae (gharial and false gharial) and Crocodylidae (true crocodiles). In Australia, crocodilians are represented by 'true crocodiles' (Crocodylidae) in a single genus (*Crocodylus*). True crocodiles are composed of three extant genera (*Crocodylus, Mecistops* and *Osteolaemus*) with a global distribution from the Western Pacific, through Asia, Africa, and North and South America. Globally, there are 13 species in the genus *Crocodylus*; two species are found in Australia, one of which is endemic to Australia (*Crocodylus johnstoni*) and the other of which has a much broader distribution (*Crocodylus porosus*). Both species occur in the Northern Territory.

Crocodilians include the largest living reptiles on the planet. We now know that crocodilians are the closest living relatives of birds, and are more closely related to birds and dinosaurs than they are to other reptiles. Despite their prehistoric appearance, crocodiles are one of the most biologically advanced reptiles, with a four-chambered heart, cerebral cortex and the functional equivalent of a diaphragm. Crocodiles are unmistakeable from any other group of Australian reptiles. They possess long, streamlined bodies armoured with bony, sometimes keeled, plates (osteoderms); powerful, laterally compressed tails; short, robust limbs with webbed feet; eyes set on top of their head, which can be retracted into their skull; elongate snouts with nostrils set high above the tip to allow them to breathe while their body is submerged; and powerful jaws lined with long, conical teeth.

Australian crocodiles are largely ambush hunters. While they are regularly observed basking and hunting during the day, they are most active at night. Crocodile skull, snout and tooth morphology is driven by diet. Species that predominantly eat smaller, soft-bodied prey (e.g. freshwater crocodiles) have slender jaws that can be swiftly swiped through the water to catch their agile quarry. Species with more varied diets (e.g. saltwater crocodiles) that include large, hard- and/or heavy-bodied prey that require crushing or dismemberment before being consumed have broad snouts with extremely powerful jaws and muscles.

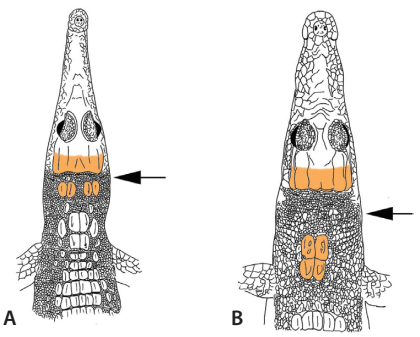
All crocodiles are oviparous, laying eggs in an excavated hole (e.g. freshwater crocodiles) or in a mound constructed from vegetation (e.g. saltwater crocodiles). Despite their fearsome reputation as brutal predators, some crocodiles, including both Australian species, exhibit maternal care. Female saltwater crocodiles in particular are extremely attentive mothers, displaying some of the most sophisticated maternal care among reptiles. After constructing the nest and laying her eggs, a female crocodile will guard the nest from any threats (including people) throughout the entire incubation period. During hatching, the young crocodiles will call out to their mother, who will gently excavate the nest and delicately carry them to the water in her powerful jaws.

Saltwater (*Crocodylus porosus*) (right) and freshwater crocodiles (*C. johnstoni*) (left) co-occur in many Northern Territory waterways. Daly River, NT. Brendan Schembri.

Saltwater crocodiles are the world's largest living reptiles with the strongest bite force of any living animal. They are a formidable predator and are by far the most dangerous reptile in Australia. Adult saltwater crocodiles are sufficiently large that humans fall well within the size of their natural prey, and they have been responsible for a number of human fatalities. **Extreme caution should be taken near waterways in saltwater crocodile habitat in the Northern Territory.**

## Key to *Crocodylus* of the Northern Territory

1. Relatively slender snout (A); a single row of enlarged nuchal shields, separated from the smooth-skinned parietal region by fewer than eight granular scales (A) . . ***C. johnstoni***
   Relatively broad snout (B); two rows of enlarged nuchal shields, separated from the smooth-skinned parietal region by more than eight granular scales (B) . . . ***C. porosus***




