

Conservation of reptiles and frogs in Western Australia

Andrew Burbidge¹ and Gordon Wyre²

¹Department of Conservation and Land Management, Western Australia, Western Australian Threatened Species and Communities Unit, P.O. Box 51, Wanneroo, WA 6065

²Department of Conservation and Land Management, Western Australia, Wildlife Branch, P.O. Box 104, Como, WA 6153

ABSTRACT

Western Australia has a rich and diverse reptile fauna of 519 named species as well as 78 named species of frogs: both groups include many endemics. The Western Australian Wildlife Conservation Act 1950, which is administered by the Department of Conservation and Land Management, protects all reptiles and amphibians and allows for protected fauna to be taken under licence. Reptiles and frogs may be permitted to be taken from the wild and/or kept for scientific research, educational purposes, limited private study and venom supply, but not as pets or for hobby purposes. No private ownership of, or trade in, reptiles or frogs for pets is permitted. Seven species of reptiles and two of frogs are declared under the Act as "threatened", while a total of 26 lizard, 8 snake and 5 frog taxa are listed as Reserve List Fauna and five species of reptiles are declared to be "specially protected".

PROTECTION OF REPTILES AND AMPHIBIANS

Western Australia has a rich and diverse reptile fauna (Table 1) of 519 named species, including many endemics. There are 78 named species of frogs, which also include many endemics (CALM checklist, J. Rolfe, pers. comm.).

The Western Australian Wildlife Conservation Act 1950 (formerly the Fauna Conservation Act 1950), which is administered by the Department of Conservation and Land Management (CALM), protects all reptiles and amphibians. Reptiles and amphibians were included as protected fauna at the time of proclamation of the Fauna Conservation Act in July 1952, but with the exception of 12 species (6 pythons and 6 lizards), were declared to be unprotected by Ministerial Notice until June 1958. At that time all reptiles and frogs other than poisonous snakes were declared to be protected fauna. The current situation is that all reptiles and amphibians are protected fauna under Section 14(1) of the Wildlife Conservation Act, but an "open season" has been declared since 22 June 1984 under Section 14(2)(a) permitting taking of 15 species of venomous terrestrial snakes and all sea snakes where they constitute "an immediate danger to human life, farm stock or domestic animals."

The Wildlife Conservation Act and Wildlife Conservation Regulations allow for protected fauna (including reptiles and amphibians) to be taken under licence. The following licences, prescribed by Regulation, are relevant:

Regulation 4 — Licence to take dangerous fauna;

Regulation 14 — Licence to farm and breed fauna for sale and commercial display;

Regulation 15 — Licence to take fauna for educational or public purposes;

Regulation 16 — Licence to keep fauna for educational or public purposes;

Regulation 17 — Licence to take fauna for scientific purposes;

Regulation 18 — Licence to export fauna; and

Regulation 19 — Licence to import Australian fauna.

TAKING AND KEEPING PROTECTED SPECIES

CALM Policy Statement No. 22 (CALM 1992) covers the taking, keeping and display of live reptiles. The objective of this policy statement is "To assist in the protection and conservation of reptiles in the wild throughout Western Australia by restricting and controlling their taking, keeping and display."

Essentially, the policy provides that reptiles may be permitted to be taken from the wild and/or kept for scientific research, educational purposes, limited private study and venom supply, but not as pets or for hobby purposes. No private ownership of, or trade in, reptiles for pets is permitted. Persons who own reptiles as pets in other States are not permitted to import them into Western Australia if they move their place of residence.

Table 1. Number of described species of reptiles and amphibians recorded from Western Australia.

Family	No. of species
Leptodactylidae	53
Hylidae	25
Cheloniidae	5
Dermochelidae	1
Chelidae	6
Gekkonidae	58
Pygopodidae	23
Agamidae	49
Scincidae	175
Varanidae	19
Typhlopidae	19
Boidae	9
Acrochordidae	1
Homalopsidae	3
Colubridae	3
Elapidae	46
Hydrophiidae	22
Crocodylidae	2

Scientific research involving reptiles may be permitted where the persons involved hold "recognized scientific qualifications and/or experience and (have) an association with recognized scientific institutions." Taking and holding reptiles for educational purposes includes public displays to demonstrate the diversity of reptile species, their ecology, and the difference between venomous and non-venomous species. Schools may also hold some species of reptiles for educational studies.

