

FROGS

of Western Australia

by David Pearson, Carolyn Thomson-Dans
and Grant Wardell-Johnson.



Department of
Parks and Wildlife



INTRODUCTION

There is something very special about frogs that captures our imagination. Perhaps it is their other-worldly appearance—large eyes, large feet and that enormous mouth. Maybe it is their soft, often colourful loose skin and a patient but curious gaze? Frogs are vertebrates like us, but are grouped together in the Class Amphibia, derived from Greek *amphi* meaning ‘of both kinds’ and *bios* meaning ‘life’ in reference to their most common reproductive strategy of starting as an aquatic egg and juvenile before venturing onto land for their adult life.

Despite their dependence on moist environments, frogs have successfully adapted to live in habitats ranging from deserts to high mountains and in all continents except Antarctica, as well as many islands.

Australia has a remarkable number and variety of frogs. More than a third of Australia’s total frog species occur in Western Australia, with more than half of these found only in WA. The state’s 80 plus frog species have a fantastic array of shapes, sizes, life histories and mating calls. Not all of them could be described in this book. A selection of frogs has been included that either live in the metropolitan area; are representative of particular regions or groups of frogs; or are of special interest due to their unusual habits or their rarity.

LIFE HISTORY Each species of frog has a different call. In the breeding season, male frogs emit a loud advertisement call that serves to attract a mate and to alert other males to their presence. Female frogs that are ready to mate respond to the calling male and move towards the source of the noise. The biggest and loudest males generally call from the most suitable places for egg-laying. When the female locates the male, mating occurs and the eggs are laid. Male frogs often have extra pads on their forefeet to enable them to hang on tight to the top of females during the mating process, called amplexus.



Photo — David Pearson/DFaW

A green tree frog emerging from its day-time shelter.

All frogs are carnivorous, most catching their prey with a sticky extendible tongue attached to the front of the lower jaw. All small frogs predominantly eat insects, but also consume mites, snails, earthworms and spiders. Larger frogs may eat scorpions, centipedes and sometimes other frogs or even lizards. Anyone who has kept frogs in captivity, for even a short time, will know that it is essential to separate large ones from small ones because of the risk of cannibalism. This is also common in their natural habitats. Feeding habits of frogs change dramatically during their life cycle. While tadpoles are mostly herbivorous, grazing on algae, adult frogs are active predators, which feed opportunistically on animals they encounter or that move past them.

FINDING FROGS A night-time expedition to a dam or creek at any time of the year may reward you with a chorus of calling frogs. A torch will help you to locate calling frogs.

Frogs should always be handled with care. They have moist, glandular skins through which they breathe. Some also secrete toxic mucous onto their skin, to help protect them from predators. These toxins may prove irritable to people, especially if they come in contact with the eyes or mouth. A useful reference for identification is a *Field Guide to Frogs of Western Australia* (Tyler and Doughty 2009, WA Museum).

FROG-FRIENDLY GARDENS Gardens can easily be made more frog friendly. Species native to the local area may well make your garden their home if you provide or conserve suitable habitats. They may also help in pest control and provide a year-round chorus that reflects the changes in season. A garden suitable for frogs will also be suitable for a wide variety of other wildlife. The WA Museum produces an excellent handbook *Building frog friendly gardens* (Aplin, Piano and Sleep, 2009) and Kevin Casey's book *Attracting frogs to your garden* (Envirobooks, 2001) is a valuable resource.

Generally, frogs prefer damp places, so shade and moisture will encourage many species. A pond will always encourage frogs, particularly the motorbike frog. A pond is readily built and need not be a breeding site for mosquitoes, particularly if other animals, such as frogs, are present. An inexpensive but attractive pond can be made from black plastic and bricks or old tyres, with rocks and reeds at its edge to hide the construction materials. Of course, construction materials should not be taken from the bush, where they are already somebody else's home. If you live near a swamp, most of the local species will rapidly appear in your garden if you make suitable changes.

While most breathing is via the lungs, frogs are also able to undertake gas exchange through the skin. Their skin needs to be moist, so that oxygen can diffuse throughout it, and be picked up by the blood circulating just underneath.

If exposed too long to a dry atmosphere, water will evaporate from the body, and the frog will dry out and ultimately die. Their permeable skin means that frogs are also particularly susceptible to pesticides and other chemicals. A healthy garden is most easily achieved by no or minimal use of chemicals.

Providing abundant shelter sites will encourage many species of frogs (and also invertebrates). More invertebrates will lead to more frogs, and diversity in the system will reduce the need for continued intervention (such as spraying to remove pests). If logs and stones are turned over when searching for frogs in the garden or other places, they should be replaced so that their refuges are not destroyed.



Photo – David Pearson/DPaW

Above: A male long-footed frog inflates its throat during calling.

NORTHERN SANDHILL FROG

(*Arenophryne rotunda*)

One of the strangest creatures along the Mid West coast of WA is the rotund northern sandhill frog, which spends most of its days buried in sand dunes in the Shark Bay region. It is one of very few frogs that lives its entire life out of water.

DESCRIPTION Sandhill frogs are thickset with very short legs and toes, and the skin around the hind legs is very loose. They vary in colour from off-white to cream, but may darken on their dorsal surface rapidly to a grey or brown colour. Their bodies are spotted with green, brown or red. These diminutive animals weigh only two to eight grams and range from 2.6 to 3.3cm long, with females larger than males. The eyes are small on a blunt rounded head. They burrow into sand headfirst in contrast to all other Australian frogs except the southern sandhill and turtle frogs.

DISTRIBUTION This species is confined in a relatively small area in Shark Bay, including Edgeland Peninsula and Dirk Hartog Island.

PREFERRED HABITAT It lives entirely in sand hills, in a burrow 10cm below the surface.

LIFE HISTORY The sandhill frog emerges to feed on ants and other insects when it rains, or when there is night dew. It does not have tadpoles. Young frogs hatch directly from clutches of large creamy-white eggs laid in moist sand, some 80cm below the surface.

RELATED SPECIES The southern sandhill frog (*A. xiphorhyncha*) was recognised as a distinct species in 2008. It occurs further south in the Kalbarri National Park area and adjoining inland areas. Its eyes and snout are smaller but its forelimbs are larger than those of the northern sandhill frog, perhaps reflecting the coarser sands in its habitats. The upper surface of the southern sandhill frog is creamy yellow to dark brown, with red flecks and a pale stripe along the back.



Photo – Jiri Lochman

Above: Northern sandhill frog.

Below: Southern sandhill frog.



Photo – Mark Cowan

QUACKING FROG

(*Crinia georgiana*)

This common frog is the largest species of *Crinia* but is still tiny. *Crinia* species can be difficult to distinguish because of colour and skin texture variations. To identify them, a range of factors including location, call and the extent of dark belly patterns needs to be considered.

DESCRIPTION The quacking frog grows to a maximum length of 4.4cm. The back varies greatly in colour and pattern, but there is always a bright red patch on the thighs and groin and the upper eyelids are yellow or reddish. Like other members of the genus it has long, unwebbed fingers and toes. Males often have a white dot on the armpit.

OTHER NAMES Red-thighed froglet.

DISTRIBUTION The quacking frog is patchily distributed on coastal plains in and around clayey ephemeral swamps. It is common in the Darling Range and in the forests of south-western Australia from near Jurien Bay to east of Esperance.

PREFERRED HABITAT It lives in the vicinity of temporary swamps, streams, forest gullies and in other moist habitats such as under granite rocks and logs.

LIFE HISTORY The species has a prolonged breeding season, with most activity occurring between July and October. Its reproductive behaviour is unusual. Males congregate around shallow water, and call to attract females. Particularly favourable sites are found around granite outcrops in the Darling Range. Females are attracted to a chorus of mating frogs and select a mate. Often during mating, several males may embrace the female to attempt to fertilise her eggs. The large arms of the males are used to wrestle for position and a writhing ball of frogs may form. Between 90 and 300 eggs are released, then fertilised externally by the males releasing sperm over them.