## Freshwater crocodile

*Crocodylus johnstoni*
Krefft, 1873

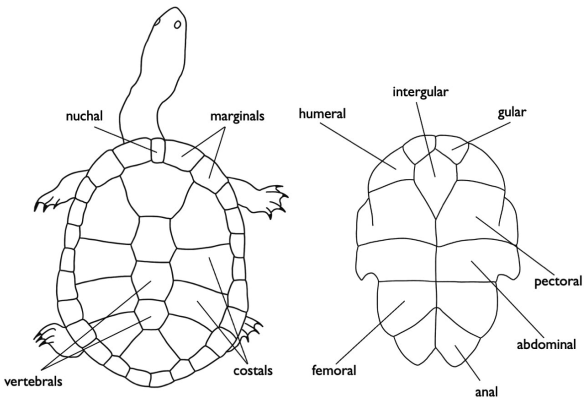
TL 3 m. A moderately sized crocodile with **a relatively narrow snout;** and **enlarged nuchal shields in a single row that is separated from the smooth-skinned parietal region by fewer than eight scales.** Dorsal surface olive–green to dark brown with darker brown to black markings often coalescing to form incomplete dorsal cross-bands. Ventral surface paler than dorsum. **Notes:** Endemic to Australia. Found across much of northern Australia, from the interior of Far North Qld to the Kimberley region, WA. It occurs through much of northern NT. Predominantly found in freshwater rivers, creeks and billabongs. Can be found in smaller, more inland reaches of waterways than saltwater crocodiles, but the two species are regularly found in sympatry. Feeds on crustaceans, fish, frogs, reptiles, birds and small

*Crocodylus johnstoni*. Daly River, NT. Brendan Schembri.

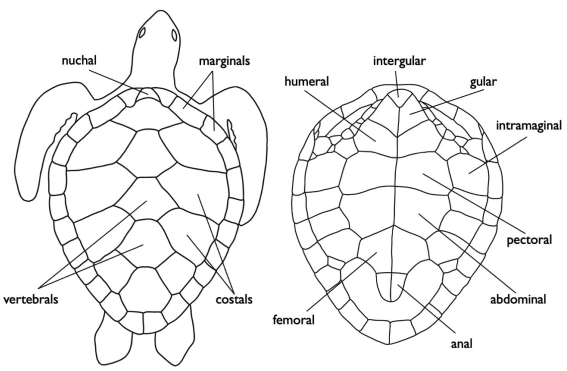
# Turtles and tortoises

## (Order Testudines)

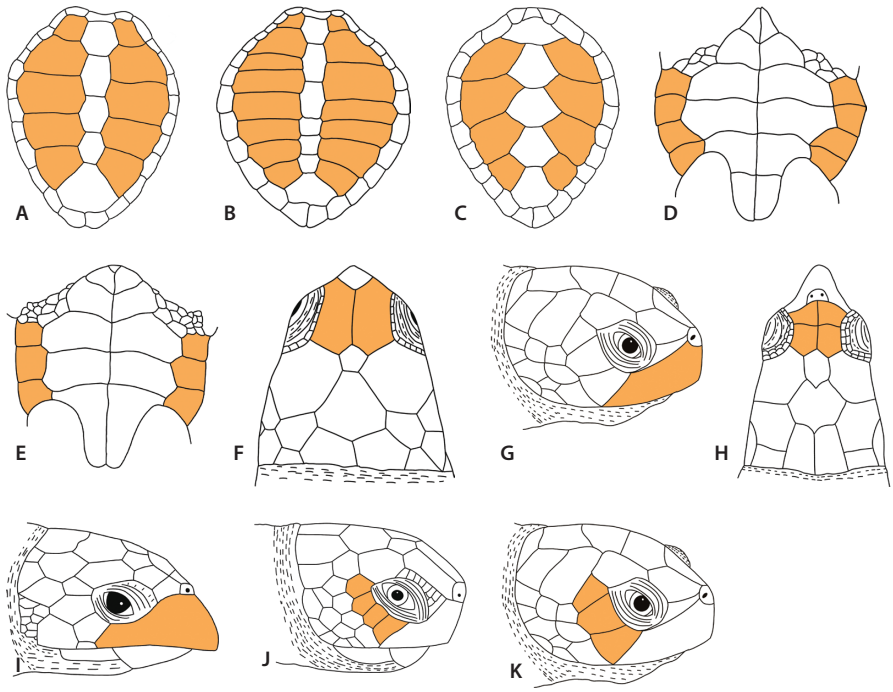
Turtles and tortoises (testudines) are an iconic, unmistakeable group of reptiles. While the entirely terrestrial species are known as tortoises and the entirely marine species are known as turtles, the freshwater species have been referred to as both turtles and tortoises. Nowadays, most Australian sources (including this guide) refer to them as freshwater turtles. Australia has no terrestrial tortoises, but we do have a diverse array of marine and freshwater turtles. Australian coastal waters are home to six of the world's seven marine turtle species, with representatives from both families (Cheloniidae and Dermochelyidae). Our native freshwater turtle species are divided into two families: Chelidae, with 24 species; and Carettochelydidae, containing