Licences for private study of reptiles may be issued under Regulations 15 and 16 to persons where CALM determines that their proposed study will add to the knowledge of the biology of reptiles and these persons can demonstrate an ability to care for and study the species concerned. Prior to the 1992 revision of the reptile policy there were no provisions for private reptile study. The current policy was endorsed in November 1992, but as yet no private study licences have been issued. However, applications have been received and are being considered, and it is expected that some licences will be issued in the near future.

Details of scientific licences involving surveys for reptiles as a component of general survey work, or for taking of specific reptile species are not available at short notice. As at 30 June 1993, there were six Regulation 16 licences covering the keeping of reptiles for educational displays involving a total of 32 snakes (nine taxa).

While no private keeping of reptiles for hobby purposes is permitted, persons wishing to handle snakes and lizards may be licensed to perform voluntary services, such as relocating snakes from suburban homes and gardens into

nearby bushland or reserves. Persons undertaking these activities are licensed under Regulation 4. On 30 June 1993, a total of 11 persons held these licences on an annual basis.

In addition to the provisions covering taking and keeping snakes and lizards, CALM also has responsibility for managing Saltwater and Freshwater Crocodiles in Western Australia. Both species are specially protected under Section 14(2)(ba) of the Wildlife Conservation Act (see below). CALM administers a management programme covering both species, which provides for crocodile farming (ranching and captive breeding), crocodile protection and problem crocodile control. On 30 June 1993 there were three crocodile farms approved to operate under Regulation 14 and they held approximately 3 000 Saltwater Crocodiles and approximately 1 900 Freshwater Crocodiles.

THREATENED SPECIES

Section 14 (2)(ba) of the Wildlife Conservation Act allows the declaration of protected fauna as "fauna which is likely to become extinct or is rare or otherwise in need of special protection." Taxa that meet the requirements for declaration as "likely to become extinct or . . . rare" are referred to in CALM Policy Statement 33 (CALM 1991) as "threatened fauna".

CALM Policy Statement 33 states that:

"A taxon may be recommended for declaration as threatened fauna by the [Department's] Threatened Fauna Scientific Advisory Committee if it satisfies the following criteria:

- (i) The taxon is part of the indigenous fauna of Australia or its external territories, and is well-defined in the taxonomic literature or, in the case of an undescribed or poorly defined taxon, it is represented by a voucher specimen in a State or National Museum or some other collection recognized by the Western Australian Museum as a proper repository for taxonomic material. It need not necessarily be formally described under conventions in the International Code of Zoological Nomenclature, but such a description is preferred and should be undertaken as soon as possible after listing on the schedule.
- (ii) It has been established that the taxon in the wild is either:
 - (a) presumed to be extinct;

- (b) in imminent danger of or threatened with extinction, i.e., it is likely to decrease in numbers and possibly become extinct if factors causing its decline continue to operate (includes taxa whose numbers have been reduced to a critically low level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction, and taxa that are not yet rare but are under threat from serious adverse factors throughout their range);
- (c) dependent on or restricted to habitats that are vulnerable and/or subject to factors that may cause its decline; or
- (d) very uncommon, even if widespread.

“Taxa may be recommended by the Committee if it believes that they meet one or more of the above criteria, even if insufficient information exists to accurately establish their status at the time.” (Section 3.)

Lists of such species are published from time to time by Ministerial Notice in the Western Australian *Government Gazette*. The most recent Notice was on 16 November 1990 and reptile and frog taxa listed at that time are given in Table 2. The lists are reviewed at least every three years by the Threatened Fauna Scientific Advisory Committee, which is made up of CALM scientists and managers as well as scientists from the Western Australian Museum, other institutions and the voluntary conservation movement.

