

# Rainforest Frogs of the Wet Tropics

north-east Australia



Conrad Hoskin & Jean-Marc Hero

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by

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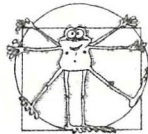
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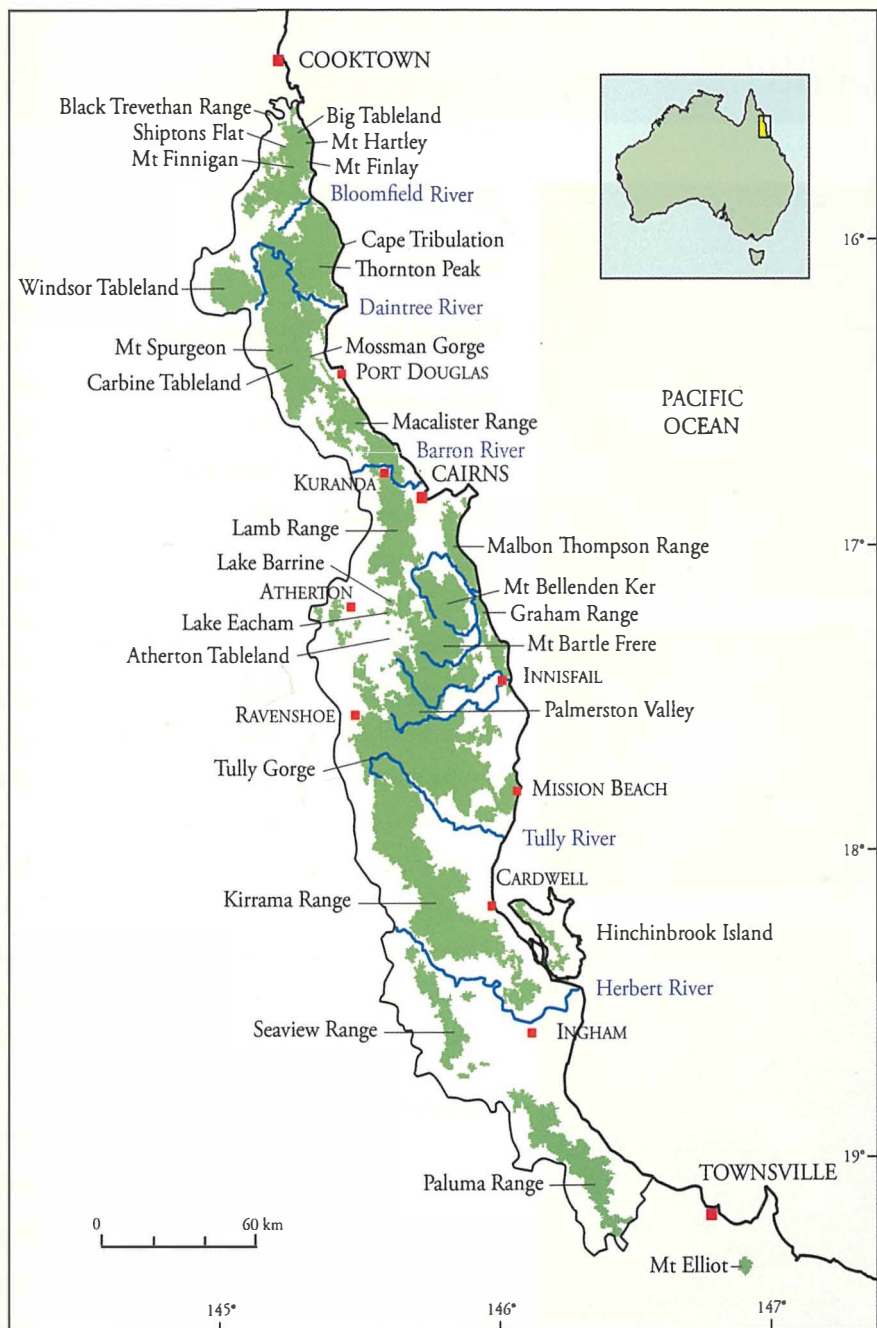
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FRONT COVER: White-lipped Treefrog  
(*Litoria infrafrenata*) - Photo: Steve Williams.