CALL A short and loud quack, quack, quack.



Photo – Mark Cowan

RATTLING FROGLET

(*Crinia glauerti*)

This tiny frog was named after Ludwig Glauert, a British-born zoologist who migrated to Perth in 1908 and worked as a curator and director for many years at the WA Museum. He described a number of new species of frogs and lizards.

DESCRIPTION Rattling froglets have long, unwebbed fingers and toes. The species is varied in colour, but there are often reddish lines along the thighs. The skin on its back may either be smooth or ridged and wart-like with a pattern of lines and patches of grey, brown or white. These frogs are very small, with a maximum length of just 2.4cm. Females always have black markings on their underside, and males have a black throat and often a white dot on the armpit.

OTHER NAMES Glauert's froglet, clicking froglet.

DISTRIBUTION This species is found on coastal plains and in the forests of south-western Australia, from near Jurien Bay to Fitzgerald River National Park.

PREFERRED HABITAT The rattling froglet inhabits permanently moist areas. During dry conditions in summer it burrows down to damp soil.

LIFE HISTORY This frog is an opportunistic breeder after rains at almost any time of year except for the height of summer. Eggs are laid singly in still pools and sink to the bottom. After the tadpoles emerge, they take at least three months and sometimes up to five months to metamorphose into frogs.

CALL The call is a long, hollow rattle or clicking, similar to a pea shaken in a can.



Photo – Babs & Bert Wells/DPAW

SQUELCHING FROGLET

(*Crinia insignifera*)

This species is very similar to the bleating froglet and the two hybridise along the base of the Darling Scarp. They can be distinguished on the basis of their different calls.

DESCRIPTION The squelching froglet may be plain grey, brown or black, or a mixture of those tones. The dorsal surface can be smooth, bumpy or even ridged. There is often a dark triangular patch on the top of the head between the eyes. Females can grow up to three centimetres long, but males reach no more than 2.3cm in length. Its legs often have dark barring, and the abdomen is blotched with irregular black or grey markings. The fingers and toes are long and unwebbed.

OTHER NAMES Little froglet, sandplain froglet.

DISTRIBUTION The squelching froglet is found only on the coastal plain, from near Jurien Bay to Busselton, and on Rottnest Island.

PREFERRED HABITAT This frog inhabits temporary swamps, seasonally wet areas, as well as permanent rivers and streams.

LIFE HISTORY Squelching froglets breed in winter, laying their eggs singly in still pools which then sink to the bottom. The tadpoles take up to five months to develop into frogs.

CALL The call can be described as a squelch, rather like drawing a wet finger over a balloon.

RELATED SPECIES The bleating or granite froglet (*C. insignifera*) is very similar but the call is a high-pitched wavering 'baa, baa' of three to four notes like a bleating sheep. This species tends to occupy different habitats than the squelching froglet, being found throughout the south-west region but usually associated with granite areas from near Kalbarri, through the Wheatbelt to near Esperance. It usually breeds in winter. Eggs are laid in water or in waterlogged soil. The tadpoles take up to 130 days to develop into frogs.



Photos – Babs & Bert Wells/DPAW

GRANITE FROGLET

(*Crinia pseudinsignifera*)

While the granite froglet is very hard to tell apart from the squelching froglet, they occupy mutually exclusive areas. The granite froglet is completely absent from the Swan Coastal Plain, which is the only place the squelching froglet is found.

DESCRIPTION Granite froglets may be exquisitely patterned, with toning closely resembling the appearance of layered rocks. Some individuals, however, have a simple colouring of grey, brown or black. There is often a dark triangle on the top of the head. Wart-like protuberances and ridges may or may not be present on the back, but the belly invariably has a granular texture. Fingers and toes are long and unwebbed. Granite froglets may reach 2.5cm long.

OTHER NAMES Bleating froglet.

DISTRIBUTION Granite froglets are distributed across a wide area of the south-west, from Kalbarri to east of Esperance, and also occur well inland. They are not, however, found on the Swan Coastal Plain, due to the lack of granite outcrops.

PREFERRED HABITAT As their name suggests, these tiny creatures are restricted to areas of granite, living near the base of outcrops, which are well watered due to runoff.

LIFE HISTORY The eggs are laid in water or waterlogged soil, one at a time. The tadpoles too may survive in waterlogged soil and take up to 130 days to develop into frogs.

CALL The call, a 'baa, baa, baa', is highpitched.



Photos – Jiri Lochman

WATER-HOLDING FROG

(*Cyclorana platycephala*)

This rotund creature is adapted to survive the long dry periods of the arid areas in which it lives. For most of its life, it dwells below ground in chambers, excavated up to a metre deep in the desert soil. The chambers hold water, retained by an impervious lining. Water is also stored in the frog's bladder.

DESCRIPTION This burrowing species has a rounded body and a flattened rounded head, with small eyes. Adults are between four and seven centimetres long, with females larger than males. It tends to be grey, brown or green above, with grey or green flecks on its upper body and pale beneath. The skin is smooth, with a few flattened glands on its back. Toes are fully webbed. The tadpoles too are large, up to 7.5cm long.

DISTRIBUTION The water-holding frog is found across the arid centre of Australia and in all of the mainland states except Victoria. In WA, it occurs from North West Cape south to Morawa and east through the desert.

PREFERRED HABITAT Temporary claypans, swamps and seasonal creeks.

LIFE HISTORY On the irregular occasions when it rains in the arid areas, usually when a cyclone pushes inland, the water-holding frog emerges to breed in temporary pools or watercourses. Eggs are laid in large masses numbering up to 1700. Development of tadpoles is typically rapid so that metamorphosis is completed before pools dry up.

CALL This has been described as a drawn out snoring 'mawwww, mawwww'.

RELATED SPECIES The sheep frog (*C. maini*) also occurs across the arid middle of WA and into the Northern Territory and northern South Australia in contrast to the other Western Australian species of *Cyclorana* that occur in the wetter tropics. It is also

Photo – Babs & Bert Wells/DPAW



Above: *Water-holding frog.*

Below: *Sheep frog.*

Photo – Mark Cowan



rotund with a dull grey to brown back with darker brown or olive markings. The limbs are short, fingers unwebbed and toes half-webbed. Its call has been described as like the bleating of sheep or an ambulance siren.

GIANT FROG

(*Cyclorana australis*)

This tropical species is one of the largest ground-dwelling frogs in Australia which, along with its usually brown colour, results in it often being mistaken for a cane toad. It is an active predator and is often sighted on roads.

DESCRIPTION The giant frog is a burrowing large frog with a solid body and muscular limbs. Males grow up to 8.5cm long and females up to 10.2cm. The upper surface is variable in colour, most typically pale brown or grey but some are also bright green. The head is triangular and the eyes are large. Two raised skin folds run down the flanks of this frog and there is a dark stripe from the snout tip through the eye to behind the tympanum (ear). Fingers are unwebbed and the toes are long with minimal webbing.

DISTRIBUTION The giant frog is distributed across northern tropical Australia. In WA it is predominantly found in the Kimberley region but it does extend into the northern edge of the Pilbara and down onto the northern edges of the Great Sandy and Tanami deserts.

PREFERRED HABITAT Seasonally flooded grasslands, creeklines and wetlands.

LIFE HISTORY During the dry season, it remains inactive in a burrow up to a metre below the soil surface. It is an explosive breeder at the onset of the first wet season rains, with the males forming large, noisy choruses. Females can produce up to 1000 eggs in newly formed pools. The tadpoles form large schools like cane toad tadpoles, but the giant frog tadpoles are cream rather than black. It feeds largely on other frogs as well as insects and spiders.