Declaration under Section 14(2)(ba) increases the maximum penalty for illegally “taking” a species from the standard maximum of \$4,000 to \$10,000. The Act states “to take in relation to any fauna, includes to kill or capture any fauna by any means or to disturb or molest any fauna by any means or to use any method whatsoever to hunt or kill any fauna whether this results in killing or capturing any fauna or not; and also includes every attempt to take fauna and every act of assistance to another person to take fauna and derivatives and inflections have corresponding meaning,” (Section 6(1).)

A draft Wildlife Conservation Bill to repeal and replace the Wildlife Conservation Act 1950 has been prepared and released for public comment. The bill includes provisions for increased protection of threatened fauna.

Two species of Western Australian reptiles, the Western Swamp Tortoise *Pseudemysdura umbrina* and the Lancelin Island Skink *Ctenotus*

Table 2. Threatened Western Australian reptiles and frogs.

REPTILES	
Dermochelyidae	<i>Dermochelys coriacea</i> , Leatherly Turtle or Luth
Chelidae	<i>Pseudemysdura umbrina</i> , Western Swamp Tortoise
Agamidae	<i>Ctenophorus yinnietharra</i> , Yinnietharra Rock-dragon
Scincidae	<i>Ctenotus angusticeps</i> , Airlie Island Ctenotus <i>Ctenotus lancelini</i> , Lancelin Island Skink <i>Egernia stokesii aethiops</i> , Baudin Island Spiny-tailed Skink
Boidae	<i>Morelia carinata</i> , Rough-scaled Python
FROGS	
Leptodactylidae	<i>Geocrinia alba</i> , White-bellied Frog <i>Geocrinia vitellina</i> , Yellow-bellied Frog

lancelini, meet the criteria for the draft World Conservation Union (IUCN) Red List category “Critical” (Mace and Lande 1991, Mace *et al.* 1992). The former meets Mace *et al.* criterion A (population estimated to number less than 50 mature individuals), while the latter meets criterion C1 (range area estimated to be less than 10 km² and found only at a single location). The Yellow-bellied Frog *Geocrinia vitellina*, may also meet criteria for listing as Critical, being known from only six populations and having a known geographic extent of 6.3 km² and a range area of less than 20 ha; however, this species is currently considered to meet the IUCN category “Vulnerable” because its total range is within State Forest managed by CALM.

Research into the Western Swamp Tortoise commenced in 1963 and the species and its remaining habitat have been managed for many years. Recently a Recovery Plan has been finalized (Burbidge and Kuchling, in press) and is being implemented. The Recovery Plan is fully funded, with money and resources coming from CALM, the Australian Nature Conservation Agency (ANCA), Perth Zoo, The University of Western Australia’s Zoology Department, the Western Australian Water Authority, the World Wide Fund for Nature Australia, two herpetological societies and several corporate sponsors.

Concern for the status of the Lancelin Island Skink is recent (Browne-Cooper and Maryan 1992; Rolfe 1992). Interim Wildlife Management Guidelines for the species have been prepared by CALM and funding has been obtained from CALM and ANCA. Habitat management has commenced and research into the causes of the species’ apparent decline will get underway shortly.

A Recovery Plan for the Yellow-bellied Frog *Geocrinia vitellina* and the closely related White-bellied Frog *G. alba* has been completed. It is funded by CALM and ANCA and is now being implemented. The White-bellied Frog has a very restricted geographic range, with a known geographic extent of 101 km² and a range area of about 1.9 km², over 70 per cent of which is on private land. Thirty of 38 known populations are wholly or partly on private land, and the species is considered to meet the IUCN category "Endangered".

Policy Statement No. 33 provides for a Reserve Species List. It states:

"The Committee also prepares a 'Reserve List' including animal taxa:

- "(a) that have recently been removed from the list of threatened fauna,
- "(b) that have a restricted distribution, are uncommon or are declining in range and/or abundance, but which do not meet the criteria for listing as threatened fauna, and
- "(c) for which there is insufficient information for the Committee to make an assessment of their status."