Carapace and plastron of a chelid turtle (*Chelodina canni*) showing the position and name of scutes from a dorsal and ventral perspective.




Carapace and plastron of a cheloniid turtle (*Chelonia mydas*) showing the position and name of scutes from a dorsal and ventral perspective.

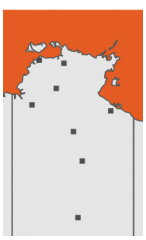



## Genus *Caretta* Rafinesque, 1841

A monotypic sea turtle genus with a global tropical and subtropical distribution. In Australia, they typically inhabit coastal waters from WA to NSW. Hatchlings tagged in Australia are known to disperse as far as South America, spending around 15 years at sea before returning to Australian waters. Female loggerhead turtles reach breeding age at around 30 years. Loggerhead turtles are the only species of Australian sea turtle that has not been recorded nesting on NT beaches. Loggerhead turtles can be distinguished from other sea turtles by the following characteristics: large head, especially on older individuals; **five (rarely six) costal shields on each side of carapace; carapace longer than wide; dorsal colouration of adults and hatchlings reddish brown;** and **four enlarged inframarginal scales without pores.** Loggerheads are carnivorous and feed on a range of marine invertebrates, such as jellyfish, crustaceans and molluscs.

### Loggerhead turtle

*Caretta caretta* (Linnaeus, 1758)

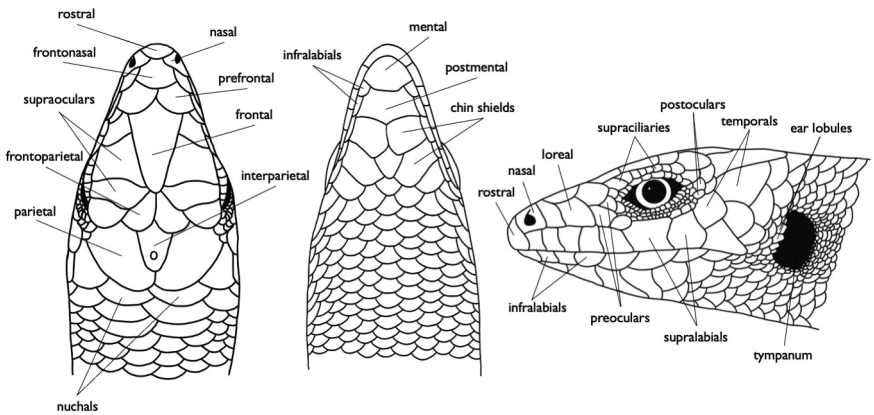


CL 1.25 m. A large, robust sea turtle with a disproportionally massive head, especially in older individuals, and two pairs of prefrontal shields. **Carapace longer than wide** and roughly heart-shaped with **five (rarely six) pairs of costal shields.** Dorsal colouration of adults and hatchlings usually **reddish brown to**