CALL A loud 'whoark' that, in a large chorus, sounds like honking



Photo – David Pearson/DPAW

geese.

RELATED SPECIES Several other smaller *Cyclorana* occur in the Kimberley region although they are not as widely distributed as the giant frog. The hidden-ear frog (*C. cryptotis*) lacks a visible ear and its call is a repetitive 'wwoarr'. The knife-footed (*C. cultripes*) and wailing frog (*C. vagitus*) are similar in appearance although the wailing frog is generally larger and the call is a repeated 'waaa, waaa' like an infant's cry. The knife-footed frog makes a short harsh call. The long-footed frog (*C. longipes*, see photo on page 5) is strongly patterned.

WHITE-BELLIED FROG

(*Geocrinia alba*)

The white-bellied frog was discovered in 1983 in the jarrah forest of Leeuwin-Naturaliste National Park. It is classed as threatened, and a recovery plan was prepared with actions to conserve its habitat and bring it back from the brink of extinction.

DESCRIPTION As the name suggests, the underside of this frog is white, or pale yellow, and smooth. The back is light to dark brown, with a series of raised dark spots in distinct rows. Adults grow to no more than 2.4cm in length.

DISTRIBUTION White-bellied frogs are confined to a few sites between Margaret River and Augusta. Their known distribution is an area of about 130skm. However, within this area, sites with suitable habitat cover just 1.9skm.

PREFERRED HABITAT They shelter in damp peaty sites in tea tree swamps. Clearing of native vegetation for agriculture has left few swamps suitable for white-bellied frogs and many of these are privately owned and at risk of being cleared in the future. Protection of habitat is essential for the frog's survival, including the exclusion of summer and autumn fires. The Department of Parks and Wildlife's purchase of a 1570-ha block of private land, south-east of Margaret River, has helped to improve its conservation outlook. The land provides habitat for 30 per cent of known populations.

LIFE HISTORY Males call from small clay depressions in spring to early summer, with peak activity in September and October.

CALL Males make a series of short clicks, each click like the sound made by pulling your tongue from the roof of your mouth. There are about 15 clicks in each burst.

Photo – Grant Wardell-Johnson



RELATED SPECIES The ticking frog (*G. leai*) is more widely distributed, occurring in steams and swamps across the south-west region from Dandaragan to near Albany and inland to the Porongurup Range. It is small (less than 2.6cm long) and has a brown to yellowish smooth upper surface with a darker patch bordered with white, or irregular yellow markings. Its belly is greenish and the male call is a high-pitched rapid burst of notes followed by 'tick, tick, tick'.

WALPOLE FROG

(*Geocrinia lutea*)

The Walpole frog was described in 1963, but it is still only known from a small area near Walpole.

DESCRIPTION The back is smooth and grey-brown with darker stripes on the flanks. The belly is yellowish with irregular darker spotting, and pink spots may be found around the groin and thighs. Males have a distinctive black chin. They are no bigger than a thumbnail, reaching just 2.3cm in length.

DISTRIBUTION This frog is found only at sites within a 12-km radius of Walpole, but is common within this range.

PREFERRED HABITAT Peaty soils and forest leaf litter along creeklines.

LIFE HISTORY Males make tunnels in mud under thick vegetation and call to females. Between 25 and 30 eggs are deposited in a jelly mass in these tunnels and they display direct development: the eggs hatch and develop in the jelly, living on yolk in the gut. They never feed, and metamorphose into frogs without ever entering water.

CALL An incessant 'tk, tk, tk'.

RELATED SPECIES The roseate frog (*G. rosea*) is also found in south-west jarrah and karri forests between Margaret River and Walpole. It prefers densely vegetated streams with clay soils. It is tiny (to 2.5cm long) with smooth skin. The back is grey or brown with a darker dorsal stripe. The belly is usually pink or red and males have a black chin. It also displays direct development with up to 32 eggs placed in small depressions in moist soil or under leaf litter. The call is very similar to that of the Walpole frog.

Photo – Grant Wardell-Johnson



ORANGE-BELLIED FROG

(*Geocrinia vitellina*)

The orange-bellied frog is a threatened species. It has the most restricted distribution of any vertebrate known from mainland Australia. A recovery plan is underway to bring this species back from the brink of extinction.

DESCRIPTION This tiny species is very distinctive. The front half to two thirds of the underside is bright yellowish-orange (hence the name *vitellina*, meaning the 'colour of an egg yolk'). Like the other geocrinias, this species is no bigger than a thumbnail.

OTHER NAMES Yellow-bellied frog.

DISTRIBUTION The orange-bellied frog is confined to a very small area within State forest to the north of the Blackwood River, north-east of Augusta. Within its total range of only six square kilometres, there are few areas suitable for breeding and these occupy just 0.2skm.

PREFERRED HABITAT The males call from moist ground that may be very close to streams. They are usually well hidden among vegetation. The habitat of this frog harbours many unusual species, including the distinctive locally endemic giant rush (*Reedia spathacea*) and previously unknown aquatic invertebrates.

LIFE HISTORY Males call in spring to early summer, with peak activity in September and October. Orange-bellied frogs do not have a free-swimming tadpole stage. The eggs are laid in moist depressions, hidden beneath litter or dense vegetation. After hatching, the tadpoles remain in the jelly surrounding the eggs until they metamorphose into frogs.

CALL Males make a series of short clicks, like the sound made by pulling your tongue from the roof of your mouth. The call is similar to that of the white-bellied frog, but there are only about 11 clicks in each burst (compared to about 11 to 18 very rapid clicks in the white-bellied frog). The clicking is only just slow enough to count and changes with temperature; warmer frogs call faster.



Photo – Grant Wardell-Johnson

SPOTTED BURROWING FROG

(*Heleioporus albopunctatus*)

The spotted burrowing frog was the first *Heleioporus* species described in 1841 by prolific English zoologist John Edward Grey. The origin of *Heleioporus* is unclear but is probably derived from the Greek words *helios* (sun) and *poros* (holes) on account of the spotted pattern of this species. Five of the six Australian species of *Heleioporus* occur in south-west WA.

DESCRIPTION Spotted burrowing frogs are quite large and robust. The upper body is dark chocolate-brown with the colour becoming paler on the limbs and lower body. White, cream or pale yellow spots cover the dorsal surface and the limbs. These frogs reach up to 10cm long, with females larger than males. Adult breeding males have one large and two smaller black (nuptial) spines on the first finger used to hold onto the female during mating.

OTHER NAMES Western spotted frog.

DISTRIBUTION It is found throughout the Wheatbelt and the Goldfields in areas of relatively low rainfall. It occurs north to near Kalbarri and almost east as far as Jerramungup. Near Perth, spotted burrowing frogs are absent from the Swan Coastal Plain, but occur in the Darling Range, where they are known to hybridise with the moaning frog (*H. eyrei*).

PREFERRED HABITAT Spotted burrowing frogs live along ephemeral creeks, in swamps, temporary watercourses and around the edges of claypans. They burrow into banks or under stones and emerge following suitable rainfall.

LIFE HISTORY Up to 700 eggs are laid in a burrow within a foam nest.



Photos – Babs & Bert Wells/DPaW



The tadpoles emerge in 10 to 40 days, when the burrow is flooded. They are an iridescent gold colour on their upper bodies, finely spotted with black.

CALL Spotted burrowing frogs make a rapid, high-pitched, repeated ‘coo’ at a rate of slightly faster than once per second.

HOOTING FROG

(Heleioporus barycragus)

In contrast to the related spotted burrowing frog, the hooting frog was described some 126 years later in 1967. Its specific name, *barycragus*, means 'deep-voiced'.