ABOVE: Northern Orange-eyed Treefrog  
(*Litoria xanthomeria*) - Photo: Mike Trenerry.



Map of the Wet Tropics, showing major areas of rainforest, rivers, the boundary of the Wet Tropics Bioregion, and localities referred to in the text.

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*Litoria rheocola*

Steve Richards



*Nyctimystes dayi*

Steve Richards



*Taudactylus rheophilus*

Mike Trenerry

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**NARROW-MOUTHED  
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Ant Backer

*Cophixalus saxatilis*

Mike Trenerry

*Rana daemeli*

Megan Higgie

# Introduction

This field guide summarises current knowledge on the rainforest frogs of the Wet Tropics region of north eastern Queensland. The Wet Tropics is a narrow, reasonably continuous band of rainforest running 450 km north to south between Cooktown and Townsville and extending up to 85 km inland from the coast.

The rainforest of the Wet Tropics is of outstanding biological interest and harbours a particularly diverse frog fauna. This book covers all 33 frog species restricted to, or commonly found in, rainforest habitat in the Wet Tropics. This area of rainforest has long been isolated from rainforest to the north and south by dry barriers and, as a result, 27 of the species covered in this book are found only in (i.e. are endemic to) the Wet Tropics. Rainforest habitat in the Wet Tropics ranges from the steamy lowlands to the cool, misty mountaintops of Queensland's highest mountains, and to the peripheral fragments growing amongst boulder fields. Several of the rainforest species included in this book can also be found in wet sclerophyll forest and other moist habitat types (e.g. swamps, gardens) in the vicinity of rainforest.

Many stream-dwelling frogs underwent alarming declines in the Wet Tropics during the late 1980's and early 1990's. This is part of an ongoing worldwide phenomenon of frog declines, often in apparently pristine environments. The observed declines in stream-dwelling frogs of the Wet Tropics include: the complete disappearance of *Taudactylus acutirostris* and *L. nyakalensis*; a dramatic decline of *Taudactylus rheophilus* and *Litoria lorica* to critically low levels; and the general disappearance of *Litoria nannotis*, *L. rheocola* and *Nyctimystes dayi* from altitudes over 500 m. It is increasingly apparent that 'chytrid' fungus disease has played a major role in these declines and this remains an active area of research.

Over 50% of the rainforest frogs of the Wet Tropics belong to the family Microhylidae. Although the microhylid frogs were not affected by the sudden declines described above, there is increasing concern that they will be heavily impacted by global climate change. Many of the *Cophixalus* species have tiny distributions on one or a few mountaintops. These mountaintops are cool, moist 'islands' surrounded by the hot lowlands. The warmer, drier conditions forecast with global climate change are predicted to lead to rapid reduction in the area of these upland 'islands' on which *Cophixalus* depend. In recognition of these predicted declines within currently small and fragmented distributions, *Cophixalus concinnus* has recently been listed as 'Critically Endangered', *C. mcdonaldi*, *C. monticola* and *C. neglectus* as 'Endangered', and *C. aenigma*, *C. hosmeri* and *C. saxatilis* as 'Vulnerable'.

This book aims to facilitate identification through a key and individual species accounts. We hope this book will help in the rediscovery of populations of the 'missing' frog species as well as in monitoring future declines. The back pages give details on what notes and photos to take and who to contact if you believe you have encountered one of the Critically Endangered or 'missing' frog species, or have found a population of any of the other species beyond its known range.



Rainforest stream (Thornton Peak).