"The Reserve list is also reviewed at least every three years." (Section 3.)

A total of 26 lizard, 8 snake and 5 frog taxa were listed as Reserve List Fauna in 1993. (Table 3).

SPECIALLY PROTECTED SPECIES

Taxa that meet criteria for "otherwise in need of special protection" are known as "specially protected fauna".

CALM Policy Statement No 33 provides that the Schedule of Specially Protected Fauna is dealt with in a similar way to the Schedule of Threatened Fauna. Criterion (i) for addition to the schedule is the same as that for threatened fauna, while criterion (ii) is as follows:

- "(ii) It has been established that the taxon in the wild is either:
 - "(a) likely to be taken because of high commercial value and the standard penalty for taking is insufficient deterrent, or
 - "(b) uncommon, but not threatened at present, but is either of commercial or intrinsic value or is perceived to be damaging a commercial or hobby enterprise, and taking may lead to the taxon becoming threatened."

Table 3. Western Australian Reserve List reptile and frog species.

REPTILES

Pygopodidae

Aprasia haroldi
Aprasia rostrata

Gekkonidae

Diplodactylus kenneallyi

Agamidae

Diporiphora convergens
Pogona minor minima, Abrolhos Dwarf Bearded Dragon

Scincidae

Ctenotus delli, Dell's Skink
Ctenotus nigrilineatus
Ctenotus youngsoni, Youngson's Skink
Egernia longicauda, Jurien Bay Skink
Egernia stokesii stokesii, Houtman Abrolhos Spiny-tailed Skink
Lerista apoda
Lerista axillaris
Lerista bunglebungle
Lerista christinae
Lerista humphriesi
Lerista quadrivincula
Lerista lineata, Lined Burrowing-skink
Lerista macropisthopus remota
Lerista praefrontalis, Buccaneer Burrowing-Skink
Lerista puncticauda
Lerista robusta
Lerista separanda
Lerista talpina
Lerista viduata
Menetia amaura
Tiliqua rugosa konowi, Rottnest Bobtail

Typhlopidae

Rhamphotyphlops howi
Rhamphotyphlops margaretae
Rhamphotyphlops micromma
Rhamphotyphlops yampiensis, Koolan Blind Snake

Elapidae

Denisonia atriceps, Lake Cronin Snake
Pseudonaja affinis tanneri, Recherche Dugite
Pseudonaja affinis exilis, Rottnest Dugite
Vermicella calonotus, Black-striped Snake

FROGS

Leptodactylidae

Arenophryne rotunda, Sandhill Frog
Heleioporus barycragus
Geocrinia lutea
Uperoleia minima
Uperoleia variegata

Table 4 lists specially protected reptiles. No amphibians are currently specially protected.

Policy Statement No. 22 covers the taking of species declared as threatened or specially protected:

"Applications involving species declared pursuant to Section 14(2)(ba) of the Wildlife Conservation Act to be 'fauna likely to become extinct, or is rare' will be approved only in special cases and where there is a conservation benefit. Applications involving species declared to be 'fauna which is otherwise in need of special protection' will be considered on a case by case basis. (Section 4.3.2.)"

Table 4. Specially protected Western Australian reptiles and frogs.

REPTILES

Crocodylidae

Crocodylus porosus, Saltwater Crocodile

Crocodylus johnstoni, Australian Freshwater Crocodile

Boidae

Aspidites ramsayi, Woma or Ramsay's Python

Morelia spilota imbricata, Carpet Python

Morelia olivacea barroni, Pilbara Olive Python

ACKNOWLEDGEMENTS

We thank Jim Rolfe for providing Table 1 and Keiran McNamara, who provided useful comments on a draft of this paper.

REFERENCES

BURBIDGE, A. A. AND KUCHLING, G. (in press). Recovery Plan for the Western Swamp Tortoise *Pseudemydura umbrina*. Western Australian Wildlife Management Program No. 11. Department of Conservation and Land Management, Perth.