DESCRIPTION The hooting frog has a rounded body, prominent eyes and a blunt snout. It is light chocolate to grey in colour and has numerous yellow spots or blotches on its sides, which have a wart-like texture. In some cases, small black spines are present in the middle of each spot on the flanks. When they are breeding, adult males have a black spine on their first finger and smaller spines on the first and second finger. Adults may reach 8.6cm long. Like other members of the genus *Heleioporus*, the species has short limbs of unwebbed fingers ideal for digging, and partially webbed toes.

OTHER NAMES Yellow-flanked frog or western marsh frog.

DISTRIBUTION Hooting frogs have a relatively small distribution, occurring through the Darling Range from Bullsbrook south to Darkan and as far inland as Northam and Dryandra in the Wheatbelt.

PREFERRED HABITAT This species lives in forests on rocky or clayey soils close to winter-flowing watercourses.

LIFE HISTORY The large eggs are laid in autumn in a shallow tunnel made by the male in the side of a near-vertical bank. The tadpoles emerge after the nest is flooded.

CALL For a sizeable frog, its call is relatively soft, low-pitched and repeated slowly, resembling the call of an owl.



Photo – Mark Cowan

MOANING FROG

(Heleioporus eyrei)

The moaning frog is common around Perth, and is also widespread in the lower south-west. It can make itself unpopular, when it calls from beneath houses late into the night upsetting the sleep of its human inhabitants. Its calls, however, are welcomed by gardeners in autumn, for they herald the arrival of winter rains after the long dry summer. It was named in honour of the explorer Edward Eyre who was the first European to cross the Nullarbor in 1841 and noted this species in his journal.

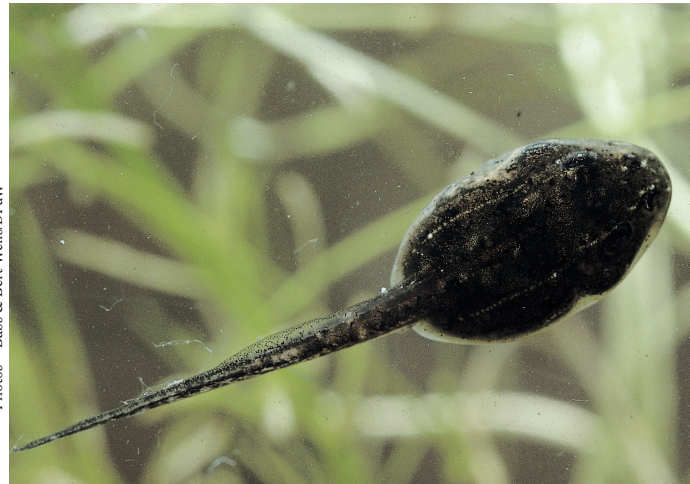
DESCRIPTION This rotund animal has large eyes and relatively slender limbs. Its back is dark grey or brown and interspersed with patches of yellow. The flanks are decorated with numerous small white spots. Its throat is white. Unlike other members of this genus, breeding males lack nuptial spines on the first or second fingers. Moaning frogs grow up to 6.6cm long.

DISTRIBUTION Moaning frogs are found in the south-west between Geraldton and Cape Arid National Park, but do not extend far inland. They are abundant on the Swan Coastal Plain around Perth and also occur on Rottnest Island.

PREFERRED HABITAT This species likes sandy soils near streams and swamps that are flooded during winter. It lives in suburban gardens with appropriate habitat.

LIFE HISTORY Moaning frogs lay clutches of 80 to 500 eggs in a foam nest in an angled burrow on a flat site. The eggs hatch in the foam and, after the burrows flood with the early winter rains, the tadpoles swim free.

CALL Males call from their burrows in autumn, making a long and rising moan.



Photos – Babs & Bert Wells/DPAw

WHOOPING FROG

(*Heleioporus inornatus*)

The whooping frog is relatively plain in colour compared to the other *Heleioporus* species as apparent from its scientific name *inornatus* meaning 'unadorned'.

DESCRIPTION It is stout with short muscular limbs and protruding eyes. The body is coppery brown in colour without pattern or mottled faintly with white, yellow or grey. The fingers of this species are not webbed, whereas its toes are only partially webbed. Breeding males have one or two small black spines on the first finger. Adults reach up to 7.3cm long.

OTHER NAMES Plain frog, chocolate burrowing frog.

DISTRIBUTION Near Perth, whooping frogs are confined to the Darling Range from Chidlow, extending south to the Leeuwin-Naturaliste region around Margaret River and around the southern coast almost to Albany.

PREFERRED HABITAT The whooping frog lives in low-lying sandy or peaty bogs often where grass trees are growing.

LIFE HISTORY It breeds in autumn before winter rains. Between 100 and 250 large, pale yellow eggs are laid in a foam nest down a 20 to 40cm burrow excavated in a steeply sloping bank. Tadpoles emerge when the burrow floods.

CALL Its call is a loud and repetitive 'whoop, whoop'.

RELATED SPECIES The sand frog (*H. psammophilus*) is light to dark brown or grey on the back with irregular white or grey mottling. It grows up to 6.2cm long and occurs from Geraldton to Jerramungup. Around Perth, they are found on the Swan Coastal Plain and the western edge of the Darling Range. Like other *Heleioporus*, eggs are laid in a burrow and tadpoles disperse after winter rains. The call is a short high-pitched 'put, put, put', like a small outboard motor.



Photos – Grant Wardell-Johnson

WESTERN BANJO FROG

(*Limnodynastes dorsalis*)

The western banjo frog lives throughout the south-west, is very robust and has a bright crimson groin. *Limnodynastes* is Latin for 'lord of the marshes'. The males have been seen fighting for calling sites during the breeding season, with the bouts said to resemble those of sumo wrestlers.

DESCRIPTION This frog is distinguished from all other Western Australian species by the large, oval, bulbous gland on the top of each hind limb. There is usually a narrow, pale stripe down its back, hence the name *dorsalis* for dorsal stripe. A dark stripe runs through the eye to the top of its short powerful arms. Mottled markings on the rest of the upper body are a variable mixture of pale to dark brown, olive green and yellow cream. Adults can reach up 7.3cm long, with females larger than males

OTHER NAMES Pobblebonk, bull frog, banjo frog.

DISTRIBUTION It is restricted to WA and is found across the south-western corner of WA, from near Kalbarri to east of Esperance.

PREFERRED HABITAT These frogs call from vegetation alongside swamps and dams in winter and spring. In summer they shelter in burrows away from water. They are often found on roads during wet summer nights, or may be dug up when turning garden soil.

LIFE HISTORY The eggs are laid on still or slowly flowing water in a foam nest. The large black tadpoles are up to 6.5cm long and have deep tail fins.

CALL This frog makes an unmistakable loud, deep, explosive 'bonk'.

RELATED SPECIES Three species of *Limnodynastes* are found in the Kimberley region. The marbled frog (*L. convexiusculus*) is stout, is olive in colour and forms loud honking choruses in swamps and grasslands flooded by wet season rains. The carpenter frog (*L. lignarius*) prefers rocky areas and has a soft tapping call like a



Photo – Babs & Bert Wells/DPaW

Above: *Western banjo frog.*

Below: *Marbled frog.*



Photo – David Pearson/DPaW

hammer striking wood. The flat-headed frog (*L. depressus*) is only known in WA from the far east Kimberley near Kununurra where it occurs in swamps and flooded grassland. Its call is a quiet trill of around seven notes repeated rapidly.

SLENDER TREE FROG

(*Litoria adelaidensis*)

The genus *Litoria* (loosely called tree frogs) includes about 70 species of frogs in Australia and many more in other countries to the north. About 20 species occur in WA, primarily in tropical areas, but several species are found in the south-western corner of the state. The slender tree frog is one of the smaller species and, despite its scientific name, it does not occur in Adelaide. When describing the species in London, zoologist John Edward Grey believed the specimens to have come from that city.