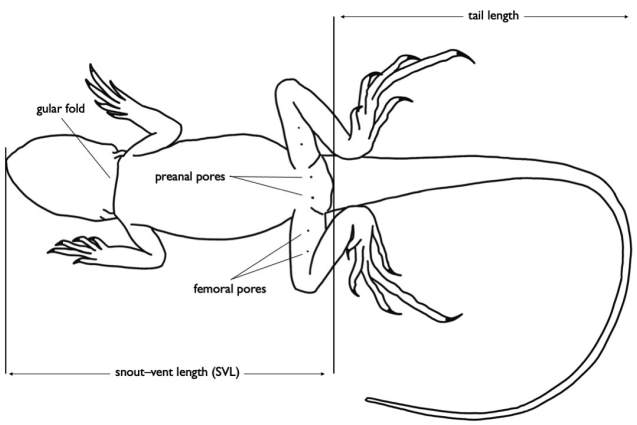
# Lizards

## (Order Squamata, Suborder Lacertilia)

Lizards are an incredibly diverse, paraphyletic group of squamate reptiles. While we now know that snakes evolved from lizards (meaning that snakes are actually just limbless lizards), this guide treats these two groups separately for convenience. Lizards have a near-global distribution and are found on every continent except Antarctica. Early lizards were first observed in the fossil records about 200 million years ago. They have since diversified into nearly 6000 species across the globe. Australia is home to seven lizard families: southern padless geckos (Carphodactylidae), Austral




Head of a typical skink (*Ctenotus robustus*) showing the position and name of head scales from a dorsal, ventral and lateral perspective.




Lizard body measuring points and some key features.

## Knob-tailed geckos genus *Nephrurus* Günther, 1876

A group of nine large, robust gecko species with large, deep heads, slender limbs, short, clawed, padless digits and small, spinous subdigital lamellae. Four of these species are recorded in the NT. *Nephrurus* can be distinguished from other carphodactylids by the following characteristics: **original tails terminate in a small, distinctive knob;** and **more than 16 supralabial scales, each of which is small and only slightly larger than adjacent granular scales.**

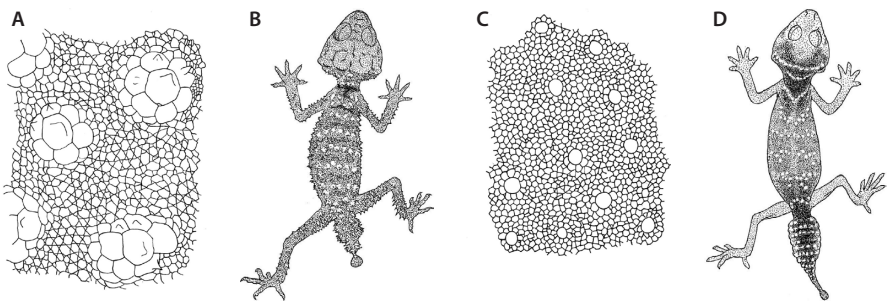
*Nephrurus* are ground-dwelling geckos. In the NT, *Nephrurus* fall into two groups that differ in morphology and habitat association: the smooth knob-tailed geckos (*N. laevissimus* and *levis*), which are adorned with only small, single scale dorsal tubercles, and are associated with sandplains and dunefields; and the rough knob-tailed geckos (*N. amyae* and *shaei*), which are adorned with large tubercles composed of multiple conical spines, and are associated with rocky habitats. Smooth knob-tailed geckos excavate their own burrows, while rough knob-tailed geckos tend to shelter under rocks and in crevices. Rough-knob tailed geckos are the only geckos that have lost the ability to autonomise their tails. When harassed or threatened, *Nephrurus* raise and inflate their bodies, gape and lunge at the aggressor while uttering a wheezing bark. Carnivorous, mostly consuming arthropods but will also take small vertebrates, such as other geckos.

