

## *Reptiles*

After participating in numerous exhibitions and displays it is becoming increasingly obvious that the Australian public is fascinated by reptiles and many want to keep reptiles as pets. All native reptiles are protected and you need a licence to keep any in captivity. It is illegal to keep exotic (non-Australian) reptiles in captivity. Licences are issued by your state's National Parks and Wildlife Service.

### *What you need to know first*

If you are thinking of keeping a reptile as a pet, you should find out what you are letting yourself in for. A book well worth reading is "Care of Australian Reptiles in Captivity" by John Weigel. This contains lots of information on housing, feeding, breeding and diseases, as well as care sheets on a whole range of species.

### *Long term commitment*

Remember - a reptile is a long term commitment. Turtles can live for more than 30 years, pythons for more than 15 years and lizards such as blue-tongues for 20 years. Your pet may well outlive you.

### *Locating a reptile keeper*

Once you have received your licence you can start your quest to locate a suitable animal. Reptiles cannot be removed from the wild (or even from the back garden) and can only be obtained from another keeper. If you do not know any keepers you should join one of the reptile groups to meet other people with similar interests, to find out more about keeping and to obtain your reptile. Most groups have facilities at meetings for members to advertise animals available or wanted, and some groups also provide this information in their newsletters.

### *Keeping records*

When you have found your animal a transfer is made from the present holder to you. You must provide to the person from whom you are obtaining the animal your licence number, name and address. That person must in return provide you with their licence number, name and address. You must record this information immediately into the record book that you will have received with your licence. Similarly, if you acquire any additional animals, lose or dispose of any, this must also be recorded in the book. The record book must be completed and returned to the Service in April of each year. You are liable to be fined if you fail to do this. Your licence is renewed every two years on 1

December and you will receive a notification from the Service inviting renewal.

## *Snakes*

Snakes are something most people go out of their way to avoid. Snakes can be distinguished from the other members of the reptile class by the absence of external limbs, eyelids and external ears. There are seven families of snakes in Australia. Most species belong to the Elapidae family and are venomous.

A family of harmless snakes includes the pythons, with about 15 species occurring in Australia, ranging in size from half a metre long to five metres long.

### *Diamond python*

The beautiful diamond python is confined to the east coast and adjacent ranges of New South Wales with the centre of its distribution in the Gosford district, where it is a common inhabitant. Mating usually occurs in mid-spring, resulting in the production of 15 to 40 eggs which are laid approximately two months later.

The eggs are then protected and "incubated" by the mother for another two months or so. By occasionally twitching and shivering while coiled around the eggs she is able to maintain a steady clutch temperature of approximately 29° Celsius.

The female diamond python abandons the nest site shortly before hatching commences. The emerging young are approximately 40 centimetres long and appear quite drab before they begin to adopt their beautiful markings six months to a year later.

Hatchling diamond pythons are particularly fond of small lizards which are killed by constriction before being swallowed "head first". When big enough, the young snakes will switch to a diet of small mammals and birds.



*Morelia spilota spilota (diamond python)*

Diamond pythons grow to a length of up to three metres and are able to kill and devour anything up to the size of a brush-tailed possum or full grown chicken. Central coast farmers recognise that diamond pythons naturally control rodent populations.

### *Green tree snake*

The green tree snake is a common non-venomous inhabitant of northern and eastern Australia, feeding primarily upon frogs. Green tree snakes don't bother killing their prey prior to swallowing it, hence reports of freshly captured specimens of green tree snakes disgorging live frogs. When upset or attacked, snakes often void their stomach contents, presumably to allow a faster escape.



*Common ('green') tree snake (dendrelaphis punctulatus)*

### *The Eastern snake-necked turtle*

This turtle lives in freshwater environments and feeds on aquatic invertebrates, tadpoles and small fishes. Most of its time is spent in the water, but it can make overland movements in search of new waterholes and nesting areas.

As its name suggests, this turtle has a long neck, which is usually about half the length of its carapace (shell). It has webbed feet used for swimming and digging. The colour of the carapace varies through shades of brown. Also known by another common name of 'stinker', this turtle can eject pungent liquid gland secretions from its 'armpits' and groin when handled or disturbed.

In summer, females dig holes in sand or in soft sediments along stream banks and lay about 10 eggs. These eggs occasionally provide a meal for water-rats and lizards. Hatchlings are eaten by fish and birds, and adults may be killed by cars while moving overland.



*Eastern snake-necked turtle (Chelodina longicollis)*

The terms turtle and tortoise are often used interchangeably and can cause some confusion. In the past, all freshwater turtles were called tortoises and marine turtles were called turtles. The more recent convention has been to restrict the term 'tortoise' to the purely land-dwelling species. As such, Australia has no tortoises.