DESCRIPTION This long, slender frog can be brown, green, or brown with large green patches. Small red, orange or yellow spots are sprinkled across the back of the thighs. On each side of the body there is usually a broad dark stripe, with a narrower white stripe below. The skin is smooth. The fingers have no webbing, while the toes are webbed. Adults grow up to 4.7cm long.

DISTRIBUTION It has been recorded in the south-western corner of WA, from Port Gregory to Bremer Bay, and also from Esperance to Mount Ragged in near-coastal areas.

PREFERRED HABITAT This species lives in areas with still or slow-moving water adjacent to dense vegetation, often in gardens. They can sometimes be seen in the day-time, clinging to sedges or bulrushes.

LIFE HISTORY These frogs are spring breeders, calling from sites in or close to water. The mass of eggs has an irregular shape, and is attached to vegetation growing in water. Distinctive tadpoles (dark brown with two paler stripes extending from the nostrils) hatch and subsequently develop in the water.

CALL Slender tree frogs emit a harsh grating screech, and grunts.



Photo – Mark Cowan

RELATED SPECIES The northern dwarf tree frog (*L. bicolor*) is a tiny species that is found in the Kimberley. It is light green with dark and white stripes running from the snout to the groin. Its preferred habitats are swamps and dense vegetation along slow-moving watercourses where it tends to cling to grass and reeds. The call is a high-pitched 'richetty, reek, reek, reek'.

GREEN TREE FROG

(Litoria caerulea)

Visitors to the Kimberley are likely to encounter this large green tree frog, which is often present in houses, sheds and outside toilets. Raucous male choruses within wall spaces herald the arrival of rain for many Kimberley residents.

DESCRIPTION Green tree frogs are large with females growing up to 11cm long. Prominent glands on the rear of the head and neck partly cover the tympanum (external ear), creating a thick ridge that gives the frog a distinctive flat-topped head. Green tree frogs have smooth, light green skin on the upper surface, sometimes with fine white markings. Parts of the limbs and flanks not seen when the frog is resting, are usually pale yellow. The underside is white. The fingers are partly webbed and the tips have broad and fringed discs which aid climbing. The toes are extensively webbed and also have large discs.

DISTRIBUTION In WA, green tree frogs are largely confined to the Kimberley region. They are found in most other mainland states, including most of the Northern Territory, Queensland and New South Wales.

PREFERRED HABITAT They live in a wide variety of habitats, especially on logs, trees and rocks along watercourses.

LIFE HISTORY This frog congregates to breed in grassy, flooded areas. Females lay 1500 to 4400 eggs from November to March. Tadpole growth is rapid resulting in metamorphosis in just four to five weeks.

CALL The call is a deep and raucous 'wark, wark, wark'.



Photos – David Pearson/DPAW

SPOTTED-THIGHED FROG

(*Litoria cyclorhyncha*)

The origin of this frog's specific name is derived from Greek *cyclo* (circle) and *rhynchus* (snout), a reference to the more rounded snout of this species compared to its close relative the green and golden bell frog of eastern Australia. Genetically, it is very similar to the motorbike frog which occurs along the west coast.

DESCRIPTION It is a very distinctive and attractively patterned frog, covered in bright green blotches edged in gold or bronze on a dark green to brown body. It grows up to 8.6cm in length. The fingers are unwebbed with prominent discs, whereas the toes are webbed with discs. The groin and back of the thighs are black, with numerous pale-yellow spots, which are absent on the motorbike frog. These bright colours on the groin are thought to be an adaptation to startle predators and so enable escape.

DISTRIBUTION The spotted-thighed frog is found along the southern coast of WA, from Albany to Israelite Bay. It extends inland to Broomehill and Ravensthorpe. It is also known from Middle Island in the Recherche Archipelago near Esperance.

PREFERRED HABITAT This species lives near swamps, permanent water bodies, agricultural dams and semi-permanent rock-holes in granite areas.

LIFE HISTORY Little is known about its breeding biology, although calling has been reported in December and January.

CALL The call is a low rising tone followed by a number of growls, described by biologist Bert Main as "like the distant sound of wood being sawn".



Photos – David Pearson/DPaW

MOTORBIKE FROG

(*Litoria moorei*)

The motorbike frog lives in the most populated part of WA so is the most frequently encountered by people in their gardens, ponds, greenhouses or ferneries. The remarkable call of this frog is immediately recognisable for many Perth and south-west town dwellers.

DESCRIPTION This large and robust tree frog has a triangular head, bulging eyes and a prominent ear (tympanum). Its colouration is variable from pale brown or green or pale brown with striking green patches. There is a pale stripe down the centre of the back and a dark stripe through each eye to the forearm. Hind legs are large and strong. The fingers are long and unwebbed, whereas the toes are distinctly webbed. All digits have small terminal discs. Males reach 7.1cm long and females up to 7.8cm long.

OTHER NAMES Bull frog, bell frog, western green tree frog, western green and golden bell frog.

DISTRIBUTION The motorbike frog's range extends from Kalbarri to Cape Riche on the southern coast of WA. Further east, it is replaced by the closely related spotted-thighed frog. The motorbike frog is also found on Rottnest Island and has been accidentally introduced to Kalgoorlie.

PREFERRED HABITAT This species requires sites with permanent water. It is sometimes found in backyard ponds and often shelters beneath bark on trees, underneath rocks or beneath pot plants or timber piles.



Photo - Babs & Bert Wells/DPAW

LIFE HISTORY Breeding occurs in spring to summer. A floating clump of eggs is attached to pool vegetation. Large black tadpoles, with a pointed tail, emerge to develop in pools. Some metamorphose to frogs as late as April, while others remain as tadpoles over winter and metamorphose in the next spring.

CALL In spring, this species calls from water, with a long growling call of broken parts that sounds like a motorbike changing gears followed by growls like a revving engine.

DESERT TREE FROG

(*Litoria rubella*)

The desert tree frog is one of the most widespread frog species in Australia. It is capable of surviving in arid areas and in hot habitats by adopting a tight huddled posture and sheltering in rock crevices or other well-insulated places. Consequently, it is common around houses and especially windmills and water tanks. It is often a hitch-hiker in building materials reaching remote areas and establishing small populations if water is available.

DESCRIPTION The desert tree frog is small (up to 4.3cm in length) and variable in colour. Its dorsal colours are mainly subdued tones of brown to reddish brown, sometimes with darker flecks. However, it does have the ability to change its colour markedly to match its background even changing to white to enable it to sit in direct sunlight. An obvious dark stripe runs along the side of the head and body of this frog species, separating the upper surface from the white, cream or yellow belly. The thighs often have a smattering of fine white spots. The discs on the fingers and toes are large. The fingers have little webbing, but the toes are around three-quarter webbed.

OTHER NAMES Red tree frog, dunny frog.

DISTRIBUTION In WA, it is found from Shark Bay north to the tropics and across the Pilbara and central deserts. In the deserts, however, it is confined to ranges, to larger rivers and lakes or sources of permanent water like windmills. It is present across most of Australia apart from southern areas and Tasmania. It also occurs in New Guinea.



Photo – David Pearson/DPAW

PREFERRED HABITAT The desert tree frog occurs in a great variety of habitats from flooded grasslands and riparian woodlands to around homes, gardens and infrastructure such as windmills and dams.

LIFE HISTORY In the far north, and on the eastern coast, breeding takes place after rains in summer time. Breeding is more opportunistic in arid areas whenever sufficient rains occur. Males call from ground near water. Small circular spawn clumps of 40 to 300 eggs are laid onto still water. The eggs form a film that floats on the water surface. Pale brown tadpoles may develop into frogs in only 14 days, depending on water temperature.