BROWNE-COOPER, R. AND MARYAN, B., 1992. Notes on the status of the skink lizard *Ctenotus lanceolini*, on Lancelin Island. *Western Australian Naturalist* 19: 63–65.

CALM, 1991. Policy Statement No. 33. Conservation of Endangered and specially protected fauna in the wild. December 1991.

CALM, 1992. Policy Statement No. 22. Taking, keeping and display of live reptiles. November 1992.

MACE, G. M. AND LANDE, R., 1991. Assessing extinction threats: towards a re-evaluation of IUCN threatened species categories. *Conservation Biology* 5: 148–57.

MACE, G., COLLAR, N., COOKE, J., GASTON, K., GINSBERG, J., LEADER-WILLIAMS, N., MAUNDER, M. AND MILNER-GULLAND, E. J., 1992. The development of new criteria for listing species on the IUCN Red List. Species No. 19, pp. 16–22.

ROLFE, J. K., 1993. Report to the Western Australian Threatened Species and Communities Unit on a survey to determine the current status of the Lancelin Island Skink *Ctenotus lanceolini* (Ford 1969). Unpublished report, Department of Conservation and Land Management, Perth.

BOOK REVIEW

“Snakes of Australia — Dangerous and Harmless”

Peter Mirtschin and Richard Davis

Hill of Content Publishing, Melbourne,
Victoria

Recommended retail price: \$24.95

Peter Mirtschin is an enthusiastic and dedicated herpetologist with a true passion for the animals that hold his main interest — snakes. This enthusiasm is evident when the reader picks up Peter's new book — I say new; really it is a product of, and a development from, his first book, also written with the help of Richard Davis, entitled *Dangerous Snakes of Australia*, published in 1982. This earlier book has now been expanded to include the other members of the Australian snake fauna, pythons, colubrids, blind snakes, file snakes and sea snakes. That the senior author is primarily concerned with members of the family Elapidae (front-fanged, venomous land snakes) is quickly gathered; treatments of other snake groups are more perfunctory, and, in the case of the blind snakes (family Typhlopidae) reduced to covering only four of the 30 species found in Australia.

Peter Mirtschin is the senior author and, as a herpetologist, is responsible for the majority of the content and its scientific accuracy. Richard Davis's expertise on medical and clinical aspects of snake bite has materially improved those relevant parts of the text. The book methodically treats all the groups of the Australian snake fauna — the Boidae, Elapidae, Hydrophiidae, Laticaudidae, Colubridae, Acrochordidae and Typhlopidae in turn, with individual descriptions, a distribution map and photograph complementing the text (with the proviso for the

blind snakes mentioned earlier). Chapters on Snakes and people in Australia, Identification, First aid for snake bite, Conservation and Further Reading complete the book. Indexes for common and scientific names and a glossary are usefully included.

The photographs chosen for the book are mostly Peter Mirtschin's and again illustrate his many talents. Their clarity and good contrast will aid the reader in identifications. A small criticism is that on many pages throughout the book large expanses of white paper occur. How much better it would have been to use this valuable space by enlarging the photographs.

The book has a nice balance to it and is of a size (13 × 19 cm) that will endear it to users in the field. However, books that purport to be scientific treatments and desire to be listed as reference sources must, wherever possible, be error-free and as accurate as the author can ensure. “As the author can ensure” is often difficult, for it is usually left to the resources of the publisher to “dot the i's and cross the t's”.

More rigorous editing and checking would have eliminated many errors that I found in the text. As a scientific editor it is often difficult to divorce oneself from “over enthusiastic” reading of scientific works, but I feel that such books should be able to sustain this checking process. It is not my intent to make a list of errors which would only serve to devalue the book and this is not my aim. Suffice to draw the reader's attention to several. On pages 15 and 72 we read *Morelia spilotes* while the correct *Morelia spilota* is on page 29. On page 92 we learn that *Pseudechis butleri* is “either nocturnal or diurnal”. Does this mean that the author is unsure or can the snake exhibit both chronological patterns? Statements without scientific support or references are common, for example on page 61 “Its bite has been reported as producing severe symptoms.”; on page 90 “The authors record

that populations . . .”, “Scientific evidence on chromosomes . . .”. Where are the sources for these statements?