### Key to *Nephrurus* occurring in the Northern Territory

1. Scattered tubercles on flanks . . . . . 2
   Smooth flanks, without tubercles. . . . . ***N. laevissimus***

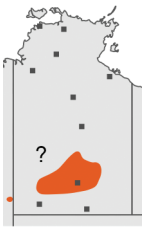
2. Complex tubercles composed of multiple conical scales (A); tail small, shrivelled and spiny (B) . . . . . 3
   Simple dorsal tubercles composed of a single conical scale (C); tail comparatively broad and flat (D) . . . . . ***N. levis***

3. Digits without bands; tubercles heavily spinous; occurs in the arid central NT . . ***N. amyae***
   Digits strongly banded; tubercles moderately spinous; occurs in northern NT . . . ***N. sheai***



## Centralian knob-tailed gecko

*Nephrurus amyae* Couper, 1994

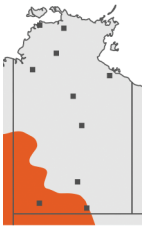



SVL 135 mm. Australia's most massive gecko. A large, robust *Nephrurus* adorned with **complex tubercles composed of multiple conical scales, the largest and most spinous on rump and thighs; small, shrivelled, spiny tail;** and **lacking banded digits**. Dorsal colouration rich reddish brown with broad, dark transverse band on nape and fine, dark transverse lines alternating with rows of paler bands or spots, with each pale spot centred on a spinous tubercle. Flanks are tan brown with numerous rosettes of pale, spinous tubercles. Limbs long and slender, lacking irregular crossbands distally and with enlarged tubercles on dorsal surface. Large head patterned with a fine dark and broader pale reticulum. Tail short and spinous, terminating in a globular, kidney-shaped knob. Ventral surface pale. **Notes:** Occurs in the **rocky ranges of arid central NT.** Known outside of the NT from only a single record collected near Warburton, WA. Predominantly associated with the rocky areas of the MacDonnell Ranges and Burt Plain bioregions; however, recent, unconfirmed records suggest *N. amyae* may occur in areas of the Tanami. Inhabits rocky slopes and outcrops vegetated by spinifex. Shelters beneath or between rocky boulders. **Similar species:** *N. sheai*

*Nephrurus amyae.* Watarrka National Park, NT. Brendan Schembri.

## Pale knob-tailed gecko

*Nephrurus laevissimus* Mertens, 1958



SVL 93 mm. Smallish, with **smooth flanks, lacking tubercles**. Dorsal colouration pinkish, yellowish to orangish brown with or without scattered white dorsal dots. Dorsal body pattern includes broad, dark lines and/or blotches, the most prominent of which are from behind eyes and across base of head, across nape, curving longitudinally from each shoulder and above each hip. Sharp demarcation between darker dorsal and white ventral colour on flanks. Limbs long and relatively robust, lacking tubercles and typically patternless. Head large, patterned with dark blotches and stripes, with pale supraoculars. Tail short with white dorsal tubercles, terminating in a smooth, globular, kidney-shaped knob. Ventral

*Nephrurus laevissimus*. Yulara, NT. Brendan Schembri.

*Nephrurus laevissimus.* Yulara, NT. Chris Jolly.