CALL This frog makes a long hard screech. In chorus, desert tree frogs sound like a flock of seagulls congregated outside a fish-and-chip shop.

MAGNIFICENT TREE FROG

(*Litoria splendida*)

The magnificent or splendid tree frog is a striking looking tree frog that occurs in the Kimberley and has a superficial similarity to the green tree frog (*Litoria caerulea*). The magnificent tree frog is the largest Western Australian frog (excluding the introduced cane toad).

DESCRIPTION Males grow to around 10.6cm in length and females are larger, up to 11.8cm long. The body is olive or green, spotted with usually circular sulphur-yellow or white spots. Sometimes these spots are ringed with black. There are enormous protruding parotid glands behind the eyes and over the top of the head. These glands are known to secrete peptides with antibiotic qualities.

DISTRIBUTION It is found across most of the Kimberley to the north and east of Derby and south to the Bungle Bungle Range. It is also found in a small area of the Northern Territory adjacent to the east Kimberley.

PREFERRED HABITAT It is most frequently observed in sandstone caves or on rocks and trees along rocky watercourses. It is occasionally encountered in houses and amenities blocks.

LIFE HISTORY Following heavy wet season rains, males commence calling from rocks several metres from a creekine. Eggs are laid on or beneath the surface of the water. The tadpoles hatch in water. Up to 6400 eggs have been laid by a female in captivity.

CALL The call is a slow, deep bark rising slightly in pitch and it does not form large choruses like the green tree frog.

RELATED SPECIES The cave frog (*L. cavernicola*) only occurs in the north-west Kimberley in caves or trees among massive sandstone boulders—a habitat it shares with the splendid tree frog. It is a uniform green to reddish-brown and grows up to 6cm.



Above: *Magnificent tree frog.*

Below: *Cave frog.*



Photos – David Pearson/DPAW

STRIPED ROCKET FROG

(*Litoria nasuta*)

Rocket frogs have a distinctive shape with slender, elongated bodies and long back legs that enable them to make huge leaps. The striped rocket frog is further distinguished by its protruding, triangular snout and stripes running down the length of its body.

DESCRIPTION The back of the striped rocket frog is brownish with several prominent lighter brown to yellow stripes and the skin is raised into folds. It has large, bulbous eyes, a large, obvious eardrum and a black stripe running from the snout to the forearm. The fingers have no webbing with small discs, while the toes are very long with little webbing. They grow to 5.5cm long, with females being larger than males.

DISTRIBUTION The striped rocket frog occurs across much of the Kimberley, north from Beagle Bay, then eastwards to across the Northern Territory and Queensland and into New South Wales.

PREFERRED HABITAT This species prefers flooded grasslands alongside creeks and swamps, but also occurs in open forest.

LIFE HISTORY Males call in noisy choruses from the base of grass tussocks on the water's edge. Eggs are laid in clumps of 20 to 100 in soaks, waterholes and swamps.

CALL After one or two short notes, a long series of 'wick, wick, wick' sounds are made.

RELATED SPECIES The larger wotjulum frog (*L. watjulumensis*) was named after the Wotjulum Mission on the north-west coast. It occurs across the Kimberley region living along rocky creeklines or flooded grasslands. Its remarkable and complex 'crazy-chicken' call features rapid clucking (three to four per second) for up to 30 seconds, changes in rate and is interspersed with other loud clucks. The bumpy rocket frog (*L. inermis*) is a small species favouring grasslands and small streams in the Kimberley and also has a complex call of a base 'meep, meep' combined with many other notes.



Photo - HD Lochman Transparencies

Above: Striped rocket frog.

Below: Wotjulum frog.



Photo - David Pearson/DPAW

NORTHERN LAUGHING TREE FROG

(*Litoria rothi*)

Northern laughing tree frogs are masters of disguise, able to change colour to match their surroundings and adopt a low rounded posture by day when sitting in trees, logs or rocks. This frog was named after an anthropologist, Henry Roth, who collected the original specimens used in the description of the species.

DESCRIPTION This frog is of moderate size (up to 5cm long) with a flattened appearance. It is typically grey or brown on its upper surface, with a black stripe from behind the eye to near the forearm. However, it can change colour to appear pale cream all over. There are usually concealed black markings on the groin, and black and yellow patches on the thigh. The upper half of the eye's iris is a distinctive rich red. The limbs are long. The fingers and toes have expanded discs and the fingers have broad lateral fringes while the toes are fully webbed.

OTHER NAMES Roth's tree frog

DISTRIBUTION The northern laughing tree frog occurs across the Kimberley from near Broome to coastal Queensland.

PREFERRED HABITAT This species occurs near streams, rivers or swamps, especially where there are trees and pandanus. It is commonly found perched on branches overhanging water from where its loud call carries vast distances. It also frequently seen around houses.

LIFE HISTORY It breeds soon after the first rains of the wet season. Small clusters of eggs are laid on, or beneath, the water's surface in temporarily flooded areas.

CALL The call is a wavering trill that sounds like raucous laughter.

RELATED SPECIES Some other tree frog species are ground-dwelling and live around swamps including the bumpy rocket frog (*L. inermis*) and the pale rocket frog (*L. pallida*).



Photo – Babs & Bert Wells/DPaW

Above: Northern laughing tree frog.

Below: Pale rocket frog.



Photo – David Pearson/DPaW

CHATTERING ROCK FROG

(*Litoria staccato*)

Large areas of the Kimberley region have been little explored for their fauna, especially in the wet season when access is difficult. Consequently, new frog species are still being located and described. One such is the chattering rock frog, initially found at a popular picnic and swimming hole at The Grotto near Wyndham and then subsequently at a number of sites in the north-west Kimberley. Its scientific description was published in 2007.

DESCRIPTION This small slender frog grows to a maximum size of 3.9cm. It has an angular head with bulging eyes. The back is dark red to beige with indistinct stripes and a paler patch on the snout. A dark stripe runs from the snout under the eye and onto the flanks. The fingers are unwebbed with large terminal discs while the toes are webbed with moderately-sized discs.

DISTRIBUTION It is confined to the Kimberley region, where it is known from just a few populations, one near Wyndham and the others in Prince Regent National Park and the Mitchell Plateau in the north Kimberley.

PREFERRED HABITAT It has been found in sandstone ranges and cliffs along watercourses but also in rocky areas far from running water.

LIFE HISTORY Little is known about the biology of this species. Males call from alongside flowing streams in rocky escarpment or near rocky slopes. Eggs are presumably laid in small pools and the tadpoles have adaptations for coping with fast-moving water. They metamorphose in around seven weeks.

CALL It has a complex call, predominantly a high-pitched rapid Morse-code-like chatter interspersed with short trills and chirps.

Photo – Paul Doughty/WA Museum



Above: Chattering rock frog.

Below: Rock frog.

Photo – David Pearson/DPaW



RELATED SPECIES Many other species of *Litoria* occur in the rocky escarpments of the Kimberley. The rock frog (*L. coplandi*) looks similar to the chattering rock frog but has a very different soft and repetitive whirring call. The tiny rockhole frog (*L. meiriana*) is unusual in being very active by day and is commonly found along small watercourses, pools and under waterfalls in sandstone ranges.

TURTLE FROG

(*Myobatrachus gouldii*)

This bizarre species is common around Perth and is frequently sent to the museum as an oddity. Matching its appearance, the lifestyle of the turtle frog is most unusual and an example of extreme ecological specialisation. It is the only member of the genus *Myobatrachus* although further study will probably result in dividing the genus into a number of different species.

DESCRIPTION This frog reaches up to 5cm in length. It has a swollen flattened body that looks out of proportion to its small head with tiny eyes and its short, muscular limbs. Its colouration is a subdued yellow–pink to dark brown. The fingers and toes are unwebbed and stubby. They don't hop, but crawl 'commando-style' when above ground. Colour varies from a pale yellowish brown to dark brown.