The Eastern snake-necked turtle is distributed throughout Queensland, New South Wales, Victoria and south-eastern South Australia. Its habitat is freshwater and wetlands.

### *Crocodiles*

With snapping jaws and prehistoric looks, crocodiles are one of Australia's most feared animals. Australia is home to two types of crocodile: the freshwater crocodile (*Crocodylus johnstoni*), and the estuarine (saltwater) crocodile (*Crocodylus porosus*). Both live in northern Australia, mainly across the top of Queensland, Northern Territory and Western Australia.

Both types are important to conserve, because Australia is the only country inhabited by the freshwater crocodile, and the estuarine crocodile is a threatened species. In fact, Australia is one of the very few places in the world where estuarine crocodiles have a chance to survive.

Although these animals are important to conserve, they can pose a serious threat to people. Freshwater crocodiles pose less danger, but estuarine crocodiles are very dangerous animals

### *Freshwater crocodiles*

Freshwater crocodiles are grey or olive-brown with ragged dark mottling. A freshwater crocodile can be distinguished from an estuarine by its narrow snout, needle-like teeth and row of four large scales on the neck immediately behind its head. A male freshwater crocodile rarely grows larger than 2.5m in length, while the female is usually less than 2m.



*Unlike their larger relatives, freshwater crocodiles (Crocodylus johnstoni), also known as Johnstone crocodiles, are not usually dangerous to people. They are very common in the Kimberley*

Estuarine crocodiles are grey, olive-brown or almost black, with ragged dark mottling. Unlike the freshwater crocodile, the estuarine crocodile has a broad snout, thick teeth and no row of large scales on its neck. An adult male can reach 7m in length, although most are less than 5m. Females are usually less than 4m.

#### ***Habitat***

Freshwater crocodiles make their home in inland freshwater rivers, billabongs and swamps of northern Australia. These crocodiles move into new areas during the wet season (November-April). As the floodwaters recede, the crocodiles return to their usual habitats. In Queensland, they are found mainly in rivers of Cape York Peninsula and the Gulf of Carpentaria.

Estuarine crocodiles are found throughout south-east Asia - from India all the way south to Australia.

Although it lives mainly in the tidal reaches of rivers, the estuarine crocodile is also common in freshwater lagoons and swamps and beaches. This crocodile can even be seen in inland waterways hundreds of kilometres from the sea and on Great Barrier Reef islands.

#### ***Diet***

Crocodiles are top of the food chain in wetland environments, preying on many different animals. Freshwater crocodiles are active during the day, but forage mostly at night. They eat small things like insects, fish, frogs, lizards, turtles, bats and birds. Mainly nocturnal, young estuarine crocodiles munch on fish, frogs, prawns, crabs and insects. Larger crocodiles eat larger prey such as pigs, wallabies and even other crocodiles.

To capture prey, both types of crocodile wait in ambush at the water's edge and then lunge or snap sideways at animals which come to feed or drink. Another method is dragging prey underwater, and then twisting it in a 'death-roll' until it dies or disintegrates.

#### ***Reproduction***

Freshwater crocodiles nest in August and September during the dry season. About 12 eggs are laid in simple holes dug in sand or soil near the water's edge. Incubation takes 65–90 days, so the young usually hatch before the first floods of the wet season.

When about 12 years old, a female estuarine crocodile will make a nest, a large mound of soil and vegetation, on the banks of a watercourse or freshwater swamp. She will then lay about 50 eggs and guard the nest during incubation, which takes about 90 days. Sex of the offspring is determined by incubation temperature: low and high temperatures produce females and temperatures of 31–33°C produce males. When the young estuarine crocodile hatches from its egg, it squeaks to attract the mother. The female protects the estuarine crocodile hatchlings for four to five weeks. Distressed hatchlings squawk loudly to attract the mother's attention. The mother comes immediately to defend her offspring from predators.

Seeing crocodiles in the wild is difficult - they are very wary and may stay underwater when people are around. Crocodiles spend much of their day basking in the sun, sheltering among plants or in mud. Slide marks along river banks and beaches are a good indicator they may be close.

#### ***Threats to survival***

Less than one percent of the eggs laid by an estuarine crocodile reach adulthood. Floods destroy many crocodile nests. Pigs and goannas often take eggs. Young crocodiles are eaten by other animals, even other crocodiles!

Public antagonism towards crocodiles is also a threat to their survival. Unless the community values crocodiles and their habitats, it will be difficult to promote their long-term conservation.