Distribution maps are essential in field guides and in general in this book are as accurate as the authors can make them. In my copy of the book, at least, maps on pages 54, 102 and 112 have white spaces included in the black distribution area; I doubt that, at the scale chosen, these white areas indicate mini areas where the species is not believed to occur. Tasmania is incorrectly excluded from the map for the Copperhead on page 37, no distribution map is included for *Glyphodon barnardi* on page 66 and the maps for *Uroechis dwyeri* (p. 123) and *Uroechis flagellum* (p. 124) are transposed.

The authors dabble with various nomenclatures for the scientific names of the species. The use of Storr's interpretation of the genus *Rhinoplocephalus* for several species is incorporated by adding this name in parentheses after a more conservative and traditionally recognized genus is given (see pages 123, 124, etc.) No references to Storr's taxonomic revisions of several of the elapid genera are included (an extreme example is Storr's placement of the Bardick *Echiopsis curta* into the Tiger Snake genus *Notechis*! — fortunately not taken up by the authors). I think that a small chapter, or section, explaining the current dilemmas in herpetological nomenclature in Australia would have been welcome and overcome this apparent confusion.

It is when we come to reading about the lethality of snake venoms that I think a few explanations are necessary to assist the reader. Research undertaken by scientists at The Commonwealth Serum Laboratories and elsewhere on the toxicity of snake venoms is often misconstrued and quoted out of context. To say that a venom is 5× as toxic as that of the Indian Cobra is fair enough, as long as we remember that these tests are conducted on laboratory mice (it takes the reader until page 86 to learn this) and as such should be viewed with caution when drawing analogies to the human species. I got quite confused reading about the various lethality of the species' venoms, especially on page 85, where it is stated that venom from the Common Tiger Snake is less toxic

than for the related species *Notechis ater ater*, *ater occidentalis* and *ater niger*, being 4.3× more toxic than the Indian Cobra. Yet on page 83 *Notechis ater occidentalis* is listed as being only 4× more toxic than the Indian Cobra. I think a table listing the various toxicities would have been helpful here.

Several small, albeit annoying, errors diminish the value of this book only slightly. On page 37 it is stated that the Copperhead *Austrelaps superbus* “has the lowest tolerance for cool temperatures . . .” rather than the correct “has the highest tolerance for cool temperatures”. No scale counts are given for *Demansia psammophis* and its subspecies on page 49. There are many spelling errors in scientific names, for example *Lampropholis* (p. 41), *Anas superciliosa* (p. 78), *Mus musculus* (p. 79), *Stegonotus parvis* (p. 198). Latin names, especially for taxa that the reader has not encountered before in the text, should not be abbreviated, for example *E. camaldulensis* and *E. cladocalyx* for *Eucalyptus* on page 77.

The chapter on conservation is interesting and pertinent. I think the point Peter Mirtschin makes about the too many overzealous bureaucratic agencies in charge of wildlife standing in the way of true conservation is timely. Unfortunately it is unlikely to be taken up as a model for the future — after all which State authorities would bow to a greater God?

I have dwelt on the errors in this book only to emphasize how they can detract a little from an otherwise excellent publication. For books to be referenced as scientific texts they must withstand the rigours of close editing and checking and it is a pity that this otherwise fine book has not. I do not think that this book will suffer from these constructive criticisms — rather I hope that it will benefit and move forward. It will stand as a useful and valuable addition to the library of all herpetologists and people interested in our unique snake fauna and I recommend it. It contains 216 pages and is affordable at \$24.95 at all good book shops.

Richard Longmore

This review first appeared in the Newsletter of the ACT Herpetological Association August-September 1992.