DISTRIBUTION Turtle frogs are found across the south-west from Kalbarri National Park to Grass Patch near Esperance, but excluding areas of jarrah and karri in the far south-western corner. Around Perth, they inhabit the Swan Coastal Plain, but are absent from the Darling Range.

PREFERRED HABITAT This species inhabits sandy areas and is often found near termite colonies, on which it feeds almost exclusively.

LIFE HISTORY The turtle frog lives, feeds and breeds entirely underground. During summer thunderstorms it calls on or just below the soil surface. Once paired up, they dig deep burrows and stay together until autumn. Between nine and 38 eggs are laid 0.5 to 1.5m underground. There is no free-swimming larval stage and when eggs hatch, the young are small versions of the adults.

CALL A series of abrupt, deep croaks.



Photo – Mark Cowan



Photo – Babs & Bert Wells/DPaW

HUMMING FROG

(*Neobatrachus pelobatoides*)

Eight species of *Neobatrachus* burrowing frogs occur in WA from the southern edge of the Kimberley to the south coast. They have robust globular bodies with short limbs with unwebbed fingers and partly webbed toes.

DESCRIPTION The back of the humming frog is dull green to yellow-brown with numerous irregular brown or green patches. The skin is covered with tiny raised lumps called tubercules. Typically a fine yellow or red stripe runs down the centre of the head and back. Adults reach a maximum length of 4.5cm.

DISTRIBUTION The humming frog is distributed in a broad band across the south-west, from near Shark Bay south to Israelite Bay, east of Esperance and inland as far as Mount Elvire near Kalgoorlie. It is absent from the lower south-west from Bunbury to Fitzgerald River National Park. This is the only *Neobatrachus* found in the Perth region, where it is common in the Darling Range.

PREFERRED HABITAT Humming frogs inhabit temporary claypans and loamy soils, soakages around granite rocks and farm dams.

LIFE HISTORY Humming frogs breed in temporary claypans, rockholes or farm dams between May and July. The eggs are laid in long strings. For much of their life, they remain deep in the soil in burrows to prevent water loss and conserve energy until the next rains.



Photo: Eabs & Bert Weils/DPAW

CALL The call is a soft low-pitched trill or hum.

RELATED SPECIES The northern burrowing frog (*N. aquilonius*) and the desert trilling frog (*N. centralis*) are found across remote desert areas of WA and display explosive breeding in response to infrequent rainfall, typically from cyclones. They lay large numbers of eggs in shallow flooded areas and tadpole development is rapid in a race to metamorphose to frogs before the pools dry up.

DESERT SPADEFOOT

(*Notaden nichollsi*)

The burrowing frogs of the genus *Notaden* are among the most bizarre and ‘amusing’ frogs on account of their very globular shape, short limbs, very blunt snout and bulging eyes. Four species occur in Australia and three of these are in WA, primarily in the northern tropics, but the desert spadefoot is also found in central sandy deserts. All species have loud calls and secrete a milky viscous substance if handled.

DESCRIPTION A medium-sized round frog growing up to 6.7cm in length. Females are slightly larger than males. While the limbs are short, the fingers and toes are long and pointed with no webbing. The rear foot has a shovel-shaped raised ridge (metatarsal tubercle) which is used for digging. Colouration is variable, but generally the back is orange, brownish or olive-grey over which there are numerous raised lumps called tubercles, giving it a prickly appearance.

DISTRIBUTION It is distributed across much of arid northern WA in the Pilbara, the Great Sandy, Tanami and Little Sandy deserts.

PREFERRED HABITAT It occurs in open arid country especially areas of sandplain and dunefield, typically with spinifex grasslands.

LIFE HISTORY The desert spadefoot remain inactive in a burrow a metre or more below the surface for much of its life, sometimes for longer than a year. Heavy rains coax it to the surface and breeding is rapid in a race against drying pools. Up to 1000 eggs are deposited in shallow flooded areas. The egg and tadpole phases may last just 30 days.

CALL Males form loud noisy choruses floating in shallow water and calling with a distinctive ‘whoop’.

RELATED SPECIES The large Kimberley spadefoot (*N. weigeli*) was only described in 1987 and is restricted to the north Kimberley, where it lives in sandstone areas vegetated by spinifex.



Photo – Mark Cowan

Above: Desert spadefoot.

Below: Kimberley spadefoot.



Photo – David Pearson/DPaW

ORNATE BURROWING FROG

(*Platyplectrum ornatum*)

There are only two species of this genus of burrowing frogs and its uncertain affinities with other frogs have led to several scientific name changes in recent years. They are round-bodied with powerful limbs and enlarged shovel-like lumps at the base of the rear feet, called metatarsal tubercles, to aid with digging.

DESCRIPTION A rotund frog with relatively long limbs, fingers and toes. It grows to a maximum length of 5cm. The back is pale grey, orange-brown or pale brown, sometimes plain or with an intricate pattern of bands or patches. Often the upper lips have strong brown bands and there is a paler 'saddle-patch' between the eyes. A paler vertebral stripe may be present.

DISTRIBUTION Widespread in the Kimberley region and into the adjoining Northern Territory, Queensland and into New South Wales. Its range extends southwards to the northern end of the Great Sandy Desert.

PREFERRED HABITAT It is generally found in grassland areas that are inundated during the summer wet season, although it also occurs along seasonal creeklines.

LIFE HISTORY During the dry season, it lives in burrows below ground, but commences breeding soon after the first heavy rains of the wet season cause localised flooding of grasslands. Up to 1000 eggs are laid in a foam nest in shallow static water that deteriorates quickly leaving a 'slick of eggs'. The resulting tadpoles are small, but develop quickly and can metamorphose in just 25 days.



Photo – Mark Cowan

CALL Males float on the surface of shallow water and make a single note 'unk' which sounds like a dripping tap when in chorus.

RELATED SPECIES The centralian burrowing frog (*P. spenceri*) is similarly robust and occurs through the Pilbara, the Gascoyne, Goldfields and across into the Northern Territory and South Australia. It is found in sandy creek beds and is an opportunistic breeder, typically in response to rains generated by cyclones.

CRAWLING TOADLET

(*Pseudophryne guentheri*)

The scientific name of this tiny species conveys a rich Germanic association. An Austrian herpetologist, Leopold Fitzinger, gave the genus its name, meaning *Pseudo* (false) and *phryne* (a toad but, more particularly, a large warty European toad known to him). George Boulenger, a prolific British zoologist who described more than 550 amphibians, gave it the specific name 'guentheri' after German-born zoologist Albert Günther. This toadlet usually walks rather than hops, hence its common name.

DESCRIPTION Like other species in the genus *Pseudophryne* the body is flattened, the head and eyes are small and the fingers and toes are unwebbed. The dorsal skin of crawling toadlets is mottled grey, brown and orange. The belly is white with black patches. Adults grow to 3.3cm long.

DISTRIBUTION The crawling toadlet is distributed throughout south-western Australia, from Shark Bay in an arc to east of Esperance.

PREFERRED HABITAT It lives in moist areas under rocks, fallen timber and leaf litter.

LIFE HISTORY Breeding occurs in autumn and eggs are deposited in damp tunnels with the male often remaining on guard. Early development occurs in the egg and the tadpoles emerge when tunnels are flooded by winter rain.

CALL The call is a short grating squelch.

RELATED SPECIES The gorge toadlet (*P. douglasi*, see photo on page 72) is marked with vibrant orange markings and is restricted to the Pilbara region, occurring in deep gorges and canyons with permanent water. The western or orange-crowned toadlet (*P. occidentalis*) is widely distributed around low-lying clayey areas in the Wheatbelt and granite outcrops in the Goldfields.