#### ***Protection***

While crocodiles are killed in other countries for their skins, Australia's two species of crocodiles are protected. In Queensland, interfering with crocodiles or their eggs and possessing or taking parts of crocodiles are illegal without a licence from the Queensland Parks and Wildlife Service. The Service has been conducting research on the





biology of freshwater and estuarine crocodiles for many years. Through research, it hopes to:

- assess crocodile numbers and locations
- determine their ecological role in water ecosystems
- understand their reproductive biology and population traits
- encourage conservation and management of healthy wild populations, while keeping the risk to people as low as possible.

Keeping the balance between protecting crocodiles and protecting people from crocodiles is a challenge for the Environmental Protection Agency. The Agency is concerned about crocodiles being in places where people live. Potentially dangerous crocodiles are often captured and relocated away from people or made available to commercial crocodile farms and zoos.

### *The future*

Crocodiles are one of few remaining links to our prehistoric past. As predator and prey, crocodiles play an important role in keeping our wetlands healthy.

In conservation terms, freshwater crocodiles are found only in Australia. Estuarine crocodiles are seriously threatened elsewhere, throughout their range. Through conservation efforts we can secure their future in the wild.

### *How can you help?*

Follow these simple guidelines to help protect crocodiles:

- Never interfere with crocodiles or their eggs
- Report any incidents of crocodile killing or poaching to the nearest Queensland Parks and Wildlife Service office
- Be 'crocodile smart'. Stay away from crocodiles in the wild and report any crocodiles in populated areas.

### *Living safely with crocodiles*

Unprovoked attacks by a freshwater crocodile have never been reported. But don't be fooled, these are wild animals and may inflict a nasty bite if provoked.

Estuarine crocodiles, on the other hand, are very dangerous. Be very careful throughout central and north Queensland at rivers, swamps, billabongs and when swimming in the sea. They are large, efficient predators which can kill or seriously injure people. Their bite can easily crush the bones of a pig or buffalo.

### *Follow these guidelines:*

- Don't disturb crocodile nests as nesting crocodiles may be aggressive
- Travel quietly in a stable boat when crocodile spotting. Never approach the crocodile too closely, and keep your hands and legs inside the boat
- Never provoke crocodiles, even small ones
- Do not encourage wild crocodiles by feeding them. This is illegal and dangerous!
- Camp at least 50m from the water's edge and never prepare food or clean fish at the water's edge
- Stand back when fishing. Don't stand on overhanging logs
- Never swim in crocodile territory.

### *Australian saltwater crocodile*

The saltwater crocodile is the largest living crocodilian species, and in fact the world's largest living reptile in terms of mass. Adult males can reach sizes of up to six or seven metres (20 to 23 feet), the largest confirmed individual being 20.7 feet (6.3m). There is always a lot of interest over the largest ever recorded "saltie". In general, males over five metres (17 feet) in length are extremely rare. Females are smaller, the normal maximum adult size being 2.5m to 3m (8 to 10 feet) being the normal maximum adult size. Maximum weight varies, but has been known to exceed 1,000 kg in 18 to 19 foot adults. Five metre adults are closer to 400 to 500 kg.

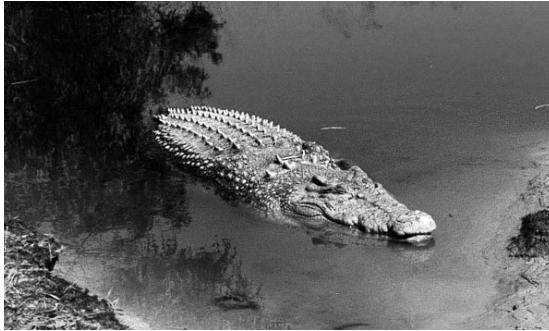
Saltwater crocodiles are a large-headed species with a heavy set of jaws. A pair of ridges run from the eye orbits along the centre of the snout, becoming more distinct with age. Juveniles are normally pale tan in colour with black stripes and spots on the body and tail. The juvenile colouration persists for several years, growing progressively paler and less colourful with more indistinct bands which never completely disappear, although are rarely visible in adults except in clear water. Mature adults are generally dark, with lighter tan or grey areas. The belly is creamy yellow to white in colour, except the tail which tends to be greyer on the underside nearer the tip. Dark bands and stripes are present on the lower flanks, but do not extend onto the belly region.

The saltwater crocodile has a total of 64 to 68 teeth.