Conrad Hoskin

### The frog families present in the Wet Tropics

#### Hylidae (Treefrogs)

Hylid frogs are found across much of the world but reach their greatest diversity in Central and South America, Australia and New Guinea. Members of this diverse family are found in all habitats throughout Australia. The family includes arboreal, ground dwelling, and burrowing species. Two genera are present in the rainforests of the Wet Tropics, *Litoria* (11 species) and *Nyctimystes* (1 species). Most of the Wet Tropics species are arboreal. The species all breed in streams or isolated pools and have an aquatic tadpole stage. The tadpoles of several stream-dwelling species (*Nyctimystes dayi*, *Litoria nannotis*, *L. rheocola*, *L. nyakalensis*, and probably *L. lorica*) have their mouthparts modified into a large suctional disc which allows them to cling to, and forage on, rocks in the rushing water around cascades. These species are known as the 'torrent frogs' and all have undergone dramatic population declines over the last two decades.



Tadpole of *Litoria rheocola*, showing suctional mouth disc.

J-M Hero



### Myobatrachidae (Southern Frogs)

Myobatrachid frogs are restricted to Australia and New Guinea. They are the most diverse frog family in Australia and occupy all habitats across the continent. Most species are ground dwellers. While several genera and a diverse array of species occupy the drier habitat types in the Wet Tropics, only five species, belonging to two genera (*Mixophyes* and *Taudactylus*), occur in the rainforest. The three *Mixophyes* species are large ground dwelling species that breed in streams, producing the very large, dark tadpoles commonly seen in rainforest stream pools. The loud 'wark' or 'worg' call of these species is a common rainforest sound at night. The two *Taudactylus* species are small, cryptic frogs found along small streams and associated seepage areas. The *Taudactylus* have undergone dramatic population declines over the last two decades.



*Mixophyes coggeri* eggs laid on rock overhanging stream.

Conrad Hoskin

### Microhylidae (Narrow-mouthed Frogs)

A worldwide (primarily tropical) family of frogs, which only occur in Australia in northern Queensland and on the northern tip of the Northern Territory. There is high diversity in the Wet Tropics region: 14 species (11 *Cophixalus* and 3 *Austrochaperina*). All 14 species are endemic to the Wet Tropics region and are found in rainforest or neighbouring wet sclerophyll forest or boulder fields. Microhylid frogs account for over 50% of the frog diversity in the Wet Tropics rainforest. Most species are restricted to one or a few neighbouring mountaintops and only a few species have broad geographical or altitudinal distributions. Most sites have just one species of *Cophixalus* and *Austrochaperina*; however, a few areas have several microhylid species (e.g. six on the Carbine Tableland and five on the Mt Bellenden Ker Range).

All the Wet Tropics microhylid frogs are small to very small in size and include Australia's smallest frog species – adults of several species can be just 11 mm!

All species lead cryptic lifestyles amongst leaf-litter, logs, rocks and low vegetation. Generally, microhylid frogs are only located when males call in the summer wet season (October-March) in response to rain. All are terrestrial breeders with direct development. Large (3-5 mm) unpigmented eggs (joined in a string by a strong mucilaginous cord) are laid in a sheltered place on land (e.g. amongst leaf-litter, logs, rocks or palm axils). There is no free-swimming tadpole stage and fully developed froglets emerge from the eggs. Egg clutches are almost always attended (and often straddled) by an adult male, who may attend up to three clutches at one time. The reason for this is unclear but the adult may be protecting the eggs from invertebrate predators, desiccation and/or fungal attack. The froglets (approx. 4 mm) appear to have little interaction with the adult frog and leave the nest area shortly after hatching.



Terrestrial egg clutch typical of Australian microhylid frogs (*Cophixalus ornatus*).