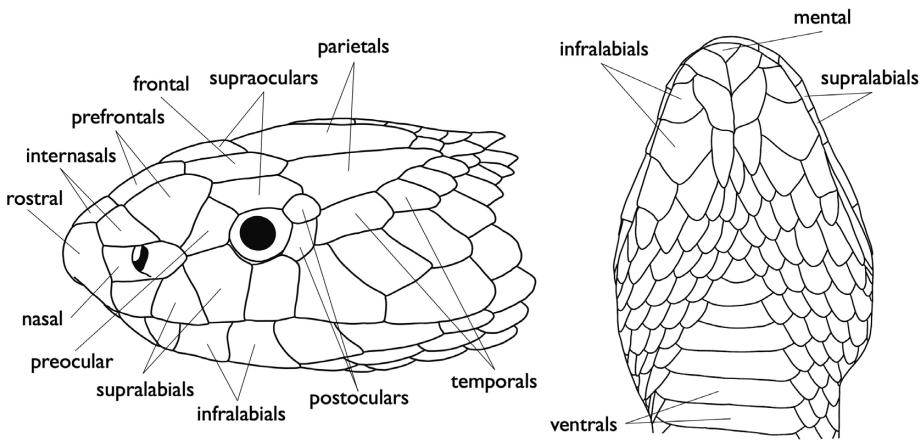
# Snakes

## (Order Squamata, Suborder Serpentes)

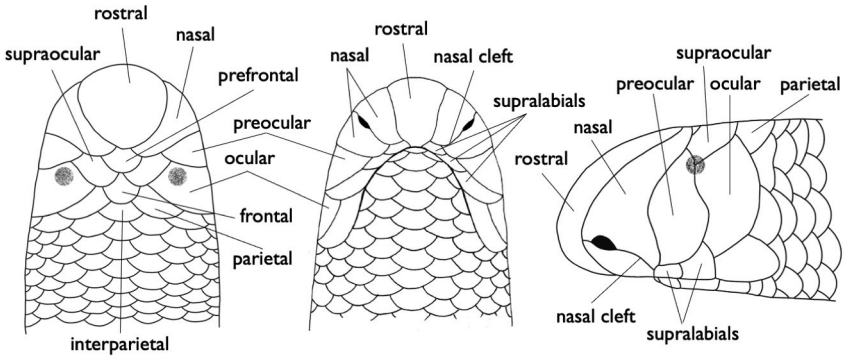
Snakes are elongate, limbless, carnivorous reptiles that first appeared around 100 million years ago. Since then, they have diversified into nearly 4000 species and have spread to every continent except Antarctica. Australia is home to six snake families: blind snakes (Typhlopidae), pythons (Pythonidae), files snakes (Acrochordidae), colubrids (Colubridae), homalopsids (Homalopsidae) and elapids (Elapidae). Representatives of all six families are found in the Northern Territory.

Snakes are incredibly varied in their morphology and life history: from the tiny fossorial blind snakes that can be transported around the country in flower pots, to the giant arboreal pythons and the fully aquatic and highly venomous sea snakes. They are, however, unified in **lacking limbs, eyelids** and **external ears,** and **possessing long, forked tongues** with which they sense the world.

Likely because of our long evolutionary history with them as a potential threat, snakes play a prominent role in human religion, mythology and folklore. A fear of snakes (ophidiophobia) is one of the most common animal phobias. Given that bites from venomous snakes result in 80 000–140 000 human fatalities per year globally, this widespread fear is potentially justified in some parts of the world. Despite being home to some of the world's most venomous snakes, snakes pose relatively little threat to humans in Australia. Although Australia is unique in being the only continent to have more venomous than non-venomous snakes, most of our snakes are only mildly venomous and generally not considered dangerous to humans. Bites from dangerously venomous snakes are relatively rare in Australia, especially if we exclude bites to herpetologists and reptile keepers who specifically seek out and handle them.




Elapid heads showing the position and name of head scales from a laterodorsal (*Pseudechis australis*) and ventral (*Acanthophis hawkei*) perspective.




Blind snake heads showing the position and name of head scales from a dorsal (*Anilios yirrikalae*), ventral (*Anilios ligatus*) and lateral (*Anilios troglodytes*) perspective.