Photos – Babs & Bert Wells/DPaW

SUNSET FROG

(*Spicospina flammocaerulea*)

The Walpole-Nornalup region is a special area for frogs, home to two species found nowhere else. One of these, the sunset frog, is believed to have evolved 30 to 40 million years ago. As well as its distinctive appearance, this species has a call like no other, and is not closely related to any other frogs found in southern WA. Because of the remote area in which it lives, the frog was only discovered in January 1994 and described in 1997.

DESCRIPTION The sunset frog is one of the world's most unusual-looking frogs. It has a brownish-black back with knobby skin and bright orange hands and feet, but the belly is even more dramatic. Half is orange and the other half is covered with striking light blue spots. It grows to about 3.5cm.

OTHER NAMES Harlequin frog.

DISTRIBUTION The sunset frog is known from around a dozen swamps to the east of Mount Frankland. All have deep peat beds and are especially vulnerable to wildfire damage. It is also important to protect the vegetation surrounding the swamps from dieback by ensuring water tables stay at current levels. The tiny range of the species and the susceptibility of its habitat to fire means that it is listed as 'endangered' and a recovery plan has been prepared to guide actions to protect its populations.

LIFE HISTORY The sunset frog breeds in late spring to summer. Males call from small seepages or along creek beds from October to December. Between 50 and 120 eggs are deposited singly in mats of algae in water. The timing of the breeding season is unusual with calling and egg laying occurring in the heat of November.

CALL The call is two notes 'duk duk' repeated rapidly. Calling is strongest on the hottest days—totally unlike any other frog species in WA.



Photos - Grant Wardell-Johnson

NORTHERN TOADLETS

(*Uperoleia* species)

At least 13 species of *Uperoleia* (of about 24 found throughout Australia) are found in WA. Surprisingly, this group is the most closely related frogs to the sunset frog (*Spicospina flammocaerulea*). Generally termed ‘toadlets’, little is known about the distribution and ecology of many species.

DESCRIPTION Toadlets have small heads, squat bodies and short limbs. They have rough, glandular skin. Fingers are unwebbed and the first finger is always shorter than the second. Toes may or may not be webbed. The eardrums (tympanum) are not visible. The back usually has several large glands, particularly behind the head. Most species are 2-3cm in length, although the mole toadlet can reach 4cm.

DISTRIBUTION Ten species are found in the Kimberley region, two in the north-west arid zone—the glandular toadlet (*U. glandulosa*) and Russell’s toadlet (*U. russelli*)—and one in the northern central arid zone—the Tanami toadlet (*U. micromeles*). Some have very small distributions, such as the small toadlet (*U. minima*) just around Mitchell Plateau, and the marbled toadlet (*U. marmorata*), known from just a single specimen collected on the north-west Kimberley coast in 1841.

PREFERRED HABITATS Those toadlets whose biology has been studied live below ground in soil cracks during dry times, emerging when shallow floodplains or grasslands flood.

LIFE HISTORY Since many species live in isolated areas, little is known about their breeding biology. Males of some species, such as the blacksoil toadlet (*U. trachyderma*) have been recorded calling away from water. Others form large choruses around the edge of inundated areas calling from underneath grass tussocks. Those studied lay their eggs in shallow water and produce free-swimming tadpoles.

CALL Calls vary from squelches to the explosive tick of the stonemason toadlet (*U. lithomoda*).

Photo – Babs & Bert Wells/DPaW



Above: Russell's toadlet.

CANE TOAD

(*Rhinella marina*)

This introduced species is well known, indeed notorious, across Australia. Originally released in coastal Queensland in 1935 to control two species of beetles attacking sugarcane, it has now spread across much of northern Australia. In 2009, cane toads began to invade the Kimberley region of WA. Its progress through the western Northern Territory and the east Kimberley was measured at up to 50km a year, depending on the amount and duration of wet season rains. Its progress south has been slower, but it has reached the Port Macquarie area of New South Wales and there is even a population derived from 'hitch-hikers' in a southern suburb of Sydney.

DESCRIPTION A large, flattened and dry-skinned toad. Males grow to between eight and 15cm, but females are larger, from nine to 24cm with the occasional giant kept as a pet growing well in excess of this length and up to 2kg in weight. The skin is rough, more so in males than females. Cane toads are of very solid build with characteristic bony ridges around the eyes and snout. The head is wide and a large parotid gland behind each eye and above the forelimb are conspicuous. The limbs are relatively short with unwebbed fingers and some webbing between the toes. The colour of the back ranges from golden yellow to dark brown usually with little pattern in adults. Juveniles have a complex pattern of darker patches and some barring on the legs. The parotid glands and the skin contain complex cocktails of powerful toxins, bufodienolides, that cause the heart of anything that eats them to beat erratically or stop.

OTHER NAMES It is still often known by its earlier scientific name, *Bufo marinus*. Other common names include marine toad. In an interesting twist, people from Queensland, and especially their football teams, are referred to as 'the Cane Toads'.

Photo—David Pearson/DPAW



DISTRIBUTION The cane toad's natural range is central and south America, but it has spread to a number of other countries with the original intention of controlling sugarcane beetles. It has invaded most of northern Australia including rafting to islands up to 20 kilometres offshore. Its likely final distribution is a subject of some conjecture depending on climate change and the ability of the toad to adapt to cooler and drier conditions.

PREFERRED HABITATS It is remarkably tolerant of a wide variety of climatic conditions and different landscape and vegetation types. In general, it prefers more open habitats such as open grasslands but can be found high into sandstone escarpments along ephemeral creeks and around the margins of mangroves.

LIFE HISTORY The cane toad breeds during the wet northern summer. Males call from static pools, usually with little overhanging vegetation. Huge clutches of small black eggs (some recorded to be more than 30,000) are laid in long gelatinous strings in shallow water. Tadpoles are small (up to 2.7cm) and black in colour. They develop very rapidly and metamorphosis can occur in just one month.

CALL A steady trill that has been likened to the engaged signal of a telephone.

SIGHTINGS RECORD

Species	Date	Locality	Remarks
cane toad			
chattering rock frog			
crawling toadlet			
desert spadefoot			
desert tree frog			
giant frog			
granite froglet			
green tree frog			
hooting frog			
humming frog			
magnificent tree frog			
moaning frog			
motorbike frog			
northern laughing tree frog			
northern sandhill frog			
northern toadlet			

Species	Date	Locality	Remarks
orange-bellied frog			
ornate burrowing frog			
quacking frog			
rattling froglet			
slender tree frog			
spotted burrowing frog			
spotted-thighed frog			
squelching froglet			
striped rocket frog			
sunset frog			
turtle frog			
Walpole frog			
water-holding frog			
western banjo frog			
white-bellied frog			
whooping frog			

INDEX

cane toad	68–69	orange-bellied frog	24–25
chattering rock frog	52–53	ornate burrowing frog	60–61
crawling toadlet	62–63	quacking frog	8–9
desert spadefoot	58–59	rattling froglet	10–11
desert tree frog	44–45	slender tree frog	36–37
giant frog	18–19	spotted burrowing frog	26–27
granite froglet	14–15	spotted-thighed frog	40–41
green tree frog	38–39	snelching froglet	12–13
hooting frog	28–29	striped rocket frog	48–49
humming frog	56–57	sunset frog	64–65
magnificent tree frog	46–47	turtle frog	54–55
moaning frog	30–31	Walpole frog	22–23
motorbike frog	42–43	water-holding frog	16–17
northern laughing tree frog	50–51	western banjo frog	34–35
northern sandhill frog	6–7	white-bellied frog	20–21
northern toadlets	66–67	whooping frog	32–33

Photo – Mark Cowan



Above: *Gorge toadlet.*