Conrad Hoskin

### **Ranidae (True Frogs)**

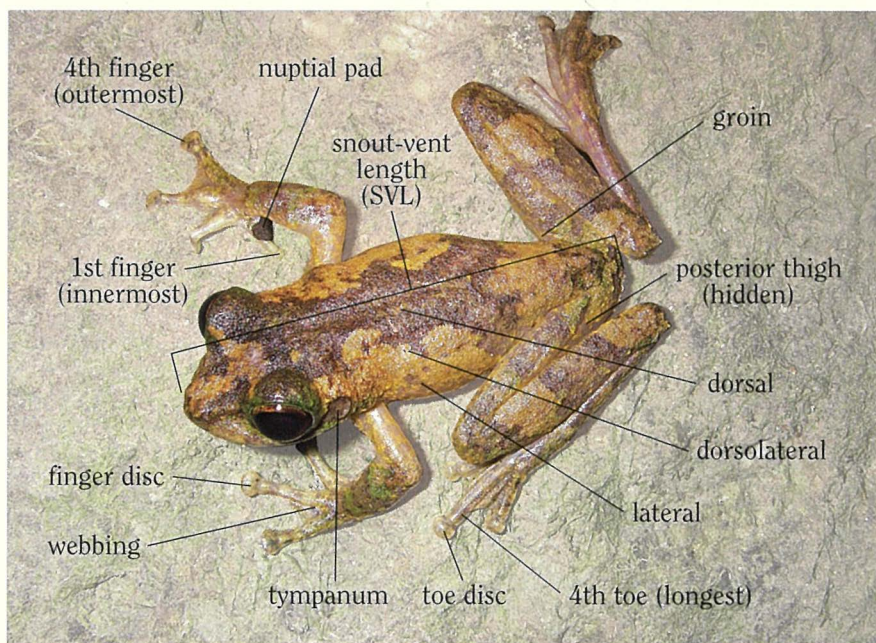
A worldwide family with just one species in Australia, the Wood Frog *Rana daemeli*. This species is found in lowland habitats in northern Queensland and north-east Northern Territory, and also in New Guinea. It is probable that this species colonised Australia from the north during a period of land connection across the Torres Strait.

### **Bufoidea (Toads)**

A worldwide family represented in Australia by just one introduced species, the Cane Toad *Bufo marinus*. A native of Central and South America, the cane toad was first introduced into Australia in 1935 around Cairns, Gordonvale and Innisfail. The Cane Toad rapidly established itself and is now abundant in all habitats in eastern and northern Queensland, and is still spreading across northern Australia and northern New South Wales.

## The key and species accounts

The key and species accounts refer primarily to adult frogs, particularly calling males, which are the most frequently encountered frogs. Males are the easiest to identify because even species which look very similar (e.g. microhylid frogs) usually have obviously different calls. Some sections of the key require callipers or a ruler, and magnification using a hand-lens, microscope, or digital camera. Some species are included twice in the key to allow for difficulty in scoring characters or determining the appropriate size (SVL) category. The microhylid frog section of the key is extracted from Hoskin (2008) with permission from the Queensland Museum. The species accounts are summarised from published literature, supplemented with our observations. Particularly useful sources for identification are: Barker *et al.* 1995; Cogger 2000; Cunningham 2002; Hoskin 2004, 2007, 2008; Mahony *et al.* 2006; McDonald 2000; Zweifel 1985. A list of references pertaining to Wet Tropics frogs is included at the back. The 'Status' of each species is the listing it has under the international IUCN 2001 criteria (following the Global Amphibian Assessment 2004), ranging from currently secure categories (Least Concern, Near Threatened) to those threatened with extinction (Vulnerable, Endangered, Critically Endangered). 'Distribution' covers the known range of the species. 'Habitat and Habits' outlines where the species will most likely be found and their basic behaviour. 'Call' is a verbal description of the call. Calls for most species can be heard on the CD 'Australian Frog Calls: Tropical North-east' (Stewart 1998). The breeding biology of each species is described, and includes details for identifying tadpoles where available. Technical terms used in the text are defined in a glossary at the back.



*Litoria serrata*

Steve Williams