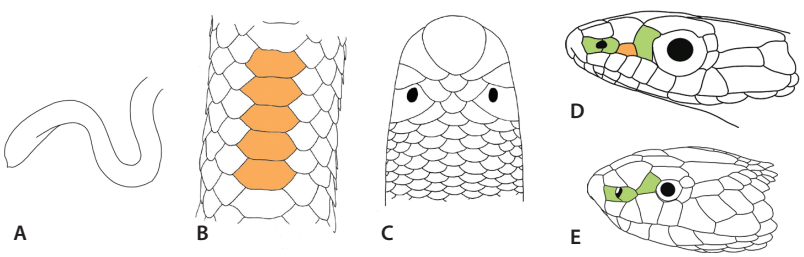
## Key to snake families of the Northern Territory

1. Tail cylindrical in cross-section, without paddle-shaped tip . . . . . 2
   Tail strongly laterally compressed with paddle-shaped tip (A; part) . . . . . **Elapidae** (marine elapids)

2. No enlarged ventral scales, scales on the belly are similar in size to lateral and dorsal scales . . . . . 3
   A single row of enlarged ventral scales that are at least twice as wide lateral and dorsal scales (B) . . . . . 4

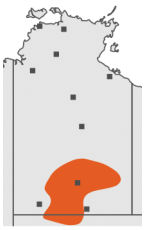
3. More than 80 midbody scales; scales are rough, each with a tall spinous keel; eyes are comparatively well-developed . . . . . **Acrochordidae** (file snakes)
   Fewer than 40 midbody scales; scales are smooth; eyes are vestigial, reduced to dark spots beneath scales (C) . . . . . **Typhlopidae** (blind snakes)

4. Fewer than 30 midbody scales . . . . . 5
   More than 30 midbody scales . . . . . **Pythonidae** (pythons)



## Centralian blind snake

*Anilios centralis* (Storr, 1984)



TL 306 mm. A moderately slender blind snake **with nasal cleft usually joining the second supralabial; from above, snout slightly trilobed; rostral with sharp transverse keel;** 405–482 ventrals; and **20 midbody scales. Nasal cleft not visible from above and not dividing nasal, extending from second supralabial to slightly beyond nostril. Snout is angular and beak-like in profile.** Dorsal body colour tan to purplish brown, fading to creamish white laterally. Ventral surface creamish white. **Notes:** Although previously considered to be restricted to the MacDonnell Ranges bioregion of NT, *A. centralis* is now known to occur in southern NT and northern SA. In the NT, it is associated with the flat alluvial plains and rocky ranges surrounding Alice Springs and the Finke and Central Ranges bioregions. **Similar species:** *A. bituberculatus*

*Anilios centralis*. Kulgera, NT. Brendan Schembri.

## Northern blind snake

*Anilios diversus* (Waite, 1894)

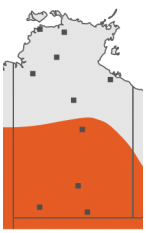
TL 352 mm. A **smallish,** moderately slender blind snake **with nasal cleft usually joining the preocular; from above and in profile, snout rounded; 389–457 ventral scales;** and

*Anilios diversus*. Manyallaluk, NT. Chris Jolly.

**20 midbody scales. Nasal cleft just visible from above, extending from preocular to beyond nostril, often dividing the nasal.** Rostral scale elliptical, sometimes with slightly concave sides. Dorsal body colour **pinkish brown to purplish brown**, fading to paler pink laterally. **Ventral surface pinkish cream. Notes:** Occurs across much of northern Australia from inland Qld, throughout much of NT, to northern WA. In the NT, occurs from about Alice Springs north to the Top End, including the Pellew, Wessel and Tiwi islands. Found in a range of arid, semi-arid and tropical habitats. **Similar species:** *Indotyphlops braminus*

## Interior blind snake

*Anilios endoterus* (Waite, 1918)



TL 376 mm. A moderately slender blind snake **with nasal cleft usually joining the preocular;** 406–438 ventrals; and **22 midbody scales. Nasal cleft not visible from above and not dividing nasal, extending from preocular to nostril.** Snout bluntly rounded or slightly trilobed from above, and bluntly angular in profile. Dorsal body colour pinkish, pink–brown to reddish brown, fading to creamish to pinkish white laterally. Ventral surface creamish to pinkish white. **Notes:** Occurs throughout much of central Australia from western NSW, south-western Qld, interior SA, southern NT and central WA. In the NT, it appears to occur throughout the semi-arid and arid zone north to the northern Tanami