### *Habitat*

As its name implies, this species has a high tolerance for salinity, being found in brackish water around coastal areas and in rivers. However, it is also present in freshwater rivers, billabongs and swamps. Movement between different habitats occurs between the dry and wet season, and

as a result of social status - juveniles are raised in freshwater areas, but eventually sub-adult crocodiles are usually forced out of these areas (used for breeding by dominant, territorial adults), into more marginal and saline areas. Subordinate animals unable to establish a territory in a tidal river system are either killed or forced out into the sea where they move around the coast in search of another river system.



*Australian saltwater crocodile (Crocodylus porosus)*

#### *Diet*

Saltwater crocodiles take a wide variety of prey, although juveniles are restricted to smaller items such as insects, amphibians, crustaceans, small reptiles and fish. The larger the animal grows, the greater the variety of items that it includes in the diet, although items include crustaceans (eg mud crabs) and vertebrates (eg turtles, goannas, snakes, shore and wading birds). Large adults occasionally take much larger prey include buffalo and domestic livestock, wild boar, monkeys etc.

#### *Breeding*

Breeding territories are established in freshwater areas. Females reach sexual maturity at lengths of 2.2 to 2.5m (10 to 12 years old). Males mature later (3.2m, at around 16 years old). 40 to 60 eggs are usually laid (can range from 25 to 90) in mound nests made from plant matter and mud. These are constructed between the months of November and March during the wet season - this serves to raise the eggs above the ground to help prevent losses due to flooding. Many nests are still flooded every year, however, killing all the unhatched embryos. Alternately, if the nest is in danger of getting too dry, the female has apparently been observed to splash water onto it from a purpose-dug, adjacent pool. Although the female stays near the nest, some eggs do fall foul of predators (eg monitor lizards and feral wild pigs) and human egg collectors. Juveniles hatch after around 90 days, although this varies with nest temperature. The female digs the neonates out of the nest when they start their characteristic chirping sounds, assisting them to the water by carrying them in her mouth. Much research has been carried out

into Temperature-dependant Sex Determination in this species, which is of value for captive breeding programs to ensure the correct sex ratio, or to produce faster growing males for farming purposes. The highest percentage of males are produced around 31.6°C, with more females a few degrees above and below this. It is estimated that less than one percent of hatchlings will survive to reach maturity, given predation (eg turtles, goannas) and social pressures (territorial males will kill and eat juveniles - they are one of the main limiting factors in population growth along with competition).


#### *Conservation*

Many species of crocodiles are falsely viewed as man-eaters, but fear of this species is not unfounded, with a number of people injured or killed each year, although in most cases these tragedies can be avoided with increased awareness. However, loss of life has led to a degree of antipathy towards the species, making conservation measures more difficult to implement.

Given its relatively wide distribution, control of trade can be very difficult. The commercial value of the hide is very high (the most valuable of any crocodile species). Unregulated hunting mainly between 1945 and 1970 caused a dramatic decline throughout the range of the species. This has been controlled, but threats from habitat destruction still exist. Protection is often ineffective and, while illegal trade is relatively insignificant now for this species, killing due to fear is becoming an increasing problem.

Australia has been the centre for most of the extensive research carried out on this species, and several model breeding and conservation programs exist. It is estimated that there are at least 100,000 to 150,000 crocodiles in the northern three states of Australia (Western Australia, Queensland and Northern Territory where the largest population base exists), so the problem has now shifted to one of persuading landowners and public alike of the value of the species which is otherwise only seen as destructive.

Sustainable use programs have been implemented in the Northern Territory, and have proven to be highly successful in giving people an incentive to preserve not only the crocodiles but, more importantly, the habitat which supports them. These primarily involve collection of eggs from wild nests, with payment for the eggs being given to the landowners. The hatchlings are then sold to crocodile farms for raising and skin production. Extensive surveys are conducted with the harvesting, which has demonstrated no detectable impact of the harvesting program on population growth. A trial harvest of wild, adult crocodiles involving aboriginal communities was started in 1997 - the first time crocodiles had been legally hunted in the



Northern Territory for 26 years. Some discussion of safari-style hunting is now taking place, directed by traditional Aboriginal landowners, but such program are yet to be implemented.

Although populations are recovering in some areas, others are less positive. Habitat destruction and illegal hunting can be major problems. Feral buffalo populations have destroyed nesting habitat in the Northern Territory, although feral eradication programs have reduced this problem considerably.

The future of the species seems to be very secure at the moment, given the large population bases in Australia and Papua New Guinea. However, it is likely that the range of the species will be severely reduced through extirpation of many small populations in various countries unless management programs can be implemented, or more effective control and protection set up. The idea of sustainable use remains controversial, yet it has been clearly demonstrated to be effective in the conservation of this species. The only areas where the species is likely to disappear are those where proper management and conservation programs do not sufficiently protect the wild populations.